Town of Paradise Valley

6401 E Lincoln Dr
Paradise Valley, AZ 85253

Meeting Notice and Agenda

Town Council

Mayor Mark Stanton
Vice Mayor Ellen Andeen-Keller
Councilmember Christine Labelle
Councilmember Karen Liepmann
Councilmember Scott Moore
Councilmember Julie Pace
Councilmember Anna Thomasson

Thursday, November 13, 2025 **3:00 PM** **Council Chambers**

1. CALL TO ORDER / ROLL CALL

Notice is hereby given that members of the Town Council will attend either in person or by electronic conference system, pursuant to A.R.S. §38-431(4).

2. STUDY SESSION ITEMS - IMMEDIATELY FOLLOWING THE EXECUTIVE SESSION

The Study Session is open to the public for viewing, and the following items are scheduled for discussion among the Council, Staff, and their designees. The Town Council will be briefed by staff and other Town representatives. There will be no votes and no final action taken on discussion items. The Council may give direction to staff and request that items be scheduled for consideration and final action at a later date. The order of discussion items and the estimated time scheduled to hear each item are subject to change.

25-247 **Discussion of Proposed Amendments for Administrative Review on Certain Plat Applications**
45 Minutes

Staff Contact: Chad Weaver, 480-348-3522

25-234 **Discussion of Sanitary Sewer Manhole Inventory Update**
30 Minutes

Staff Contact: Sam Kayat, 480-348-3541

25-257 **Discussion of Employee Handbook Updates**
15 Minutes

Staff Contact: Gina Monger, 480-348-3542

3. EXECUTIVE SESSION

25-249 **Discussion of Town Attorney mid-year performance check in as authorized by A.R.S. §38-431.03(A)(1).**

25-256 **Discussion or consultation with the Town Attorney in order to consider the Town Council's position and instruct the Town Attorney regarding the Town's position regarding contracts that are subject to pending or contemplated litigation or in settlement discussions conducted in order to avoid or resolve litigation related to Five Star Development project as authorized by A.R.S. §38-431.03(A)(4); and discussion and consultation with the Town Attorney for legal advice regarding the development agreement and associated agreements with Five Star Development as authorized by A.R.S. §38-431.03(A)(3).**

25-250 **The Town Council may go into executive session at one or more times during the meeting as needed to confer with the Town Attorney for legal advice regarding any of the items listed on the agenda as authorized by A.R.S. §38-431.03(A)(3).**

4. BREAK

5. RECONVENE FOR REGULAR MEETING 6:00 PM

6. ROLL CALL

7. PLEDGE OF ALLEGIANCE*

8. PRESENTATIONS*

9. CALL TO THE PUBLIC

Citizens may address the Council on any matter not on the agenda or any item on the Study Session (Section 3 on the agenda). In conformance with Open Meeting Laws, Council may not discuss or take action on this matter at this Council meeting, but may respond to criticism, ask that staff review a matter raised, or ask that it be placed on a future agenda. Those making comments shall limit their remarks to three (3) minutes. Please fill out a Speaker Request form prior to addressing the Council.

10. CONSENT AGENDA

All items on the Consent Agenda are considered by the Town Council to be routine and will be enacted by a single motion. There will be no separate discussion of these items. If a member of the Council or public desires discussion on any item it will be removed from the Consent Agenda and considered separately. Please fill out a Speaker Request form prior to the start of the meeting and indicate which item you would like to address.

25-251 **Town Council Minutes October 23, 2025**

25-253 **Discussion and Possible Action to Adopt Resolution 2025-12 Approving the 2026 Legislative Agenda**

Recommendation: Adopt Resolution 2025-12.

Staff Contact: Amy Rebenar, Andrew Ching, 480-348-3690

25-258 **Discussion and Possible Action to Authorize Acceptance of Two Governor's Office of Highway Safety Grants**

Recommendation: Authorize the Town Manager to accept two Governor's Office of Highway Safety Grants in the total amount of $16,000 for overtime costs associated with DUI and traffic safety enforcement.

Staff Contact: Freeman Carney, 480-948-7418

25-261 **Discussion and Possible Action to Authorize the Town Manager to Execute a Contract for Phase II Sanitary Sewer Manhole Locating Services**

Recommendation: Authorize Town manager to execute contract No. CON-26-018-ENG with Michael Baker International for amount not to exceed $101,163 for phase II of sanitary sewer manhole locating services.

Staff Contact: Sam Kayat, 480-348-3541

11. PUBLIC HEARINGS

The Town Council may hear public comments and take action on any of these items. Citizens may address the Council regarding any or all of these items. Those making comments are limited to three (3) minutes. Speakers may not yield their time to others. Please fill out a Speaker Request form prior to the start of the meeting and indicate which item you would like to address.

12. ACTION ITEMS

The Town Council May Take Action on This Item. Citizens may address the Council regarding any or all of these items. Those making comments are limited to three (3) minutes. Speakers may not yield their time to others. Please fill out a Speaker Request form prior to the start of the meeting and indicate which item you would like to address.

25-260 **Discussion and Possible Action to Adopt the Town of Paradise Valley Stormwater Master Plan**

Recommendation: Adopt the Town of Paradise Valley Stormwater Master Plan.

Staff Contact: Shar Johnson, 480-348-3573

13. FUTURE AGENDA ITEMS

The Town Council May Take Action on This Item. The Mayor or Town Manager will present the long range meeting agenda schedule and announce major topics for the following meeting. Any member of the Council may move to have the Town Manager add a new agenda item to a future agenda. Upon concurrence of four more Members, which may include the Mayor, the item shall be added to the list of future agenda items and scheduled by the Town Manager as a future agenda item within 60 days, or longer with Council approval.

25-252 **Consideration of Requests for Future Agenda Items**

Recommendation: Review the current list of pending agenda topics.

Staff Contact: Town Manager, 480-348-3690

14. MAYOR / COUNCIL / MANAGER COMMENTS

The Mayor, Council or Town Manager may provide a summary of current events. In conformance with Open Meeting Laws, Council may not have discussion or take action at this Council meeting on any matter discussed during the summary.

15. ADJOURN

AGENDA IS SUBJECT TO CHANGE

**Notice is hereby given that pursuant to A.R.S. §1-602.A.9, subject to certain specified statutory exceptions, parents have a right to consent before the State or any of its political subdivisions make a video or audio recording of a minor child. Meetings of the Town Council are audio and/or video recorded, and, as a result, proceedings in which children are present may be subject to such recording. Parents in order to exercise their rights may either file written consent with the Town Clerk to such recording, or take personal action to ensure that their child or children are not present when a recording may be made. If a child is present at the time a recording is made, the Town will assume that the rights afforded parents pursuant to A.R.S. §1-602.A.9 have been waived.*

The Town of Paradise Valley endeavors to make all public meetings accessible to persons with disabilities. With 72 hours advance notice, special assistance can also be provided for disabled persons at public meetings. Please call 480-948-7411 (voice) or 480-483-1811 (TDD) to request accommodation to participate in the Town Council meeting.

Town of Paradise Valley

6401 E Lincoln Dr
Paradise Valley, AZ 85253

Action Report

File #: 25-247

AGENDA TITLE:
Proposed amendments for Administrative Review on Certain Plat Applications

STAFF CONTACT:

TOWN
Of
PARADISE VALLEY

STAFF REPORT

TO: **Mayor Stanton & Town Council Members**

FROM: **Andrew Ching, Town Manager**
Chad Weaver, Community Development Director
Paul Michaud, Planning Manager

DATE: **November 13, 2025**

DEPARTMENT: **Community Development Department**
Chad Weaver, 480-348-3522

AGENDA TITLE: **Proposed amendments for Administrative Review on Certain Plat Applications**

REQUEST

Proposed amendments to Article 2-5 (Committees and Commissions), Section 2-5-2 (Planning Commission), of the Town Code and Chapter 6, Subdivisions, of the Town Code that will allow for the administrative review of certain plat applications in accordance with current State of Arizona legislation along with correcting any technical and other conforming changes.

BACKGROUND

In 2025, the Legislature of the State of Arizona passed House Bill 2447 (Attachment B). This legislation requires (compared to the previous 'may' language) municipal legislative bodies to authorize administrative personnel to review and approve site plans, development plans, land divisions, lot line adjustments, and plat amendments, and to review and approve design review plans based on objective standards, without a public hearing. Also, it allows municipalities to adopt a self-certification program for registered architects and professional engineers, allowing them to be responsible for compliance with ordinances and construction standards. This legislation becomes effective on January 1, 2026. As such, municipalities across Arizona have been evaluating and amending their codes and/or policies in advance of the December 31st deadline.

The Town Council has been updated on this legislation during the process by the Town Manager and Town Attorney. Town Council discussed this legislation and general direction at an executive session on September 11, 2025. Based on this discussion, Town staff drafted the attached proposed amendments related to certain plat applications via draft Ordinance 2025-05 (Attachment D). The full code text is shown for reference but the final ordinance will use the adoption-by-reference process whereby the ordinance will only show the changed sections.

PLANNING COMMISSION DISCUSSION

Unlike text amendments to the Zoning Ordinance, a text amendment to the Town Code provisions only requires Town Council review and action. However, due to the nature of the changes within the subdivision regulations of the Town Code, the Planning Commission provided input at their November 4th meeting. Overall, the Planning Commission was agreeable with the proposed amendments. There was discussion regarding the Non-Administrative Land Modification process for a lot split on a site under 2.5-net acres (which is a Planning Commission approval process) be appealable to the Town Council instead of directly moving to the Town Council if denied. However, after discussion, the current process with a direct route to the Town Council on a denial was seen to be the most expeditious and likely route an applicant would take. The other discussion point related to allowing for some latitude on compliance to the side lot lines at 90 degrees. The proposed text adds the term "nearly" 90 degrees which a few Planning Commission Members expressed the need to quantify but were agreeable that in certain instances it may make sense to not apply an exact 90-degree side lot line based on the site characteristics. Alternatively, an option exists to leave the text as 90 degrees. There was a suggestion to apply a staff approval and 7-day review process by the Planning Commission should there be a request for a side lot line other than the 90 degrees as this streamlines the process for this modification compared to the full Planning Commission and Town Council review and provides another look.

TEXT AMENDMENT CHANGES

The general approach for the proposed text amendment is that the Town processes related to site plans, development plans, land divisions, lot line adjustments, and plat amendments are already administrative. However, draft Ordinance 2025-05 is an opportunity to clarify and further define the administrative process. The current processing remains the same (including preliminary plat, replat, easement or right-of-way abandonment, and administrative land modification). The changes are on final plat with some changes to the non-administrative land modification process. This is outlined in the Land Modification Process Table (Attachment C) with the changes summarized below.

- Correct Section 6-2-3 by removing the word "final plat" under Section 6-2-3 as the Planning Commission is not the approver of a final plat (which is the current code). This section covers time limits on Planning Commission action.
- Add a definition for "Staff".
- Modify the final plat/map process from Town Council review and action at a public meeting to a staff approval process with a 7-day Town Council review (like the Managerial Special Use Permit (SUP) and Personal Wireless Service Facility process in the Town) with the Mayor still required to sign the plat/map. This applies to any zoning district (including SUP). Town Council will still review/act on a final plat/map if the Planning Commission rejects the preliminary plat or the plat has a modification of the subdivision standards pursuant to Article 6-8. Indirectly, Planning Commission and Town Council will see the final plat/map if the applicant requests a private road Conditional Use Permit (CUP) and/or the application includes a Special Use Permit for a private roadway gate (as these processes remain the same). Also, the final plat requires a preliminary plat (which the Planning Commission reviews/approves which allows for oversight by more than staff).

- Correct the General Plan reference of the width of all rights-of-way and streets to the Town's Typical Street Cross Sections as this was removed from the 2022 General Plan.
- Allow under Lots that all side lines of lots shall be at nearly right angles to straight street lines as the current wording technically requires a variance/modification process if the property line is not exactly 90 degrees 0 minutes and 0 seconds between the property line and the front setback line.
- Correct the reference regarding lighting under subdivision walls or fences that a lighting plan for safety/security shall be submitted with the Special Use Permit application to with the application as may be required under Article XI, Special Uses And Additional Use Regulations, of the Zoning Ordinance. Article XI covers SUPs, private gate SUPs, and private road CUPs that this type of lighting would be included.
- Correct under hillside provision that private roadways are approved by the private road Conditional Use Permit (which is approved by the Planning Commission and appealable to the Town Council) and not approved by the Town Council. Years back this process was by Special Use Permit that was approved by the Town Council. Also, under public roads, the surface material is noted as decorative pavers or other surface material. However, asphalt is the typical public road standard with decorative surface material allowable by a private road CUP.
- Modify the Non-Administrative Land Modification process for a lot split on a non-SUP property to be approved by a simple majority vote instead of by unanimous vote as this is the only plat action requiring unanimous approval. There is no change with the Planning Commission review and action (appealable to the Town Council) for these lot splits or if not approved the review and approval moves onto the Town Council.
- Modify the Non-Administrative Land Modification process for any plat adjustment on an SUP property (other than preliminary plat, final plat, and replat as the process for these are described separately under Chapter 6 of the Town Code). The process will follow the modified final plat/map process from Town Council review and action at a public meeting to a staff approval process with a 7-day Town Council review. This modification to retain a level of Town Council review is because there is not always an amendment to the SUP with a Non-Administrative Land Modification that warrants Town Council review as an SUP is tailored zoning compared to the Town's residential zoning districts (which the process for these type of plat applications that are not a preliminary plat, final plat, or replat are deemed an Administrative Land Modification reviewed and approved by Town staff).
- No change to the process when any of the plat applications include a deviation from Chapter 6, Article 6-8, Variances and Modifications, which requires Planning Commission review and recommendation followed by Town Council review and action.
- No changes to other ancillary processes that may accompany a plat application. This includes the private road Conditional Use Permit process requiring Planning Commission review and action (appealable to the Town Council), the private gate Special Use Permit process requiring Town Council Statement of Direction, Planning Commission review and recommendation, and Town Council review

and action, and the Special Use Permit amendment process which requires Planning Commission and/or Town Council review.

NEXT STEPS
The Town Council public hearing is tentatively set for December 11th.

ATTACHMENT(S)
A. Staff Report
B. House Bill 2447
C. Land Modification Process Table
D. Draft Ordinance 2025-05
E. Presentation

State of Arizona
House of Representatives
Fifty-seventh Legislature
First Regular Session
2025

HOUSE BILL 2447

AN ACT

AMENDING SECTION 9-500.49, ARIZONA REVISED STATUTES; RELATING TO MUNICIPAL ADMINISTRATIVE REVIEWS.

(TEXT OF BILL BEGINS ON NEXT PAGE)

Be it enacted by the Legislature of the State of Arizona:

Section 1. Section 9-500.49, Arizona Revised Statutes, is amended to read:

9-500.49. Administrative review and approval; self-certification program; expedited approval; definitions

A. Notwithstanding any other law, the legislative body of a city or town ~~may~~ SHALL by ordinance do the following:

1. Authorize administrative personnel to review and approve site plans, development plans, land divisions, lot line adjustments, lot ties, preliminary plats, final plats and plat amendments without a public hearing.

2. Authorize administrative personnel to review and approve design review plans based on objective standards without a public hearing.

~~3. Adopt a self-certification program allowing registered architects and professional engineers to certify and be responsible for compliance with all applicable ordinances and construction standards for projects that the ordinance identifies as being qualified for self-certification.~~

~~4.~~ 3. Allow at-risk submittals for certain on-site preliminary grading and drainage work or infrastructure.

~~5.~~ 4. Allow applicants with a history of compliance with building codes and regulations to be eligible for expedited permit review.

B. NOTWITHSTANDING ANY OTHER LAW, THE LEGISLATIVE BODY OF A CITY OR TOWN MAY BY ORDINANCE ADOPT A SELF-CERTIFICATION PROGRAM ALLOWING REGISTERED ARCHITECTS AND PROFESSIONAL ENGINEERS TO CERTIFY AND BE RESPONSIBLE FOR COMPLIANCE WITH ALL APPLICABLE ORDINANCES AND CONSTRUCTION STANDARDS FOR PROJECTS THAT THE ORDINANCE IDENTIFIES AS BEING QUALIFIED FOR SELF-CERTIFICATION.

~~B.~~ C. Applications for a license pursuant to this section are subject to chapter 7, article 4 of this title.

~~C.~~ D. For the purposes of this section: ~~,~~

1. "LICENSE" HAS THE SAME MEANING PRESCRIBED IN SECTION 9-831.

2. "Objective" means not influenced by personal interpretation, taste or feelings of a municipal employee and verifiable by reference to an adopted benchmark, standard or criterion available and knowable by the applicant or proponent.

Sec. 2. Effective date

This act is effective from and after December 31, 2025.

Date Prepared: October 16, 2025

LAND MODIFICATION PROCESS TABLE *AZHB 2447 Town of Paradise Valley Compliance/Amendment*			
Case Type	***Code Reference***	***Current Process***	***Potential Future Process***

Preliminary Plat
 	
Case Type Abbreviation (PP)
	Town Code:
	• Section 2-5-2(D)
	• Chapter 6, Subdivisions
	  ○ Article 6-1 Definitions
	  ○ Section 6-2-1 Pre-Application
	  ○ Section 6-2-2 Preliminary Plat/Map
	  ○ Article 6-5 Information Required on preliminary plat
	  ○ Article 6-7(A) Special Preliminary Plat Requirements (hillside)
	
	Zoning Ordinance
	  ○ Section 908 Cluster Plans Commission to approve preliminary plat
	
	Notes
	• Design and related standards throughout Chapter 6 apply to all types of land modifications (including plats)
	• Typically, a private road Conditional Use Permit (CUP) approved by Commission and appealable to Council runs with the plat (The CUP is administrative via public meeting and typically occurs at the preliminary plat stage, but could occur at the final plat stage)
	• A private gate Special Use Permit (SUP) may accompany a plat (The SUP process is legislative via a public hearing requiring Council
		• Preliminary plat is administrative via public meeting, unless deviation from Chapter 6 requirement(s) is requested pursuant to Town Code, Article 6-8, Variances and Modifications (which requires Commission review/recommendation and Council review/action)
		• Average 1 application annually
		• Pre-application review up to 20 business days
		• Commission Work Session
		  ○ Must occur at least 28 days prior to the public meeting
		• Commission Action
		  ○ 1,500' mailing notice of action meeting by Town policy
		  ○ Public comment taken (but not required)
		  ○ Simple majority to approve
		  ○ If denied, then moves forward to Council for review/approval
		  ○ Action must be done within 40 days of a completed application
		
		Applies
		• All zoning districts
		• Hillside and non-Hillside
		• When property is divided into 4 or more lots
			BROAD INTERPRETATION (RECOMMENDED)
			• **Keep the current Commission process the same (include noticing, allow for public comment, and placed as action item on the agenda)**
			Reasons
			• **Commission review/action process is administrative not legislative via public hearing**
			• **Current approach emphasizes plat compliance to Town subdivision regulations and other related code provisions for plat approval**
			• **Any notice/public commentary is to apprise residents of upcoming plat (not deny plat)**
			• **Greater impact on subdivisions of any size exists due to Town's small area and large-lot residential nature**
			• **Aligns with Commissions advisory role on land development**
			• **Occurrence is low since preliminary plats are uncommon**
			• **Allows for greater scrutiny with hillside and/or SUP subdivisions**
			
			NARROW INTERPRETATION
			• Modify code for more administrative process that is Town staff review and approval only
			Reasons
			• If intent for administrative is to be more staff driven process (instead of Commission driven process)
			
			EITHER INTERPRETATION
			• Still require Commission and/or Council approval for code deviations
			• No changes to the private road CUP via Commission and private gate SUP process to Commission/Council

	Statement of Direction (SOD), Commission review and recommendation, and Council review and action. This could occur at the final plat stage.	• When property is divided into 2 or more lots if a new street is required (most common)	• If preliminary plat on SUP site, the request typically has an SUP amendment to Commission or Council

Case Type	*Code Reference*	*Current Process*	*Potential Future Process*

Final Plat
 	
Case Type Abbreviation (FP)
	Town Code:
	• Section 5-8-1(A)
	• Chapter 6, Subdivisions
	  ○ Article 6-1 Definitions
	  ○ Section 6-2-1 Pre-Application
	  ○ Section 6-2-3 Final Plat/Map
	  ○ Article 6-4 Assurances, Warranty, Minimum Improvements
	  ○ Article 6-6 Information Required on Final Plat
	  ○ Article 6-7(B) Special Final Plat Requirements (hillside)
	  ○ Article 6-7(C) Special Design Standards (hillside)
	  ○ Article 6-7(D) Maximum Number Lots (hillside)
	Notes
	• Design and related standards throughout Chapter 6 that apply to all types of land modifications (including plats)
	• Typically, a private road Conditional Use Permit (CUP) approved by Commission and appealable to Council runs with the plat (The CUP is administrative via public meeting and typically occurs at the preliminary plat stage, but could occur at the final plat stage)
	• A private gate Special Use Permit (SUP) may accompany a plat (The SUP process is legislative via a public hearing requiring Council Statement of Direction (SOD), Commission review and recommendation, and
		• Final Plat starts post preliminary plat action
		• Administrative via public meeting, unless deviation from Chapter 6 requirement(s) is requested pursuant to the Town Code, Article 6-8, Variances and Modifications or the final plat does not comply with the stipulations of the preliminary plat/map or contains substantial differences final plat requires Commission review/action
		• Average 1 application annually
		• Council Study Session
		• Council Action
		  ○ 1,500' mailing notice of action meeting by Town policy
		  ○ Public comment taken (but not required)
		  ○ Simple majority to approve
		  ○ Action must be done within 40 days of a completed application
		• If Commission action (as described above), Commission action required within 14 days staff deems complete, and Council action must be done within 40 days from the Commission action
		
		Applies
		• All zoning districts
		• Hillside and non-Hillside
			BROAD INTERPRETATION
			• Keep the current Council review and approval process the same
			Reasons
			• Council review/action process is administrative not legislative via public hearing
			• Current approach emphasizes plat compliance to preliminary plat for approval
			• Any notice/public commentary is to apprise residents of upcoming plat (not deny plat)
			• Greater impact on subdivisions of any size exists due to Town's small area and large-lot residential nature
			• Occurrence is low since final plats are uncommon
			• Allows for greater scrutiny with hillside and/or SUP subdivisions (in particular)
			
			MODIFIED BROAD INTERPRETATION (RECOMMENDED)
			• Modify the current Council process to allow final plat/map as a staff review and approval with a 7-day review (with ability for Council to hold meeting for action) like the SUP Managerial Amendment process.
			• Exceptions would be if the final plat is not in substantial conformance with the preliminary plat (then a separate study session and placement on public meeting for Council discussion/action or deviation from Chapter 6 requirement(s) is requested pursuant to Town Code, Article 6-8, Variances and Modifications which requires Commission review/recommendation and Council review/action)
			Reasons
			• Same as under Broad Interpretation
			• Commission and/or Council would review the final plat/map as described under exceptions above

	Council review and action. This could occur at the final plat stage.	• When property is divided into 4 or more lots • When property is divided into 2 or more lots if a new street is required (most common)	• Final plat requires a preliminary plat (which Commission reviews/approves which allows for oversight by more than staff) • Residents would have received notice/given opportunity for public comment with the preliminary plat at Commission • Mayor will still sign the final plat • In recent years many final plats are on the consent agenda since they match the preliminary plat • If final plat on SUP site, the request will have a preliminary plat to Commission and typically has an SUP amendment to Commission and/or Council **NARROW INTERPRETATION** • Modify code for more administrative process that is Town staff review and approval only Reasons • If intent for administrative is to be more staff driven process **EITHER INTERPRETATION** • Still require Commission and/or Council approval for code deviations • No changes to the private road CUP via Commission and private gate SUP process to Commission/Council • If final plat on SUP site, the request would have had a preliminary plat reviewed and approved by Commission and typically has an SUP amendment to Commission or Council

Case Type	*Code Reference*	*Current Process*	*Potential Future Process*

Replat
 	
Case Type Abbreviation (RP)
	Town Code:
	• Chapter 6, Subdivisions
	  ○ Article 6-1 Definitions
	  ○ Section 6-10-7(G) Procedures
	
	Note
	• Design and related standards throughout Chapter 6 that apply to all types of land modifications (including replats that follow the standards for a final plat)
		• Administrative via public meeting, unless deviation from Chapter 6 requirement(s) is requested pursuant to Town Code, Article 6-8, Variances and Modifications (which requires Commission review/recommendation and Council review/action)
		• Uncommon to have replat cases
		• Pre-application review up to 20 business days
		• Council Study Session
		• Council Action
		  ○ 1,500' mailing notice of action meeting by Town policy
		  ○ Public comment taken (but not required)
		  ○ Simple majority to approve
		
		Applies
		• All zoning districts
		• Hillside and non-Hillside
		• When there is an amendment of an existing plat of record through the act of modifying or reconfiguring (but since the code has an Administrative Land Modification and Non-Administrative Land Modification process, the replat is used when the application does not fall under those categories)
			BROAD INTERPRETATION (RECOMMENDED)
			• Keep the current Council process the same
			Reasons
			• Council review/action process is administrative not legislative via public hearing
			• Current approach emphasizes plat compliance to Town subdivision regulations and other related code provisions for plat for approval
			• Any notice/public commentary is to apprise residents of upcoming plat (not deny plat)
			• Greater impact on subdivisions of any size exists due to Town's small area and large-lot residential nature
			• Occurrence is low since replats are uncommon
			• Allows for greater scrutiny with hillside and/or SUP subdivisions (in particular)
			• Most common with an SUP and not always an amendment to the SUP with a replat
			
			NARROW INTERPRETATION
			Modify code for more administrative process that is Town staff review and approval only Reasons
			• If intent for administrative is to be more staff driven process
			
			EITHER INTERPRETATION
			• Still require Commission and/or Council approval for code deviations
			• No changes to the private road CUP via Commission and private gate SUP process to Commission/Council

Case Type	*Code Reference*	*Current Process*	*Potential Future Process*

Administrative Land Modification
 	
Case Type Abbreviation (LLA) (LS)
	Town Code:
	• Chapter 6, Subdivisions
	  ○ Article 6-1 Definitions
	  ○ Article 6-10 Administrative Land Modification (Procedures Section 6-10-7)
	
	Note
	• Design and related standards throughout Chapter 6 that apply to all types of land modifications (including plats)
		• Administrative via Town staff, unless deviation from Chapter 6 requirement(s) is requested pursuant to Town Code, Article 6-8, Variances and Modifications (which requires Commission review/recommendation and Council review/action)
		• Average 7 to 8 applications annually
		• Pre-application review up to 20 business days
		• No noticing
		• Town staff review typically 10 to 15 business days per review
		
		Applies
		• Any property zones except SUP
		• Hillside and non-Hillside
		• Lot Line Adjustment
		• Lot Split (Exempt) – are divisions on property over 2.5 acres into 2 or 3 lots (without a new road)
		• Easement Modifications
			BROAD INTERPRETATION (RECOMMENDED)
			• Keep the current Town staff process (for SUP properties see Non-Administrative Land Modification)
			Reasons
			• Town staff review/action process is administrative
			• Current approach emphasizes plat compliance to Town subdivision regulations and other related code provisions for plat for approval
			• Administrative land modification cannot create any nonconformities
			
			NARROW INTERPRETATION
			• Same as Broad Interpretation
			
			EITHER INTERPRETATION
			• Still require Commission and/or Council approval for code deviations
			• No changes to the private road CUP via Commission and private gate SUP process to Commission/Council

Case Type	*Code Reference*	*Current Process*	*Potential Future Process*

Non-Administrative Land Modification
 	
Case Type Abbreviation (LLA) (LS)
	Town Code:
	• Chapter 6, Subdivisions
	  ○ Article 6-1 Definitions
	  ○ Article 6-9 Non-Administrative Land Modification (Procedures Section 6-9-7)
	
	Note
	• Design and related standards throughout Chapter 6 that apply to all types of land modifications
	• Any site zoned SUP follows the preliminary plat, final plat, replat, or Non-Administrative Land Modification process.
		• Administrative via public meeting, unless deviation from Chapter 6 requirement(s) is requested pursuant to Town Code, Article 6-8, Variances and Modifications (which requires Commission review/recommendation and Council review/action)
		• Average 1 to 2 applications annually
		• Pre-application review up to 20 business days
		
		Lot Split (on Site Under 2.5 Net Acres Only Non-SUP)
		• Commission Work Session
		• Commission Action
		  ○ 500' mailing notice of action meeting by Town policy
		  ○ Public comment taken (but not required)
		  ○ Unanimous approval
		  ○ If there is no unanimous approval for Lot Split under 2.5 net acres, then moves forward to Council for review/action
		
		Non-Administrative Land Modification (SUP Property)
		• Applies to any other plat process except for preliminary plat, final plat, or replat as described in Chapter 6, Subdivisions, of the Town Code
		• Council Study Session
		• Council Action
			BROAD INTERPRETATION
			• Keep the current Commission process the same
			Reasons
			• Commission review/action process is administrative not legislative via public hearing
			• Current approach emphasizes plat compliance to Town subdivision regulations and other related code provisions for plat for approval
			• Any notice/public commentary is to apprise residents of upcoming plat (not deny plat)
			• Greater impact on plats of any size exists due to Town's small area and large-lot residential nature
			• Occurrence is low since Non-Administrative Land Modifications are uncommon
			• Allows for greater scrutiny with hillside and/or SUP subdivisions (in particular)
			
			MODIFIED BROAD INTERPRETATION (RECOMMENDED)
			• Retaining the Commission review of Lot Splits (on Non-SUP Sites Under 2.5 Net Acres Only) since state law seems to still allow for a different procedure for splits on 2.5-acre lots or less. The change is removing the unanimous vote to simple majority vote as this process is administrative.
			• Modify the current Council review and approval process for Non-Administrative Land Modification (SUP property) to staff review and approval with a 7-day review (with ability for Council to hold meeting for action) like the SUP Managerial Amendment process.
			Reasons
			• Same as under Broad Interpretation
			• Lot Splits (on Non-SUP Sites Under 2.5 Net Acres Only) were the only plat-type action requiring unanimous approval
			• There is not always an amendment to the SUP with a Non-Administrative Land Modification. This is why

		○ 500' mailing notice of action meeting by Town policy ○ Public comment taken (but not required) ○ Simple majority approval All other Non-Administrative Land Modification • Applies to public easement abandonment (e.g., Public Utility Easement or Drainage Easement - any zoning district) • Council study session • Council action ○ 500' mailing notice of action meeting by Town policy ○ Public comment taken (but not required) ○ Simple majority approval Applies • Any property zone (as noted above) • Hillside and non-Hillside	Council review is still appropriate since a SUP is tailored zoning compared to the Town's residential zoning districts (which the process for plat-type applications that are not a preliminary plat, final plat, or replat and are deemed an Administrative Land Modification which is reviewed and approved by Town staff) **NARROW INTERPRETATION** • Modify code for more administrative process that is Town staff review and approval only Reasons • If intent for administrative is to be more staff driven process **EITHER INTERPRETATION** • Still require Commission and/or Council approval for code deviations • No changes to the private road CUP via Commission and private gate SUP process to Commission/Council • Easement abandonment and Right-of-Way abandonments (any zoning district) process remain the same (through the Engineering Division with review/approval by Council)

Other Code Sections related to land modification requirements and process that do not require changes:

- Town Code, Section 5-10-5(C) dust control
- Town Code, Section 5-10-10 assessments for streets, sidewalks, and other public places (5-10-5, 5-10-6)
- Town Code, Section 15-3-3, 15-3-12 wastewater development fees
- Zoning Ordinance, Section 905 Cluster Plan indentures recorded with final plat and Commission to review/ act upon preliminary plat
- Zoning Ordinance, Section 2408 Location, height, setback, and design of subdivision perimeter walls or view fences shall be part of the approved final plat

ORDINANCE NUMBER 2025-05

AN ORDINANCE OF THE TOWN OF PARADISE VALLEY, ARIZONA, AMENDING THE TOWN CODE OF THE TOWN OF PARADISE VALLEY, ARTICLE 2-5, COMMITTEES AND COMMISSIONS, AND CHAPTER 6, SUBDIVISIONS, REGARDING PLAT APPROVALS; AND PROVIDING FOR SEVERABILITY.

WHEREAS, on _____, the Town Council held a public hearing to hear and take action on Ordinance Number 2025-05, as recommended by the Planning Commission; and

WHEREAS, in accordance with Article II, Sections 1 and 2 of the Constitution of Arizona, the Town Council has considered the individual property rights and personal liberties of the residents of the Town before adopting this ordinance; and

WHEREAS, the Town Council has determined that this ordinance, although a "zoning ordinance text amendment of general applicability" as described in A.R.S. § 9-462.01(J), does not, because of its limited applicability, have any relationship to, or impact on, housing. Therefore, the Town Council has determined is not possible to prepare or consider a housing impact statement regarding the impact of the zoning ordinance text amendment that includes the information required by A.R.S. § 9-462.01(J)(1) – (3).

NOW, THEREFORE, BE IT ORDAINED BY THE MAYOR AND TOWN COUNCIL OF THE TOWN OF PARADISE VALLEY, ARIZONA, AS FOLLOWS:

Section 1. The recitals above are incorporated as if fully set forth herein.

Section 2. Article 2-5 (Committees and Commissions), Section 2-5-2 (Planning Commission) is hereby deleted in its entirety, and replaced to read as follows:

[Text in red is new text and ~~strikeout~~ deleted text]

Section 2-5-2 Planning Commission

D. Time Limits for Commission Action.

1. All applications, cases, or other matters before the Planning Commission shall be heard and considered by the Commission in an expeditious manner and without unreasonable delay, and as provided by the following limits:

   (a) ~~(~~Complete applications for preliminary ~~and final~~ subdivision approval shall be heard, approved or disapproved, and forwarded to the Town Council within 90 calendar days of the filing of the application for subdivision approval.

   (b) Applications for Special Use Permits and amendments to Special Use Permits shall be heard, approved or disapproved, and forwarded to the Town Council within the time period specified by the Town Council in its Statement of Direction for a particular Special Use Permit application; or in the absence of a specified time period, the time period shall be the lesser of 90 calendar days from the approval of the Statement of Direction or 150 calendar days from the filing of the application for the Special Use Permit.

   (c) Proposed amendments, additions, and repeals of provisions of the Zoning Ordinance and amendments, supplements or changes to zoning district boundaries shall be heard, approved or disapproved, and forwarded to the Council within these time limits:

      (1) Where the proposal is referred to the Commission by the Town Council, within 45 calendar days of such Town Council action.

      (2) Where the proposal would amend, supplement or change zoning district boundaries pursuant to Section 306 of the Zoning Ordinance, within 45 calendar days after initiation of such action or the filing of a petition pursuant to Section 306 of the Zoning Ordinance with the Town.

   (d) For the purpose of this section, the term "filing" of a petition shall mean an application that is filed by the applicant with the Town and determined to be administratively complete by the Town, in accordance with Section 307 of the Zoning Ordinance and applicable Planning Commission rules and regulations.

Commented [PM1]: Removed final plat as this process is described under Section 6-2-3 and Commission is not the approver of a final subdivision (which is the current code). This section covers time limits on Commission action.

2. Effect of Failure of Commission to Act Within Prescribed Time Limits.
When the Commission fails to hear, approve or disapprove, and forward to the Town Council any application, case, or other matter within the time limits provided by Subsection D-1 of this Section, the following shall occur:

(a) Applications for preliminary subdivision plat approval, ~~final subdivision plat approval,~~ Special Use Permits, and amendments to Special Use Permits, shall be forwarded to the Town Council for Town Council action on such application along with the minutes of all Commission meetings where such application was heard, considered, or discussed, and the Commission shall be deemed to have recommended for approval such application; however, where the Commission finds that it cannot recommend approval or disapproval of an application because the applicant has failed to appear at a Commission meeting, then such application shall be deemed to have been withdrawn and vacated by the applicant, and the application shall be moot.

(b) A proposed amendment, addition, or repeal of a provision of the Zoning Ordinance shall be forwarded as a recommendation for approval to the Town Council for Town Council action on such proposal.

3. For good cause shown by the applicant, the Commission, by majority vote of those Commission members present at a Commission hearing, may extend the time limits set forth hereinabove for a period not to exceed 30 calendar days. Only one such extension shall be granted.

Commented [PM2]: Removed final plat as this process is described under Section 6-2-3 and Commission is not the approver of a final subdivision (which is the current code). This section covers time limits on Commission action.

CHAPTER 6 SUBDIVISIONS

Article 6-1 **DEFINITIONS** 86 112 170 210 535 2019-05

Article 6-2 **PROCEDURE FOR THE PREPARATION AND FILING OF PLATS**

6-2-1 Pre-Application Conference
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6-3-6 Building Lines
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6-3-8 Easement Along Streams 601
6-3-9 Building in Designated Flood Plain Areas
6-3-10 Character of Development
6-3-11 Subdivision Identification Signs 34, 83, 170
6-3-12 Subdivision Walls or Fences 36, 375

Article 6-4 **ASSURANCES, WARRANTY, MINIMUM IMPROVEMENTS REQUIRED** 145 185 210 351 459 478

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6-4-2 Warranty 210
6-4-3 Minimum Improvements Required 351 459 478 540

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Article 6-7 **HILLSIDE DEVELOPMENT REGULATIONS** 540

Article 6-8 **VARIANCES AND MODIFICATIONS**

Article 6-9 **NON-ADMINISTRATIVE LAND MODIFICATION** 86 88 2019-05
(Retitled 2019-05)

6-9-1 Fees 491

6-9-2 Final Plats 2018-02
6-9-3 Standards of Design
6-9-4 Minimum Improvements Required
6-9-5 Information Required on Final Plats
6-9-6 Hillside Development Areas
6-9-7 Procedures

Article 6-10 ADMINISTRATIVE LAND MODIFICATION 2019-05

6-10-1 Fees
6-10-2 Administrative Plat Maps Required
6-10-3 Standards of Design
6-10-4 Minimum Improvements Required
6-10-5 Information Required on Final Plats
6-10-6 Hillside Development Areas
6-10-7 Procedures

CHAPTER 6 SUBDIVISIONS

Article 6-1 DEFINITIONS [86 112 170 210 535]

In this chapter unless the context requires otherwise, the following terms contained in this chapter shall mean:

Administrative Land Modification – A Lot Line Adjustment, Lot Split (Exempt), and/or Easement Modification on non-Special Use Permit zoned property made pursuant to Article 6-10 of the Town Code, without modifications pursuant to Article 6-8.

Administrative Plat Map - A document prepared in accordance with the procedures specified in Article 6-10 used to evidence the changes specified in an approved Administrative Land Modification and that contains the information required for the filing of a final plat pursuant to the requirements of Article 6-6.

Alley - A passage or way open to public travel, affording generally a secondary means of vehicular access to abutting lots or upon which service entrances of buildings abut, and not intended for general traffic circulation.

Building line - A line between which line and street line no building or structure, or portion thereof, may be erected, constructed or established.

Commission - The Planning and Zoning Commission of the Town of Paradise Valley.

Cul-de-sac **(**as distinguished from an unplanned dead-end street**)** - A short minor street having but one end open for motor traffic, the other being permanently terminated by a vehicular turn-around.

Cut - The land surface, which is shaped through the removal of soil, rock, or other materials.

Double frontage - A lot which extends from one street to another or proposed street.

Easement - A grant by a property owner of the use of a strip of land for a specific purpose or purposes, by the general public, a corporation, or a certain person or persons.

Easement Modification – The act of modifying, relocating, and/or dedicating an easement (including, but not limited to drainage easements, sewer easements, and public utility easements). An Easement Modification does not include the abandonment or release of Easement.

Fill - The deposit of soil, rock or other materials placed by man.

Hillside Development Area - Those areas marked in **FIGURE 2** of Article XXII Hillside Development Regulations of the Town of Paradise Valley Zoning Ordinance and to all lands

where the natural terrain under the building pad has a slope of ten percent (10%) or greater, whether shown in **FIGURE 2** or not. However, a 10% or greater slope, in an area not denoted on **FIGURE 2**, created by a natural wash on land that otherwise would not be classified as hillside land shall be exempt from the hillside regulations.

Lot - A parcel of land occupied or intended for occupancy by one main building, together with any accessory buildings including the open spaces required of the Hillside Regulations and having adequate frontage on a public or private street.

Lot, double frontage - A lot which extends from one street to another street, existing or proposed.

Lot Line Adjustment – A procedure that may be used as a method for making minor revisions to property lines between two or more existing parcels such that the total number of lots or parcels remain the same or are less. This procedure also includes the combining of two existing lots or a parcel assemblage, being a combination of land within the Town which results in the assemblage of improved or unimproved land, whether immediate or future, into a single property. A Lot Line Adjustment is not a procedure for dividing property and shall not create any additional lots, tracts, or parcels.

Lot Split – The division of improved or unimproved land whose area is two and one-half (2.5) net acres or less into two or three tracts or parcels of land and shall meet the minimum size, setback, and other requirements of the underlying zoning district for the property at issue as specified in the Zoning Ordinance and official zoning map for the property.

Lot Split (Exempt) – The division of improved or unimproved land whose area is greater than two and one-half (2.5) net acres into two or three tracts or parcels of land, provided that no new street is involved. The Lot Split (Exempt) shall meet the minimum size, setback, and other requirements of the underlying zoning district for the property at issue as specified in the Zoning Ordinance and official zoning map for the property.

Master plan - A comprehensive plan or parts thereof adopted by the Council indicating the general locations recommended for streets and highways, parks, playgrounds, schools, public building sites and other physical improvements.

Non-Administrative Land Modification – Any Lot Line Adjustment, Lot Split, Lot Split (Exempt) and/or Easement modification that is not an Administrative Land Modification. Non-Administrative Land Modifications shall be made and approved pursuant to Chapter 6 of the Town Code.

Plat, final - A plat conforming to the requirements of Article 6-6 and which must be approved as set forth in this chapter ~~by the Council~~ before it can be filed for record with the recorder of deeds.

Plat, preliminary - The preliminary plat of the layout of the proposed subdivision.

Replat – Amendment of an existing plat of record; including the act of modifying or reconfiguring existing lots, parcels, and easements of record, or relocation of thereof.

Staff – The employees of the Town of Paradise Valley responsible for overseeing the implementation of Chapter 6, Subdivisions, of the Town Code.

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Street - A road, highway, drive, lane, avenue, boulevard, easement for access, right of way, parking or any other way, whether public or private, which affords the principal means of access to abutting property.

Subdivider - The individual, firm, corporation, partnership, association, syndication, trust or other legal entity that files an application and initiates proceedings for the subdivision of land in accordance with the provisions of this chapter; and said subdivider need not be the person or persons holding title by deed to land, or holding title as vendees under land contract or holding any other title of record.

Subdivision - Improved or unimproved land or lands divided for the purpose of financing, sale or lease, whether immediate or future, into four or more lots, tracts or parcels of land, or, if a new street is involved, any such property which is divided into two or more lots, tracts or parcels of land, or, any such property, the boundaries of which have been fixed by a recorded plat, which is divided into more than two parts; provided that the sale or exchange of parcels of land to or between adjoining property owners where such sale or exchange does not create additional lots shall not be deemed a subdivision. The partitioning of land in accordance with state statutes regulating the partitioning of land held in common ownership shall not be deemed a subdivision.
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Article 6-2 PROCEDURE FOR THE PREPARATION AND FILING OF PLATS/MAPS

6-2-1 Pre-Application Conference
6-2-2 Preliminary Plat/Map [144] [540] [2018-02]
6-2-3 Final Plat/Map [2018-02]

Section 6-2-1 Pre-Application Conference

Prior to filing of a preliminary plat/map, the subdivider is invited to discuss with the Staff ~~Commission~~ any problem involved in the development of a particular tract of land concerned as it pertains to requirements of the Zoning Ordinance, the Master Plan and Subdivision Regulations as these apply to the area. It is further suggested that the subdivider confer with the Town Engineer, County Engineer and the County Health Department regarding matters of streets, drainage, flood control, sanitation and public health.

Section 6-2-2 Preliminary Plat/Map [540] [2018-02]

Commented [PM3]: No change to the current process of Commission (and Council if Commission rejects the preliminary plat or the plat has a modification of the subdivision standards pursuant to Article 6-8). The text changes shown are clean up language and clarification.

A. Following the pre-application conference, if any, the subdivider shall submit a water service impact study prepared by a registered civil engineer that analyzes the water flow and pressure in the immediate area of the proposed subdivision and the appropriate infrastructure or other water system improvements that are necessary to assure that the subdivision shall have adequate flow and pressure to meet Town Code standards. After completion of the water service impact study and a review of such study and other required submittals associated with the preliminary plat/map by the Town, the subdivider shall present to the Commission ~~twenty (20) copies of~~ the preliminary plat/map, together with a completed application form. The preliminary plat/map shall be presented at least twenty-eight (28) days prior to the ~~a~~ meeting of the Commission to take action in order that reasonable time is obtained for study of the plat/map by the ~~Planning and Zoning~~ Commission and other officials and agencies concerned. The Commission shall act on the preliminary plat/map within forty (40) days after Staff deems the application complete (unless waived by the applicant).

B. Subdivision application fees shall be those prescribed in the Town of Paradise Valley Fee Schedule. [144]

C. Following action of the Commission, one copy of the preliminary plat/map, together with a written report, shall be returned to the subdivider or plat engineer describing any recommended changes and stating the action of the Commission. Reconsideration of a plat/map may be requested by the subdivider.

D. If a preliminary plat/map is rejected by the Commission and the subdivider elects not to modify it to secure Commission approval, but to stand on it as submitted and rejected, the subdivider may appeal the rejection to the Council and the Council may affirm, reverse, or modify the action of the Commission, or the Council may remand the matter to the Commission for further proceedings. If the preliminary plat/map is not rejected by the Planning Commission, no approval of the preliminary plat/map by the Council is required.

Section 6-2-3 Final Plat/Map 2018-02, 2018-11

A. No ~~Planning~~ Commission or Council approval is required for the final plat/map within any zoning district unless ~~s~~Staff determines that the final plat/map does not comply with the stipulations of the preliminary plat/map approved by the ~~Town's Planning~~ Commission (or the stipulations imposed by the ~~Town~~ Council should the plat/map have required Council approval in accordance with Article 6-8, Variances and Modifications, of Chapter 6 of the Town Code, if any) or contains substantial differences from such preliminary plat/map. If ~~s~~Staff so determines, then ~~Planning~~ Commission ~~approval~~recommendation to the Council of the final plat/map is required. The ~~Planning~~ Commission shall act on the final plat/map no later than fourteen (14) calendar days after ~~s~~Staff deems the application complete. If no ~~Planning~~ Commission approval is required, then the ~~Town~~ Council shall act on the final plat/map application within forty (40) calendar days from when staff deems the application complete. If ~~Planning~~ Commission approval was required, then the ~~Town~~ Council shall act on the final plat/map application within forty (40) calendar days from the date that the ~~Planning~~ Commission has approved the final plat/map. A final plat/map application request shall be approved by the ~~Town~~ Council if it is determined to comply with the stipulations of the preliminary plat/map approved by the ~~Town's Planning~~ Commission along with all of the other requirements set forth in this Section.

B. Subdividers or plat engineers shall obtain final plat/map review by the Town Engineer and other officials and agencies concerned prior to ~~presentation~~ final action on the final plat/map.

C. Following the pre-application conference, if any, the subdivider shall submit to the Town (1) the formal plat/map application on a form prescribed by the Town, (2) the fee set forth in the Town of Paradise Valley Fee Schedule, as such may be amended from time to time, and (3) all documents and materials deemed necessary by the Town to be in compliance with Chapter 6, Subdivisions, of the Town Code.

D. Upon receipt of a complete submittal including all of the information and fees as set forth in Chapter 6, Subdivisions of the Town Code, Staff will review the submittal within a reasonable time to verify the final plat/map meets requirements and completion of any required conditions (e.g., assurances). If not met, the applicant will make any necessary revisions and/or submittals. If met, Staff will transmit to the Town Manager (or designee) a copy of the final plat/map, together with a written report outlining compliance within two business days of making the determination.

E. The Town Manager (or designee) shall transmit all determinations approving the final plat/map to the Council within two business days of receiving the met determination of Section 6-2-3(D) above.

F. The Town Manager's (or designee's) decision shall be final, and the Mayor (or designee) and applicable Staff shall sign the final plat/map in preparation for recordation with the

Commented [PM4]: If the Council finds an amendment best serves compliance with the state law change, the text changes made for final plat/map is a staff approval process with a 7-day Council review (similar to the Managerial SUP/PWSF process in the Town) with the Mayor still required to sign the plat/map. This applies to any zoning district (including SUP).

Council will still review/act on a final plat/map if Commission rejects the preliminary plat or the plat has a modification of the subdivision standards pursuant to Article 6-8. Indirectly, Commission/Council would see the final plat/map if the applicant requests a private road CUP and/or private roadway gate (as these processes remain the same). Also, the final plat requires a preliminary plat (which Commission reviews/approves which allows for oversight by more than staff).

recorder of Maricopa County, Arizona, subject to Council review as set forth in Section 6-2-3(G).

G. If, within seven calendar days after the Town Manager's (or designee's) written determination, at least three members of the Council submit a written request to the Town Manager, the Council shall have the authority to review the approved final plat/map application. Such review shall be considered at a Council meeting within 14 calendar days after the Town Manager's receipt of the third written request pursuant to this Section. The Council's review shall be limited to a determination, by a majority vote of the members present and not otherwise disqualified, as to whether the Town Manager's (or designee's) decision meets the requirements outlined in Chapter 6, Subdivisions, of the Town Code. If the Council decides that the criteria have been met, then there shall be no further consideration, and the final plat/map approval is final. If the Council determines that the requirements have not been met, the Council may deny the final plat/map, in whole or in part. A majority vote of the members present and not otherwise disqualified shall be necessary to deny or modify the decision of the Town Manager (or designee); otherwise the Town Manager's written determination shall be deemed affirmed.

Article 6-3 **STANDARDS OF DESIGN** [170 535]

6-3-1 Relation to Adjoining Street Systems
6-3-2 Right-of-way, Street and Alley Width, Cul-de-Sac, Half Street, Alley [86 115]
6-3-3 Easements
6-3-4 Blocks
6-3-5 Lots [432 564]
6-3-6 Building Lines
6-3-7 Public Reservations
6-3-8 Easement Along Streams [513 601]
6-3-9 Building in Designated Flood Plain Areas
6-3-10 Character of Development
6-3-11 Subdivision Identification Signs [34 83 170]
6-3-12 Subdivision Walls or Fences [36 375]

Section 6-3-1 Relation to Adjoining Street Systems

A. The arrangement of streets in new subdivisions shall make provision for the continuation of the principal existing streets in adjoining areas or their proper projections where adjoining land is not subdivided insofar as they may be deemed necessary for public requirements. The width of streets in new subdivisions shall be not less than the minimum width established by the Town.

B. Wherever a subdivision adjoins a major thoroughfare, the Town ~~Commission~~ may require that access to all residential lots be provided from other than the major thoroughfare.

C. The street and alley arrangement shall take into consideration adjoining property and seek to provide for convenient access thereto.

Section 6-3-2 Right-of-way, Street and Alley Width [86 115]

A. Rights-of-Way and Streets. The width of all rights-of-way and streets shall conform to the width designated in the Town's Street Cross Sections ~~General Plan~~, or such other width as specified by the Town. The subdivider shall dedicate to the Town all rights-of-way within the subdivision.

Commented [PM5]: These were removed from the 2022 General Plan and put as a policy interpretation

B. Cul-de-sac. A dead-end street not to exceed five hundred feet (500') in length may be established, provided that there shall be a turn-around, at the closed end, having a right-of-way radius of not less than forty-five feet (45') with an improved traffic circle having a radius of forty feet (40').

C. Half Street. Dedication of half streets shall be discouraged. Where there exists a dedicated or platted half street or alley adjacent to the tract being subdivided, the other half shall be platted unless deemed unnecessary by the Town.

D. Alley. Where alleys are required to serve residential lots a minimum width of twenty-four feet (24') shall be provided. All half alleys shall have a minimum width of twelve feet (12'). Alleys are required in the rear of all commercial lots if no other provisions are made for adequate service access or for parking and the rights-of-way of such alleys shall not be less than thirty feet (35'), and dead-end alleys shall not be permitted.

Section 6-3-3 Easements

Private easements for utilities shall be provided as follows:

A. Where alleys are provided, four feet (4') for aerial overhang on each side of an alley may be provided by dedication but need not be delineated on the plat.

B. Where no alley is provided and adjoining land is a part of the subdivision, eight feet (8') on each side of rear lot line.

C. Where no alley is provided and adjoining land is unplatted, eight feet (8') adjacent to the tract boundary.

D. Along side lot lines, six feet (6') on each side of lot lines for distribution facilities and one foot (1') on each side of lot lines for street lighting as may be designated.

C. Guy and anchor easements, one foot (1') wide on each side of a lot line and approximately thirty-five feet (35') in length measured from rear lot line as designated.

Section 6-3-4 Blocks

A. No block shall be longer than fifteen hundred feet (1,500'). Where a subdivision adjoins a major thoroughfare, the greater dimension of the block shall front or back on such major thoroughfare to avoid unnecessary ingress or egress.

B. A dedicated and improved right of way not less than eight feet (8') wide may be required if necessary to provide proper access to schools, playgrounds and other facilities.

Section 6-3-5 Lots [432 564]

A. The lot arrangement and design shall be such that all lots will provide satisfactory and desirable building sites, properly related to topography and to the character of surrounding development and will preclude unorthodox or unusually shaped lots.

B. All side lines of lots shall be at nearly right angles to straight street lines and radial to curved street lines for a distance equal to the horizontal distance between the property line and the front setback line.

Commented [PM6]: If the property line is not 90 degrees 0 minutes and 0 seconds it technically requires a variance/modification process. This would allow for a degree or so off to still meet compliance. Could also use "at right angles with an allowable tolerance not to exceed one degree" if we want to be more specific.

C. No lot shall have less area, width or access than required by the zoning regulations applying to the area in which it is located nor otherwise violate the Town's Zoning Ordinance.

D. Corner lots for residential use shall have adequate width to permit appropriate building orientation to and setbacks from both streets except as otherwise provided in Section 306 of the Paradise Valley Zoning Ordinance.

E. Each lot shall have adequate vehicular access to a public street.

F. Multi-frontage lots shall be avoided except where essential to provide separations of residential development from major thoroughfares or to overcome specific disadvantages of topography and lot orientation.

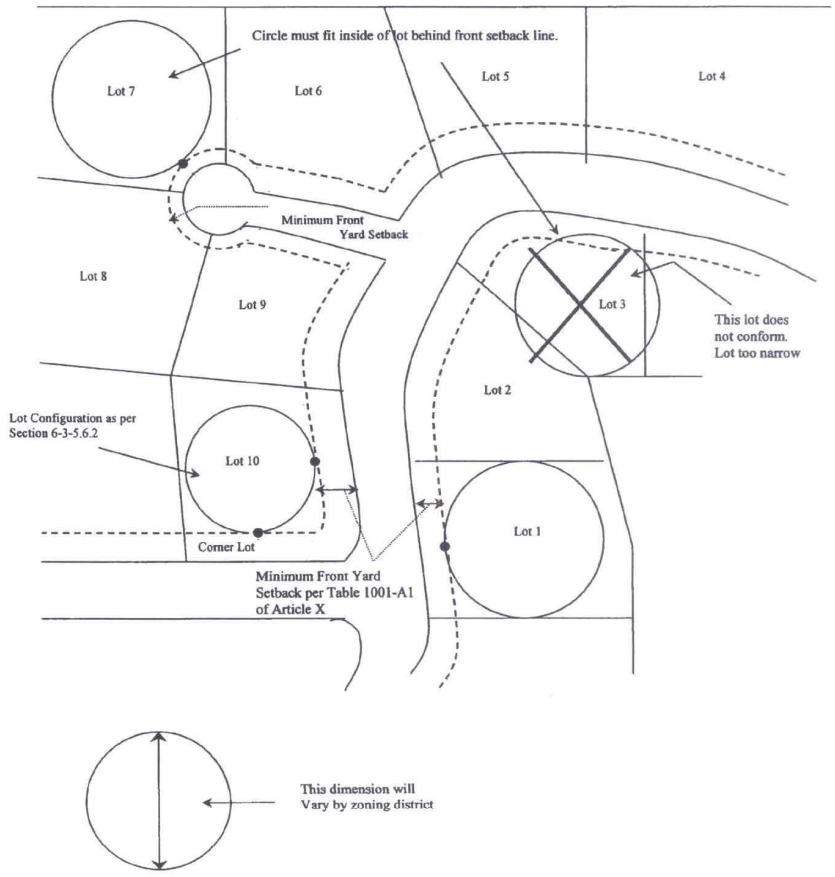
G. Lot Configuration [432 564]

1. A lot shall be designed so that the side and rear boundary lines and the front setback line fully enclose a circle which fits within the lot area and touches the front setback line at a single point (see diagram in figure 6-3-5.G). The diameter of such circle shall be no less than the minimum lot width for the zoning district within which the lot is located (see Table 1001-A1).

2. If the front of the dwelling on a corner or double frontage lot has not been established at the time the lot is created, a front setback is required for each frontage of the lot. The circle described in subsection 1 shall be fully enclosed within the lot area and touch each front setback line at a single point.

3. Figure 6-3-5.G attached to this article and incorporated herein by reference.

Figure 6-3-5.G, Lot Configuration



Section 6-3-6 Building Lines

Minimum building lines shall be shown on all lots intended for residential use of any character and on commercial or industrial lots immediately adjoining residential areas. Such setback lines shall not be less than required by any Zoning Ordinance or building line regulation applying to the property. Whenever minimum building lines are shown, a statement of restrictions requiring buildings to be located on or in back of such minimum building lines shall be shown on the plat.

Section 6-3-7 Public Reservations

Where the subdivision contains a park, school, or other public area which is shown upon the Master Plan of the Town or as recommended by the Town~~Commission~~, such area shall either be dedicated to the proper public agency, or it shall be reserved for acquisition thereby within a specified period of time. An agreement should be entered within a reasonable period of time between the subdivider and the proper public agency regarding the time and method of acquisition and the cost thereof. If the Town~~Commission~~ determines that an agreement has not been reached within a reasonable period of time then the Town~~Commission~~ may make a determination that the requirements of this section have been met.

Section 6-3-8 Easement Along Watercourses, Easement Maintenance Agreements, and Required Maintenance [513 601]

A. For the purposes of this section, "watercourse" means any creek, stream, wash, arroyo, channel or other body of water having historical banks and a bed at least two (2) feet deep and five (5) feet wide through which waters flow on a recurrent basis.

B. Whenever any watercourse is located in the area being subdivided, provision shall be made on the plat for an adequate drainage easement along the main channel and each side of the watercourse for the purpose of widening, deepening, relocating, improving or protecting the watercourse for drainage purposes, and the plat notes shall state that the provision of the drainage easement is for the purposes stated above, but that the maintenance responsibility for the watercourse, as required by Town Code, shall be the responsibility of the homeowner's association for the subdivision, if such is established, and each lot owner within the subdivision.

C. In addition to the plat requirements, Drainage Easement Maintenance Agreements shall be required for any watercourse located in an area being subdivided. Said agreements shall:

1. Be in a form acceptable to the Town Engineer,
2. Grant easement rights and a right of entry in, over, and across the drainage easement area,
3. Specify that the maintenance responsibility for the drainage easement area remains private, and
4. Be recorded in the Maricopa County Recorder's Office.

D. The Homeowners Association for the platted area, if any, and the individual lot owners in the subdivision shall clean, repair and maintain the watercourse within the Drainage Easement area in a safe, clean, and properly operating condition and in compliance with all applicable Town Codes.

Section 6-3-9 Building in Designated Flood Plain Areas

All subdivisions built wholly or in part within designated flood plain areas shall comply with all provisions of the Flood Plain Regulations as contained in the Zoning Ordinance.

Section 6-3-10 Character of Development

The subdivider shall confer with the Town~~Commission~~ regarding the type and character of development that will be permitted in the subdivision and the Town may require certain minimum restrictions to be placed upon the property to prevent the construction of substandard buildings, control of the type of structure or the use of the lots, which, unless so controlled, would clearly depreciate the character and value of the proposed subdivision and of adjoining property. These restrictions may include provisions for the proper protection and maintenance of the subdivision in the future.

Section 6-3-11 Signs [34 83 170]

All signs shall comply with the terms of Article XXV of the Zoning Ordinance of the Town of Paradise Valley.

Section 6-3-12 Subdivision Walls or Fences [36 121 375]

A. All subdivision perimeter walls and fences must conform to the provisions of Article XXIV of the Zoning Ordinance. Construction of perimeter walls may not begin until after the ~~Town Planning and Zoning~~ Commission has considered a plan for the wall or fence, or both, and the plan has been approved by the ~~Town~~ Council. The plan must show the location and dimensions, and must include detailed landscape plans.

B. In any subdivision that has a perimeter wall, no landscape or accent or aesthetic lighting shall be allowed between that wall and the nearest street. All safety or security lighting for guardhouses and guardgates shall be restricted to the entrance of that guardhouse or guardgate and a lighting plan for safety/security shall be submitted with the ~~Special Use Permit~~ application as may be required under Article XI of the Zoning Ordinance.

EXCEPTION: If signage is allowed for a subdivision, any lighting of that signage shall be governed by Section 2506 of the Town Zoning Ordinance.

Commented [PM7]: Article XI cover SUPs, private gate SUPs, and private road CUPs that this type of lighting would be included.

Article 6-4 ASSURANCES, WARRANTY, MINIMUM IMPROVEMENTS REQUIRED [145 185 210 351 459 478 535]

6-4-1 Assurances
6-4-2 Warranty [210]
6-4-3 Minimum Improvements Required [351 459 478 540]

Section 6-4-1 Assurances

No final plat of any subdivision shall be approved unless the subdivider shall have petitioned and secured the approval of the Town of a procedure which places the Town in an assured position to do or to contract to be done all or any part of the improvements listed in Section 6-4-3, the cost of which may be assessed against the owners of the property within the subdivision.

Section 6-4-2 Warranty [210]

No final plat of any subdivision shall be approved unless the subdivider shall have provided the Town with a warranty deed or deeds certifying title to all dedicated property such as right-of-ways and public utility and drainage easements.

Section 6-4-3 Minimum Improvements Required [540]

A. Street Improvements. All streets shall be paved and curbs or combined curbs and gutters shall be constructed along all streets in accordance with the standard specifications of the Town.

B. Water System. Every subdivision shall be provided with a complete water distribution system. Both the quality and adequacy of the supply of water to be provided by the complete water distribution system shall: (1) incorporate all water system improvements recommended by the water service impact study, pursuant to Section 6-2-2 of Article 6-2 of the Subdivisions Code, and any additional system requirements identified during the review of the water service impact study**,** (2) be certified by the Water Corporation or public utility that shall provide water to the subdivision, and (3) be approved by the Maricopa County Department of Health Services, as conditions precedent to final subdivision plat approval.

C. Sanitary Sewers. [478]

1. Where public sanitary sewers are within reasonable access of the subdivision, in the opinion of the County Health Department or Town Engineer, each lot therein shall be provided with sanitary sewer line, notwithstanding the construction of such sewer line, a homeowner may choose private wastewater treatment approved by the Town. [478]

2. Whenever a public sanitary sewer is not accessible, in the opinion of the County Health Department or Town Engineer, proper provision shall be made for disposal of sanitary wastes in accordance with standards and requirements of such department.

D. Fire Hydrants. Every subdivision shall be provided with fire hydrants as an integral part of the water distribution system which are considered adequate to serve the area in the opinion of the Town Engineer or such other official as may be designated by the Council by resolution. Such hydrants shall be dedicated to the Town.

E. Drainage. All necessary facilities, as determined by the Town Engineer, including underground pipe, inlets, detention/retention basins, or open drainage ditches, shall be installed to provide for the adequate containment and disposal of surface water and to maintain any natural drainage course. [145]

F. Reference Monuments. Permanent reference monuments shall be installed in accordance with current Town standards at all corners, angle points and points of curvature and at all street intersections. On section corners and quarter section corners a brass monument shall be installed in the street. After all improvements have been installed, a registered surveyor or engineer shall check the location of monuments and certify their accuracy to the satisfaction of the Town~~Commission~~. Iron pipe shall be set at all corners, angle points, and points of curvature for each lot within the subdivision prior to the recording of the plat.

G. Street Name Signs. Street name signs, of a type meeting the approval of and in locations designated by the Town, shall be erected at all highways, thoroughfares, and street intersections.

H. Miscellaneous. Electrical service, gas mains, telephone service, water service and cable communications systems shall be provided within each subdivision. All such services shall be located underground. The subdivider shall notify the appropriate provider of each service. The notice shall include date of trenching and location sketches. [185]

I. Plans, Specifications and Supervision. All of the improvements required in this section shall be installed in accordance with the specifications and under the supervision of the appropriate public official.

J. Provisions for Maintenance and Operation. [205] Where the subdivision is to contain sewers, sewage treatment plants, park areas, street trees or other physical facilities necessary or desirable for the welfare of the area and which are of common use or benefit for example private streets, and cluster plan common area and which are of such character that the Town does not desire to maintain them, or has no original obligation to maintain, then provision shall be made for the proper and continuous maintenance and supervision of such facilities by the lot owners in the subdivision. The provisions for maintenance and supervision shall be in the form of deed restrictions (CC&R's) and must include the right of the Town of Paradise Valley to do the maintenance after reasonable notice if the property owners fail to do the maintenance. The deed restrictions shall permit the Town of Paradise Valley, if it does maintenance, to recover costs from the property owners, and to place a lien on the individual lots of the subdivision if the property owners do not reimburse the Town.

Article 6-5 INFORMATION REQUIRED ON THE PRELIMINARY PLAT [535]

The preliminary plat shall be drawn at a scale of not more than one hundred feet to the inch and shall show the following information:

A. The proposed street and lot layout showing the names and location of all existing streets, roads, alleys, parks, parkways, tree masses, public spaces, easements, sewers, utilities and utility easements, buildings, streams, washes, ditches, political and zoning district boundaries and similar features in the subdivision and adjacent to the property where such features would affect the design of the subdivision.

B. The elevation and description of the bench mark used.

C. The name and address of the subdivider.

D. The date, north point, scale and title under which the proposed subdivision is to be recorded.

E. The name, address and license number of the engineer, surveyor, landscape architect or land planner who prepared the plat.

F. The name and address of all owners and the location of the unsubdivided property adjoining the property to be subdivided.

G. The names and adjoining boundaries of all adjoining subdivisions showing the name, book and page of recording and existing dedications adjacent to the preliminary plat.

H. Topography by contours related to USGS survey datum, or other datum approved by the Town or County Engineer, and shown on the same map as the proposed subdivision layout. The contour interval shall be such as to reflect adequately the character and drainage of the land.

I. Indications to show areas which are subject to frequent or periodic inundation.

J. Indication to show the proposed use of all the land in the subdivision including reservations and exceptions.

K. The location, height, design and setback of the subdivision perimeter wall. [134]

Article 6-6 INFORMATION REQUIRED ON THE FINAL PLAT [535]

The following items shall be included in the final plat:

A. The name and address of the subdivider.

B. The title of the subdivision, date, north point, scale and name of the registered professional engineer or land surveyor who prepared the plat.

C. The boundaries of the property fully balanced and closed showing all bearings, angles and dimensions, determined by an accurate survey in the field. A relative location to the nearest existing street shall also be shown on the plat.

D. The location and description of all permanent monuments, and a reference bench mark set at such critical points and so interconnected and dimensioned that any surveyor can lay out lots or street s in the subdivision correctly by referring to the plat alone without any additional information.

E. The names, locations and widths of all parkways or easements and any other portions intended to be dedicated to public use or provided for the installation of utilities, fully dimensioned showing the angles of intersection of streets and the radii, chords, points of tangency and central angels for all curvilinear streets and the radii of all rounded corners and with notations concerning their dedication, reservation and use.

F. Lot and block numbers, lot lines and setback lines, fully dimensioned.

G. The location of all immediately adjoining property lines and the location, name and width of all roads, streets, alleys, parkways and easements.

H. All dimensions shall be expressed in feet or decimals thereof.

I. Any private restrictions and trusteeships and their period of existence shall be shown on the plat or reference to them made thereon. If such restrictions are too long to be shown

on the plat, a copy of the same shall be filed with the Town~~Commission~~ together with the final plat.

J. The final plat is to be drawn at a scale of not more than one hundred feet to the inch from an accurate survey. If more than two sheets are required, an index sheet of the same dimension shall be filed showing the entire subdivision on one sheet together with all areas shown on other streets.

K. The following certificates shall be placed on the plat:

1. Statement of dedication of all streets, alleys, crosswalks, and other rights of ways and easements for public use by the person holding title by deed to the lands, by persons holding any other title or record, by persons holding title as vendee under land contract, and by wives of said parties. If lands dedicated are mortgaged, the mortgagee shall also sign the plat. Dedication shall include a written location by section, Township, and range of the tract. If the plat contains private streets, the public shall be reserved the right to install and maintain utilities in the street rights of way.

2. Certification by the registered professional engineer or land surveyor making the plat that the plat is correct and accurate and that the monuments described in it have been located as described.

3. Such other certificates as may be required for the enforcement of these regulations.

L. The location, height, design and setback of the subdivision perimeter wall. [134]

Article 6-7 HILLSIDE DEVELOPMENT REGULATIONS [535] [540]

All subdivisions and lot splits within the Hillside Development Area, as defined in Article 6-1 of this Ordinance shall abide by the requirements and provisions contained in the following sections and the regulations for Hillside Development as outlined in Article XXII of the Town of Paradise Valley Zoning Ordinance.

A. SPECIAL PRELIMINARY PLAT REQUIREMENTS [540]

There shall be filed with the Town a preliminary plat which shall contain in addition to all other information and submittals required in Chapter 6 of this Ordinance the following:

1. A topographic map, certified by a registered engineer or land surveyor, with a scale of not less than one inch per 100 feet of existing terrain with contour intervals adequate to show the nature and variations in the terrain,

   a. two (2) foot intervals for grades less than 15 percent.

   b. five (5) foot intervals for grades greater than 15 percent.

   c. elevations of critical spots, rock outcrops, and special characteristics.

2. A proposed grading plan, certified by a registered Engineer, for each lot, in conformance with the grading and drainage regulations as adopted by the Town, showing the natural topography of the total parcel to be platted, the location and size of all structures, and grade of all improvement locations and the depth and extent of all cuts, fills, and disturbed areas.

3. A report of a soil investigation by a registered engineer or geologist to determine any geological hazard and soil bearing quality.

4. Location of existing and proposed conservation easements, if any.

B. SPECIAL FINAL PLAT REQUIREMENTS

There shall be filed with the Town a final plat which shall contain in addition to the information required in Article 6-6 of this Ordinance the following:

1. A final grading plan which conforms to the requirements of the grading and drainage regulations as required by and established in the Uniform Building Code adopted and approved by the Council.

2. A detailed topographic map at larger scale and closer contour intervals than in the preliminary plat, or suitable cross sections or profiles of areas where roads, driveways, buildings, utility, or grading construction is proposed.

3. Road profiles and cross sections at all significant changes in the cross slopes; the cross section to show proposed and natural grade at the centerline of the road, the right-of-way line, and the proposed building setback lines.

4. Locations of all building sites and proposed driveways.

C. SPECIAL DESIGN STANDARDS

1. A road with a grade exceeding 12% shall not be longer than 600 feet.

2. One-way loop roads may be constructed upon recommendation of the Commission and the Town Engineer and approved by the Council.

3. All public roads shall have a 50-~~-~~foot dedicated right-of-way and shall be constructed with a ~~decorative brick pavers or other~~ surface material as approved by the Town ~~Council~~. To minimize cuts, the Commission may recommend and the Council may approve a road of reduced pavement width but not less than 20 feet wide. The maximum grade shall not exceed 15% except that under demonstrated hardship the Commission may recommend and the Council may approve a road having grade not to exceed 20%.

4. Private roadways, where permitted, shall have a tract width of 50 feet, be approved pursuant to the Zoning Ordinance of the Town of Paradise Valley**,** and be constructed with decorative brick pavers or other surface material as approved by the private road Conditional Use Permit ~~Town Council~~. In addition to all other requirements, and where needed, easements for drainage shall be provided. Such private roadways in Hillside Development Area subdivisions or lot splits shall have a paved surface width of not less than twelve feet if serving only one lot, fifteen feet if serving two lots, and twenty feet if serving three or more lots. Each private road shall have a 50-foot easement for utility purposes and shall conform to Town standards.

5. All private roads shall have sufficient turnarounds, and may be identified by a single road sign.

6. Subdivision identification signage shall not be permitted.

7. In any Hillside Development Area to be subdivided, the amount of land devoted to public rights-of-way or private roads approved by Conditional ~~Special~~ Use Permit shall not exceed ten (10) percent of the gross parcel area.

Commented [PM8]: Discuss typically Town only takes public roads as asphalt. The section below addresses decorative surface material for private roads. Ord 535 in 2003 added Article 6-7 details (no information in past minutes or other documents to understand the reason)

Commented [PM9]: Private roads are processed by Conditional Use Permit (CUP). Commission approves the CUP and appealable to Council

Commented [PM10]: Private roads are approved by CUP, not SUP. They were many years back approved by SUP.

8. The total area subject to cut and/or fill for purposes of public or private roads within a Hillside Development Area subdivision shall not exceed five (5) percent of the gross parcel area.

9. Upon recommendation by the Commission and the approval of the Council, the following street modifications may apply:

    a. Various designs for turning and backing such as hammerheads may be substituted for cul-de-sacs.

    b. Required paving width of the traffic lanes may be modified when off-road parking bays are provided, developed, and paved in the public right-of-way.

    c. Centerline of the paving may be offset from the centerline of the right-of-way to provide parking bays in the right-of-way.

10. Vertical curbs may be required on the downhill side of roads having grades of 6 percent (6%) or greater; concrete U or V gutter may be installed in lieu of conventional rolled or vertical curb elsewhere as determined by the Engineer's final drainage report.

11. Transverse road cross sections with gutter on the uphill side may be used where approved by the Town.

12. All cut and fill shall be within the roadway right-of-way or easement. For cul-de-sacs and turnarounds, easements for slope maintenance may be required by the Town Engineer.

13. All cut slopes and fill slopes shall be landscaped or treated in such a manner that the slopes blend into the natural appearance of the hillside. Such blending shall be accomplished within one year of the start of any roadway improvements and shall be required before the release of the Assurance of Construction bond on the improvements within the subdivision.

14. All excavated material from a right-of-way shall be removed from the right-of-way or contained behind retaining walls or otherwise hidden in order that no fill material will be visible from any public or private road.

15. Roadway retaining walls shall not exceed 8 feet in height. Roadway retaining walls over 4 feet in height shall not exceed 100 feet in length. Roadway retaining walls shall be veneered with natural rock compatible to the site.

16. Intersecting roads shall not be graded at their intersection so as to create an obstruction to vision which extends two feet or more above the grade of either road within an area formed by the lot lines on the road sides of such lot and a line joining points on such lines located a distance of fifty (50) feet from the point of their

intersection. If excessive cut and fill is required to attain the fifty (50) foot then a lesser dimension (thirty (30) feet minimum) may be permitted if approved by the ~~Town~~ Council.

17. Permanent survey markers shall be installed in accordance with current Town standards at all corner, angle points, and points of curve and at all street intersections, and at all corners, angle points, and points of curve of all conservation easements. After all improvements have been installed, a registered land surveyor or civil engineer, at the expense of the developer, shall check the location of markers, correct any inaccuracies, and certify their accuracy.

18. Percolation test and test boring logs in accordance with the requirements of the County Health Department shall be taken at the proposed subdivision prior to the submittal of the preliminary plat.

19. Any proposed sewage treatment facility shall be approved by the County Health Department prior to final plat approval.

D. MAXIMUM NUMBER OF LOTS

No lot split or subdivision subject to the provisions of this Section shall be approved when such lot split or subdivision would thereby create a greater number of lots than allowed under Section 2209 of the Zoning Ordinance of the Town of Paradise Valley and by the following **TABLE 1.**

TABLE 1 – Density / Slope Category

Average Lot Slope %	Min. Lot Size Acres	Min. Lot Size -Sq. Ft.	Average Lot Slope %	Min. Lot Size Acres	Min. Lot Size – Sq. Ft.
10%	1	43,560	41%	6.8	296,208
11%	1.01	43,996	42%	7.6	331,056
12%	1.02	44,431	43%	8.4	365,904
13%	1.04	45,302	44%	9.2	400,752
14%	1.06	46,174	45%	10	435,600
15%	1.08	47,045	46%	11	479,160
16%	1.1	47,916	47%	12	522,720
17%	1.2	52,272	48%	13	566,280
18%	1.3	56,628	49%	14	609,840
19%	1.4	60,984	50%	15	653,400
20%	1.55	67,518	51%	16	696,960
21%	1.6	69,696	52%	17	740,520
22%	1.7	74,052	53%	18	784,080
23%	1.8	78,408	54%	19	827,640
24%	1.9	82,764	55%	20	871,200
25%	2	87,120	56%	21	914,760
26%	2.2	95,832	57%	22	958,320
27%	2.4	104,544	58%	23	1,001,880
28%	2.6	113,256	59%	24	1,045,440
29%	2.8	121,968	60%	25	1,089,000
30%	3	130,680	61%	26	1,132,560
31%	3.2	139,392	62%	27	1,176,120
32%	3.4	148,104	63%	28	1,219,680
33%	3.6	156,816	64%	29	1,263,240
34%	3.8	165,528	65%	30	1,306,800
35%	4	174,240	66%	32	1,393,920
36%	4.4	191,664	67%	34	1,481,040
37%	4.8	209,088	68%	36	1,568,160
38%	5.2	226,512	69%	38	1,655,280
39%	5.6	243,936	70%	40	1,742,400
40%	6	261,360			

Article 6-8 VARIANCES AND MODIFICATIONS [535]

A. Where the Commission in its recommendations and the Council find that extraordinary hardships may result from strict compliance with these regulations, the Council may vary the regulations after receipt of recommendations for the Commission so that substantial justice may be done and the public interest secured; provided, that such variation shall not have the effect of nullifying the intent and purpose of the Master Plan or these regulations.

B. The standards and requirements of these regulations may be modified by the Council upon recommendation of the Commission in the case of a plan and program for a neighborhood unit, which in the judgment of the Commission and the Council provides for adequate public spaces and improvements for the circulation, recreation, light, air, and service needs of the tract when fully developed and populated, and which also provide such covenants or other legal provisions as will assure conformity to and achievement of the plan.

C. In granting variances and modifications, the Commission, by recommendation, and the Council may require such conditions as will, in their judgment, secure substantially the objectives of the standards or requirements so varied and modified.

Article 6-9 NON-ADMINISTRATIVE LAND MODIFICATION 86 88 491 2018-02 2019-05

6-9-1 Fees
6-9-2 Final Plats
6-9-3 Standards of Design
6-9-4 Minimum Improvements Required
6-9-5 Information Required on Final Plats
6-9-6 Hillside Development Areas
6-9-7 Procedures

Section 6-9-1 Fees

Application fees shall be in accordance with the ~~Paradise Valley~~Town Fee Schedule and shall be paid upon filing of the applicable application.

Section 6-9-2 Final Plats

A final plat and two paper prints shall be submitted with a Non-Administrative Land Modification application.

Section 6-9-3 Standards of Design

The standards of design set forth in Article 6-3 shall apply to a Non-Administrative Land Modification, except that identification signs as provided in Section 6-3-11 shall not be allowed.

Commented [PM11]: If the Council finds an amendment best serves compliance with the state law change, the text changes made for Non-Administrative Land Modification stays the same for Council review and action (except that plat/map changes on SUP-zoned property would follow the final plat/map process of Staff approval and Council review). Also, kept the lot split on site less than 2.5-net acres as Commission review/approval (Council on appeal) with a change from unanimous approval to simple majority (with no change if lot split on site less than 2.5-net acres not approved by Commission moves to Council).

Section 6-3-10 shall not apply to Non-Administrative Land Modifications. No Non-Administrative Land Modification which creates a substandard or non-conforming lot or structure shall be approved except by Council action.

Section 6-9-4 Minimum Improvements Required

The minimum improvements and bonding procedures set forth in Article 6-4 shall apply to a Non-Administrative Land Modification, except that street improvements may be waived if the existing streets adjacent to the Non-Administrative Land Modification are comparable to the streets on adjacent properties.

Section 6-9-5 Information Required on Final Plats

Where applicable, the information required on final plats as specified in Article 6-6 shall apply to Non-Administrative Land Modifications.

Section 6-9-6 Hillside Development Area

The provisions of Article 6-7 shall apply to a Non-Administrative Land Modification.

Section 6-9-7 Procedures

A. A Non-Administrative Land Modification is only allowed for an existing lot, parcel, tract of land or combination thereof identified in the official records of the Town and the Maricopa County Recorder, Arizona, at the time of the filing of the application.

B. ~~A Non-Administrative Land Modification shall follow the final plat/map process in accordance with Section 6-2 of the Town Code.~~ A Non-Administrative Land Modification shall be subject to ~~Town~~ Council review and approval with the exception of Lot Splits approved pursuant to Section 6-9-7(C) reviewed and approved by the Commission and appealable to Council, certain plat/map applications on property with Special Use Permit zoning pursuant to Section 6-9-7(D) that is approved by Staff with Council review, and a plat/map that includes a variance or modification request pursuant to Article 6-8 of the Town Code that requires Commission review and recommendation, and Council review and action.

C. A Lot Split application on non-Special Use Permit zoned property shall be reviewed by ~~Town s~~Staff for compliance with the Town Code and Zoning Ordinance, and any other applicable requirements. After review by the ~~Town s~~Staff, the Lot Split application shall be submitted to the ~~Planning and Zoning~~ Commission, and if approved by a simple majority ~~unanimous~~ vote of the ~~Planning~~ Commission, then the Lot Split shall be deemed approved. If the Lot Split application is not approved by ~~a unanimous vote of~~ the

Commented [PM12]: Retaining the Commission review of Lot Splits since state law seems to still allow for a different procedure for splits on 2.5-acre lots or less. The change is removing the unanimous vote to simple majority vote as this process is administrative. A.R.S. § 9-463(3) definitions "Land splits" as used in this article means the division of improved or unimproved land whose area is two and one-half acres or less into two or three tracts or parcels of land for the purpose of sale or lease" and Pursuant to A.R.S. § 9-463.01(T), the legislative body of a city or town *may* regulate these lot splits, but only the dividing lines, area and shape of the parcels.

~~Planning~~ Commission, including a vote to deny, then the Lot Split application shall be subject to ~~Town~~ Council review and approval.

D. A Non-Administrative ~~Lot~~Land Modification application (e.g. Lot Split, Lot Split (Exempt), Lot Line Adjustment, Easement Modification) on property with Special Use Permit zoning shall follow the final plat/map process for Staff approval in accordance with Section 6-2 of the Town Code, ~~and~~ the applicable Special Use Permit provisions, and are subject to ~~Town~~ Council review ~~and approval~~.

E. Applicants for a Non-Administrative ~~Lot~~Land Modification application must first submit a pre-application for ~~s~~Staff review in accordance with Section 2-5-2(E) of the Town Code. Deficiencies in the application that are identified by the ~~Town s~~Staff during the pre-application process will be brought to the applicant's attention. Pre-application is a required and informal review where major issues will be identified.

F. Upon the filing of a Non-Administrative ~~Lot~~Land Modification application, the ~~Town s~~taff shall review the application for completeness and compliance with applicable Town Codes, including Zoning Ordinance and any Special Use Permit provisions.

G. Requests for Non-Administrative ~~Lot~~Land Modifications shall meet the minimum size, setback, and other requirements of the underlying zoning district for the property at issue as specified in the Zoning Ordinance, official zoning map, and/or the Special Use Permit (if applicable) for the property, as well as the lot arrangement and configuration requirements specified in Section 6-3-5.

H. After a Non-Administrative ~~Lot~~Land application is approved by the ~~Planning~~ Commission and/or ~~Town~~ Council, if appropriate, it may thereafter be recorded with the Maricopa County Recorder, Arizona.

Commented [PM13]: If Council finds an amendment best serves with the state law change, the text change made is for any plat adjustment on an SUP to go through the Staff approval and Council review process (in lieu of a Council study session/meeting). This matches the text change in Section 6-2-3 on final plat/map allows for the Staff approval/Council review process on all zoning types (including SUP sites).

Article 6-10 ADMINISTRATIVE LAND MODIFICATION 2019-05

Commented [PM14]: No process changes since this is already a staff process.

6-10-1 Fees
6-10-2 Administrative Plat Maps Required
6-10-3 Standards of Design
6-10-4 Minimum Improvements Required
6-10-5 Information Required on Final Plats
6-10-6 Hillside Development Areas
6-10-7 Administrative Land Modification Procedures

Section 6-10-1 Fees

Application fees shall be in accordance with the Paradise Valley Master Fee Schedule and shall be paid upon filing of the applicable application.

Section 6-10-2 Administrative Plat Maps Required

An Administrative Plat Map and two paper prints shall be submitted with an Administrative Land Modification application.

Section 6-10-3 Standards of Design

With the exception of Section 6-3-10 and Section 6-3-11, the standards of design set forth in Article 6-3 shall apply to Administrative Land Modifications.

Section 6-10-4 Minimum Improvements Required

The minimum improvements and bonding procedures set forth in Article 6-4 shall apply to an Administrative Land Modification, except that compliance with street or other required minimum improvements may be waived by the concurrence of the Town Engineer and Community Development Director if the existing streets or other minimum improvements servicing the property for which the Administrative Land Modification has been requested are deemed to be adequate at the time of application.

Section 6-10-5 Information Required on Administrative Plat Maps

Where applicable, the information required on Final Plats as specified in Article 6-6 shall apply to an Administrative Land Modification.

Section 6-10-6 Hillside Development Area

The provisions of Article 6-7 shall apply to an Administrative Land Modification.

Section 6-10-7 Procedures

A. An Administrative Land Modification is only allowed for an existing lot, parcel, tract of land or combination thereof identified in the official records of the Town and the Maricopa County Recorder, Arizona, at the time of the filing of the Administrative Land Modification application.

B. An Administrative Land Modification may be approved by ~~Town s~~Staff in accordance with this Section.

C. Applicants for an Administrative Land Modification must first complete a pre-application review process in accordance with Section 2-5-2(E) of the Town Code. Deficiencies in the application that are identified by the ~~Town s~~Staff during the pre-application process will be brought to the applicant's attention. The pre-application phase is a required and informal review where major issues will be identified.

D. Upon the filing of an Administrative Land Modification application, the ~~Town s~~Staff shall review the application for completeness and compliance with applicable Town Codes, including the Zoning Ordinance.

E. Request for an Easement Modification made in an Administrative Land Modification application shall comply with all Town Code requirements, including relevant development and design standards. Documentation such as, but not limited to, a drainage report, drainage study, drainage easement maintenance agreement, and/or written correspondence from affected utility companies may be required in conjunction with a request for an Easement Modification. Easement Modifications do not include the abandonment or release of easement.

F. Requests for a Lot Line Adjustment and/or a Lot Split (Exempt) made in an Administrative Land Modification application must meet the minimum size, setback, and other requirements of the underlying zoning district for the property at issue as specified in the Zoning Ordinance and official zoning map for the property, as well as the lot arrangement and configuration requirements specified in Section 6-3-5.

G. If an application for an Administrative Land Modification does not meet the standards of design per Article 6-3 and other Town Code requirements for an Administrative Land Modification, ~~s~~Staff shall reject the application and advise the applicant to instead submit an application for a Non-Administrative Land Modification, such as for a Lot Split, Lot Split (Exempt), Lot Line Adjustment, Subdivision Plat or Replat, which shall then be processed pursuant to Article 6-2, Article 6-8, and/or Article 6-9 of the Town Code, as applicable.

H. If, after a final review, the Town staff determines that the application is in full compliance with this Article and all other Town Codes, the application may be approved administratively and, if appropriate, thereafter recorded with the Maricopa County Recorder, Arizona.

FOOTNOTES

34 Ordinance #118 - 5/27/76
35 Ordinance #151 - 4/26/79
36 Ordinance #161 - 2/28/80
83 Ordinance #279 - 6/25/81
86 Ordinance #183 - 6/25/81
88 Ordinance #185 - 8/27/81
112 Ordinance #221 - 9/27/84
115 Ordinance #224 - 12/6/84
121 Ordinance #231 - 7/25/85
134 Ordinance #250 - 9/25/86
144 Ordinance #260 - 2/12/87
145 Ordinance #262 - 3/26/87
170 Ordinance #295 - 2/9/89
185 Ordinance #310 - 4/12/90
205 Ordinance #335 - 3/12/92
351 Ordinance #351 - 9/29/92
375 Ordinance #375 - 8/25/94
406 Ordinance #406 - 9/28/95
432 Ordinance #432 - 12/19/96
459 Ordinance #459 - 03/12/98
478 Ordinance #478 - 01/14/99
491 Ordinance #491 - 11/18/99
513 Ordinance #513 – 06/28/2001
535 Ordinance #535 – 10/09/2003
540 Ordinance #540 – 5/27/2004
545 Ordinance #454 – 10/14/2004 (Amend effective date of Ordinance 535)
564 Ordinance #564 – 11/03/2005
601 Ordinance #601 – 02/28/2008
Ordinance 2018-02 – 03/22/2018
Ordinance 2018-11 – 05/31/2018
Ordinance 2019-05 – 06/13/2019

Section 4. If any provision of this ordinance is for any reason held by any court of competent jurisdiction to be unenforceable, such provision or portion hereof shall be deemed separate, distinct, and independent of all other provisions, and such holding shall not affect the validity of the remaining portions of this ordinance.

Section 5. The Mayor, the Town Manager, the Town Clerk, and the Town Attorney are hereby authorized and directed to take all steps necessary to carry out the purpose and intent of this ordinance.

[Signatures on following page]

PASSED AND ADOPTED by the Mayor and Town Council of the Town of Paradise Valley, Arizona, this _____ day of _____, 2025.

_____
Mark Stanton, Mayor

ATTEST:

_____
Duncan Miller, Town Clerk

APPROVED AS TO FORM:

_____
Andrew J. McGuire, Town Attorney

TOWN OF PARADISE VALLEY

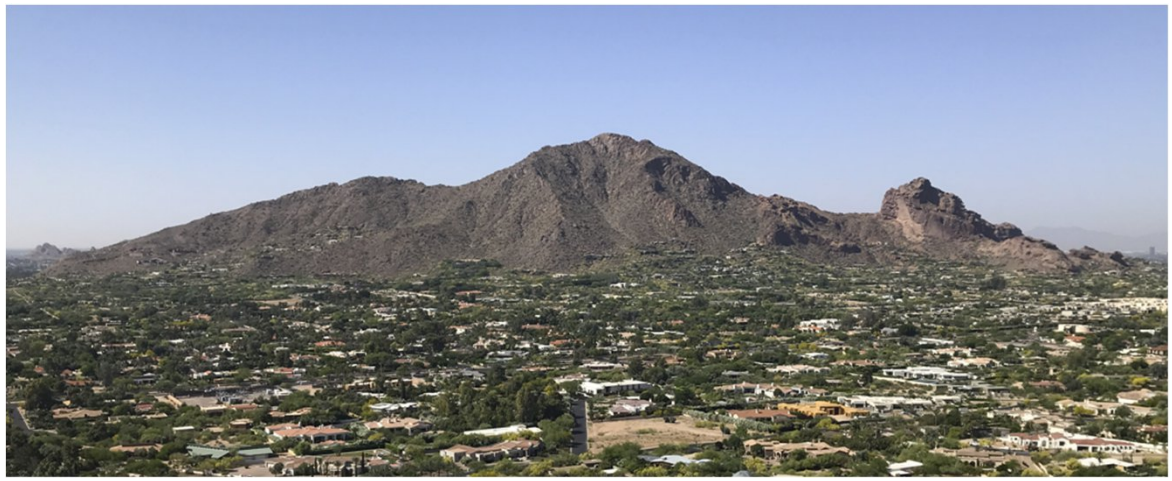
Administrative Review Plat Applications Text Amendment Work Session



Town Council
November 13, 2025

TODAY'S GOAL & AGENDA

- **Discuss amendments on administrative review of certain plat applications in accordance with current State of Arizona legislation**



BACKGROUND

- Legislature of State of Arizona passed House Bill 2447 in 2025
- Requires (‘shall’ rather than ‘may’) municipalities to authorize administrative personnel to review and approve site plans, development plans, land divisions, lot line adjustments, and plat amendments, and to review and approve design review plans based on objective standards, without a public hearing
- Allows municipalities to adopt a self-certification program for registered architects and professional engineers, allowing them to be responsible for compliance with ordinances and construction standards
- Becomes effective on January 1, 2026

HOUSE BILL 2447

H.B. 2447

Be it enacted by the Legislature of the State of Arizona:

Section 1. Section 9-500.49, Arizona Revised Statutes, is amended to read:

9-500.49. Administrative review and approval; self-certification program; expedited approval; definitions

A. Notwithstanding any other law, the legislative body of a city or town ~~may~~ SHALL by ordinance do the following:

1. Authorize administrative personnel to review and approve site plans, development plans, land divisions, lot line adjustments, lot ties, preliminary plats, final plats and plat amendments without a public hearing.

2. Authorize administrative personnel to review and approve design review plans based on objective standards without a public hearing.

~~3. Adopt a self-certification program allowing registered architects and professional engineers to certify and be responsible for compliance with all applicable ordinances and construction standards for projects that the ordinance identifies as being qualified for self-certification.~~

~~4.~~ 3. Allow at-risk submittals for certain on-site preliminary grading and drainage work or infrastructure.

~~5.~~ 4. Allow applicants with a history of compliance with building codes and regulations to be eligible for expedited permit review.

B. NOTWITHSTANDING ANY OTHER LAW, THE LEGISLATIVE BODY OF A CITY OR TOWN MAY BY ORDINANCE ADOPT A SELF-CERTIFICATION PROGRAM ALLOWING REGISTERED ARCHITECTS AND PROFESSIONAL ENGINEERS TO CERTIFY AND BE RESPONSIBLE FOR COMPLIANCE WITH ALL APPLICABLE ORDINANCES AND CONSTRUCTION STANDARDS FOR PROJECTS THAT THE ORDINANCE IDENTIFIES AS BEING QUALIFIED FOR SELF-CERTIFICATION.

~~B.~~ C. Applications for a license pursuant to this section are subject to chapter 7, article 4 of this title.

~~C.~~ D. For the purposes of this section: ~~:~~

1. "LICENSE" HAS THE SAME MEANING PRESCRIBED IN SECTION 9-831.

2. "Objective" means not influenced by personal interpretation, taste or feelings of a municipal employee and verifiable by reference to an adopted benchmark, standard or criterion available and knowable by the applicant or proponent.

Sec. 2. Effective date

This act is effective from and after December 31, 2025.

- Council updated on the legislation
- Council executive session on topic September 11th
- Based on discussion is draft Ordinance 2025-05

PROCESS

- Unlike text amendments to the Zoning Ordinance, a text amendment to the Town Code provisions only requires Council review and action
- Commission provided input during November 4th study session
  - Consider lot split on a site under 2.5-net acres be appealable to Council instead of directly moving to Council if denied (After discussion, current process directly to Council on denial seen most expeditious)
  - Provide some latitude on compliance to the side lot lines at 90 degrees
    - Discussion on the proposed term “nearly” 90 degrees to quantify it
    - Suggestion to apply staff approval and 7-day Commission review process to allow for a 2nd look and still streamline this modification

DRAFT ORDINANCE 2025-05

- General approach is Town processes related to site plans, development plans, land divisions, lot line adjustments, and plat amendments are already administrative
- Opportunity to clarify and further define the administrative process
- Current processing remains the same for preliminary plat, replat, easement or right-of-way abandonment, and administrative land modification
- Refer to Land Modification Process Table Attachment for more information

SUMMARY OF CHANGES

- Correct Section 6-2-3 by removing the word “final plat” as Commission is not the approver of a final plat
- Modify the Chapter 6 final plat/map process from Council review/action to staff approval process with 7-day Council review
  - Mayor still sign the final plat
  - Applies to any zoning district (including Special Use Permit - SUP)
  - Council will still review/act if Commission rejects the preliminary plat or plat modifies the subdivision standards pursuant to Article 6-8
  - Commission/Council will see the final plat/map if the applicant requests a private road Conditional Use Permit (CUP) and/or the application includes a SUP for a private roadway gate (as these processes remain the same)
  - All final plats require a preliminary plat (which Commission reviews/approves)

Section 6-2-3 Final Plat/Map [2018-02, 2018-11]

A. No ~~Planning~~ Commission or Council approval is required for the final plat/map within any zoning district unless ~~s~~Staff determines that the final plat/map does not comply with the stipulations of the preliminary plat/map approved by the ~~Town's Planning~~ Commission (or the stipulations imposed by the ~~Town~~ Council should the plat/map have required Council approval in accordance with Article 6-8, Variances and Modifications, of Chapter 6 of the Town Code, if any) or contains substantial differences from such preliminary plat/map. If ~~s~~Staff so determines, then ~~Planning~~ Commission ~~approval~~recommendation to the Council of the final plat/map is required. The ~~Planning~~ Commission shall act on the final plat/map no later than fourteen (14) calendar days after ~~s~~Staff deems the application complete. If no ~~Planning~~ Commission approval is required, then the ~~Town~~ Council shall act on the final plat/map application within forty (40) calendar days from when staff deems the application complete. If ~~Planning~~ Commission approval was required, then the ~~Town~~ Council shall act on the final plat/map application within forty (40) calendar days from the date that the ~~Planning~~ Commission has approved the final plat/map. A final plat/map application request shall be approved by the ~~Town~~ Council if it is determined to comply with the stipulations of the preliminary plat/map approved by the ~~Town's Planning~~ Commission along with all of the other requirements set forth in this Section.

B. Subdividers or plat engineers shall obtain final plat/map review by the Town Engineer and other officials and agencies concerned prior to ~~presentation~~ final action on the final plat/map.

C. Following the pre-application conference, if any, the subdivider shall submit to the Town (1) the formal plat/map application on a form prescribed by the Town, (2) the fee set forth in the Town of Paradise Valley Fee Schedule, as such may be amended from time to time, and (3) all documents and materials deemed necessary by the Town to be in compliance with Chapter 6, Subdivisions, of the Town Code.

D. Upon receipt of a complete submittal including all of the information and fees as set forth in Chapter 6, Subdivisions of the Town Code, Staff will review the submittal within a reasonable time to verify the final plat/map meets requirements and completion of any required conditions (e.g., assurances). If not met, the applicant will make any necessary revisions and/or submittals. If met, Staff will transmit to the Town Manager (or designee) a copy of the final plat/map, together with a written report outlining compliance within two business days of making the determination.

E. The Town Manager (or designee) shall transmit all determinations approving the final plat/map to the Council within two business days of receiving the met determination of Section 6-2-3(D) above.

F. The Town Manager's (or designee's) decision shall be final, and the Mayor (or designee) and applicable Staff shall sign the final plat/map in preparation for recordation with the recorder of Maricopa County, Arizona, subject to Council review as set forth in Section 6-2-3(G).

G. If, within seven calendar days after the Town Manager's (or designee's) written determination, at least three members of the Council submit a written request to the Town Manager, the Council shall have the authority to review the approved final plat/map application. Such review shall be considered at a Council meeting within 14 calendar days after the Town Manager's receipt of the third written request pursuant to this Section. The Council's review shall be limited to a determination, by a majority vote of the members present and not otherwise disqualified, as to whether the Town Manager's (or designee's) decision meets the requirements outlined in Chapter 6, Subdivisions, of the Town Code. If the Council decides that the criteria have been met, then there shall be no further consideration, and the final plat/map approval is final. If the Council determines that the requirements have not been met, the Council may deny the final plat/map, in whole or in part. A majority vote of the members present and not otherwise disqualified shall be necessary to deny or modify the decision of the Town Manager (or designee); otherwise the Town Manager's written determination shall be deemed affirmed.

Article 6-3 STANDARDS OF DESIGN [170 535]

6-3-1 Relation to Adjoining Street Systems
6-3-2 Right-of-way, Street and Alley Width, Cul-de-Sac, Half Street, Alley [86 115]
6-3-3 Easements
6-3-4 Blocks
6-3-5 Lots [432 564]
6-3-6 Building Lines
6-3-7 Public Reservations
6-3-8 Easement Along Streams [513 601]
6-3-9 Building in Designated Flood Plain Areas
6-3-10 Character of Development
6-3-11 Subdivision Identification Signs [34 83 170]
6-3-12 Subdivision Walls or Fences [36 375]

Section 6-3-1 Relation to Adjoining Street Systems

A. The arrangement of streets in new subdivisions shall make provision for the continuation of the principal existing streets in adjoining areas or their proper projections where adjoining land is not subdivided insofar as they may be deemed necessary for public requirements. The width of streets in new subdivisions shall be not less than the minimum width established by the Town.

SUMMARY OF CHANGES

- Correct General Plan reference of the width of all rights-of-way and streets to Typical Street Cross Sections to match existing process
- Allow under Lots that all side lines of lots shall be at nearly right angles to straight street lines as the current wording technically requires a variance/modification process if the property line is not exactly 90 degrees

SUMMARY OF CHANGES

- Correct reference regarding lighting under subdivision walls or fences from submitted with SUP application to under Article XI, Special Uses And Additional Use Regulations to match existing process
- Correct under hillside provision that private roadways are approved by CUP and not SUP to match existing process and public roads not decorative surface material

SUMMARY OF CHANGES

- Modify lot split on a non-SUP property be approved by simple majority vote instead of unanimous vote
  - This is the only plat requiring unanimous approval
  - No change with Commission review/action (appealable to Council)
  - No change if not approved moves onto Council
- Modify Non-Administrative Land Modification process on SUP property follow final plat/map process of staff approval with 7-day Council review
  - Excludes preliminary plat, final plat, & replat (different processing)
  - Retain level of Council review as not always a SUP amendment and SUP is tailored zoning compared to the other zoning districts

Section 6-3-10 shall not apply to Non-Administrative Land Modifications. No Non-Administrative Land Modification which creates a substandard or non-conforming lot or structure shall be approved except by Council action.

Section 6-9-4 Minimum Improvements Required

The minimum improvements and bonding procedures set forth in Article 6-4 shall apply to a Non-Administrative Land Modification, except that street improvements may be waived if the existing streets adjacent to the Non-Administrative Land Modification are comparable to the streets on adjacent properties.

Section 6-9-5 Information Required on Final Plats

Where applicable, the information required on final plats as specified in Article 6-6 shall apply to Non-Administrative Land Modifications.

Section 6-9-6 Hillside Development Area

The provisions of Article 6-7 shall apply to a Non-Administrative Land Modification.

Section 6-9-7 Procedures

A. A Non-Administrative Land Modification is only allowed for an existing lot, parcel, tract of land or combination thereof identified in the official records of the Town and the Maricopa County Recorder, Arizona, at the time of the filing of the application.

B. ~~A Non-Administrative Land Modification shall follow the final plat/map process in accordance with Section 6-2 of the Town Code.~~ A Non-Administrative Land Modification shall be subject to ~~Town~~ Council review and approval with the exception of Lot Splits approved pursuant to Section 6-9-7(C) reviewed and approved by the Commission and appealable to Council, certain plat/map applications on property with Special Use Permit zoning pursuant to Section 6-9-7(D) that is approved by Staff with Council review, and a plat/map that includes a variance or modification request pursuant to Article 6-8 of the Town Code that requires Commission review and recommendation, and Council review and action.

C. A Lot Split application on non-Special Use Permit zoned property shall be reviewed by ~~Town s~~Staff for compliance with the Town Code and Zoning Ordinance, and any other applicable requirements. After review by the ~~Town s~~Staff, the Lot Split application shall be submitted to the ~~Planning and Zoning~~ Commission, and if approved by a simple majority ~~unanimous~~ vote of the ~~Planning~~ Commission, then the Lot Split shall be deemed approved. If the Lot Split application is not approved by ~~a unanimous vote of~~ the

~~Planning~~ Commission, including a vote to deny, then the Lot Split application shall be subject to ~~Town~~ Council review and approval.

D. A Non-Administrative ~~Lot~~Land Modification application (e.g. Lot Split, Lot Split (Exempt), Lot Line Adjustment, Easement Modification) on property with Special Use Permit zoning shall follow the final plat/map process for Staff approval in accordance with Section 6-2 of the Town Code, ~~and~~ the applicable Special Use Permit provisions, and are subject to ~~Town~~ Council review ~~and approval~~.

E. Applicants for a Non-Administrative ~~Lot~~Land Modification application must first submit a pre-application for ~~s~~Staff review in accordance with Section 2-5-2(E) of the Town Code. Deficiencies in the application that are identified by the ~~Town s~~Staff during the pre-application process will be brought to the applicant's attention. Pre-application is a required and informal review where major issues will be identified.

F. Upon the filing of a Non-Administrative ~~Lot~~Land Modification application, the ~~Town s~~staff shall review the application for completeness and compliance with applicable Town Codes, including Zoning Ordinance and any Special Use Permit provisions.

G. Requests for Non-Administrative ~~Lot~~Land Modifications shall meet the minimum size, setback, and other requirements of the underlying zoning district for the property at issue as specified in the Zoning Ordinance, official zoning map, and/or the Special Use Permit (if applicable) for the property, as well as the lot arrangement and configuration requirements specified in Section 6-3-5.

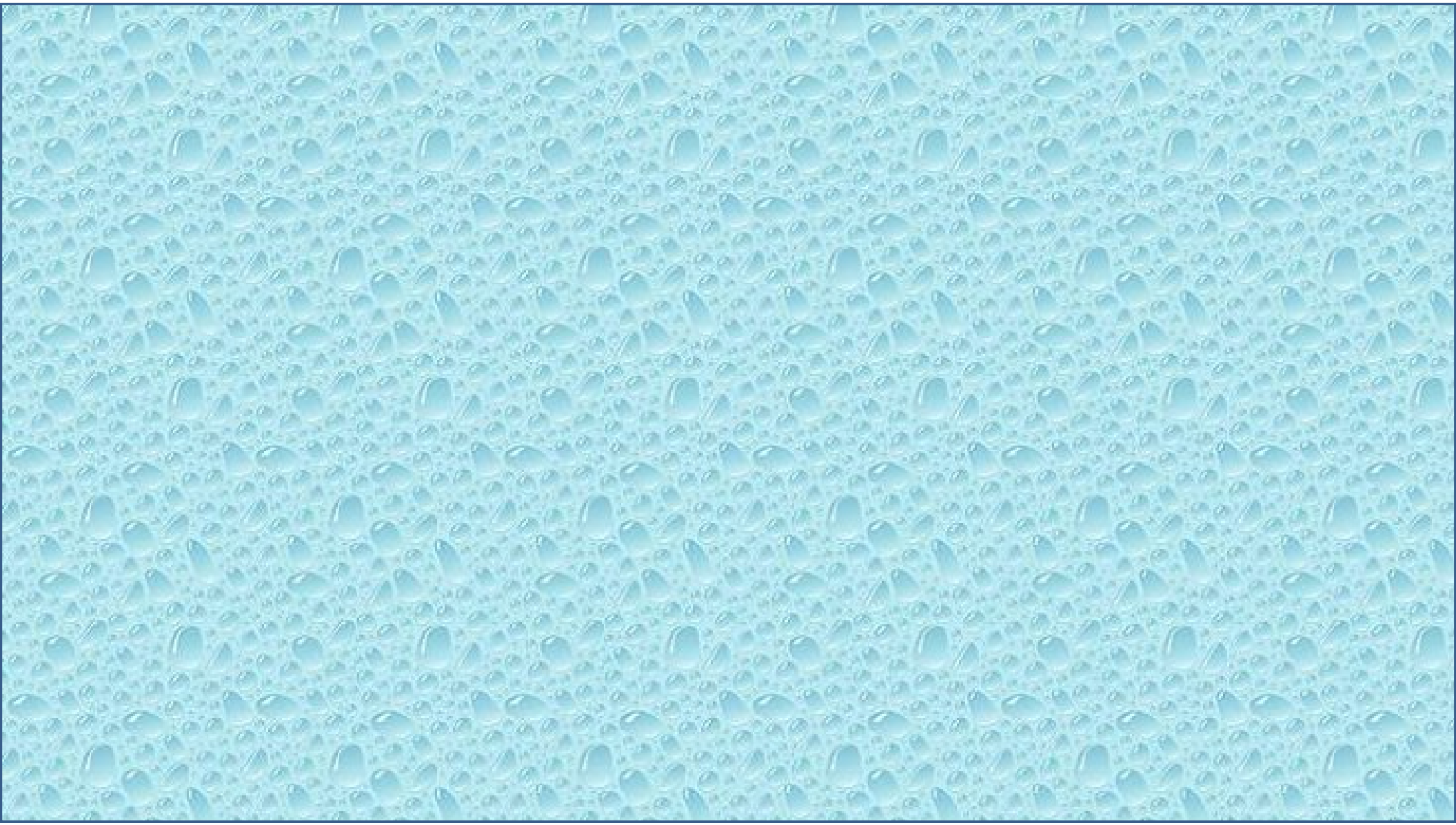
H. After a Non-Administrative ~~Lot~~Land application is approved by the ~~Planning~~ Commission and/or ~~Town~~ Council, if appropriate, it may thereafter be recorded with the Maricopa County Recorder, Arizona.

SUMMARY OF CHANGES

- No change to process when include a deviation from Chapter 6, Article 6-8, Variances and Modifications, requiring Commission review and recommendation followed by Council review and action
- No changes to other ancillary processes that may accompany a plat application
  - Private Road CUP of Commission review/action (appealable to Council)
  - Private Gate SUP of Council Statement of Direction, Commission review/recommendation, and Council review/action
  - SUP amendment process of Commission and/or Council review/action

NEXT STEPS/QUESTIONS

- **December 11th** Council Public Hearing



Action Report

File #: 25-234

AGENDA TITLE:
Discussion of Sanitary Sewer Manhole Inventory Update

STAFF CONTACT:

TOWN
Of
PARADISE VALLEY

STAFF REPORT

TO: **Mayor Stanton and Town Council Members**

FROM: **Andrew Ching, Town Manager**
Chad Weaver, Community Development Director
Shar Johnson, Town Engineer
Sam Kayat, CIP Manager

DATE: **November 13th, 2025**

DEPARTMENT: Community Development - Engineering
Sam Kayat, 480-348-3541

AGENDA TITLE: Locating Missing Manholes

SUMMARY STATEMENT

Town staff is providing project update and seeking Council approval to move forward with Phase Two of the missing sewer manhole locating effort. These manholes were not located during the Town's 2021 sanitary sewer assessment or in the initial search conducted by staff and the Town's consultant in Phase One of the search for missing manholes. As a result, they remain uninspected and without structural evaluation. Phase Two will utilize advanced technologies to locate and assess the remaining manholes.

RECOMMENDATION

Authorize Town manager to execute contract No. CON-26-018-ENG with Michael Baker International for amount not to exceed $101,163 for phase II of sanitary sewer manhole locating services.

BACKGROUND

- October 2024**:** Engineering staff became aware of missing manholes that had not been located during the Town's sanitary sewer assessment concluded in 2021.
- December 2024**:** Staff requested and received an updated count of missing manholes from the consultant who performed the 2021 assessment. The consultant reported 129 missing manholes**.**
- January to March 2025: Staff conducted their own field search and successfully located 55 of the missing manholes. The remaining manholes required specialized equipment to locate.
- May 2025**:** The Town retained Michael Baker International to conduct a more detailed search. The work was divided into two phases:

- Phase One**:** Utilized ground penetrating radar (GPR) and metal detectors to locate as many manholes as possible. This phase concluded in June 2025, with 25 manholes located**.**
- Phase Two (upcoming): Will use more advanced technologies to continue searching for the remaining 49 missing manholes.

Phase two of the search will use robotic crawlers equipped with cameras and sounders to locate manholes, mark found manholes, expose manholes if possible and update manhole location in the Town's geographic information system (GIS).

BUDGETARY IMPACT

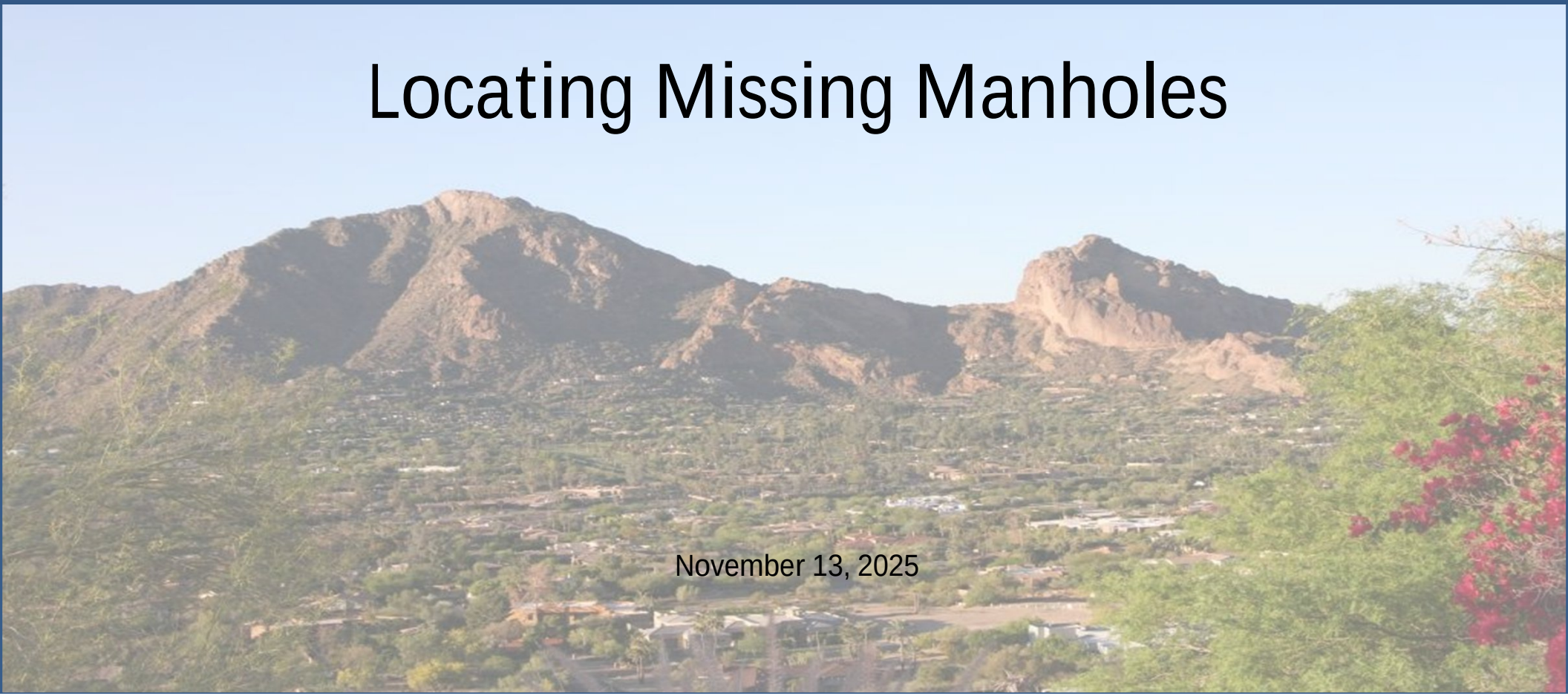
The Town's FY26 CIP budget includes $150,000 for sanitary sewer assessment. The current estimated cost to complete this task is $101,163.

ATTACHMENT(S):

A. Staff Report
B. Presentation
C. Contract No. CON-26-018-ENG

TOWN OF PARADISE VALLEY

Locating Missing Manholes



November 13, 2025

PRESENTATION'S HIGHLIGHTS



MISSING MANHOLES

In October 2024, staff became aware of missing manholes that had not been located during the Town's sanitary sewer assessment completed in 2021.

In December 2024, staff received an updated report confirming that 129 manholes remain unaccounted for within the Town.

PREVIOUS LOCATING EFFORTS

- Staff conducted field search and successfully located 55 MH.
- Remaining MH required specialized equipment to locate.
- In May 2025, the Town retained Michael Baker International to conduct a more detailed search. The work was divided into two phases.
- Phase One utilized GPR and metal detectors to locate as many MH as possible. Concluded in June 2025, with 25 MH located.

* GPR = Ground Penetrating Radar

PROPOSED PHASE II

Phase Two will employ more advanced technologies to locate the remaining 49 missing manholes.

Use robotic crawlers with sounder & camera

Mark & expose found manholes

Update manhole locations in Town's GIS*

*GIS = Geographic Information System

PHOTOS OF TOOLS



Ground Penetrating Radar (GPR)



Robotic Crawler

PROJECT'S COST VS BUDGET

The Town's FY26 CIP budget includes $150,000 for Sanitary Sewer Assessment. The current estimated cost to complete this task is $101,163.

PROJECT TIMELINE

Task	Date
Contract approval (*)	November 2025
Notice to proceed	December 2025
Anticipated start	January 2026
Estimated duration	60 days

(*) Council action

RECOMMENDED COUNCIL ACTION

Authorize Town Manager to execute contract No. CON-26-018-ENG with Michael Baker International in the amount not-to-exceed $101,163.00 for phase II of Sanitary Sewer Manhole Locating Services.

Thank You

Questions?

ON-CALL PROFESSIONAL SERVICES AGREEMENT
BETWEEN
THE TOWN OF PARADISE VALLEY
AND
MICHAEL BAKER INTERNATIONAL, INC.

WORK AUTHORIZATION #1

On-Call Professional Services for Civil Engineering

THIS WORK AUTHORIZATION #1 (this "Work Authorization") is entered into as of _____, between the Town of Paradise Valley, an Arizona municipal corporation (the "Town"), and Michael Baker International, Inc, a Pennsylvania corporation (the "Consultant"). The Consultant will perform the Scope of Work detailed in Section 1, below, pursuant to the terms and conditions of On-Call Professional Services Agreement No. CON-26-018-ENG, dated October 15, 2025, (the "Agreement").

1. Scope of Work. The Consultant shall provide civil engineering services for the Sewer Manhole Mapping and Locating Project – Phase 2, described in **Attachment 1** to this Work Authorization. Upon acceptance by the Town, this Work Authorization will become part of the Agreement and attached thereto as part of Exhibit D.

2. Schedule of Completion of Services. The Consultant shall commence work immediately upon execution of this Work Authorization and complete the work required herein within 120 days of said execution, in accordance with the schedule set forth as part of **Attachment 1** to this Work Authorization.

3. Fee Breakdown. The total cost to complete the Scope of Work required under this Work Authorization shall not exceed $101,163.

4. Subject to the Agreement. This Work Authorization is subject to the terms and conditions of the Agreement.

5. Conflict of Interest. The Town may cancel this Work Authorization pursuant to Ariz. Rev. Stat. § 38-511.

4. Forced Labor of Ethnic Uyghurs. To the extent applicable under Ariz. Rev. Stat. § 35-394, the Consultant warrants and certifies that it does not currently, and agrees that it will not use, for the duration of this Agreement, the forced labor, any goods or services produced by the forced labor, or any contractors, subcontractors, or suppliers that use the forced labor or any goods

or services produced by the forced labor of ethnic Uyghurs in the People's Republic of China.

IN WITNESS WHEREOF, the parties hereto have executed this Work Authorization as of the date and year first set forth above.

"**Town**"

TOWN OF PARADISE VALLEY,

an Arizona municipal corporation

Andrew Ching, Town Manager

ATTEST:

Duncan Miller, Town Clerk

APPROVED AS TO FORM:

Andrew J. McGuire, Town Attorney
Gust Rosenfeld, PLC

"**Consultant**"

MICHAEL BAKER INTERNATIONAL, INC.
a Pennsylvania corporation

By: A. J. M. C.

Name: Tony Cabrera

Title: Vice President, Office Executive

ATTACHMENT 1
TO
ON-CALL PROFESSIONAL SERVICES AGREEMENT
BETWEEN
THE TOWN OF PARADISE VALLEY
AND
MICHAEL BAKER INTERNATIONAL, INC.
WORK AUTHORIZATION #1

On-Call Professional Services for Civil Engineering

[Scope of Work]

See following pages.

Michael Baker
INTERNATIONAL

We Make a Difference

August 14, 2025

Mr. Sam Kayat, PE
CIP Manager
Town of Paradise Valley
6401 E. Lincoln Drive
Paradise Valley, Arizona 85253

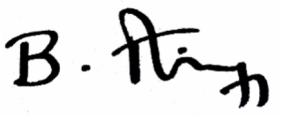
Subject: Sewer Manhole Mapping and Locating Project – Phase 2

Dear Mr. Kayat,

Michael Baker International, Inc. (**MBI**) is pleased to present this Scope of Work and Fee to map and locate 49 Sewer Manholes that have been identified as not found by the previous investigations and inspection reports, located in the Town of Paradise Valley (**TOPV**), Arizona. Should the attached meet your expectations, then we should discuss how to proceed towards an executed contract to complete this work.

Adrian Navarro will be the Project Manager (**PM**) on this project and can be reached at 602-798-7565 (office), 602-284-7608 (mobile) or by email anavarro@mbakerintl.com. Please feel free to contact me or Adrian with any questions or comments you may have.

Sincerely,



Thirumurugan Bose, P.E, CFM
Department Manager - Water

Attachments: Exhibit A – Scope of Work
Exhibit B – Fee Proposal

Exhibit A

SCOPE OF WORK

Sewer Manhole Mapping and Locating Project – Phase 2

Section 1 – Summary

Town of Paradise Valley (TOPV) has requested Michael Baker International (MBI) to locate 49 Sewer Manholes using intrusive methods that have been identified as not found by the TOPV and previous inspection reports identified to have been inaccessible, covered over or buried. The tasks included within represent the specific scope of work that shall be completed by MBI.

MBI will locate the 49 manholes using a closed-circuit television video (CCTV), sondes, remote crawls and other equipment to locate the covered manholes within the project location show in Figure 1 below.

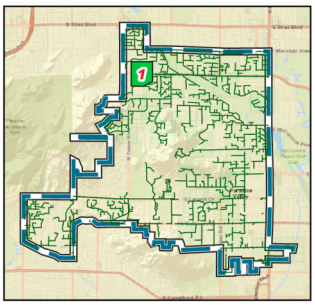


Figure 1 – Project Location

The following tasks shall be addressed as part of the project:
Task 1 – Meetings, Progress and Reporting
Task 2 – GIS Mapping
Task 3 – Utility Locating

Summary of Fees:

Tasks	Fee
Task 1 – Meetings, Progress, and Reporting	$15,736
Task 2 – GIS Mapping	$5,302
Task 3 – Utility Locating	$64,125
Overhead Direct Costs	$6,000
Owner Allowance	$10,000
TOTAL	**$101,163**

Section 2 – Tasks

Task 1: Meeting, Progress and Reporting

MBI shall schedule and facilitate a kickoff conference call with the TOPV, to discuss the project, scope of work, request documentation, execution of work plan and associated schedule. A Kick-off Meeting shall be scheduled after the Notice to Proceed is issued or at the discretion of TOPV.

MBI shall also schedule and facilitate two (2) progress meetings with TOPV prior to reporting the findings.

MBI will prepare a work plan to coordinate dates, notifications, access and entry locations prior to the site visits. MBI will survey locate, map and report the manholes located in the findings report. MBI will notify TOPV and homeowners prior to entry from a known manhole that includes intrusive measure to locate the missing manhole covered.

Task 2: GIS Mapping

MBI will provide GIS updates to the existing database with the latest data schema provided by TOPV. The existing TOPV sewer database will be updated to include the missing manholes. This task includes preparing exhibits and map book for utility locating and coordination.

Task 3: Utility locating

MBI shall schedule a site visits to notify and gain access to locate manhole using an intrusive method, document the existing conditions, impacts, and identify the manholes to be used for entry to locate the missing manholes and any of the problem areas within the project area.

MBI shall coordinate access, entry and traffic control with the TOPV to locate the covered or inaccessible manholes and expose found manholes covers **except** when under pavement or other structures. MBI will use the intrusive method below to locate the manholes:

- Camera with a sonder attached to cable crawler that will be traced aboveground from nearest manhole to the position of the covered manhole.

Task 4: Project Timeline and Deliverables

The proposed timeline to complete the project:

Kick Off Meeting	Within 5 calendar days from Notice to Proceed
Notification to Homeowners	Within 15 calendar days from the Notice to Proceed

1st Progress Meetings	Within 30 calendar days from the Notice to Proceed
Utility Locate	Within 60 calendar days from the Notice to Proceed
2nd Progress Meetings	Within 70 calendar days from the Notice to Proceed
Draft Reporting and Findings	Within 90 calendar days from the Notice to Proceed
Contract Completion	Within 120 calendar days from the Notice to Proceed

Task 5 - Invoicing

Invoices shall be submitted Monthly, to the TOPV, with appropriate supporting data and documentation and in a format as prescribed by TOPV. Any invoice which lists a requested payment for any individual task beyond the current approved task budget will be rejected. Task (deliverables) shall be appropriately documented. TOPV shall review and check the invoice to determine if it is complete and acceptable; if it is determined to be complete and acceptable, the TOPV will approve the invoice for payment.

Invoicing fees will be in accordance with the Exhibit B Fee Proposal.

Section 3 – Direct Expenses

Overhead Direct Cost

All overhead direct costs including reproduction, lodging, milage, courier charges, etc. shall be billed to the TOPV at cost and shall not exceed $6,000.

Owner Allowance

An owner's allowance of $10,000 has been included to cover additional expenses with CLIENT approval.

Section 4 – Exclusions

Town of Paradise Valley Responsibilities

TOPV responsibilities include, but are not limited to, the following:

- A **PM** will be assigned to represent **TOPV**.
- The **PM** will coordinate the **MBI** contract, deliverables and invoices.
- The **PM** will supply the **MBI** with printed copies of all relevant Paradise Valley reports, studies, and plans to accomplish the analysis in the scope of work. The **TOPV** shall also supply the **MBI** with electronic copies of documents when available.
- **TOPV** will provide relevant materials prepared by other **TOPV** contractors as required.
- **TOPV** will provide conference room space for scheduled meetings.
- **TOPV** will provide the **MBI** with access to any data available.

Exclusions

- Topographic Survey
- Design Report
- Construction Documents
- NASSCO Inspection and Assessment
- Construction/Post Design Services
- Legal Descriptions are not included for this project
- Potholing locating
- Any item not specifically listed in the scope of work

Note: CONSULTANT can provide the above services for an additional fee that can be negotiated with CLIENT.

EXHIBIT B - FEE PROPOSAL

Michael Baker INTERNATIONAL

Sewer Manhole Mapping and Locating Project - Phase 2

Town of Paradise Valley

Classification	Project Principal	Project Manager	Sr. GIS Analyst	Project Engineer	Designer	Project Assistant	Total Hours	Total Labor	Total
Hourly Rate:	276.00	186.00	176.00	159.00	121.00	125.00			
Project Management									
Task 1.0 – Meetings, Progress, Reporting and Coordination									
Subtask 1.1 - Kick-off Meeting		1	1	1	1	2	6	892.00	892.00
Subtask 1.2 - Coordination Meetings (Progress, Traffic Control, Work Plan, Approach and Technology)		4	2	4	2	2	14	2,224.00	2,224.00
Subtask 1.3 - Work plan and Reporting	1	2	16	24	40	4	87	12,620.00	12,620.00
Subtotal Project Management	1	7	19	29	43	8	107	15,736.00	15,736.00
Sewer Manhole Locating									
Task 2.0 – GIS Mapping									
Subtask 2.1 - Existing Sewer Basin Mapping		1	8	8	16	4	37	5,302.00	5,302.00
Task 3.0 – Utility Locating									
Subtask 3.4 - CCTV with Sondes Locating		80	147	147			374	64,125.00	64,125.00
Subtotal Design	0	81	155	155	16	4	411	69,427.00	69,427.00
Direct Expenses									
Overhead Direct Costs (equipment, reproduction, logging, mileage, delivery and postage)								6,000.00	6,000.00
Owner Allowance								10,000.00	10,000.00
Subtotal Not to Exceed	0	0	0	0	0	0	0	10,000.00	16,000.00
Total	**1**	**88**	**174**	**184**	**59**	**12**	**518**	**95,163.00**	**101,163.00**

Dose not Include below:

Topographic Survey
Potholing
Condition Inspection and Assessment
Construction/Post Design Services

Action Report

File #: 25-257

AGENDA TITLE:
Discussion of Employee Handbook Updates

STAFF CONTACT:

TOWN
Of
PARADISE VALLEY

STAFF REPORT

TO: **Mayor Stanton and Town Councilmembers**

FROM: **Andrew Ching, Town Manager**
Gina Monger, Human Resources Director

DATE: **November 13, 2025**

DEPARTMENT: Town Manager (Human Resources)
Gina Monger
gmonger@paradisevalleyaz.gov
480-348-3542

AGENDA TITLE:
***Employee Handbook* Updates**

RECOMMENDATION
The information being presented is to serve as the foundation for the proposed updates to the *Town of Paradise Valley Employee Handbook* at a future Town Council meeting.

SUMMARY STATEMENT
The *Employee Handbook* was most recently adopted by Town Council effective July 13, 2024. The revised *Employee Handbook* was intended and designed to be a "living document," and accordingly, periodic changes are needed to ensure it supports the current direction of Council and the operations of the Town, or as required by statute.

Following the application of the *Employee Handbook* since last year, some needed changes have been identified that affect *Section 202: Smoke-Free Workplace*, *Section 400: Workplace Conduct*, and Section 1402: Appeals.

Section 202: Smoke-Free Workplace
Changes to this section are needed to clarify that the 25-foot distance from any exterior entrance, is a long-standing Town policy, not the *ARS § 36-601.01 Smoke-Free Arizona Act,* which requires a 20-foot distance. Also, the current designated smoking area (outside of the Town Hall employee break area) was deemed to be unsuitable, and instead, the existing area between the Police Department and Town Hall is identified as such. It is noted that this area is already equipped to serve as a smoking area on campus as it has seating, a shade structure, and an ashcan receptacle.

Language is also included to clarify that employees may smoke/vape in their personal vehicles, so long as they are at least 25 feet away from any exterior entrances, windows, or ventilation systems.

Additional language is also included that confirms employees are responsible for the safe and sanitary disposal of any smoking/vaping items.

Section 400: Workplace Conduct
This section previously included conduct expectations for all employees, but upon further review, it was realized that additional expectations should be included for supervisors and/or director-level positions, as they are held to a higher standard of performance. Therefore, the added expectations to this section are similar to the performance review expectations that supervisors and/or director-level employees are evaluated on.

Section 1100: Allowances
In the last *Employee Handbook* revision, safety boots were not specifically identified in the list of eligible allowances. This is a long-standing benefit, so the change is to clearly recognize safety boots as an eligible allowance.

Section 1402: Appeals
It was discovered that the appeal provisions in the *Employee Handbook* were not consistent with the *Town Code 2-5-5 Personnel Appeals Board.* Specifically, the *Town Code* stipulates suspensions of three or more days, involuntary demotions, and disciplinary pay reductions may be appealed. Therefore, the proposed *Employee Handbook* has been modified to reflect this specific language.

BUDGETARY IMPACT
No new budget impacts.

ATTACHMENTS:

- **A.** Staff Report: *Employee Handbook* Updates
- **B.** *Employee Handbook*, adopted 07/13/2024, with tracked changes
- **C.** Presentation

EMPLOYEE HANDBOOK

~~July 13, 2024~~TBD

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CHAPTER 1: HANDBOOK ADMINISTRATION

SECTION 100: WELCOME

For employees who are just beginning their employment career with Town of Paradise Valley ("Town"), on behalf of Town Mayor and Council, please accept our warmest welcome. We are grateful you have made the choice to serve our amazing community.

For employees who have been with us, thank you for your past and continuing dedicated service.

We understand that it is our employees who provide the public services that our residents rely upon, and who will enable us to enrich the community we all serve. Thank you again and we look forward to the ongoing success of this great organization.

SECTION 101: PURPOSE

A. This Handbook summarizes fundamental employment policies that align with Town Council expectations and Town Code, in addition to state and federal requirements.

B. The Handbook is not intended to address every possible topic, and many matters covered by this Handbook are addressed in other documents, including administrative policies, departmental directives, and supervisory and regulatory requirements. Employees are strongly encouraged to direct questions to supervisors and Human Resources.

C. Neither this Handbook nor any other verbal or written communication by a Town representative is, nor should it be considered, an agreement, contract of employment, expressed or implied, or a promise of treatment in any particular manner in any given situation, nor does it confer any contractual rights.

SECTION 102: REVISIONS TO THIS HANDBOOK

A. The Town Council reserves the right and authority to amend, change, or discontinue any provision of this Handbook. Approved changes will be communicated to all Town employees.

B. The provisions of this Handbook should comply at all times with relevant state and federal law. Therefore, the Town Manager is authorized to amend any provision of this Handbook, with the advice of the Town Attorney, to reflect, incorporate, or comply with a change to state or federal law. Any such amendment will be listed on the next Town Council meeting agenda.

SECTION 103: ADMINISTRATIVE POLICIES

A. The Town Manager is authorized to implement, clarify, and interpret the provisions of this Handbook by establishing the administrative policies identified in this Handbook.

B. Administrative policies will be signed by the Town Manager and made accessible electronically to all members of the Town Council and Town Staff. New administrative policies and updates to existing policies will be communicated to all Town employees.

C. In the event of any conflict between the provisions of this Handbook and the provisions of an administrative policy, this Handbook will prevail.

SECTION 104: SAVINGS CLAUSE

A. Should any provision of this Handbook or the application of the same to a particular set of persons or circumstances be declared invalid for any reason, the remainder of this Handbook will not be affected.

B. This Handbook supersedes all prior handbooks.

CHAPTER 2: GENERAL INFORMATION

SECTION 200: HOURS OF BUSINESS

Subject to closures due to the observance of the Town's designated holidays, business hours are as follows:

A. Town Hall: Monday through Friday, 7:00 a.m. to 4:00 p.m.

B. Town Hall Post Office: Monday through Friday, 8:00 a.m. to 4:00 p.m.

C. Police Administration Office: Monday through Thursday, 7:00 a.m. to 6:00 p.m.

D. Municipal Court: Monday through Thursday, 7:00 a.m. to 6:00 p.m.

E. Public Works Building: Monday through Thursday, 6:00 a.m. to 4:00 p.m.

SECTION 201: PARKING

Parking is available on a first-come, first-served basis, other than parking spots designated for disabled drivers or carpool.

SECTION 202: SMOKE-FREE WORKPLACE

A. Smoking and vaping are prohibited in Town vehicles and on Town premises, except ~~for designated smoking areas and inside personal vehicles.~~as defined below.

1) Employees may only smoke/vape on Town premises only if at least 25 feet away from any exterior entrances, open windows, and ventilation systems.

2) Employees may smoke/vape in their personal vehicles, provided the conditions in subsection 1 above are also met.

3) Employees may smoke/vape in the outdoor seating area between Town Hall and the Police Department.

A. Employees are responsible for the safe and sanitary disposal of all smoking items.

B.

~~B. In accordance with state statute, designated smoking areas must be at least 25 feet from any exterior doorway. The Town's designated smoking area is outside of the employee break area in Town Hall. The exit door to the smoking area is to be kept shut to prevent smoke from entering the building.~~

SECTION 203: HOUSEKEEPING

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A. The Town takes pride in its buildings and facilities. Employees are expected to keep their workspaces safe, clean, and free of slip, trip, and fall hazards.

B. Employees who use the break areas are to clean up after use, to include food, dishes, and other items are washed and/or properly disposed of.

SECTION 204: EMPLOYMENT FILES

A. The Town maintains a file for each employee, which consists of records related to salary, benefit elections and accruals, and discipline. The confidentiality and security of these files is maintained by the Human Resources Department. Access to all employment files is limited to those who are authorized to view the records, have a business reason to do so, and is allowed by statute.

B. The Town Manager is hereby authorized to implement this section through an administrative policy.

SECTION 205: DIRECT DEPOSIT AND PAYDAYS

A. The Town maintains a bi-weekly payroll schedule and payday is every other Friday.

B. The Town finds that the electronic deposit of employee earnings is an efficient and reliable method of payment and requires direct deposit enrollment for all employees.

CHAPTER 3: CODE OF ETHICS

SECTION 300: EMPLOYEE OATH

A. Employees will uphold the Constitution of the United States of America, the Constitution of the State of Arizona, and the Ordinances of the Town of Paradise Valley. Goals and policies established by the Town Council will also guide employee actions.

B. Employees will:
1) Uphold the public trust.
2) Act with honor, integrity, and respect for others.
3) Conduct themselves in a manner that reflects positively on the Town.
4) Respect private, confidential, and proprietary information to which they are privy.
5) Take and abide by the oath of office in accordance with *ARS 38-231, Officers and employees required to take loyalty oath*

SECTION 301: TOWN MISSION AND VISION

A. The mission of the Town is to provide high-quality public service to a community which values limited government. The vision of the Town of Paradise Valley is to make every effort to enhance the community's unique character for its residents and people from around the world.

B. Town employees will provide public service to the Town in support of the Town's mission and vision.

SECTION 302: EMPLOYEE VALUES

The Town has established employee values to guide employee performance throughout their employment. Employees of the Town dedicate themselves to:

A. PROFESSIONALISM
1) Seeking opportunities to enhance ourselves through education and training for improved performance, organizational results, and career growth.
2) Proactively identifying and creating ways to overcome obstacles and provide solutions.

3) Becoming known as very knowledgeable within our own areas.
4) Remaining current on "best practices."
5) Being flexible and open to new responsibilities.
6) Acting and behaving in ways that promote positive working relationships.
7) Recognizing and rewarding accomplishments.

B. HIGH-QUALITY CUSTOMER SERVICE

1) Continuing to make our customers' needs our primary focus.
2) Developing trust and credibility with our customers.
3) Being courteous, respectful, and helpful in all customer interactions (both internal and external).
4) Responding to customer questions and requests in a timely manner and making helpful referrals when appropriate.
5) Staying in touch with the "public service spirit."
6) Valuing and actively seeking out customer feedback.

C. TEAMWORK

1) Collaborating across departments, programs, and services to accomplish common goals.
2) Working towards solutions that all team members can support.
3) Addressing conflict positively and quickly to make best use of team effectiveness.
4) Recognizing and encouraging behaviors that contribute to teamwork.
5) Maintaining positive relationships with coworkers.
6) Understanding how our actions and decisions affect other work groups and working with those groups toward solutions.

D. RESPECT

1) Creating an environment of mutual respect and honesty in how we communicate with each other.
2) Listening to what is said at all levels of the organization and the citizens we serve.
3) Remaining open to different perspectives.
4) Fostering and celebrating the diversity of our workforce
5) Keeping the workplace free from harassment.
6) Interacting with other employees and the public with respect and dignity at all times.

E. ACCOUNTABILITY

1) Taking responsibility for our actions and decisions.
2) Following through on our commitments.
3) Ensuring our work and information is complete and accurate.
4) Achieving results stated in our performance plans.
5) Continually striving to improve efficiency and cost effectiveness.
6) Committing to the highest standards of ethical conduct in all that we do.

F. TRANSPARENCY

1) Building a common understanding of administrative processes between the Town's residents and their government.
2) Ensuring that internal controls are established, properly documented, and maintained.
3) Avoiding both actual conflicts of interest and the appearance of such conflicts.
4) Making decisions at the level closest to the customer whenever possible.
5) Improving access to public records through enhanced public communication and web-based solutions.

G. APPRECIATION OF THE TOWN'S HERITAGE

1) Knowing about the people in the community who have made significant contributions to the Town and its history.
2) Being aware that the community's current values are shaped by its history and heritage.

DRAFT

3) Understanding that the Town's resort community has played an integral role in developing Paradise Valley into a world class destination.
4) Appreciating the involvement of past and current citizens who have helped shape the Town's vision and continue to affect the Town's future through civic engagement.
5) Respecting the community's values of limited government, low density, and open space, in a residential desert setting.

CHAPTER 4: CODE OF CONDUCT

SECTION 400: WORKPLACE CONDUCT

A. The Town is committed to providing a safe and healthy work environment for all employees, regardless of background, position, or employment status. The Town finds that there are fundamental expectations in the workplace that employees are expected to follow to ensure a safe, productive, and healthy workplace.

B. These fundamental employee expectations include, but are not limited to, the expectation that all employees will:

1) Follow all lawful Town policies, procedures, rules, directions, and expectations.
2) Subscribe to the oath of the State of Arizona or other affirmations required by the Town.
3) Display a positive, courteous, and respectful attitude, maintain professionalism, and foster a collaborative work environment.
4) Encourage representation and participation of different groups of individuals within the Town.
5) Maintain required licenses, certifications, and other credentials.
6) Adhere to emergency availability and duty reporting requirements.
7) Refrain from engaging in discriminatory, harassing, abusive, retaliatory, defaming, threatening language, behavior, or conduct toward any person.
8) Maintain a well-groomed, clean, and professional appearance including appropriate attire and, if applicable, well-kept uniforms, workwear, and equipment.
9) Strive to be good stewards of public funds.
10) Comply with all technology resource policies regarding computers and electronic communication.
11) Use Town vehicles for official business only.
12) Maintain an acceptable driving record.
13) Be forthcoming and truthful in all communications related to the Town and Town business.
14) Maintain the confidentiality of sensitive or non-public information.
15) Comply with guidance regarding publicity and media interactions.
16) Comply with guidance on recording communications with employees and the public.
17) Comply with all Town policies and rules regarding the use of social media for Town business.
18) Report fit for duty, on time, and as scheduled.
19) Accurately record and submit their time.
20) Maintain satisfactory work performance and strive to exceed expectations.
21) Refrain from conduct, on or off-duty, that may cause discredit to the Town.
22) Perform duties safely and properly report safety concerns.
23) Immediately report damage to Town property.
24) Immediately report all workplace injuries and accidents.
25) Maintain a drug and alcohol-free workplace.
26) Report all criminal convictions within five calendar days of ruling.
27) Comply with provisions for employment outside of the Town.
28) Refrain from inappropriate political activity.
29) Take steps to avoid any appearance of any conflict of interest.
30) Abide by Town's policy of receiving gifts, gratuities, fees, services, or goods of any value.

31) Refrain from hiring or appointing any relative, by blood or marriage, of any member of the Town Council to any Town position and immediately reporting any personal relationship that may constitute nepotism in the workplace.
32) Refrain from inducing, influencing, planning, supporting, or participating in a strike, work stoppage, or any concerted activity intended to interfere with Town business, including but not limited to its working conditions, compensation, rights, privileges, or obligations of employment.
33) Understand that all records, regardless of form created, are subject to *ARS Title 39 – Public Records, Printing, and Notices* and must comply with retention, disclosure, and disposal requirements of Town records.
34) Be familiar with guidance regarding artificial intelligence.
35) Comply with purchasing requirements.
36) Comply with guidance regarding solicitation and distribution of materials and information on Town property.
37) Abide by the travel policy, when traveling for Town business.
38) Comply with security provisions.
39) Comply with work rules regarding pets and service animals on Town property.

C. Employees who are also supervisors and/or director-level employees are held to a higher standard of performance and are expected to:

1) Lead by example.
2) Inspire, motivate, and guide others.
3) Coach, mentor, and challenge staff.
4) Respect and support diversity, and equal treatment of all.
5) Recognize positive employee performance and accomplishments when applicable.
6) Hold staff accountable for their performance and document appropriately.
7) Mediate and resolve conflicts at the lowest level possible, as appropriate.
8) Advocate for the Town's mission, vision, values, and initiatives.
9) Establish trust and respect within the Town and the community.
10) Make sound and timely decisions that reflect the Town's strategic initiatives and organizational goals.
11) Be politically savvy with potentially sensitive situations and know when to seek guidance.
12) Manage allotted budget in accordance with Council and Town authority and direction.
13) Effectively manage employee time and staffing levels. Mitigate overtime whenever possible.
14) Seek opportunities to save or reallocate resources.

~~C.~~**D.** The Town Manager is hereby authorized, subject to established budget limitations, to implement this section through one or more administrative policies.

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SECTION 401: EMPLOYEE CONDUCT POLICIES

A. In furtherance of the Town's commitment to a safe and healthy workplace, the Town Manager will implement the following administrative policies:

1) Employee code of conduct
2) Equal employment opportunity and harassment prevention
3) Reasonable accommodation
4) Drug and alcohol-free workplace
5) Loss control and safety
6) Worker's compensation benefits and transitional duty

B. The Town Manager is hereby authorized, subject to established budget limitations, to implement this section through one or more administrative policies.

SECTION 402: PERSONAL PRIVACY AND INSPECTIONS

A. The Town makes facilities, vehicles, equipment, and office amenities available to employees to improve the delivery of public services and to support employees in the performance of their duties. Employees have no expectation of privacy when using such property or facilities, which may be inspected at any time.

B. Employees are expected to fully cooperate in the conduct of any search or inspection for cause, of their persons, personal possessions, and property, including personal vehicles parked on Town property

C. The Town Manager is hereby authorized to implement this section through an administrative policy.

SECTION 403: REPORTING IMPROPER GOVERNMENTAL ACTIONS

A. The Town encourages reporting by its employees of improper governmental action (commonly referred to as a "whistleblower") taken by Town officers or employees and to protect Town employees who have reported improper governmental actions, as provided for in *ARS 23-425, Employee discharge or discrimination.*

B. The Town Manager is hereby authorized to implement this section through an administrative policy.

CHAPTER 5: CONDITIONS OF EMPLOYMENT

SECTION 500: UNCLASSIFIED SERVICE

A. The unclassified service includes employees in positions which must be responsive to Town Council. Unclassified employees serve at-will, and their employment is subject to termination at any time, for any lawful reason or for no reason, unless otherwise stated in a written contract of employment.

B. The following positions are unclassified:

1) Town Officers appointed by the Town Council:
- **a.** Town Manager
- **b.** Town Attorney
- **c.** Town Magistrate

2) Town Officers appointed by the Town Manager, on or after July 8, 2023. Such officers will include (working titles may vary):
- **a.** Chief Financial Officer
- **b.** Chief Information Officer
- **c.** Chief of Police
- **d.** Community Development Director
- **e.** Human Resources Director/Manager
- **f.** Public Works Director
- **g.** Town Clerk
- **h.** Town Engineer
- **i.** Town Marshal

An incumbent appointed to one of the above-listed positions on or before July 8, 2023, will retain the rights and privileges of the classified service until such time that the incumbent is terminated from Town employment, transfers to a different unclassified position, or voluntarily relinquishes classified status.

3) Volunteers and other personnel appointed to serve without pay.
4) Temporary employees.
5) Probationary employees.

SECTION 501: CLASSIFIED SERVICE

A. Classified service includes all employees in positions that are not otherwise identified as unclassified.

B. The Town Manager is hereby authorized, subject to established budget limitations, to implement this section through an administrative policy.

SECTION 502: RECRUITMENT AND SELECTION

A. The Town supports hiring and retaining a highly qualified and diverse workforce to deliver outstanding public services. The Town may utilize various programs and services to meet the hiring needs of the Town, in accordance with state and federal requirements.

B. The Council will not appoint any person to an unclassified position who is a relative of a Councilmember by blood or marriage, nor will the Town Manager or any department director or other individual with hiring authority hire any relative or any member of the Council to any position.

C. The Town Manager is authorized to utilize open competitive and internal-only recruitments, lateral transfers, promotions, demotions, direct appointments, and apprenticeship programs. All appointments made by the Town Manager without a competitive recruitment process will be clearly documented.

D. The Town Manager is hereby authorized, subject to established budget limitations, to implement this section through an administrative policy.

SECTION 503: INTERNSHIPS

A. The Town recognizes the value of supporting students in secondary education programs through internship opportunities.

B. The Town Manager may establish an internship program that supports Town services while providing students with worthwhile civic experience.
C. The Town Manager is hereby authorized, subject to established budget limitations, to implement this section through an administrative policy.

SECTION 504: PROBATIONARY AND REVIEW PERIODS

A. All newly hired and rehired employees will serve a probationary period, during which time the employee will serve at-will and may be dismissed at any time, without a statement of cause, without prior notice, and without the right to grievance or appeal procedures.

B. When appointed to a new classified position, an employee may be required to serve a new probationary period.

C. The Town Manager is hereby authorized to implement this section through an administrative policy.

SECTION 505: PERFORMANCE REVIEWS

A. The Town seeks to review employee performance on at least an annual basis, or more often as employee performance dictates.

B. The Town Manager may recommend performance pay (merit) increases for qualifying employees to Town Council for approval. In conjunction with merit increases, the Town Manager authorize exemplary service awards for exceptional employee performance.

C. The Town Manager is hereby authorized, subject to established budget limitations, to implement this section through an administrative policy.

SECTION 506: REMOTE WORK

A. The Town recognizes that providing remote working opportunities for eligible positions and personnel promotes work/life balance, while supporting clean air efforts within the region.

B. The Town Manager is hereby authorized, subject to established budget limitations, to implement this section through an administrative policy.

SECTION 507: EMERGENCY RESPONSE AVAILABILITY

A. The Town must ensure proper precautions are in place in the event of an emergency, to include the availability of personnel whose services may be required. Public safety and Public Works Department personnel may be called in for duty in an emergency and therefore must reside within a reasonable distance from the Paradise Valley Municipal Complex to respond accordingly.

B. The Town Manager may require the response of additional personnel as appropriate to the emergency.

SECTION 508: TRAINING AND PROFESSIONAL DEVELOPMENT

A. The Town encourages the training and development of employees to improve effectiveness and broaden the knowledge of Town officers and employees in the performance of their respective duties.

B. The Town Manager is hereby authorized, subject to established budget limitations, to implement this section through an administrative policy.

SECTION 509: REDUCTIONS-IN-FORCE, LAYOFFS, AND FURLOUGHS

A. The Town strives to remain fiscally responsible and organizationally sound to ensure the greatest use of limited public resources. The Town also recognizes that there may be circumstances that warrant temporary layoffs or permanent reductions-in-force and/or furloughs to ensure the future of the Town.

B. The Town Manager is hereby authorized to implement this section through an administrative policy.

SECTION 510: SEPARATION FROM EMPLOYMENT

A. Employees voluntarily separating from the Town will submit their written notice of resignation to their department director at least 14 calendar days prior to their separation effective date. Department directors will document the date and time received, if notice is not through email or other electronic means.

B. Resignations received by the department director are final and may not be withdrawn, unless authorized by the Town Manager prior to the effective date of the separation.

C. The Town Manager is hereby authorized to implement this section through an administrative policy.

CHAPTER 6: CLASSIFICATION

SECTION 600: PURPOSE

The Council finds that a systematic process for grouping jobs into common classifications based on similarities in duties, responsibilities, and requirements, supports the Town's efforts to provide equitable and competitive jobs and compensation.

SECTION 601: APPLICATION

A. The Town Manager is responsible for the establishment and maintenance of a position classification plan, subject to approval by the Town Council.

B. Classification studies are an effective tool to review the classification plan, which includes compensation for each classification, on a periodic basis. The Town Manager will issue a classification plan administrative policy that will include five to eight municipalities that are reflective of the Town's workforce competition, to be used for compensation and classification studies and other comparative analyses.

C. The Town Manager is responsible for the position classification reviews.

D. The Town Manager is hereby authorized, subject to established budget limitations, to implement this section through an administrative policy.

CHAPTER 7: COMPENSATION

SECTION 700: PURPOSE AND APPLICABILITY

A. The Town seeks to offer competitive wages and salary to recruit and retain highly qualified employees through consideration of market conditions, competing employers, and internal equity.

B. Salaries, pay adjustments, and allowances for the Town Manager and the Town Attorney are determined by the Town Council.

SECTION 701: BASE PAY

Except as otherwise noted, the Town Manager will establish and maintain a compensation schedule for all active positions that includes minimum and maximum wage/salary ranges.

SECTION 702: PAY ADJUSTMENTS

A. The Town recognizes the need to adjust employee pay to address various pay issues.

B. The Town Manager is authorized to establish wage and salary adjustments for:
1) Promotions
2) Demotions
3) Reclassifications
4) Special Work Assignments
5) Communication Training Officer (CTO) Assignments (Police Dispatchers)
6) Rotational Assignments
7) Performance
8) Acting Appointments
9) Recruitment
10) Retention
11) Internal Equity

12) Other specific conditions as deemed appropriate.

C. The Town Manager is authorized to establish rates of premium pay for:
1) Nontraditional work schedules.
2) Standby and callback assignments.
3) Hazardous work environments or work duties.
4) Bilingual services.
5) Other specialized skills or unique working conditions that warrant additional pay.

SECTION 703: DELEGATED AUTHORITY

The Town Manager is hereby authorized, subject to established budget limitations, to implement this chapter through an administrative policy.

CHAPTER 8: HOURS OF WORK AND OVERTIME

SECTION 800: WORKWEEKS AND WORK SCHEDULES

A. The Town's designated workweek is 12:00 a.m. Sunday, through 11:59:59 p.m. Saturday.

B. The Town Manager may designate work schedules within the designated workweek, including flexible and alternate work schedules, provided they are in accordance with state and federal statutes.

SECTION 801: BREAKS AND MEAL PERIODS

A. The Town finds that rest periods and unpaid meal periods support employee productivity and wellbeing. The Town Manager/designee may designate certain positions, depending upon nature of the work, to be scheduled for unpaid meal periods of 30-60 minutes. Rest periods/breaks during an employee's shift are unscheduled, intermittent, and short in duration.

B. The Town Manager/designee may designate certain positions eligible for paid meal periods if employees are required to remain on call and available to respond to work throughout their meal period as work necessitates.

C. The Town will provide appropriate break time and space for nursing employees.

SECTION 802: OVERTIME

A. The Town finds that to ensure the effective delivery of its public services, employees may be required to work over 40 hours in the designated workweek.

B. The Town further recognizes that non-exempt employees are eligible for overtime compensation for all hours worked over 40 in the designated workweek.

C. The Town Manager may establish alternate overtime rules for specific work groups, in accordance with state and federal regulations.

D. Compensation for overtime hours will be paid at time and one-half, inclusive of any assignment pay, or as other required by state or federal statute.

E. The Town authorizes the use of compensatory time off in lieu of cash payment for overtime hours worked.

SECTION 803: EXEMPT EMPLOYEES

A. The Town finds that employees exempt under the Fair Labor Standards Act (FLSA) are expected to work, on average, a 40-hour workweek, over a 52-week calendar year.

B. The Town further finds that exempt employees may use paid leave for absences of less than one day.

C. The Town also authorizes additional time off for exempt employees, as a result of excessive hours worked under specific circumstances.

SECTION 804: DELEGATED AUTHORITY

The Town Manager is hereby authorized, subject to established budget limitations, to implement this chapter through an administrative policy.

CHAPTER 9: INSURANCE BENEFITS

SECTION 900: ELIGIBILITY

A. Full-time and part-time eligible employees' insurance benefits begin on the first day of the month following their date of hire.

B. Temporary employees are not eligible for insurance benefits, except for those that are mandated by statute.

SECTION 901: HEALTHCARE

A. The Town provides group healthcare benefits that includes medical, dental, vision, prescription, life, and accidental death and dismemberment (AD&D) insurances for eligible employees as part of an overall comprehensive compensation package.

B. The Town may pay a portion of the applicable premiums for employee and/or dependent coverages, as established by action of the Town Council.

SECTION 902: DISABILITY INSURANCE

A. The Town finds that short- and long-term disability insurances are critical to an employee's ability to recover from an illness or injury.

B. The Town Manager will establish disability insurance for eligible employees to supplement the long-term disability benefits offered through the Arizona State Retirement System (ASRS) or Public Safety Personnel Retirement System (PSPRS).

SECTION 903: SUPPLEMENTAL INSURANCES

A. The Town finds that offering other insurance coverages to employees provides additional support to employees' health and wellbeing.

B. The Town Manager is hereby authorized to offer optional insurances with 100 percent of the premiums paid by the employee. The Town may pay the administrative fees associated with the optional coverages.

C. Optional coverages that may be offered include:
1) Pet insurance

2) Supplemental healthcare (medical, dental, vision, and related)
3) Disability
4) Accident
5) Life and final expenses
6) Others as identified

SECTION 904: DELEGATED AUTHORITY

The Town Manager is hereby authorized, subject to established budget limitations, to implement this chapter through an administrative policy.

CHAPTER 10: HOLIDAY AND LEAVE BENEFITS

SECTION 1000: ELIGIBILITY

The Town Manager will determine eligibility and accrual rates for all paid leave benefits, including holidays.

SECTION 1001: DESIGNATED HOLIDAYS

A. The Town recognizes the observation of paid designated holidays throughout the calendar year.

B. The holidays observed by the Town are:
1) New Year's Day
2) Martin Luther King/Civil Rights Day
3) Presidents' Day
4) Memorial Day
5) Independence Day
6) Labor Day
7) Veterans' Day
8) Thanksgiving Day
9) Native American Heritage Day (day after Thanksgiving)
10) Christmas Day

C. The Town also honors former Town Clerk Mary Ann Brines in recognition of her years of outstanding public service. As provided for in *Town Resolution 1230*, the Town Manager is authorized to grant one special paid holiday to all eligible employees each calendar year.

SECTION 1002: PERSONAL LEAVE

A. The Town will offer paid personal leave days as part of the total compensation package.

B. The Town Manager will determine the accrual rate for eligible employees for personal leave as set forth in this section.

SECTION 1003: VACATION LEAVE

A. The Town finds that it is important for employees to take time away from work and authorizes the accrual of paid vacation leave for eligible employees.

B. The Town Manager will determine the accrual rate for eligible employees for vacation leave as set forth in this section.

SECTION 1004: SICK LEAVE

A. The Town finds that paid sick leave is an added insurance benefit to support employee health. The Town authorizes the accrual of paid sick leave for eligible employees each pay period at a rate no less than what is statutorily required.

B. The Town Manager will determine under what conditions sick leave may be used by employees.

SECTION 1005: FAMILY AND MEDICAL LEAVE ACT LEAVE

The Town adheres to the Family and Medical Leave Act (FMLA) and provides job-protected leave from work for family and medical reasons.

SECTION 1006: MISCELLANEOUS LEAVES

The Town recognizes that employees may need to be absent from work and offers:

A. *Civil Leave* to address absences due to legal proceeding for personal reasons or on behalf of the Town.

B. *Bereavement Leave* to address absences due to the death of an immediate family member or in certain circumstances, the death of a Town employee.

C. *Donated Leave* is a leave-program designed to enable employees to donate accrued leave to eligible employees during times of illness and injury.

D. *Military Leave* to address absences due to miliary training and orders to serve in the US military. their residential jurisdiction.

E. *Parental Leave* to support absences from work due to the birth or adoption of a child.

F. *Voting Leave* to address absences to exercise their right to vote in local, state, or federal elections.

G. *Administrative Leave* is to address circumstances that warrant removing an employee from the worksite.

H. *Leave Without Pay* for circumstances that necessitate an employee's absence beyond any paid leave that may be available or eligible for use.

SECTION 1007: DELEGATED AUTHORITY

The Town Manager is hereby authorized, subject to established budget limitations, to implement this chapter through one or more administrative policies. For more information, see the administrative policy on miscellaneous leave benefits.

CHAPTER 11: MISCELLANEOUS BENEFITS

SECTION 1100: ALLOWANCES

A. The Town appreciates the need to support employees in the performance of their duties by providing additional resources to protect their health, safety, and security as well as to offset costs associated with their job.

B. The Town Manager may establish allowances for designated positions to provide the following:

1) Uniforms
2) Workwear
3) Clothing
4) Equipment
5) Tools
6) Cell phones
7) Hazardous work
8) Safety boots

~~7)~~9) Other working conditions that warrant an allowance to support employees in the effective performance of their duties.

SECTION 1101: EMPLOYEE SERVICE RECOGNITION

A. The Town appreciates the dedicated service its employees provide to the public.

B. The Town Manager is authorized to utilize compensation and benefits to establish and maintain an employee service recognition program to honor years of service, retirement, and extraordinary work contributions.

C. The Town Manager is hereby authorized, subject to established budget limitations, to implement this section through an administrative policy.

SECTION 1102: PERFORMANCE BONUSES

A. The Town recognizes that there are opportunities that warrant employee performance recognition compensation in addition to annual merit increases.

B. The Town Manager may utilize a bonus to reward exceptional performance over an entire review period. The Town Manager may utilize a bonus to reward incident-specific performance recognition that is outside of the annual performance review process.

C. The Town Manager is hereby authorized, subject to established budget limitations, to implement this section through an administrative policy.

SECTION 1103: TUITION ASSISTANCE

A. The Town supports employees who seek to expand their education in support of their current or future Town employment opportunities, are eligible to receive tuition reimbursement.

B. The Town Manager is hereby authorized, subject to established budget limitations, to implement this section through an administrative policy.

SECTION 1104: WORKER'S COMPENSATION

A. The Town strives to maintain a safe and healthy environment for its employees and the public.

B. The Town is a self-insured employer and may elect to join a risk pool.

C. All Town employees are covered by workers' compensation insurance beginning on the first day of employment. Workers' compensation provides state-prescribed medical and hospitalization expense benefits, as well as partial compensation in lieu of salary for lost time for workers injured on the job.

D. The Town Manager is hereby authorized, subject to established budget limitations, to implement this section through an administrative policy.

SECTION 1105: EMPLOYEE SUGGESTION PROGRAM

A. The Town encourages employees to provide innovative and efficient ideas to further promote the Town's mission and vision.

B. The Town Manager is authorized to establish an employee suggestion program that provides monetary awards.

C. The Town Manager is hereby authorized, subject to established budget limitations, to implement this section through an administrative policy.

SECTION 1106: EMPLOYEE ASSISTANCE PROGRAM

The Town provides the Employee Assistance Program (EAP), which offers counseling, legal, and other self-help referral services to assist employees and their families.

SECTION 1107: WELLNESS PROGRAM

A. The Town recognizes the value of proactive health and wellness benefits for employees.

B. The Town Manager is hereby authorized, subject to established budget limitations, to implement this section.

SECTION 1108: TRAUMATIC EVENT COUNSELING

A. The Town acknowledges that peace officers may be exposed to traumatic events during the performance of their duties.

B. The Town will provide traumatic counseling services in accordance with *ARS 38-672 Traumatic event counseling for public safety employees*, and *38-673 Traumatic event counseling for peace officers and firefighters.*

SECTION 1109: COMMUTE REDUCTION INCENTIVES

A. The Town finds that providing commute trip reduction programs support efforts to reduce traffic congestion, improve air quality, and assist with work/life balance for employees.

B. The Town Manager is authorized to provide travel reduction incentives for employees who use alternate modes of transportation.

SECTION 1110: RETIREMENT PLANS

A. The Town finds that providing a retirement benefit to eligible employees is an integral part of an overall comprehensive benefits package.

B. The Town is a participating employer in the Arizona State Retirement System (ASRS) and the Public Safety Personnel Retirement System (PSPRS).

C. Eligibility for plan enrollment and benefits are governed by each plan's respective provisions.

D. The Town Manager is hereby authorized, subject to established budget limitations, to implement this section.

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SECTION 1111: DEFERRED COMPENSATION

A. The Town finds that offering an optional deferred compensation plan (Section 457 of the Internal Revenue Code) supports employees in their efforts to plan for their retirement futures.

B. Employees are eligible to participate in the Town-sponsored deferred compensation plan subject to plan and federal limitations.

C. The Town may elect to offer deferred compensation employer contributions for employees who elect the high-deductible healthcare plan.

D. The Town Manager is hereby authorized, subject to established budget limitations, to implement this section.

SECTION 1112: HEALTH SAVINGS ACCOUNT

A. The Town finds that offering a high-deductible healthcare plan (HDHP) for eligible employees, also known as a health-savings account-eligible plan, provides greater health and wellbeing options for employees.

B. By providing a HDHP, the Town must also provide a supplemental health-savings account. Employees who enroll in the HDHP, are also eligible to contribute to their health-savings account.

C. The Town Manager is hereby authorized, subject to established budget and federal limitations, to implement this section.

SECTION 1113: FLEXIBLE SPENDING ACCOUNTS

A. The Town finds that offering flexible savings accounts (Section 125 of the Internal Revenue Code) for healthcare and dependent care expenses as an option for employees provides them with additional financial options to meet their personal needs.

B. Employees are eligible to participate in the Town-sponsored flexible spending account plan subject to plan and federal limitations.

C. The Town Manager is hereby authorized, subject to established budget limitations, to implement this section.

SECTION 1114: DELEGATED AUTHORITY

The Town Manager is hereby authorized, subject to established budget limitations, to implement this chapter through one or more administrative policies.

CHAPTER 12: EMPLOYEE GRIEVANCES

SECTION 1200: PURPOSE

A. The Town encourages employees to resolve any concerns or complaints at the lowest possible level.

B. Employees and supervisors are encouraged to meet, discuss, and resolve problems, to prevent grievances whenever possible. In the absence of an informal resolution, the Town provides for a grievance process to address classified employee complaints.

SECTION 1201: ADMINISTRATION

A. For the purposes of this section, a grievance is an allegation that this Handbook, an administrative policy, or the written work rules of any Town department have been misinterpreted or misapplied as to that employee; or that the employee has been discriminated against because of race, color, religion, gender, age, national origin, sexual orientation, disability, or other lawfully protected status.

B. Issues that are not grievable and exempt from this section include:
- **1)** The Town's right to direct its employees.
- **2)** The Towns' right to manage Town operations, and to determine the methods, means, resources, and personnel by which these operations are to be conducted.
- **3)** Benefits provided by the Town, as set forth in this Handbook.
- **4)** The Town's right to hire, promote, transfer, assign, and retain employees.
- **5)** Any examination, certification, or appointment.
- **6)** Any compensation or classification action (including salary ranges, merit increases, right to performance evaluation, or contents of performance evaluation).
- **7)** Any reduction-in-force, layoff, or furlough action.
- **8)** Any matter not subject to control of the Town government.
- **9)** Complaints by unclassified employees, except as set forth in subsection B.2 of *Section 502: Unclassified Service.*

C. The procedure will include:

- **1)** The information required to submit a grievance.
- **2)** The timelines for processing a grievance.
- **3)** An outline for each step in the process.
- **4)** The appeal process for each step, up to and including the final and binding step.

SECTION 1202: AUTHORITY

The Town Manager will establish an administrative policy to respond to formal grievances filed by eligible employees and is hereby authorized to implement this chapter through an administrative policy.

CHAPTER 13: EMPLOYEE INVESTIGATIONS

SECTION 1300: PURPOSE

The Town recognizes that certain allegations of employee misconduct will require an investigation to determine the facts of the matter. Allegations regarding harassment, discrimination, or retaliation for reporting such allegations will be fully investigated, as appropriate to the circumstances.

SECTION 1301: ADMINISTRATION

The Town Manager will establish an administrative policy to conduct employee investigations, which, at a minimum, will include:

- **A.** How an investigator is assigned.
- **B.** The general timeframes for which an investigation is to be completed.
- **C.** The rights of the employee under investigation.

SECTION 1302: AUTHORITY

The Town Manager is hereby authorized to implement this chapter through an administrative policy.

CHAPTER 14: DISCIPLINE AND APPEALS

SECTION 1400: PURPOSE

A. The Town's progressive discipline policy and procedures are designed to provide a structured corrective action process to improve and prevent a recurrence of unwanted employee behavior and performance issues.

B. The Town reserves the right to combine or skip the application of progressive discipline depending on the facts of each situation and the nature of the offense. The seriousness of the offense may result in dismissal.

SECTION 1401: DISCIPLINARY PROCESS

A. The Town will outline the process through an administrative policy for which discipline will be administered.

B. At a minimum, the administrative policy will include:

1) Definitions of the types of discipline that are the subject of this chapter.
2) Investigative process.
3) Notification of possible discipline.
4) Pre-disciplinary hearing process.
5) Appeal process to the Town Manager.
6) Appeal process to the Personnel Appeals Board.

C. Employees who have been dismissed from Town service are not eligible to be rehired in any capacity by the Town.

SECTION 1402: APPEALS

A. The Town finds that the seriousness of specific disciplinary actions require the ability for the affected employee to appeal the action taken against them. In accordance with *Section 2-5-5 Personnel Appeals Board* of the *Town Code*, ~~O~~only ~~demotions,~~ disciplinary suspensions of three or more workdays, involuntary demotions, disciplinary pay reductions, and dismissals are eligible for appeal to the Personnel Appeals Board (PAB)~~,~~ ~~unless otherwise stipulated in this Handbook or an administrative policy.~~ Employees disciplined for strike activities defined in *Chapter 4: Code of Conduct* do not have the right to an appeal under this chapter.

B. The Town will provide a PAB in accordance with *Town Code Section 2-5-5 Personnel Appeals Board,* to hear appeals filed in accordance with this article and corresponding administrative policy of disciplinary actions taken, provided the affected employee has exhausted all other rights of review and appeal.

C. The PAB will convene as needed, but no less than once a year for training purposes.

D. The decision of the PAB hearing is final and binding.

SECTION 1403: AUTHORITY

A. The Town Manager has authority to take disciplinary action against any classified or unclassified employee who meets the criteria in *Section 501: Unclassified Service*.

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B. The Town Manager may delegate the authority to reprimand and suspend without pay to appropriate Town personnel. Demotions and dismissals are under the authority of the Town Manager only.

C. The Town Manager will establish an administrative policy to administer the discipline and appeals and is hereby authorized to implement this chapter through an administrative policy.

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Town of Paradise Valley

EMPLOYEE HANDBOOK UPDATE

November 13, 2025

PURPOSE OF PRESENTATION



Brief History of *Employee Handbook*



Identify Proposed Changes and Rationale



Council "Ask": Seeking Council's feedback on the proposed changes and consensus for changes to be presented at upcoming Council meeting for action.

BRIEF HISTORY

- *Employee Handbook* most recently updated and approved by Council effective July 13, 2024.

- Changes (other than statutory) must be approved by Council, in accordance with *Employee Handbook*, which states in its pertinent part:

  - **SECTION 102: REVISIONS TO THIS HANDBOOK**

    A. The Town Council reserves the right and authority to amend, change, or discontinue any provision of this *Handbook*. Approved changes will be communicated to all Town employees.

PROPOSED CHANGES: SMOKE-FREE WORKPLACE









- Current designated smoking area outside of Town Hall employee breakroom is not suitable.
- *ARS § 36-601.01 Smoke-Free Arizona Act* requires a minimum distance of 20 feet from any entrance; however, the Town has long-standing policy of no smoking within 25 feet.
- Clarify location of existing available.
- Clarify that employees are responsible for safe and sanitary disposal of smoking items.

PROPOSED CHANGES: SMOKE-FREE WORKPLACE



SECTION 202: SMOKE-FREE WORKPLACE

A. Smoking and vaping are prohibited in Town vehicles and on Town premises, except ~~for designated smoking areas and inside personal vehicles.~~as defined below.

1) Employees may only smoke/vape on Town premises if at least 25 feet away from any exterior entrances, windows, and ventilation systems.

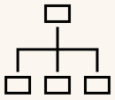
2) Employees may smoke/vape in their personal vehicles, provided the conditions in subsection 1 above are also met.

3) Employees may smoke/vape in the outdoor seating area between Town Hall and the Police Department.

B. Employees are responsible for the safe and sanitary disposal of all smoking items.

~~B. In accordance with state statute, designated smoking areas must be at least 25 feet from any exterior doorway. The Town's designated smoking area is outside of the employee break area in Town Hall. The exit door to the smoking area is to be kept shut to prevent smoke from entering the building.~~

PROPOSED CHANGES: WORKPLACE CONDUCT







- Added language to reflect additional conduct expectations of supervisors and director-level employees.
- Similar to current performance review language expectations for supervisors and directors.

SECTION 400: WORKPLACE CONDUCT

C. Employees who are also supervisors and/or director-level employees are held to a higher standard of performance and are expected to:

1) Lead by example.
2) Inspire, motivate, and guide others.
3) Coach, mentor, and challenge staff.
4) Respect and support diversity, and equal treatment of all.
5) Recognize positive employee performance and accomplishments when applicable.

PROPOSED CHANGES: WORKPLACE CONDUCT

6) Hold staff accountable for their performance and document appropriately.
7) Mediate and resolve conflicts at the lowest level possible, as appropriate.
8) Advocate for the Town's mission, vision, values, and initiatives.
9) Establish trust and respect within the Town and the community.
10) Make sound and timely decisions that reflect the Town's strategic initiatives and organizational goals.
11) Be politically savvy with potentially sensitive situations and know when to seek guidance.
12) Manage allotted budget in accordance with Council and Town authority and direction.
13) Effectively manage employee time and staffing levels. Mitigate overtime whenever possible.
14) Seek opportunities to save or reallocate resources.



PROPOSED CHANGES: MISCELLANEOUS BENEFITS

- Specify allowance for safety boots.
- Long-standing benefit for eligible positions.

SECTION 1100: ALLOWANCES

B. The Town Manager may establish allowances for designated positions to provide the following:

1) Uniforms
2) Workwear
3) Clothing
4) Equipment
5) Tools
6) Cell phones
7) Hazardous work
8) Safety boots

PROPOSED CHANGES: APPEALS



- Align language with *Town Code 2-5-5 Personnel Appeals Board.*
- Specify suspensions of 3 or more workdays, involuntary demotions, and disciplinary pay reductions are eligible for appeal rights.

SECTION 1402: APPEALS

A. The Town finds that the seriousness of specific disciplinary actions require the ability for the affected employee to appeal the action taken against them. In accordance with *Section 2-5-5 Personnel Appeals Board* of the *Town Code*, ~~O~~only ~~demotions~~, disciplinary suspensions of three or more workdays, involuntary demotions, disciplinary pay reductions, and dismissals are eligible for appeal to the Personnel Appeals Board (PAB).~~,~~ ~~unless otherwise stipulated in this Handbook or an administrative policy.~~ Employees disciplined for strike activities defined in *Chapter 4: Code of Conduct* do not have the right to an appeal under this chapter.

COUNCIL “ASK”

The Town is seeking:

1) Council’s feedback and consideration regarding the proposed changes.

2) Council’s consensus on the changes to be presented at an upcoming Council Meeting for action.





Questions?

Action Report

File #: 25-249

Discussion of Town Attorney mid-year performance check in as authorized by A.R.S. §38-431.03(A)(1).

Action Report

File #: 25-256

Action Report

File #: 25-250

The Town Council may go into executive session at one or more times during the meeting as needed to confer with the Town Attorney for legal advice regarding any of the items listed on the agenda as authorized by A.R.S. §38-431.03(A)(3).

Action Report

File #: 25-251

TOWN
Of
PARADISE VALLEY

TOWN COUNCIL MEETING
6401 E. LINCOLN DRIVE
PARADISE VALLEY, ARIZONA 85253
MINUTES
THURSDAY, OCTOBER 23, 2025

1. CALL TO ORDER / ROLL CALL

Mayor Stanton called to order the Town Council Meeting for Thursday, October 23, 2025 at 3:00 PM in the Town Hall Boardroom, 6401 E. Lincoln Drive, Paradise Valley, AZ 85253.

COUNCIL MEMBERS PRESENT
Mayor Mark Stanton
Vice Mayor Ellen Andeen-Keller
Council Member Christine Labelle
Council Member Karen Liepmann
Council Member Scott Moore
Council Member Julie Pace
Council Member Anna Thomasson

STAFF MEMBERS PRESENT
Town Manager Andrew B. Ching
Attorney John Gaylord
Police Chief Freeman Carney
Town Clerk Duncan Miller
Community Development Director Chad Weaver
Public Works Director Isaac Chavira
Human Resources Director Gina Monger
Management Analyst Amy Rebenar
Doug Cole, Highground Public Affairs

2. STUDY SESSION ITEMS

25-243 Discussion of 2026 Legislative Agenda

Public Affairs Consultant Doug Cole, Highground Public Affairs, and Management Analyst Amy Rebenar presented the draft Legislative Agenda for the 2026 legislative session.

The Council suggested grammatical edits, clarifying language, and emphasis on the importance of maintaining local control. The Council discussed other potential legislative topics to track during the session including drone delivery services and timeshare/fractional ownership.

25-244 Discussion of Healthcare Request for Proposals

Human Resources Director Gina Monger stated that the Town has been a member of the *Arizona Metropolitan Trust* (*AzMT*), which is a self-insured pool, since July 1, 2017. The AzMT provides employee healthcare benefits which include medical, dental, vision, prescription, short-term disability, employee assistance programming, wellness, and life and accidental death and dismemberment coverages for all eligible employees. The Town's current contract with *AzMT* expires June 30, 2026.

During the FY 2026 budget process, it was noted that the Town planned to issue a health benefits request for proposal (RFP) to test the market. The Town entered into an agreement with *Capital Financial Consulting* (*Capfi Consulting*) to support the RFP process. In preparation for the RFP, *Capfi Consulting* conducted a feasibility study to determine if the Town would be a strong candidate to become fully self-insured. The study projections indicated that the fully self-funded model would outperform self-funded pooled model. She provided background on the self-insurance pool model and the fully self-insured model and considerations for both.

Dave Thomas (Partner) and Alison Sparks (Senior Account Executive) with Capfi Consulting responded to questions.

There was Council consensus to proceed with the RFP process for healthcare benefits that includes both self-insured pools and fully self-insured options for bidders.

It was anticipated that the RFP would be issued during the winter and that a recommendation would be presented to Council in March 2026.

A motion was made at 4:15 PM by Vice Mayor Andeen-Keller, seconded by Council Member Thomasson, to go into executive session to discuss item 25-242. The motion carried by the following vote:

Aye: 7 - Mayor Stanton
Vice Mayor Andeen-Keller
Council Member Labelle
Council Member Liepmann
Council Member Moore
Council Member Pace
Council Member Thomasson

DRAFT

3. EXECUTIVE SESSION

25-242 **Discussion of Town Manager six month performance check in as authorized by A.R.S. §38-431.03(A)(1).**

25-236 **The Town Council may go into executive session at one or more times during the meeting as needed to confer with the Town Attorney for legal advice regarding any of the items listed on the agenda as authorized by A.R.S. §38-431.03(A)(3).**

4. BREAK

DRAFT

5. RECONVENE FOR REGULAR MEETING

Mayor Stanton reconvened the meeting at 6:00 PM in the Town Hall Council Chambers.

6. ROLL CALL

COUNCIL MEMBERS PRESENT
Mayor Mark Stanton
Vice Mayor Ellen Andeen-Keller
Council Member Christine Labelle
Council Member Karen Liepmann
Council Member Scott Moore
Council Member Julie Pace
Council Member Anna Thomasson

STAFF MEMBERS PRESENT
Town Manager Andrew B. Ching
Attorney John Gaylord
Police Chief Freeman Carney
Town Clerk Duncan Miller
Community Development Director Chad Weaver
Public Works Director Isaac Chavira
Municipal Court Director Jeanette Wiesenhofer

7. PLEDGE OF ALLEGIANCE

Maya Abrams, a 7th grader at Cocopah and Evi Abrams, a freshman at Chaparral High School led the Pledge of Allegiance.

8. PRESENTATIONS

25-240 Paradise Valley Mountain Preserve Trust (PVMPT) Update

Paradise Valley Mountain Preserve Trust Chair John Graham presented the Trust's annual update. He reviewed the history and mission of the Trust and highlighted 2024 accomplishments including the Donor Wall dedication and the acceptance of 5562 E Roadrunner Rd.

25-241 Historical Advisory Committee Update

Historical Advisory Committee Chair Catherine Kauffman presented her annual update. She stated that the Committee has added 27 new interviews of notable residents to the website bringing the total number of interviews to 98 since 1997. She stated that six homes received the Historic Property Program recognition. The Committee hosted a Heritage Celebration Event in October 2024.

9. CALL TO THE PUBLIC

Resident Berkeley Danelski addressed the Town Council related to the Stormwater Master Plan. She stated that there are discrepancies between Maricopa County's 2D flow model and the 2D flow model contained in the Town's Stormwater Master Plan for her neighborhood. She expressed concern that errors at a micro level for a macro level study would be applied to her property.

DRAFT

10. CONSENT AGENDA

Mr. Ching summarized the items on the items on the consent agenda.

25-237 Minutes of Town Council Meeting October 9, 2025

A motion was made by Council Member Thomasson, seconded by Council Member Liepmann, to approve the Consent Agenda. The motion carried by the following vote:

Aye: 7 - Mayor Stanton
Vice Mayor Andeen-Keller
Council Member Labelle
Council Member Liepmann
Council Member Moore
Council Member Pace
Council Member Thomasson

11. PUBLIC HEARING

There were no public hearings.

12. ACTION ITEMS

25-239 Discussion and Possible Action to Reappoint the Municipal Court's Presiding Judge and Associate Judges

Mayor Stanton stated that the Municipal Court has jurisdiction to hear all criminal misdemeanors, civil traffic offenses, and Town Code violations occurring within the Town limits, as well as jurisdiction over orders of protection, harassment injunctions, and the issuance of summons and arrest warrants within Town limits. The Court is made up of the Presiding Judge and eight Associate Judges who all serve on a volunteer basis, accepting no compensation for their service.

On October 9, 2025, the Town Council met in executive session to review the judicial surveys and performance evaluations for the current judges.

There was no discussion or public comment.

A motion was made by Council Member Pace, seconded by Vice Mayor Andeen-Keller, to make the following appointments to the Paradise Valley Municipal Court:

J. Tyrrell Taber, Presiding Judge
John L. Auran, Associate Presiding Judge
Steven A. Cohen, Associate Judge
Jack Cunningham, Associate Judge
Stanley J. Marks, Associate Judge
Terry A. Gould, Associate Judge
Karen Nagle, Associate Judge
Linda Lory, Associate Judge
David Sandweiss, Associate Judge (New Appointment)

DRAFT

The motion carried by the following vote:

Aye: 7 - Mayor Stanton
Vice Mayor Andeen-Keller
Council Member Labelle
Council Member Liepmann
Council Member Moore
Council Member Pace
Council Member Thomasson

13. FUTURE AGENDA ITEMS

25-230 Consideration of Requests for Future Agenda Items

Town Manager Ching summarized the future agenda schedule.

14. MAYOR / COUNCIL / MANAGER COMMENTS

Council Members provided comments and updates on current events.

15. ADJOURN

A motion was made at 6:56 PM by Vice Mayor Andeen-Keller, seconded by Council Member Thomasson, to adjourn. The motion carried by the following vote:

Aye: 7 - Mayor Stanton
Vice Mayor Andeen-Keller
Council Member Labelle
Council Member Liepmann
Council Member Moore
Council Member Pace
Council Member Thomasson

Mayor Stanton adjourned the meeting at 6:56 PM

TOWN OF PARADISE VALLEY

SUBMITTED BY:

_____
Duncan Miller, Town Clerk

DRAFT

STATE OF ARIZONA)

:ss.

COUNTY OF MARICOPA)

CERTIFICATION

I, Duncan Miller, Town Clerk of the Town of Paradise Valley, Arizona hereby certify that the following is a full, true, and correct copy of the minutes of the regular meeting of the Paradise Valley Town Council held on Thursday, October 23, 2025

I further certify that said Municipal Corporation is duly organized and existing. The meeting was properly called and held and that a quorum was present.

_____

Duncan Miller, Town Clerk

DRAFT

Action Report

File #: 25-253

AGENDA TITLE:
Discussion and Possible Action to Adopt Resolution 2025-12 Approving the 2026 Legislative Agenda

RECOMMENDATION:
Adopt Resolution 2025-12.

STAFF CONTACT:

TOWN
Of
PARADISE VALLEY

STAFF REPORT

TO: **Mayor Stanton and Town Council Members**

FROM: **Andrew Ching, Town Manager**
Amy Rebenar, Management Analyst

DATE: **November 13, 2025**

DEPARTMENT: Town Manager
Amy Rebenar, 480.348.3544

AGENDA TITLE:
Discussion and Possible Action to Adopt Resolution 2025-12 Approving the 2026 Legislative Agenda

RECOMMENDATION:
Approve Resolution 2025-12, adopting the proposed 2026 Legislative Agenda.

SUMMARY STATEMENT:
The Town of Paradise Valley annually develops a Legislative Agenda to outline and reaffirm the Town's legislative priorities for the year. The Town Council is scheduled to meet with its Legislators before the next session to go over the Town priorities.

Throughout the session the Town's contract Legislative Lobbyist, Doug Cole from Highground, works to further the Town's interests and values and continually updates the Council. Attached is a proposed Legislative Agenda that largely reflects the values and direction from previous years. The attached Legislative Agenda includes changes based on a review by staff and Highground, and recommendations from Council received at the October 23, 2025 Council Study Session

ATTACHMENT(S):

A. Staff Report
B. Resolution 2025-12 - 2026 Legislative Agenda

RESOLUTION NUMBER 2025-12

A RESOLUTION OF THE MAYOR AND COUNCIL OF THE TOWN OF PARADISE VALLEY, ARIZONA, ADOPTING THE 2026 LEGISLATIVE AGENDA FOR THE TOWN.

WHEREAS the Mayor and Town Council (the "Town Council") of the Town of Paradise Valley (the "Town") annually develops a "Legislative Agenda" to outline and reaffirm the Town's legislative priorities for the year; and

WHEREAS, by adopting the Legislative Agenda, the Town Council provides clear direction to the Town staff and to the Town's contract legislative lobbyists as to the legislative priorities for the Town as determined by the Town Council; and

WHEREAS the Legislative Agenda allows the Town to be effective in protecting the interests of the Town by presenting a consistent message to the Town's representatives at the Arizona Legislature, to the Town's representatives in the United States Congress, and to fellow Arizona municipalities and political subdivisions; and

WHEREAS, the Town Council has determined that, to maintain the consistency necessary to protect the interests of the Town, once the Legislative Agenda is established by a majority of the Town Council, no Town Council Member or Town staff member shall, in their official capacity, publicly take a position on behalf of the Town contrary to the Legislative Agenda or such other Town Council position.

NOW, THEREFORE, BE IT RESOLVED by the Mayor and Council of the Town of Paradise Valley, Arizona, as follows:

Section 1. The foregoing recitals are hereby referred to, adopted, and made a part hereof as if fully set forth herein.

Section 2. The Town Council hereby adopts as its Legislative Agenda for 2026 the document attached hereto as Exhibit A and incorporated herein by reference.

Section 3. The Town Manager, the Town Clerk, and the Town Attorney are authorized and directed to take all actions necessary to carry out the purpose and intent of this Resolution.

[Signatures on following page.]

PASSED AND ADOPTED by the Town Council of the Town of Paradise Valley this 13th day of November, 2025.

_____
Mark Stanton, Mayor

ATTEST:

_____
Duncan Miller, Town Clerk

APPROVED AS TO FORM:

_____
Andrew McGuire, Town Attorney

7841665

EXHIBIT A
TO
RESOLUTION 2025-12

[2026 Legislative Agenda]

See following pages.

TOWN OF PARADISE VALLEY
INTERGOVERNMENTAL AFFAIRS PROGRAM
2026 Legislative Agenda Summary

Paradise Valley is universally recognized for its exceptional residential lifestyle, natural beauty, and limited government with a focus on public safety, fiscal responsibility, and maintaining the Town's large-lot, residential character. It embodies what people come to Arizona to enjoy. As a small community within a large metropolitan area, the Town believes local government best represents the quality of life of communities regarding their respective public safety, zoning, financial, and locally focused policy matters. Paradise Valley's beautiful resorts, medical and educational facilities, high-quality neighborhoods, and houses of worship benefit the entire region.

Efficient and effective solutions to difficult problems should preserve local control, not create new agencies or regulations nor duplicate existing ones. Our residents value the ability to determine appropriate service levels to preserve PV's many unique qualities, including:

- Limited Government model focused on preserving quality residential living
  - Only residential neighborhoods and resorts; no commercial
  - Town Council and Municipal Judges, 100% volunteers
  - No local property tax
  - Effective and efficient use of technology
- Low density large lots
- High quality of life and quiet neighborhoods
- Active preservation of open space and mountains; reclaiming desert vistas
  - For example, residents contributed personal funds to underground utilities and for open space preservation

ACTION ITEMS

Quality of Life Concerns to Preserve Neighborhoods

- Watch for any proposed legislation that could adversely impact Paradise Valley; work with others where opportunities may arise to reform any existing state or federal laws to reflect Town Code and the Town's General Plan to protect and/or enhance PV residential neighborhoods
- Monitor and continually evaluate the operational aspects of existing state and federal laws and Town ordinances
- Protect against adverse impacts of short-term and fractional rental impact on neighborhoods

Local Financial Stability

- Work to ensure the Town's portion of state shared revenue does not decrease or obligations increase (i.e., State obligation for maintenance)
- Highway User Revenue Fund (HURF)
  - Watch for proposed legislation that could adversely impact Paradise Valley; work with all interested parties on reform provided revenues held harmless
- Transaction Privilege Tax (TPT) Construction Sales Tax
  - Amend MRRA to cap maximum project amount or remove alterations
- Work with all interested parties on reform provided revenues held harmless
- Retain local options in single tax code

Public Safety/Traffic Enforcement/Smart Technology

- Protect ability of local government to maintain safety through all tools and technology
- Maintain all public safety technology including photo enforcement
- Preserve essential law enforcement tools to efficiently provide public safety within limited resources
- Enhance community safety through education, outreach, and technology for traffic safety

CONTINUING PRIORITIES

- Zoning/preservation of quality of life, and any other emerging trend that may contradict the standards, values or measures of Town Code or the Town's General Plan including density mandates, and sober living homes
- Preserving the Town's portion of state-shared revenues
- Rights of Way use, such as with utilities
- Sustainable pension structure, responsible financial management – The Town has effectively paid down the PSPRS unfunded liability reducing the unfunded amount from 71% in 2016 to 5.1% in 2024

Action Report

File #: 25-258

AGENDA TITLE:
Discussion and Possible Action to Authorize Acceptance of Two Governor's Office of Highway Safety Grants

RECOMMENDATION:
Authorize the Town Manager to accept two Governor's Office of Highway Safety Grants in the total amount of $16,000 for overtime costs associated with DUI and traffic safety enforcement.

STAFF CONTACT:

TOWN
Of
PARADISE VALLEY

STAFF REPORT

TO: **Mayor Stanton and Town Council Members**

FROM: **Andrew Ching, Town Manager**
Freeman Carney, Chief of Police

DATE: **November 13, 2026**

DEPARTMENT: Police Department
Freeman Carney, 480 948-7410

AGENDA TITLE:
Consider the acceptance of a Governor's Office of Highway Safety (GOHS) grant.

RECOMMENDATION:
Authorize the Town Manager to accept two Governor's Office of Highway Safety grants in the total amount of $16,000.

SUMMARY STATEMENT:
In FY 24/25, the Police Department participated in the Governor's Office of Highway Safety (GOHS) grant. During FY 24/25, the GOHS grant allowed officers to work overtime shifts to specifically seek traffic violations and DUI violators.

The GOHS has offered the Town of Paradise Valley two grants during this federal fiscal year. The grants are to enforce DUI ($6,000) and Traffic laws ($10,000). These grants cover the officer's overtime wage and 40% of the employee-related expenses associated with the employee, which includes part of the PSPRS match.

BUDGETARY IMPACT:
The acceptance of these grants could have a minimal financial impact on the Town, which will be covered by the current FY 25/26 budget.

ATTACHMENT(S):
A. Staff Report
B. GOHS Grant Letter

ARIZONA
GOVERNOR'S OFFICE OF
HIGHWAY SAFETY

1700 W Washington St, Exec. Tower Ste. 430
Phoenix, AZ 85007

602.255.3216

KATIE HOBBS
GOVERNOR

J.M. "JESSE" TORREZ
DIRECTOR

August 11, 2025

Chief Freeman Carney
Paradise Valley Police Department
6433 E Lincoln Dr
Paradise Valley, Arizona 85253

Re: **FFY 2026 GOHS Grant Agreement**

Grant No.:	Grant Description:	Award Amount:
2026-II-004	DUI/Impaired Driving Enforcement	$6,000.00
2026-PTS-044	STEP Enforcement Overtime	$10,000.00

Dear Chief Carney:

The Governor's Office of Highway Safety (GOHS) has completed the review of the proposals submitted for funding for Federal Fiscal Year (FFY) 2026 commencing on October 1, 2025. All of the proposals were carefully considered by an evaluation team at GOHS that reviewed agency performance, program priority area, problem identification, supporting fiscal/data documentation, consistency of reporting, and available funding levels.

As a result of this evaluation process, we are pleased to be able to include your agency's submitted proposal(s) listed above in the **Arizona's FFY 2026 Annual Grant Application (AGA)** to the National Highway Traffic Safety Administration (NHTSA). However, please be aware that your agency's awarded highway safety project(s) may not have been funded at the amount requested and may be subject to change as we strive to make the best use of federal taxpayers' dollars.

All FFY 2026 grants will begin **on** October 1, 2025 as long as NHTSA approves the FFY 2026 AGA. If approval from a Town/City Council or Board of Supervisors is required, your agency should begin the process of scheduling the grant award for approval.

The assigned GOHS project coordinator will be contacting you regarding your project(s) and your agency should have the grant(s) soon. **During the interim, do not make any public announcement concerning the grant and do not incur any costs or proceed with any portion of the project until GOHS has written a grant agreement with your agency and it has been signed and executed by both parties.**

We appreciate the time and effort put forth by your agency in submitting its proposal(s). Should any questions and/or concerns arise, please feel free to contact your grant project coordinator at 602-255-3216.

Sincerely,



J.M. "Jesse" Torrez, Director
Governor's Office of Highway Safety

Action Report

File #: 25-261

AGENDA TITLE:
Discussion and Possible Action to Authorize the Town Manager to Execute a Contract for Phase II Sanitary Sewer Manhole Locating Services

RECOMMENDATION:
Authorize Town manager to execute contract No. CON-26-018-ENG with Michael Baker International for amount not to exceed $101,163 for phase II of sanitary sewer manhole locating services.

STAFF CONTACT:

TOWN
Of
PARADISE VALLEY

STAFF REPORT

TO: **Mayor Stanton and Town Council Members**

FROM: **Andrew Ching, Town Manager**
Chad Weaver, Community Development Director
Shar Johnson, Town Engineer
Sam Kayat, CIP Manager

DATE: **November 13th, 2025**

DEPARTMENT: Community Development - Engineering
Sam Kayat, 480-348-3541

AGENDA TITLE: Locating Missing Manholes

SUMMARY STATEMENT

Town staff is providing project update and seeking Council approval to move forward with Phase Two of the missing sewer manhole locating effort. These manholes were not located during the Town's 2021 sanitary sewer assessment or in the initial search conducted by staff and the Town's consultant in Phase One of the search for missing manholes. As a result, they remain uninspected and without structural evaluation. Phase Two will utilize advanced technologies to locate and assess the remaining manholes.

RECOMMENDATION

Authorize Town manager to execute contract No. CON-26-018-ENG with Michael Baker International for amount not to exceed $101,163 for phase II of sanitary sewer manhole locating services.

BACKGROUND

- October 2024**:** Engineering staff became aware of missing manholes that had not been located during the Town's sanitary sewer assessment concluded in 2021.
- December 2024**:** Staff requested and received an updated count of missing manholes from the consultant who performed the 2021 assessment. The consultant reported 129 missing manholes**.**
- January to March 2025: Staff conducted their own field search and successfully located 55 of the missing manholes. The remaining manholes required specialized equipment to locate.
- May 2025**:** The Town retained Michael Baker International to conduct a more detailed search. The work was divided into two phases:

- Phase One**:** Utilized ground penetrating radar (GPR) and metal detectors to locate as many manholes as possible. This phase concluded in June 2025, with 25 manholes located**.**
- Phase Two (upcoming): Will use more advanced technologies to continue searching for the remaining 49 missing manholes.

Phase two of the search will use robotic crawlers equipped with cameras and sounders to locate manholes, mark found manholes, expose manholes if possible and update manhole location in the Town's geographic information system (GIS).

BUDGETARY IMPACT

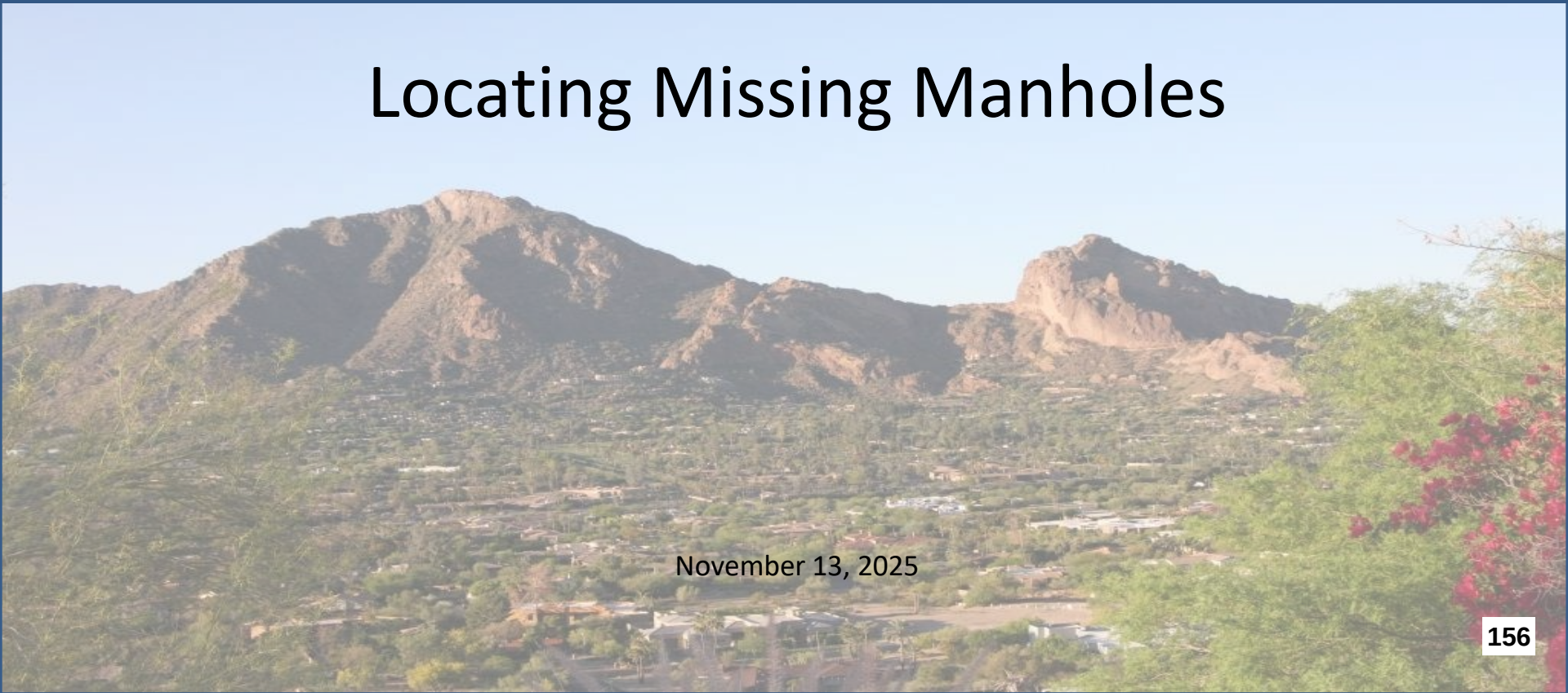
The Town's FY26 CIP budget includes $150,000 for sanitary sewer assessment. The current estimated cost to complete this task is $101,163.

ATTACHMENT(S):

A. Staff Report
B. Presentation
C. Contract No. CON-26-018-ENG

TOWN OF PARADISE VALLEY

Locating Missing Manholes



November 13, 2025

PRESENTATION'S HIGHLIGHTS

- Missing Manholes
- Previous Locating Efforts
- Proposed Phase II
- Cost VS Budget
- Project Timeline
- Recommended Council Action

MISSING MANHOLES

In October 2024, staff became aware of missing manholes that had not been located during the Town's sanitary sewer assessment completed in 2021.

In December 2024, staff received an updated report confirming that 129 manholes remain unaccounted for within the Town.

PREVIOUS LOCATING EFFORTS

- Staff conducted field search and successfully located 55 MH.
- Remaining MH required specialized equipment to locate.
- In May 2025, the Town retained Michael Baker International to conduct a more detailed search. The work was divided into two phases.
- Phase One utilized GPR and metal detectors to locate as many MH as possible. Concluded in June 2025, with 25 MH located.

* GPR = Ground Penetrating Radar

PROPOSED PHASE II

Phase Two will employ more advanced technologies to locate the remaining 49 missing manholes.

- Use robotic crawlers with sounder & camera
- Mark & expose found manholes
- Update manhole locations in Town's GIS*

*GIS = Geographic Information System

PHOTOS OF TOOLS



Ground Penetrating Radar (GPR)



Robotic Crawler

PROJECT'S COST VS BUDGET

The Town's FY26 CIP budget includes $150,000 for Sanitary Sewer Assessment. The current estimated cost to complete this task is $101,163.

PROJECT TIMELINE

Task	Date
Contract approval (*)	November 2025
Notice to proceed	December 2025
Anticipated start	January 2026
Estimated duration	60 days

(*) Council action

RECOMMENDED COUNCIL ACTION

Authorize Town Manager to execute contract No. CON-26-018-ENG with Michael Baker International in the amount not-to-exceed $101,163.00 for phase II of Sanitary Sewer Manhole Locating Services.

Thank You

Questions?

ON-CALL PROFESSIONAL SERVICES AGREEMENT
BETWEEN
THE TOWN OF PARADISE VALLEY
AND
MICHAEL BAKER INTERNATIONAL, INC.

WORK AUTHORIZATION #1

On-Call Professional Services for Civil Engineering

THIS WORK AUTHORIZATION #1 (this "Work Authorization") is entered into as of _____, between the Town of Paradise Valley, an Arizona municipal corporation (the "Town"), and Michael Baker International, Inc, a Pennsylvania corporation (the "Consultant"). The Consultant will perform the Scope of Work detailed in Section 1, below, pursuant to the terms and conditions of On-Call Professional Services Agreement No. CON-26-018-ENG, dated October 15, 2025, (the "Agreement").

1. Scope of Work. The Consultant shall provide civil engineering services for the Sewer Manhole Mapping and Locating Project – Phase 2, described in **Attachment 1** to this Work Authorization. Upon acceptance by the Town, this Work Authorization will become part of the Agreement and attached thereto as part of Exhibit D.

2. Schedule of Completion of Services. The Consultant shall commence work immediately upon execution of this Work Authorization and complete the work required herein within 120 days of said execution, in accordance with the schedule set forth as part of **Attachment 1** to this Work Authorization.

3. Fee Breakdown. The total cost to complete the Scope of Work required under this Work Authorization shall not exceed $101,163.

4. Subject to the Agreement. This Work Authorization is subject to the terms and conditions of the Agreement.

5. Conflict of Interest. The Town may cancel this Work Authorization pursuant to Ariz. Rev. Stat. § 38-511.

4. Forced Labor of Ethnic Uyghurs. To the extent applicable under Ariz. Rev. Stat. § 35-394, the Consultant warrants and certifies that it does not currently, and agrees that it will not use, for the duration of this Agreement, the forced labor, any goods or services produced by the forced labor, or any contractors, subcontractors, or suppliers that use the forced labor or any goods

or services produced by the forced labor of ethnic Uyghurs in the People's Republic of China.

IN WITNESS WHEREOF, the parties hereto have executed this Work Authorization as of the date and year first set forth above.

"**Town**"

TOWN OF PARADISE VALLEY,

an Arizona municipal corporation

_____

Andrew Ching, Town Manager

ATTEST:

_____

Duncan Miller, Town Clerk

APPROVED AS TO FORM:

_____

Andrew J. McGuire, Town Attorney
Gust Rosenfeld, PLC

"**Consultant**"

MICHAEL BAKER INTERNATIONAL, INC.
a Pennsylvania corporation

By: _____

Name: Tony Cabrera

Title: Vice President, Office Executive

ATTACHMENT 1
TO
ON-CALL PROFESSIONAL SERVICES AGREEMENT
BETWEEN
THE TOWN OF PARADISE VALLEY
AND
MICHAEL BAKER INTERNATIONAL, INC.
WORK AUTHORIZATION #1

On-Call Professional Services for Civil Engineering

[Scope of Work]

See following pages.

Michael Baker INTERNATIONAL

We Make a Difference

August 14, 2025

Mr. Sam Kayat, PE
CIP Manager
Town of Paradise Valley
6401 E. Lincoln Drive
Paradise Valley, Arizona 85253

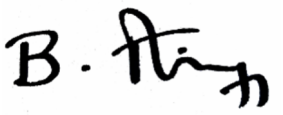
Subject: Sewer Manhole Mapping and Locating Project – Phase 2

Dear Mr. Kayat,

Michael Baker International, Inc. (**MBI**) is pleased to present this Scope of Work and Fee to map and locate 49 Sewer Manholes that have been identified as not found by the previous investigations and inspection reports, located in the Town of Paradise Valley (**TOPV**), Arizona. Should the attached meet your expectations, then we should discuss how to proceed towards an executed contract to complete this work.

Adrian Navarro will be the Project Manager (**PM**) on this project and can be reached at 602-798-7565 (office), 602-284-7608 (mobile) or by email anavarro@mbakerintl.com. Please feel free to contact me or Adrian with any questions or comments you may have.

Sincerely,



Thirumurugan Bose, P.E, CFM
Department Manager - Water

Attachments: Exhibit A – Scope of Work
Exhibit B – Fee Proposal

Exhibit A

SCOPE OF WORK

Sewer Manhole Mapping and Locating Project – Phase 2

Section 1 – Summary

Town of Paradise Valley (TOPV) has requested Michael Baker International (MBI) to locate 49 Sewer Manholes using intrusive methods that have been identified as not found by the TOPV and previous inspection reports identified to have been inaccessible, covered over or buried. The tasks included within represent the specific scope of work that shall be completed by MBI.

MBI will locate the 49 manholes using a closed-circuit television video (CCTV), sondes, remote crawls and other equipment to locate the covered manholes within the project location show in Figure 1 below.

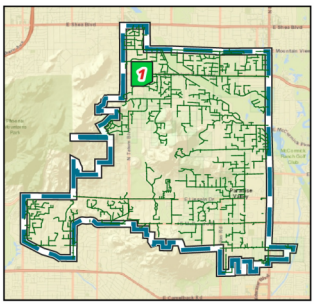


Figure 1 – Project Location

The following tasks shall be addressed as part of the project:
Task 1 – Meetings, Progress and Reporting
Task 2 – GIS Mapping
Task 3 – Utility Locating

Summary of Fees:

Tasks	Fee
Task 1 – Meetings, Progress, and Reporting	$15,736
Task 2 – GIS Mapping	$5,302
Task 3 – Utility Locating	$64,125
Overhead Direct Costs	$6,000
Owner Allowance	$10,000
TOTAL	**$101,163**

Section 2 – Tasks

Task 1: Meeting, Progress and Reporting

MBI shall schedule and facilitate a kickoff conference call with the TOPV, to discuss the project, scope of work, request documentation, execution of work plan and associated schedule. A Kick-off Meeting shall be scheduled after the Notice to Proceed is issued or at the discretion of TOPV.

MBI shall also schedule and facilitate two (2) progress meetings with TOPV prior to reporting the findings.

MBI will prepare a work plan to coordinate dates, notifications, access and entry locations prior to the site visits. MBI will survey locate, map and report the manholes located in the findings report. MBI will notify TOPV and homeowners prior to entry from a known manhole that includes intrusive measure to locate the missing manhole covered.

Task 2: GIS Mapping

MBI will provide GIS updates to the existing database with the latest data schema provided by TOPV. The existing TOPV sewer database will be updated to include the missing manholes. This task includes preparing exhibits and map book for utility locating and coordination.

Task 3: Utility locating

MBI shall schedule a site visits to notify and gain access to locate manhole using an intrusive method, document the existing conditions, impacts, and identify the manholes to be used for entry to locate the missing manholes and any of the problem areas within the project area.

MBI shall coordinate access, entry and traffic control with the TOPV to locate the covered or inaccessible manholes and expose found manholes covers **except** when under pavement or other structures. MBI will use the intrusive method below to locate the manholes:

- Camera with a sonder attached to cable crawler that will be traced aboveground from nearest manhole to the position of the covered manhole.

Task 4: Project Timeline and Deliverables

The proposed timeline to complete the project:

Kick Off Meeting	Within 5 calendar days from Notice to Proceed
Notification to Homeowners	Within 15 calendar days from the Notice to Proceed

1st Progress Meetings	Within 30 calendar days from the Notice to Proceed
Utility Locate	Within 60 calendar days from the Notice to Proceed
2nd Progress Meetings	Within 70 calendar days from the Notice to Proceed
Draft Reporting and Findings	Within 90 calendar days from the Notice to Proceed
Contract Completion	Within 120 calendar days from the Notice to Proceed

Task 5 - Invoicing

Invoices shall be submitted Monthly, to the TOPV, with appropriate supporting data and documentation and in a format as prescribed by TOPV. Any invoice which lists a requested payment for any individual task beyond the current approved task budget will be rejected. Task (deliverables) shall be appropriately documented. TOPV shall review and check the invoice to determine if it is complete and acceptable; if it is determined to be complete and acceptable, the TOPV will approve the invoice for payment.

Invoicing fees will be in accordance with the Exhibit B Fee Proposal.

Section 3 – Direct Expenses

Overhead Direct Cost

All overhead direct costs including reproduction, lodging, milage, courier charges, etc. shall be billed to the TOPV at cost and shall not exceed $6,000.

Owner Allowance

An owner's allowance of $10,000 has been included to cover additional expenses with CLIENT approval.

Section 4 – Exclusions

Town of Paradise Valley Responsibilities

TOPV responsibilities include, but are not limited to, the following:

- A **PM** will be assigned to represent **TOPV**.
- The **PM** will coordinate the **MBI** contract, deliverables and invoices.
- The **PM** will supply the **MBI** with printed copies of all relevant Paradise Valley reports, studies, and plans to accomplish the analysis in the scope of work. The **TOPV** shall also supply the **MBI** with electronic copies of documents when available.
- **TOPV** will provide relevant materials prepared by other **TOPV** contractors as required.
- **TOPV** will provide conference room space for scheduled meetings.
- **TOPV** will provide the **MBI** with access to any data available.

Exclusions

- Topographic Survey
- Design Report
- Construction Documents
- NASSCO Inspection and Assessment
- Construction/Post Design Services
- Legal Descriptions are not included for this project
- Potholing locating
- Any item not specifically listed in the scope of work

Note: CONSULTANT can provide the above services for an additional fee that can be negotiated with CLIENT.

EXHIBIT B - FEE PROPOSAL

Michael Baker INTERNATIONAL

Sewer Manhole Mapping and Locating Project - Phase 2

Town of Paradise Valley

Classification	Project Principal	Project Manager	Sr. GIS Analyst	Project Engineer	Designer	Project Assistant	Total Hours	Total Labor	Total
Hourly Rate:	276.00	186.00	176.00	159.00	121.00	125.00			
Project Management									
Task 1.0 – Meetings, Progress, Reporting and Coordination									
Subtask 1.1 - Kick-off Meeting		1	1	1	1	2	6	892.00	892.00
Subtask 1.2 - Coordination Meetings (Progress, Traffic Control, Work Plan, Approach and Technology)		4	2	4	2	2	14	2,224.00	2,224.00
Subtask 1.3 - Work plan and Reporting	1	2	16	24	40	4	87	12,620.00	12,620.00
Subtotal Project Management	1	7	19	29	43	8	107	15,736.00	15,736.00
Sewer Manhole Locating									
Task 2.0 – GIS Mapping									
Subtask 2.1 - Existing Sewer Basin Mapping		1	8	8	16	4	37	5,302.00	5,302.00
Task 3.0 – Utility Locating									
Subtask 3.4 - CCTV with Sondes Locating		80	147	147			374	64,125.00	64,125.00
Subtotal Design	0	81	155	155	16	4	411	69,427.00	69,427.00
Direct Expenses									
Overhead Direct Costs (equipment, reproduction, logging, mileage, delivery and postage)								6,000.00	6,000.00
Owner Allowance								10,000.00	10,000.00
Subtotal Not to Exceed	0	0	0	0	0	0	0	10,000.00	16,000.00
Total	**1**	**88**	**174**	**184**	**59**	**12**	**518**	**95,163.00**	**101,163.00**

Dose not Include below:

Topographic Survey
Potholing
Condition Inspection and Assessment
Construction/Post Design Services

Action Report

File #: 25-260

AGENDA TITLE:
Discussion and Possible Action to Adopt the Town of Paradise Valley Stormwater Master Plan

RECOMMENDATION:
Adopt the Town of Paradise Valley Stormwater Master Plan.

STAFF CONTACT:

TOWN
Of
PARADISE VALLEY

STAFF REPORT

TO: **Mayor Stanton and Town Council Members**

FROM: **Andrew Ching, Town Manager**
Chad Weaver, Community Development Director
Shar Johnson, Town Engineer
Geoff Brownell, Kimley-Horn Consulting Project Manager

DATE: **November 13, 2025**

DEPARTMENT: Community Development – Engineering Division
Shar Johnson , 480-348-3522

AGENDA TITLE:
Town of Paradise Valley's Stormwater Master Plan Development (Adoption)

SUMMARY STATEMENT:

The Town's Stormwater Master Plan Development is final and ready for final adoption.

An extensive list of development interests were emailed a copy of the draft plan and instructed to provide any comments or questions to staff. No comments or questions were received.

The project scope of work includes combining and overlaying modeling efforts from the Flood Control District of Maricopa County's previous Area Drainage Master Studies and Plans with additional modeling within the Town of Paradise Valley to identify and prioritize alternative projects for high hazard areas.

The major scope tasks for the Stormwater Master Plan includes:

- Task 1 – Project Management
- Task 2 – Data Collection
- Task 3 – Mapping and Assessment of Storm Drain Assets
- Task 4 – Townwide FLO-2D Model
- Task 5 – Long Range Capital Improvement Plan Development
- Task 6 – Development of Stormwater Master Plan
- Task 7 – Town Council Meetings/Coordination

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BACKGROUND

Between 2013 and 2014, the Town of Paradise Valley experienced significant flooding events and property damage during these events. The Town Council was moved to host a Community Conversation on Stormwater on February 26, 2015. Town staff proceeded to develop a plan in 2015 that included short-term, mid-term and long-term measures to educate residents and provide solutions to remediate flooding in the Town.

Major milestones for stormwater management in the Town include the following Council actions:

1) On April 13, 2017, the Town Council Approves Resolution 2017-08 with the following excerpt:

   NOW, THEREFORE, BE IT RESOLVED BY THE MAYOR AND COUNCIL OF THE TOWN OF PARADISE VALLEY, ARIZONA, THAT:

   SECTION 1. The Town of Paradise Valley will:

   A. provide storm water data and information available to it concerning the 100 year, 2 hour storm event to property owners;
   B. participate in National Flood Insurance Program such that property owners have the ability to purchase federally backed flood insurance;
   C. regulate development to mitigate the impacts of storm drainage;
   D. budget for small (i.e. under the Capital Improvement Program financial threshold) flood control projects that benefit two or more Paradise Valley parcels and seek cost sharing opportunities for these or other storm water management projects; and,
   E. consider cost-benefit analysis for all proposed projects.

2) Town Council Approves Ordinance 2017-01 on 4/13/2017 adopting the updated Storm Drainage Design Manual

   - Originally adopted in 1987, first comprehensive update
   - The updated manual incorporated all aspects of stormwater management.
     - Major changes include comprehensive submittal requirements, BMPs, updated rainfall data, updated retention requirements, certification of retention basin volume, first flush requirements.

3) Between 2017 and 2023, Council declines to participate in some large ($10M+) Flood Control District of Maricopa County (FCDMC) projects identified in the Area Drainage Master Plan/Study (ADMP/S) due to cost/benefit analyses.

4) April 27, 2023, Council approves the FY24 Capital Improvement Plan budget. The budget includes $450,000 for Watershed Studies / Storm Drainage Strategic Plan (i.e. Stormwater Master Plan).

5) On November 9, 2023, Council issued comments and directions to staff to revise the scope and fee proposal to develop a Town Stormwater Master Plan for further review. Council's comments and directions emphasized: a) The benefits and costs associated with developing a Town-wide Stormwater Master Plan; b) A cost-effective project approach that includes more direct oversight by staff; c) Council "check-ins" throughout the plan's development; public involvement by data collection activities; d) understanding the Town's history of stormwater management and mitigation practices; and e) the identification of new flood hazard areas, prioritization of new and existing projects and the process to include these projects in the Town's Five-Year Capital Improvement Program budget.

6) On January 11, 2024, Council directed staff to proceed with a professional services contract with Kimley-Horn to develop a Town-wide Stormwater Master Plan.

7) The Town of Paradise Valley's professional services contract agreement (CON-24-025) with Kimley-Horn was entered on March 6, 2024.

8) Intergovernmental Agreement (IGA) between the Town of Paradise Valley and the Flood Control District of Maricopa County (FCD) was approved and accepted on March 27, 2024.

PROJECT PROGRESS

The project kick-off meeting took place on March 26, 2024, and Council Session check-ins on June 13, 2024, November 14, 2024, March 27, 2025 and October 9, 2025. At the initial Council check-in on June 13, 2024, staff presented the results of data collection and cataloging, and the compilation of a townwide comprehensive two-dimensional hydrologic and hydraulics modeling effort.

- **Data collection and cataloging –** Considerable data on flood problem areas and potential mitigation projects has already been identified by residents, Town Staff, and through the various watershed studies completed within Town boundaries. The intent is for the PVSWMP to springboard off and build from this data to identify the project that will benefit residents the most. To this end, the project team has collected all pertinent study data, project data, flood complaints, and staff identified problem locations.

- **Hydrologic and Hydraulic Modeling –** The project team focused on compiling the townwide model that will serve as the basis of design for conceptual project formulation. The model results will also allow Town staff to effectively manage new development such that flood hazards are reasonably mitigated. Modeling is scheduled to continue until the end of November 2024 with refinement and calibration of flood areas.

At the second Council check-in on November 14, 2024, staff presented the results of the flood hazard area designations and flood area prioritization. Staff also presented the plan for project prioritization as part of future efforts.

- **Flood Hazard Areas** – Flood hazard areas were classified as either having nuisance, moderate, or severe flooding potential based on depth of flood flows against structures and over roadways. The classifications were overlayed onto the Flood Hazard Areas Map. Also illustrated on maps were factors and parameters to further delineate the flood hazard areas such as maximum depth, depth x velocity, and erosion or sedimentation potential.

  An additional map prepared was the Reported Flooding Issues Map which overlays the Flood Hazard Classifications areas with property flooding, road closures due to flooding risks, road flossing and structural flooding. The flooding issues are demonstrated throughout the entire Town with many clusters near or within the flood hazard areas.

- **Flood Area Prioritization -** A decision matrix was prepared to assist with prioritizing flood areas. The decision variables included with initial priority weightings were:
  - Severity of Flooding,
  - Potential Benefits to Streets/Structures,
  - Potential Streets Protected,
  - Emergency Access, and
  - Multi-Use Opportunities.

  The results of the areas ranking based on the decision matrix was mapped and overlayed with the flood hazard areas for prioritization.

- **Project Prioritization -** The check-in presentation included a brief overview of the proposed project alternative analysis in preparation for next steps in the development of the Town's Stormwater Master Plan. The analysis included categorizing and prioritizing project alternatives for capital improvements in the Town. Major project categories include small, medium and large projects based on the Flood Control District of Maricopa County's (FCDMC) funding program thresholds and other qualifying regional and federal grant programs.

At the third Council check-in on March 27, 2025, staff presented updates on the Town-wide hydrologic and hydraulic modeling effort, a summary of the flood hazard area prioritization, and project alternatives development and prioritization.

- **Model Finalization –** Draft final models were submitted to the Town and Flood Control District of Maricopa County (FCDMC) on January 21, 2025. Comments were received from FCDMC on March 10, 2025 and are currently being addressed. The submission to FCDMC included calibration models using actual storm event data. The FCDMC flood control basin near 44th Street and Shea Boulevard was used for calibration as it has a reliable stream gage at the spillway into the basin.

Once the models are finalized, the Town will have comprehensive, town-wide hydrology and hydraulic data spaced every ten feet. This will allow for the determination of runoff conditions anywhere in the Town, helping facilitate safe developments and informed improvement projects.

- **Flood Hazard Area Prioritization –** During the Council check-in on November 14, 2024, the flood hazard area prioritization process was discussed in detail. Areas were delineated based on modeling results, erosion/sedimentation potential, flood complaints, and reoccurring maintenance. These areas were classified as nuisance, moderate, and severe based on depth of flooding against structures and over roadways during the simulated 100-year event. Nineteen total areas were delineated as particularly flood prone. Of these, three were categorized as nuisance, seven as moderate, and nine as severe. Flood hazard project alternatives were developed for the nine areas with potentially severe flood hazards (high priority areas).

- **Project Alternative Development –** For each of the nine severe flooding potential areas, flood mitigation project alternatives were developed. All projects were developed such that improvements were contained within existing Town right-of-way where feasible. Projects for each area were then ranked to determine a recommended alternative using the following criteria:

    1. Improvements were sized to convey runoff from a 10-year storm event
    2. Potential structures protected and design/construction costs were weighed the highest score of 5.
    3. Streets protected and partnership opportunities weighed the next highest score of 4.
    4. Operations and maintenance costs and utility constraints were weighed using a factor of 3.
    5. Multi-use opportunities were weighted using a factor of 2.
    6. Green stormwater infrastructure opportunities were weighed the lowest 1.

    The recommended alternative for each of the nine high priority areas was refined to create conceptual plans, opinion of probable cost/benefit analysis, and proposed conditions hydraulic modeling. These data are housed in the Storm water Master Plan and will help inform CIP updates and prioritization.

    Each of the high priority areas and the corresponding project alternatives were included in the presentation. The alternatives data included a brief description, estimated cost, and estimated quantities of improvements. The presentation also included a summary sheet of the recommended alternative per high priority area with the major design component.

At the fourth and final Council check-in on October 9, 2025, staff presented the draft-final Stormwater Master Plan that included the following summaries and updates:

- **Overall Project Summary –** The summary includes project timeline to date, project purpose, methods for identifying flood hazard areas, the study and model boundaries, and summary of final deliverables.

- **Model Compilation and Results Summary –** Two-dimensional modeling was compiled for the entire Town for the 2-, 10-, and 100-year hypothetical storm events. The modeling results provide detailed and accurate flood depth and velocity results anywhere in the Town, discretized on a 10' by 10' gridded basis (unique results every 10').

- **Data Collection Summary –** The data collection effort consisted of compiling flood related complaints and problem spots from both residents and Town staff. In all, 275 unique locations were identified. Past flood mitigation study results from both Town and Flood Control District of Maricopa County (FCDMC) projects were also collected and used as the starting point for the modeling effort and for identifying flood hazard areas.

- **Existing Infrastructure Evaluation –** Existing infrastructure was evaluated to qualitatively identify infrastructure that may be undersized. These determinations were made by evaluating performance during the 2-, 10-, and 100-year theoretical storm simulations. For example, if significant ponding occurred at a storm drain or culvert inlet during the 10-year simulation but not during the 2-year simulation, it was deduced that the capacity of that system was between the two storm events. These evaluations were focused mainly on culverts as there is limited storm drain in the Town, and undersized culvert can create significant flooding hazards for vehicles during large storm events.

- **Flood Hazard Analysis –** Model results were next used to perform flood hazard analyses. These analyses included mapping buildings potentially inundated (with depth data) for each storm event, erosion and sedimentation potential along washes using velocity data, and risk to passenger vehicle at wash road crossings using the product of depth and velocity. The results of each analysis were used to create hazard maps, and to identify potential flood prone areas throughout the Town.

- **Flood Hazard Area Classification and Prioritization –** Using staff and resident identified problem areas, model results, and the flood hazard analyses, nineteen separate areas were identified as particularly flood prone. Each of these areas was classified as having either 'nuisance flooding', moderate flooding', or 'severe flooding' potential based on depths of flooding in the roadways and the number of structures impacted. Sixteen of the nineteen areas were classified as having either moderate or severe flooding potential. These sixteen areas were ranked for development of flood mitigation project alternatives. Rankings were based on:

    1. Severity of Flooding
    2. Potential Structures Protected
    3. Potential Streets Protected

4. Restrictions to Emergency Access
5. Muti-Use Opportunities

The specific criteria and ranking scheme are detailed in the master plan report. The top nine areas were advanced for mitigation project alternative development. The nine include seven severe and two moderate flood potential areas, with up to 512 structures protected, and emergency access improvements for six.

- **Proposed Project Alternatives Development –** For each of the nine areas, two or three project alternatives were developed and ranked against each other to determine one recommended alternative. The rankings were based on:

    1. Potential Structure Benefitted
    2. Design and Construction Cost/Benefit
    3. Potential Streets Protected
    4. Green Storm Water Infrastructure Opportunities
    5. Project Partnership Potential
    6. Multi-Use Opportunities
    7. Operations and maintenance Costs
    8. Utility Constraints

    The specific criteria and ranking scheme are detailed in the master plan report. It should be noted that because of the Council's directive to keep proposed improvements within existing Town right-of-way, cost was the primary determining factor as most project alternatives consist of storm drain systems or improved road crossings.

- **Highest Priority Alternatives Conceptual Plan Development –** For the top six highest ranked flood hazard areas, the recommended alternative was further developed to provide design and construction cost estimates, cost/benefit analysis if applicable, proposed conditions modeling results, and 15% level plans. It is anticipated that these six will inform the Town's CIP for stormwater projects over the next several years. Only six, as opposed to all nine, were further developed due to budget limitations.

- **Grant Funding Opportunities Summary –** The Stormwater Master Plan also includes a matrix of possible grant funding opportunities. In addition to the two programs through FCDMC (small projects and large project) that the Town has leveraged in the past, other potential federal opportunities with typical requirements and due dates were also listed.

- **CIP Prioritization Summary –** Of the six fully developed projects, two benefit a significant number of residential structures. These two were ranked against each other based on their cost/benefit ratios. The four roadway focused projects were ranked based largely on cost. The table listed in the Stormwater Master Plan gives the Town some data points to program CIP expenditures depending on budgets and priorities at the time.

General Plan:

The project supports the General Plan, particularly the Environmental Planning and Water Resources section by recognizing the hazards within the Town due to rainfall runoff. Analyzing such hazards with the best available data in concert with regional authorities in the area and formulating plans for mitigation and improvement when they are needed, warranted, and represent an efficient use of the Town's resources.

BUDGETARY IMPACT:

The Town staff administers Capital Improvement Projects through the Town based on approvals by the Town Council during the annual budget process. The Stormwater Master Plan project is in the Town's approved FY 2024 Capital Improvement Plan (CIP) Stormwater category for $450,000. The Town is also seeking cost participation through the Flood Control District of Maricopa County (FCDMC) for this study.

Here is a breakdown of the project budget with FCDMCs participation:

1) Town of PV (FY24 Approved CIP) - **$450,000**
2) Flood Control District of Maricopa County (FCDMC) – 50/50 share = **$316,000**

Total Estimated Project Fee/ Cost (Intergovernmental Agreement)	**$632,000 (rounded)**
FCDMC Share	$316,000
Town of PV's Share	$316,000

With the Flood Control District of Maricopa County's 50/50 participation, the current approved CIP budget is sufficient to fund all phases of the project.

RECOMMENDATION:

Staff recommends Town Council's adoption of the Town-wide Stormwater Master Plan.

ATTACHMENT(S):

A. Staff Report
B. Presentation – Summary of revisions
C. Stormwater Master Plan - Final
D. H&H Model Report





Paradise Valley Storm Water Master Plan Adoption

Town Council Session
November 13, 2025

Kimley»Horn

Project Timeline

Project Kick Off
March 26, 2024

- Town Priorities
- Overview of Project Scope and Schedule

1st Council Session
June 13, 2024

- Data Collection
- Hydrology and Hydraulics Model

2nd Council Session
November 14, 2024

- Flood Hazard Analysis
- Identification of Priority Areas
- Project Ranking Criteria

Project Timeline

3rd Council Session
March 27, 2025

- Model Finalization
- Flood Hazard Area Prioritization Results
- Proposed Project Alternative Analysis

4th Council Session
October 9, 2025

- Draft Final Deliverables
- Adoption (November 13, 2025)

Plan Implementation

Summary of Comments Addressed from 10/09/25 Council Work Session & Staff

Comment	Page #	Response
Change row colors to match previous table	42	Updated
Conduct spelling and grammar check of entire document	n/a	Completed
Change “Medium” to “Moderate”	iii	Updated
Change Figure 4 colors to match Figures 5 & 6	33 & 34	Updated
Change “Medium” to “Moderate”	41	Updated
Rearrange order of legend	136	Updated
Add ‘PV Border’ to legend	161	Added
Table title is cutoff	362	Fixed

Table 7 (Page 42) Updates

Table 7: Flood Hazard Area Ranking and Characteristics

Flood Mitigation Alternatives Developed

Flood Hazard Area	Matrix Score	Severity of Flooding	Structures with Adjacent Depths of at Least 0.5 ft	Streets Impacted by at Least 0.5 ft Depths	Potential Impact to Emergency Access
N	49	Severe	123	2 Collector; 8 Local	Yes
A	45	Severe	43	2 Collector; 6 Local	Yes
O	45	Severe	22	2 Collector; 4 Local	Yes
K	43	Severe	141	2 Collector; 13 Local	No
L	41	Severe	35	0 Collector; 5 Local	Yes
H	40	Severe	9	2 Collector; 2 Local	Yes
P	39	Severe	17	1 Collector; 2 Local	Yes
C	39	Moderate	70	1 Collector; 2 Local	No
E	38	Moderate	52	2 Collector; 5 Local	No
S	36	Severe	14	1 Collector; 1 Local	Yes
R	36	Severe	27	1 Collector; 5 Local	Yes
D	33	Severe	20	2 Collector; 1 Local	No
G	32	Severe	2	0 Collector; 2 Local	Yes
M	25	Moderate	19	1 Collector; 6 Local	No
B	25	Moderate	4	1 Collector; 2 Local	No
J	21	Moderate	8	0 Collector; 3 Local	No

...cont. Table 7 (Page. 42) Updates - Matching to Table 6(Pg. 41) and Figure 7 (Pg. ii)

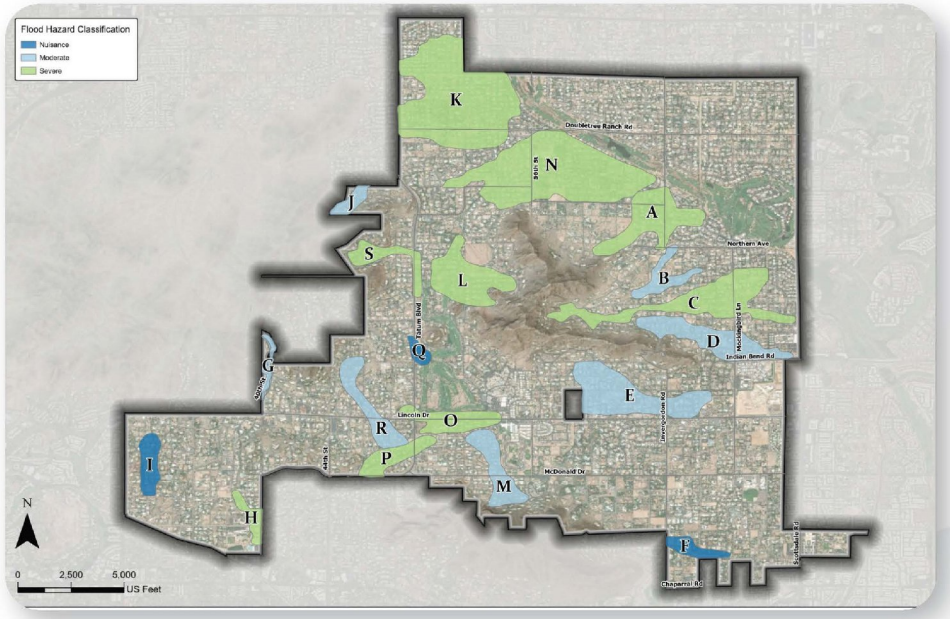
Flood hazard areas with moderate and severe classifications were ranked in a decision matrix based on five criteria, as outlined in **Table 6**. Classification of the severity of flooding and the potential number of structures that could be benefited in the area were the criteria that were given the greatest weight within the matrix with a weighted score of 5. Structures that could be benefitted were defined as any structure with adjacent flood depths of 0.5 feet. The number of streets inundated with at least 0.5 feet of depth was another variable considered in the matrix and was given a weighted score of 4. Impacts to emergency access and the potential for multi-use opportunities were considered in the matrix as well with priority scores of 3 and 1, respectively. The results of the area decision matrix and area data sheets are provided in **Appendix D.**

Table 7 includes the location, the severity designation, the number of buildings impacted, and potential impacts to emergency access for each flood hazard area. Of the 16 areas classified as having severe or moderate flood potential, the top 9 were selected to develop flood mitigation alternatives. The three areas classified as having nuisance flooding potential were not included in the ranking, but can be evaluated further by Town maintenance or engineering staff as annual maintenance budgets allow.

Table 6: Flood Hazard Area Prioritization Criteria

Criteria	Scoring Criteria		Weighted Score	Highest Possible Score	Lowest Possible Score
Severity of Flooding	1-	Nuisance	5	15	5
	2-	Moderate			
	3-	Severe			
Potential Structures Protected	1-	1 to 30 Structures	5	15	5
	2-	31-50 Structures			
	3-	>51 Structures			
Potential Streets Protected	1-	Local Street Benefits Only	4	12	4
	2-	Arterial/Collector Street or Multiple Local Streets Benefits			
	3-	Multiple arterial/collector & Local Street Benefits			
Restriction to Emergency Access	0-	No Impact to Emergency Access	3	6	0
	2-	Impacts to Emergency Access			
Mulei-Uac Opportunitics	1-	No Opportunities	1	2	1
	2-	Possible Opportunities			

Figure 7: Classifications of Flood Hazard Areas



Page iii - Updates

and well-being of residents and the community. The degree of flooding, whether nuisance, moderate, or severe, influences the urgency and scale of necessary interventions.

2. Potential Structures Protected (Weight: 5)

- The number of structures that could be protected by mitigation measures was also heavily weighted. This criterion reflects the plan's focus on minimizing property damage and protecting as many residential and commercial buildings as possible.

3. Potential Streets Protected (Weight: 4)

- The number of roads (local, collector, arterial) affected by flooding and their role in community connectivity and accessibility were considered significant, but slightly less critical than the direct impact of flooding on structures and severity.

4. Impacts to Emergency Access (Weight: 3)

- Evaluating how flooding affects emergency vehicle access and response times was important, as maintaining reliable emergency services is crucial during and after flood events. This criterion was given a moderate weight.

5. Multi-Use Opportunities (Weight: 1)

- This criterion considered the potential for projects to incorporate additional community benefits beyond flood mitigation, such as recreational spaces or aesthetic enhancements. It had the lowest weight, reflecting its lower priority relative to immediate flood risk reduction.

For a detailed review of how each criterion was scored and its weight, please refer to the decision matrices included within the full text of the Master Plan and **Appendix D** where the area decision matrix and area data sheets are provided.

Snapshot of Decision Matrix (Table 6 from the Master Plan)

Criteria	Scoring Criteria	Score Range	Weighted Score
Severity of Flooding	Nuisance, Moderate, Severe	1, 3, 5	5
Potential Structures Protected	1 to 30 Structures, 31-50 Structures, >51	1, 3, 5	5
Potential Streets Protected	Local Street Benefits Only, Arterial/Collector Street or Multiple Local Streets Benefits, Multiple arterial/collector & Local Street Benefits	1, 2, 4	4
Impacts to Emergency Access	No Impact to Emergency Access, Impacts to Emergency Access	1, 3	3
Multi-Use Opportunities	No Opportunities, Possible Opportunities	1, 2	1

The nine-highest ranking flood hazard areas are furthered for project alternative development. Nine areas were chosen to advance based on the scoring results and a logical breakpoint. The nine highest-ranking flood hazard areas identified are:

1. **Flood Hazard Area A:** Invergordon Road and Mockingbird Lane
2. **Flood Hazard Area C:** Cheney Wash
3. **Flood Hazard Area E:** Lincoln Wash
4. **Flood Hazard Area H:** 40th Street and Stanford Drive
5. **Flood Hazard Area K:** Mountain View Road
6. **Flood Hazard Area L:** Upstream Cherokee Wash
7. **Flood Hazard Area N:** Downstream Cherokee Wash
8. **Flood Hazard Area O:** Lincoln Drive
9. **Flood Hazard Area P:** Tatum Boulevard and McDonald Drive

Proposed Project Alternatives

For the nine highest-ranking flood hazard areas, flood mitigation projects are identified and/or developed. Identified projects are those from previous studies. These projects and new projects are further developed. Projects are categorized into maintenance projects, medium-sized projects, and large projects based on their estimated construction costs:

- **Maintenance Projects:** Costs less than $250,000.
- **Medium Projects:** Costs between $250,000 and $1.3 million. These are eligible for the Flood Control District of Maricopa County's Small Project Assistance Program (SPAP).
- **Large Projects:** Costs exceed $1.3 million. These projects qualify for other grant programs like the Flood Control District of Maricopa County's Capital Improvement Project Partnership Program (CIPPP) or other grant opportunities through FEMA.

Page 33 and 34 Updates

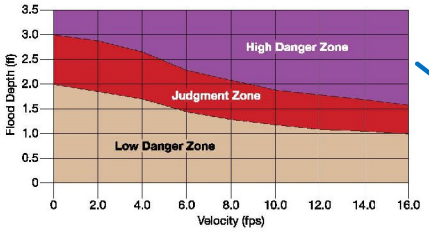
C. Potential Risk to Passenger Vehicles

During large storm events in Town of Paradise Valley, roads such as Doubletree Ranch Road and 40th Street have been closed for passenger vehicle safety. Data obtained from the Town revealed an incident in which a car had been swept off the road at the CCW low water crossing on 40th St. Given the issues identified, risk to passenger safety was an important hazard to evaluate in the Paradise Valley Master Plan.

The methodology used to identify potential risk to passenger vehicles is based on the depth-velocity flood danger level relationship for passenger vehicles developed in ACER Technical Memorandum No. 11: Downstream Hazard Classification Guidelines, (U.S. Department of the Interior Bureau of Reclamation, 1988). The memorandum presents the relationship, created between both the depth and velocity of flood water on a roadway, that is used to classify road conditions as a low danger zone, judgment zone, and high danger zone. **Figure 4** shows the graphical representation of this relationship. Each zone provides predictions of the severity of risk to passenger vehicles.

- **Low Danger Zone –** In this zone, almost all passenger vehicles can safely navigate on the road. The risk categorization is based on the ranges of the depth and velocity relationship shown in **Figure 4**. It should be noted that depths lower than 0.5 feet were removed from this zone due to the negligible effect on passenger vehicles. The depth of 0.5 feet was chosen as the minimum, because at this height, water will begin to reach the bottom of many passenger vehicles.
- **Judgement Zone –** In this zone, roadway flooding with a combination of depths and velocities shown in **Figure 4** present a highly significant hazard to most passenger vehicles. The ranges of depth outlined in this category are 2 to 3 feet of water. At these depths, emergency vehicles should proceed with caution, and passenger vehicles should be blocked from proceeding.
- **High Danger Zone –** In this zone, flood hazards are extreme for all passenger vehicles. The associated depths and velocities of this zone, shown in **Figure 4**, will block access to emergency vehicles.

Figure 4: Depth Times Velocity Graph for Passenger Vehicles (USBR 1988)



Analyses of passenger vehicular risk were conducted for the 10-year and 100-year storm events. Using modeling results, areas of the Town were categorized into each flood zone type. The resulting passenger vehicle flood hazard layer was intersected with the centerline of all roads within Paradise Valley. Two methodologies were utilized to display and quantify the results of the intersection. The polyline method serves to quantify what percentage of roads in the Town are located within the high danger zone risk category, while the point method quantifies the total number of roadway wash crossings subject to the same risk category.

The 100-year result maps of potential risk to passenger vehicles are shown on Pages 35-37, with the 10-year results maps included **in Appendix C**. Examples of the polyline and point methods are shown in **Figures 5 and 6. Table 5** contains the percentage and number of roadway segments that are located within high danger zones for passenger vehicles.

Figure 5: Example of Polyline Shapefile for Passenger Vehicles Risks

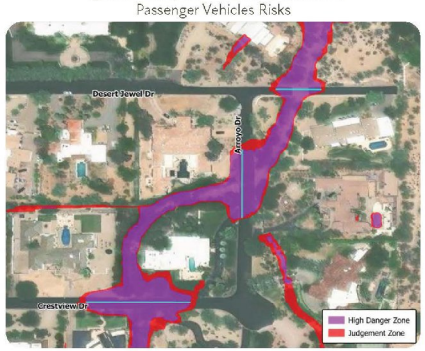
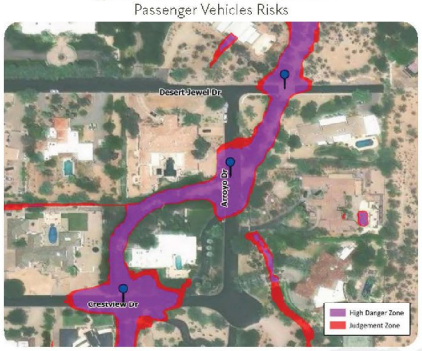


Figure 6: Example of Point Shapefile for Passenger Vehicles Risks



Page 41 Updates

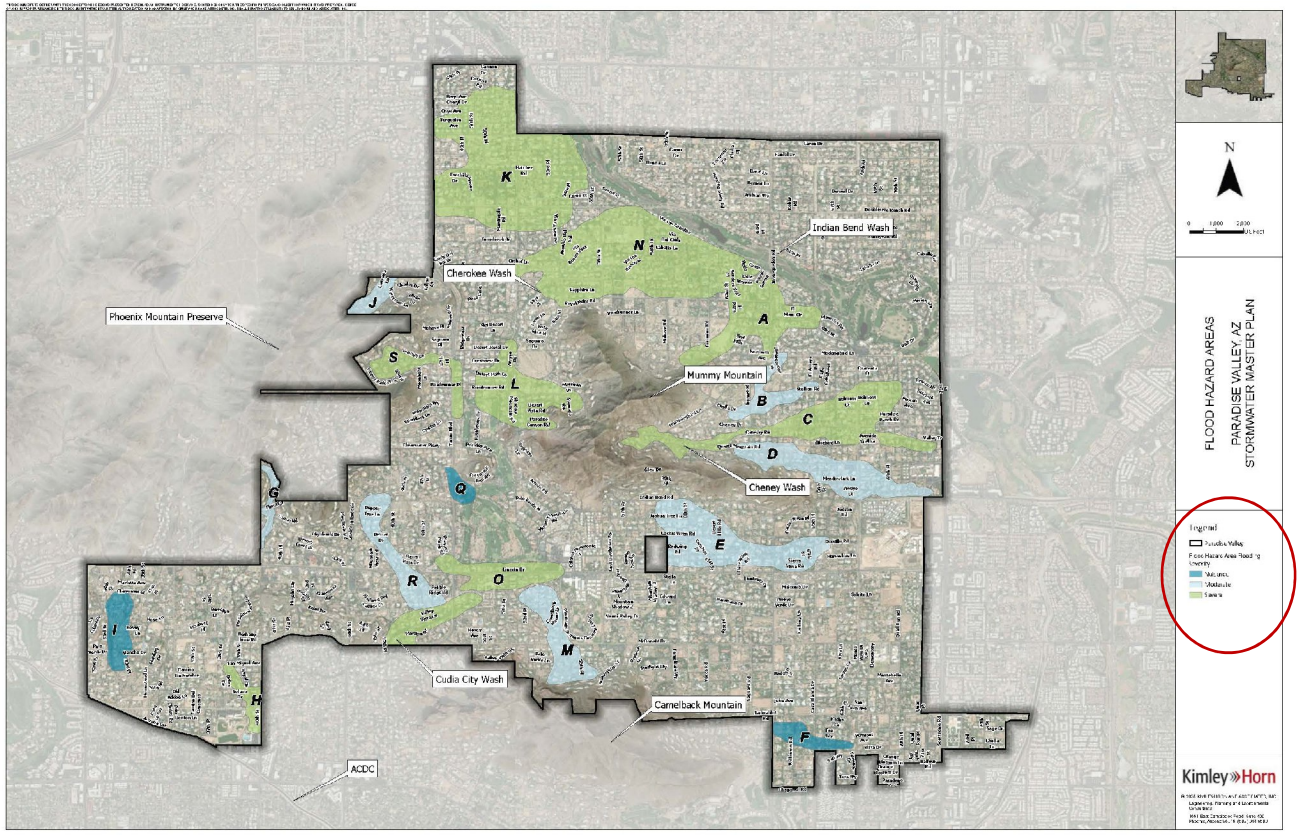
Flood hazard areas with moderate and severe classifications were ranked in a decision matrix based on five criteria, as outlined in **Table 6**. Classification of the severity of flooding and the potential number of structures that could be benefited in the area were the criteria that were given the greatest weight within the matrix with a weighted score of 5. Structures that could be benefitted were defined as any structure with adjacent flood depths of 0.5 feet. The number of streets inundated with at least 0.5 feet of depth was another variable considered in the matrix and was given a weighted score of 4. Impacts to emergency access and the potential for multi-use opportunities were considered in the matrix as well with priority scores of 3 and 1, respectively. The results of the area decision matrix and area data sheets are provided in **Appendix D.**

Table 7 includes the location, the severity designation, the number of buildings impacted, and potential impacts to emergency access for each flood hazard area. Of the 16 areas classified as having severe or moderate flood potential, the top 9 were selected to develop flood mitigation alternatives. The three areas classified as having nuisance flooding potential were not included in the ranking, but can be evaluated further by Town maintenance or engineering staff as annual maintenance budgets allow.

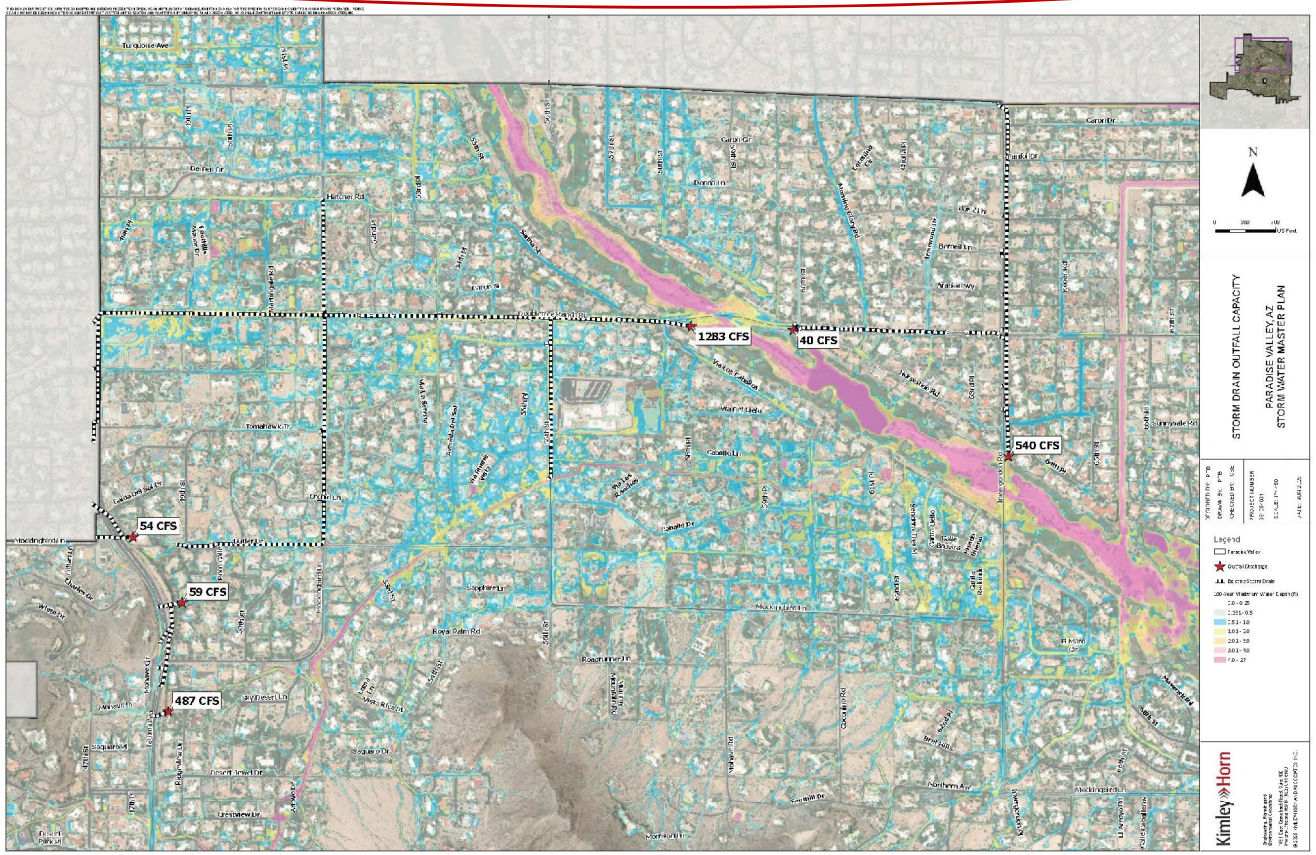
Table 6: Flood Hazard Area Prioritization Criteria

Criteria	Scoring Criteria		Weighted Score	Highest Possible Score	Lowest Possible Score
Severity of Flooding	1-	Nuisance	5	15	5
	2-	Moderate			
	3-	Severe			
Potential Structures Protected	1-	1 to 30 Structures	5	15	5
	2-	31-50 Structures			
	3-	>51 Structures			
Potential Streets Protected	1-	Local Street Benefits Only	4	12	4
	2-	Arterial/Collector Street or Multiple Local Streets Benefits			
	3-	Multiple arterial/collector & Local Street Benefits			
Restriction to Emergency Access	0-	No Impact to Emergency Access	3	6	0
	2-	Impacts to Emergency Access			
Multi-Use Opportunities	1-	No Opportunities	1	2	1
	2-	Possible Opportunities			

Page 136 Updates



Page 161 Updates



Page 362 Updates

Area H - Engineer's Opinion of Probable Cost

Item	Description	Unit	Quantity	Unit Price	Cost
	Construction Estimate				
1	Storm Drain Outlet	EA	1	$2,500	$2,500
2	Storm Drain Pipe 24"	LF	110	$410	$45,100
3	Manhole	EA	1	$10,000	$10,000
4	Staff Gage	EA	1	$210	$210
5	Flood Warning Sign	EA	1	$275	$275
6	Protective Railing	LF	75	$180	$13,500
7	Removal of Curb and Gutter	LF	3	$250	$750
8	Curb & Gutter	LF	3	$100	$300
9	Concrete Sidewalk	SF	10	$35	$350
10	Storm Drain Pipe 36"	SF	15	$375	$5,625
11	Remove Bollards	EA	6	$260	$1,560
12	Removal of Pipe	LF	15	$75	$1,125
13	Riprap	CY	15	$120	$1,800
14	Channel Excavation	CY	1,200	$28	$33,600
15	Diversion Structure	LS	1	$55,000	$55,000
16	Basin Excavation	CY	2,600	$25	$65,000
17	Landscaping	LS	1	$15,000	$15,000
				Sub Total	$251,695
	General Costs				
18	SWPPP (10%)	LS	1	$25,170	$25,170
19	Mobilization/Demobilization (50%)	LS	1	$125,848	$125,848
20	Design (50%)	LS	1	$125,848	$125,848
21	Construction Management (45%)	LS	1	$113,263	$113,263
22	Utilities (20%)	LS	1	$50,339	$50,339
23	Traffic Control (20%)	LS	1	$50,339	$50,339
				Subtotal	$742,500
				Contingency (40%)	$297,000
				Total	$1,039,500

QUESTIONS?



October 9, 2025 Study Session's Topics

PRESENTATION OF DRAFT FINAL STORM WATER MASTER PLAN

POSSIBLE COUNCIL ADOPTION

Project Purpose



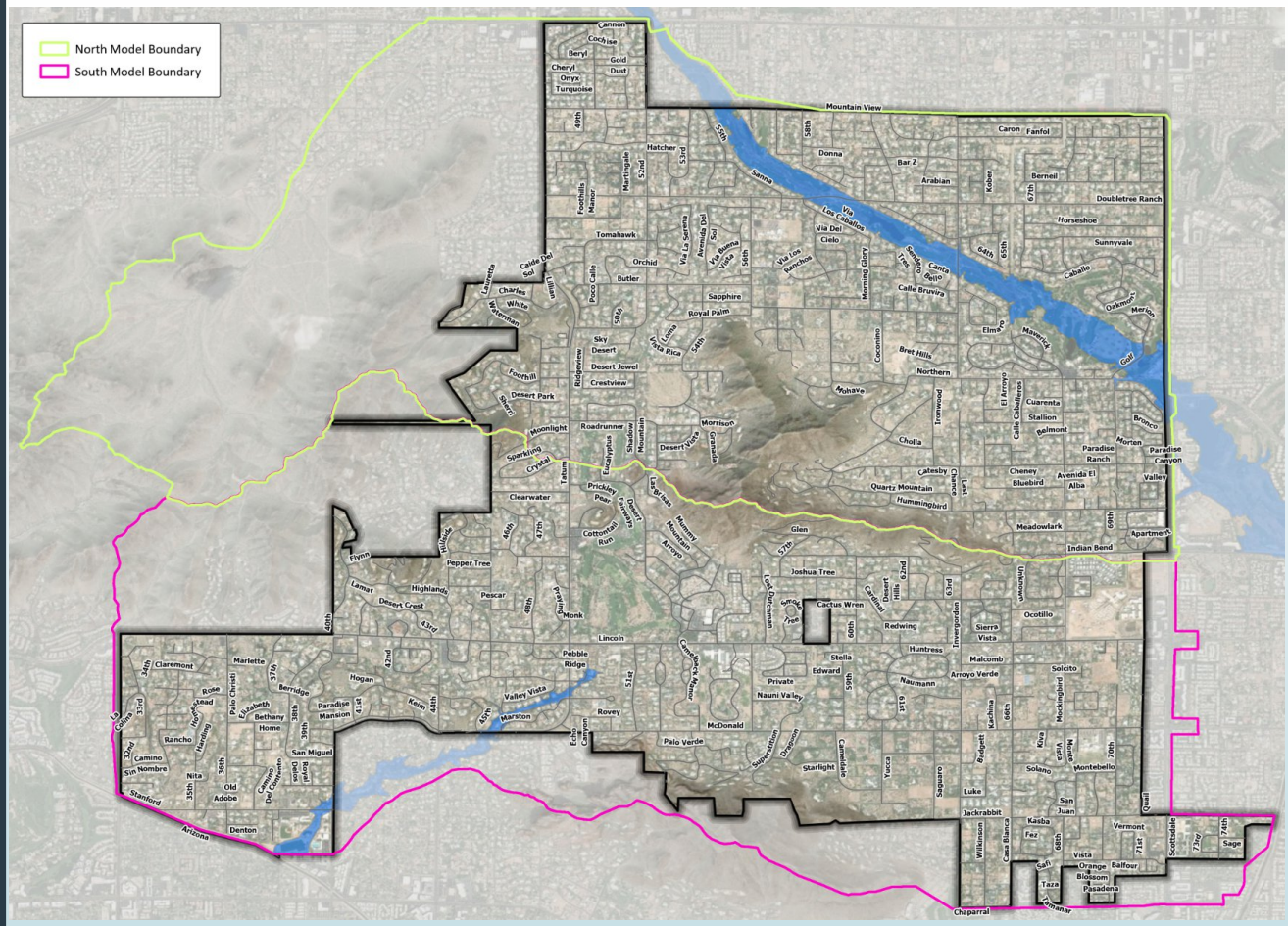
Jul 21, 2013 ABC15Arizona

- Identify flood prone areas
- Develop conceptual solutions
- Inform CIP
- Identify funding opportunities for infrastructure improvements

Methodology for Identifying Flood Hazard Areas

- Data from Town staff and residents
- Previous conceptual engineering studies
- Comprehensive Town-wide 2D hydrology and hydraulics models

Study Location

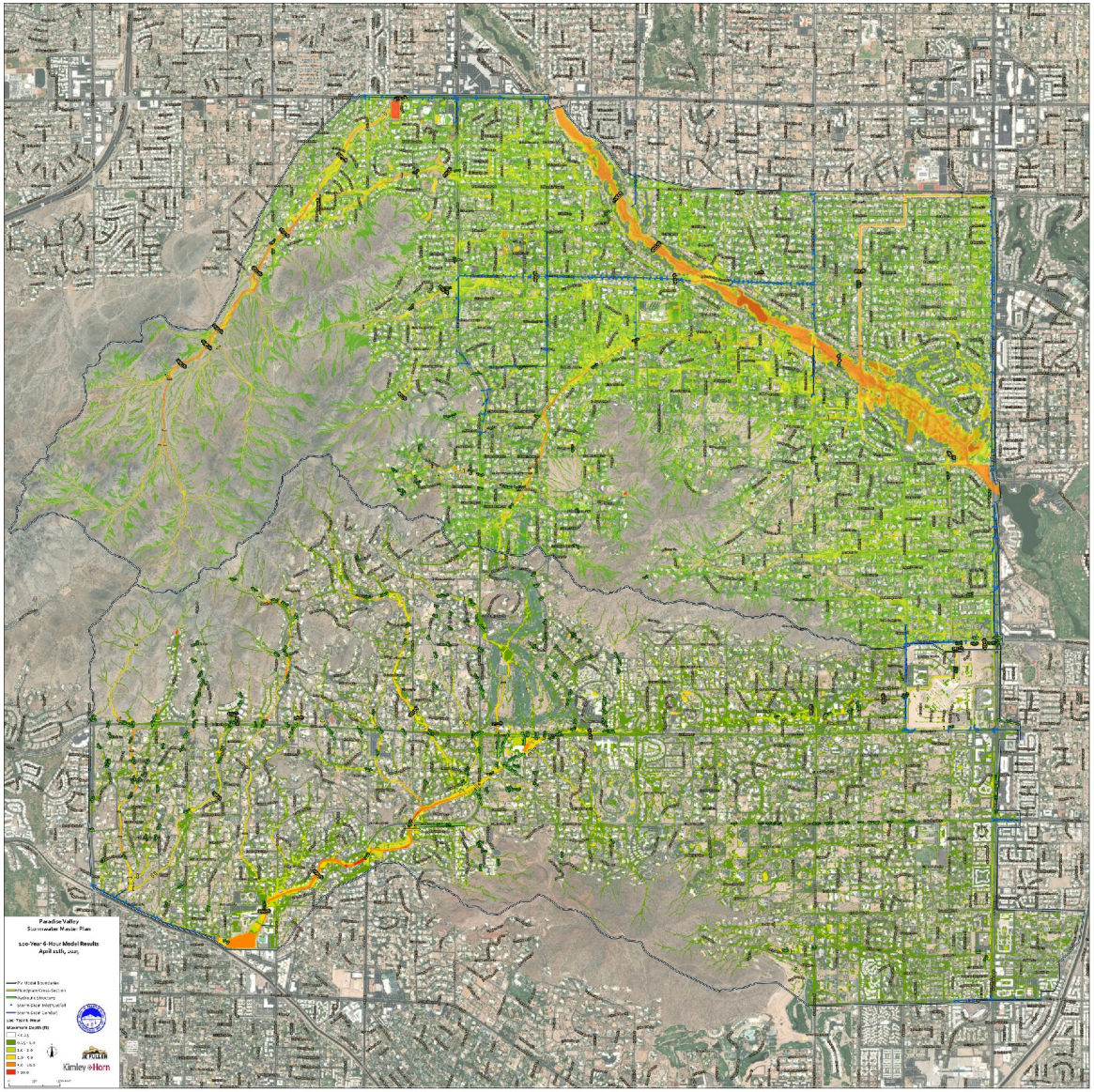


Final Deliverables

- Comprehensive Town-wide 2D Hydrology and Hydraulics Model
- Final SWMP Report
  - Summary of Data Collection
  - Existing Infrastructure Capacity
  - Flood Hazard Analysis
  - Flood Hazard Area Classification/Prioritization
  - Proposed Project Alternatives
  - Highest Priority Alternatives with Cost Analysis
  - Grant Funding Opportunities
  - Project Prioritization

Model Completion

- Reliable and accurate model
  - 2-, 10-, and 100-year results
- FCDMC reviewed and approved *

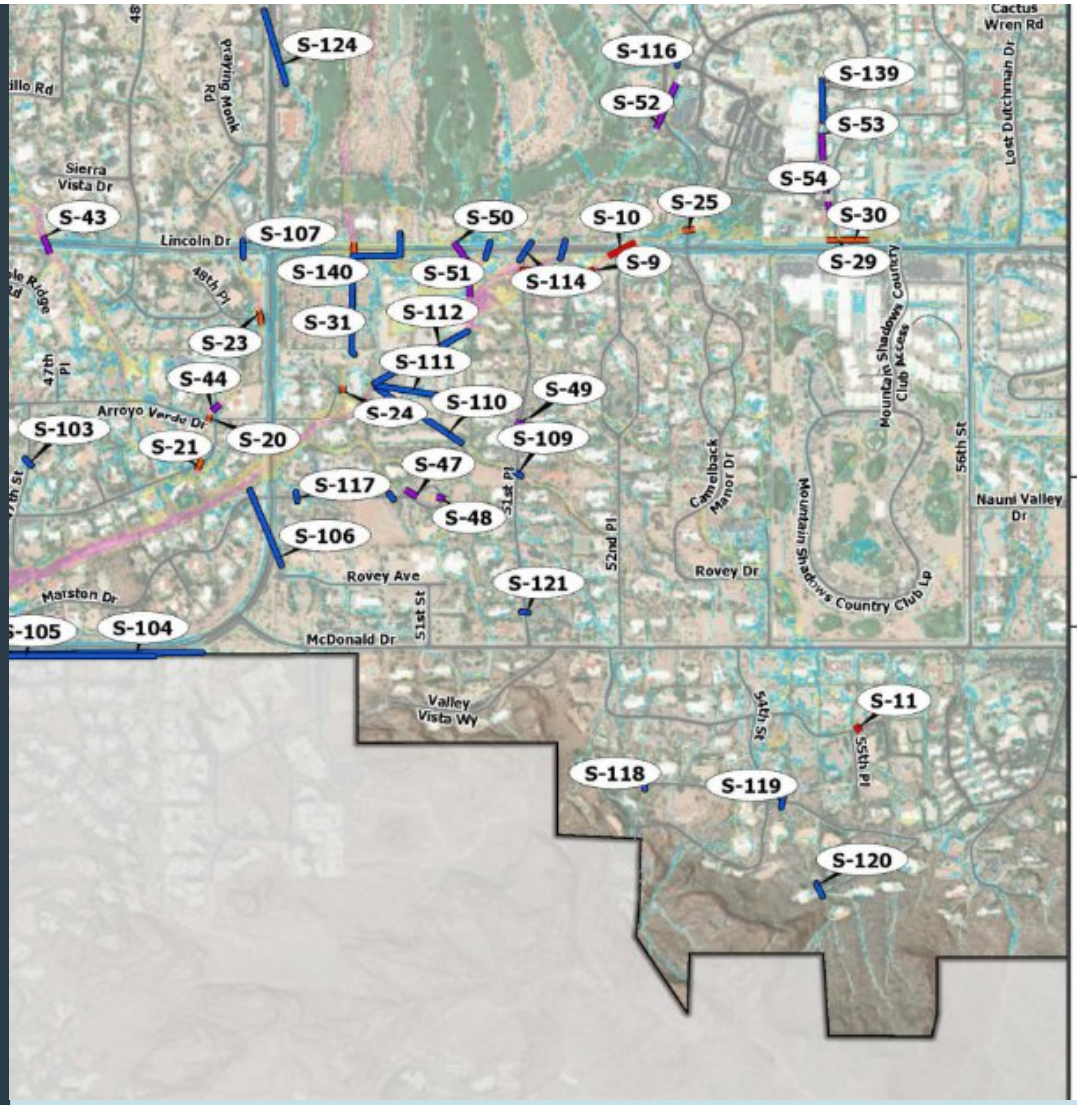


Data Collection

- 275 stormwater problem locations were identified
  - Identified by both staff and residents
  - Consists of structure (25), property(39), and road(211)flooding
- Flood hazard data and projects from regional and Town studies
  - Cheney Watershed Study - Town
  - Cudia City Wash ADMS and DCR - FCDMC
  - Lower Indian Bend Wash ADMP - FCDMC
  - Middle Indian Bend Wash ADMS – FCDMC
  - East Shea ADMS - FCDMC

Existing Infrastructure Evaluation

- Focused on street inlets and storm drain
- Used 2-, 10-, and 100-year model results to evaluate performance



Flood Hazard Analysis

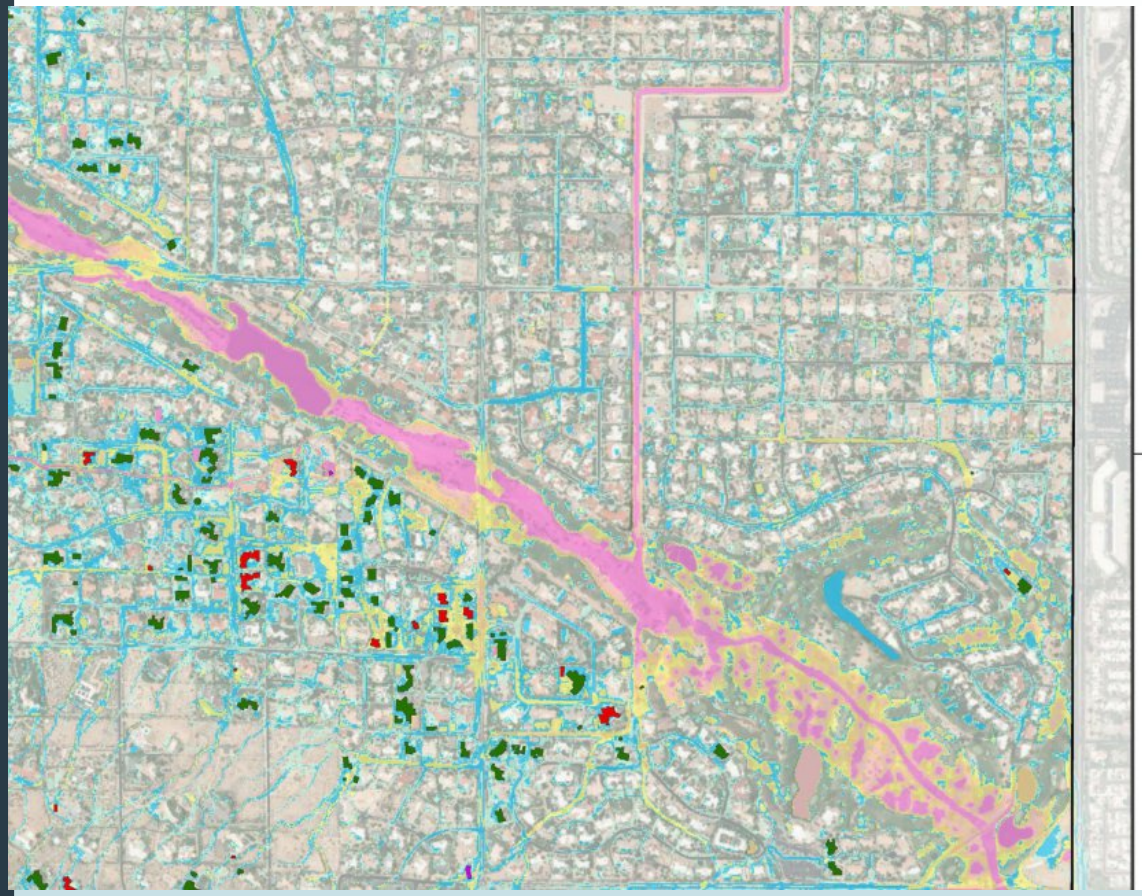
- Includes:
  - Building inundation analysis
  - Erosion potential
  - Sedimenation potential
  - Risk to passenger vehicles

Methodology	Per Storm Event		
	2-Year	10-Year	100-Year
>0.5 feet of flow depth for at least 20% of the building	43	304	857
>1 foot of flow depth for at least 15% of the building	11	43	283
>2 feet of flow depth for at least 10% of the building	6	9	52
Total Structures Impacted	60	356	1,192

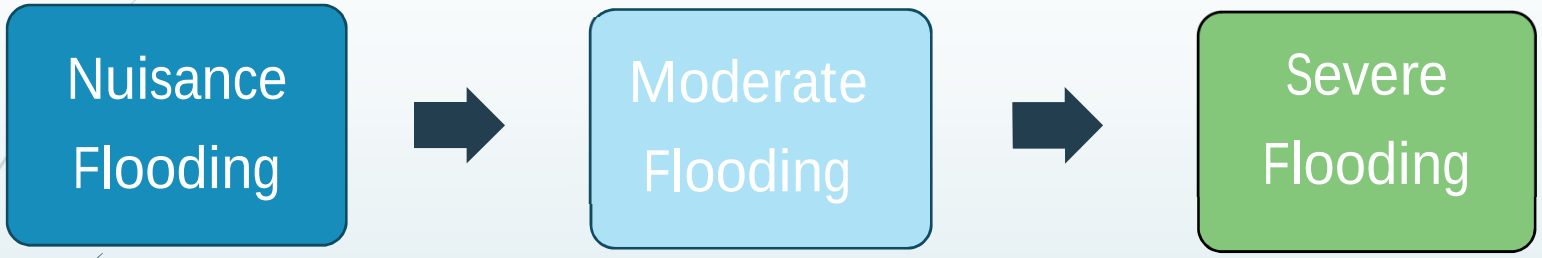
Storm Event	Street Type	Extreme Erosion Risk Locations	Extreme Sediment Risk Locations
100-Year	Arterial	6	28
	Collector	29	144
	Residential	245	989
10-Year	Arterial	2	14
	Collector	12	65
	Residential	92	352

Storm Event	Street Type	High Danger Zone for Passenger Vehicles
100-Year	Arterial	29 Crossings
		3.9% of Arterial Streets
	Collector	79 Crossings
		9.7% of Collector Streets
	Residential	931 Crossings
		7.0% of Residential Streets
10-Year	Arterial	12 Crossings
		1.2% of Arterial Streets
	Collector	29 Crossings
		3.4% of Collector Streets
	Residential	220 Crossings
		1.6% of Residential Streets

Building Inundation



Flood Hazard Designations



0.5 ft of water at road crossings and/or properties within Flood Hazard Area

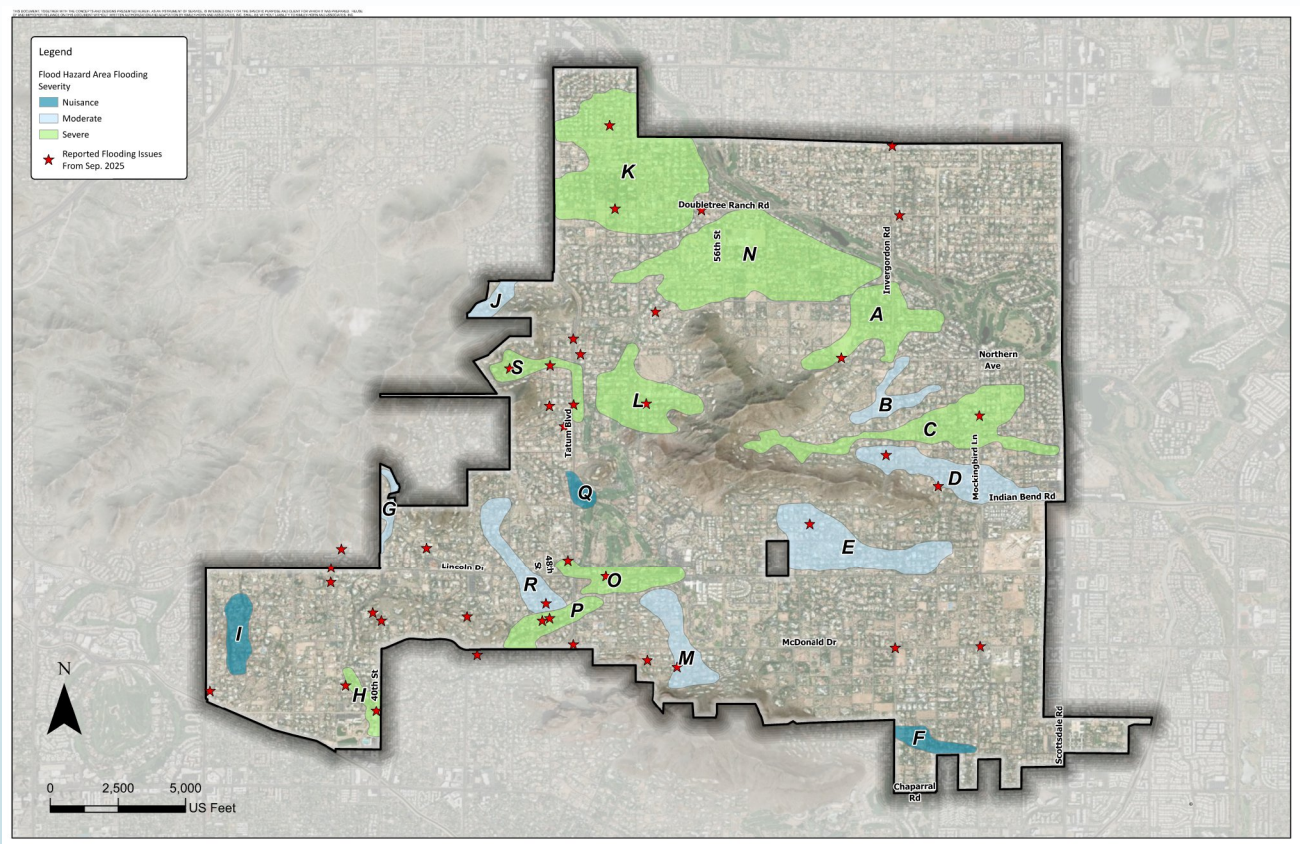
1 ft of water at road crossings and properties within Flood Hazard Area

> 2 ft of water at road crossings and properties within Flood Hazard Area

- Delineation of areas based on max depth, depth x velocity, erosion & sedimentation potential, and impacted properties & structures

Flood Hazard Area Classification

- Nuisance – 3
- Moderate – 7
- Severe – 9



Flood Hazard Area Prioritization

Table 6: Flood Hazard Area Prioritization Criteria

Criteria	Scoring Criteria		Weighted Score	Highest Possible Score	Lowest Highest Score
Severity of Flooding	1-	Nuisance	5	15	5
	2-	Medium			
	3-	Severe			
Potential Structures Protected	1-	1 to 30 Structures	5	15	5
	2-	31-50 Structures			
	3-	>51 Structures			
Potential Streets Protected	1-	Local Street Benefits Only	4	12	4
	2-	Arterial/Collector Street or Multiple Local Streets Benefits			
	3-	Multiple arterial/collector & Local Street Benefits			
Restriction to Emergency Access	0-	No Impact to Emergency Access	3	6	0
	2-	Impacts to Emergency Access			
Multi-Use Opportunities	1-	No Opportunities	1	2	1

Flood Hazard Area Prioritization

Table 7: Flood Hazard Area Ranking and Characteristics

Flood Mitigation Alternatives Developed

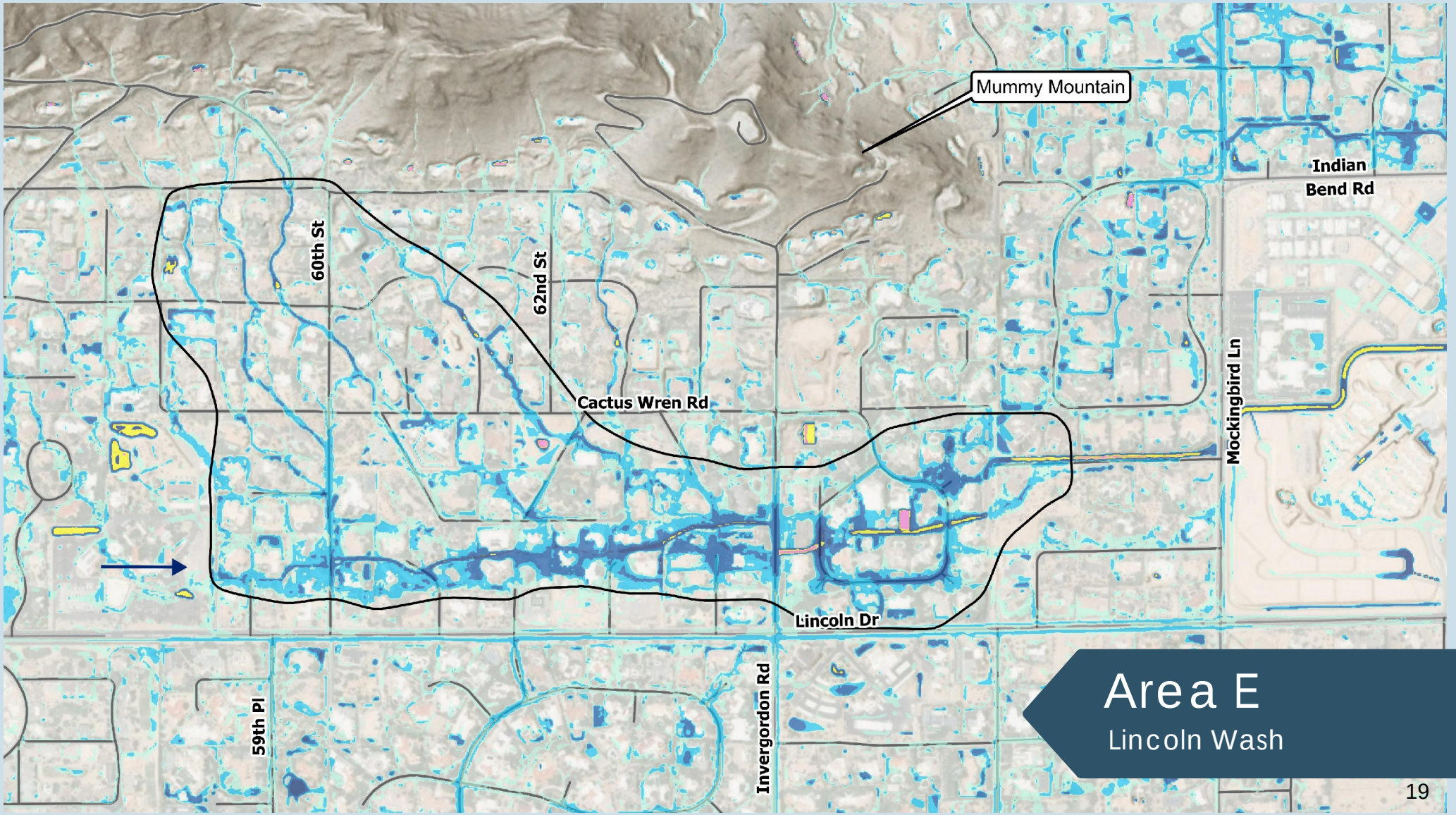
Flood Hazard Area	Matrix Score	Severity of Flooding	Structures with Adjacent Depths of at Least 0.5 ft	Streets Impacted by at Least 0.5 ft Depths	Potential Impact to Emergency Access
N	49	Severe	123	2 Collector; 8 Local	Yes
A	45	Severe	43	2 Collector; 6 Local	Yes
O	45	Severe	22	2 Collector; 4 Local	Yes
K	43	Severe	141	2 Collector; 13 Local	No
L	41	Severe	35	0 Collector; 5 Local	Yes
H	40	Severe	9	2 Collector; 2 Local	Yes
P	39	Severe	17	1 Collector; 2 Local	Yes
C	39	Moderate	70	1 Collector; 2 Local	No
E	38	Moderate	52	2 Collector; 5 Local	No
S	36	Severe	14	1 Collector; 1 Local	Yes
R	36	Severe	27	1 Collector; 5 Local	Yes
D	33	Severe	20	2 Collector; 1 Local	No
G	32	Severe	2	0 Collector; 2 Local	Yes
M	25	Moderate	19	1 Collector; 6 Local	No
B	25	Moderate	4	1 Collector; 2 Local	No
J	21	Moderate	8	0 Collector; 3 Local	No

Proposed Project Alternatives

- 2-3 projects per area
- Ranked based on Table 8 criteria
- Because of ROW constraints:
  - Cost was primary determining factor
  - Most projects are storm drain or improved road crossings

Table 8: Project Prioritization Criteria

Criteria	Scoring Criteria	Weighted Score	Highest Possible Score	Lowest Possible Score
Potential Structures Protected	1- 1 to 30 Structures	5	15	5
	2- 31 to 50 Structures			
	3- > 51 structures			
Design & Construction Cost/Benefit	1- Most Expensive	5	10	5
	2- Least Expensive			
Potential Streets Protected	1- Local Street Benefit Only	4	12	4
	2- Arterial/Collector Street or Local Streets Benefit			
	3- Multiple Arterial/Collector Streets and Local Streets Benefit			
Green Storm Water Infrastructure	1- No Opportunities	1	2	1
	2- Some Opportunities			
Project Partnership	1- Grant Funding or Partnerships Likely	4	12	4
	2- Local Partnership/Grant Eligible			
	3- Local and Federal Partnerships/Grant Eligible			
Multi-Use Opportunities	1- No Opportunities	2	4	2
	2- Some Opportunities			
Operation and Maintenance Costs	1- Maintenance After Every Storm Event	3	6	3
	2- Maintenance at Standard Intervals			
Utility Constraints	1- Major Constraints	3	6	3
	2- Minor Constraints			


Mummy Mountain
Indian Bend Rd
60th St
62nd St
Cactus Wren Rd
Mockingbird Ln
Lincoln Dr
59th Pl
Invergordon Rd
Area E
Lincoln Wash

Alternative 1

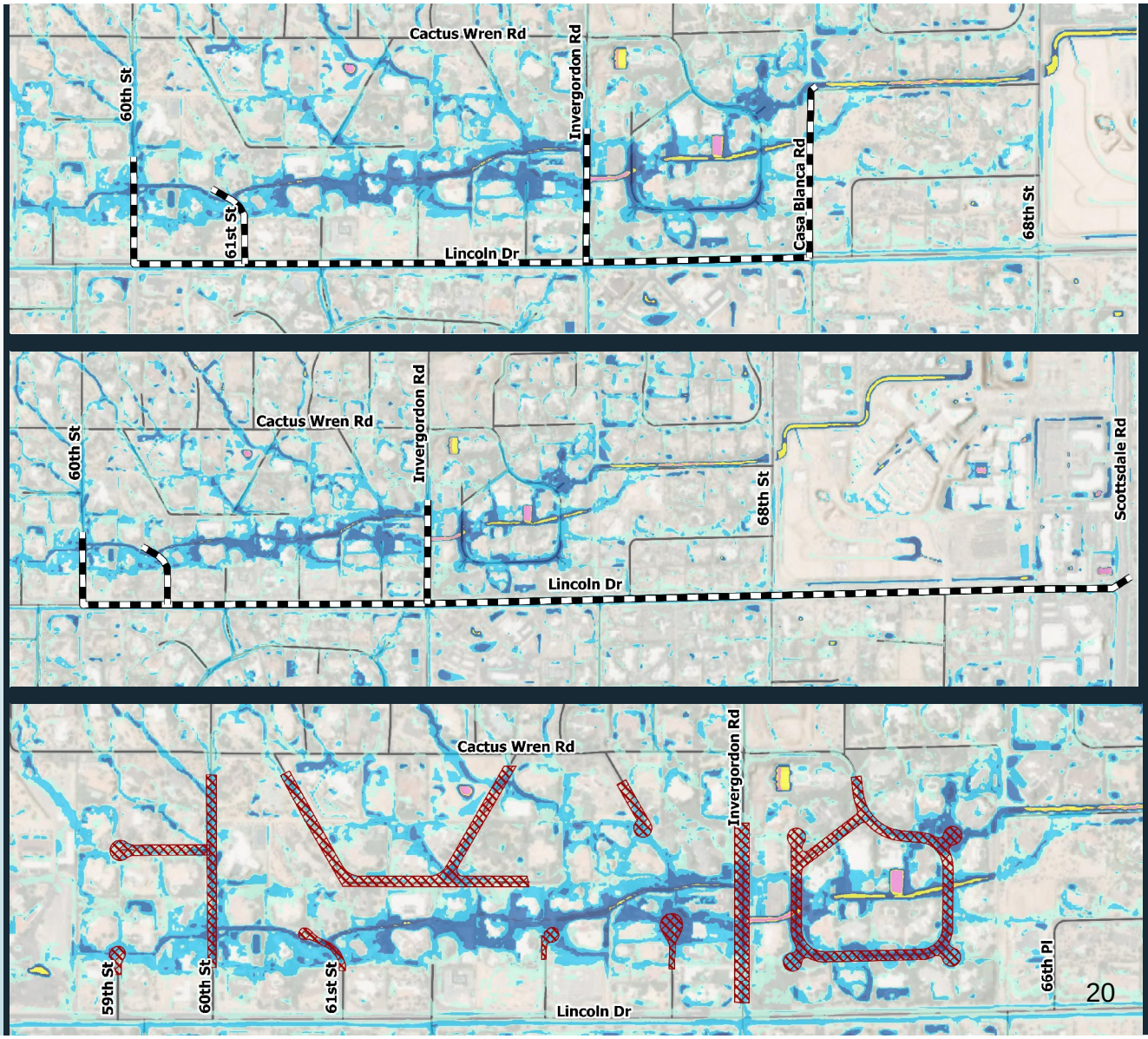
- Outfall to Ritz-Carlton Channel
- 4,500 LF of 36” SD
- 2,300 LF of 48” SD
- ~$14.9 M

Alternative 2

- Outfall to Existing Scottsdale Rd SD
- 4,500 LF of 36” SD
- 5,250 LF of 48” SD
- ~ $9.5 M

Alternative 3

- 7,900 LF of Permeable Pavement
- ~$1.4M



Highest Priority Alternatives

- 15% Plans
- Cost Estimates
- Benefit/Cost Analysis
- Proposed Conditions Modeling

Table 29: Prioritized Projects Summary

Top Ranking Six

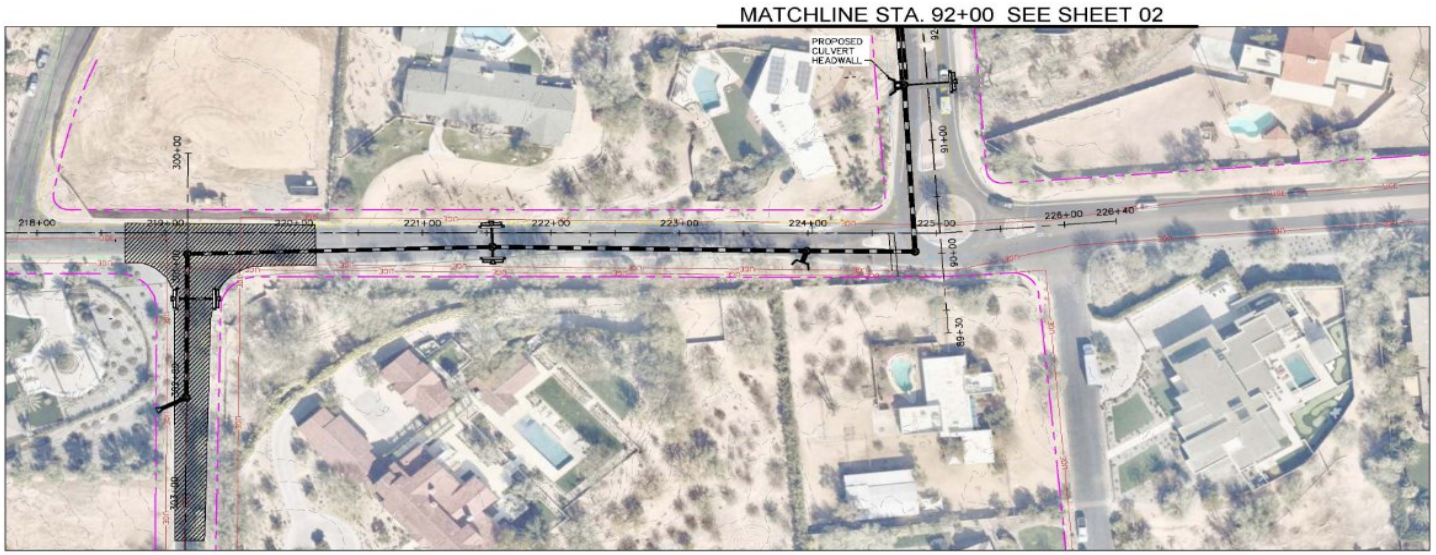
Area Identification	Selected Alternative	Ranking Score
N	Alternative 1	49
A	Alternative 1	45
O	Alternative 2	45
K	Alternative 2	43
L	Alternative 1 & 2	41
H	Alternative 2	40
P	Alternative 1	39
C	Alternative 2	39
E	Alternative 3	38

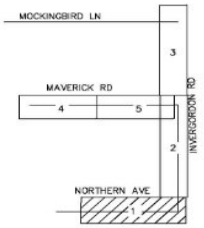
Area A Example

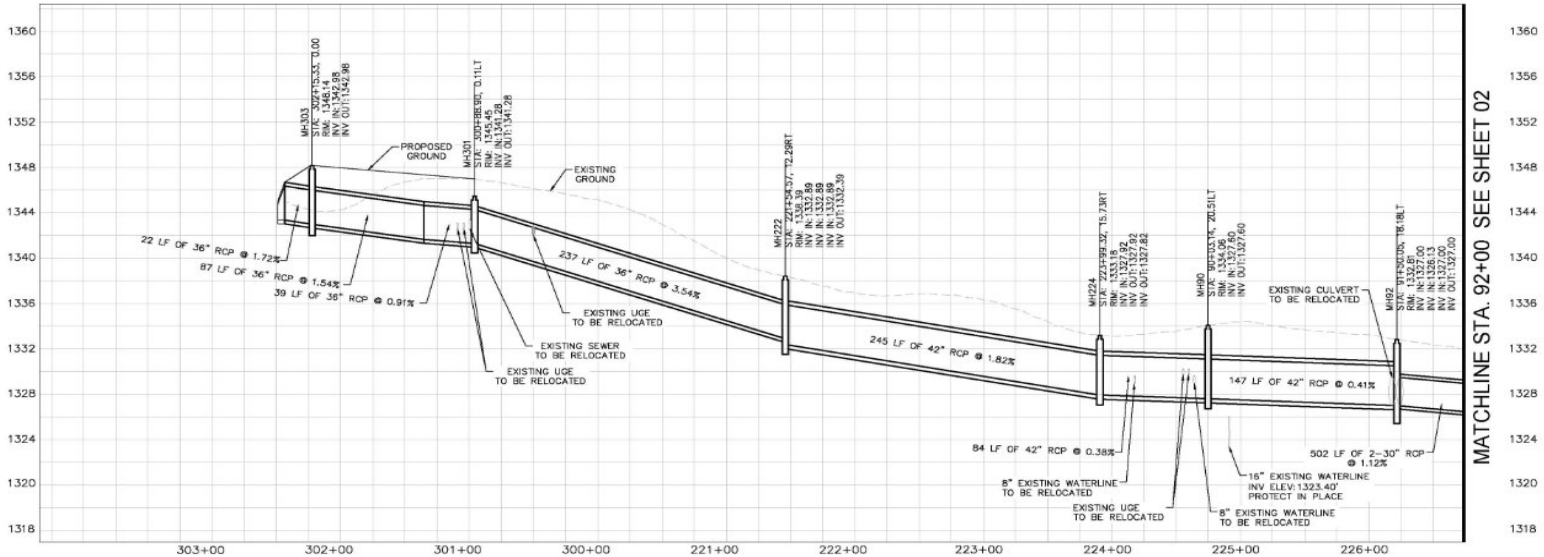
Table 30: Area A Benefit Cost Ratio Summary

Number of Properties Impacted		220
Approximate Population1		550
Benefit with Drainage Improvements in Place ($)	Damage Reduction	21,394,816
	Social Benefits	1,978,900
	Total	23,293,796
Construction Cost		11,616,355
Benefit-Cost Ratio (BCR)		2.01

1Assumed 2.5 people per household from U.S. Census for the Town of Paradise Valley.
2Social benefits are based on the number of residents impacted and are calculated using FEMA's Benefit Cost Analysis toolkit. This would account for traffic closures, interruptions to work, etc.
3Assumed at least seven 10-year storms and one 100- year storm occur during the 75-year life span of the improvements.







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PHOENIX, ARIZONA 85016 (602) 944-5500

NO.	REVISION	DATE

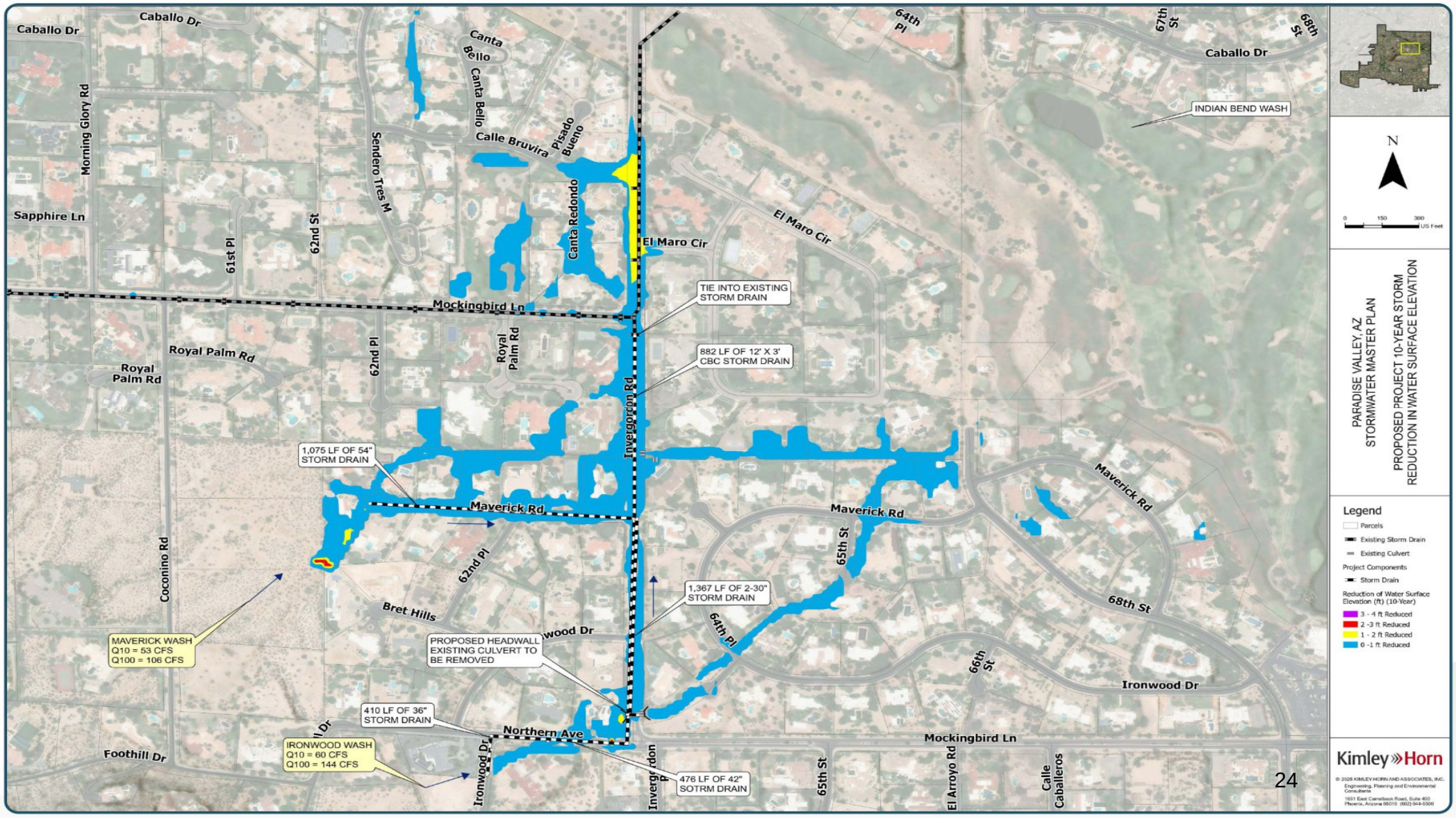
SCALE (H): 1"=50'
SCALE (V): 1"=5'
DESIGNED BY: PTB
DRAWN BY: PTB
CHECKED BY: DSB
DATE: 05/2025

PARADISE VALLEY SWMP
AREA A SELECTED ALTERNATIVE 15% PLANS

NORTH

PROJECT NO.
091054031
DRAWING NAME
AREA A
1 OF 6

23


Caballo Dr
Caballo Dr
Morning Glory Rd
Sapphire Ln
61st Pl
62nd St
Sendero Tres M
Canta Bello
Canta Bello
Calle Bruvira
Pisado Bueno
Canta Redondo
El Maro Cir
El Maro Cir
64th Pl
67th St
68th St
Caballo Dr
INDIAN BEND WASH
TIE INTO EXISTING STORM DRAIN
Mockingbird Ln
882 LF OF 12' X 3' CBC STORM DRAIN
Royal Palm Rd
Royal Palm Rd
62nd Pl
Royal Palm Rd
Invergordon Rd
1,075 LF OF 54" STORM DRAIN
Maverick Rd
Maverick Rd
Maverick Rd
65th St
Coconino Rd
62nd Pl
Bret Hills
1,367 LF OF 2-30" STORM DRAIN
64th Pl
68th St
MAVERICK WASH
Q10 = 53 CFS
Q100 = 106 CFS
PROPOSED HEADWALL
EXISTING CULVERT TO
BE REMOVED
66th St
Ironwood Dr
410 LF OF 36" STORM DRAIN
Northern Ave
Mockingbird Ln
IRONWOOD WASH
Q10 = 60 CFS
Q100 = 144 CFS
Foothill Dr
Ironwood Dr
Invergordon Dr
476 LF OF 42" SOTRM DRAIN
65th St
El Arroyo Rd
Calle Caballeros
N
0 150 300 US Feet
PARADISE VALLEY, AZ
STORMWATER MASTER PLAN
PROPOSED PROJECT 10-YEAR STORM
REDUCTION IN WATER SURFACE ELEVATION
Legend
Parcels
Existing Storm Drain
Existing Culvert
Project Components
Storm Drain
Reduction of Water Surface Elevation (ft) (10-Year)
3 - 4 ft Reduced
2 -3 ft Reduced
1 - 2 ft Reduced
0 -1 ft Reduced
Kimley»Horn

24

Grant Funding Opportunities

- FCDMC Grants
  - Small Project Assistance Program (<$1.3M)
  - Capital Improvement Program (>$1.3M)
- Other Federal Grant Programs Identified
  - FEMA (x4)
  - US Department of Housing and Urban Development
  - EPA (x2)
  - US Army Corps of Engineers
  - US Economic Development Administration

Prioritization

Table 33: Project Prioritization

Flood Hazard Area Designation	Project Size (Medium or Large)	Primary Benefit	Cost	BCR	Project Considerations
K	Large	Residential Structures	~ $6.1 M	3.08	The recommended project alternative for Area K has the highest BCR for the projects that primarily benefit residential structures. It is also potentially more cost effective than the Area A project. Because of this, it is ranked as the highest priority large project benefiting private property.
A	Large	Residential Structures	~ $11.6M	2.01	recommended project alternative ties into the ongoing Mockingbird Lane drainage improvements, creating an overall flood mitigation project for the area.
H	Medium	Arterial Roadways	~ $1M	n/a	Area H recommended project alternative may fall within the SPAP cost criteria, making it eligible for a 75% cost share with FCDMC. Because of this, Area H was ranked as the highest priority roadway-oriented project.
O	Large	Arterial and Residential Roadways	~ $2M	n/a	Area O recommended project alternative benefits both an arterial roadway (Lincoln Drive) and residential streets. Because of this, it was ranked higher than Areas L and N.
N	Large	Residential Roadways	~ $2M	n/a	Area N was ranked higher than Area L because of the lower cost for construction.
L	Large	Residential Roadways	~ $6.1M	n/a	Area L benefits residential streets only.

Key Takeaways

- Comprehensive Town-wide flood hazard modeling
  - Regulate development
  - Design stormwater improvements
- Assessed building inundation, erosion, sedimentation, and vehicular hazards for 2-, 10-, & 100-year storms
- Identified 19 flood prone areas
- Developed project alternatives for 9 of these
- Further developed 15% plans, cost, benefit/cost for 6 of the 9
- Identified local and federal grant funding opportunities
- Cited prioritization considerations

QUESTIONS?



PARADISE VALLEY
STORM WATER MASTER PLAN

June 30, 2025



Prepared by

Kimley»Horn

Expect More. Experience Better.

I. EXECUTIVE SUMMARY

The Paradise Valley Master Plan identifies and assess areas susceptible to flooding and proposes mitigation strategies to address the highest-risk areas. This plan supports the Town's efforts to prioritize projects for Capital Improvement Program (CIP) and grant funding opportunities. Potential flood risk areas were identified through input from Town staff and residents, previous studies, and new comprehensive townwide hydrology and hydraulic modeling.

Purpose of Study

The primary objective of the study is to identify flood-prone areas and offer solutions that will assist the Town of Paradise Valley in strategic planning for flood mitigation.

Methodology

The Master Plan incorporates data from Town staff and residents, previous efforts and two-dimensional (2D) hydrologic and hydraulic modeling from the Flood Control District of Maricopa County (FCDMC) Area Drainage Master Studies/Plans (ADMP/S). These data are coupled with new town-wide 2D modeling using current rainfall, land use, topography, and hydraulic structures data to pinpoint potential flood hazards and effective mitigation strategies.

Study Location

The study covers the entire Town of Paradise Valley, encompassing approximately 15 square miles. The area is significantly impacted by runoff from surrounding mountains, including Mummy Mountain and Camelback Mountain. In addition, townwide modeling also included flow inputs from the surrounding areas in both the City of Phoenix and the City of Scottsdale. A Hydrology Report was prepared under separate cover detailing the modeling approach.

Data Collection

Data was aggregated from diverse sources, including past drainage studies, FCDMC ADMS/Ps, reports from Town staff and residents, and on-site documentation. This preliminary understanding of flooding hazards forms the foundation for the Master Plan. Housing this data in one reference was also a primary goal of the Master Plan.

Existing Infrastructure Evaluation

The Master Plan evaluates existing basin, channel, storm drain, and culvert capacities by reviewing performance during the 2-, 10-, and 100-year storm simulations per the modeling effort. This approach allows for an estimate of existing capacities as less than 2-year, between 2- and 10-year, between 10- and 100-year, and greater than 100-year. Significant findings include undersized inlets/storm drain affecting residential neighborhoods, and culverts that impede the traveling public and emergency access.

Flood Hazard Analysis

Flood analysis includes evaluating inundation risk, erosion and sediment deposition hazards, and potential risks to passenger vehicles. These insights were crucial in identifying flood hazard areas within the Town. These analyses were also coupled with staff and resident flood complaints, road closure locations, and undersized culvert locations to better develop a holistic understanding of flood hazards throughout the town. The Master Plan creates a database of each hazard that can be used in the future to plan routine maintenance and smaller scale improvement projects as part of the annual maintenance budget.

Flood Hazard Area Classification

Nineteen distinct flood hazard areas were identified and classified within the Town based on the extent and nature of flooding. Each the flood hazard for each identified area was characterized as either nuisance, moderate, or severe using the following criteria:

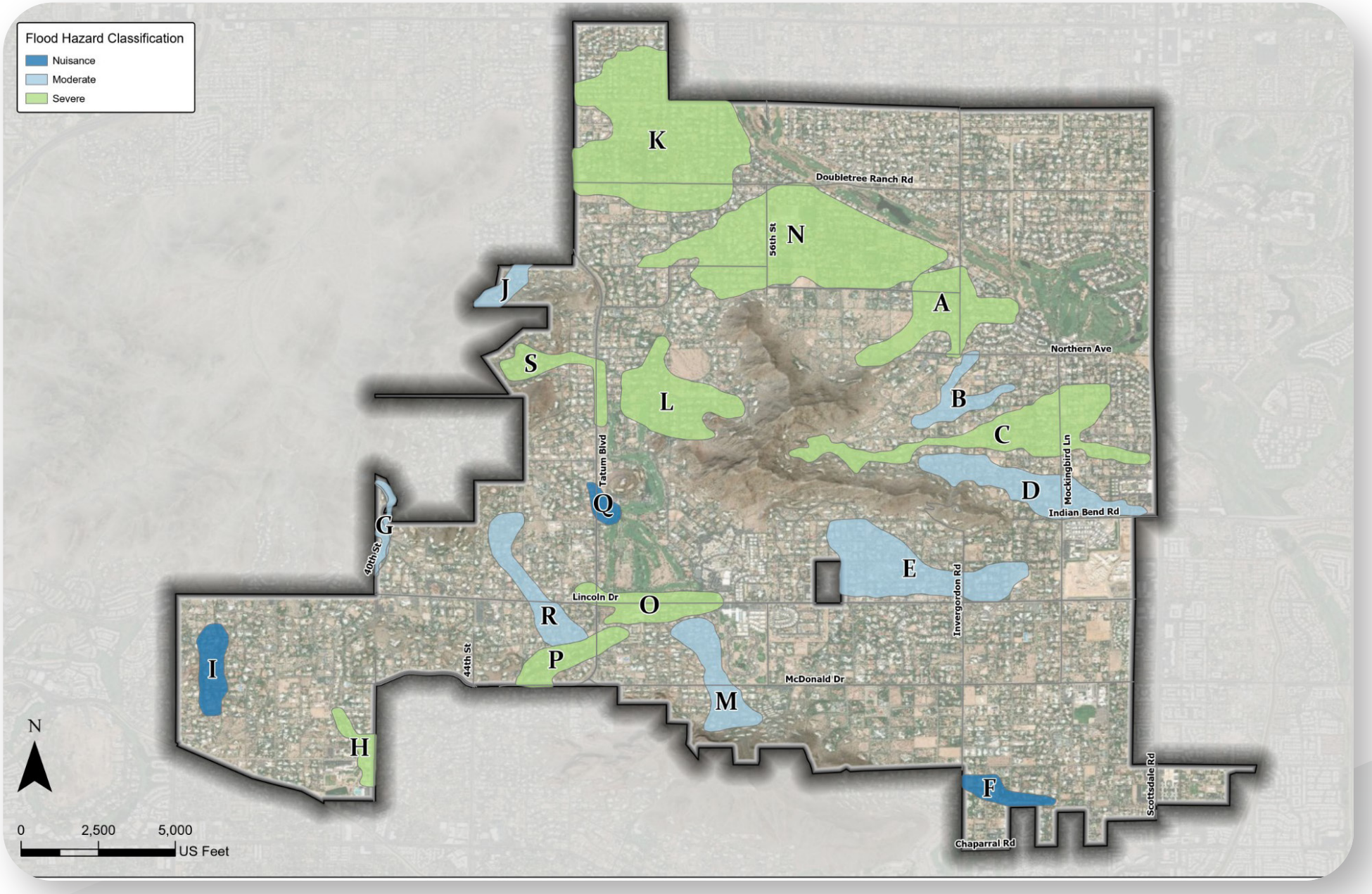
- **Nuisance Flooding:** Water depth approximately 0.5 to 1 foot along roads and adjacent to structures.
- **Moderate Flooding:** Water depth approximately 1 to 2 feet along roads and adjacent to structures.
- **Severe Flooding:** Water depth greater than 2 feet along roads and adjacent to structures.

A decision matrix is used to rank the flood hazard areas incorporating the criteria and weights shown below, allowing the plan to prioritize areas that would benefit the greatest from flood mitigation.

1. Severity of Flooding (Weight: 5)

- This criterion received a weighted score of 5, as it directly impacts the safety

Figure 7: Classifications of Flood Hazard Areas



and well-being of residents and the community. The degree of flooding, whether nuisance, moderate, or severe, influences the urgency and scale of necessary interventions.

2. Potential Structures Protected (Weight: 5)

- The number of structures that could be protected by mitigation measures was also heavily weighted. This criterion reflects the plan's focus on minimizing property damage and protecting as many residential and commercial buildings as possible.

3. Potential Streets Protected (Weight: 4)

- The number of roads (local, collector, arterial) affected by flooding and their role in community connectivity and accessibility were considered significant, but slightly less critical than the direct impact of flooding on structures and severity.

4. Impacts to Emergency Access (Weight: 3)

- Evaluating how flooding affects emergency vehicle access and response times was important, as maintaining reliable emergency services is crucial during and after flood events. This criterion was given a moderate weight.

5. Multi-Use Opportunities (Weight: 1)

- This criterion considered the potential for projects to incorporate additional community benefits beyond flood mitigation, such as recreational spaces or aesthetic enhancements. It had the lowest weight, reflecting its lower priority relative to immediate flood risk reduction.

For a detailed review of how each criterion was scored and its weight, please refer to the decision matrices included within the full text of the Master Plan and **Appendix D** where the area decision matrix and area data sheets are provided.

Snapshot of Decision Matrix (Table 6 from the Master Plan)

Criteria	Scoring Criteria	Score Range	Weighted Score
Severity of Flooding	Nuisance, Medium, Severe	1, 3, 5	5
Potential Structures Protected	1 to 30 Structures, 31-50 Structures, >51	1, 3, 5	5
Potential Streets Protected	Local Street Benefits Only, Arterial/Collector Street or Multiple Local Streets Benefits, Multiple arterial/collector & Local Street Benefits	1, 2, 4	4
Impacts to Emergency Access	No Impact to Emergency Access, Impacts to Emergency Access	1, 3	3
Multi-Use Opportunities	No Opportunities, Possible Opportunities	1, 2	1

The nine-highest ranking flood hazard areas are furthered for project alternative development. Nine areas were chosen to advance based on the scoring results and a logical breakpoint. The nine highest-ranking flood hazard areas identified are:

1. **Flood Hazard Area A:** Invergordon Road and Mockingbird Lane
2. **Flood Hazard Area C:** Cheney Wash
3. **Flood Hazard Area E:** Lincoln Wash
4. **Flood Hazard Area H:** 40th Street and Stanford Drive
5. **Flood Hazard Area K:** Mountain View Road
6. **Flood Hazard Area L:** Upstream Cherokee Wash
7. **Flood Hazard Area N:** Downstream Cherokee Wash
8. **Flood Hazard Area O:** Lincoln Drive
9. **Flood Hazard Area P:** Tatum Boulevard and McDonald Drive

Proposed Project Alternatives

For the nine highest-ranking flood hazard areas, flood mitigation projects are identified and/or developed. Identified projects are those from previous studies. These projects and new projects are further developed. Projects are categorized into maintenance projects, medium-sized projects, and large projects based on their estimated construction costs:

- **Maintenance Projects:** Costs less than $250,000.
- **Medium Projects:** Costs between $250,000 and $1.3 million. These are eligible for the Flood Control District of Maricopa County's Small Project Assistance Program (SPAP).
- **Large Projects:** Costs exceed $1.3 million. These projects qualify for other grant programs like the Flood Control District of Maricopa County's Capital Improvement Project Partnership Program (CIPPP) or other grant opportunities through FEMA.

For the nine areas, two to three medium and large-scale project alternatives are developed and proposed. Small projects are not included as these projects are more appropriate as annual maintenance projects. Project costs, benefits, and multi-use opportunities are determine such that the most effective flood mitigation strategies are recommended for each area. A decision matrix similar to the matrix used to rank flood hazard areas is used to rank the alternatives for a given area.

Snapshot of Project Prioritization Matrix (Table 8 from the Master Plan)

Criteria	Scoring Criteria	Weighted Score	Highest Possible Score	Lowest Possible Score
Potential Structures Protected	1 to 30 Structures	5	15	5
	31 to 50 Structures	5	15	5
	> 51 Structures	5	15	5
Design & Construction Cost/Benefit	Most Expensive	10	10	5
	Least Expensive	10	10	5
Potential Streets Protected	Local Street Benefit Only	4	12	4
	Arterial/Collector Street or Local Streets Benefit	4	12	4
	Multiple Arterial/Collector Streets and Local Streets Benefit	4	12	4
Green Storm Water Infrastructure	No Opportunities	1	2	1
	Some Opportunities	1	2	1
Project Partnership	Grant Funding or Partnerships Likely	4	12	4
	Local Partnership/Grant Eligible	4	12	4
	Local and Federal Partnerships/Grant Eligible	4	12	4
Multi-Use Opportunities	No Opportunities	2	4	2
	Some Opportunities	2	4	2
Operation and Maintenance Costs	Maintenance After Every Storm Event	3	6	3
	Maintenance at Standard Intervals	3	6	3
Utility Constraints	Major Constraints	3	6	3
	Minor Constraints	3	6	3

This table outlines the criteria used to prioritize projects, assigning a weighted score to each criterion to help determine the overall priority of each project, and ultimately selected a recommended project alternative.

Highest Priority Alternatives – Benefit Cost Analysis

Of the nine highest-ranking flood hazard areas identified in the Paradise Valley Master Plan, recommended alternatives for the top six are further developed into 15% conceptual plans, with engineer's opinion of probable costs (EOPC) and cost/benefit analysis also included. The top six areas and recommended alternatives are:

1. Flood Hazard Area A – Invergordon and Mockingbird Lane

- Recommended Alternative: Implementation of new storm drain systems along Invergordon Road and Maverick Road, with inlets and lateral extensions. The estimated construction cost for this alternative is approximately $11,616,355.

2. Flood Hazard Area H – 40th Street and Stanford Drive

- Recommended Alternative: Improvements to the existing roadway drainage infrastructure including curb inlets, a flood control basin at the corner of Stanford Drive and 40th Street, safety rails, staff gages, and warning signs. The estimated construction cost for this alternative is approximately $1,039,500.

3. Flood Hazard Area K – Mountain View Road

- Recommended Alternative: Construction of a detention/retention basin upstream of Mountain View Road to reduce runoff discharge at Tatum Boulevard. The estimated construction cost for this alternative is approximately $6,072,476.

4. Flood Hazard Area L – Upstream Cherokee Wash

- Recommended Alternative: Replacement of low water crossings at Crestview Drive, Arroyo Drive, and Desert Jewel Drive with box culverts and necessary road improvements. The estimated construction cost for this alternative is approximately $6,113,214.

5. Flood Hazard Area N – Downstream Cherokee Wash

- Recommended Alternative: Replacement of four low water crossings at 58th Place, 59th Place, Morning Glory Road, and 61st Place with box culverts and channel improvements. The estimated construction cost for this alternative is approximately $2,800,333.

6. Flood Hazard Area O – Lincoln Drive

- Recommended Alternative: Increase culvert capacity at Desert Fairways Drive, Lincoln Drive, and 51st Place by replacing undersized culverts with new configurations and making corresponding road improvements. The estimated construction cost for this alternative is approximately $1,979,147.

Grant Funding Opportunity

The plan identifies accessible grant funding options, including the Flood Control District of Maricopa County's (FCDMC) SPAP and CIP programs, and outlines other state and federal funding opportunities.

Prioritization

Projects were prioritized based on cost, benefit/cost ratios, and mitigation impacts. Key considerations included grant funding accessibility and overall project effectiveness. Prioritization is qualitative in nature, as both medium and large projects are included, as well as projects that benefit both roadway and residential structure. This will allow the Town to program projects into CIP planning based on funding, grant opportunities, and overall Town priorities.

Abreviation Guide

Abbreviation	Meaning
PV-SWMP	Paradise Valley Storm Water Master Plan
CIP	Capital Improvement Project
2D	Two-dimensional
FCDMC	Flood Control District of Maricopa County
ADMP/S	Area Drainage Master Plans/Studies
ACDC	Arizona Canal Diversion Channel
CIPPP	Capital Improvement Project Partnership Program
FEMA	Federal Emergency Management Agency
EOPC	Engineer's Opinion of Probable Cost
SPAP	Small Project Assistance Program
CCW	Cudia City Wash
MIBW	Middle Indian Bend Wash
LIBW	Lower Indian Bend Wash
ESC	East Shea Corridor
PE	Professional Engineer
FLO-2D	Floodplain Modeling in Two-dimensions
RCBC	Reinforced Concrete Box Culvert
CMP	Corrugated Metal Pipe
PCSWMM	Personal Computer Storm Water Management Model
GIS	Geographic Information System
USD	United States Dollar
USACE	United States Army Corps of Engineers
BCR	Benefit-Cost Ratio

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II. INTRODUCTION

A. Purpose of Study

The primary objective of the Paradise Valley Master Plan Master Plan is to identify and quantitatively assess areas vulnerable to flooding and to propose flood mitigation strategies to address areas at the highest risk. The flooding solutions proposed in this study are intended to assist the Town with prioritizing projects for Capital Improvement Program (CIP) and for identifying grant funding sources to aid in project development.

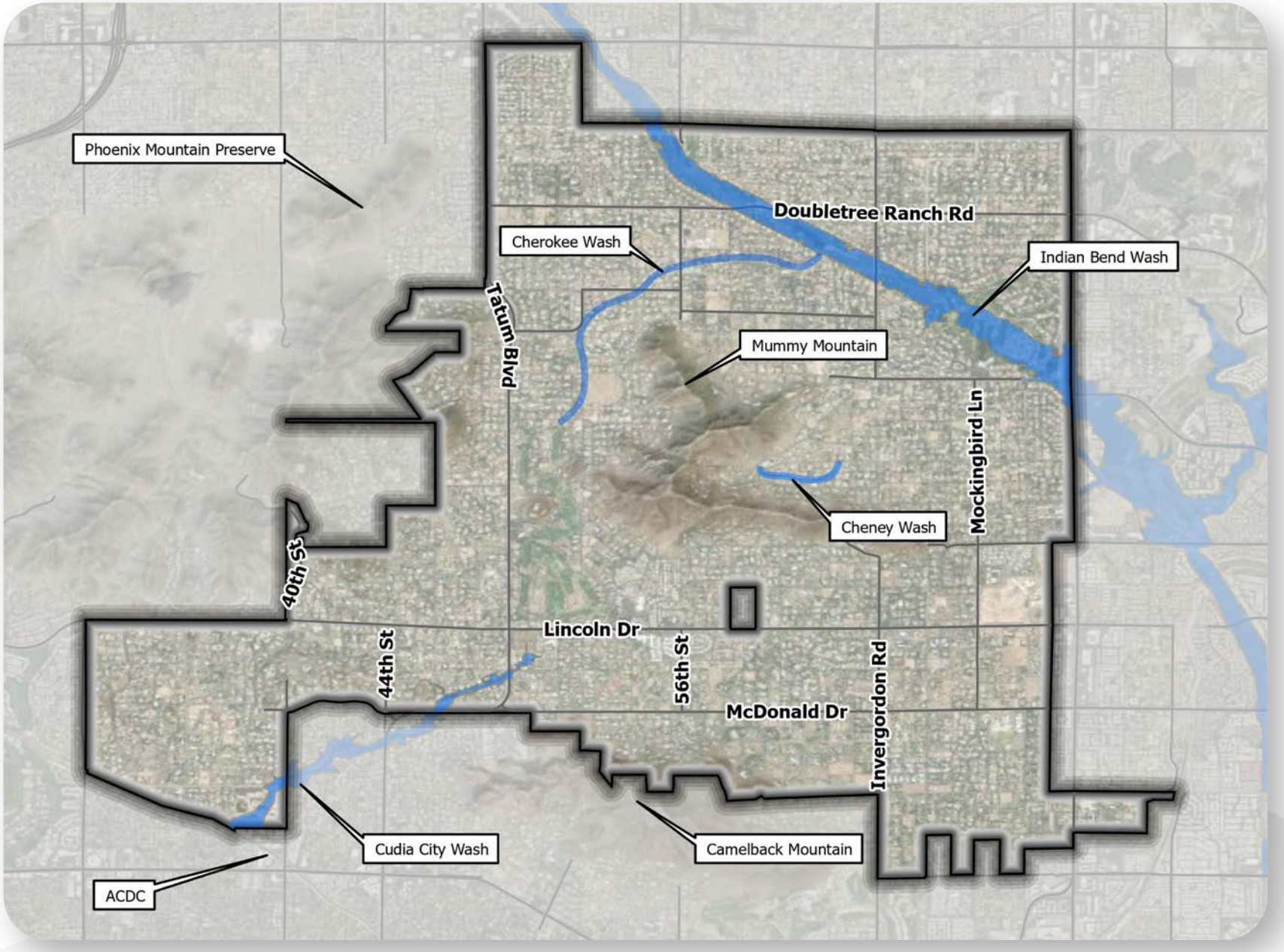
B. Methodology

The Master Plan utilized data collected by previous efforts in the Town, and two-dimensional (2D) hydrologic and hydraulic modeling from Flood Control District of Maricopa County (FCDMC) Area Drainage Master Studies/Plans (ADMP/S) for an initial assessment of flood hazards. New, comprehensive town-wide 2D modeling was also developed by incorporating up-to-date rainfall, land use, topography, and hydraulic structures data. These models serve as the basis for identifying and characterizing potential flood hazard areas, utilizing defined criteria to assess the level of risk. Subsequently, multiple drainage solutions were established for each identified area. Based on feedback and priorities provided by the Town Council, staff, and residents, the most beneficial flood mitigation projects were selected. The selected projects were further developed into conceptual plans with associated cost. With the results and recommendations derived from this comprehensive study, Paradise Valley can formulate an informed and strategic plan for effective flooding mitigation.

C. Study Location

The project area is the entire Town of Paradise Valley, approximately 15 square miles. Paradise Valley is bordered roughly by Shea Blvd to the north, Scottsdale Rd to the east, Camelback Mountain and Camelback Road to the south, and the Phoenix Mountain Preserve and Arizona Canal to the west. Flooding in the Town is primarily attributed to runoff from surrounding mountains and lack of conveyance through residential areas. Mummy Mountain, centrally located in Paradise Valley, plays a significant role in contributing runoff to the major washes in the area, namely Cherokee Wash, Cheney Wash, and Cudia City Wash. Camelback Mountain, situated along the southern border of the Town, contributes to the flow in Cudia City Wash. The western portion of the Town is impacted by runoff from the Phoenix Preserve Mountains, which flow into both Cudia City Wash and Cherokee Wash. Indian Bend Wash (IBW) is the largest flood conveyance corridor in the Town and is the ultimate outfall for the northern and southeast portion of Paradise Valley. The southwest portion of the Town primarily drains to Cudia City Wash and then to the Arizona Canal Diversion Channel (ACDC). The location and major features within Paradise Valley are shown in **Figure 1 and Appendix A.**

Figure 1: Location Map



III. DATA COLLECTION

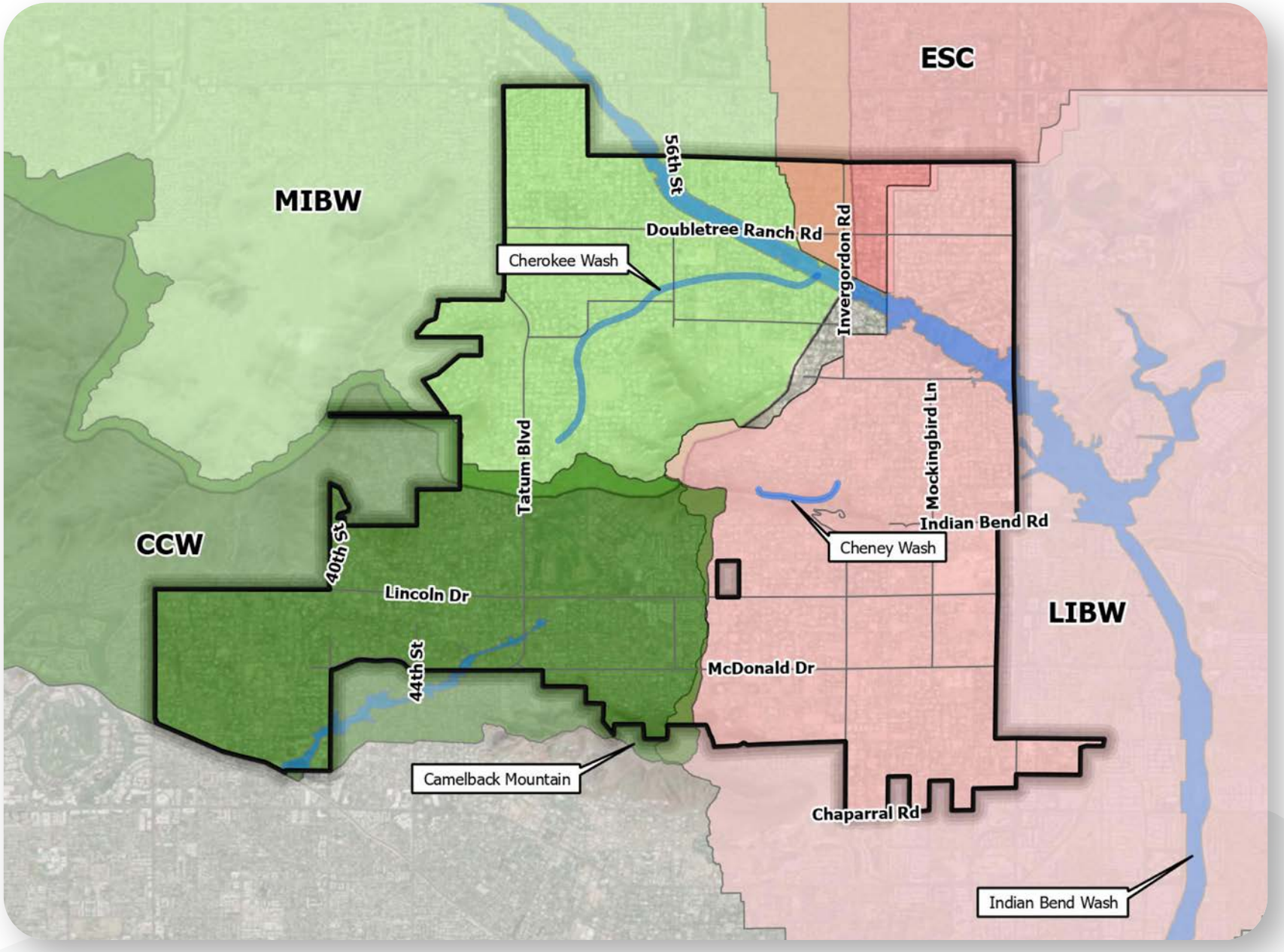
The data collected for the Paradise Valley Master Plan was from multiple sources and consisted of both qualitative and quantitative flood related information. These sources included past drainage studies and FCDMC ADMS/Ps with corresponding modeling results, reports of flooding issues from Town staff and residents, and on-site documentation. By incorporating and analyzing these diverse sources of data, a preliminary understanding of the extent of flooding hazards existing within the Town was developed. This comprehensive approach forms the basis for the creation of an effective and tailored Master Plan.

A. Existing Studies

The Flood Control District of Maricopa County previously completed five Area Drainage Master Studies or Plans that cover portions of Paradise Valley. These studies were completed between 2017 and 2022. In addition, Paradise Valley conducted several studies and evaluations focused on flood hazard identification. In combination, these studies were used to compile information on existing drainage infrastructure and previously proposed solutions for flooding. They also formed the basis for the updated FLO-2D modeling. For more details on the town-wide FLO-2D modeling, please refer to the Hydrology & Hydraulics report. See **Figure 2 and Appendix A** for a map of the previous study boundaries. The studies incorporating portions of the Town include:

- Cudia City Wash (CCW) ADMS (Michael Baker, 2020)
- Middle Indian Bend Wash (MIBW) ADMS (Kimley-Horn, 2019)
- Lower Indian Bend Wash (LIBW) ADMS (Gavin & Barker, 2017)
- East Shea Corridor (ESC) ADMS (Wilson, 2023)
- Paradise Valley Cheney Watershed Hazards Identification (Dibble, 2017)
- Paradise Valley Identified Drainage Problem Areas Technical Memorandum (Kimley-Horn, 2019)
- Cudia City Wash (CCW) Zone 4 Drainage Concept Report (JE Fuller, 2021)

Figure 2: Previous FCDMC ADMS/Ps



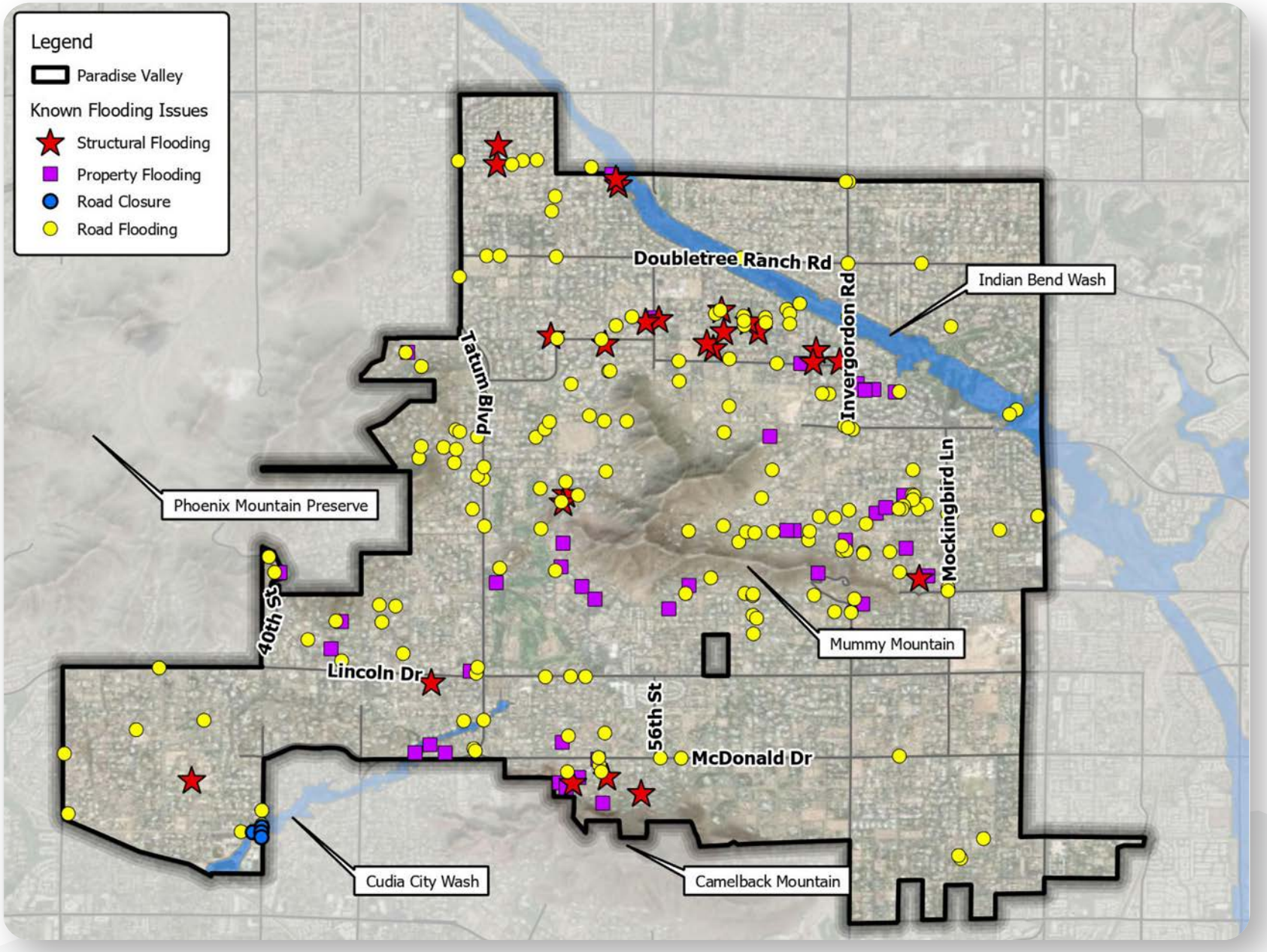
B. Known Flooding Issues

Reports of flooding issues from Town staff and residents played a vital role in capturing direct experiences and observations, ensuring that the Master Plan addressed the concerns of those directly impacted by flooding events.

Past flood complaints from both Town staff and residents were catalogued. Documentation of flooding issues was provided by the Town, including records from Engineering and Public Work's maintenance logs. Records of documented road closure locations were also included. Residents' complaints were extracted from the CivicPlus Portal, an online hub specifically designed for residents to submit issues and receive feedback from the Town.

To enhance the understanding of the frequency and qualitative impacts of flooding throughout the town, the past complaints were categorized accordingly. The categorization was based on both the source of reporting, whether from Town staff or residents, and the type of flooding reported. The types of flooding considered included road flooding, property flooding, and structural flooding. Based on the location of the report, it was noted that the majority of flooding issues occurred at the washes or directly downstream of the Phoenix Mountain preserve. For a detailed list and map of known flooding issues, refer to **Appendix A. Figure 3** shows the location and type of flooding for each past reported or documented issue.

Figure 3: Known Flooding Issues



C. As-Built and Design Plans

Information about drainage infrastructure that has recently been built or is currently in design was not included in past studies. Therefore, coordination was conducted to receive as-builts or Professional Engineer (PE) sealed plans to include recent drainage infrastructure in the updated, town-wide FLO-2D models. **Table 1** contains the information received.

D. Field Assessment

Field assessments were conducted to bridge data gaps as needed to support the modeling effort and to supplement the Town's geodatabase. During these visits, culverts and inlets were measured and assessed to evaluate the Town's existing infrastructure sizes and conditions. A collection of photos documenting the visited sites is included on the following **Pages 9-15.**

Table 1: As-Builts and Plans Received for Data Collection

Type of Document	Consultant	Project	Location
As-Built	TY LIN International 07/28/2021	Roadway and Utility Improvements on Lincoln Drive, Mockingbird Lane and Indian Bend Road	N 68th Street from E Meadowlark Lane to E Lincoln Drive
Drainage Plan Sealed by PE	Coe & Van Loo Consultants, Inc. 05/24/2019	Ritz-Carlton	Between N 68th Street and N Scottsdale from E Lincoln Drive to E Indian Bend Road
Drainage Plan Sealed by PE	Kimley-Horn, Inc. 08/01/2024	Mockingbird Lane Drainage and Roadway Improvements	Mockingbird Lane from N 56th Street and N Invergordon Road

Field Assessment Sheets

STRUCTURE ID: N-23



Number of Barrels: **2**
Barrel Height: **4 ft**
Barrel Width: **10 ft**
Culvert Type: **RCBC**
Culvert Length: **49 ft**

Location: **70th Street & Foothill Drive**
Juristiction: **Paradise Valley**

Inlet Sediment: **Clean**
Inlet Vegetation: **None**
Inlet Protection: **Concrete/Riprap**
Inlet Scour: **None**
Inlet Invert: **1297.90**

Outlet Sediment: **Little to none**
Outlet Vegitation: **None**
Outlet Protection: **Concrete/Riprap**
Outlet Scour: **None**
Outlet Invert: **1297.75**

Inlet Photo



Upstream Photo



Outlet Photo



Downstream Photo



STRUCTURE ID: N-27



Number of Barrels: **3**
Barrel Height: **1.5 ft**
Barrel Width: **26 ft**
Culvert Type: **RCBC**
Culvert Length: **170 ft**

Location: **Scottsdale Road & Hummingbird Lane**
Juristiction: **Paradise Valley**

Inlet Sediment: **Little to none**
Inlet Vegetation: **Moderate**
Inlet Protection: **Grate**
Inlet Scour: **None**
Inlet Invert: **1290.17**

Outlet Sediment: **Little to none**
Outlet Vegitation: **None**
Outlet Protection: **Riprap**
Outlet Scour: **None**
Outlet Invert: **1291.17**

Inlet Photo



Upstream Photo



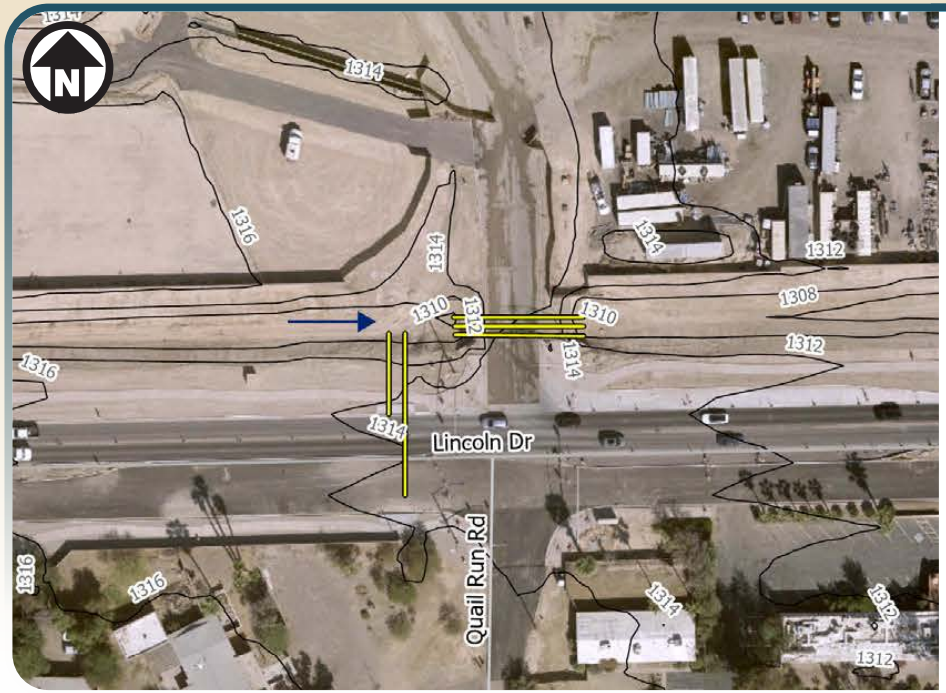
Outlet Photo



Downstream Photo



STRUCTURE ID: S-149



Number of Barrels: **3**
Barrel Height: **3 ft**
Barrel Width: **8 ft**
Culvert Type: **RCBC**
Culvert Length: **64 ft**

Location: **Lincoln Drive & Quail Run Road**
Juristiction: **Paradise Valley**

Inlet Sediment: **Little to none**
Inlet Vegetation: **None**
Inlet Protection: **Riprap**
Inlet Scour: **None**
Inlet Invert: **1309.30**

Outlet Sediment: **Little to none**
Outlet Vegitation: **Little to none**
Outlet Protection: **None**
Outlet Scour: **None**
Outlet Invert: **1308.48**

Inlet Photo



Upstream Photo



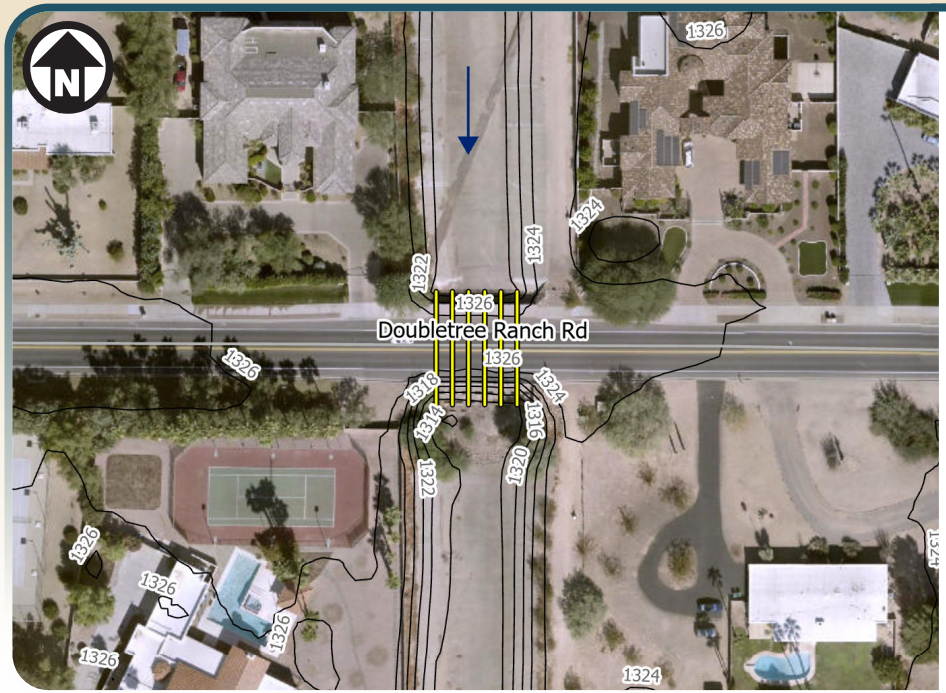
Outlet Photo



Downstream Photo



STRUCTURE ID: N-26



Number of Barrels: **6**
Barrel Height: **4 ft**
Barrel Width: **10 ft**
Culvert Type: **RCBC**
Culvert Length: **54 ft**

Location: **Along Berneil Ditch**
Juristiction: **Paradise Valley**

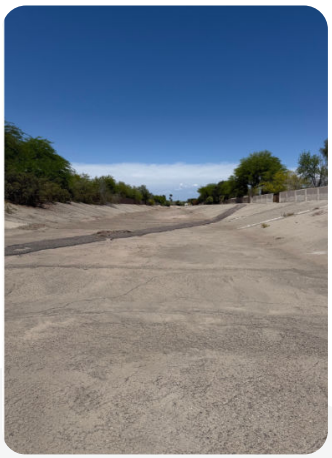
Inlet Sediment: **Clean**
Inlet Vegetation: **None**
Inlet Protection: **Concrete**
Inlet Scour: **None**
Inlet Invert: **1320.10**

Outlet Sediment: **Moderate**
Outlet Vegitation: **Little to none**
Outlet Protection: **Energy Dissipaters**
Outlet Scour: **None**
Outlet Invert: **1318.75**

Inlet Photo



Upstream Photo



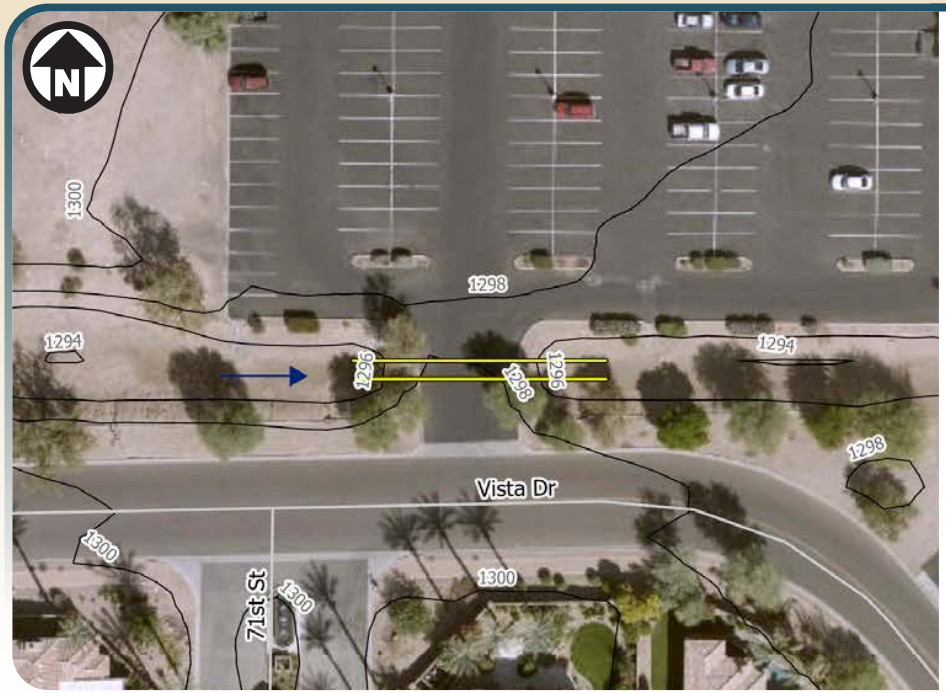
Outlet Photo



Downstream Photo



STRUCTURE ID: S-144



Number of Barrels: **2**
Barrel Height: **1.5 ft**
Barrel Width: **1.5 ft**
Culvert Type: **CMP**
Culvert Length: **99 ft**

Location: **Lincoln Drive & Scottsdale Road**
Juristiction: **Paradise Valley**

Inlet Sediment: **Moderate**
Inlet Vegetation: **None**
Inlet Protection: **Riprap**
Inlet Scour: **None**
Inlet Invert: **1294.18**

Outlet Sediment: **Moderate**
Outlet Vegitation: **None**
Outlet Protection: **Riprap**
Outlet Scour: **None**
Outlet Invert: **1294.08**

Inlet Photo



Upstream Photo



Outlet Photo



Downstream Photo



STRUCTURE ID: N-26



Number of Barrels: **3**
Barrel Height: **5.5 ft**
Barrel Width: **10 ft**
Cilvert Type: **RCBC**
Culvert Length: **99 ft**

Location: **Indian Bend Rd & Scottsdale Rd**
Juristiction: **Scottsdale**
Comment: **Inlet in closed off construction zone**

Inlet Sediment: **N/A**
Inlet Vegetation: **N/A**
Inlet Protection: **N/A**
Inlet Scour: **N/A**
Inlet Invert: **1291.40**

Outlet Sediment: **Little to none**
Outlet Vegitation: **Little**
Outlet Protection: **Grate**
Outlet Scour: **None**
Outlet Invert: **1291.10**

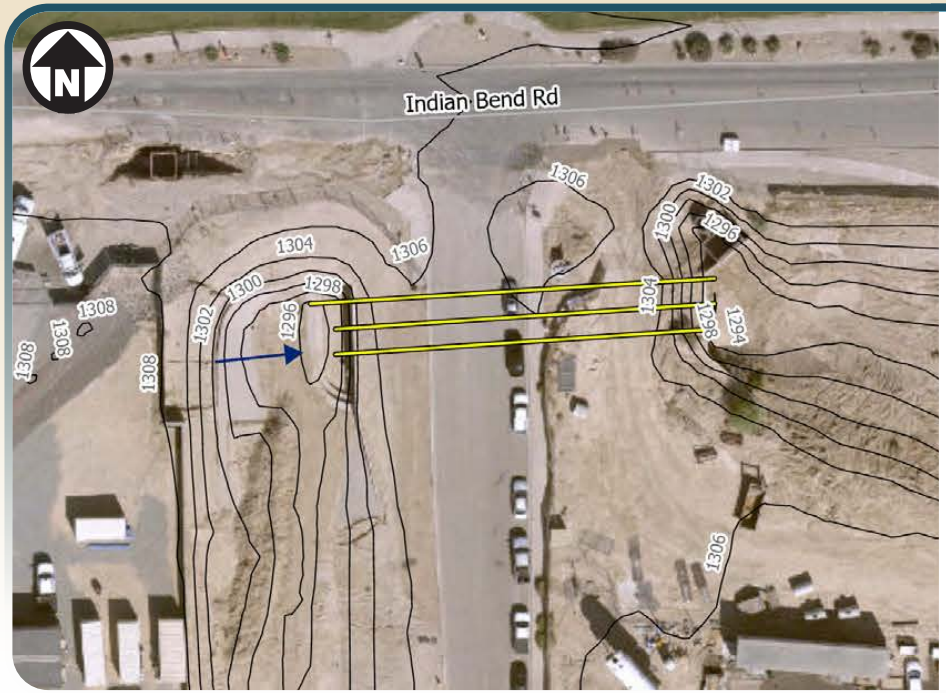
Outlet Photo



Downstream Photo



STRUCTURE ID: N-25



Number of Barrels: **3**
Barrel Height: **3 ft**
Barrel Width: **8 ft**
Cilvert Type: **RCBC**
Culvert Length: **156 ft**

Location: **Indian Bend Rodd & Palmerai Boulevard**
Juristiction: **Paradise Valley**
Comment: **Outlet in closed off construction zone**

Inlet Sediment: **None**
Inlet Vegetation: **None**
Inlet Protection: **Gabion Mattress**
Inlet Scour: **None**
Inlet Invert: **1294.50**

Outlet Sediment: **N/A**
Outlet Vegitation: **N/A**
Outlet Protection: **N/A**
Outlet Scour: **N/A**
Outlet Invert: **1293.80**

Inlet Photo



Inlet/Channel Protection



Upstream Photo



IV. EXISTING STORM WATER INFRASTRUCTURE EVALUATION

The results of the FLO-2D modeling were used to determine the level of protection provided by the existing drainage infrastructure within the Town. The hydraulic structures were considered existing if they were constructed or are currently contracted to be constructed. This assumption provides the most up to date modeling results. Basins, channels, storm drains, and culverts were evaluated for capacity limitations.

A. Storm Drain

The majority of storm drain in Town of Paradise Valley is north of Mummy Mountain and directs storm water to IBW. The largest storm drain system runs along or is connected to Doubletree Ranch Rd. The capacity of the outfall of this system was evaluated using PCSWMM and is shown on the storm drain outfall capacity figure in **Appendix B**. Storm drain that reduce flows to less than half a foot of water are considered to provide sufficient storm protection. All existing storm drain provide at least 2-year storm protection with the exception of four inlets along the Doubletree Ranch Road storm drain system. Identifying undersized inlets was also used to evaluate the capacity constraints of this storm drain system. Undersized inlets are defined as inlets where a maximum depth greater than 1 foot occurs during the 2-year storm. The 2-year storm was used as the basis of the assessment because of the frequency of occurrence. Three undersized inlets were identified in the storm drain system at Doubletree Ranch Road and one at the corner of Butler Road and 52nd Street. The undersized inlets are shown on the Storm Drain Undersized Inlet figure in **Appendix B.**

B. Culverts

Culverts in the public right-of-way are located throughout the Town, with a large concentration in the southwest quadrant, conveying runoff from the Phoenix Mountain Preserve and ultimately to CCW. Culverts typically convey flow under roadways with culverts sized for smaller storm events resulting in flood flows overtopping the road during larger storms.

Existing culvert capacity was evaluated based on several criteria. A culvert was initially considered undersized if during the 10-year storm, the roadway was overtopped by 0.5 ft of water or more. This criterion was developed based on culvert design guidance from the Maricopa County Drainage Policies and Standards. Based on these standards, culverts should be designed to convey, at a minimum, the storm frequency peak discharge listed below for each street classification with no flow overtopping the roadway. (FCDMC, 2018).

- Arterial and All-Weather Access Streets: 50-year design storm
- Collector Streets: 25-year frequency
- Local Streets: 10-year storm frequency

Based on these criteria, any culvert that overtops during a 10-year storm would be classified as undersized. The threshold depth of 0.5 feet for all streets was used because 0.5 feet of water will reach the bottom of most passenger cars and can cause loss of control. A map of undersized culverts throughout the Town can be seen below.

Impacts to surrounding structures and emergency access restrictions due to road overtopping were also assessed. Culverts with flood flows that overtop the road by more than 3 feet during a 100-year storm were considered undersized due to potential emergency vehicle access impacts. The threshold of three feet was chosen because according to the depth-velocity relationship curve discussed in the Potential Risk to Passenger Vehicles section of this report, depths greater than 3 feet are indicative of a high danger zone where all vehicles cannot safely pass. Additionally, culverts that caused a backwater water surface elevation during a 100-year storm event of at least 0.5 feet against adjacent structures were also catalogued as undersized. The figures on Pages 18-20 show culvert sizes and levels of storm protection throughout the Town with additional maps in **Appendix B.** Undersized culverts and their potential impacts are also listed in **Table 2** below. Of the 195 culverts analyzed, 36 culverts were identified as undersized.

C. Basins

In the southern portion of the Town there is one major basin, the CCW outfall basin. This basin is sufficiently sized for the local watershed, as it effectively contains the 100-year, 6-hour storm event. There is no overtopping and flooding of adjacent structures. In the northern portion of the Town, there are no large basins. This is mainly because of the proximity of the IBW, which functions as the ultimate outfall for a large portion of north Paradise Valley.

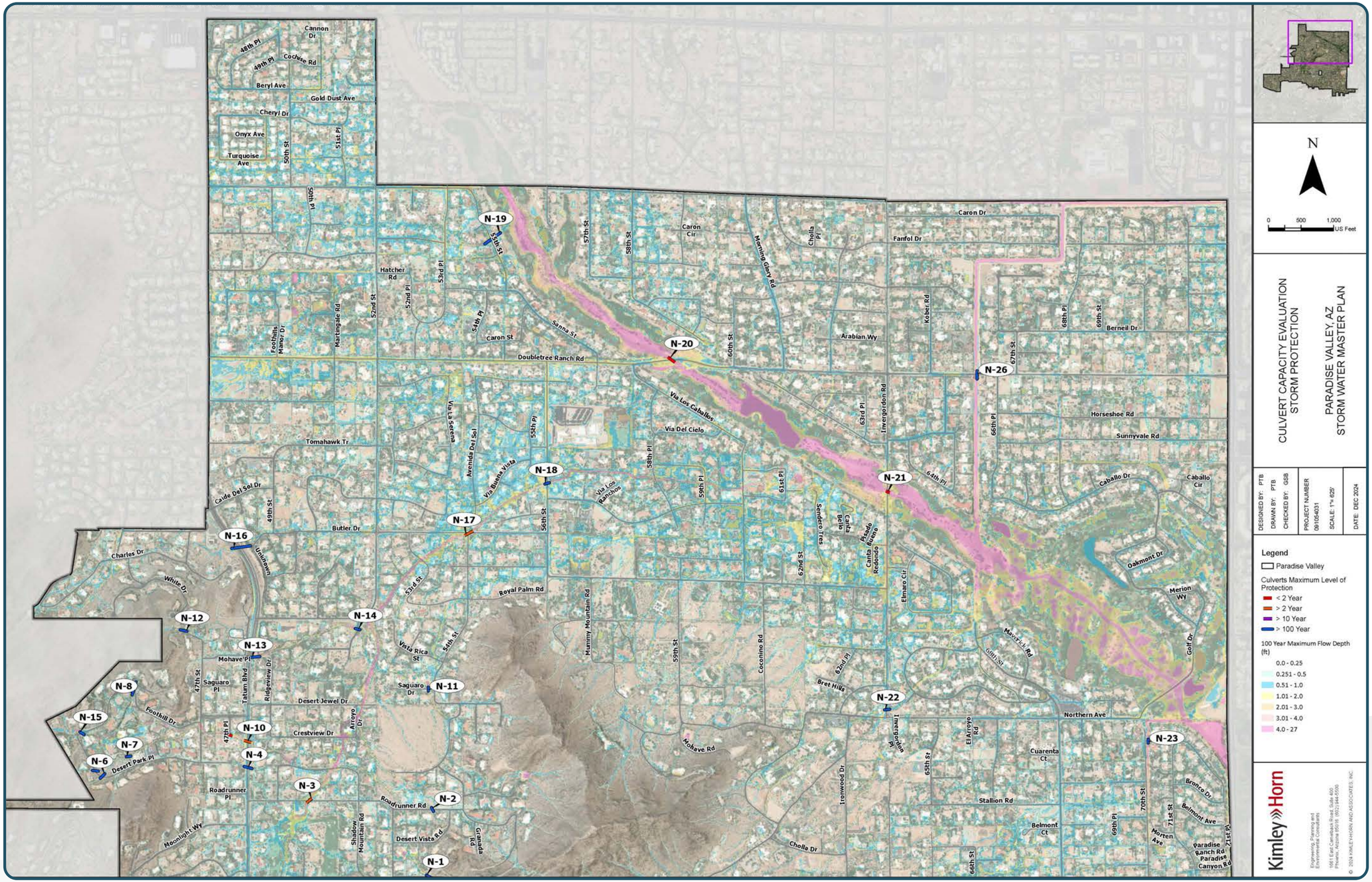
D. Channels

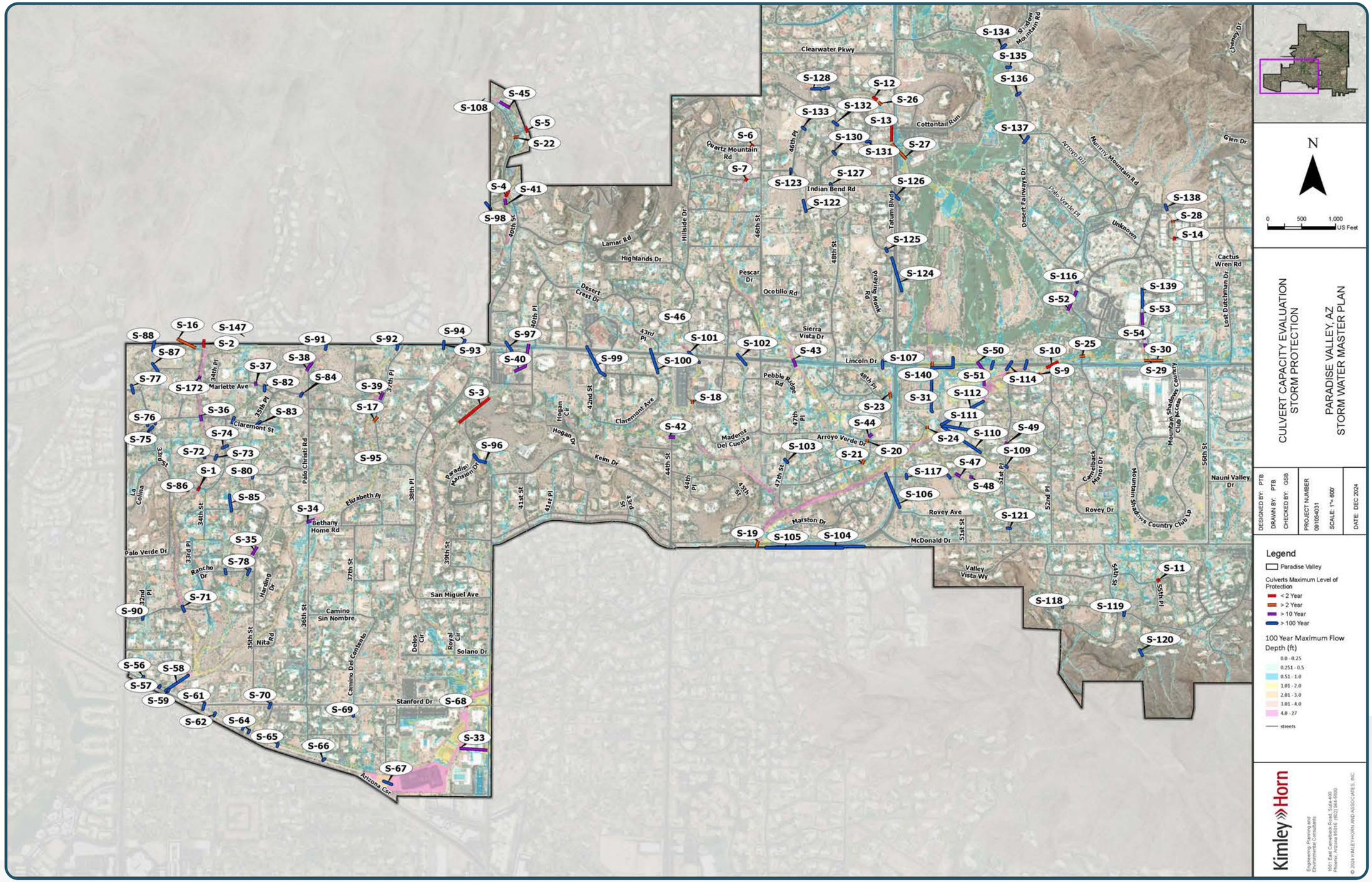
Channels are limited in the Town and flows tend to follow the paths of the existing washes. The largest manmade channel is the Berniel Ditch, a concrete lined channel within both the jurisdictions of City of Phoenix and the Town of Paradise Valley. The section of the ditch within the Town of Paradise Valley is approximately 2 miles long and outfalls into the IBW. This channel is sufficiently sized, as it contains the 100-year, 6-hour storm. It should be noted that yearly maintenance is necessary at the section of the channel just downstream of Double Tree Ranch Road. Excess sediment is deposited on the channel's energy dissipators at the downstream side of the culvert. Photos of this sedimentation can be found in the Site Assessment Data Sheets above.

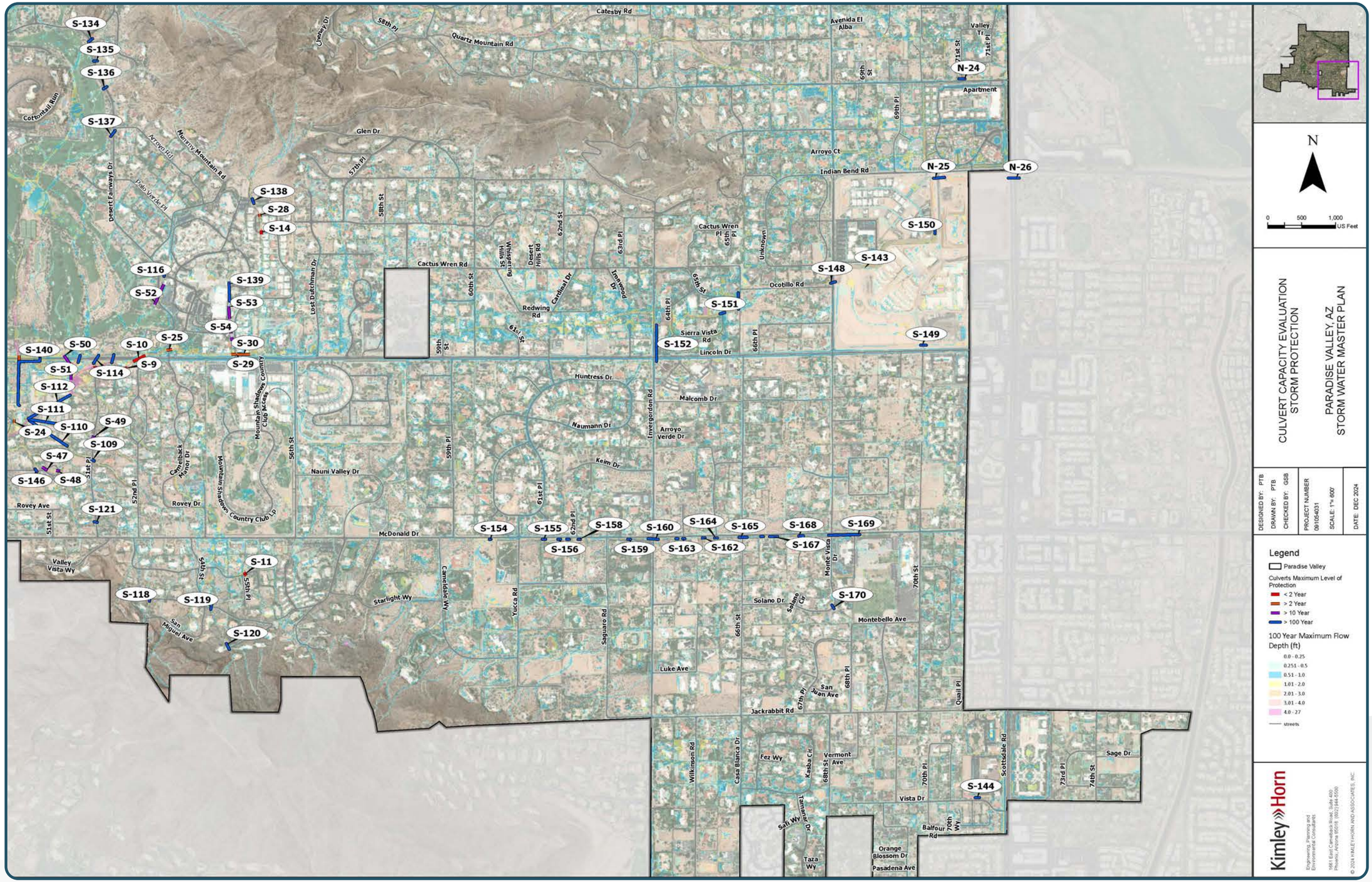
Table 2: Under Sized Culvert Summary Table

Culvert ID	Depth Over Road for 10-Year Storm (ft)	Depth Over Road for 100-Year Storm (ft)	Road Classification	Impacts to Emergency Access	Structures Impacted by Backwater
S-1	>1	>1	Residential	No	No
S-2	>1	>1	Collector	No	No
S-3	>4	>4	Residential	Yes	No
S-4	>2	>3	Residential	Yes	No
S-5	>0.5	>1	Residential	No	Yes
S-6	>1	>2	Residential	No	No
S-7	>2	>3	Residential	Yes	Yes
S-8	>2	>3	Residential	Yes	Yes
S-9	>2	>3	Residential	Yes	No
S-10	>1	>1	Collector	No	No
S-11	>0.5	>1	Residential	No	No
S-12	>0.5	>1	*	No	Yes
S-13	>0.5	>1	*	No	No
S-14	>0.5	>1	Residential	No	No
S-15	>0.5	>0.5	Residential	No	No
N-16	>0.5	>1	Collector	No	No
S-17	>0.5	>0.5	Residential	No	Yes
S-18	>0.5	>1	Local	No	No
S-19	>0.5	>2	Collector	No	Yes
S-20	>0.5	>1	Residential	No	No
S-21	>0.5	>0.5	Residential	No	No
S-22	>1	>1	Residential	No	Yes
S-23	>0.5	>1	Residential	No	No
S-24	>0.5	>0.5	Residential	No	No
S-25	>0.5	>1	Residential	No	No
S-26	>0.5	>0.5	Residential	No	Yes
S-27	>0.5	>0.5	Collector	No	No
S-28	>0.5	>1	Residential	No	Yes
S-29	>1	>2	Residential	No	Yes
S-30	>0.5	>0.5	*	No	Yes
S-31	>1	>2	Collector	No	No
N-10	>1	>1	Collector	No	No
N-17	>1	>1	Collector	No	Yes
N-20	>1	>1	Collector	No	No
N-21	>4	>4	Collector	Yes	No
N-3	>1	>1	Residential	No	Yes

*Indicates a culvert that connects under a structure other than the road such as a wall or roadside covered ditch


Cannon Dr
48th Pl
49th Pl
Cochise Rd
Beryl Ave
Gold Dust Ave
Cheryl Dr
Onyx Ave
Turquoise Ave
50th St
51st Pl
50th Pl
N-19
54th St
57th St
58th St
Caron Cir
Morning Glory Rd
Cholla Pl
Caron Dr
Fanfol Dr
Hatcher Rd
53rd Pl
52nd Pl
52nd St
Foothills Manor Dr
Martingale Rd
54th Pl
Sanna St
Caron St
Doubletree Ranch Rd
N-20
60th St
Arabian Wy
Kober Rd
68th Pl
69th St
Berneil Dr
67th St
N-26
Horseshoe Rd
Sunnyvale Rd
Via Los Caballos
Via Del Cielo
63rd Pl
Invergordon Rd
66th Pl
Tomahawk Tr
Via La Serena
Avenida Del Sol
55th Pl
Via Buena Vista
N-18
58th Pl
Via Los Ranchos
59th Pl
61st Pl
N-21
64th Pl
Caballo Dr
Caballo Cir
Caide Del Sol Dr
49th St
Butler Dr
N-17
56th St
Sendero Tres
Canta Bello
Canta Bueno
Redondo
62nd St
Oakmont Dr
Merion Wy
N-16
Charles Dr
Underdown
White Dr
53rd St
Royal Palm Rd
N-14
Mummy Mountain Rd
Elmaro Cir
N-12
Vista Rica St
54th St
Golf Dr
N-13
Mohave Pl
59th St
Coconino Rd
62nd Pl
Maverick Rd
65th St
N-8
47th St
Saguaro Pl
Tatum Blvd
Ridgeview Dr
Saguaro Dr
N-11
Bret Hills
N-22
Desert Jewel Dr
Foothill Dr
N-15
Arroyo Dr
47th Pl
N-10
Crestview Dr
Northern Ave
N-23
El Arroyo Rd
N-7
Desert Park Pl
N-6
N-4
Mohave Rd
Ironwood Dr
65th St
Cuarenta Ct
Bronco Dr
Roadrunner Pl
N-3
Stallion Rd
Belmont Ave
Roadrunner Rd
N-2
Belmont Ct
70th St
71st St
69th Pl
Morten Ave
Moonlight Wy
Shadow Mountain Rd
Desert Vista Rd
Granada Rd
Cholla Dr
66th St
Paradise Ranch Rd
Paradise Canyon Rd
71st Pl
N-1
N
0 500 1,000 US Feet
CULVERT CAPACITY EVALUATION
STORM PROTECTION
PARADISE VALLEY, AZ
STORM WATER MASTER PLAN
DESIGNED BY: PTB
DRAWN BY: PTB
CHECKED BY: GSB
PROJECT NUMBER 091054031
SCALE: 1"= 625'
DATE: DEC 2024
Legend
Paradise Valley
Culverts Maximum Level of Protection
< 2 Year
> 2 Year
> 10 Year
> 100 Year
100 Year Maximum Flow Depth (ft)
0.0 - 0.25
0.251 - 0.5
0.51 - 1.0
1.01 - 2.0
2.01 - 3.0
3.01 - 4.0
4.0 - 27
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Engineering, Planning and Environmental Consultants
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Phoenix, Arizona 85016 (602) 944-5500
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S-33
S-67
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S-118
S-119
S-120
Clearwater Pkwy
Lamar Rd
Highlands Dr
Desert Crest Dr
Pescar Dr
Ocotillo Rd
Sierra Vista Dr
Lincoln Dr
Pebble Ridge Rd
Arroyo Verde Dr
Marston Dr
Rovey Ave
McDonald Dr
Valley Vista Wy
Cottontail Run
Indian Bend Rd
Tatum Blvd
Desert Fairways Dr
Arroyo Rd
Nunnery Mountain Rd
Glen Dr
Cactus Wren Rd
Lost Dutchman Dr
Nauni Valley Dr
Rovey Dr
Camelback Manor Dr
Mountain Shadows Country Club Dr
Mountain Shadows Country Club Access
Quartz Mountain Rd
Hillside Dr
Pleasant Monk Rd
Hogan Cir
Keim Dr
Madeira Del Cuenta
Paradise Mansion Dr
Claremont Ave
Marlette Ave
Palo Christi Rd
La Colina
Elizabeth Pl
Bethany Home Rd
Palo Verde Dr
Rancho Dr
Harding Dr
Nita Rd
Camino Sin Nombre
Camino Del Contento
Delos Cir
Royal Cir
Solano Dr
San Miguel Ave
Stanford Dr
Arizona Cir
Shadow Mountain Rd
Unknown
Paradise Valley
Culverts Maximum Level of Protection
< 2 Year
> 2 Year
> 10 Year
> 100 Year
100 Year Maximum Flow Depth (ft)
0.0 - 0.25
0.251 - 0.5
0.51 - 1.0
1.01 - 2.0
2.01 - 3.0
3.01 - 4.0
4.0 - 27
streets
N
0 500 1,000 US Feet
CULVERT CAPACITY EVALUATION
STORM PROTECTION
PARADISE VALLEY, AZ
STORM WATER MASTER PLAN
DESIGNED BY: PTB
DRAWN BY: PTB
CHECKED BY: GSB
PROJECT NUMBER
091054031
SCALE: 1"= 800'
DATE: DEC 2024
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N-24
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N-26
Catesby Rd
Quartz Mountain Rd
Avenida El Alba
Valley Tr
71st St
71st Pl
69th St
69th Pl
Apartment
Cottontail Run
Arroyo Rd
Mummy Mountain Rd
Desert Fairways Dr
Palo Verde Pl
Glen Dr
57th Pl
58th St
Arroyo Ct
Indian Bend Rd
Cactus Wren Rd
Lost Dutchman Dr
60th St
Whispering Hills Cir
Desert Hills Rd
62nd St
63rd Pl
Cactus Wren Pl
65th Pl
Unknown
Redwing Rd
Cardinal Dr
Ironwood Dr
65th St
64th Pl
Ocotillo Rd
Sierra Vista Rd
Lincoln Dr
66th Pl
59th St
61st St
Huntress Dr
Malcomb Dr
Naumann Dr
Invergordon Rd
Arroyo Verde Dr
Keim Dr
Nauni Valley Dr
Mountain Shadows Country Club
Mountain Shadows Country Club Dr
Canalback Manor Dr
56th St
59th Pl
61st Pl
62nd Pl
52nd Pl
51st St
Rovey Ave
Rovey Dr
McDonald Dr
Valley Vista Wy
54th St
55th Pl
Starlight Wy
San Miguel Ave
Camelsdale Wy
Yucca Rd
Saguaro Rd
Monte Vista Dr
70th St
Solano Dr
Solano Cir
66th St
Montebello Ave
Luke Ave
San Juan Ave
67th Pl
68th Pl
Quail Pl
Jackrabbit Rd
Wilkinson Rd
Casa Blanca Dr
Fez Wy
Kaaba Cir
Vermont Ave
68th St
70th Pl
Vista Dr
Scottsdale Rd
73rd Pl
74th St
Sage Dr
Safi Wy
Tamerlane Dr
Taza Wy
Balfour Rd
70th Wy
Orange Blossom Dr
Pasadena Ave
N
0
500
1,000
US Feet
CULVERT CAPACITY EVALUATION
STORM PROTECTION
PARADISE VALLEY, AZ
STORM WATER MASTER PLAN
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Paradise Valley
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< 2 Year
> 2 Year
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1.01 - 2.0
2.01 - 3.0
3.01 - 4.0
4.0 - 27
streets
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V. FLOOD HAZARD ANALYSIS

Flood hazard analysis was conducted by developing maximum flow depth (ft), velocity (ft/s), and discharge (ft3/s) results datasets for the 2-year, 10-year, and 100-year storm events from the FLO-2D model results. These datasets, along with anecdotal data from Town staff and residents, served as the basis for the in-depth flood hazard analysis. The flood hazard analysis includes building inundation risk, erosion and sediment hazard potential, and passenger vehicle risk. The results of these analyses provide valuable insights to locations with the greatest flooding risk and were used to evaluate distinct flood hazards areas in the Town. The flood hazard analysis exhibits are included in **Appendix C.**

A. Building Inundation Analysis

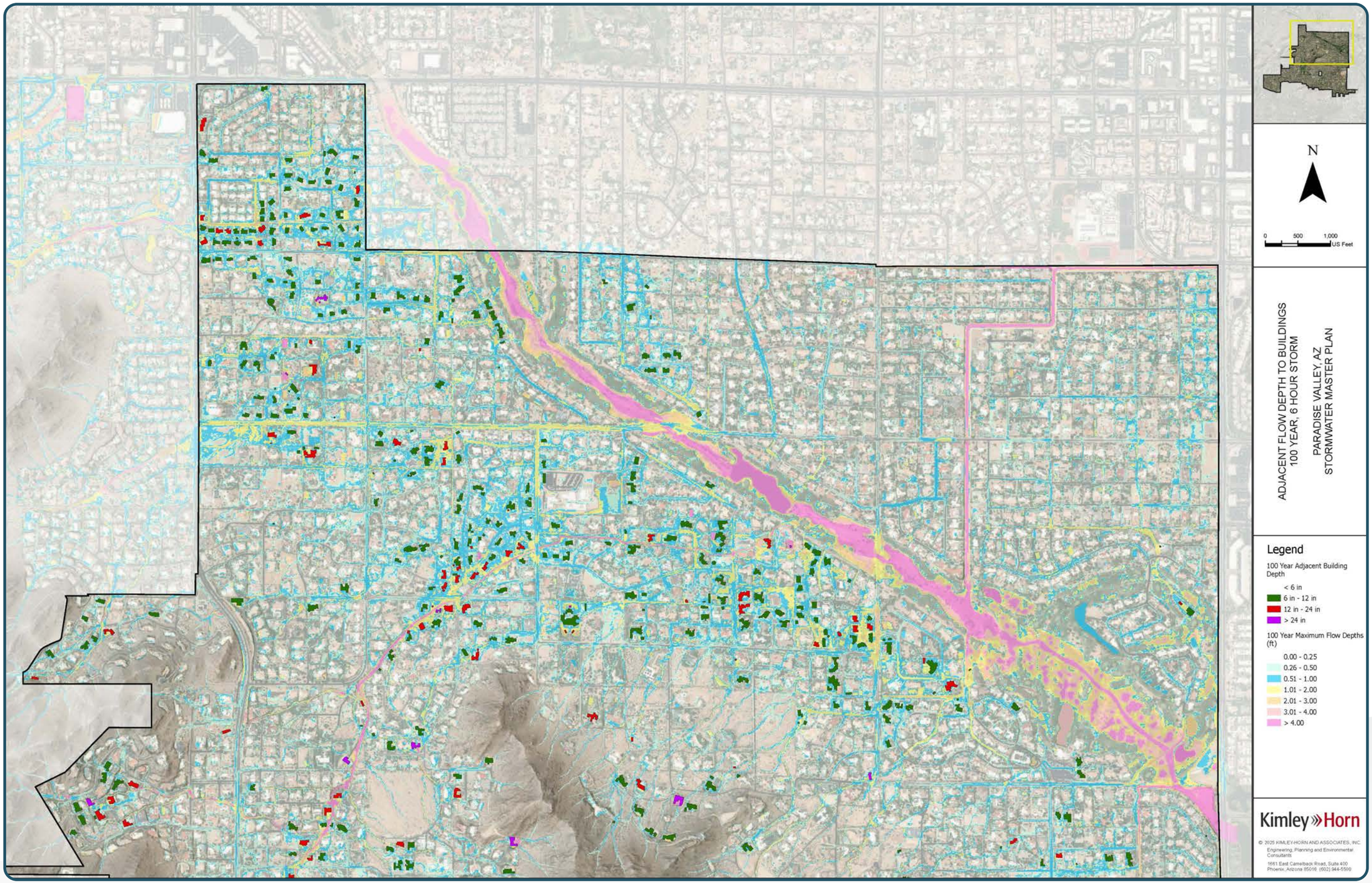
Utilizing the building footprint Geographic Information System (GIS) data provided by the Maricopa County Assessor, structures were assessed for flood risk potential based on adjacent flood depths per the FLO-2D modeling results. The GIS data was reviewed to ensure consistency with current aerial imagery. Within Paradise Valley, there are approximately 8,272 building structures classified as civil, commercial, education, outbuilding, religious, residential, and service. Flooding potential for each structure was assessed for the 100-year, 10-year, and 2-year storm events. The methodology applied to categorize structures for the three hypothetical storm events using the maximum flow depth modeling results and the building GIS data was as follows:

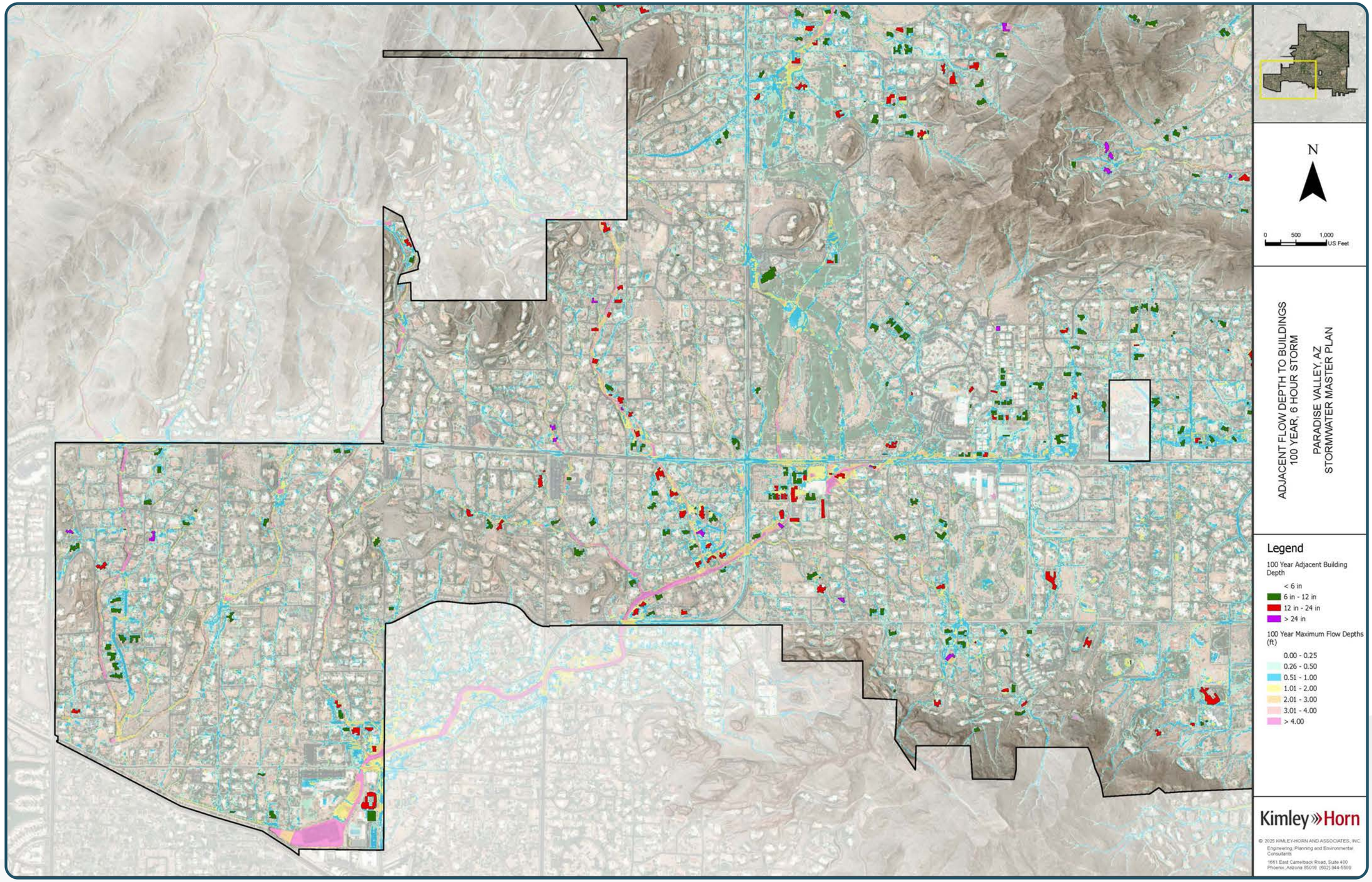
1. Building structures impacted by at least 0.5 feet of water depth for at least 20% of the building perimeter.
2. Building structures impacted by at least 1 foot of water depth for at least 15% of the building perimeter.
3. Building structures impacted by at least 2 feet of water depth for at least 10% of the building perimeter.

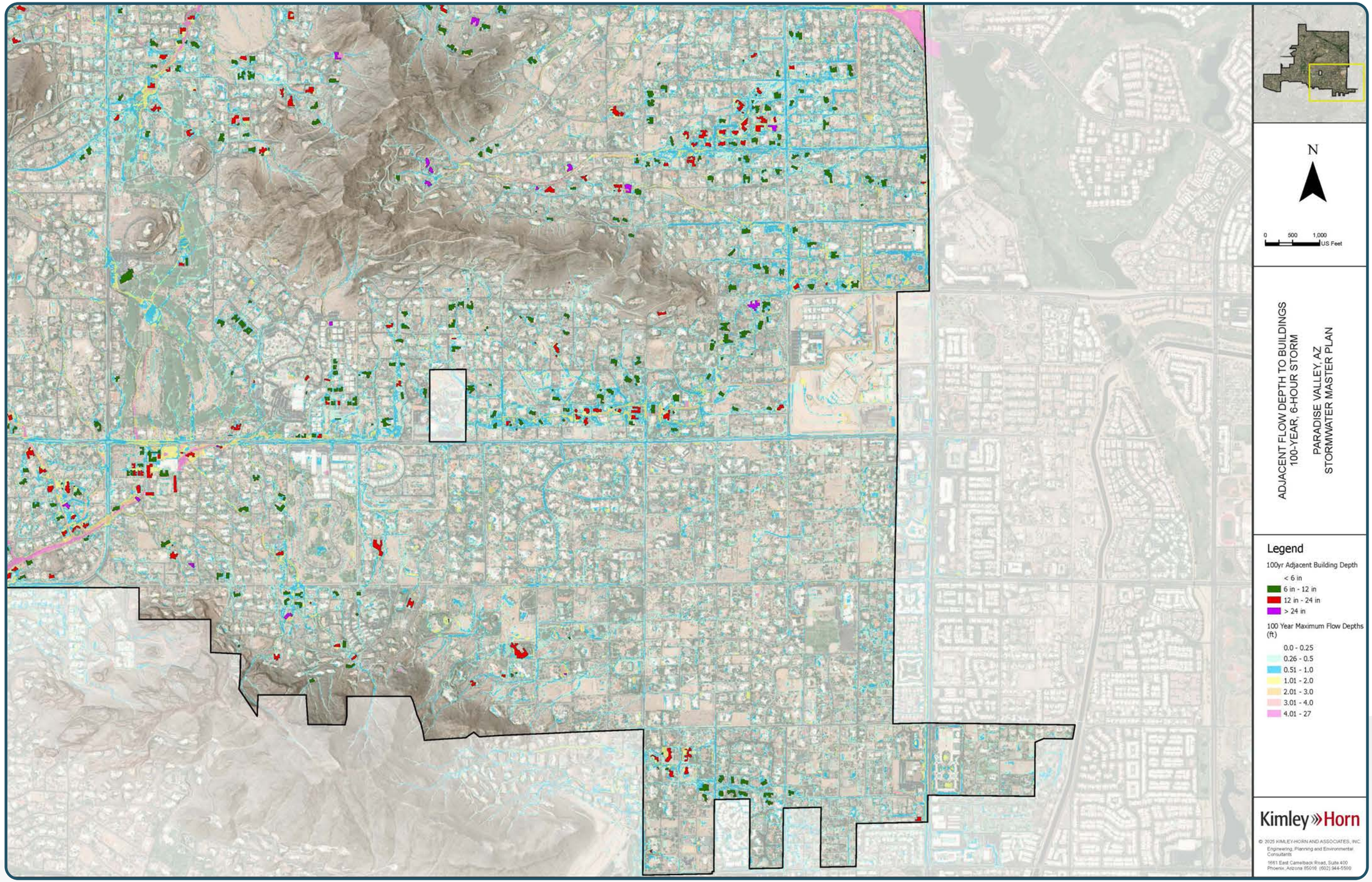
The 100-year results of these analyses are shown in exhibits on Pages 21-23 with 10-year and 2-year maps included in **Appendix C. Table 3** includes the number of buildings impacted for each criterion and storm event. It should be noted that the number of buildings identified for each scenario was refined manually to exclude structures where the flood potential is likely not accurately represented in the model results. These conditions include structures where adjacent flooding was associated with backyards or confined areas that are not near stream tributaries. In these cases, the hydraulic modeling falsely indicates trapped water where in practice flooding would likely not occur.

Table 3: Building Inundation Summary Table

Methodology	Number of Buildings Impacted Per Storm Event		
	2-Year	10-Year	100-Year
>0.5 feet of flow depth for at least 20% of the building	43	304	857
>1 foot of flow depth for at least 15% of the building	11	43	283
>2 feet of flow depth for at least 10% of the building	6	9	52
Total Structures Impacted	60	356	1,192


N
0
500
1,000
US Feet
ADJACENT FLOW DEPTH TO BUILDINGS
100 YEAR, 6 HOUR STORM
PARADISE VALLEY, AZ
STORMWATER MASTER PLAN
Legend
100 Year Adjacent Building Depth
< 6 in
6 in - 12 in
12 in - 24 in
> 24 in
100 Year Maximum Flow Depths (ft)
0.00 - 0.25
0.26 - 0.50
0.51 - 1.00
1.01 - 2.00
2.01 - 3.00
3.01 - 4.00
> 4.00
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N
0 500 1,000
US Feet
ADJACENT FLOW DEPTH TO BUILDINGS
100 YEAR, 6 HOUR STORM
PARADISE VALLEY, AZ
STORMWATER MASTER PLAN
Legend
100 Year Adjacent Building Depth
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6 in - 12 in
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1.01 - 2.00
2.01 - 3.00
3.01 - 4.00
> 4.00
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N
0 500 1,000
US Feet
ADJACENT FLOW DEPTH TO BUILDINGS
100-YEAR, 6-HOUR STORM
PARADISE VALLEY, AZ
STORMWATER MASTER PLAN
Legend
100yr Adjacent Building Depth
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6 in - 12 in
12 in - 24 in
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100 Year Maximum Flow Depths (ft)
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0.51 - 1.0
1.01 - 2.0
2.01 - 3.0
3.01 - 4.0
4.01 - 27
Kimley»Horn
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B. Erosion and Sediment Deposition Hazard

The methodologies used to identify sediment erosion and deposition potential are based on the procedure outlined in Hazard Risk Mapping: Detailed Description of Approach Memo written by West Consultants for the FCDMC in July of 2019 (West Consultants, Inc., 2019). The methodologies developed were deemed appropriate for the Paradise Valley Master Plan because the approach is based on the typical major storms that are specific to the south-central Arizona region, and the memo was written as part of the Carefree Area Drainage Master Plan. Additionally, the methodology similarly uses the same storm events, the 100-year, 6-hour and 10-year, 6-hour, as the basis of assessment.

The erosion hazard methodology provides predictions of the severity of damage and the types of erosion that are likely to take place. By associating ranges of numerical velocities with the likelihood of qualitative results, risks to residents and property can be more easily evaluated. The four categories of erosion potential and the associated velocity ranges in feet per second are listed below.

- Low Erosion Potential: Velocities between 1 and 2.5
  - 10% annual risk of some erosion of desert landscaping (scour of gravel surfaces, potential removal of small plants).
  - Minor scour to the downstream of culverts likely
  - Low risk of scour in washes
  - Low risk to roadways
  - Sand and fine gravel likely washed away during storm events with a recurrence interval > 2 years
- Moderate Erosion Potential: Velocities between 2.5 and 4
  - 10% annual risk of moderate erosion of desert landscaping (scour of sandy surfaces, some risk of damage to small plants).
  - Some scour downstream of culverts likely
  - Potential for scour in major washes
  - Larger gravel and short grass at risk of erosion during storm events with a recurrence interval > 2 years
  - Potential risk to gravel roadways and/or roads with unpaved shoulders during storm events with a recurrence interval > 2 year. Proceed with caution.
- High Erosion Potential: Velocities between 4 and 5.5
  - 10% annual risk of significant erosion of desert landscaping (gravel surfaces likely scoured, small plants likely damaged or removed, larger plants at risk).
  - 10% annual risk of significant scour downstream of culverts
  - High potential for ongoing scour and avulsions in major washes
  - Small cobbles and long grass are at risk of erosion during major storm events.
  - High risk to gravel roadways and/or roads with unpaved shoulders storm events with a recurrence interval> 10 years.
- Extreme Erosion Potential: Velocities greater than 5.5
  - 90% annual risk of significant erosion of desert landscaping (all plants in danger of removal, surface treatments likely scoured away).
  - 90% annual risk of significant scour downstream of culverts
  - Culvert installations in danger of failure during major storm events.
  - Wash instability likely due to significant scour and avulsion potential
  - All grass types likely scoured during large storm events.
  - Gravel roadway surfaces likely to fail and should be avoided during storm events with a recurrence interval> 10 years.

The 100-year result maps of each of the storm events' erosion hazard potential are included on Pages 26-28, with the 10-year and 2-year results maps in **Appendix C.** Extreme erosion potential is predicted within some washes, near some major roadways, and downstream of culverts within the Town. The number of road crossings on collector, arterial, and residential roads that are subject to extreme potential erosion hazards are summarized in **Table 4.**

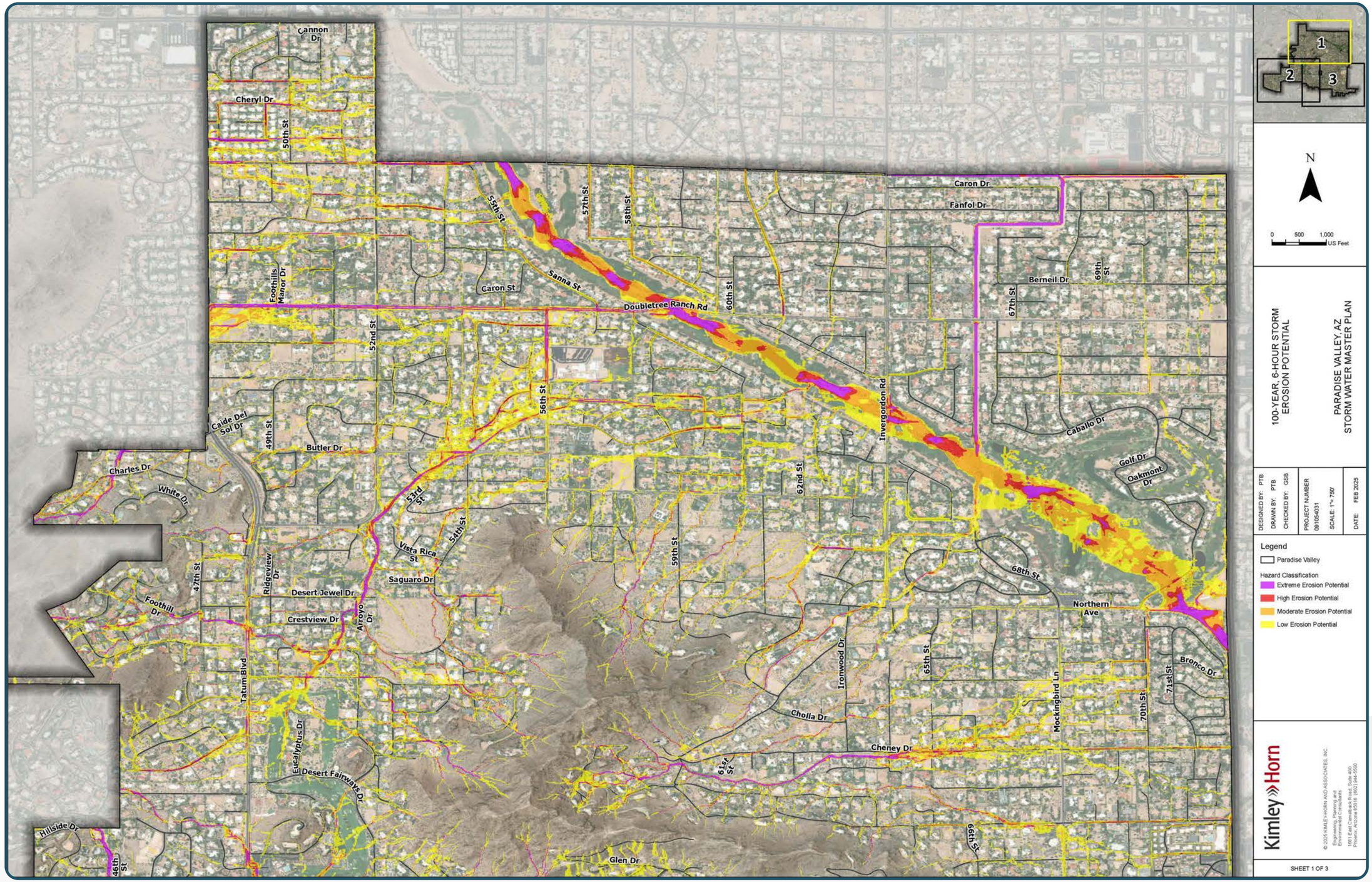
The sediment potential hazard methodology provides predictions of the severity of damage and the types of sedimentation that are likely to take place. Sedimentation potential is based on unit discharge of model cells, obtained by dividing each cell's maximum discharge by the size of the cell. By associating ranges of unit discharge with the likelihood of specific outcomes, risks to residents and property can be more easily understood. The four categories of sediment potential and the associated unit discharge ranges in cubic feet per second are listed below. It should be noted that unit discharges with a magnitude of less than 0.5 were excluded from the results.

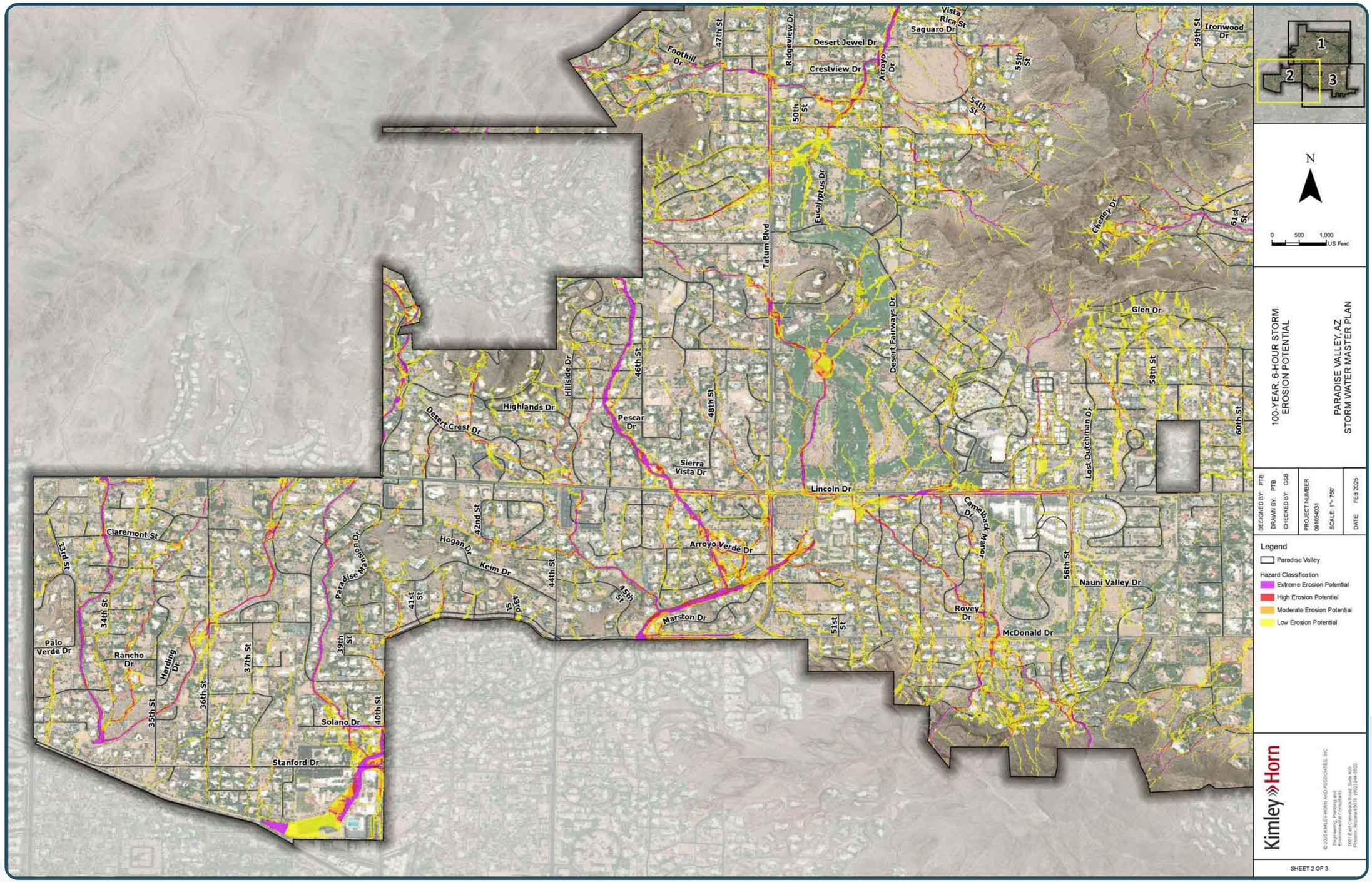
- Low Deposition Potential (q > 10)
  - Low potential of significant deposition of silty sand.
  - Some deposition upstream of culverts may occur.
  - Low risk to roadways.
- Moderate Deposition Potential (10>q>7)
  - Moderate potential of significant deposition of sands, silts, and gravel.
  - Some deposition upstream of culverts is likely. Smaller culverts may clog.
  - Proceed with caution at roadways.

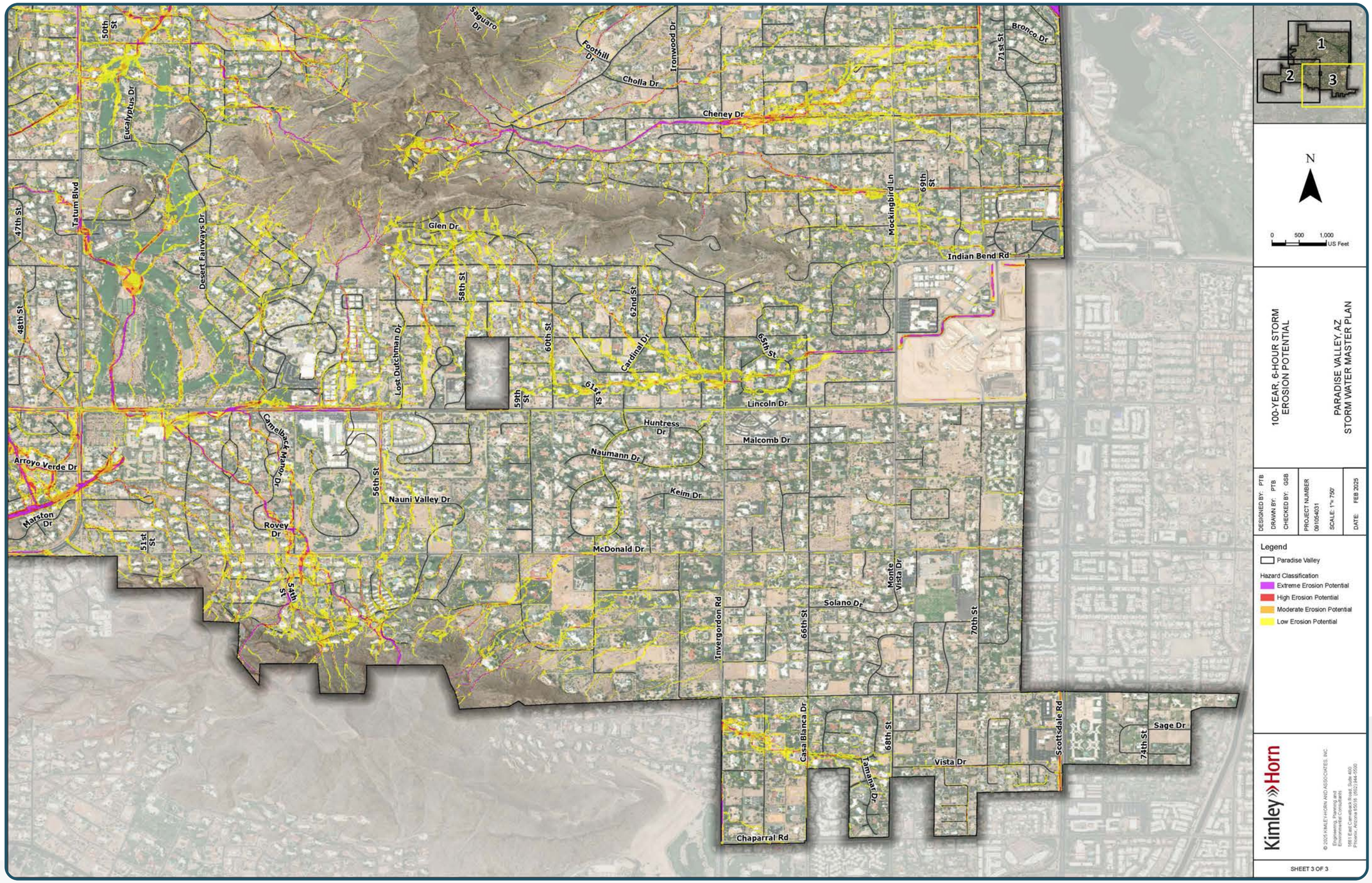
- High Deposition Potential (7>q >3)
  - High potential for sand and gravel deposition; moderate risk of cobble deposition.
  - Significant deposition of culverts likely. High clogging potential at all culverts.
  - Proceed with caution at roadways.
- Extreme Deposition Potential (3>q)
  - Extreme potential for deposition of sands, silts, gravels, and cobbles.
  - Culvert installation in danger due to likelihood of clogging.
  - Proceed with extreme caution at roadways.

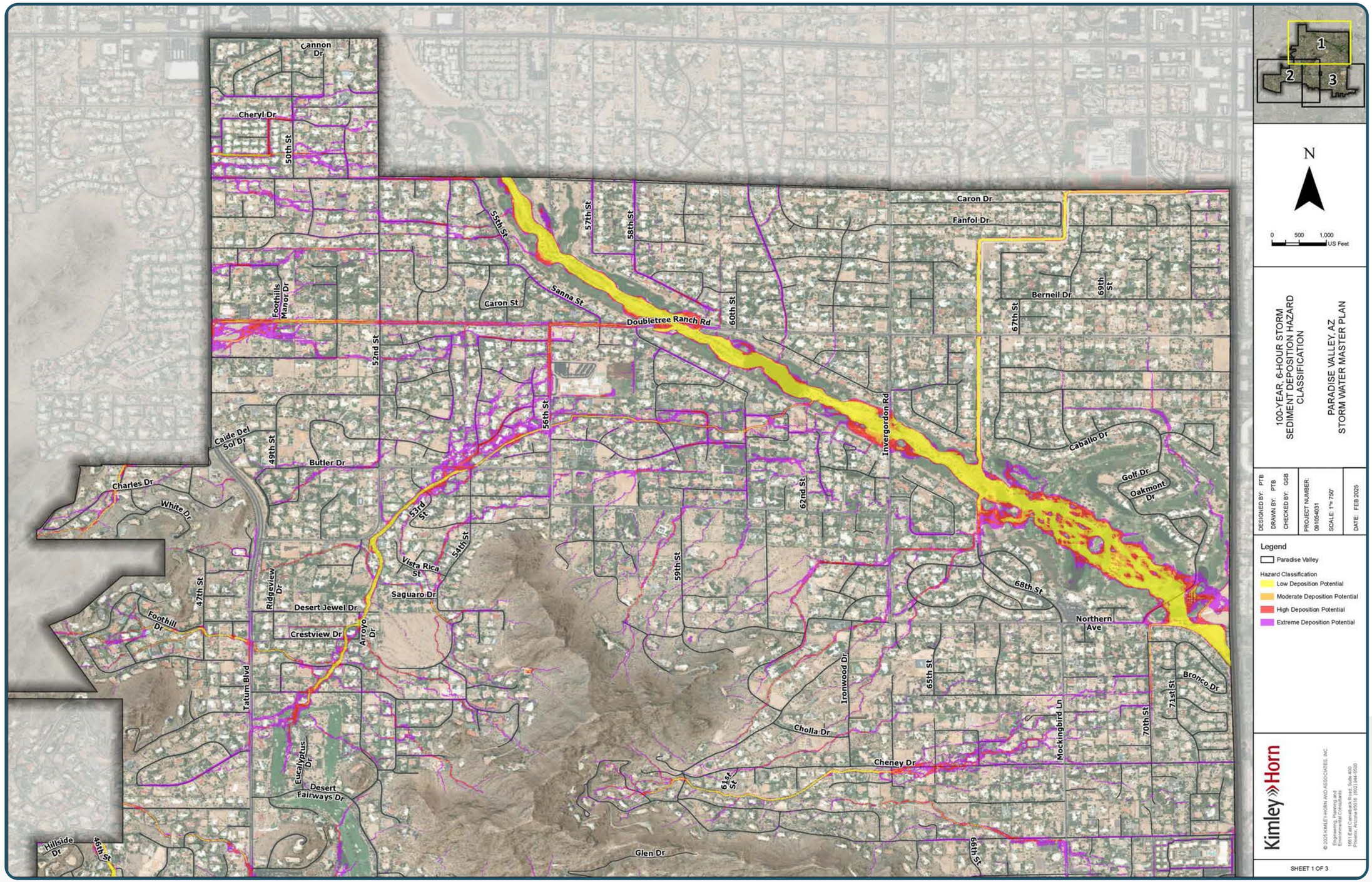
The 100-year result maps of each of the storm events' deposition hazard potential are included on Pages 29-31, with the 10-year and 2-year results maps in **Appendix C**. Extreme sediment deposition potential is predicted within some washes, along some major roadways, and downstream of culverts within the Town. The number of road crossings on arterial, collector and residential roads that are subject to extreme potential deposition hazards are summarized in **Table 4.**

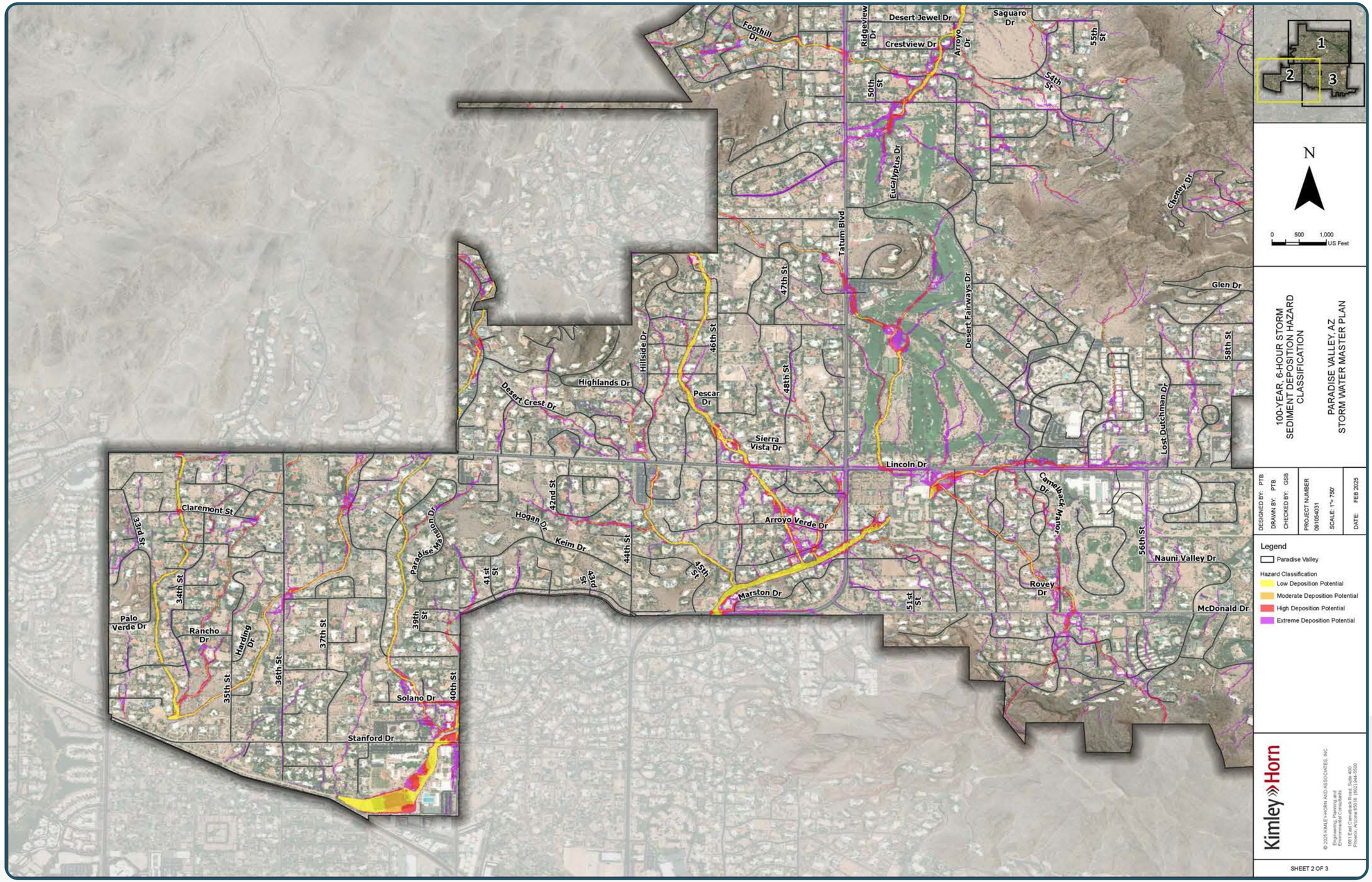
Storm Event	Street Type	Extreme Erosion Risk Locations	Extreme Sediment Risk Locations
100-Year	Arterial	6	28
	Collector	29	144
	Residential	245	989
10-Year	Arterial	2	14
	Collector	12	65
	Residential	92	352

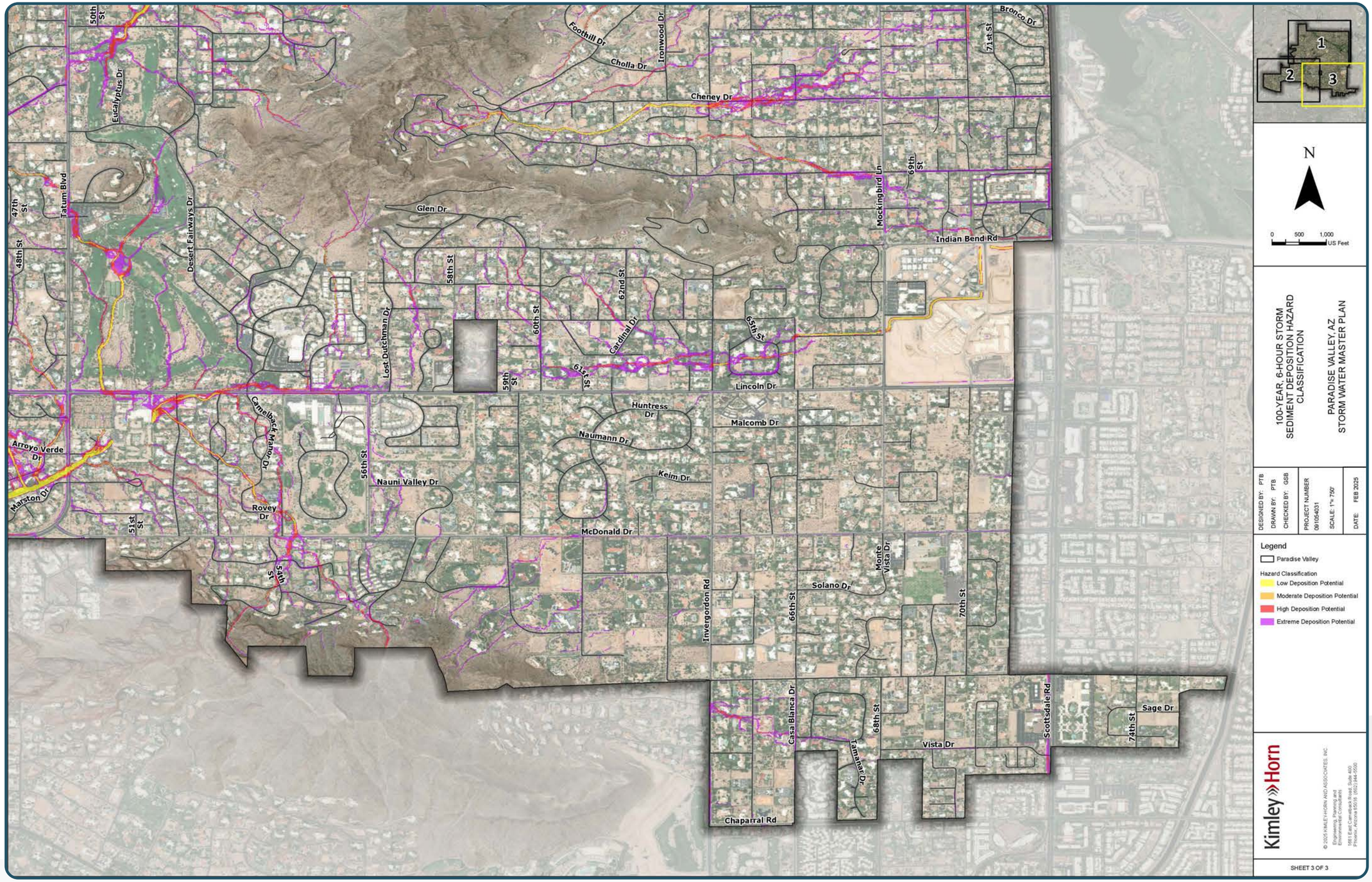

Cannon Dr
Cheryl Dr
50th St
55th St
57th St
58th St
Caron Dr
Fanfol Dr
Foothills Manor Dr
Caron St
Sanna St
Doubletree Ranch Rd
60th St
Berneil Dr
69th St
67th St
52nd St
56th St
Invergordon Rd
Caballo Dr
Caide Del Sol Dr
49th St
Butler Dr
Golf Dr
Oakmont Dr
Charles Dr
White Dr
53rd St
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Vista Rica St
59th St
68th St
Saguaro Dr
47th St
Ridgeview Dr
Desert Jewel Dr
Foothill Dr
Crestview Dr
Arroyo Dr
Northern Ave
Tatum Blvd
Ironwood Dr
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Bronco Dr
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Cholla Dr
Eucalyptus Dr
Cheney Dr
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Desert Fairways Dr
Hillside Dr
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Glen Dr
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0 500 1,000 US Feet
100-YEAR, 6-HOUR STORM EROSION POTENTIAL
PARADISE VALLEY, AZ STORM WATER MASTER PLAN
DESIGNED BY: PTB
DRAWN BY: PTB
CHECKED BY: GSB
PROJECT NUMBER 091054031
SCALE: 1"= 750'
DATE: FEB 2025
Legend
Paradise Valley
Hazard Classification
Extreme Erosion Potential
High Erosion Potential
Moderate Erosion Potential
Low Erosion Potential
Kimley»Horn
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Engineering, Planning and Environmental Consultants
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Foothill Dr
47th St
Ridgeview Dr
Desert Jewel Dr
Vista Rica St
Saguaro Dr
Crestview Dr
Arroyo Dr
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Ironwood Dr
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Stanford Dr
Paradise Mansion Dr
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Saguaro Dr
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100-YEAR, 6-HOUR STORM
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100-YEAR, 6-HOUR STORM
SEDIMENT DEPOSITION HAZARD
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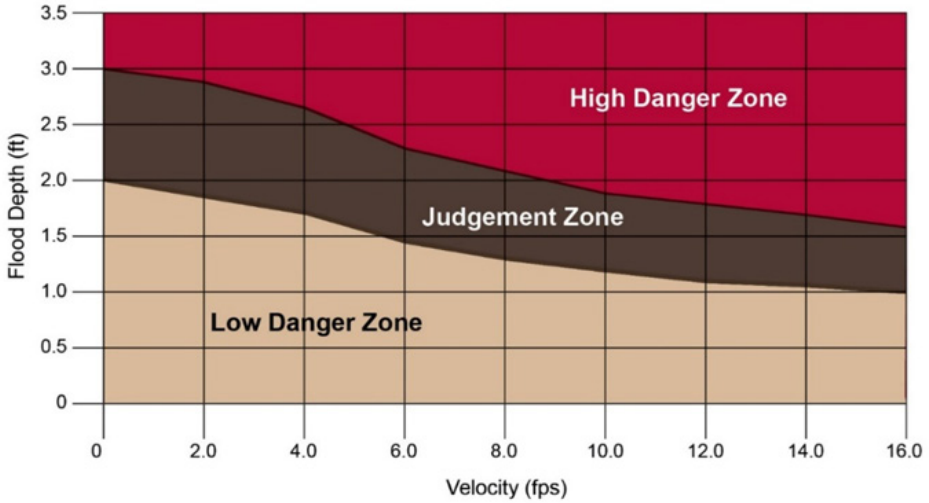
C. Potential Risk to Passenger Vehicles

During large storm events in Town of Paradise Valley, roads such as Doubletree Ranch Road and 40th Street have been closed for passenger vehicle safety. Data obtained from the Town revealed an incident in which a car had been swept off the road at the CCW low water crossing on 40th St. Given the issues identified, risk to passenger safety was an important hazard to evaluate in the Paradise Valley Master Plan.

The methodology used to identify potential risk to passenger vehicles is based on the depth-velocity flood danger level relationship for passenger vehicles developed in ACER Technical Memorandum No. 11: Downstream Hazard Classification Guidelines, (U.S. Department of the Interior Bureau of Reclamation, 1988). The memorandum presents the relationship, created between both the depth and velocity of flood water on a roadway, that is used to classify road conditions as a low danger zone, judgment zone, and high danger zone. **Figure 4** shows the graphical representation of this relationship. Each zone provides predictions of the severity of risk to passenger vehicles.

- **Low Danger Zone –** In this zone, almost all passenger vehicles can safely navigate on the road. The risk categorization is based on the ranges of the depth and velocity relationship shown in **Figure 4**. It should be noted that depths lower than 0.5 feet were removed from this zone due to the negligible effect on passenger vehicles. The depth of 0.5 feet was chosen as the minimum, because at this height, water will begin to reach the bottom of many passenger vehicles.
- **Judgement Zone –** In this zone, roadway flooding with a combination of depths and velocities shown in **Figure 4** present a highly significant hazard to most passenger vehicles. The ranges of depth outlined in this category are 2 to 3 feet of water. At these depths, emergency vehicles should proceed with caution, and passenger vehicles should be blocked from proceeding.
- **High Danger Zone –** In this zone, flood hazards are extreme for all passenger vehicles. The associated depths and velocities of this zone, shown in **Figure 4**, will block access to emergency vehicles.

Figure 4: Depth Times Velocity Graph for Passenger Vehicles (USBR 1988)



Analyses of passenger vehicular risk were conducted for the 10-year and 100-year storm events. Using modeling results, areas of the Town were categorized into each flood zone type. The resulting passenger vehicle flood hazard layer was intersected with the centerline of all roads within Paradise Valley. Two methodologies were utilized to display and quantify the results of the intersection. The polyline method serves to quantify what percentage of roads in the Town are located within the high danger zone risk category, while the point method quantifies the total number of roadway wash crossings subject to the same risk category.

The 100-year result maps of potential risk to passenger vehicles are shown on Pages 35-37, with the 10-year results maps included in **Appendix C**. Examples of the polyline and point methods are shown in **Figures 5 and 6. Table 5** contains the percentage and number of roadway segments that are located within high danger zones for passenger vehicles.

Figure 5: Example of Polyline Shapefile for Passenger Vehicles Risks

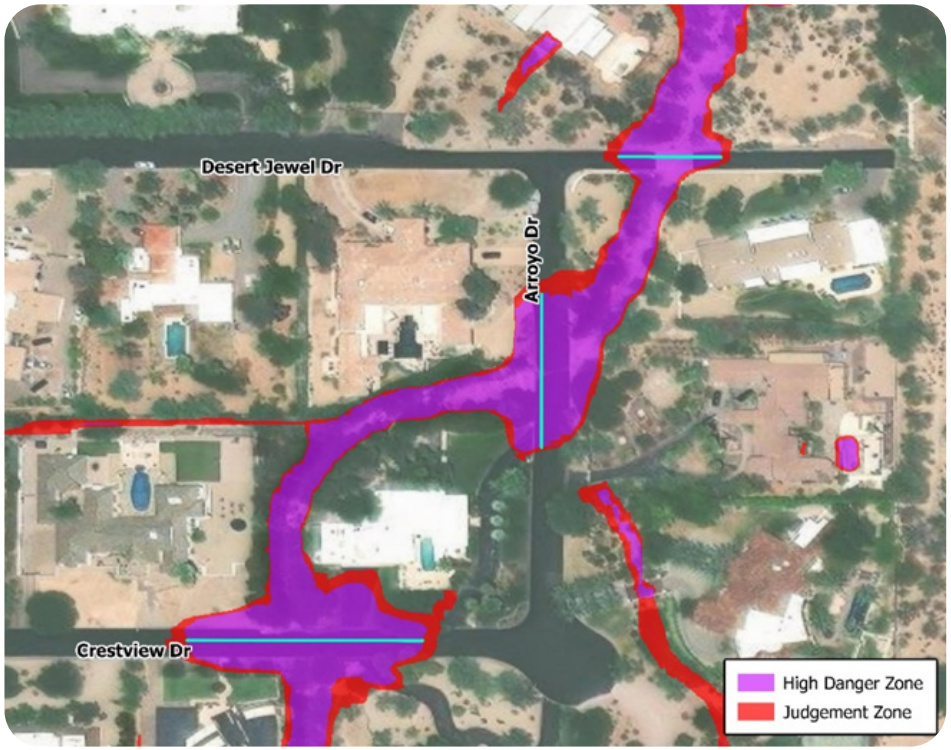


Figure 6: Example of Point Shapefile for Passenger Vehicles Risks

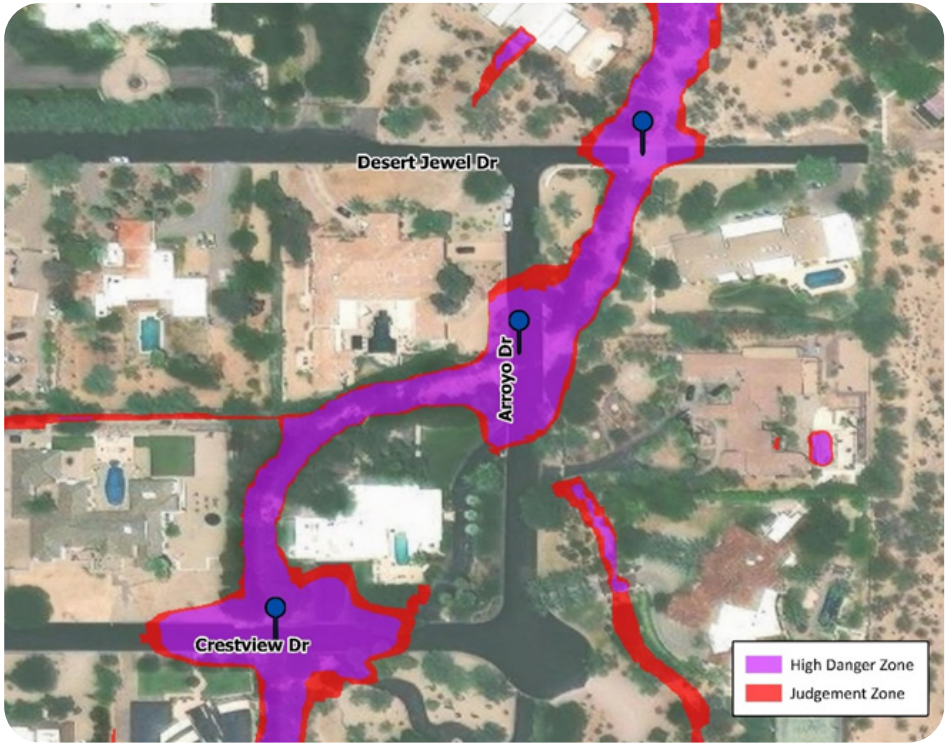
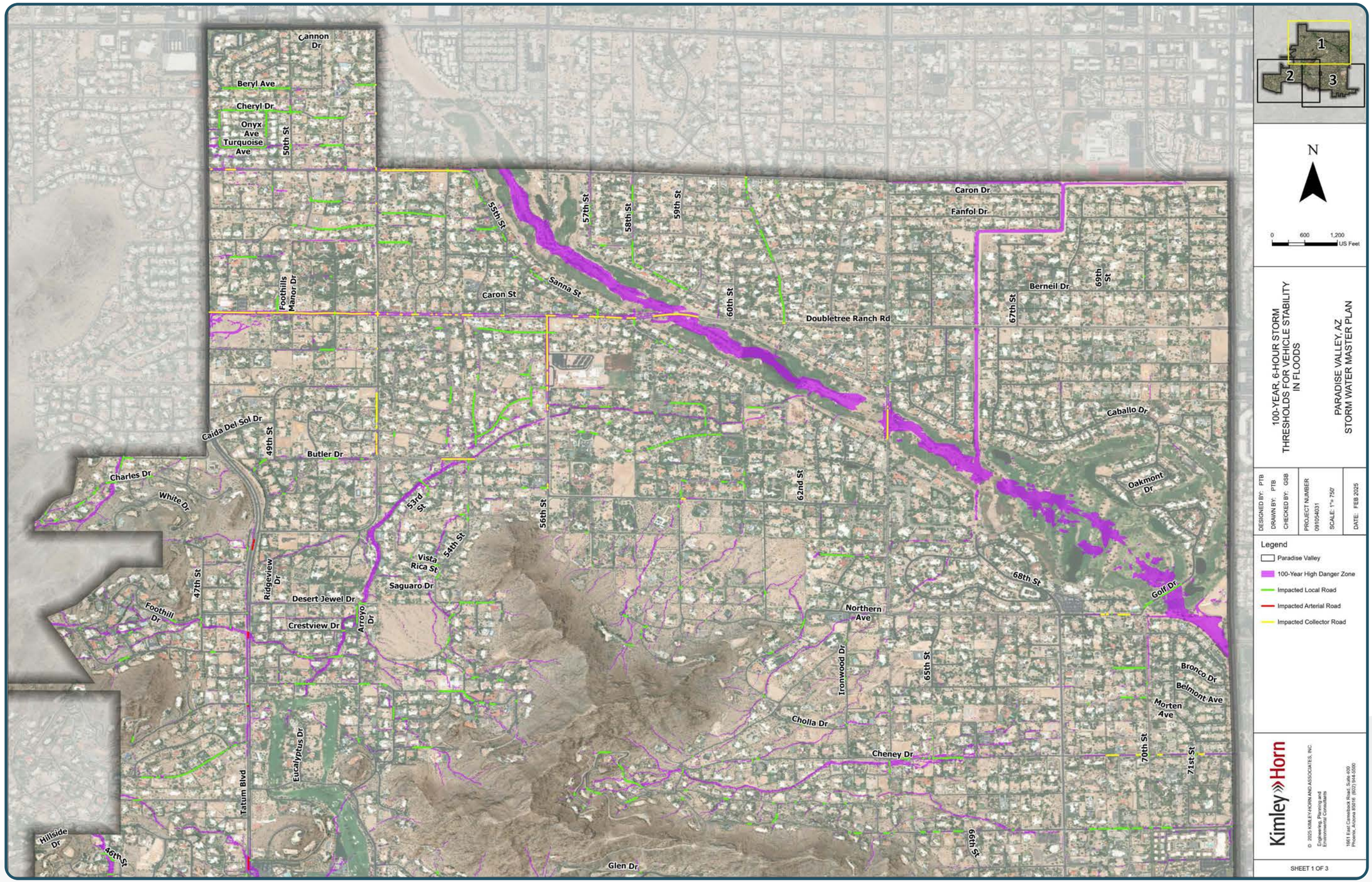
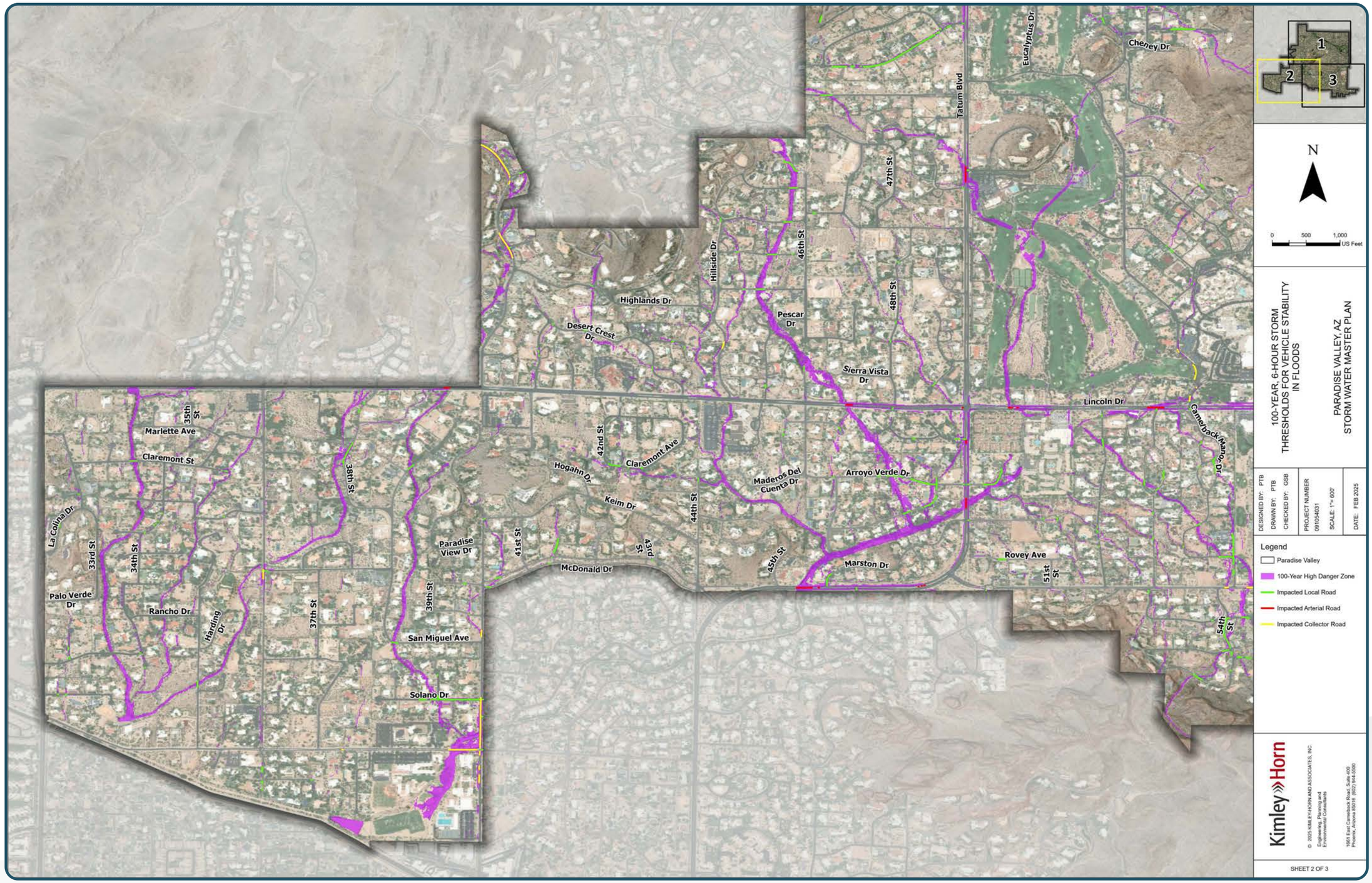
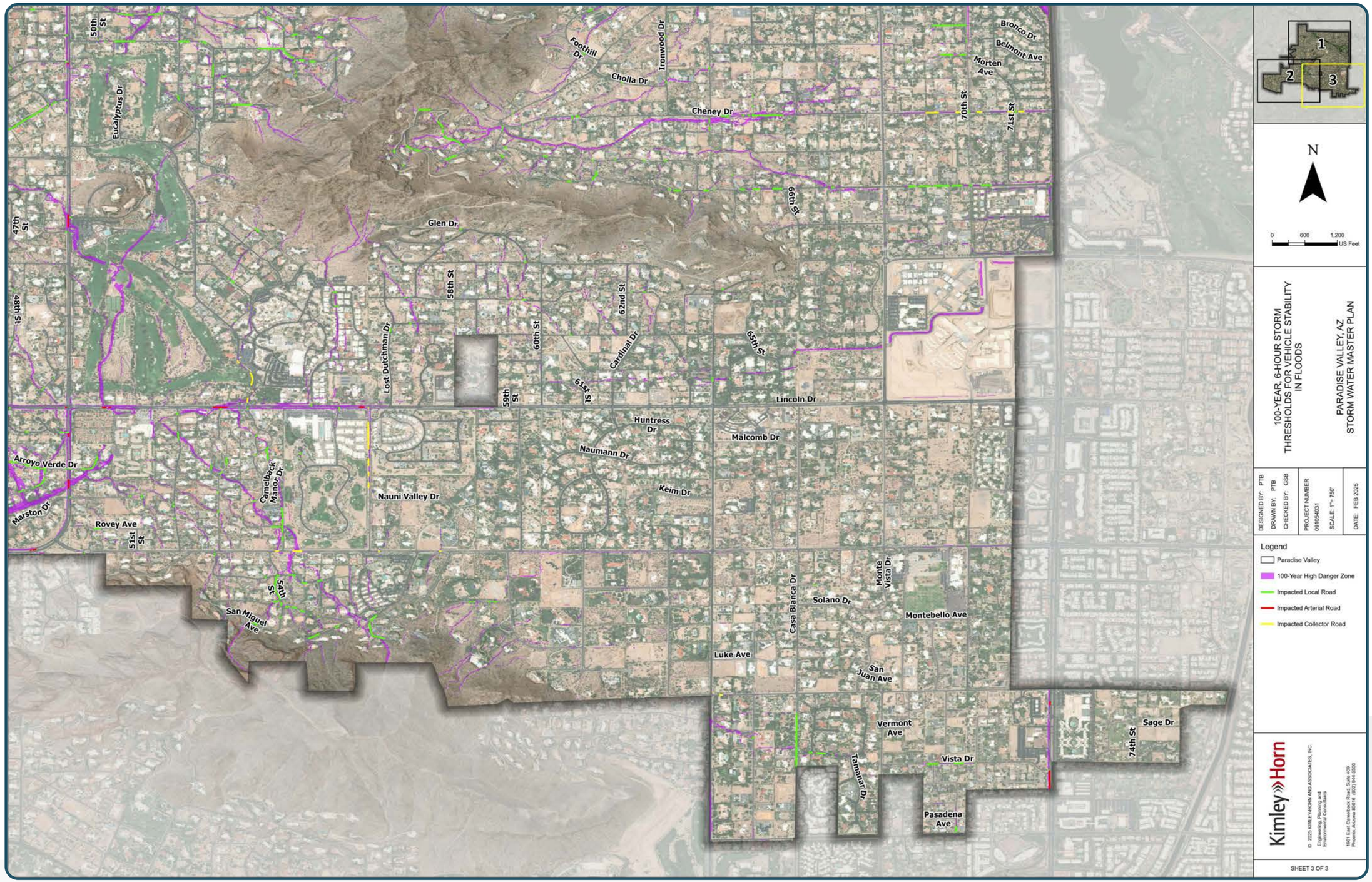


Table 5: Road Flooding Hazard Risk

Storm Event	Street Type	High Danger Zone for Passenger Vehicles
100-Year	Arterial	29 Crossings
		3.9% of Arterial Streets
	Collector	79 Crossings
		9.7% of Collector Streets
	Residential	931 Crossings
		7.0% of Residential Streets
10-Year	Arterial	12 Crossings
		1.2% of Arterial Streets
	Collector	29 Crossings
		3.4% of Collector Streets
	Residential	220 Crossings
		1.6% of Residential Streets


Cannon Dr
Beryl Ave
Cheryl Dr
Onyx Ave
Turquoise Ave
50th St
55th St
57th St
58th St
59th St
Caron Dr
Fanfol Dr
Foothills Manor Dr
Caron St
Sanna St
60th St
Doubletree Ranch Rd
Berneil Dr
67th St
69th St
Caballo Dr
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Caida Del Sol Dr
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Golf Dr
Bronco Dr
Belmont Ave
Morten Ave
Cholla Dr
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600
1,200
US Feet
100-YEAR, 6-HOUR STORM
THRESHOLDS FOR VEHICLE STABILITY
IN FLOODS
PARADISE VALLEY, AZ
STORM WATER MASTER PLAN
DESIGNED BY: PTB
DRAWN BY: PTB
CHECKED BY: GSB
PROJECT NUMBER
091004031
SCALE: 1"= 750'
DATE: FEB 2025
Legend
Paradise Valley
100-Year High Danger Zone
Impacted Local Road
Impacted Arterial Road
Impacted Collector Road
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Tatum Blvd
Eucalyptus Dr
Cheney Dr
47th St
46th St
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Hillside Dr
Highlands Dr
Desert Crest Dr
Pescar Dr
Sierra Vista Dr
Lincoln Dr
Camelback Manor Dr
35th St
Marlette Ave
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Hogahn Dr
Keim Dr
44th St
Maderos Del Cuenta Dr
Arroyo Verde Dr
La Colina Dr
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Palo Verde Dr
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Paradise Valley
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Impacted Arterial Road
Impacted Collector Road
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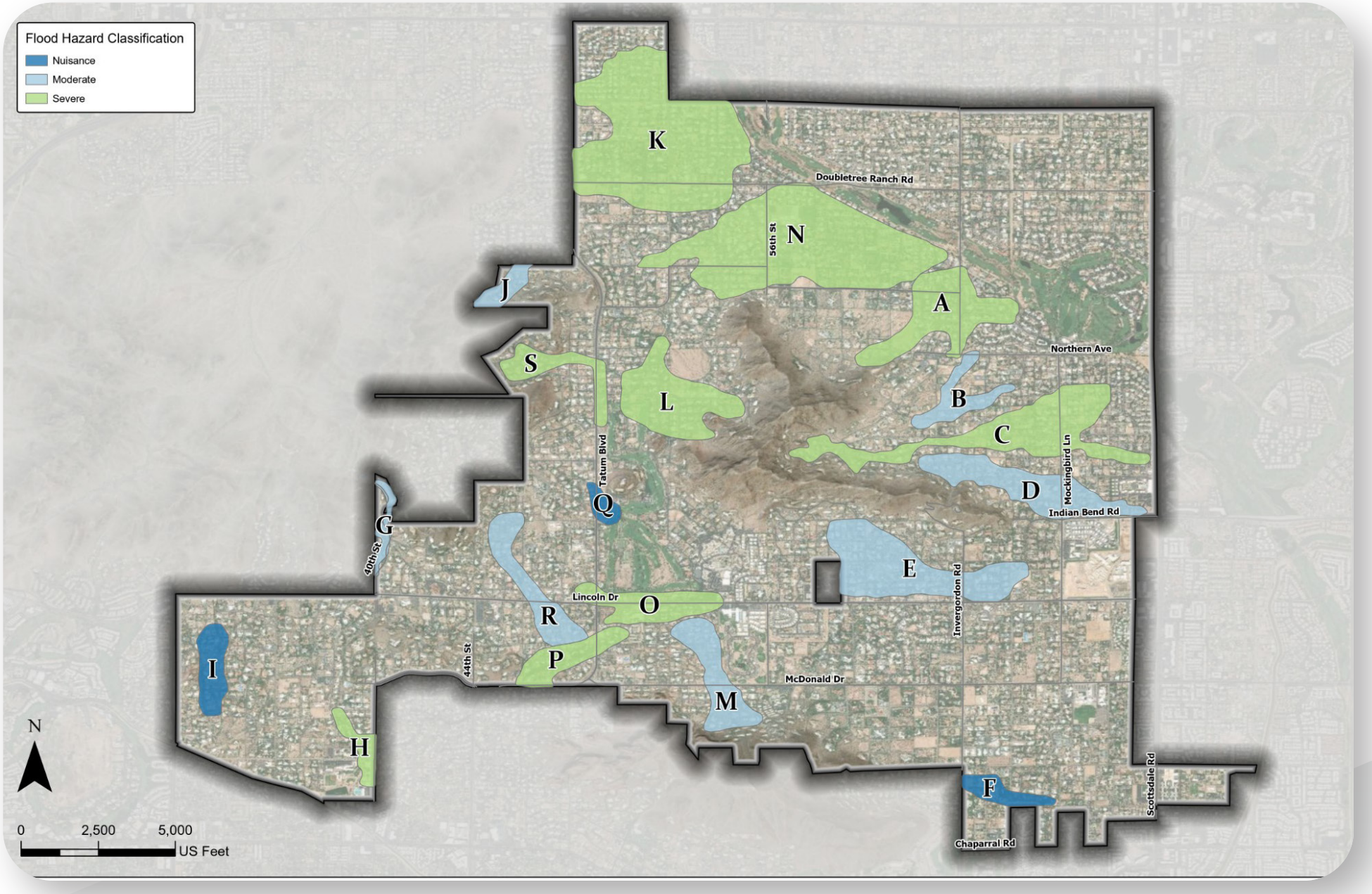

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SHEET 3 OF 3

VI. FLOOD HAZARD AREA CLASSIFICATION

Areas of significant flood potential have been identified in several past studies as outlined in the Data Collection section of this report. Utilizing the updated town-wide comprehensive FLO-2D results, these areas were reevaluated and refined, with new areas added as applicable. Areas were either revalidated or added to the list of 'Flood Hazard Areas' based on a combination of factors. Actual reported flooding by Town staff and residents was evaluated against the town-wide modeling results to identify areas with a common flooding source, or areas with clusters of complaints. These areas could allow for mitigation solutions that would benefit multiple structures or roadways at a neighborhood level. In addition, the results of the flood hazard analysis as outlined in the previous section were also used.

Nineteen areas were identified as having some level of flood potential. These areas were further classified based on the potential level of flooding as nuisance, moderate and severe flooding. Areas were classified as nuisance flooding if modeling results showed approximately 0.5' to 1' of water depth along roads and against structures. Moderate flooding was designated if the area showed approximately 1' to 2' of water depth along roads and against structures. Severe flooding was designated to areas with greater than 2' at road and structures. **Figure 7** shows the flood classifications of each of the flood hazard areas.

Figure 7: Classifications of Flood Hazard Areas



Flood hazard areas with moderate and severe classifications were ranked in a decision matrix based on five criteria, as outlined in **Table 6**. Classification of the severity of flooding and the potential number of structures that could be benefited in the area were the criteria that were given the greatest weight within the matrix with a weighted score of 5. Structures that could be benefitted were defined as any structure with adjacent flood depths of 0.5 feet. The number of streets inundated with at least 0.5 feet of depth was another variable considered in the matrix and was given a weighted score of 4. Impacts to emergency access and the potential for multi-use opportunities were considered in the matrix as well with priority scores of 3 and 1, respectively. The results of the area decision matrix and area data sheets are provided in **Appendix D.**

Table 7 includes the location, the severity designation, the number of buildings impacted, and potential impacts to emergency access for each flood hazard area. Of the 16 areas classified as having severe or moderate flood potential, the top 9 were selected to develop flood mitigation alternatives. The three areas classified as having nuisance flooding potential were not included in the ranking, but can be evaluated further by Town maintenance or engineering staff as annual maintenance budgets allow.

Table 6: Flood Hazard Area Prioritization Criteria

Criteria	Scoring Criteria		Weighted Score	Highest Possible Score	Lowest Highest Score
Severity of Flooding	1-	Nuisance	5	15	5
	2-	Medium			
	3-	Severe			
Potential Structures Protected	1-	1 to 30 Structures	5	15	5
	2-	31-50 Structures			
	3-	>51 Structures			
Potential Streets Protected	1-	Local Street Benefits Only	4	12	4
	2-	Arterial/Collector Street or Multiple Local Streets Benefits			
	3-	Multiple arterial/collector & Local Street Benefits			
Restriction to Emergency Access	0-	No Impact to Emergency Access	3	6	0
	2-	Impacts to Emergency Access			
Multi-Use Opportunities	1-	No Opportunities	1	2	1

Table 7: Flood Hazard Area Ranking and Characteristics

Flood Hazard Area	Matrix Score	Severity of Flooding	Structures with Adjacent Depths of at Least 0.5 ft	Streets Impacted by at Least 0.5 ft Depths	Potential Impact to Emergency Access
N	49	Severe	123	2 Collector; 8 Local	Yes
A	45	Severe	43	2 Collector; 6 Local	Yes
O	45	Severe	22	2 Collector; 4 Local	Yes
K	43	Severe	141	2 Collector; 13 Local	No
L	41	Severe	35	0 Collector; 5 Local	Yes
H	40	Severe	9	2 Collector; 2 Local	Yes
P	39	Severe	17	1 Collector; 2 Local	Yes
C	39	Moderate	70	1 Collector; 2 Local	No
E	38	Moderate	52	2 Collector; 5 Local	No
S	36	Severe	14	1 Collector; 1 Local	Yes
R	36	Severe	27	1 Collector; 5 Local	Yes
D	33	Severe	20	2 Collector; 1 Local	No
G	32	Severe	2	0 Collector; 2 Local	Yes
M	25	Moderate	19	1 Collector; 6 Local	No
B	25	Moderate	4	1 Collector; 2 Local	No
J	21	Moderate	8	0 Collector; 3 Local	No

Flood Mitigation Alternatives Developed

VII. PROPOSED PROJECT ALTERNATIVES

For the nine flood hazard areas that scored highest, proposed project alternatives were developed. Previously identified conceptual projects from past studies were first evaluated, as many of these fell within the nine flood hazard areas. These projects were either classified as maintenance projects, medium sized projects, or large projects based on estimated construction costs. Maintenance project costs were less than 250,000 USD and were not considered for the alternatives evaluation as they typically do not mitigate wider spread flooding. Projects with construction costs between 250,000 and 1.3 million USD were designated as medium sized as they are eligible for FCDMC's Small Project Assistance Program (SPAP) as a cost share opportunity. Large projects were designated as having construction costs that exceed 1.3 million USD and could qualify for other grant programs like FCDMC's Capital Improvement Project Partnership Program (CIPPP) or other grant opportunities through the Federal Emergency Management Agency (FEMA). Medium and/or large projects were proposed for each of the nine areas. These projects were either previously proposed, previously proposed and further refined, or developed specifically for this master plan. Two or three alternatives were developed in each area. A decision matrix was used to select a recommended alternative for each area. The project variables and their weighted score are shown in **Table 8**. See **Appendix E** for the project alternatives decision matrix for each flood hazard area. It should be noted that because of the direction that all improvements should be confined within existing Town right-of-way, most alternatives are variations of storm drain or culvert configurations. Because of this, cost became the overwhelming determining factor in the scoring matrix for determining the recommended alternative.

Pages 43-76 detail the flood mitigation alternatives developed for each of the nine flood hazard areas studied. Each area has a description of the alternatives developed, including the project sizes (medium or large), and which is the recommended alternative. Schematics of the project alternatives are also included.

Table 8: Project Prioritization Criteria

Criteria	Scoring Criteria	Weighted Score	Highest Possible Score	Lowest Possible Score
Potential Structures Protected	1- 1 to 30 Structures	5	15	5
	2- 31 to 50 Structures			
	3- > 51 structures			
Design & Construction Cost/Benefit	1- Most Expensive	5	10	5
	2- Least Expensive			
Potential Streets Protected	1- Local Street Benefit Only	4	12	4
	2- Arterial/Collector Street or Local Streets Benefit			
	3- Multiple Arterial/Collector Streets and Local Streets Benefit			
Green Storm Water Infrastructure	1- No Opportunities	1	2	1
	2- Some Opportunities			
Project Partnership	1- Grant Funding or Partnerships Likely	4	12	4
	2- Local Partnership/Grant Eligible			
	3- Local and Federal Partnerships/Grant Eligible			
Multi-Use Opportunities	1- No Opportunities	2	4	2
	2- Some Opportunities			
Operation and Maintenance Costs	1- Maintenance After Every Storm Event	3	6	3
	2- Maintenance at Standard Intervals			
Utility Constraints	1- Major Constraints	3	6	3
	2- Minor Constraints			

A. Flood Hazard Area A – Invergordon Road and Mockingbird Lane

Summary and Description

The source of flooding in this area is runoff from the north and east side of Mummy Mountain, including Maverick Wash and Ironwood Wash flowing northeast toward IBW. Insufficient drainage infrastructure results in road and property flooding. The major roads affected by runoff include Northern Avenue, Invergordon Road, Maverick Road, and El Maro Circle. Invergordon Road has the greatest level of flooding, due to additional flooding from Cherokee Wash. During the 100-year storm, a maximum water depth of 3.7 feet per modeling results from this study occurs on Invergordon Road. This poses risks to emergency vehicle access, passenger vehicles, and to the adjacent properties. Maverick Road also has flooding issues 0.5-1-foot water depths for the length of the street between 62nd Place and Invergordon Road. Several smaller washes flow through private property and across public roads with inadequate conveyance capacity. Several residents south of El Maro Circle and north of Maverick Road on the east side of Invergordon Road, residents have reported property flooding. Flooding in this area has been documented in the Cheney Watershed Hazards Identification Report and the Lower Indian Bend Wash Area Drainage Master Study/Plan (LIBW ADMS/P).

Alternative 1 (Large, Recommended)

The first proposed alternative for this area consists of the implementation of new storm drain. 60" RCP storm drain would begin north of the intersection of Invergordon Road and Northern Avenue and have an inlet to capture a portion of the flows from Ironwood Wash. The inlet would be located on the left side of Invergordon Road to alleviate the magnitude of flows through the culvert crossing the road. The storm drain would extend north towards Mockingbird Lane and would connect to the existing 12' by 3' RCBC currently being designed and constructed as part of the Mockingbird Lane project. A 48" RCP lateral would extend west at Maverick Road to capture flows from Maverick Wash. Inlets would be placed at the cul-de-sac to account for the concentrated discharge. The design and construction cost of Alternative 1 is estimated to be **4,145,670 USD**. See **Appendix E** for a detailed cost estimate of the project.

Table 9: Alternative 1 Opportunities and Constraints

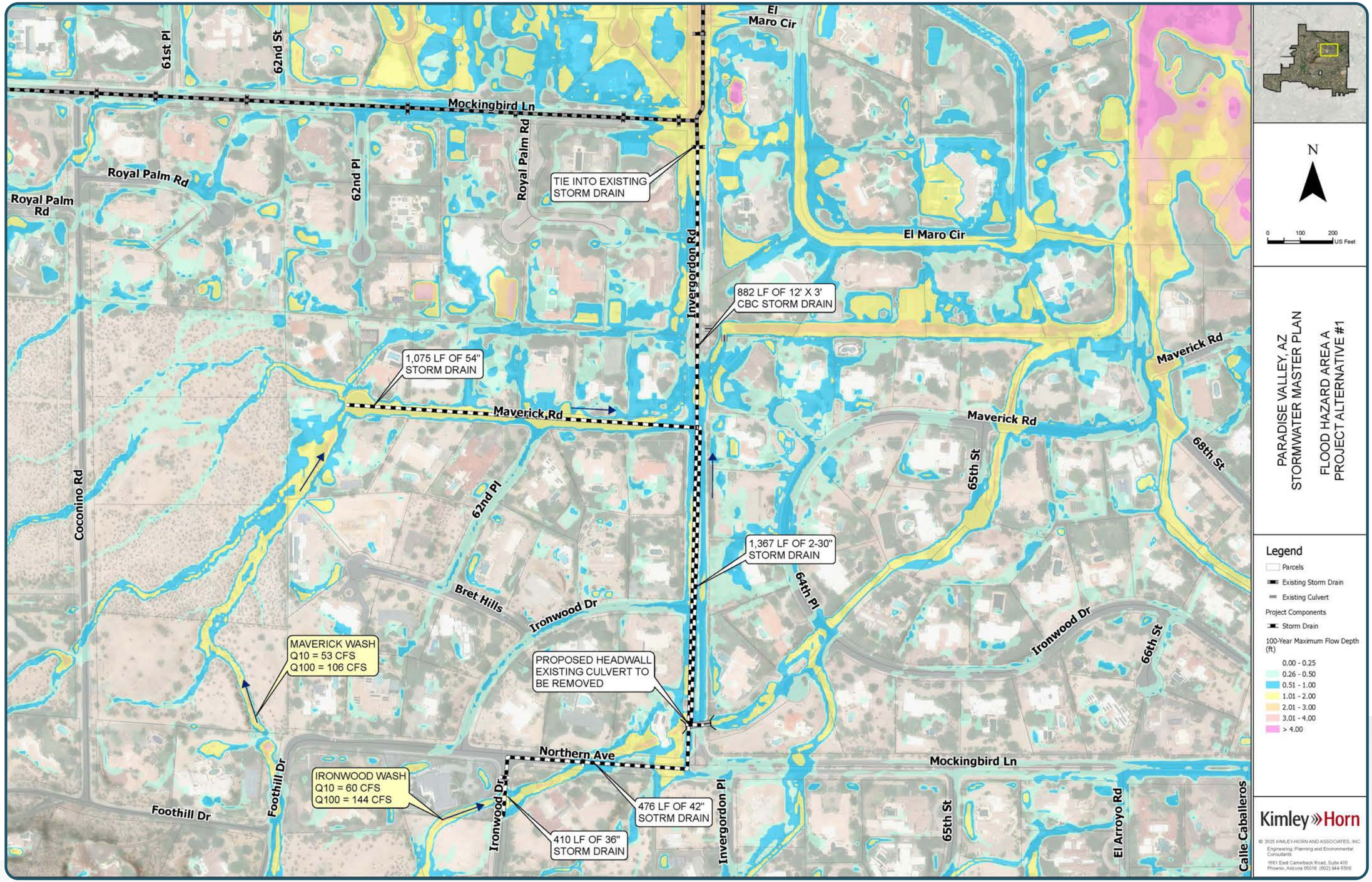
Alternative 1 Opportunities	Alternative 1 Constraints
Most Cost-effective alternative	Utility conflicts likely
Reduces discharge entering undersized existing channels that flow through private properties	Potential for sediment issues at Maverick Road that would require routine maintenance
Large area of flood mitigation	Major traffic disruptions to Invergordon Road

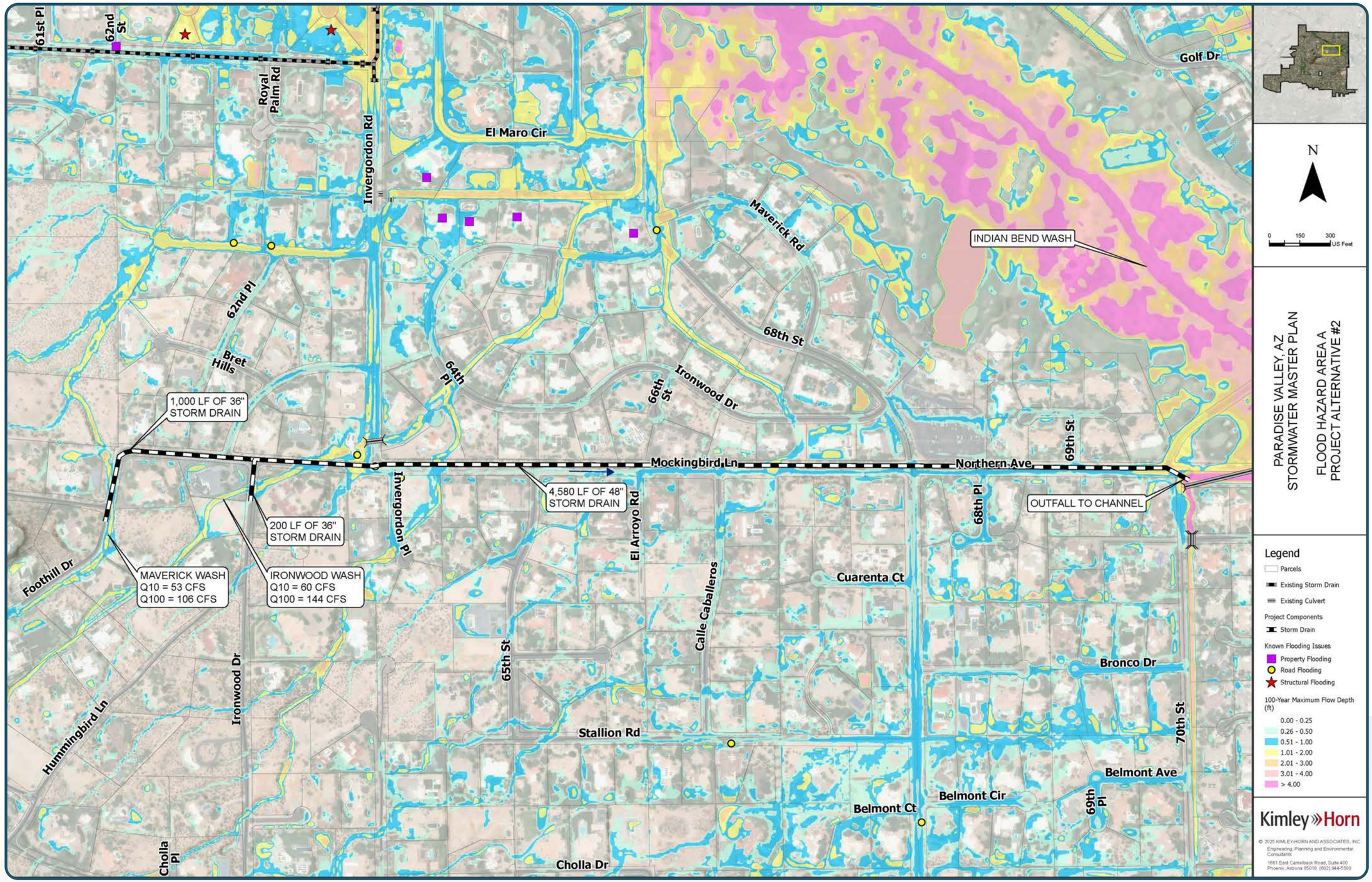
Alternative 2 (Large)

The second proposed alternative for Area A is also the implementation of new storm drain but in a different configuration. The proposed 48" RCP storm drain begins on Foothill Drive, where Maverick Wash overtops the road, and would continue north and turn east on Northern Avenue. Approximately two hundred feet of 48" RCP storm drain would be located on Ironwood Drive and would connect to the main line on Northern Avenue. This would intercept a portion of the discharge from Ironwood Wash. At Calle Caballeros, the storm drain would expand to 60" RCP and would continue east to outfall at the existing channel east of Golf Drive. The channel ultimately outfalls to IBW. The design and construction cost of Alternative 2 is estimated to be **7,083,913 USD**. See **Appendix E** for a detailed cost estimate of the project.

Table 10: Alternative 2 Opportunities and Constraints

Alternative 2 Opportunities	Alternative 2 Constraints
Captures flows from Ironwood Wash and Maverick Wash	Major traffic disruptions to Northern Avenue
Large area of flood mitigation	Utility conflicts likely
Reduce discharge entering undersized existing channels that flow through private property	More expensive alternative


61st Pl
62nd St
62nd Pl
Mockingbird Ln
Royal Palm Rd
Royal Palm Rd
Royal Palm Rd
El Maro Cir
El Maro Cir
Invergordon Rd
TIE INTO EXISTING STORM DRAIN
882 LF OF 12' X 3' CBC STORM DRAIN
1,075 LF OF 54" STORM DRAIN
Maverick Rd
Maverick Rd
Maverick Rd
65th St
68th St
Coconino Rd
62nd Pl
Bret Hills
Ironwood Dr
1,367 LF OF 2-30" STORM DRAIN
64th Pl
Ironwood Dr
66th St
MAVERICK WASH
Q10 = 53 CFS
Q100 = 106 CFS
PROPOSED HEADWALL
EXISTING CULVERT TO
BE REMOVED
Northern Ave
Mockingbird Ln
IRONWOOD WASH
Q10 = 60 CFS
Q100 = 144 CFS
Foothill Dr
Foothill Dr
Ironwood Dr
476 LF OF 42" SOTRM DRAIN
410 LF OF 36" STORM DRAIN
Invergordon Pl
65th St
El Arroyo Rd
Calle Caballeros
N
0 100 200 US Feet
PARADISE VALLEY, AZ
STORMWATER MASTER PLAN
FLOOD HAZARD AREA A
PROJECT ALTERNATIVE #1
Legend
Parcels
Existing Storm Drain
Existing Culvert
Project Components
Storm Drain
100-Year Maximum Flow Depth (ft)
0.00 - 0.25
0.26 - 0.50
0.51 - 1.00
1.01 - 2.00
2.01 - 3.00
3.01 - 4.00
> 4.00
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Phoenix, Arizona 85016 (602) 944-5500


61st Pl
62nd St
Royal Palm Rd
Invergordon Rd
El Maro Cir
Golf Dr
Maverick Rd
INDIAN BEND WASH
62nd Pl
Bret Hills
64th Pl
66th St
Ironwood Dr
68th St
69th St
1,000 LF OF 36" STORM DRAIN
Mockingbird Ln
Northern Ave
4,580 LF OF 48" STORM DRAIN
OUTFALL TO CHANNEL
200 LF OF 36" STORM DRAIN
Invergordon Pl
El Arroyo Rd
68th Pl
MAVERICK WASH
Q10 = 53 CFS
Q100 = 106 CFS
IRONWOOD WASH
Q10 = 60 CFS
Q100 = 144 CFS
Foothill Dr
Calle Caballeros
Cuarenta Ct
Ironwood Dr
65th St
Bronco Dr
70th St
Hummingbird Ln
Stallion Rd
Belmont Ave
Belmont Cir
Belmont Ct
69th Pl
Cholla Pl
Cholla Dr
N
0 150 300 US Feet
PARADISE VALLEY, AZ
STORMWATER MASTER PLAN
FLOOD HAZARD AREA A
PROJECT ALTERNATIVE #2
Legend
Parcels
Existing Storm Drain
Existing Culvert
Project Components
Storm Drain
Known Flooding Issues
Property Flooding
Road Flooding
Structural Flooding
100-Year Maximum Flow Depth (ft)
0.00 - 0.25
0.26 - 0.50
0.51 - 1.00
1.01 - 2.00
2.01 - 3.00
3.01 - 4.00
> 4.00
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B. Flood Hazard Area C – Cheney Wash

Summary and Description

The source of flooding in this area is Cheney Wash. Runoff from the east side of Mummy Mountain flows east and parallel to Cheney Drive. Once the wash reaches Invergordon Road, there is no infrastructure to convey the discharge to an outfall. The water fans out onto the street and the adjacent neighborhood properties until it reaches Indian Bend Wash (IBW). As the water crosses Cheney Drive, a maximum water depth of 1.4 ft occurs during the 100-year storm event per the FLO-2D modeling results from this study. Town residents and staff have reported flooding issues in this area. The Lower Indian Bend Wash Area Drainage Master Study/Plan (LIBW ADMS/P) and Cheney Watershed Hazards Identification Report have also identified flood hazards in this area.

Alternative 1 (Large)

The first alternative proposed for Area C consists of storm drain to route runoff from Cheney Wash to IBW. Runoff from Cheney Wash will be intercepted by a 60" storm drain routed from Invergordon Road to 68th Street. Large inlets are proposed at Invergordon Road, as this area contains the highest concentration of discharge. A sediment basin was initially recommended for this alternative, as it would facilitate controlled discharge release. However, large capacity inlets were selected because a sediment basin would require a significant acquisition of land. A 36" lateral of storm drain along 66th Street will connect from the north to the 60" storm drain trunkline along Cheney Drive. The storm drain size increases to 78" at the intersection of Cheney Drive and 68th Street and is routed north until it reaches Northern Avenue. East along Northern Avenue, a 72" storm drain will carry flows east towards 70th Street where it then outfalls into the existing channel running parallel to the IBW. A catch basin and bubble-up structure are proposed at the 70th Street discharge location to dissipate the high discharges in the shallow channel. The design and construction cost of Alternative 1 is estimated to be **14,251,950 USD**. See **Appendix E** for a detailed cost estimate of the project.

Table 11: Alternative 1 Opportunities and Constraints

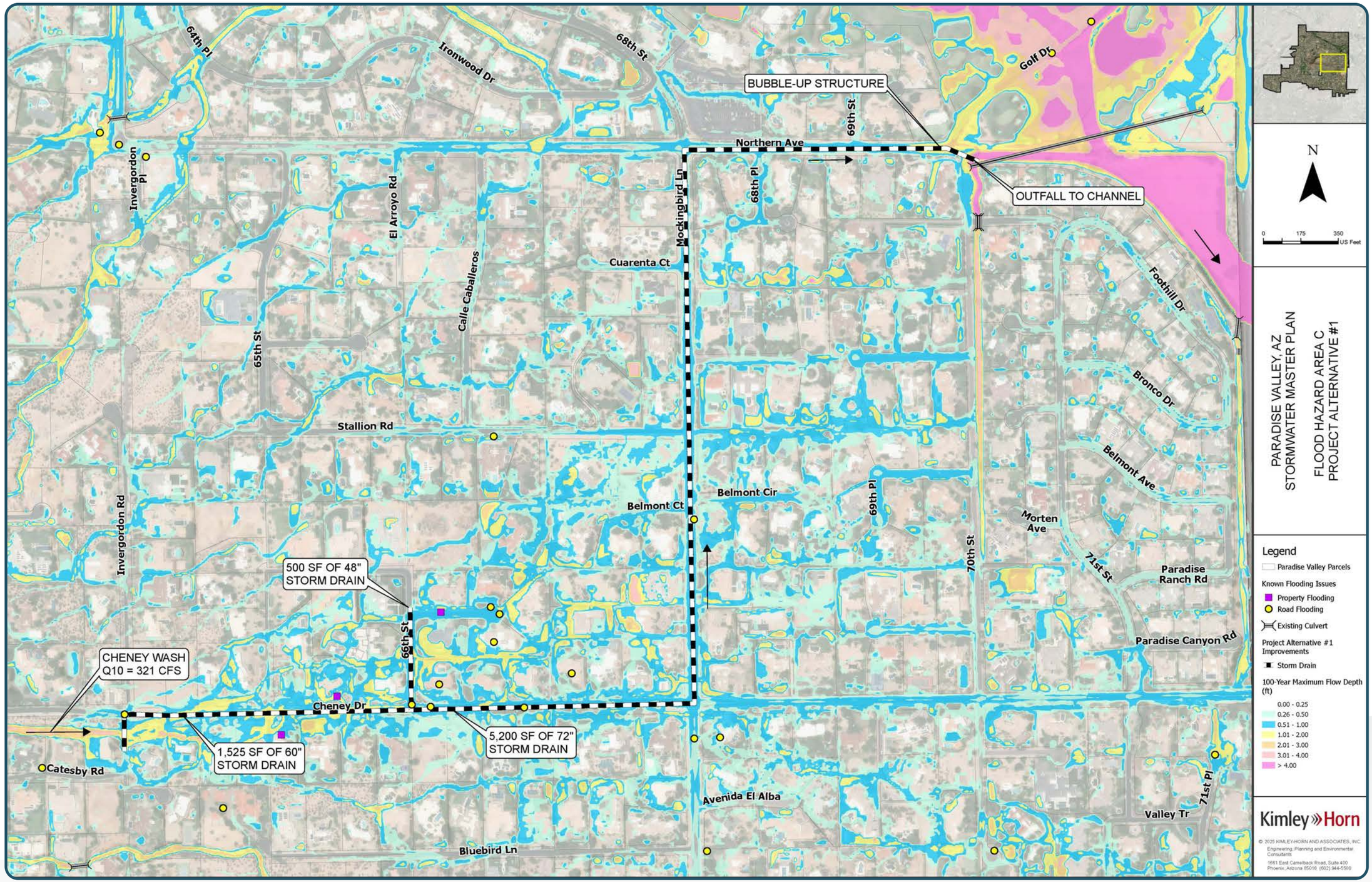
Alternative 1 Opportunities	Alternative 1 Constraints
No major land acquisition required	Utility conflicts likely
Intercepts additional flow on Northern Avenue	Cost exceeds 15 million USD
Improvements would benefit a large area of streets and structures	Potential for sediment issues at Invergordon Road that would require routine maintenance

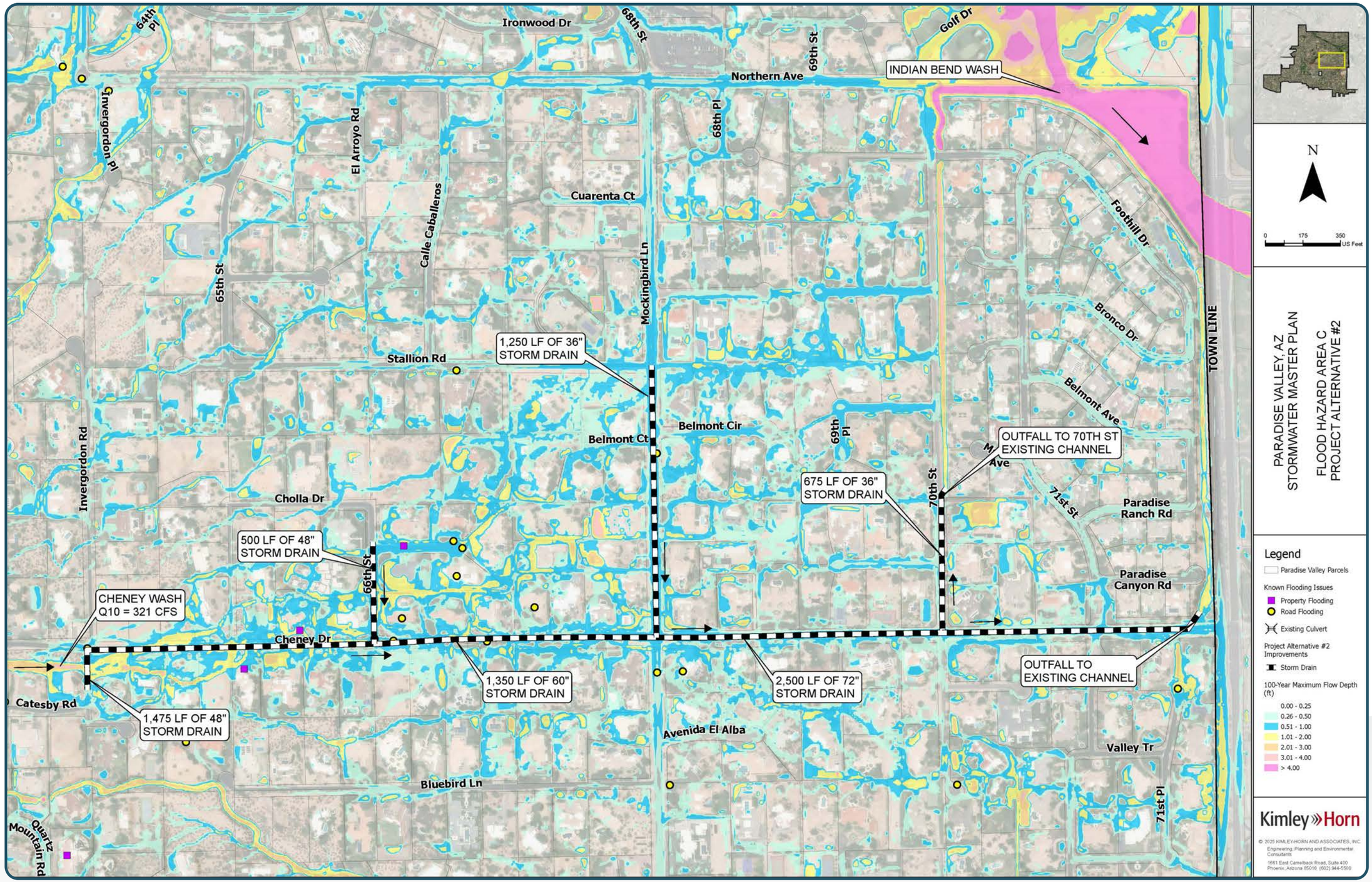
Alternative 2 (Large, Recommended)

The second alternative proposed for this area is similar to the first alternative. The 60" storm drain begins at the same location as Alternative 1, Cheney Drive, but extends past 70th Street to the existing channel west of Scottsdale Road. Along this section of storm drain there are two laterals. As in Alternative 1, a 36" lateral is located on 66th Street. On 68th Street, a 36" lateral also extends 1,250 feet to Stallion Road. At 70th Street, the storm drain on Cheney Drive splits off towards two outfalls. 72" storm drain is directed north on 70th Street where it outfalls into the existing channel on the east side of the road. That channel continues north, ultimately outfalling to Indian Bend Wash. The second outfall is located at the existing channel on the west side of Scottsdale Road. The design and construction cost of Alternative 2 is estimated to be **11,177,860 USD**. See **Appendix E** for a detailed cost estimate of the project.

Table 12: Alternative 2 Opportunities and Constraints

Alternative 2 Opportunities	Alternative 2 Constraints
Improvements would benefit a large area of streets and structures	Potential for sediment issues at Invergordon Road that would require routine maintenance
Most cost-effective alternative	Utility conflicts likely


64th Pl
Ironwood Dr
68th St
Golf Dr
BUBBLE-UP STRUCTURE
69th St
Northern Ave
Invergordon Pl
El Arroyo Rd
Calle Caballeros
Mockingbird Ln
68th Pl
OUTFALL TO CHANNEL
Cuarenta Ct
Foothill Dr
65th St
Bronco Dr
Stallion Rd
Belmont Ave
Belmont Cir
Belmont Ct
69th Pl
Morten Ave
70th St
71st St
Paradise Ranch Rd
Invergordon Rd
500 SF OF 48" STORM DRAIN
66th St
Paradise Canyon Rd
CHENEY WASH Q10 = 321 CFS
Cheney Dr
1,525 SF OF 60" STORM DRAIN
5,200 SF OF 72" STORM DRAIN
Catesby Rd
Avenida El Alba
71st Pl
Valley Tr
Bluebird Ln
N
0 175 350 US Feet
PARADISE VALLEY, AZ
STORMWATER MASTER PLAN
FLOOD HAZARD AREA C
PROJECT ALTERNATIVE #1
Legend
Paradise Valley Parcels
Known Flooding Issues
Property Flooding
Road Flooding
Existing Culvert
Project Alternative #1 Improvements
Storm Drain
100-Year Maximum Flow Depth (ft)
0.00 - 0.25
0.26 - 0.50
0.51 - 1.00
1.01 - 2.00
2.01 - 3.00
3.01 - 4.00
> 4.00
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Phoenix, Arizona 85016 (602) 944-5500


Ironwood Dr
64th Pl
68th St
69th St
Golf Dr
Northern Ave
INDIAN BEND WASH
Invergordon Pl
El Arroyo Rd
Calle Caballeros
68th Pl
Cuarenta Ct
65th St
Mockingbird Ln
Foothill Dr
Bronco Dr
TOWN LINE
1,250 LF OF 36" STORM DRAIN
Stallion Rd
Belmont Ave
Belmont Cir
Belmont Ct
69th Pl
OUTFALL TO 70TH ST EXISTING CHANNEL
Invergordon Rd
Cholla Dr
675 LF OF 36" STORM DRAIN
70th St
71st St
Paradise Ranch Rd
500 LF OF 48" STORM DRAIN
66th St
Paradise Canyon Rd
CHENEY WASH Q10 = 321 CFS
Cheney Dr
OUTFALL TO EXISTING CHANNEL
1,350 LF OF 60" STORM DRAIN
2,500 LF OF 72" STORM DRAIN
Catesby Rd
1,475 LF OF 48" STORM DRAIN
Avenida El Alba
Valley Tr
Bluebird Ln
71st Pl
Quartz Mountain Rd
N
0 175 350 US Feet
PARADISE VALLEY, AZ
STORMWATER MASTER PLAN
FLOOD HAZARD AREA C
PROJECT ALTERNATIVE #2
Legend
Paradise Valley Parcels
Known Flooding Issues
Property Flooding
Road Flooding
Existing Culvert
Project Alternative #2 Improvements
Storm Drain
100-Year Maximum Flow Depth (ft)
0.00 - 0.25
0.26 - 0.50
0.51 - 1.00
1.01 - 2.00
2.01 - 3.00
3.01 - 4.00
> 4.00
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C. Flood Hazard Area E – Lincoln Wash

Summary and Description

The source of flooding in this area is Lincoln Wash. The areas of interest are located north of Lincoln Drive, between 60th Street and Mockingbird Lane. The wash overtops several roads as flow moves towards Indian Bend Wash (IBW) to the east. Routine maintenance of these streets is required after major storm events. A maximum depth of 1.2 ft occurs at Invergordon Road during the 100-year storm event per FLO-2D model results from this study. The Lower Indian Bend Wash Area Drainage Master Study/Plan (LIBW ADMS/P) has also identified this area as a flooding issue.

Alternative 1 (Large)

The first alternative proposed for Area E consists of storm drain located from 60th Street to Mockingbird Lanew along Lincoln Drive. Lateral storm drains would be placed along roads north of Lincoln Drive to capture flow from Lincoln Wash. Three laterals extend north from Lincoln Drive at 60th Street, 61st Street, and Invergordon Road to intercept flows that overtop these roads. At the intersection of Lincoln Drive and Mockingbird Lane, a diversion structure splits the flow towards the two outfalls identified in this alternative. One outfall is located east of the diversion structure, where flow enters an existing 90" storm drain system along Scottsdale Road. A second outfall is located north of the diversion structure. Once the water level in the system reaches a certain height at the structure, flow will spill north to a storm drain system along Mockingbird Lane and towards the second outfall at the Ritz-Carlton Channel. The design and construction cost of Alternative 1 is estimated to be **14,912,386 USD**. See **Appendix E** for a detailed cost estimate of the project.

Table 14: Alternative 1 Opportunities and Constraints

Alternative 1 Opportunities	Alternative 1 Constraints
Partially in Scottsdale boundaries	Utility conflicts likely
Improvements would benefit a large area of streets and structures	Cost exceeds 14 million USD
	Least cost-effective alternative

Alternative 2 (Large)

The second alternative proposed for Area E is similar to Alternative 1. The storm drain along Lincoln Drive would have the same configuration as in Alternative 1 but would differ at the intersection of Mockingbird Lane and Lincoln Drive. In this alternative, storm drain will not turn north along Mockingbird Lane to outfall towards the Ritz-Carlton Channel. Rather, the storm drain turns north along Casa Blanca Drive to outfall into the Ritz-Carlton Channel parallel to Ocotillo Road. This alternative does not call for a diversion structure, and all flow would be routed along Casa Blanca Drive via storm drain to the Channel. The design and construction cost of Alternative 2 is estimated to be **9,523,912 USD**. See **Appendix E** for a detailed cost estimate of the project.

Table 15: Alternative 2 Opportunities and Constraints

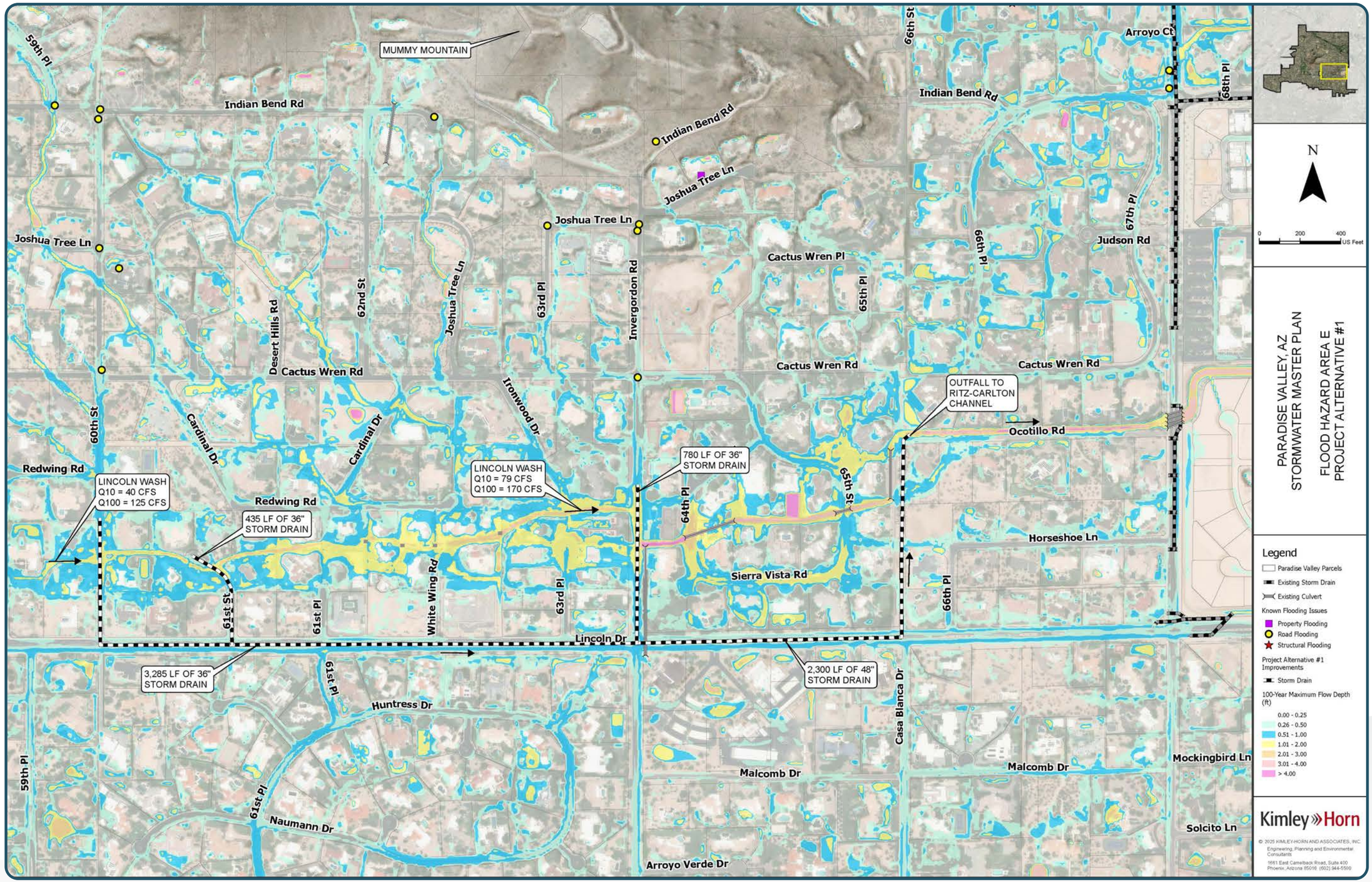
Alternative 2 Opportunities	Alternative 2 Constraints
Improvements would benefit a large area of streets and structures	Cost analysis exceeds 9 million USD
Fully within the Town's boundaries as compared to Alternative 1	Utility conflicts likely
More cost-effective alternative compared to Alternative 1	

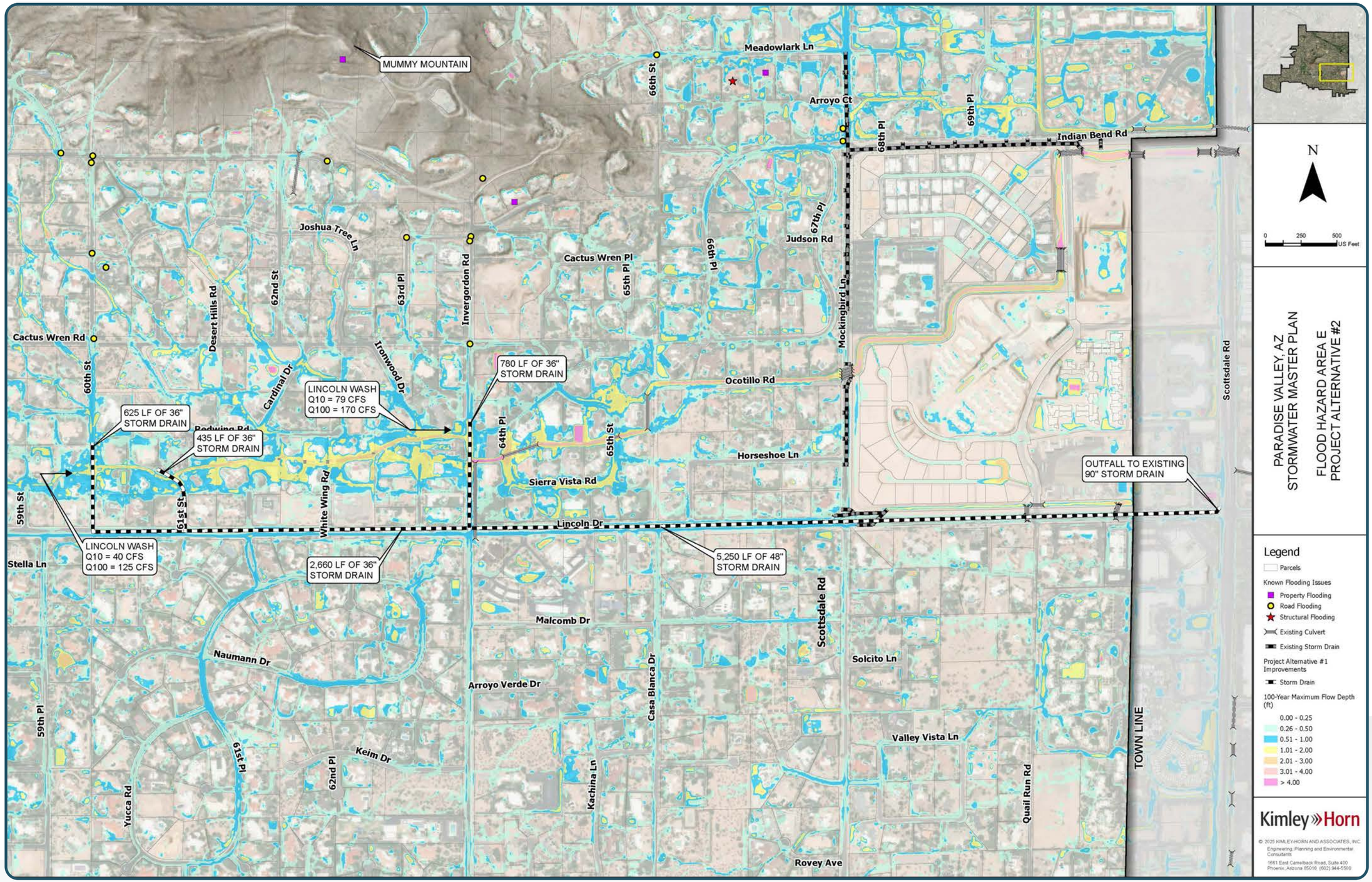
Alternative 3 (Medium/Large, Recommended)

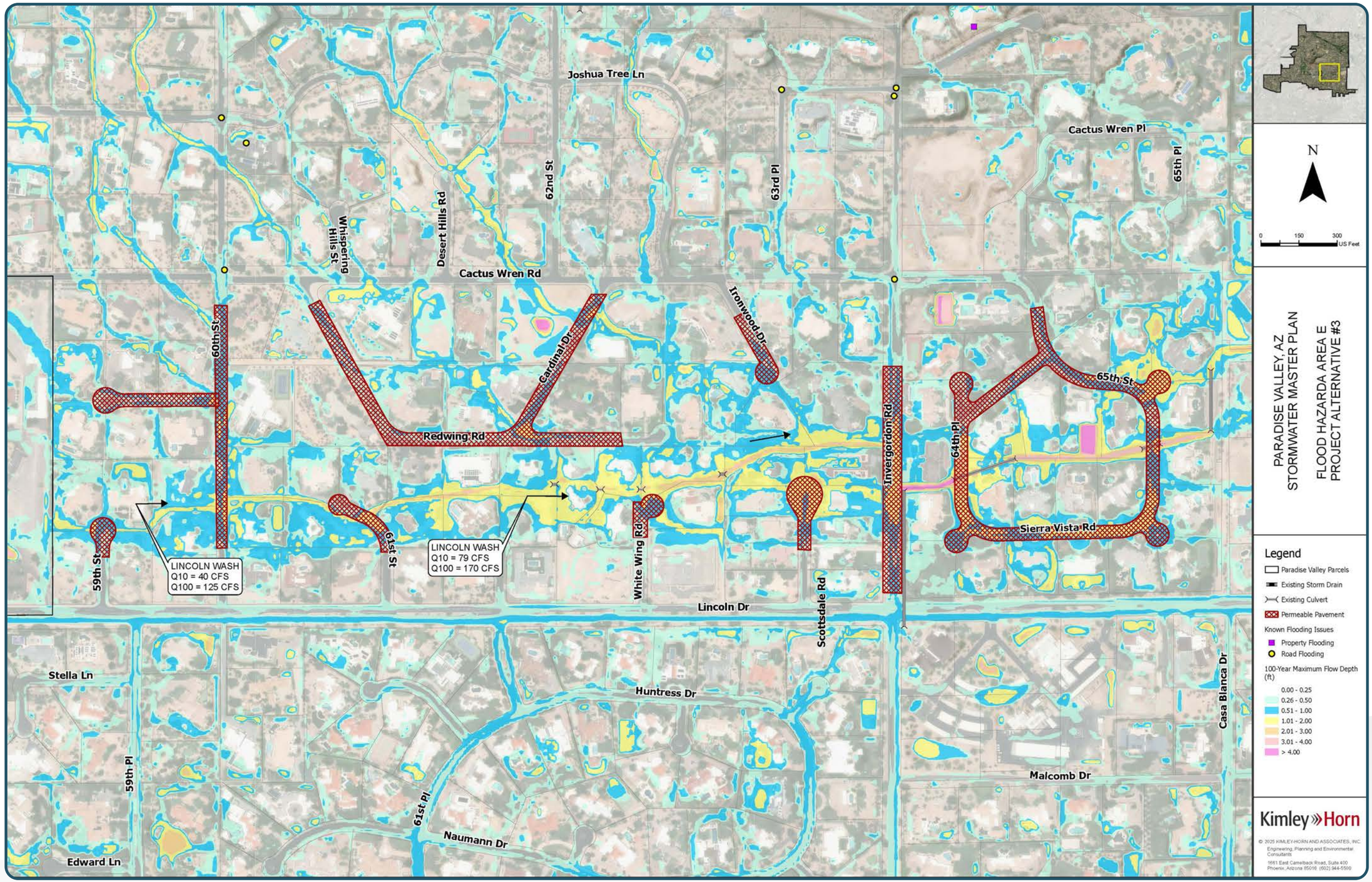
The third alternative proposed for Area E is different from Alternatives 1 & 2, because it focuses on utilizing Green Stormwater Infrastructure (GSI) rather than storm drain. North of Lincoln Drive, all sections of neighborhood pavement that are inundated by at least half a foot of water in the 100-year storm event would be replaced with permeable pavement. Therefore, as the wash overtops roads, water will naturally seep into the pavement, reducing the volume of runoff. Periodic vacuum sweep maintenance is necessary to improve infiltration rates, although less maintenance is required for cracks and potholes in comparison to traditional pavements (NPDES, 2021). The lifespan of permeable pavement is on par with that of traditional pavements and can serve as a durable, low-maintenance alternative to conventional impermeable pavements. The design and construction cost of Alternative 2 is estimated to be **1,358,798 USD**. See **Appendix E** for a detailed cost estimate of the project.

Table 16: Alternative 3 Opportunities and Constraints

Alternative 3 Opportunities	Alternative 3 Constraints
Improvements would benefit a large area of streets and structures	May not be as effective
Most cost-effective alternative	Requires specialized maintenance
Utilizes GSI	


MUMMY MOUNTAIN
59th Pl
Indian Bend Rd
Joshua Tree Ln
Desert Hills Rd
62nd St
Cactus Wren Rd
Joshua Tree Ln
63rd Pl
Invergordon Rd
Cactus Wren Pl
65th Pl
66th St
66th Pl
67th Pl
Judson Rd
Arroyo Ct
68th Pl
Ironwood Dr
Cardinal Dr
60th St
Redwing Rd
LINCOLN WASH
Q10 = 40 CFS
Q100 = 125 CFS
435 LF OF 36"
STORM DRAIN
LINCOLN WASH
Q10 = 79 CFS
Q100 = 170 CFS
780 LF OF 36"
STORM DRAIN
OUTFALL TO
RITZ-CARLTON
CHANNEL
Ocotillo Rd
64th Pl
65th St
Horseshoe Ln
Sierra Vista Rd
61st St
61st Pl
White Wing Rd
63rd Pl
Lincoln Dr
3,285 LF OF 36"
STORM DRAIN
2,300 LF OF 48"
STORM DRAIN
Huntress Dr
Naumann Dr
Casa Blanca Dr
Malcomb Dr
Mockingbird Ln
Solcito Ln
Arroyo Verde Dr
N
0 200 400 US Feet
PARADISE VALLEY, AZ
STORMWATER MASTER PLAN
FLOOD HAZARD AREA E
PROJECT ALTERNATIVE #1
Legend
Paradise Valley Parcels
Existing Storm Drain
Existing Culvert
Known Flooding Issues
Property Flooding
Road Flooding
Structural Flooding
Project Alternative #1 Improvements
Storm Drain
100-Year Maximum Flow Depth (ft)
0.00 - 0.25
0.26 - 0.50
0.51 - 1.00
1.01 - 2.00
2.01 - 3.00
3.01 - 4.00
> 4.00
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MUMMY MOUNTAIN
Meadowlark Ln
66th St
Arroyo Ct
68th Pl
69th Pl
Indian Bend Rd
Joshua Tree Ln
Cactus Wren Pl
65th Pl
66th Pl
67th Pl
Judson Rd
Mockingbird Ln
Scottsdale Rd
Cactus Wren Rd
60th St
Desert Hills Rd
62nd St
63rd Pl
Invergordon Rd
Ironwood Dr
Cardinal Dr
780 LF OF 36" STORM DRAIN
LINCOLN WASH Q10 = 79 CFS Q100 = 170 CFS
Ocotillo Rd
625 LF OF 36" STORM DRAIN
Redwing Rd
435 LF OF 36" STORM DRAIN
64th Pl
65th St
Horseshoe Ln
Sierra Vista Rd
OUTFALL TO EXISTING 90" STORM DRAIN
59th St
61st St
White Wing Rd
Lincoln Dr
LINCOLN WASH Q10 = 40 CFS Q100 = 125 CFS
2,660 LF OF 36" STORM DRAIN
5,250 LF OF 48" STORM DRAIN
Stella Ln
Malcomb Dr
Naumann Dr
Arroyo Verde Dr
Casa Blanca Dr
Solcito Ln
Valley Vista Ln
59th Pl
61st Pl
62nd Pl
Keim Dr
Yucca Rd
Kachina Ln
Quail Run Rd
TOWN LINE
Rovey Ave
N
0 250 500 US Feet
PARADISE VALLEY, AZ
STORMWATER MASTER PLAN
FLOOD HAZARD AREA E
PROJECT ALTERNATIVE #2
Legend
Parcels
Known Flooding Issues
Property Flooding
Road Flooding
Structural Flooding
Existing Culvert
Existing Storm Drain
Project Alternative #1 Improvements
Storm Drain
100-Year Maximum Flow Depth (ft)
0.00 - 0.25
0.26 - 0.50
0.51 - 1.00
1.01 - 2.00
2.01 - 3.00
3.01 - 4.00
> 4.00
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Joshua Tree Ln
Cactus Wren Pl
65th Pl
62nd St
63rd Pl
Desert Hills Rd
Whispering Hills St
Cactus Wren Rd
60th St
Cardinal Dr
Ironwood Dr
65th St
Redwing Rd
Invergordon Rd
64th Pl
Sierra Vista Rd
LINCOLN WASH
Q10 = 40 CFS
Q100 = 125 CFS
61st St
LINCOLN WASH
Q10 = 79 CFS
Q100 = 170 CFS
White Wing Rd
Lincoln Dr
Scottsdale Rd
59th St
Stella Ln
Huntress Dr
Casa Blanca Dr
59th Pl
61st Pl
Malcomb Dr
Naumann Dr
Edward Ln
N
0
150
300
US Feet
PARADISE VALLEY, AZ
STORMWATER MASTER PLAN
FLOOD HAZARDA AREA E
PROJECT ALTERNATIVE #3
Legend
Paradise Valley Parcels
Existing Storm Drain
Existing Culvert
Permeable Pavement
Known Flooding Issues
Property Flooding
Road Flooding
100-Year Maximum Flow Depth (ft)
0.00 - 0.25
0.26 - 0.50
0.51 - 1.00
1.01 - 2.00
2.01 - 3.00
3.01 - 4.00
> 4.00
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D. Flood Hazard Area H – 40th Street and Stanford Drive

Summary Description

The source of flooding in this area is Cudia City Wash (CCW). The existing low water crossing at 40th Street is consistently inundated during storm events, with a maximum depth of approximately 5 ft during the 100-year storm event. The roadway flooding leads to road closures that significantly disrupt traffic and impact emergency vehicle access. The crossing poses a hazard to passenger vehicles with at least one vehicle having been swept off the road and into the bollards downstream of 40th Street in a past storm event. The bollards on the downstream side of the crossing build up significant debris after storms and require routine maintenance. The existing curb inlet at Stanford Drive is also a flooding issue. The capacity of the inlet is limited and leads to ponding on the road. Town residents and staff have reported flooding issues in this area. The CCW Area Drainage Master Study/Plan (ADMS/P) and the CCW Design Concept Report (DCR) have also documented this flood hazard. Alternatives 2 and 3 have been studied in detail and proposed as part of the CCW DCR.

Alternative 1 (Medium)

The first project alternative consists of improvements to existing roadway drainage infrastructure. The existing combination curb and grate inlet at Stanford Drive lacks the capacity required to alleviate roadway ponding. This alternative proposes removing this inlet and replacing the outlet with a 36" pipe to allow for larger draining capacity. The existing inlet is a combination curb opening and grate type and sediment often clogs the opening of the grate. It is recommended that the grate inlet be replaced with a larger curb and gutter type inlet. Bollards at the 40th Street crossing would be removed and replaced with safety rails that will continue to prevent cars from entering the wash, while allowing sediment and debris to pass. The implementation of a safety rail will reduce the need for maintenance after storms. For public safety, it is also recommended that a "Do Not Enter When Flooded" warning sign be placed on the north side of the wash, as there is currently only a sign on the south side of the wash. A staff gage is proposed to be placed along the wash to further discourage passenger vehicles and pedestrians from attempting to cross during storms. The design and construction cost of Alternative 1 is estimated to be 68,232 USD. See **Appendix E** for a detailed cost estimate of the project.

Table 17: Alternative 1 Opportunities and Constraints

Alternative 1 Opportunities	Alternative 1 Constraints
Improves existing roadway drainage infrastructure	The level of flood mitigation is limited in comparison to Alternative 2 &3
Improvements would reduce sedimentation on 40th Street	
Least expensive alternative	

Alternative 2 (Medium, Recommended)

This project alternative involves modifying the curb inlet at Stanford Drive, improving the inlet capacity for the culvert crossing under Stanford Drive, and installing a flood control basin on the corner of Stanford Drive and 40th Street. Alternative 2 consists of all items proposed in Alternative 1 including warning signs and safety railing on 40th Street, as well as inlet modifications on Stanford Drive. In tandem with the aforementioned improvements, an offline flood control basin on the northwest corner of Standard Drive and 40th Street is also proposed. A diversion weir is proposed to facilitate overtopping into the basin once water surface elevations exceed a desired height. A 48" drain pipe on the southeast corner of the basin will release stormwater back into Cudia City Wash north of Stanford Drive. The FCDMC owns this parcel of land, so land acquisition would not be required. The design and construction cost of Alternative 2 is estimated to be 880,650 USD. See **Appendix E** for a detailed cost estimate of the project.

Table 18: Alternative 2 Opportunities and Constraints

Alternative 2 Opportunities	Alternative 2 Constraints
Improvements would improve flood conditions for Stanford Drive and 40th Street	Maintenance of the flood control basin may be required after every major storm event
Basin area owned by FCDMC	
This alternative may qualify for the Small Project Assistance Program (SPAP) grant	

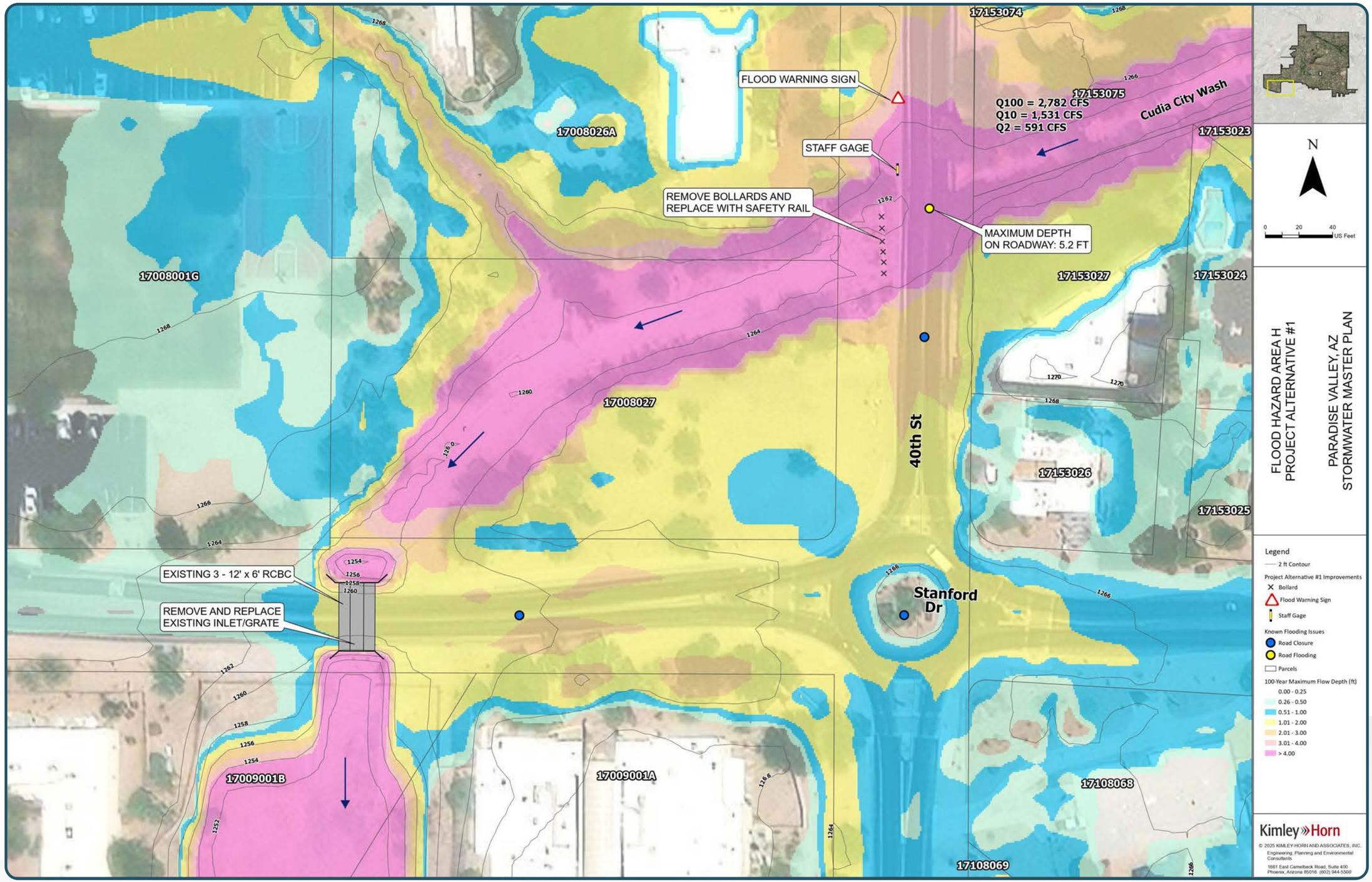
Alternative 3 (Large)

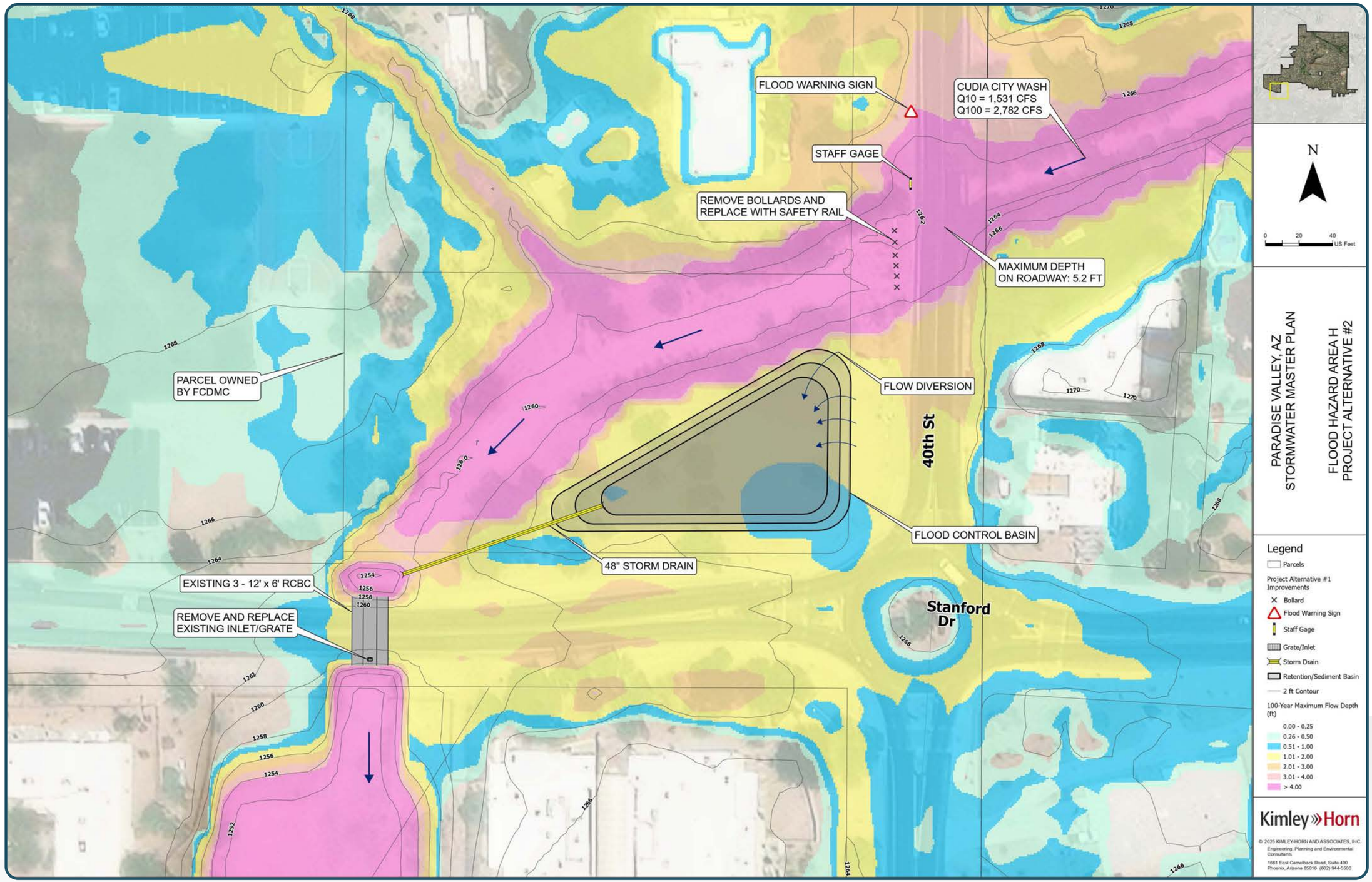
Alternative 3 proposes the replacement of the low water crossing at 40th Street with a concrete box culvert to convey Cudia City Wash under the road. Analysis

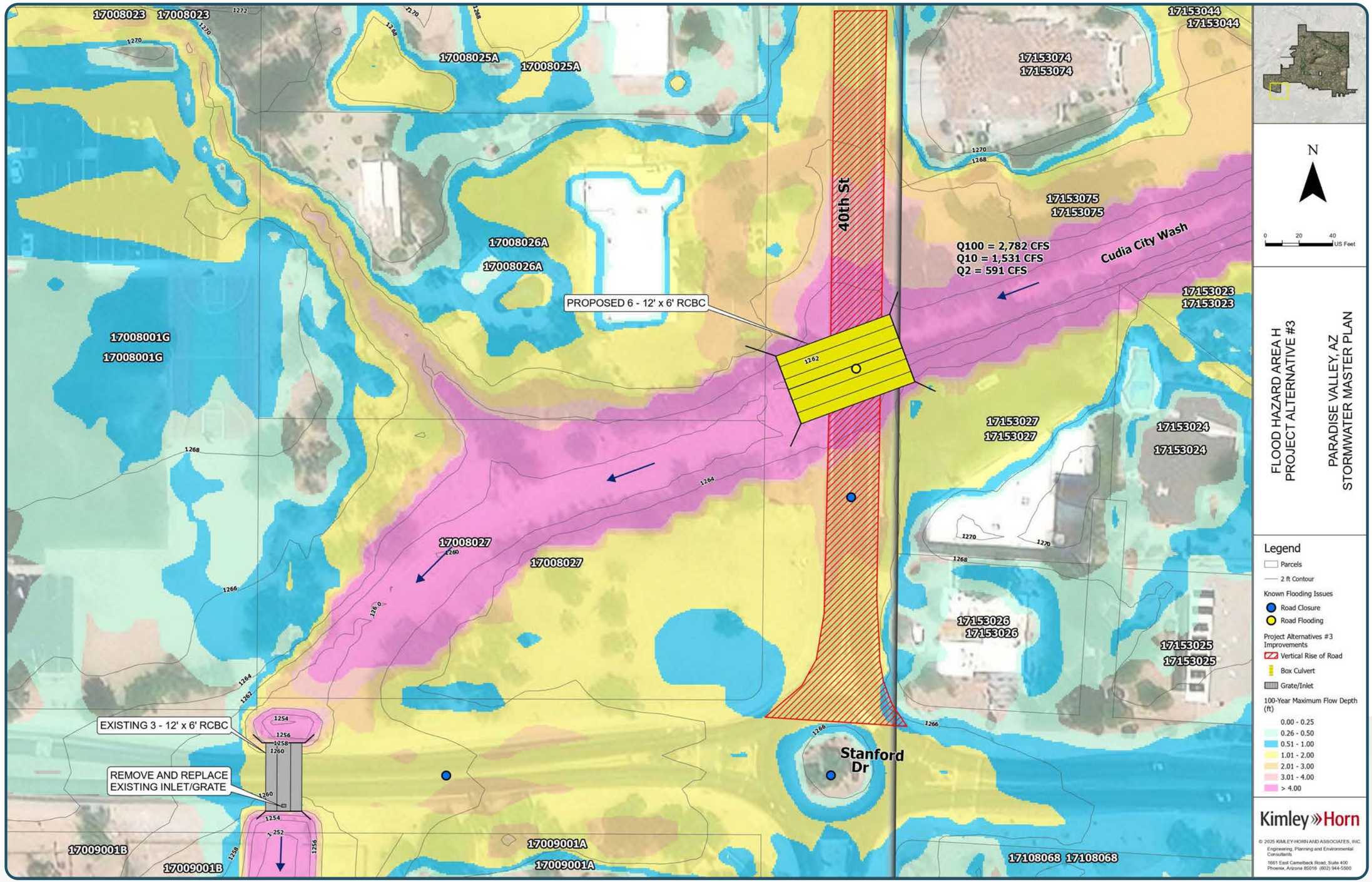
cited in the CCW DCR determined the optimal culvert configuration under 40th Street to be a six barrel 12' x 4' reinforced concrete box culvert. This configuration is wider than the channel bottom and would only partially convey the 100-year storm discharge. This culvert design would effectively convey the 25-year storm. The City of Phoenix's drainage standards require box culverts to have a height of 6 feet due to maintenance considerations. A six barrel 12' x 6' configuration would be required, with two feet of the barrels being buried below the channel invert. Roadwork at 40th Street would be required for this configuration to raise the road. This alternative also proposes modifying the inlet on Stanford Drive (as in Alternative 1) to reduce roadway flooding. The design and construction cost of Alternative 3 is estimated to be 2,240,419 USD. See **Appendix E** for a detailed cost estimate of the project.

Table 19: Alternative 3 Opportunities and Constraints

Alternative 3 Opportunities	Alternative 3 Constraints
Improvements would improve flood conditions for Standford Drive and 40th Street	The culvert can only convey the 25-year storm event and Stanford Drive flooding may still occur
40th Street would no longer need to be closed during storm events	Backwater effects would cause a rise in water surface elevation for the 100-year storm event upstream and east of 40th Street


FLOOD WARNING SIGN
STAFF GAGE
REMOVE BOLLARDS AND REPLACE WITH SAFETY RAIL
MAXIMUM DEPTH ON ROADWAY: 5.2 FT
Q100 = 2,782 CFS
Q10 = 1,531 CFS
Q2 = 591 CFS
Cudia City Wash
EXISTING 3 - 12' x 6' RCBC
REMOVE AND REPLACE EXISTING INLET/GRATE
40th St
Stanford Dr
17153074
17153075
17153023
17153027
17153024
17153026
17153025
17008026A
17008001G
17008027
17009001B
17009001A
17108068
17108069
N
0 20 40 US Feet
FLOOD HAZARD AREA H
PROJECT ALTERNATIVE #1
PARADISE VALLEY, AZ
STORMWATER MASTER PLAN
Legend
2 ft Contour
Project Alternative #1 Improvements
Bollard
Flood Warning Sign
Staff Gage
Known Flooding Issues
Road Closure
Road Flooding
Parcels
100-Year Maximum Flow Depth (ft)
0.00 - 0.25
0.26 - 0.50
0.51 - 1.00
1.01 - 2.00
2.01 - 3.00
3.01 - 4.00
> 4.00
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FLOOD WARNING SIGN
CUDIA CITY WASH
Q10 = 1,531 CFS
Q100 = 2,782 CFS
STAFF GAGE
REMOVE BOLLARDS AND
REPLACE WITH SAFETY RAIL
MAXIMUM DEPTH
ON ROADWAY: 5.2 FT
PARCEL OWNED
BY FCDMC
FLOW DIVERSION
40th St
FLOOD CONTROL BASIN
48" STORM DRAIN
EXISTING 3 - 12' x 6' RCBC
REMOVE AND REPLACE
EXISTING INLET/GRATE
Stanford
Dr
N
0 20 40
US Feet
PARADISE VALLEY, AZ
STORMWATER MASTER PLAN
FLOOD HAZARD AREA H
PROJECT ALTERNATIVE #2
Legend
Parcels
Project Alternative #1
Improvements
Bollard
Flood Warning Sign
Staff Gage
Grate/Inlet
Storm Drain
Retention/Sediment Basin
2 ft Contour
100-Year Maximum Flow Depth
(ft)
0.00 - 0.25
0.26 - 0.50
0.51 - 1.00
1.01 - 2.00
2.01 - 3.00
3.01 - 4.00
> 4.00
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17008023
17008023
17008025A
17008025A
17008026A
17008026A
17008001G
17008001G
17008027
17008027
17009001B
17009001B
17009001A
17009001A
17153044
17153044
17153074
17153074
17153075
17153075
17153023
17153023
17153027
17153027
17153024
17153024
17153026
17153026
17153025
17153025
17108068
17108068
40th St
PROPOSED 6 - 12' x 6' RCBC
EXISTING 3 - 12' x 6' RCBC
REMOVE AND REPLACE EXISTING INLET/GRATE
Q100 = 2,782 CFS
Q10 = 1,531 CFS
Q2 = 591 CFS
Cudia City Wash
Stanford Dr
N
0 20 40 US Feet
FLOOD HAZARD AREA H
PROJECT ALTERNATIVE #3
PARADISE VALLEY, AZ
STORMWATER MASTER PLAN
Legend
Parcels
2 ft Contour
Known Flooding Issues
Road Closure
Road Flooding
Project Alternatives #3 Improvements
Vertical Rise of Road
Box Culvert
Grate/Inlet
100-Year Maximum Flow Depth (ft)
0.00 - 0.25
0.26 - 0.50
0.51 - 1.00
1.01 - 2.00
2.01 - 3.00
3.01 - 4.00
> 4.00
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E. Flood Hazard Area K – Mountain View Road

Summary and Description

The source of flooding in this area is runoff from the east side of the Phoenix Mountain Preserve. Runoff flows east past Tatum Boulevard and breaks out into the neighborhood on the east side of Tatum Boulevard, resulting in flood hazards to roads and private parcels. This occurs both at Mountain View Road and Doubletree Ranch Road. Existing storm drain along Doubletree Ranch Road mitigates flooding, while Mountain View Road lacks the required infrastructure to alleviate flooding issues. In particular, Turquoise Avenue is subject to water depths of up to 2.4 feet during the 100-year storm per FLO-2D modeling results from this study, posing a potential hazard to passenger vehicles and residents. The area has been identified by Town staff and residents as a flood hazard to the road, property, and homes.

Alternative 1 (Large)

Alternative 1 consists of the construction of a storm drain system to reduce flooding on local and collector roads. The storm drain begins on Tatum Blvd and is routed east on Mountain View Road to ultimately outfall to IBW. Additional laterals would extend north along 50th Street and 51st Place, and south along 53rd Place. The likely storm drain sizes would be 36", 48", and 60" RCP, increasing progressively in size. The design and construction cost of Alternative 1 is estimated to be **7,472,758 USD**. See **Appendix E** for a detailed cost estimate of the project.

Table 20: Alternative 1 Opportunities and Constraints

Alternative 1 Opportunities	Alternative 1 Constraints
Large area of flood mitigation	Utility conflicts likely
Improvements reduce flood hazards to roads and passenger vehicles	More expensive alternative
	Major traffic disruptions to Tatum Boulevard and Mountain View Road

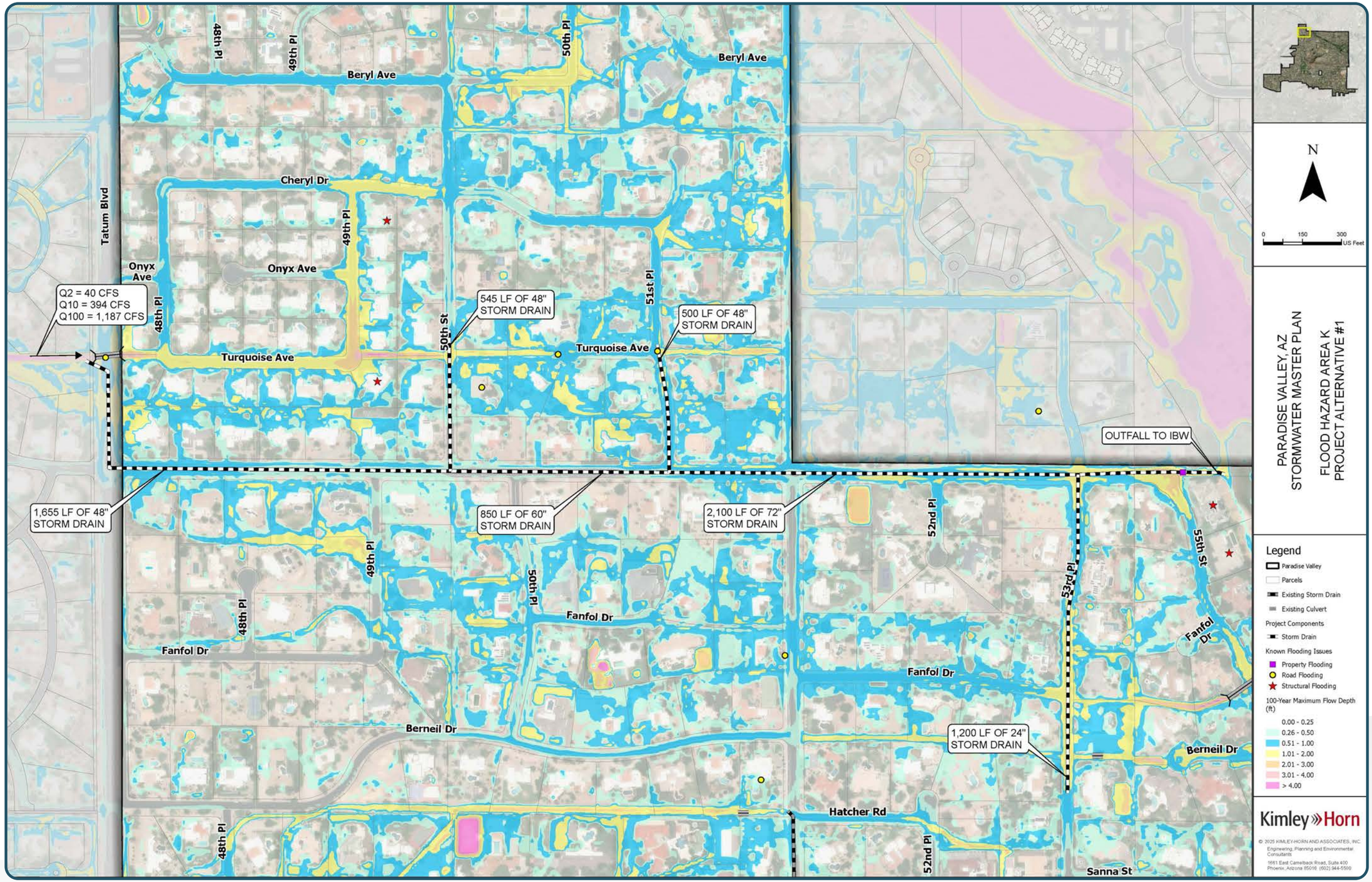
Alternative 2 (Large, Recommended)

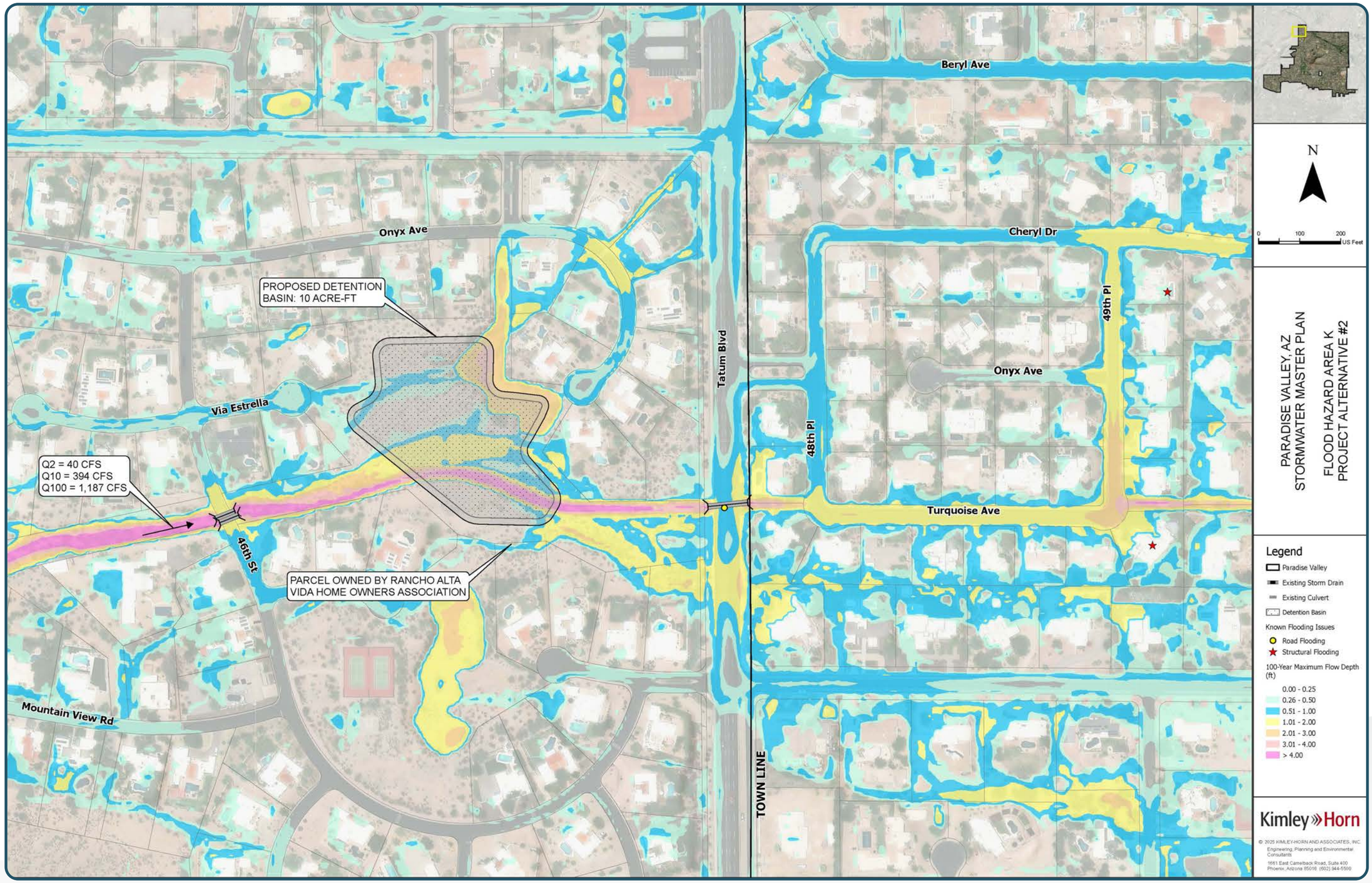
The second proposed alternative for Area K is the implementation of a detention or retention basin prior to the channel breakout on the upstream side of Tatum Boulevard. The basin is proposed on parcel 168-15-128 and is owned by Rancho Alta Vida Homeowners Association. This parcel is upstream of the channel breakout on Tatum Boulevard and would assist in reducing discharge through the existing culvert on Tatum Boulevard. The design and construction cost of Alternative 2 is estimated to be **2,192,073 USD**. See **Appendix E** for a detailed cost estimate of the project.

Table 21: Alternative 2 Opportunities and Constraints

Alternative 2 Opportunities	Alternative 2 Constraints
Most cost-effective alternative	Requires easement from the homeowner's association
Reduces discharge at Tatum Boulevard	Outside of Paradise Valley boundaries

*The recommended alternative may not be feasible due to the property constraints. It is recommended because of effectiveness and cost. Further evaluation may be required before advancing to a design concept or design phase.


48th Pl
49th Pl
Beryl Ave
50th Pl
Beryl Ave
Cheryl Dr
Tatum Blvd
Onyx Ave
Onyx Ave
49th Pl
48th Pl
Q2 = 40 CFS
Q10 = 394 CFS
Q100 = 1,187 CFS
50th St
545 LF OF 48" STORM DRAIN
51st Pl
500 LF OF 48" STORM DRAIN
Turquoise Ave
Turquoise Ave
OUTFALL TO IBW
1,655 LF OF 48" STORM DRAIN
850 LF OF 60" STORM DRAIN
2,100 LF OF 72" STORM DRAIN
49th Pl
50th Pl
52nd Pl
55th St
53rd Pl
48th Pl
Fanfol Dr
Fanfol Dr
Fanfol Dr
Fanfol Dr
Berneil Dr
1,200 LF OF 24" STORM DRAIN
Berneil Dr
Hatcher Rd
48th Pl
52nd Pl
Sanna St
N
0
150
300
US Feet
PARADISE VALLEY, AZ
STORMWATER MASTER PLAN
FLOOD HAZARD AREA K
PROJECT ALTERNATIVE #1
Legend
Paradise Valley
Parcels
Existing Storm Drain
Existing Culvert
Project Components
Storm Drain
Known Flooding Issues
Property Flooding
Road Flooding
Structural Flooding
100-Year Maximum Flow Depth (ft)
0.00 - 0.25
0.26 - 0.50
0.51 - 1.00
1.01 - 2.00
2.01 - 3.00
3.01 - 4.00
> 4.00
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Beryl Ave
Cheryl Dr
Onyx Ave
49th Pl
48th Pl
Turquoise Ave
Tatum Blvd
TOWN LINE
PROPOSED DETENTION
BASIN: 10 ACRE-FT
Via Estrella
Q2 = 40 CFS
Q10 = 394 CFS
Q100 = 1,187 CFS
46th St
PARCEL OWNED BY RANCHO ALTA
VIDA HOME OWNERS ASSOCIATION
Mountain View Rd
N
0
100
200
US Feet
PARADISE VALLEY, AZ
STORMWATER MASTER PLAN
FLOOD HAZARD AREA K
PROJECT ALTERNATIVE #2
Legend
Paradise Valley
Existing Storm Drain
Existing Culvert
Detention Basin
Known Flooding Issues
Road Flooding
Structural Flooding
100-Year Maximum Flow Depth (ft)
0.00 - 0.25
0.26 - 0.50
0.51 - 1.00
1.01 - 2.00
2.01 - 3.00
3.01 - 4.00
> 4.00
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F. Flood Hazard Area L – Upstream Cherokee Wash

Summary and Description

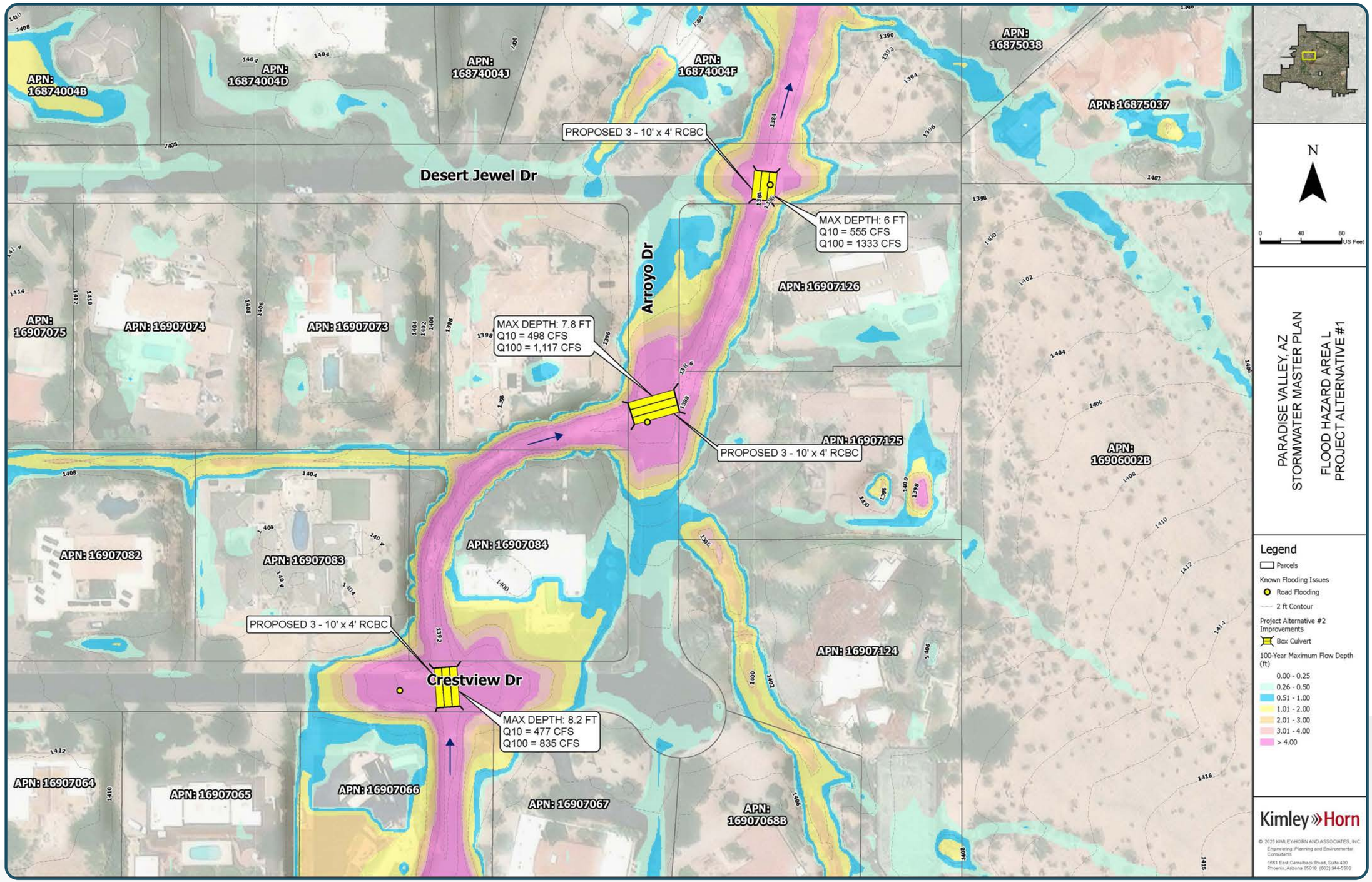
The source of flooding in Area L is runoff from the west side of Mummy Mountain and from the east of the Phoenix Mountain Preserve. This area is the collection point of discharges that contribute to the beginning of Cherokee Wash. The wash is routed through private parcels and crosses several roads over existing low water crossings in multiple areas. These crossings are undersized resulting in the deposition of sediment and debris that requires maintenance after each storm event. The maximum water depth at road crossings during the 100-year storm in this area is 8.2 feet per FLO-2D modeling results, affecting emergency vehicle access and posing a safety risk to residents and property. Area L has been identified as an issue in the Identified Drainage Problem Areas Technical Memorandum (Michael Baker, 2019). It has also been identified by Town staff and residents as a flood prone area who live adjacent to Cherokee Wash.

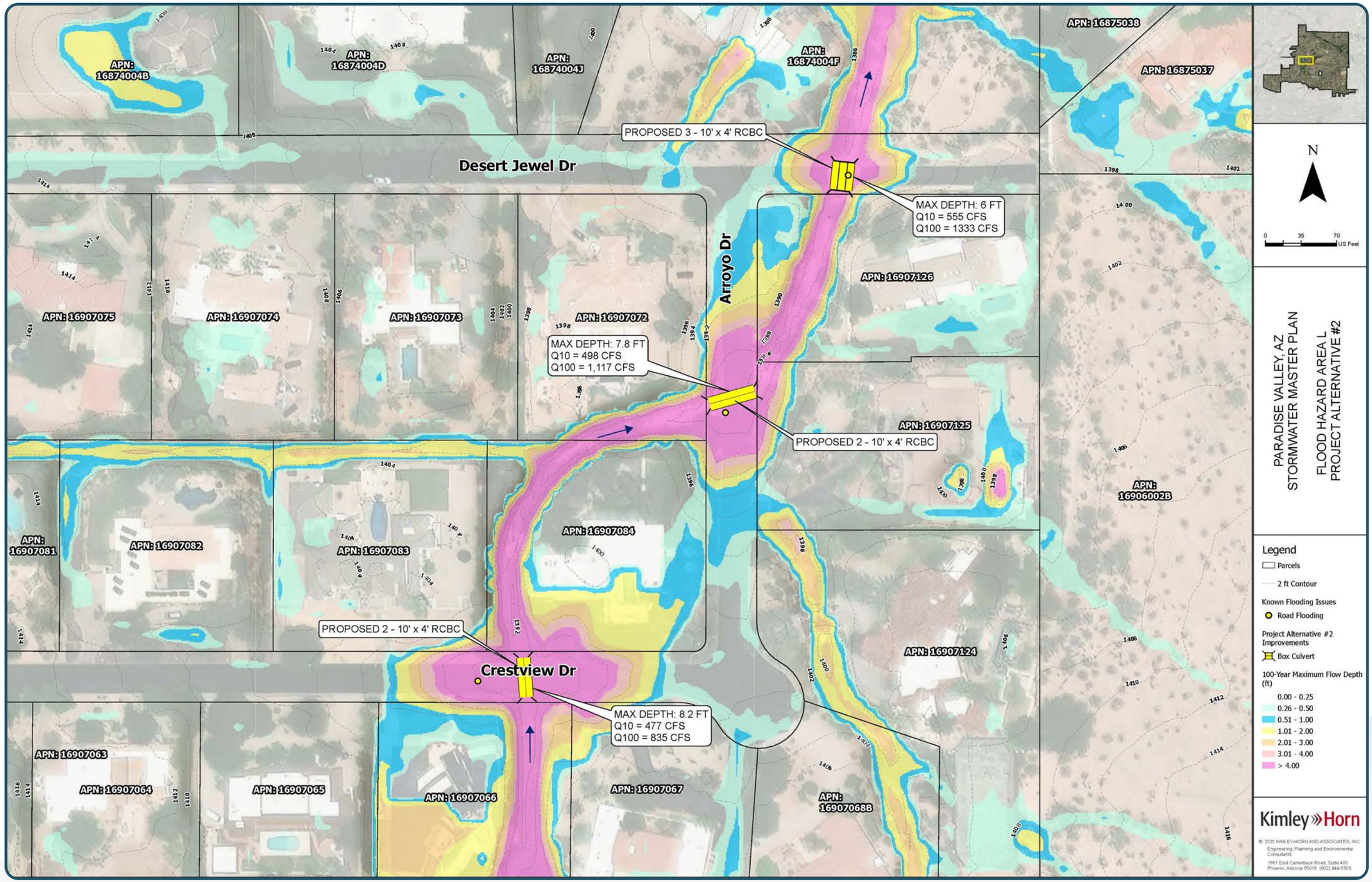
Alternative 1 & 2 (Large/Medium, Both Recommended Depending on the Desired Level of Protection)

The alternatives proposed for Area L consist of the replacement of low water crossings with culverts to convey Cherokee Wash under three roads. There are three low water crossings that would be replaced: crossings at Crestview Drive, Arroyo Drive, and Desert Jewel Drive. Alternative 1 proposes that at each crossing, a three barrel 10' by 4' reinforced concrete box culvert would be constructed. This culvert configuration would provide the necessary capacity for the 50-year storm event. Alternative 2 proposes the same improvements as Alternative 1, only varying in the configuration size of the culvert to a two barrel 10' by 4' culvert, providing 10-year storm event protection. In both alternatives, road improvements would be required to accommodate the culvert size. The design and construction cost of Alternative 1 and 2 is estimated to be **1,467,265 USD** and **1,163,369 USD**, respectively. See **Appendix E** for a detailed cost estimate of the project.

Table 22: Alternative 1&2 Opportunities and Constraints

Alternative 1 & 2 Opportunities	Alternative 1 & 2 Constraints
Reduces safety hazards to residents, passenger vehicles, and emergency vehicles	Construction would be disruptive for residents
Protects existing flow path of Cherokee Wash	Small overall area of mitigation impact
Reduces maintenance issues due to sediment deposition	


PROPOSED 3 - 10' x 4' RCBC
MAX DEPTH: 6 FT
Q10 = 555 CFS
Q100 = 1333 CFS
Desert Jewel Dr
Arroyo Dr
MAX DEPTH: 7.8 FT
Q10 = 498 CFS
Q100 = 1,117 CFS
PROPOSED 3 - 10' x 4' RCBC
PROPOSED 3 - 10' x 4' RCBC
Crestview Dr
MAX DEPTH: 8.2 FT
Q10 = 477 CFS
Q100 = 835 CFS
APN: 16874004B
APN: 16874004D
APN: 16874004J
APN: 16874004F
APN: 16875038
APN: 16875037
APN: 16907075
APN: 16907074
APN: 16907073
APN: 16907126
APN: 16907125
APN: 16906002B
APN: 16907082
APN: 16907083
APN: 16907084
APN: 16907124
APN: 16907064
APN: 16907065
APN: 16907066
APN: 16907067
APN: 16907068B
N
0 40 80 US Feet
PARADISE VALLEY, AZ
STORMWATER MASTER PLAN
FLOOD HAZARD AREA L
PROJECT ALTERNATIVE #1
Legend
Parcels
Known Flooding Issues
Road Flooding
2 ft Contour
Project Alternative #2 Improvements
Box Culvert
100-Year Maximum Flow Depth (ft)
0.00 - 0.25
0.26 - 0.50
0.51 - 1.00
1.01 - 2.00
2.01 - 3.00
3.01 - 4.00
> 4.00
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Desert Jewel Dr
Arroyo Dr
Crestview Dr
PROPOSED 3 - 10' x 4' RCBC
MAX DEPTH: 6 FT
Q10 = 555 CFS
Q100 = 1333 CFS
MAX DEPTH: 7.8 FT
Q10 = 498 CFS
Q100 = 1,117 CFS
PROPOSED 2 - 10' x 4' RCBC
PROPOSED 2 - 10' x 4' RCBC
MAX DEPTH: 8.2 FT
Q10 = 477 CFS
Q100 = 835 CFS
APN: 16874004B
APN: 16874004D
APN: 16874004J
APN: 16874004F
APN: 16875038
APN: 16875037
APN: 16907126
APN: 16907075
APN: 16907074
APN: 16907073
APN: 16907072
APN: 16907125
APN: 16906002B
APN: 16907081
APN: 16907082
APN: 16907083
APN: 16907084
APN: 16907124
APN: 16907063
APN: 16907064
APN: 16907065
APN: 16907066
APN: 16907067
APN: 16907068B
N
0 35 70 US Feet
PARADISE VALLEY, AZ
STORMWATER MASTER PLAN
FLOOD HAZARD AREA L
PROJECT ALTERNATIVE #2
Legend
Parcels
2 ft Contour
Known Flooding Issues
Road Flooding
Project Alternative #2 Improvements
Box Culvert
100-Year Maximum Flow Depth (ft)
0.00 - 0.25
0.26 - 0.50
0.51 - 1.00
1.01 - 2.00
2.01 - 3.00
3.01 - 4.00
> 4.00
Kimley»Horn
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G. Flood Hazard Area N – Downstream Cherokee Wash

Summary and Description

The source of flooding in Area N is Cherokee Wash. Runoff from Mummy Mountain and the Phoenix Mountain Preserve contribute to Cherokee Wash. The wash flows northeast, turning east and at 56th Street ultimately outfalling IBW. The wash is routed through private parcels and crosses several roads. During large storm events, Cherokee Wash does not have the full capacity required to contain flows, thereby resulting in road overtopping and property flooding. The low water crossings at 58th Place, 59th Place, Morning Glory Road, and 61st Place are inundated during storms, resulting in flooding hazards to residents and passenger vehicles. In particular, the crossing at Morning Glory Road is subject to water depths of up to 5.3 feet during the 100-year storm per FLO-2D modeling results from this study, posing a potential hazard for emergency vehicle access. Area N potential flooding conditions have been modeled in the Middle Indian Bend Wash Area Drainage Master Study/Plan (MIBW ADMS/P) (Gavin & Barker, 2017) and the Lower Indian Bend Wash Area Drainage Master Study/Plan (LIBW ADMS/P) (Kimley-Horn, 2019). The area has also been identified by Town staff and residents as a flooding hazard to the road, property, and homes.

Alternative 1 (Large, Recommended)

The first alternative proposed for this area is the construction of multiple reinforced concrete box culverts where Cherokee Wash over tops roads coupled with corresponding channel improvements. Low water crossings at 58th Place, 59th Place, Morning Glory Road, and 61st Place would be replaced with four barrel 10' by 4' reinforced concrete box culverts. Grouted riprap would be placed on the downstream side of the culverts to reduce erosion potential. At each of the four locations, road improvements will be required to accommodate the culvert. Downstream of the proposed culverts on 58th Place and 59th Place, channel improvements including clearing vegetation and grading would be required to increase conveyance. Drainage easements have been previously acquired at these locations and improvements would remain within the boundaries of the easement. Channel improvements are needed at these two locations to mitigate channel breakouts that could potentially flood the adjacent homes. The design and construction cost of Alternative 1 is estimated to be **2,800,333 USD**. See **Appendix E** for a detailed cost estimate of the project.

Table 23: Alternative 1 Opportunities and Constraints

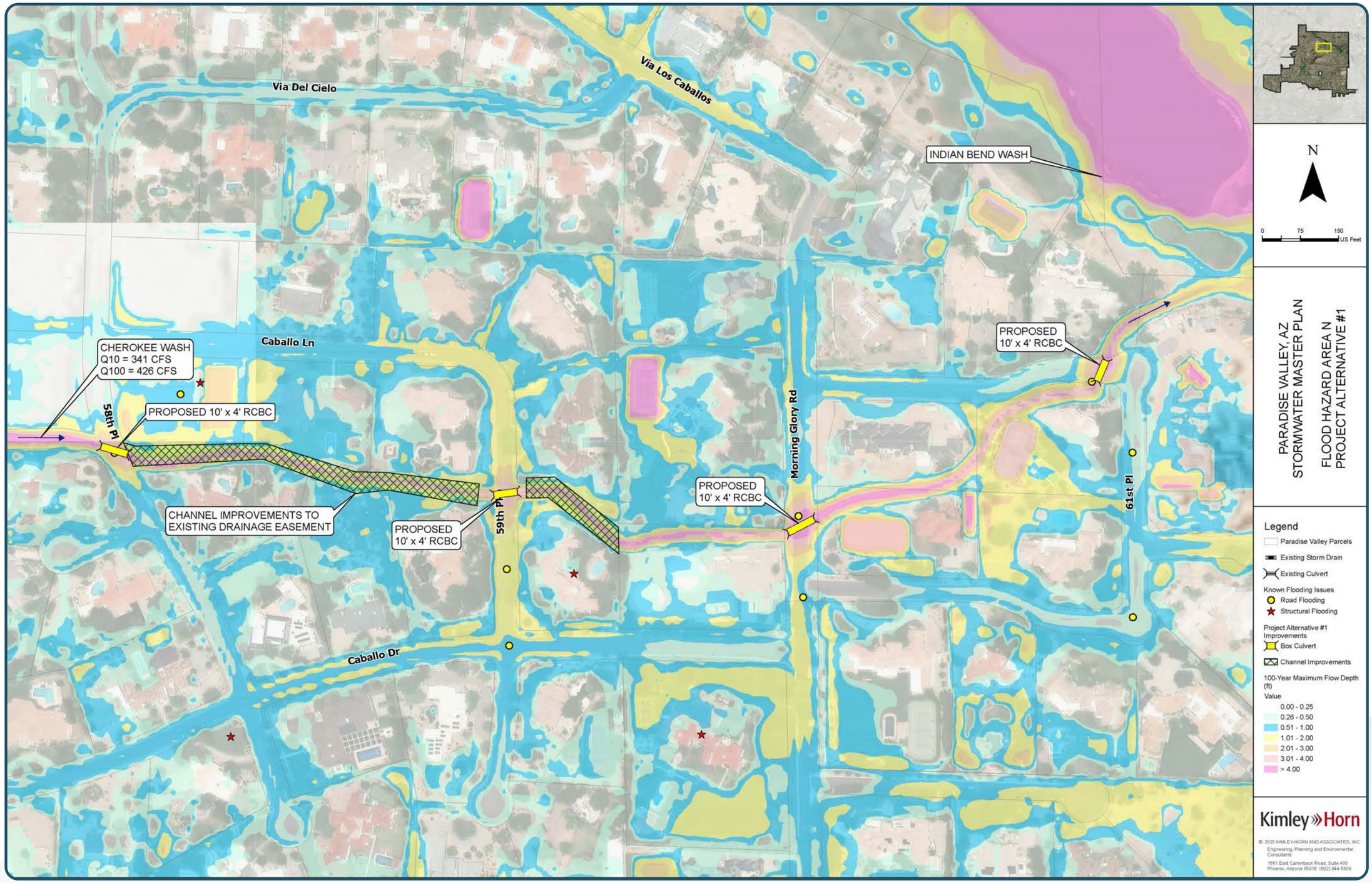
Alternative 1 Opportunities	Alternative 1 Constraints
More cost-effective alternative	Construction could be disruptive for residents
Reduces flood hazards to residents, passenger vehicles, and emergency vehicles	The total area of flood mitigation is smaller than that of Alternative 2
Provides safe road crossings during runoff event	Utility conflicts likely

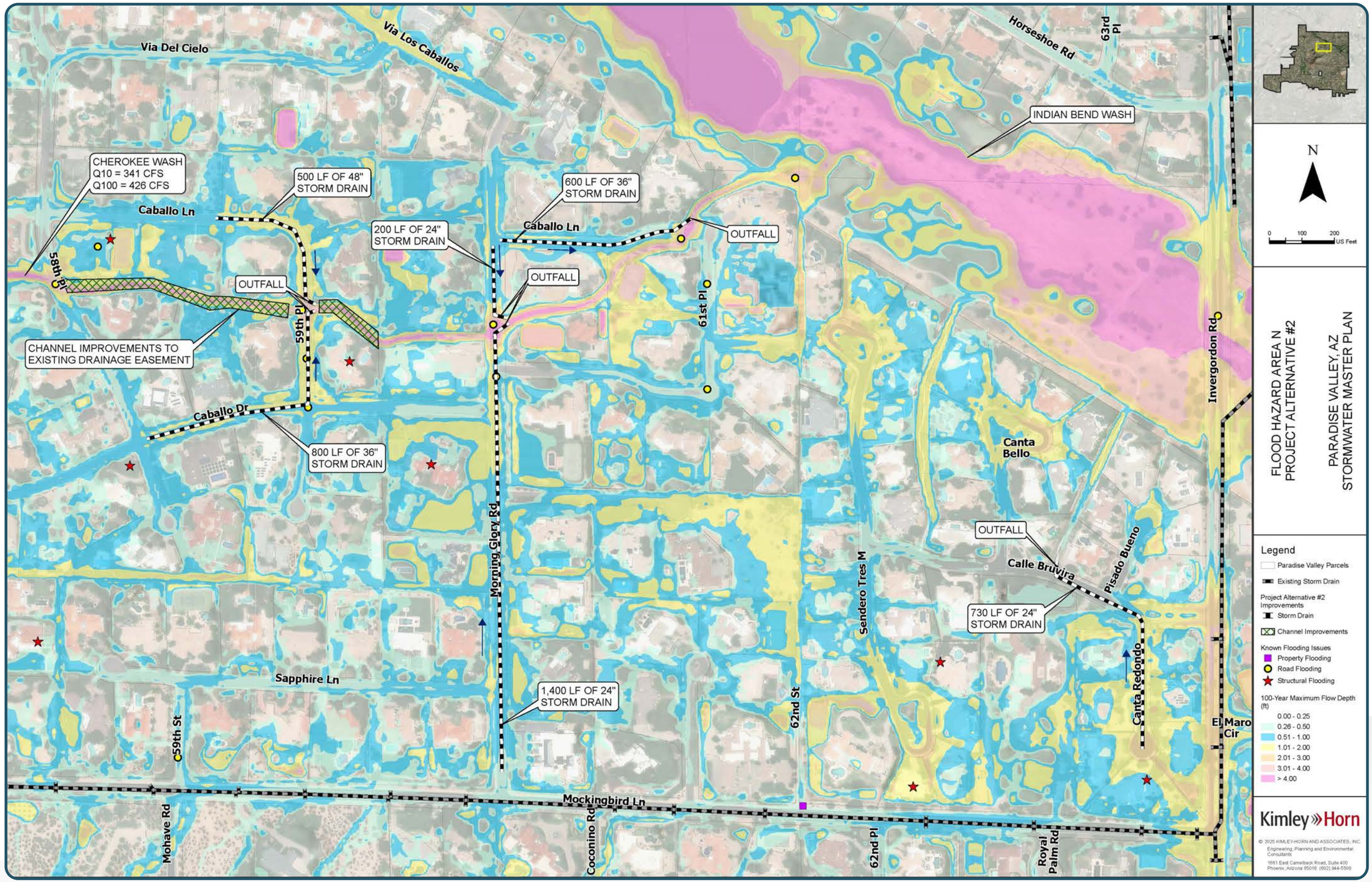
Alternative 2 (Large)

Alternative 2 for Area N consists of several small storm drain systems designed to reduce flooding on local streets. This flooding is mostly attributed to overflow from Cherokee Wash or runoff from Mummy Mountain as it flows towards Cherokee Wash. Strom drains would likely ranges in size from 36" to 48". Outfalls would further downstream along Cherokee Wash from breakout points, or at existing drainage corridors. This alternative would also include channel conveyance improvements along Cherokee Wash where existing ROW or improvements are in place. Refer to the Area N Alternative #2 exhibit on the following. The design and construction cost of Alternative 2 is estimated to be **3,956,897 USD**. See **Appendix E** for a detailed cost estimate of the project.

Table 24: Alternative 2 Opportunities and Constraints

Alternative 2 Opportunities	Alternative 2 Constraints
Larger overall area of flood mitigation in comparison to Alternative 1	More expensive alternative
Reduces flood hazards to residents, passenger vehicles, and emergency vehicles	Road crossings at Cherokee Wash may still be impassable during storm events
	Utility conflicts likely


Via Del Cielo
Via Los Caballos
INDIAN BEND WASH
PROPOSED
10' x 4' RCBC
Caballo Ln
CHEROKEE WASH
Q10 = 341 CFS
Q100 = 426 CFS
58th Pl
PROPOSED 10' x 4' RCBC
CHANNEL IMPROVEMENTS TO
EXISTING DRAINAGE EASEMENT
PROPOSED
10' x 4' RCBC
59th Pl
Morning Glory Rd
PROPOSED
10' x 4' RCBC
61st Pl
Caballo Dr
N
0 75 150
US Feet
PARADISE VALLEY, AZ
STORMWATER MASTER PLAN
FLOOD HAZARD AREA N
PROJECT ALTERNATIVE #1
Legend
Paradise Valley Parcels
Existing Storm Drain
Existing Culvert
Known Flooding Issues
Road Flooding
Structural Flooding
Project Alternative #1 Improvements
Box Culvert
Channel Improvements
100-Year Maximum Flow Depth (ft)
Value
0.00 - 0.25
0.26 - 0.50
0.51 - 1.00
1.01 - 2.00
2.01 - 3.00
3.01 - 4.00
> 4.00
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Via Del Cielo
Via Los Caballos
Horseshoe Rd
63rd Pl
INDIAN BEND WASH
CHEROKEE WASH
Q10 = 341 CFS
Q100 = 426 CFS
500 LF OF 48"
STORM DRAIN
600 LF OF 36"
STORM DRAIN
Caballo Ln
200 LF OF 24"
STORM DRAIN
OUTFALL
58th Pl
OUTFALL
59th Pl
61st Pl
CHANNEL IMPROVEMENTS TO
EXISTING DRAINAGE EASEMENT
Caballo Dr
800 LF OF 36"
STORM DRAIN
Invergordon Rd
Canta
Bello
Morning Glory Rd
Sendero Tres M
OUTFALL
Calle Bruvira
Pisado Bueno
730 LF OF 24"
STORM DRAIN
Canta Redondo
Sapphire Ln
1,400 LF OF 24"
STORM DRAIN
62nd St
El Maro
Cir
C59th St
Mockingbird Ln
Mohave Rd
Coconino Rd
62nd Pl
Royal
Palm Rd
N
0 100 200
US Feet
FLOOD HAZARD AREA N
PROJECT ALTERNATIVE #2
PARADISE VALLEY, AZ
STORMWATER MASTER PLAN
Legend
Paradise Valley Parcels
Existing Storm Drain
Project Alternative #2
Improvements
Storm Drain
Channel Improvements
Known Flooding Issues
Property Flooding
Road Flooding
Structural Flooding
100-Year Maximum Flow Depth
(ft)
0.00 - 0.25
0.26 - 0.50
0.51 - 1.00
1.01 - 2.00
2.01 - 3.00
3.01 - 4.00
> 4.00
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H. Flood Hazard Area O – Lincoln Drive

Summary and Description

The source of flooding in Area O is the runoff from the south side of Mummy Mountain contributing runoff to the upstream reach of Cudia City Wash (CCW). Runoff flows southwest from Mummy Mountain, through existing development, towards Lincoln Drive. Once the water reaches Lincoln Drive from the north, it flows under the road through existing culverts. Some culverts along Lincoln Drive do not have the required capacity to contain discharge, and the road overtops at 52nd Place with depths greater than 1 foot during the 100-year storm per the FLO-2D modeling results from this study. South of Lincoln Drive, water flows west across private parcels and under 51st Place through an existing culvert. This culvert is undersized and a maximum water depth of 4 feet occurs per modeling results. The crossing poses a hazard to passenger vehicles and impacts emergency vehicle access. Town residents and staff have reported flooding issues in this area. The CCW Area Drainage Master Study/Plan (ADMS/P) has also identified flood hazards in this area.

Alternative 1 (Large)

The first alternative proposed for Area O consists of improvements to existing roadway drainage infrastructure on Lincoln Drive. The existing culvert at Lincoln Drive and 52nd Place lacks the capacity required to prevent roadway flooding during a 100-year event. This alternative proposes a new storm drain along Lincoln Drive at 52nd Place to the outfall of three existing culverts just east of the Omni Resort on the south side of Lincoln Drive. The storm drain inlet would be adjacent to the existing culvert's inlet north of Lincoln Drive and 52nd Place, and would redirect a portion of the discharge to a separate outfall. Curb and gutter inlets would also be placed at this location to capture discharge coming from the east along Lincoln Drive. At the outfall, discharges would be captured by an existing culvert and routed south to ultimately outfall to Cudia City Wash. The design and construction cost of Alternative 1 is estimated to be **2,321,033 USD**. See **Appendix E** for a detailed cost estimate of the project.

Table 25: Alternative 1 Opportunities and Constraints

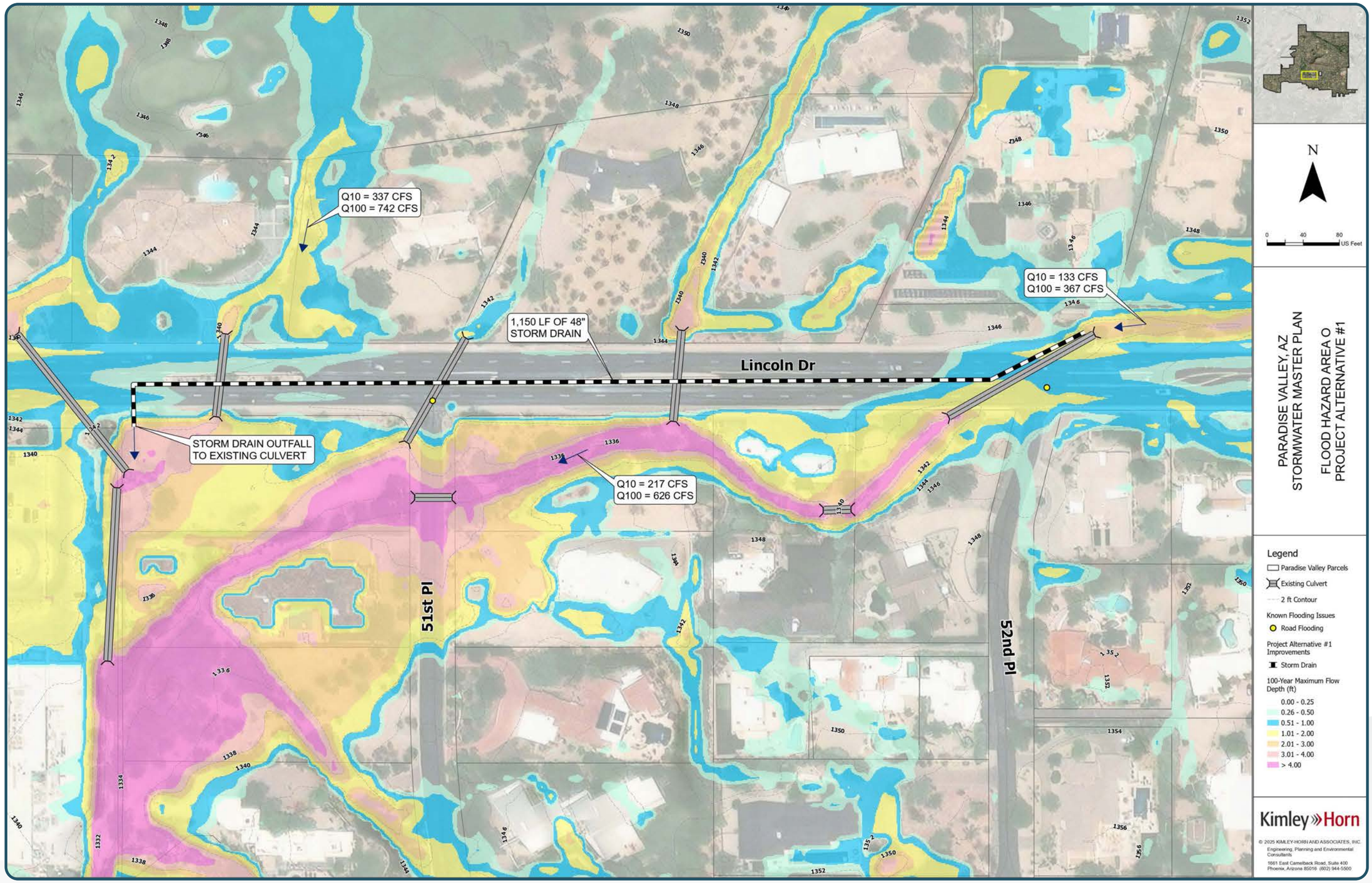
Alternative 1 Opportunities	Alternative 1 Constraints
Improves existing roadway drainage infrastructure	Major roadway impacts to Lincoln Drive during construction
Reduces discharge for undersized portions of Cudia City Wash	Utility conflicts likely
	More expensive alternative

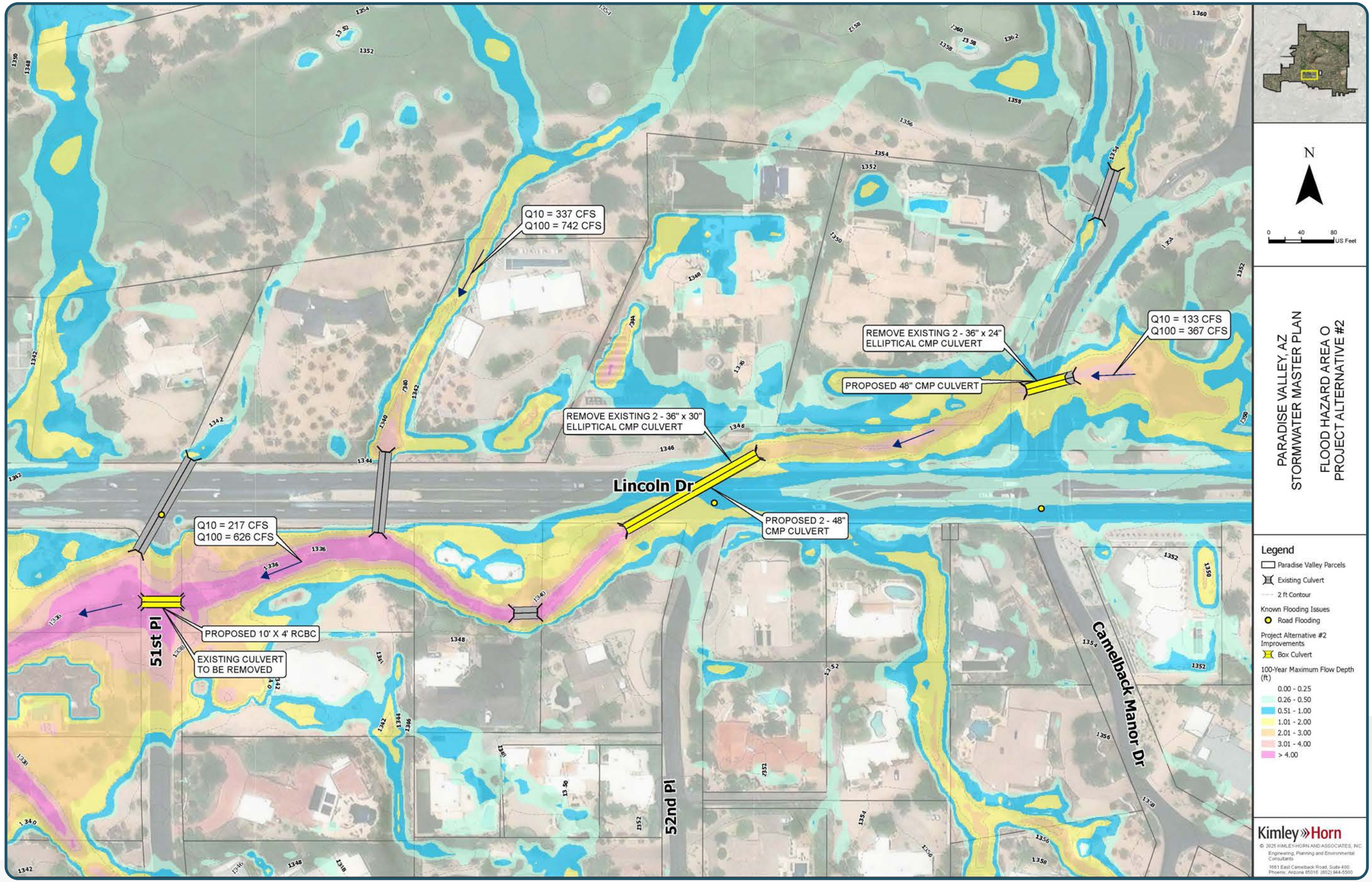
Alternative 2 (Medium, Recommended)

The second alternative proposed is the increase in existing culvert capacity at flood prone locations. Three culvert expansions or replacements are proposed upstream and downstream of Lincoln Drive. At Desert Fairways Drive, the existing box culvert would be removed and replaced with a 10' by 4' reinforced concrete box culvert (RCBC). Flows passing through this box culvert continue west and cross Lincoln Drive at the existing culvert at 52nd Place. This culvert would be replaced with a three barrel 48" reinforced concrete pipe culvert to mitigate roadway overtopping. The culvert at 51st Place is particularly undersized and would be replaced with a two barrel 10' by 4' RCBC. The proposed configuration at 51st Place is a 2 barrel 10' by 4' RCBC. Road improvements would also be required to accommodate the increased height of the new culverts. The design and construction cost of Alternative 2 is estimated to be **1,159,731 USD**. See **Appendix E** for a detailed cost estimate of the project.

Table 26: Alternative 2 Opportunities and Constraints

Alternative 2 Opportunities	Alternative 2 Constraints
Less expensive alternative	Utility conflicts likely
Improves emergency vehicle access on 51st Place	Major roadway impacts to Lincoln Drive during construction
Improvements maintain current flow paths	Would not reduce flows on parcels adjacent to Lincoln Drive
	Smaller area of flooding mitigation


Q10 = 337 CFS
Q100 = 742 CFS
1,150 LF OF 48"
STORM DRAIN
Q10 = 133 CFS
Q100 = 367 CFS
Lincoln Dr
STORM DRAIN OUTFALL
TO EXISTING CULVERT
Q10 = 217 CFS
Q100 = 626 CFS
51st Pl
52nd Pl
N
0 40 80 US Feet
PARADISE VALLEY, AZ
STORMWATER MASTER PLAN
FLOOD HAZARD AREA O
PROJECT ALTERNATIVE #1
Legend
Paradise Valley Parcels
Existing Culvert
2 ft Contour
Known Flooding Issues
Road Flooding
Project Alternative #1 Improvements
Storm Drain
100-Year Maximum Flow Depth (ft)
0.00 - 0.25
0.26 - 0.50
0.51 - 1.00
1.01 - 2.00
2.01 - 3.00
3.01 - 4.00
> 4.00
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Q10 = 337 CFS
Q100 = 742 CFS
REMOVE EXISTING 2 - 36" x 24"
ELLIPTICAL CMP CULVERT
Q10 = 133 CFS
Q100 = 367 CFS
PROPOSED 48" CMP CULVERT
REMOVE EXISTING 2 - 36" x 30"
ELLIPTICAL CMP CULVERT
Lincoln Dr
PROPOSED 2 - 48"
CMP CULVERT
Q10 = 217 CFS
Q100 = 626 CFS
51st Pl
PROPOSED 10' X 4' RCBC
EXISTING CULVERT
TO BE REMOVED
52nd Pl
Camelback Manor Dr
N
0 40 80
US Feet
PARADISE VALLEY, AZ
STORMWATER MASTER PLAN
FLOOD HAZARD AREA O
PROJECT ALTERNATIVE #2
Legend
Paradise Valley Parcels
Existing Culvert
2 ft Contour
Known Flooding Issues
Road Flooding
Project Alternative #2 Improvements
Box Culvert
100-Year Maximum Flow Depth (ft)
0.00 - 0.25
0.26 - 0.50
0.51 - 1.00
1.01 - 2.00
2.01 - 3.00
3.01 - 4.00
> 4.00
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I. Flood Hazard Area P – Tatum Boulevard and McDonald Drive

Summary and Description

The source of flooding in this area is Cudia City Wash (CCW). The wash flows across private parcels and overtops Tatum Boulevard and McDonald Drive as it flows southeast through Area P. At Tatum Boulevard, a maximum water depth over the road of 2.9 feet occurs during the 100-year storm per FLO-2D modeling results from this study. This poses safety hazards to passenger vehicles and sediment and debris deposition on the road, requiring frequent maintenance. The existing culverts under McDonald Drive are also undersized resulting in road overtopping during the 100-year storm. residents have reported property and roadway flooding at both crossings. This area has also been identified as a flooding hazard by the CCW Area Drainage Master Study/Plan (ADMS/P) and the CCW Design Concept Report (DCR). Two alternatives were developed as described below, each divided into three phases for flexibility with cost allocations. The CCW DCR also recommended the establishment of an improvement district as a funding source for construction and maintenance. The DCR also recommended acquiring a drainage easement along the wash corridor between Tatum Boulevard and McDonald Drive. A drainage easement would facilitate more regular maintenance of the channel improving the overall function of the wash.

Alternative 1 (Large/Medium/Maintenance, Recommended)

Alternative 1, Phase 1 proposed for Area P is a segment of storm drain along Tatum Boulevard and McDonald Road. The storm drain would capture flows from CCW from an inlet on the east side of Tatum Boulevard. The water would be routed south and west along the road where it would discharge back into CCW just north of McDonald Road. This would reduce the overall flow in the wash between the two road crossings. The design and construction cost of Alternative 1 is estimated to be **6,848,094 USD.** See **Appendix E** for a detailed cost estimate of Alternative 1.

Alternative 1, Phase 2 consists of increasing the existing culvert capacity at McDonald Drive. At McDonald Drive, a three barrel 10' by 4' culvert conveys CCW south under the road. This configuration does not convey the full capacity of the wash during the 100-year storm, and roadway overtopping occurs. This alternative proposes constructing an additional barrel to the culvert. The design and construction cost of Alternative 1, Phase 2 is estimated to be **789,801 USD.**

Alternative 1, Phase 3 proposes drainage improvements to mitigate the roadway overtopping that occurs on Valley Vista Lane. Flows from the north that converge at CCW overtop Valley Vista Lane prior to entering the wash. Placing a culvert under the road at the location of the wash crossing would reduce the erosion and sediment deposition in this area. The design and construction cost of Alternative 1 is estimated to be **55,823 USD.**

Table 27: Alternative 1 Opportunities and Constraints

Alternative 1, Phase 1 Opportunities	Alternative 1, Phase 1 Constraints
No large land acquisition required	Utility conflicts likely
Improvements reduce discharge for undersized portions of Cudia City Wash	High cost alternative in comparison to Alternative 2, Phase 1
	Major roadway impacts to Tatum Blvd during construction
Alternative 1, Phase 2 Opportunities	**Alternative 1, Phase 2 Constraints**
Creates a road crossing that reduces road overtopping frequency	Major roadway impacts to Tatum Blvd during construction
More cost-effective Alternative in comparison to Alternative 2, Phase 2	Does not reduce discharge entering the wash
No large land acquisition required	Utility conflicts likely
Alternative 1, Phase 3 Opportunities	**Alternative 1, Phase 3 Constraints**
Slightly more effective cost alternative in comparison to Alternative 2, Phase 3	Construction would be disruptive for residents
Improvements reduce safety hazards and maintain requirements	

Alternative 2 (Large/Medium/Maintenance)

Alternative 2, Phase 1 proposes a reinforced concrete box culvert under Tatum Boulevard. The existing road crossing on Tatum Boulevard would be replaced with a four barrel 10' by 4' box culvert to mitigate roadway flooding. Road improvements would be required to accommodate the height of the culverts. The design and construction cost of Alternative 2 is estimated to be **1,974,030 USD**. See **Appendix E** for a detailed cost estimate of Alternative 2.

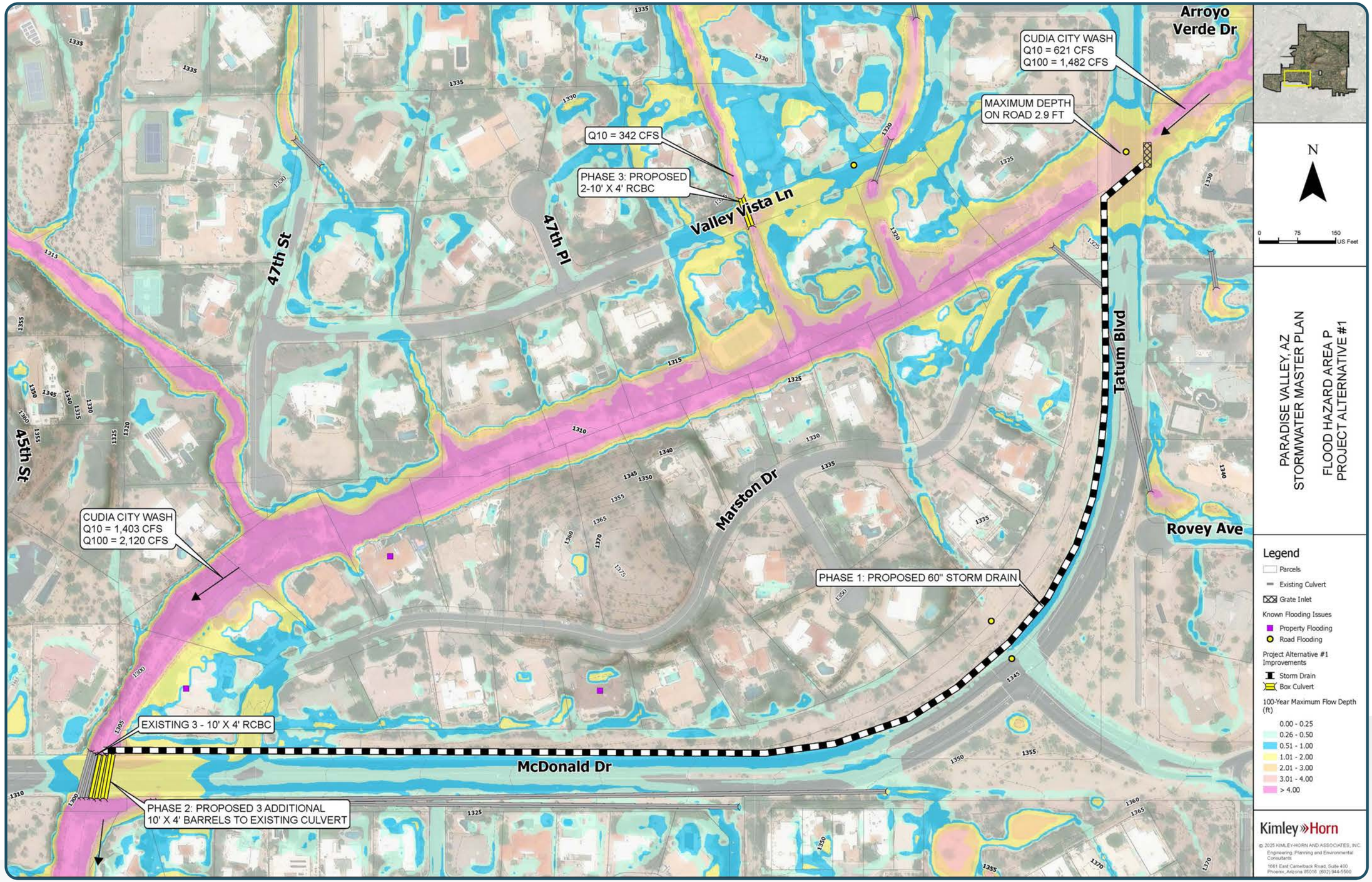
Alternative 2, Phase 2 replaces existing infrastructure. The existing box culvert under McDonald Drive would and be removed entirely replaced with a bridge, allowing the wash to flow without obstruction. This would reduce backwater effects and the water surface elevation north of the culvert. This area has been known to flood residential properties; therefore this improvement may not only improve roadway conditions, but also property conditions along the wash. The design and construction cost of Alternative 2 is estimated to be **3,341,890 USD.**

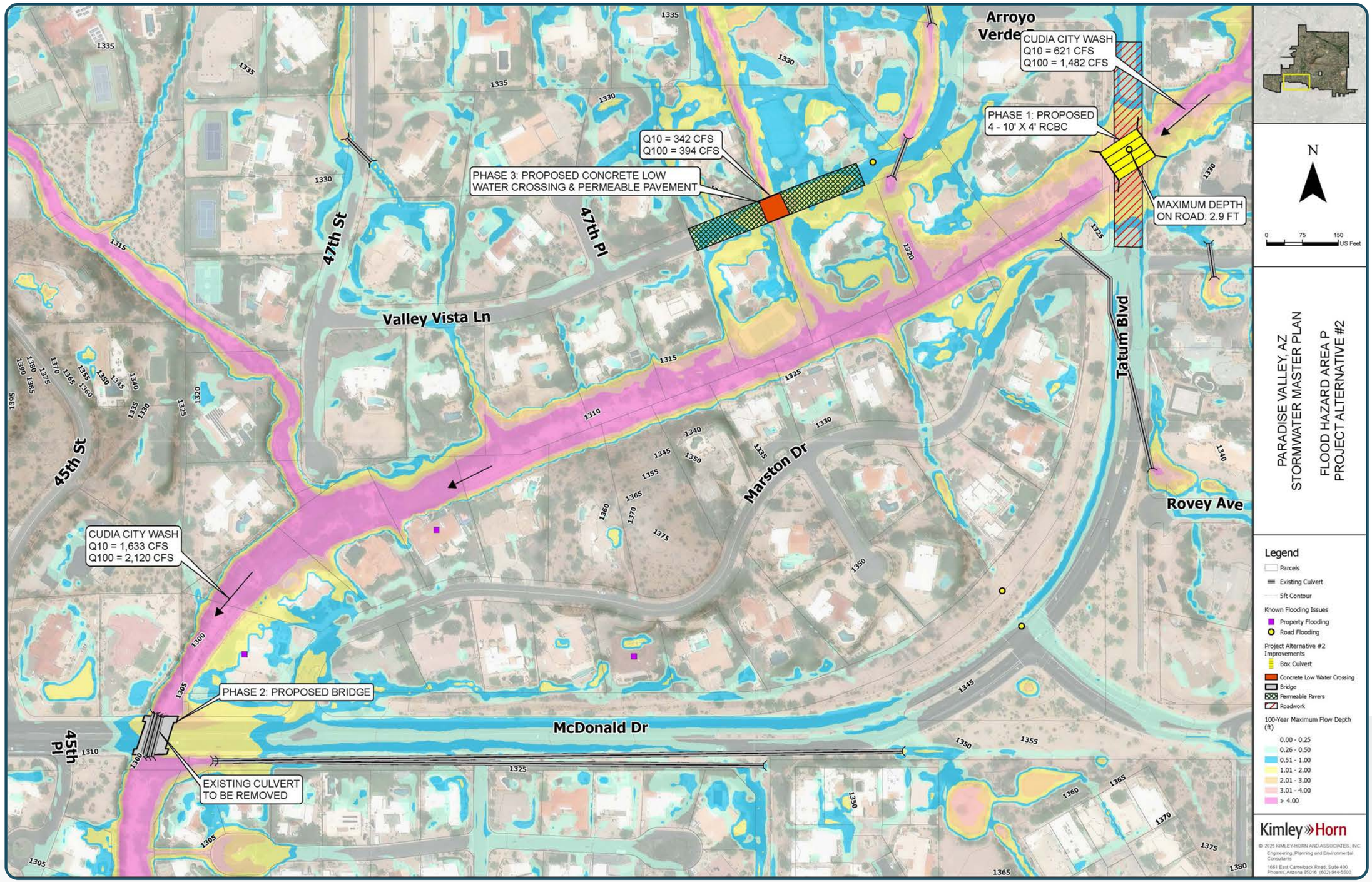
Alternative 2, Phase 3 utilizes Green Stormwater Infrastructure as a tool to reduce flooding. At the location where flows cross Valley Vista Lane, it is proposed that a low water crossing be implemented. The low water crossing would consist of concrete and grouted riprap to prevent erosion and sediment deposition on the road. It is also proposed that permeable pavement span 150 feet on either side of the crossing to help reduce the local ponding on the road. The design and construction cost of Alternative 2 is estimated to be **57,020 USD.**

CCW overtop Valley Vista Lane prior to entering the wash. Placing a culvert under the road at the location of the wash crossing would reduce the erosion and sediment deposition in this area. The design and construction cost of Alternative 1 is estimated to be **55,823 USD.**

Table 28: Alternative 2 Opportunities and Constraints

Alternative 2, Phase 1 Opportunities	Alternative 2, Phase 1 Constraints
More cost-effective alternative in comparison to Alternative 1, Phase 1	Major roadway impacts to McDonald Drive during construction
Improvement to existing infrastructure	Utility conflicts likely
Improvements would reduce roadway flooding on McDonald Drive	
Alternative 2, Phase 2 Opportunities	**Alternative 2, Phase 2 Constraints**
Improvements would mitigate roadway flooding on McDonald Drive	Higher cost alternative in comparison to Alternative 1, Phase 2
May reduce backwater issues north of McDonald Drive	Major roadway impacts to McDonald Drive during constriction
No large land acquisition required	Utility conflicts likely
Alternative 2, Phase 3 Opportunities	**Alternative 2, Phase 3 Constraints**
Improvements include GSI benefits	Construction would be disruptive for residents
Improvements reduce safety hazards and maintenance requirements	Higher cost alternative in comparison to Alternative 1, Phase 3


CUDIA CITY WASH
Q10 = 621 CFS
Q100 = 1,482 CFS
MAXIMUM DEPTH
ON ROAD 2.9 FT
Q10 = 342 CFS
PHASE 3: PROPOSED
2-10' X 4' RCBC
Arroyo
Verde Dr
47th St
47th Pl
Valley Vista Ln
Tatum Blvd
Marston Dr
Rovey Ave
45th St
CUDIA CITY WASH
Q10 = 1,403 CFS
Q100 = 2,120 CFS
PHASE 1: PROPOSED 60" STORM DRAIN
EXISTING 3 - 10' X 4' RCBC
McDonald Dr
PHASE 2: PROPOSED 3 ADDITIONAL
10' X 4' BARRELS TO EXISTING CULVERT
N
0 75 150
US Feet
PARADISE VALLEY, AZ
STORMWATER MASTER PLAN
FLOOD HAZARD AREA P
PROJECT ALTERNATIVE #1
Legend
Parcels
Existing Culvert
Grate Inlet
Known Flooding Issues
Property Flooding
Road Flooding
Project Alternative #1
Improvements
Storm Drain
Box Culvert
100-Year Maximum Flow Depth
(ft)
0.00 - 0.25
0.26 - 0.50
0.51 - 1.00
1.01 - 2.00
2.01 - 3.00
3.01 - 4.00
> 4.00
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CUDIA CITY WASH
Q10 = 621 CFS
Q100 = 1,482 CFS
PHASE 1: PROPOSED
4 - 10' X 4' RCBC
Q10 = 342 CFS
Q100 = 394 CFS
PHASE 3: PROPOSED CONCRETE LOW
WATER CROSSING & PERMEABLE PAVEMENT
MAXIMUM DEPTH
ON ROAD: 2.9 FT
CUDIA CITY WASH
Q10 = 1,633 CFS
Q100 = 2,120 CFS
PHASE 2: PROPOSED BRIDGE
EXISTING CULVERT
TO BE REMOVED
Arroyo Verde
47th St
47th Pl
45th St
45th Pl
Valley Vista Ln
McDonald Dr
Marston Dr
Tatum Blvd
Rovey Ave
N
0 75 150
US Feet
PARADISE VALLEY, AZ
STORMWATER MASTER PLAN
FLOOD HAZARD AREA P
PROJECT ALTERNATIVE #2
Legend
Parcels
Existing Culvert
5ft Contour
Known Flooding Issues
Property Flooding
Road Flooding
Project Alternative #2 Improvements
Box Culvert
Concrete Low Water Crossing
Bridge
Permeable Pavers
Roadwork
100-Year Maximum Flow Depth (ft)
0.00 - 0.25
0.26 - 0.50
0.51 - 1.00
1.01 - 2.00
2.01 - 3.00
3.01 - 4.00
> 4.00
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VIII. HIGHEST PRIORITY ALTERNATIVES – BENEFIT COST ANALYSIS

The selected alternatives for the six highest ranking flooding issue areas were further developed into 15% plans and detailed conceptual cost estimates. Pages 78-113 contain a further description of each area, cost/benefit analysis results, conceptual plans, and figures depicting 10-year pre-project, post-project, and depth-difference results. The detailed conceptual cost estimates can be found in **Appendix G**. Projects were developed using constraints and preferences provided by Town Council. Constraints included restricting projects to available right-of-way. Projects were designed to provide protection from the 10-year storm. Pre-project, post-project, and depth-difference maps for other storm events are included in **Appendix F.**

The selected alternative(s) and ranking score for each of the nine flood hazard areas is summarized in **Table 29**. Of these, the top six were developed for the Master Plan per Town project development requirements. Analyses were split into two methodologies based on the project type and flood reduction impacts. The benefits for Areas A and K were determined by incorporating the proposed drainage improvements into proposed conditions FLO-2D modeling and comparing the pre- and post-project flow depth conditions adjacent to the impacted buildings. By using the U.S. Army Corps of Engineers (USACE) depth-damage curves for the building structures and building contents, a damage reduction or benefit per building was determined for the 10- and 100-year storms. Areas A and K have the biggest positive impacts on potential residential structure flooding. The USACE depth-damage curve and the corresponding calculations for the two areas are provided in **Appendix I**. For Areas H, L, N, and O, benefits were determined by evaluating the total reduction of water surface elevation from road crossings and the potential for improving emergency vehicle access. Projects in these areas mainly benefit transportation corridors and ingress/egress.

Table 29: Prioritized Projects Summary

Top Ranking Six

Area Identification	Selected Alternative	Ranking Score
N	Alternative 1	49
A	Alternative 1	45
O	Alternative 2	45
K	Alternative 2	43
L	Alternative 1 & 2	41
H	Alternative 2	40
P	Alternative 1	39
C	Alternative 2	39
E	Alternative 3	38

A. Flood Hazard Area A – Invergordon and Mockingbird Lane

Description

Alternative 1 was selected from the project decision matrix. This project includes storm drain lines from 18" laterals up to a 12' x 3' storm drain box at the outfall. The storm drain upstream at Northern Avenue starts as a 36" pipe and transitions to a 42" storm drain downstream. Due to a sewer line crossing in Invergordon Road, a 2-30" pipe system was designed to provide clearance over the sewer line. This is an existing shallow sewer line crossing north of Maverick Road that is unavoidable. This sewer line is proposed to be rerouted by 300 feet to the north and tie into the adjacent system to avoid the conflict with the proposed storm drain box culvert. The sewer line reroute ultimately goes to the same location but the proposed realigned sewer to the north is lower allowing the storm drain to clear the existing sewer line. The Maverick Road storm drain trunk line is a 54" pipe that connects to the Invergordon trunk line. This project is estimated to cost 11,616,355 USD. Conceptual plans are shown on the following pages with the detailed cost estimate included in **Appendix G**.

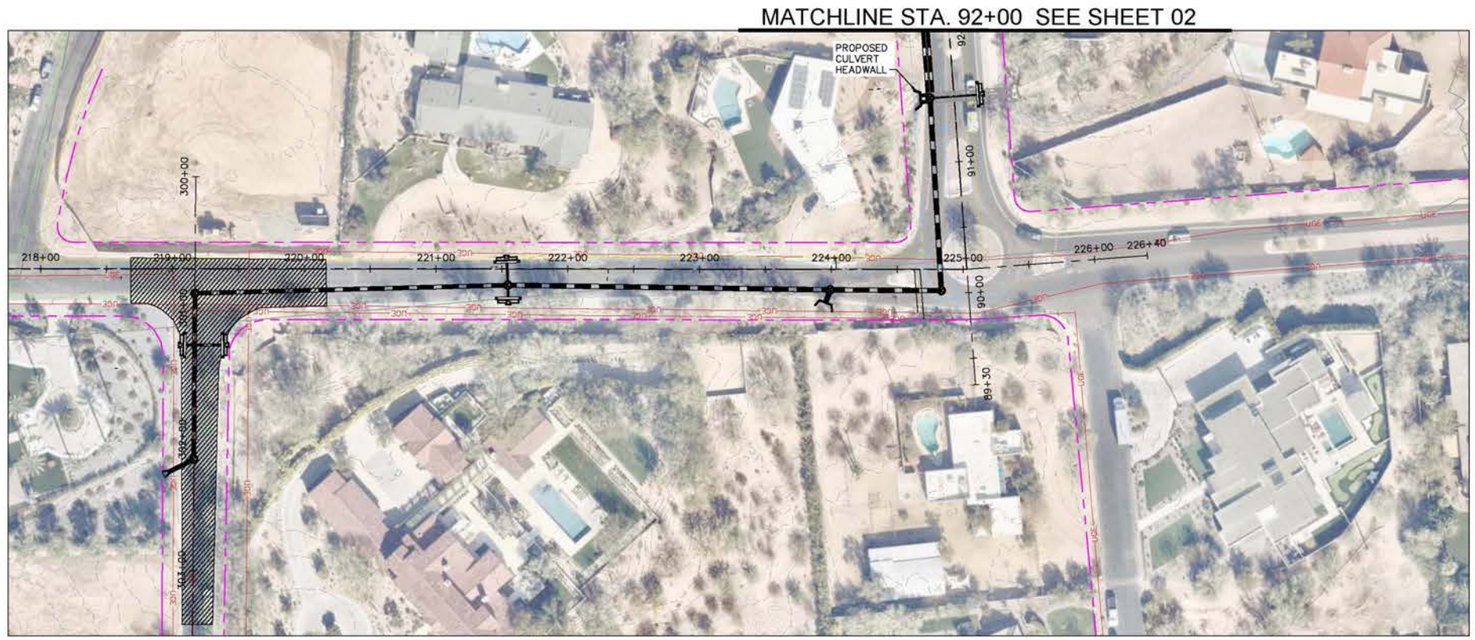
Benefits

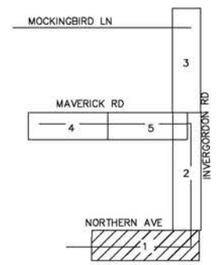
The potential benefits for the 10-year and 100-year storms were developed for the project and are shown in **Table 30**. The benefits were determined by incorporating the proposed drainage improvements into the FLO-2D model and comparing the pre and post project flow depth conditions adjacent to the impacted buildings. By using the U.S. Army Corps of Engineers (USACE) depth-damage curves for the building structures and building contents, a damage reduction or benefit per building was determined for the 10- and 100-year storms. The USACE depth damage curves can be seen in **Appendix H**. If the storm drain system is built, it is expected to have a life cycle of 75-years, and total benefits of about 23 million USD when assuming seven 10-year storms and one 100-year storm occurring during the infrastructure life span.

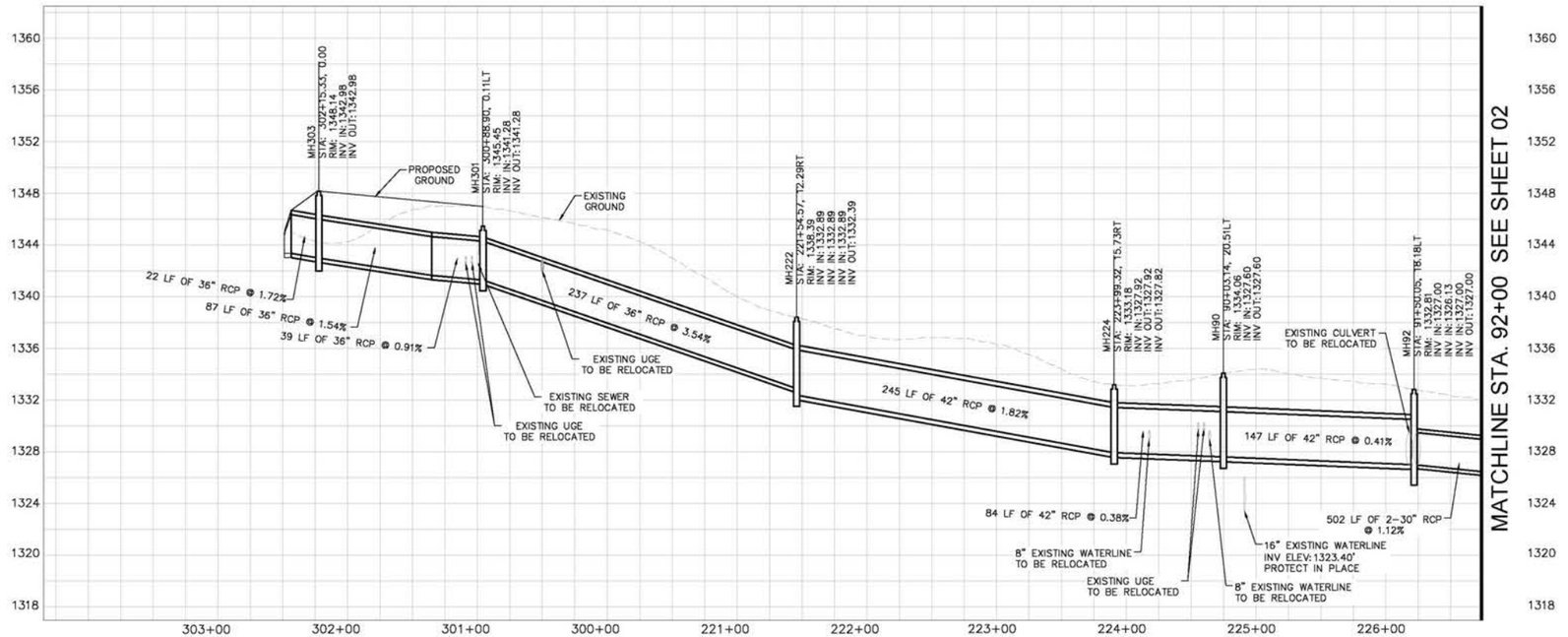
Table 30: Area A Benefit Cost Ratio Summary

Number of Properties Impacted		220
Approximate Population1		550
Benefit with Drainage Improvements in Place ($)	Damage Reduction	21,394,816
	Social Benefits	1,978,900
	Total	23,293,796
Construction Cost		11,616,355
Benefit-Cost Ratio (BCR)		2.01

1Assumed 2.5 people per household from U.S. Census for the Town of Paradise Valley.
2Social benefits are based on the number of residents impacted and are calculated using FEMA's Benefit Cost Analysis toolkit. This would account for traffic closures, interruptions to work, etc.
3Assumed at least seven 10-year storms and one 100- year storm occur during the 75-year life span of the improvements.







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CHECKED BY: GSB
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PARADISE VALLEY SWMP
AREA A SELECTED ALTERNATIVE 15% PLANS

NORTH

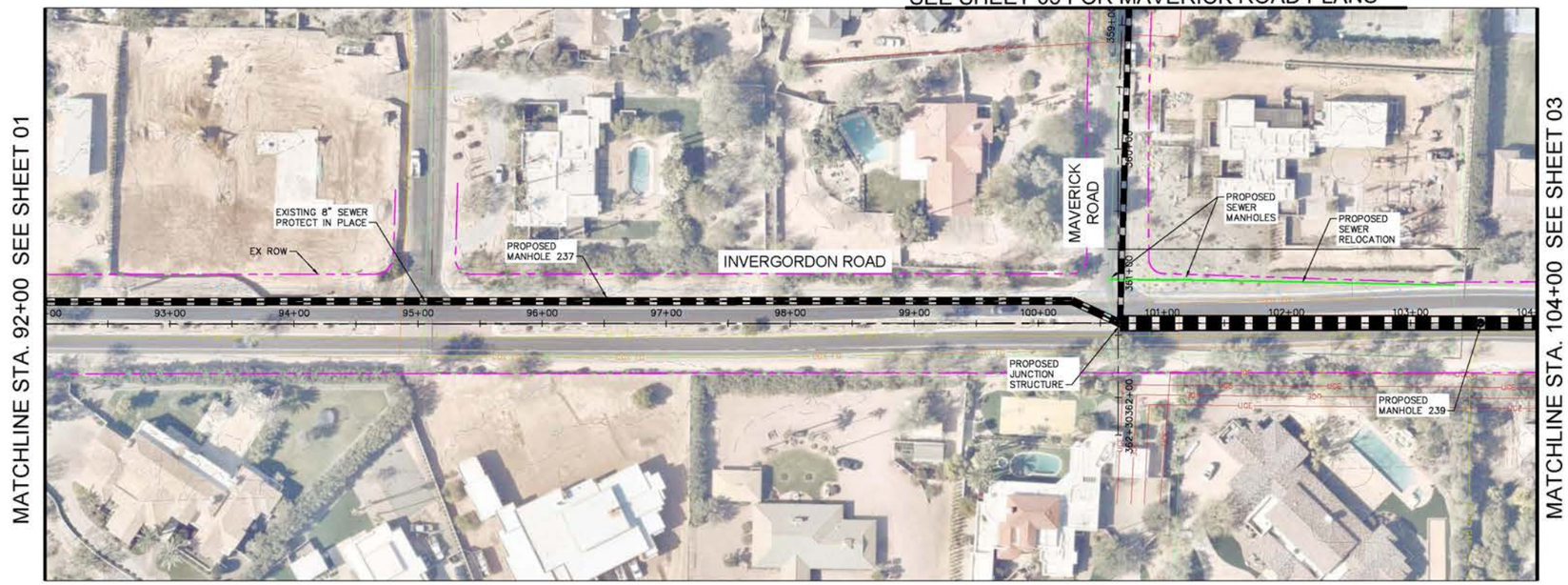
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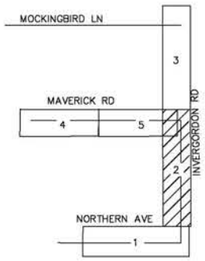
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AREA A

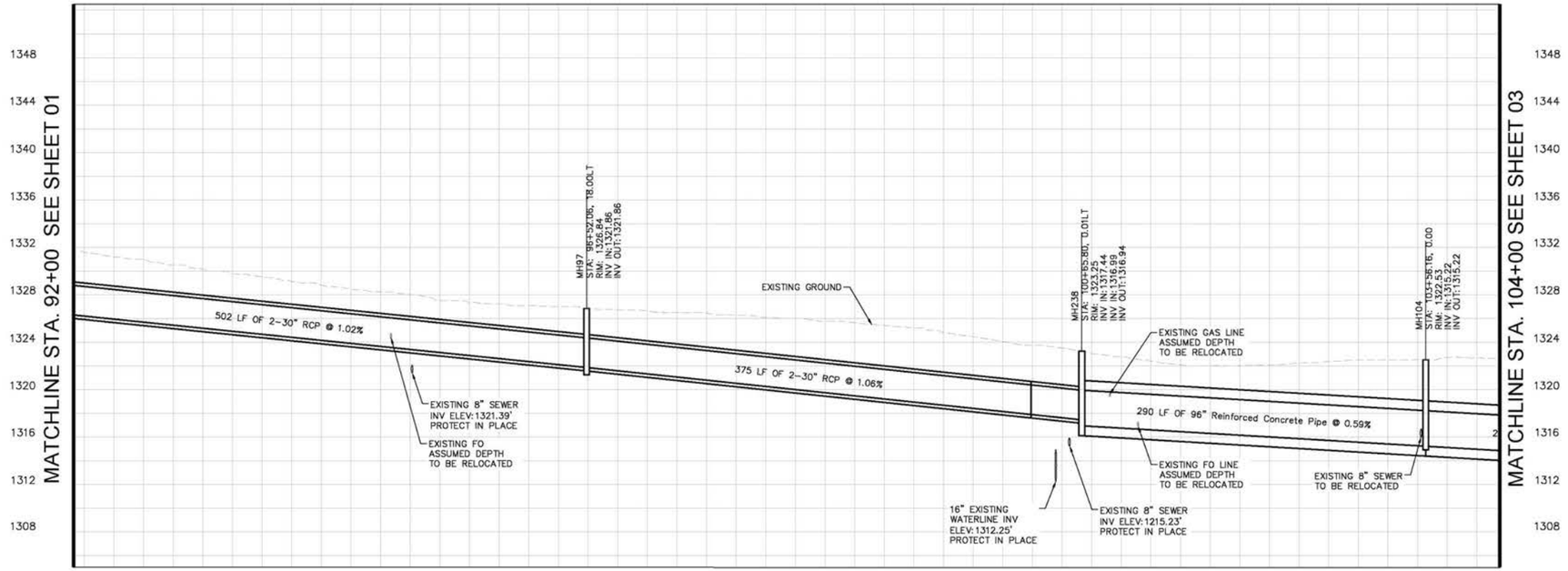
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SEE SHEET 05 FOR MAVERICK ROAD PLANS







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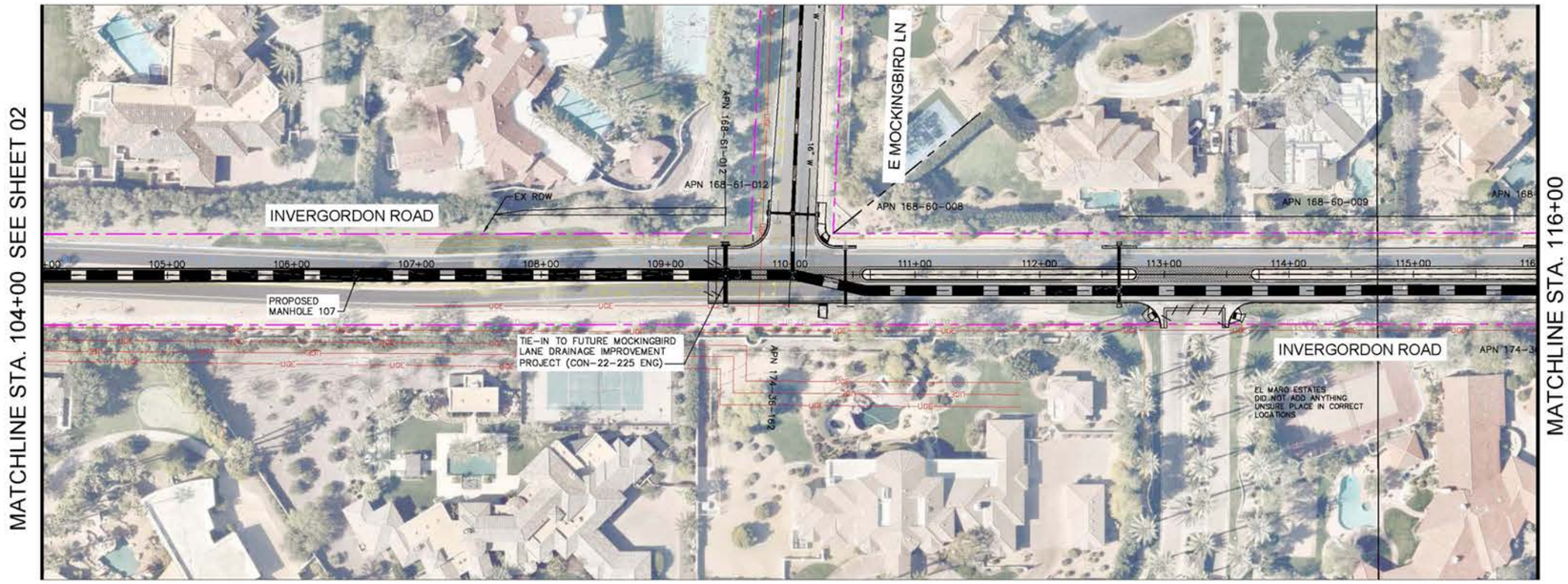
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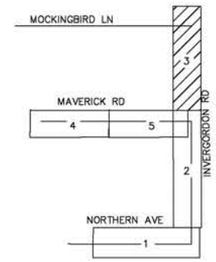
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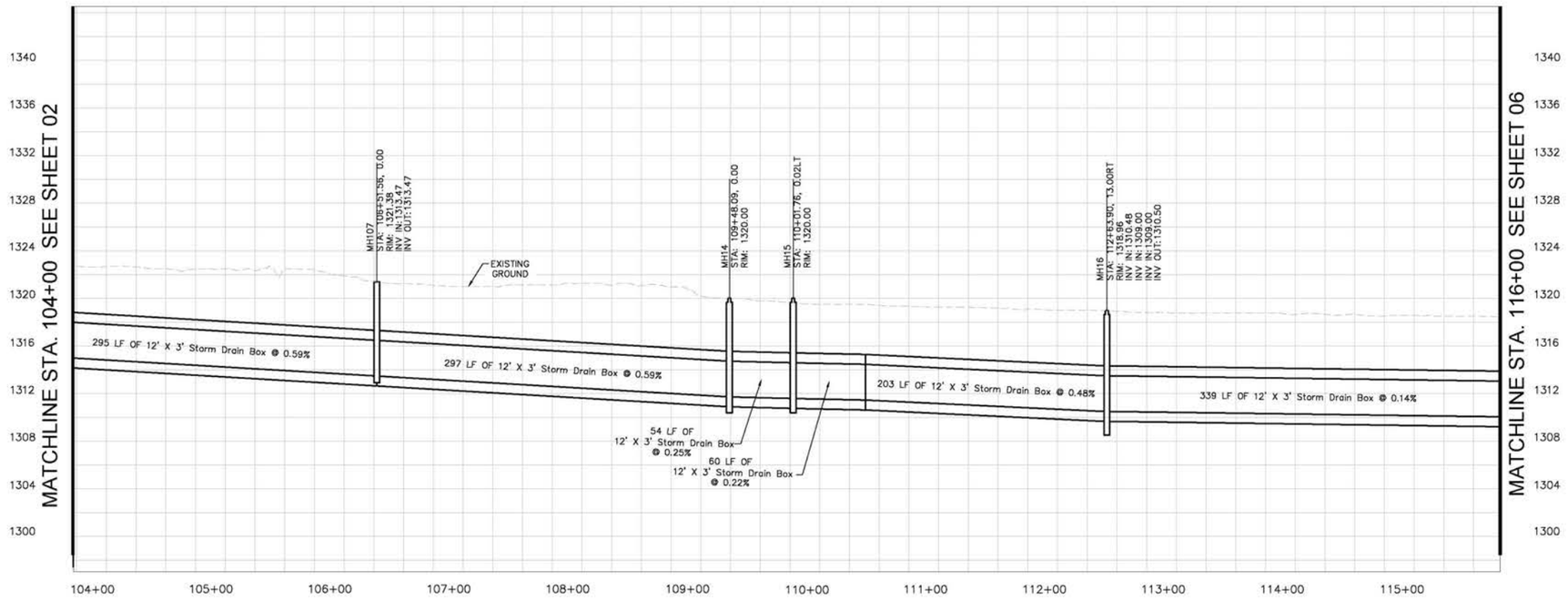
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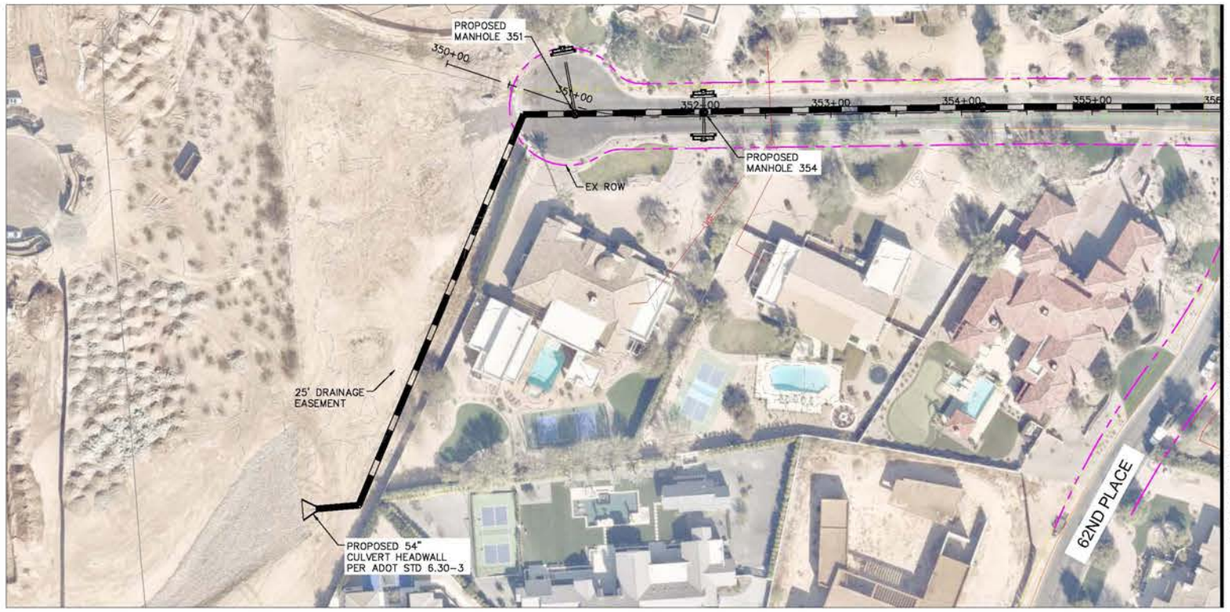
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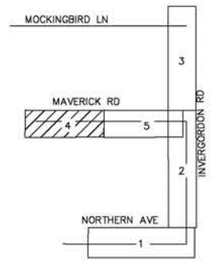
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SCALE (V): 1"=5'
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DRAWN BY: PTB
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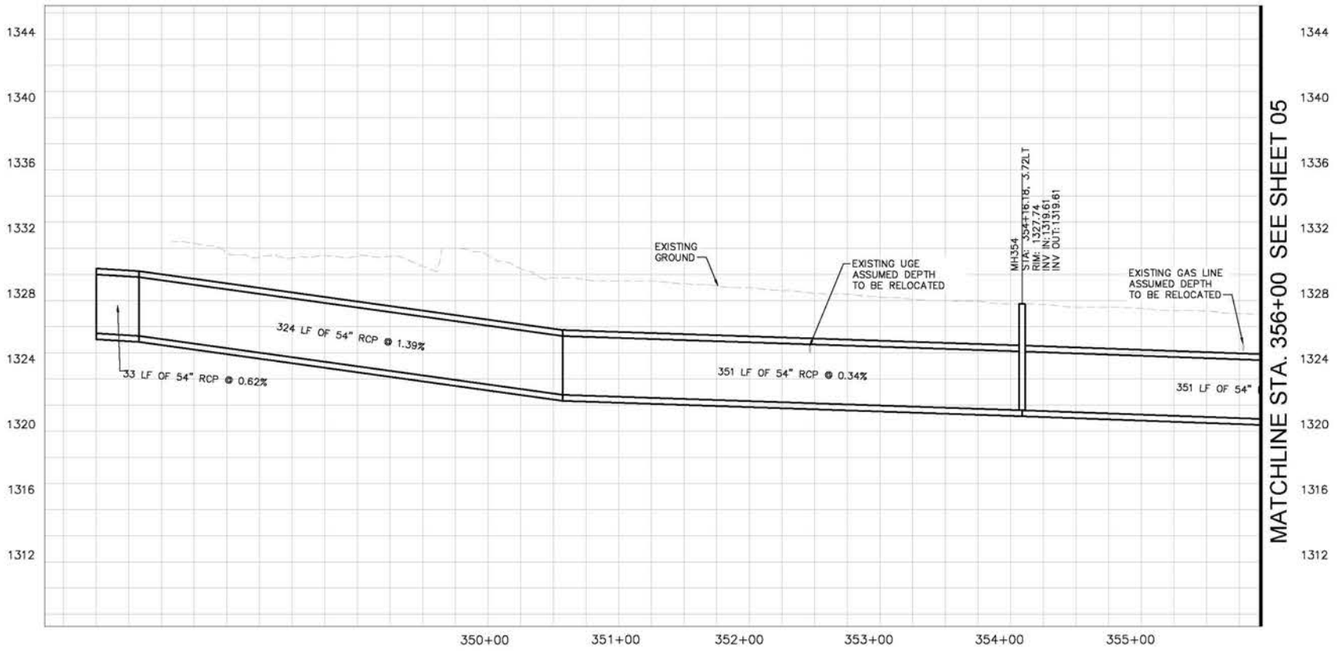
PARADISE VALLEY SWMP
AREA A SELECTED ALTERNATIVE 15% PLANS

NORTH

PROJECT NO.
091054031
DRAWING NAME
AREA A
3 OF 6







NO. | REVISION | DATE

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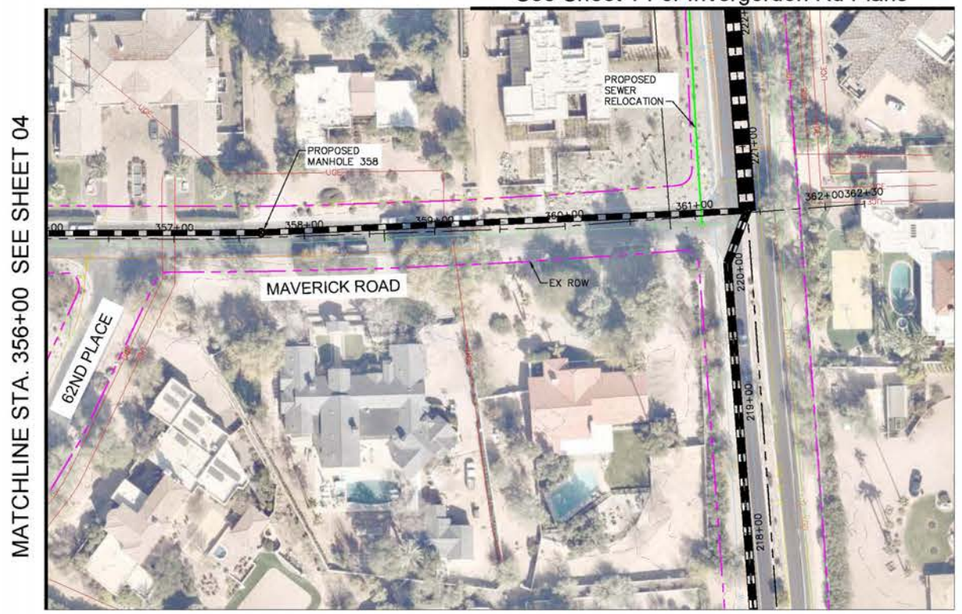
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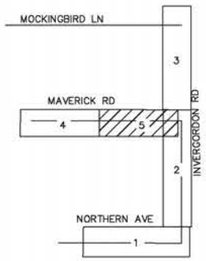
PARADISE VALLEY SWMP
AREA A SELECTED ALTERNATIVE 15% PLANS

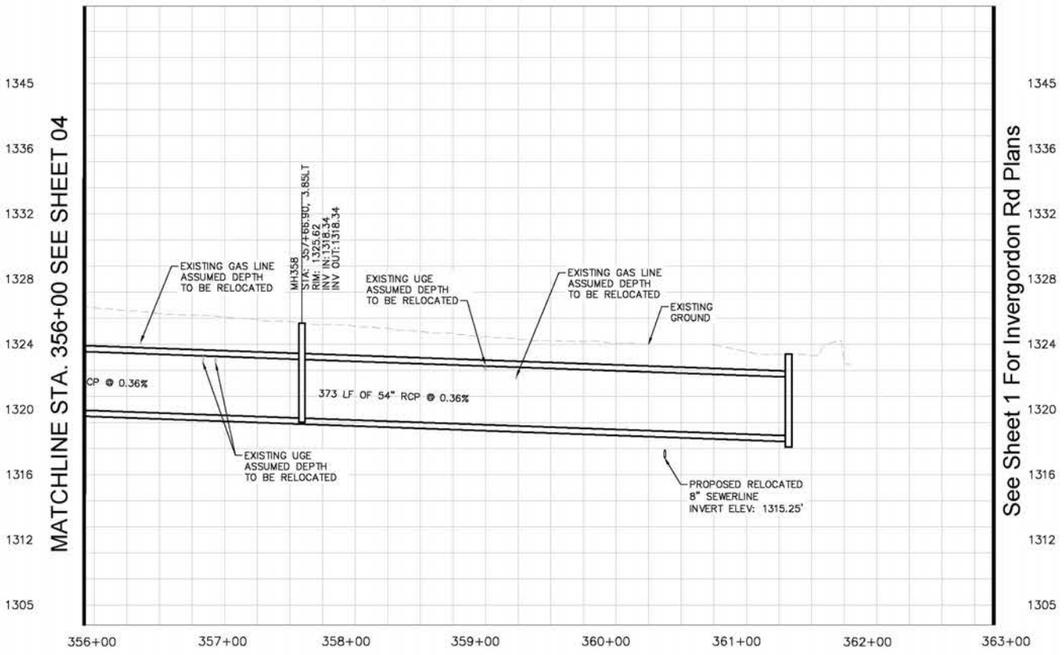
NORTH

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091054031
DRAWING NAME
AREA A
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PARADISE VALLEY SWMP
AREA A SELECTED ALTERNATIVE 15% PLANS

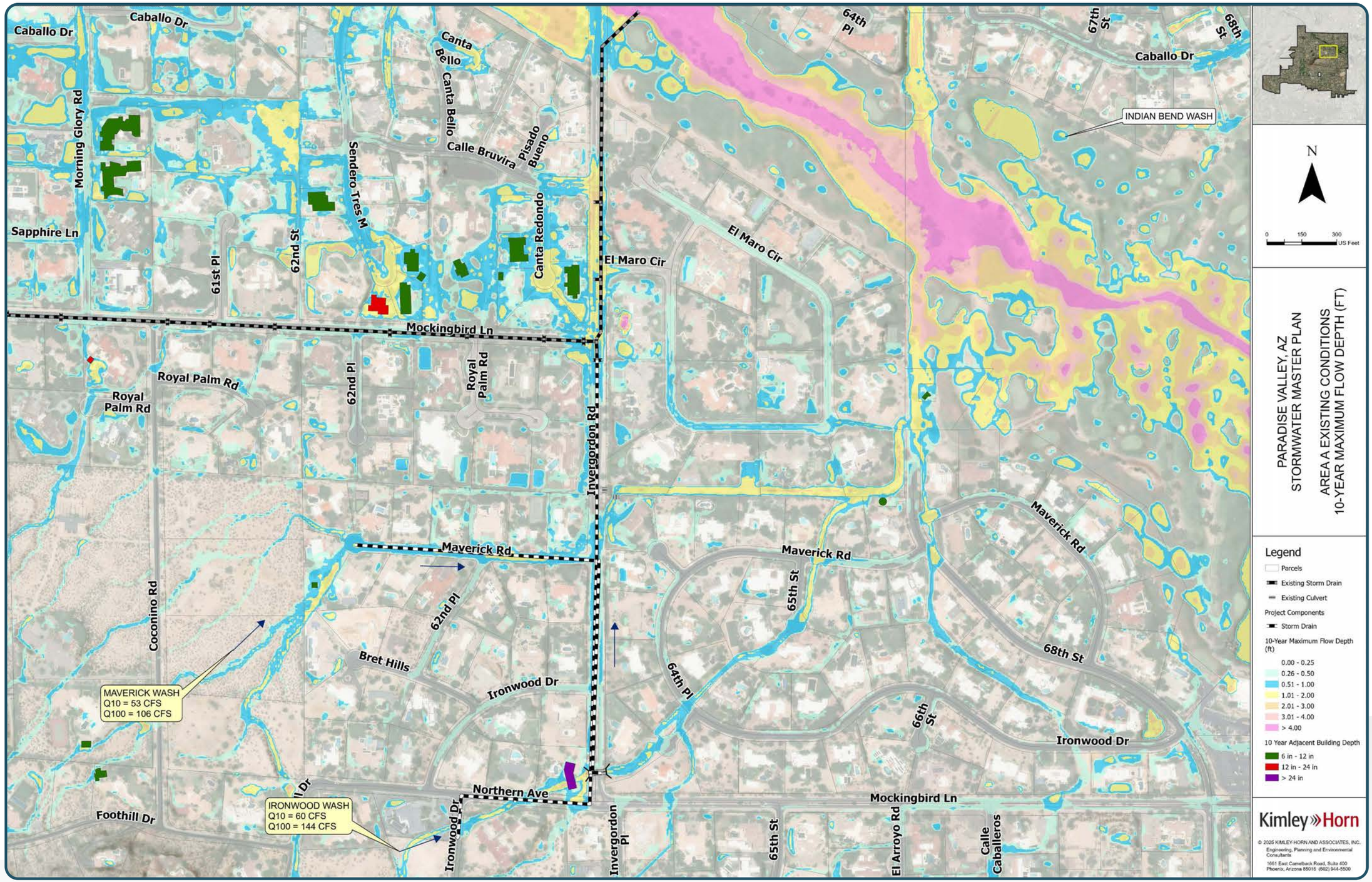
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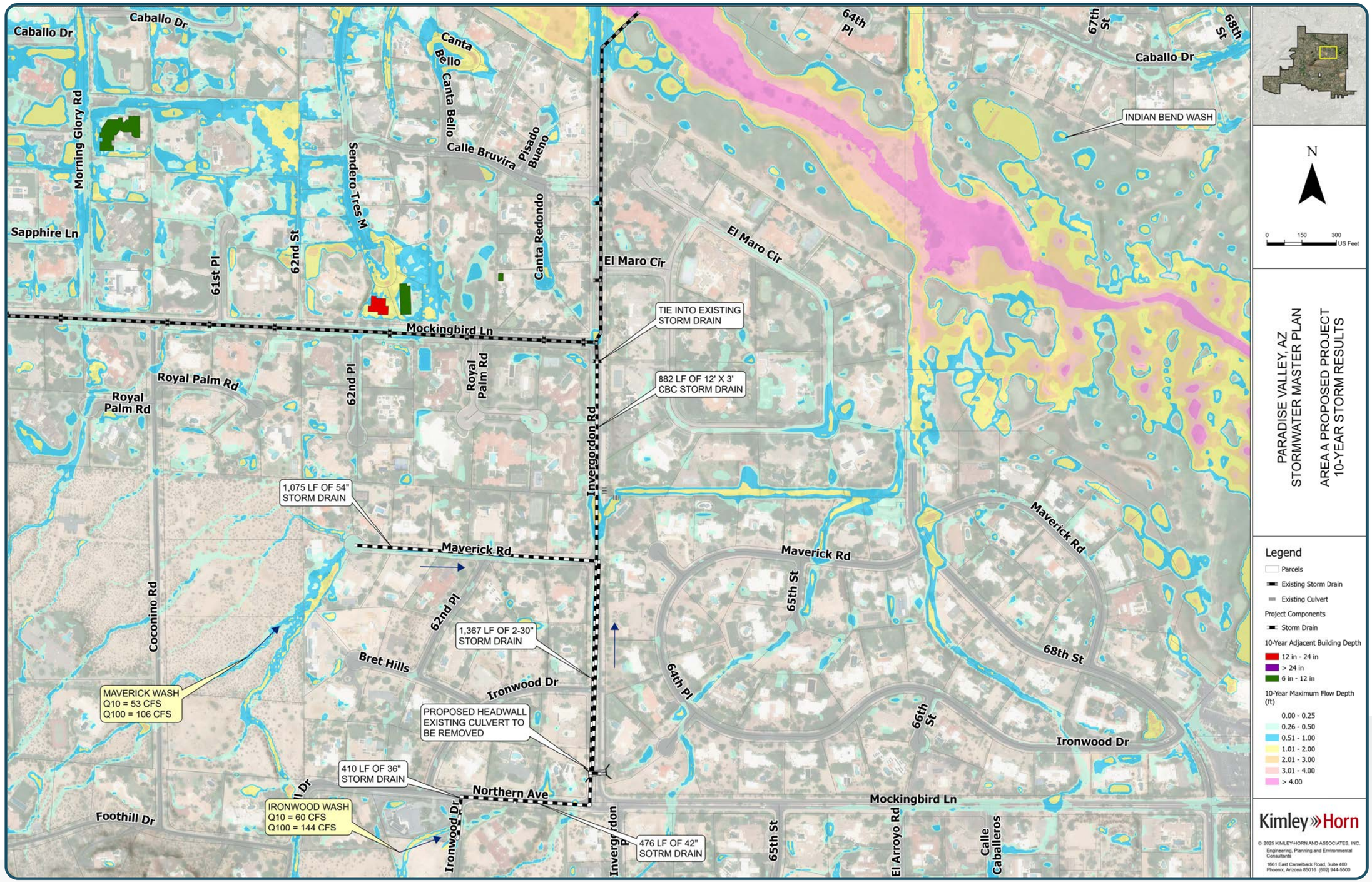
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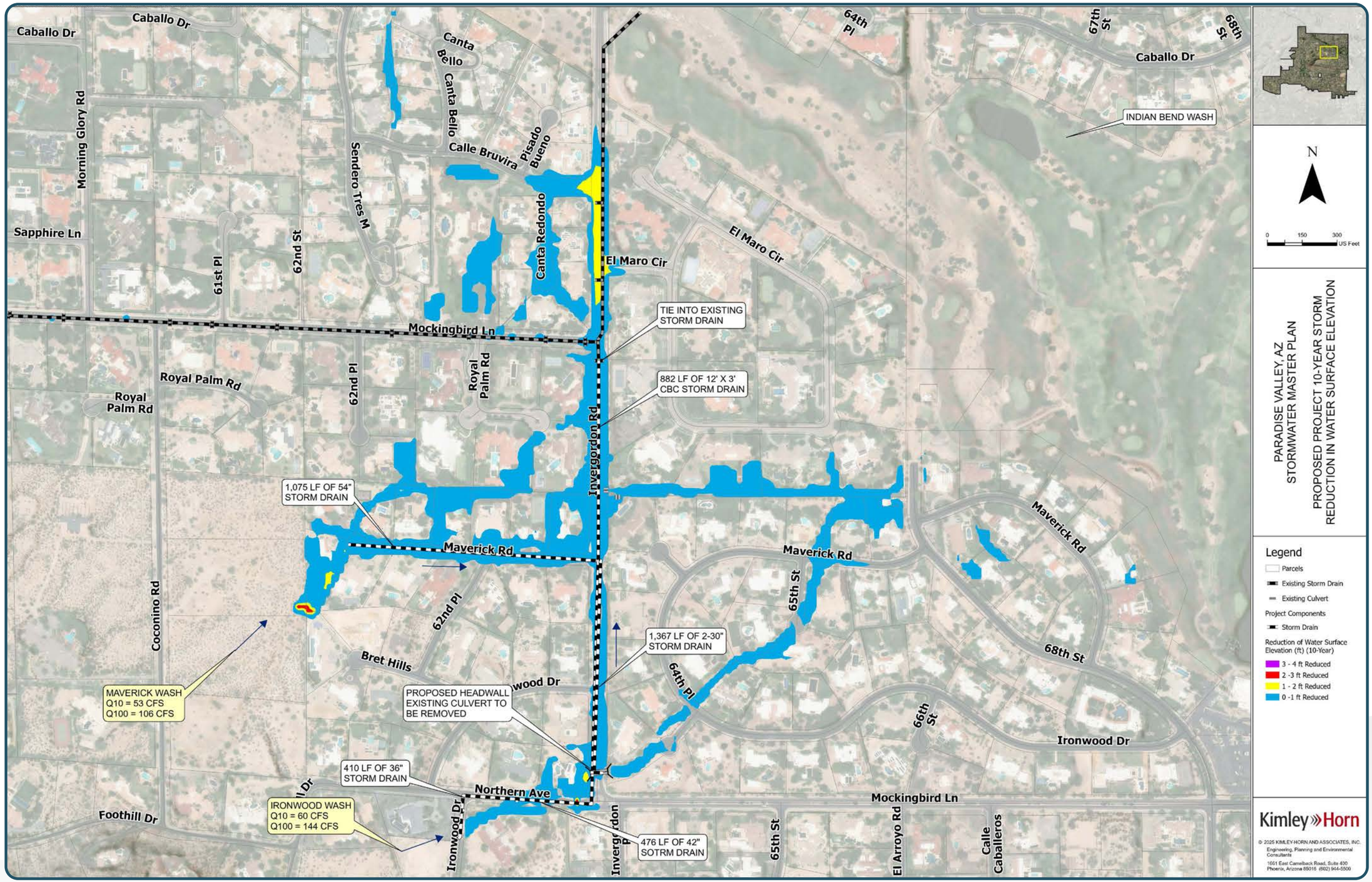
DRAWING NAME
AREA A

5 OF 6

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Caballo Dr
Caballo Dr
Morning Glory Rd
Sapphire Ln
61st Pl
62nd St
Sendero Tres M
Canta Bello
Canta Bello
Calle Bruvira
Pisado Bueno
Canta Redondo
El Maro Cir
El Maro Cir
Mockingbird Ln
Royal Palm Rd
Royal Palm Rd
62nd Pl
Royal Palm Rd
Invergordon Rd
64th Pl
67th St
68th St
Caballo Dr
INDIAN BEND WASH
Maverick Rd
Maverick Rd
Maverick Rd
62nd Pl
65th St
68th St
Coconino Rd
Bret Hills
Ironwood Dr
64th Pl
66th St
Ironwood Dr
MAVERICK WASH
Q10 = 53 CFS
Q100 = 106 CFS
IRONWOOD WASH
Q10 = 60 CFS
Q100 = 144 CFS
Northern Ave
Foothill Dr
Ironwood Dr
Invergordon Pl
65th St
Mockingbird Ln
El Arroyo Rd
Calle Caballeros
N
0
150
300
US Feet
PARADISE VALLEY, AZ
STORMWATER MASTER PLAN
AREA A EXISTING CONDITIONS
10-YEAR MAXIMUM FLOW DEPTH (FT)
Legend
Parcels
Existing Storm Drain
Existing Culvert
Project Components
Storm Drain
10-Year Maximum Flow Depth (ft)
0.00 - 0.25
0.26 - 0.50
0.51 - 1.00
1.01 - 2.00
2.01 - 3.00
3.01 - 4.00
> 4.00
10 Year Adjacent Building Depth
6 in - 12 in
12 in - 24 in
> 24 in
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Caballo Dr
Morning Glory Rd
Sapphire Ln
61st Pl
62nd St
Sendero Tres M
Canta Bello
Calle Bruvira
Pisado Bueno
Canta Redondo
El Maro Cir
Mockingbird Ln
Royal Palm Rd
62nd Pl
Invergordon Rd
64th Pl
67th St
68th St
INDIAN BEND WASH
TIE INTO EXISTING STORM DRAIN
882 LF OF 12' X 3' CBC STORM DRAIN
1,075 LF OF 54" STORM DRAIN
Maverick Rd
65th St
66th St
1,367 LF OF 2-30" STORM DRAIN
Bret Hills
Ironwood Dr
MAVERICK WASH
Q10 = 53 CFS
Q100 = 106 CFS
PROPOSED HEADWALL
EXISTING CULVERT TO
BE REMOVED
410 LF OF 36" STORM DRAIN
Northern Ave
IRONWOOD WASH
Q10 = 60 CFS
Q100 = 144 CFS
476 LF OF 42" SOTRM DRAIN
Foothill Dr
Coconino Rd
El Arroyo Rd
Calle Caballeros
N
0 150 300 US Feet
PARADISE VALLEY, AZ
STORMWATER MASTER PLAN
AREA A PROPOSED PROJECT
10-YEAR STORM RESULTS
Legend
Parcels
Existing Storm Drain
Existing Culvert
Project Components
Storm Drain
10-Year Adjacent Building Depth
12 in - 24 in
> 24 in
6 in - 12 in
10-Year Maximum Flow Depth (ft)
0.00 - 0.25
0.26 - 0.50
0.51 - 1.00
1.01 - 2.00
2.01 - 3.00
3.01 - 4.00
> 4.00
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Caballo Dr
Caballo Dr
Morning Glory Rd
Sapphire Ln
61st Pl
62nd St
Sendero Tres M
Canta Bello
Canta Bello
Calle Bruvira
Pisado Bueno
Canta Redondo
El Maro Cir
El Maro Cir
64th Pl
67th St
68th St
Caballo Dr
INDIAN BEND WASH
Mockingbird Ln
TIE INTO EXISTING STORM DRAIN
882 LF OF 12' X 3' CBC STORM DRAIN
Royal Palm Rd
Royal Palm Rd
62nd Pl
Royal Palm Rd
Invergordon Rd
1,075 LF OF 54" STORM DRAIN
Maverick Rd
Maverick Rd
Maverick Rd
62nd Pl
65th St
Coconino Rd
Bret Hills
1,367 LF OF 2-30" STORM DRAIN
64th Pl
68th St
MAVERICK WASH
Q10 = 53 CFS
Q100 = 106 CFS
PROPOSED HEADWALL
EXISTING CULVERT TO
BE REMOVED
66th St
Ironwood Dr
410 LF OF 36" STORM DRAIN
Northern Ave
Mockingbird Ln
IRONWOOD WASH
Q10 = 60 CFS
Q100 = 144 CFS
Foothill Dr
Ironwood Dr
65th St
El Arroyo Rd
Calle Caballeros
476 LF OF 42" SOTRM DRAIN
N
0 150 300 US Feet
PARADISE VALLEY, AZ
STORMWATER MASTER PLAN
PROPOSED PROJECT 10-YEAR STORM
REDUCTION IN WATER SURFACE ELEVATION
Legend
Parcels
Existing Storm Drain
Existing Culvert
Project Components
Storm Drain
Reduction of Water Surface Elevation (ft) (10-Year)
3 - 4 ft Reduced
2 -3 ft Reduced
1 - 2 ft Reduced
0 -1 ft Reduced
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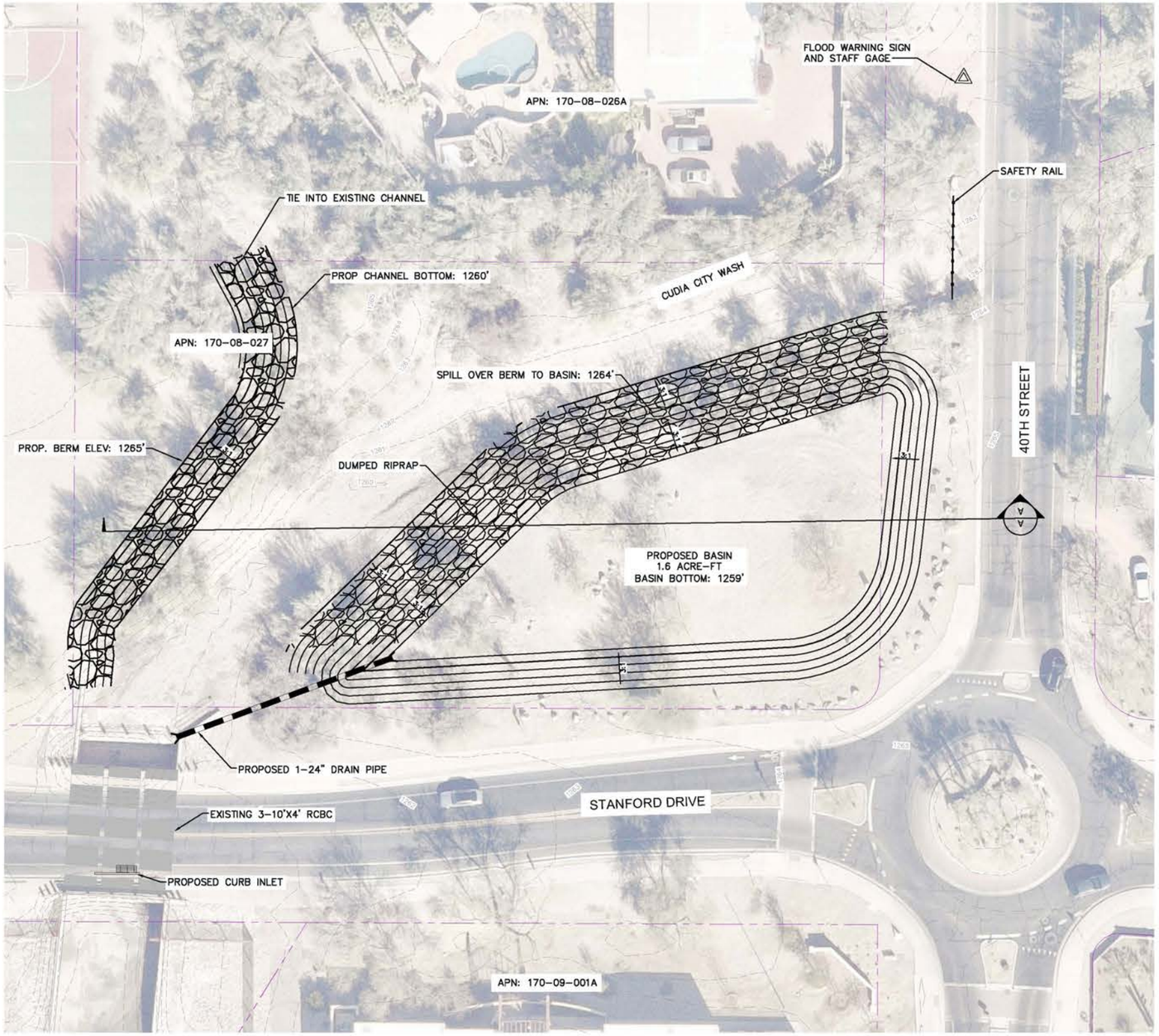
B. Flood Hazard Area H – 40th Street and Standford Drive

Description

Alternative 2 was selected from the three alternatives evaluated in the project matrix. This alternative involved making 2-year storm improvements to the existing wash running through 40th Street and Stanford Drive, the inclusion of a flood control basin, and the expansion of the curb inlet on Stanford Drive. The proposed channel was further refined with the following improvements: the channel bottom would be lowered to an elevation of 1260', and the side slopes would be graded at 3 to 1 to an elevation of 1265' on the north side of the channel. The south side of the channel would only be graded to an elevation of 1264' and would function as a spill over to the adjacent flood control basin. The basin was designed to use as much space as possible within the parcel and ROW. It would have 3 to 1 side slopes and a bottom elevation of 1259'. This would give the basin a height of 5 ft and provide a storage volume of 1.6 acre-ft. A 24" drain pipe located at the southeast corner of the basin would drain water to the existing culvert inlet on the north side of Stanford Drive. To reduce flooding along Stanford Drive, the existing curb inlet would be expanded to increase its capacity to drain water from the road. Safety measures including a staff gage, flood warning signage, and safety rails would be placed on 40th Street. This project is estimated to cost 1,039,500 USD. Conceptual plans are shown on the following pages with the detailed cost estimate include in **Appendix G**.

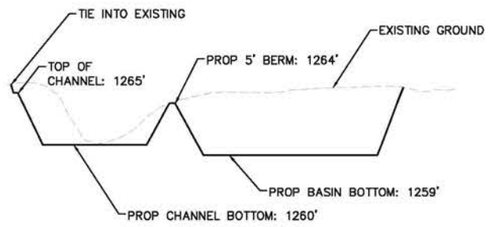
Benefits

The implementation of this project would allow for decreased frequency of road closures at this intersection. In existing conditions, the entire intersection must typically be shut down for the 2-year storm. Stanford Drive becomes inundated with 1 to 3 feet of water and 40th Street with up to 5 feet of water according to modeling results. Recorded instances of the intersection being shut down have been confirmed and recorded by Town Staff. In 2-year and 10-year storm proposed conditions, Stanford Drive could remain open with closures being limited to the 40th Street wash crossing. This project would improve emergency and passenger vehicle access. A cost/benefit ratio was not calculated for this project as the benefits are entirely improved transportation function and emergency vehicle access improvement. 10-year existing conditions, proposed conditions, and depth difference maps, along with conceptual plans, are shown on the following pages. Additional storm events results are included in **Appendix F.**



SECTION A-A

SCALE: 1"=50'



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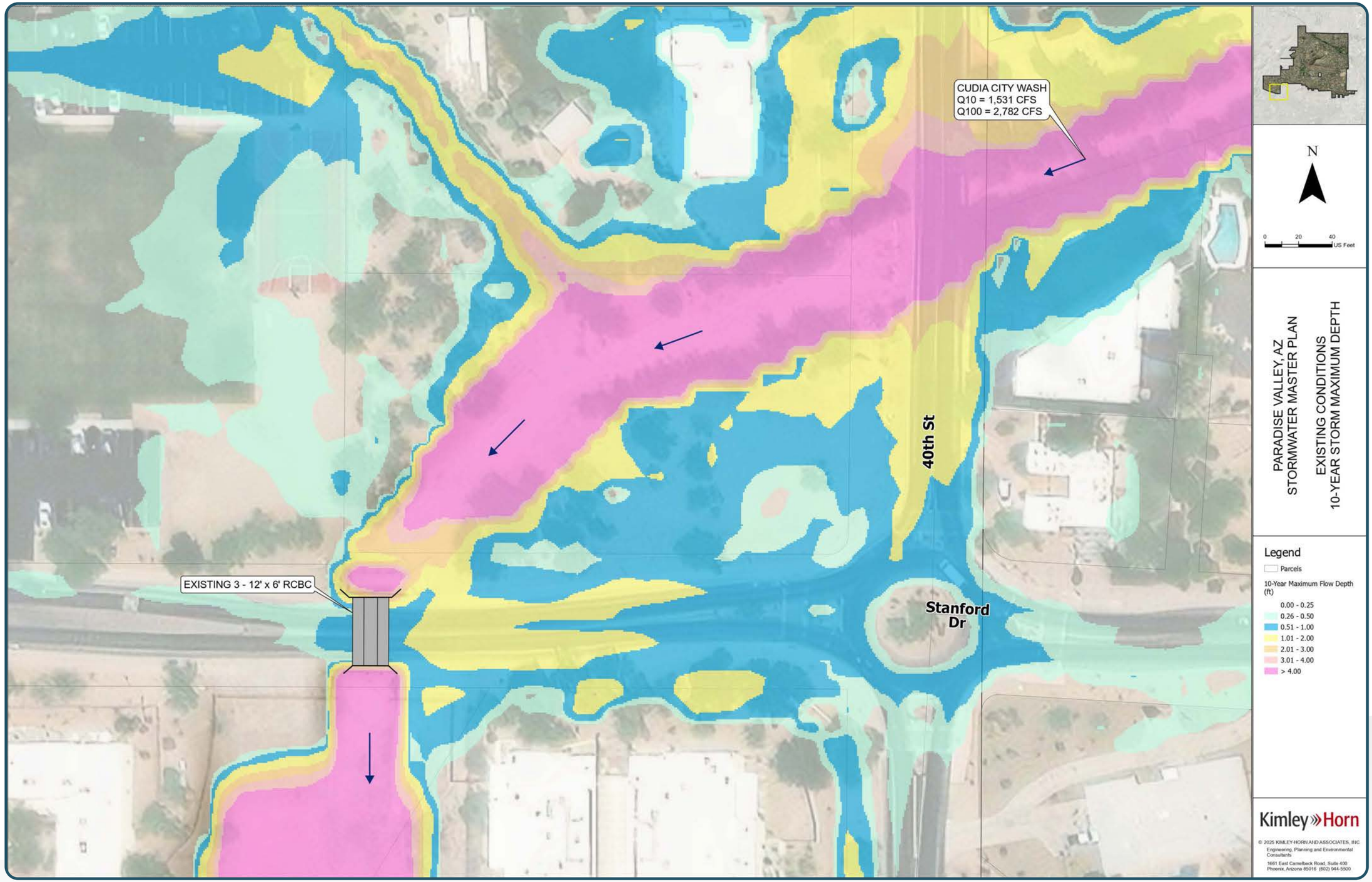
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AREA H SELECTED ALTERNATIVE 15% PLANS

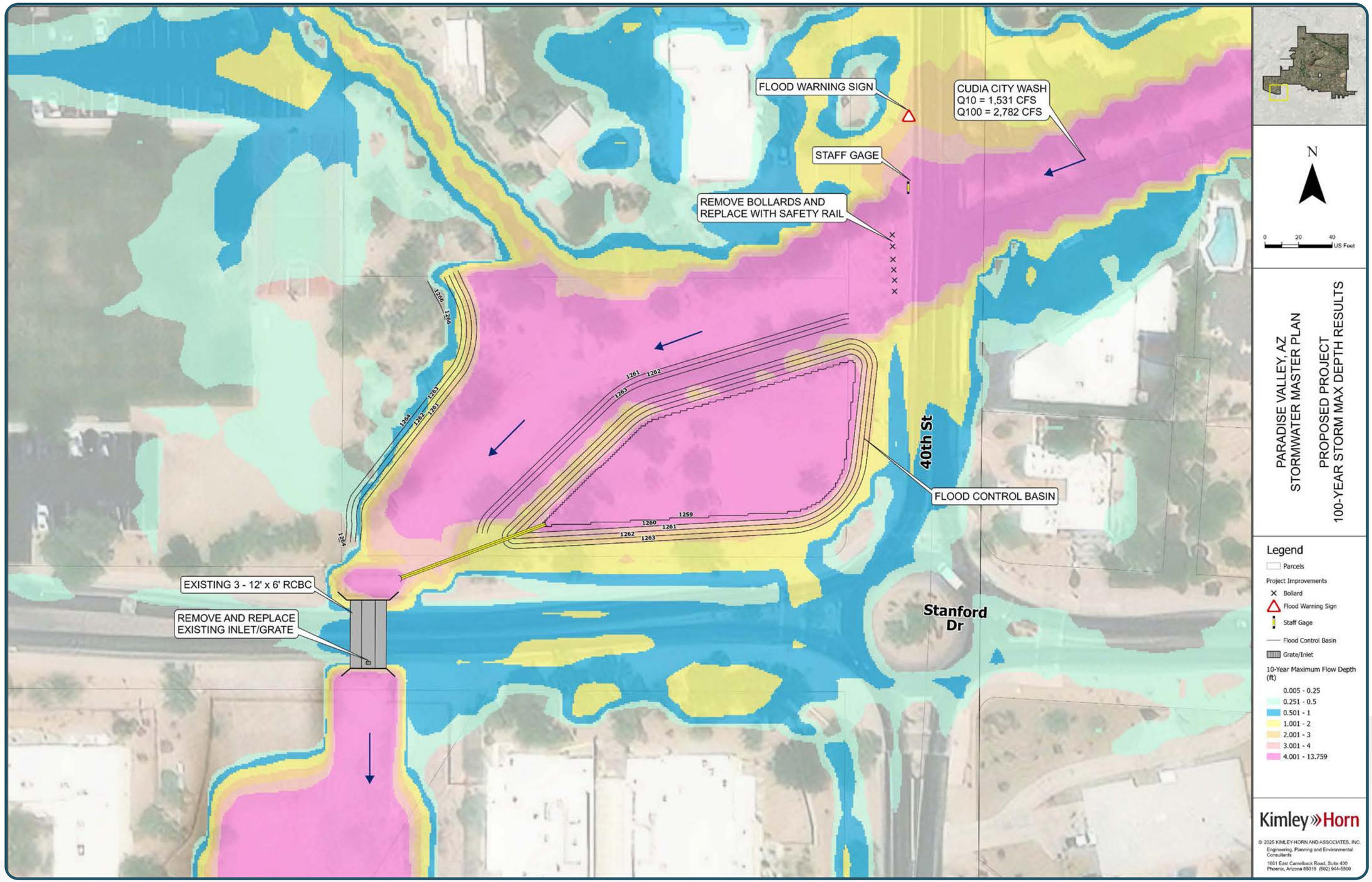
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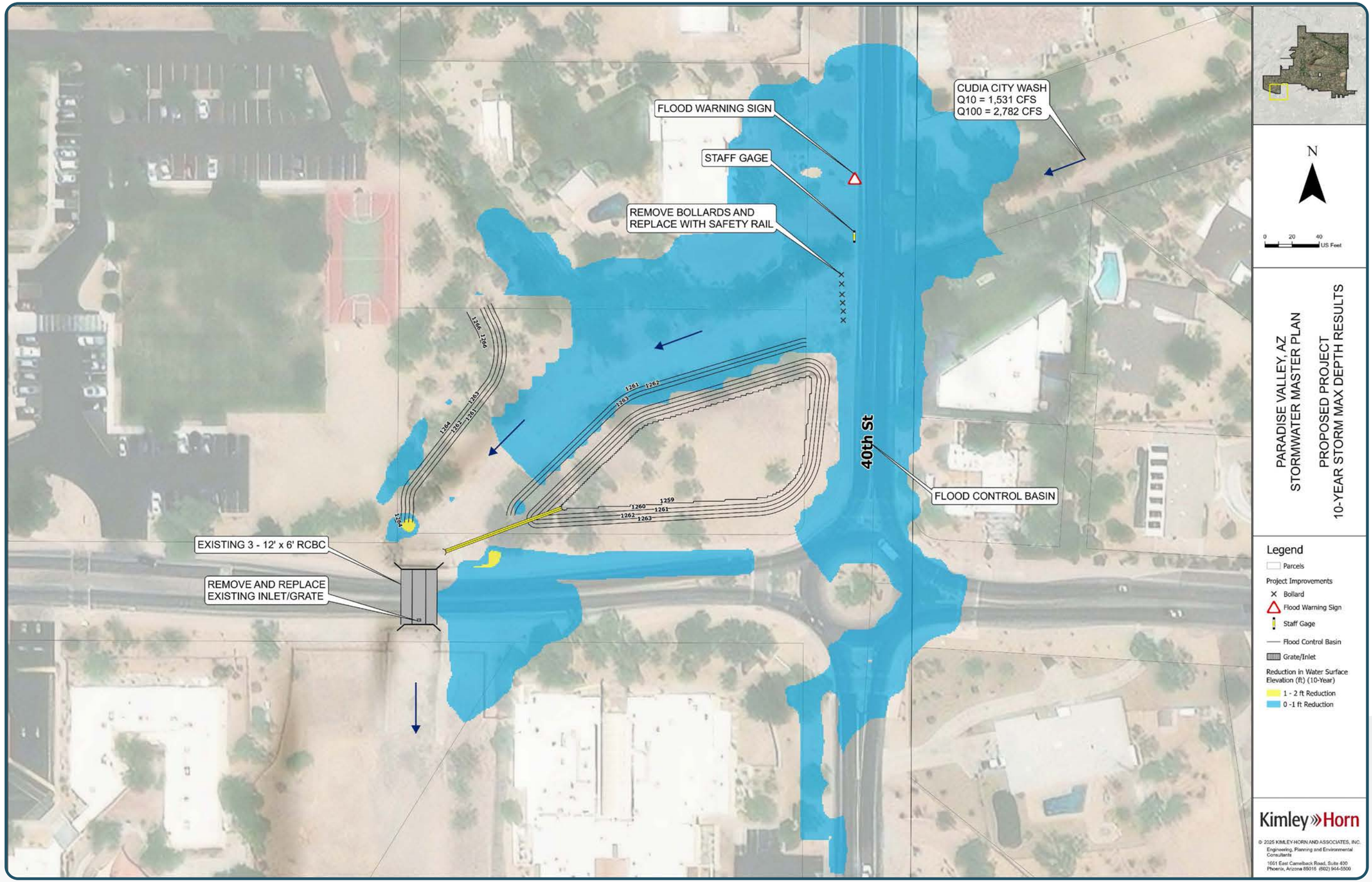
PROJECT NO.
091054031

DRAWING NAME
AREA H

1 OF 1


CUDIA CITY WASH
Q10 = 1,531 CFS
Q100 = 2,782 CFS
EXISTING 3 - 12' x 6' RCBC
40th St
Stanford Dr
N
0 20 40
US Feet
PARADISE VALLEY, AZ
STORMWATER MASTER PLAN
EXISTING CONDITIONS
10-YEAR STORM MAXIMUM DEPTH
Legend
Parcels
10-Year Maximum Flow Depth (ft)
0.00 - 0.25
0.26 - 0.50
0.51 - 1.00
1.01 - 2.00
2.01 - 3.00
3.01 - 4.00
> 4.00
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FLOOD WARNING SIGN
CUDIA CITY WASH
Q10 = 1,531 CFS
Q100 = 2,782 CFS
STAFF GAGE
REMOVE BOLLARDS AND
REPLACE WITH SAFETY RAIL
40th St
FLOOD CONTROL BASIN
EXISTING 3 - 12' x 6' RCBC
REMOVE AND REPLACE
EXISTING INLET/GRATE
Stanford
Dr
N
0 20 40
US Feet
PARADISE VALLEY, AZ
STORMWATER MASTER PLAN
PROPOSED PROJECT
100-YEAR STORM MAX DEPTH RESULTS
Legend
Parcels
Project Improvements
Bollard
Flood Warning Sign
Staff Gage
Flood Control Basin
Grate/Inlet
10-Year Maximum Flow Depth (ft)
0.005 - 0.25
0.251 - 0.5
0.501 - 1
1.001 - 2
2.001 - 3
3.001 - 4
4.001 - 13.759
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FLOOD WARNING SIGN
STAFF GAGE
REMOVE BOLLARDS AND REPLACE WITH SAFETY RAIL
CUDIA CITY WASH
Q10 = 1,531 CFS
Q100 = 2,782 CFS
40th St
FLOOD CONTROL BASIN
EXISTING 3 - 12' x 6' RCBC
REMOVE AND REPLACE EXISTING INLET/GRATE
N
0 20 40
US Feet
PARADISE VALLEY, AZ
STORMWATER MASTER PLAN
PROPOSED PROJECT
10-YEAR STORM MAX DEPTH RESULTS
Legend
Parcels
Project Improvements
Bollard
Flood Warning Sign
Staff Gage
Flood Control Basin
Grate/Inlet
Reduction in Water Surface Elevation (ft) (10-Year)
1 - 2 ft Reduction
0 -1 ft Reduction
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C. Flood Hazard Area K – Mountain View Road

Description

Alternative 2 was selected from the two alternatives evaluated in the project matrix. This alternative involves constructing a retention basin upstream of Mountain View Road. The basin was sized with 3 to 1 slopes, a top elevation of 1396, and a bottom of elevation of 1388. This configuration provides 32.6 acre-ft of water storage, containing the 10-year hydrograph. The basin outfalls to a spillover weir on the west side of Tatum Boulevard. This project is estimated to cost 6,072,476 USD. Conceptual plans are shown on the following pages with the detailed cost estimate included in **Appendix G.**

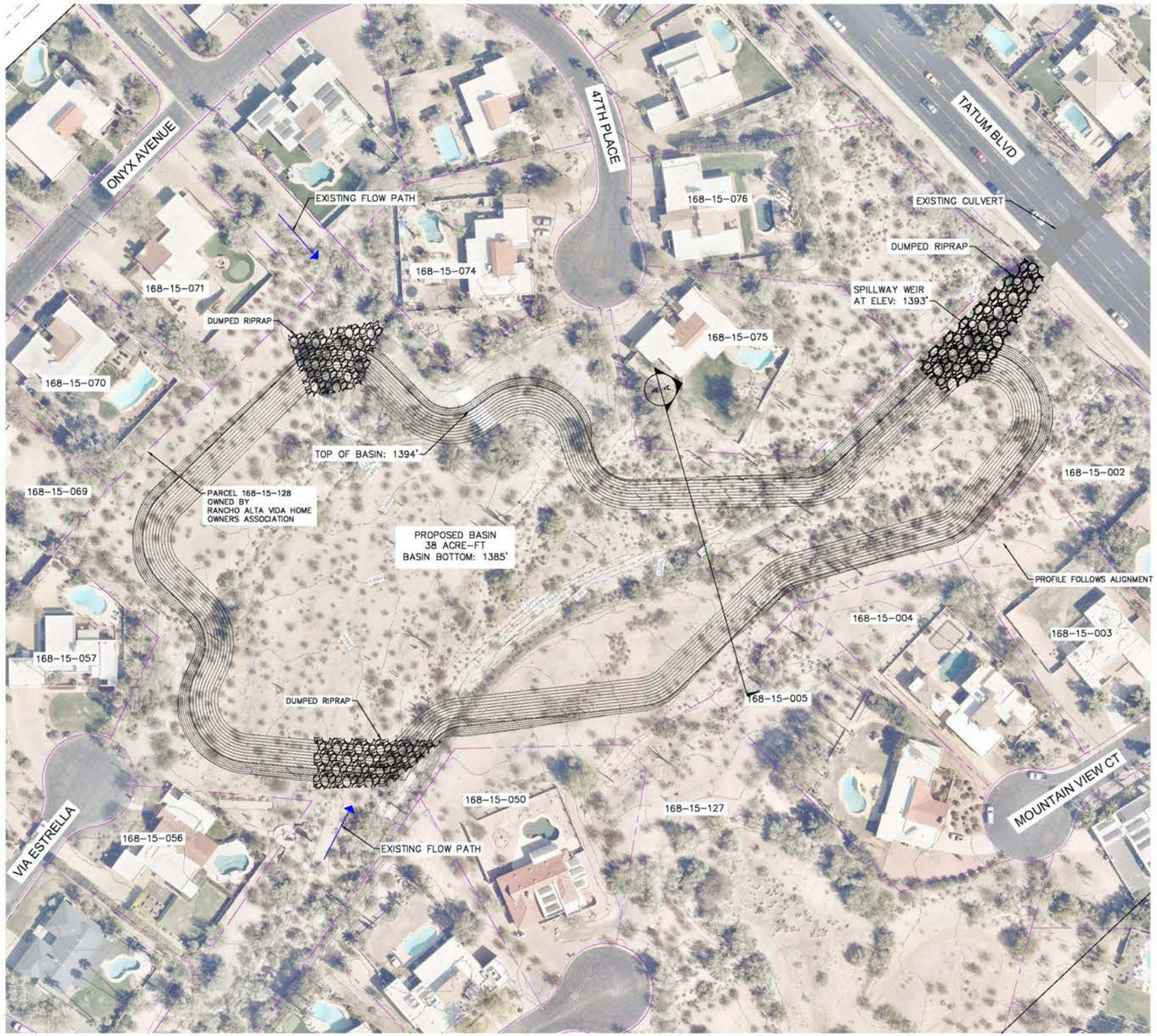
Benefits

The potential benefits for the 10-year and 100-year storms were developed for the project and are shown in **Table 31**. The benefits were determined by incorporating the proposed drainage improvements into the FLO-2D model and comparing the pre and post project flow depth conditions adjacent to the impacted buildings. By using the U.S. Army Corps of Engineers (USACE) depth-damage curves for the building structures and building contents, a damage reduction or benefit per building was determined for the 10- and 100-year storms. The USACE depth damage curves can be seen in **Appendix H**. If the detention basin is built, it is expected to have a life cycle of 75-years, and total benefits of about 18.7 million USD when assuming seven 10-year storms and one 100-year storm occurring during the infrastructure life span

Table 31: Area K Benefit Cost Ratio Summary

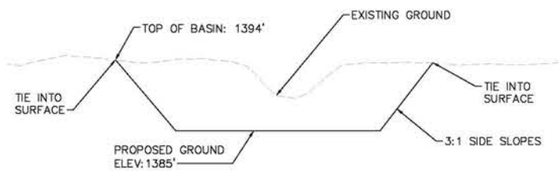
Number of Properties Impacted		220
Approximate Population1		550
Benefit with Drainage Improvements in Place ($)	Damage Reduction	21,394,816
	Social Benefits	1,978,900
	Total	23,293,796
Construction Cost		11,616,355
Benefit-Cost Ratio (BCR)		2.01

1Assumed 2.5 people per household from U.S. Census for the Town of Paradise Valley.
2Social benefits are based on the number of residents impacted and are calculated using FEMA's Benefit Cost Analysis toolkit. This would account for traffic closures, interruptions to work, etc.
3Assumed at least seven 10-year storms and one 100- year storm occur during the 75-year life span of the improvements.



SECTION A-A

SCALE: 1"=30'



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NO. REVISION DATE

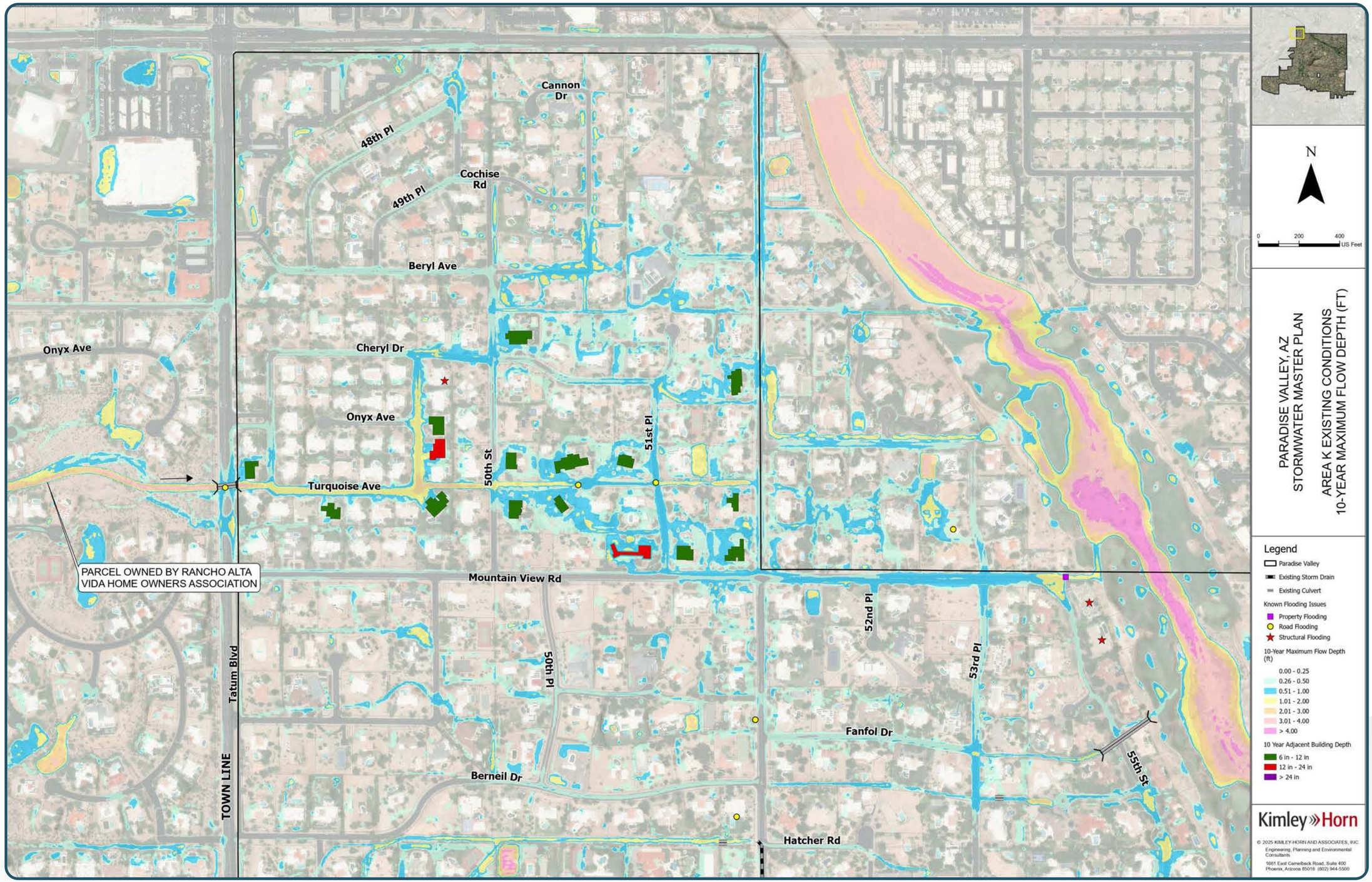
SCALE (H): 1"=30'
SCALE (V): 1"=2'
DESIGNED BY: PTB
DRAWN BY: PTB
CHECKED BY: GSB
DATE: 03/25

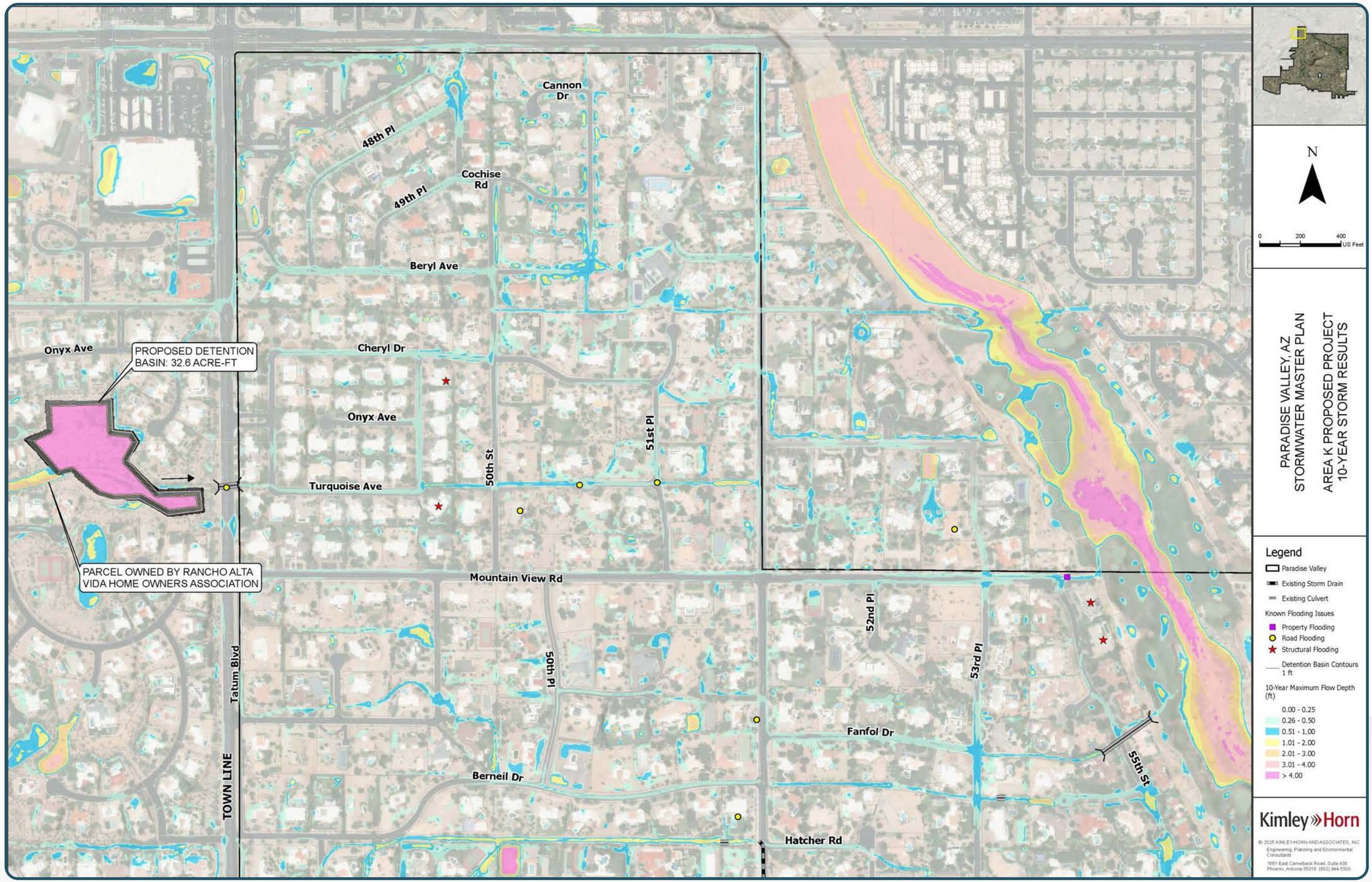
PARADISE VALLEY SWMP
AREA K SELECTED ALTERNATIVE 15% PLANS

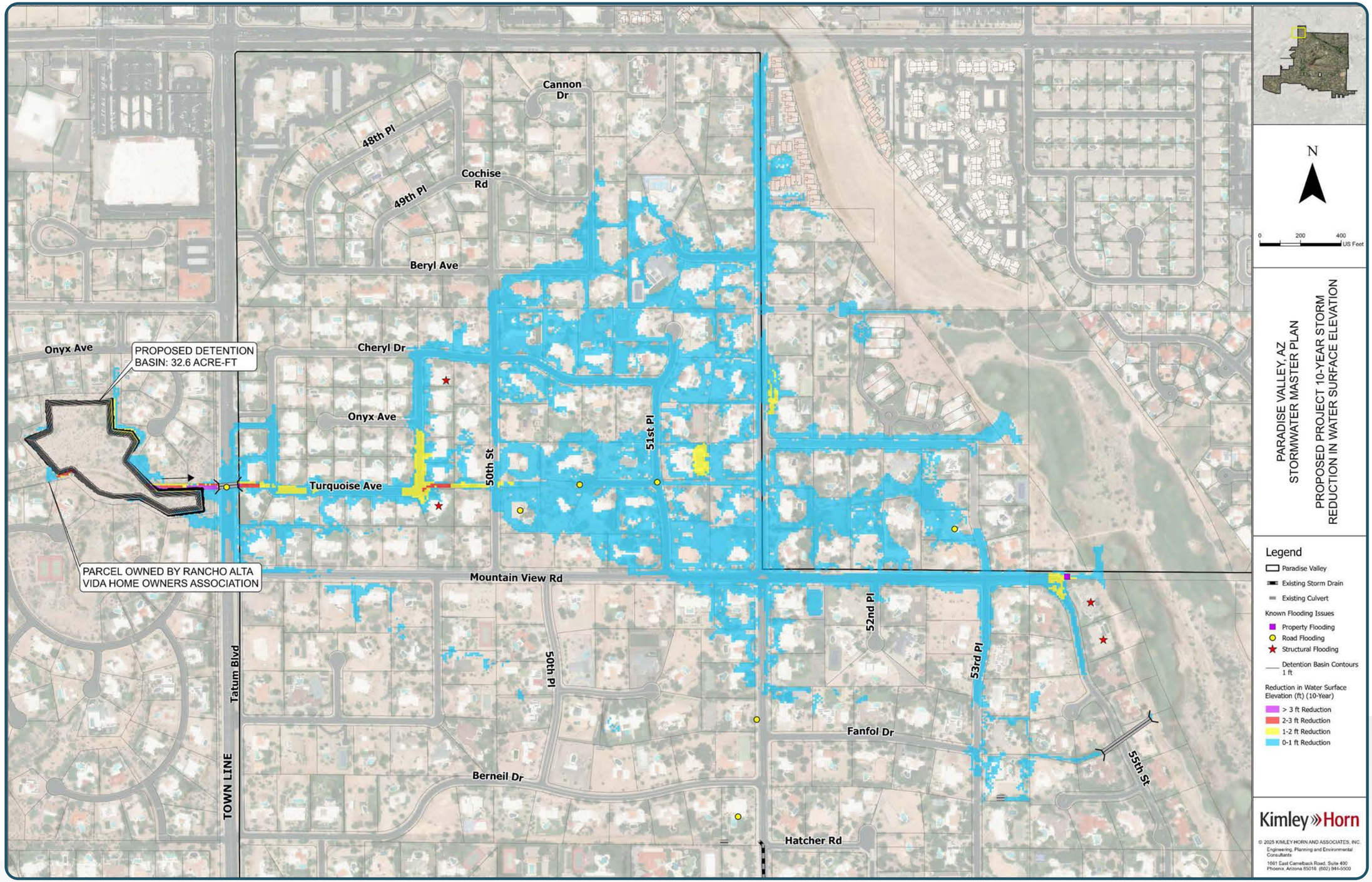
NORTH

PROJECT NO.
091054031

DRAWING NAME
AREA A


Cannon Dr
48th Pl
49th Pl
Cochise Rd
Beryl Ave
Onyx Ave
Cheryl Dr
Onyx Ave
51st Pl
50th St
Turquoise Ave
PARCEL OWNED BY RANCHO ALTA VIDA HOME OWNERS ASSOCIATION
Mountain View Rd
Tatum Blvd
50th Pl
52nd Pl
53rd Pl
Fanfol Dr
55th St
Berneil Dr
TOWN LINE
Hatcher Rd
N
0 200 400 US Feet
PARADISE VALLEY, AZ
STORMWATER MASTER PLAN
AREA K EXISTING CONDITIONS
10-YEAR MAXIMUM FLOW DEPTH (FT)
Legend
Paradise Valley
Existing Storm Drain
Existing Culvert
Known Flooding Issues
Property Flooding
Road Flooding
Structural Flooding
10-Year Maximum Flow Depth (ft)
0.00 - 0.25
0.26 - 0.50
0.51 - 1.00
1.01 - 2.00
2.01 - 3.00
3.01 - 4.00
> 4.00
10 Year Adjacent Building Depth
6 in - 12 in
12 in - 24 in
> 24 in
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Cannon Dr
48th Pl
Cochise Rd
49th Pl
Beryl Ave
Onyx Ave
PROPOSED DETENTION BASIN: 32.6 ACRE-FT
Cheryl Dr
Onyx Ave
50th St
51st Pl
Turquoise Ave
PARCEL OWNED BY RANCHO ALTA VIDA HOME OWNERS ASSOCIATION
Mountain View Rd
Tatum Blvd
TOWN LINE
50th Pl
52nd Pl
53rd Pl
Fanfol Dr
Berneil Dr
55th St
Hatcher Rd
N
0 200 400 US Feet
PARADISE VALLEY, AZ
STORMWATER MASTER PLAN
AREA K PROPOSED PROJECT
10-YEAR STORM RESULTS
Legend
Paradise Valley
Existing Storm Drain
Existing Culvert
Known Flooding Issues
Property Flooding
Road Flooding
Structural Flooding
Detention Basin Contours 1 ft
10-Year Maximum Flow Depth (ft)
0.00 - 0.25
0.26 - 0.50
0.51 - 1.00
1.01 - 2.00
2.01 - 3.00
3.01 - 4.00
> 4.00
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Cannon Dr
48th Pl
49th Pl
Cochise Rd
Beryl Ave
Cheryl Dr
Onyx Ave
PROPOSED DETENTION BASIN: 32.6 ACRE-FT
PARCEL OWNED BY RANCHO ALTA VIDA HOME OWNERS ASSOCIATION
Turquoise Ave
50th St
51st Pl
Mountain View Rd
52nd Pl
53rd Pl
55th St
Tatum Blvd
TOWN LINE
50th Pl
Fanfol Dr
Berneil Dr
Hatcher Rd
N
0 200 400 US Feet
PARADISE VALLEY, AZ
STORMWATER MASTER PLAN
PROPOSED PROJECT 10-YEAR STORM
REDUCTION IN WATER SURFACE ELEVATION
Legend
Paradise Valley
Existing Storm Drain
Existing Culvert
Known Flooding Issues
Property Flooding
Road Flooding
Structural Flooding
Detention Basin Contours 1 ft
Reduction in Water Surface Elevation (ft) (10-Year)
> 3 ft Reduction
2-3 ft Reduction
1-2 ft Reduction
0-1 ft Reduction
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D. Flood Hazard Area L – Upstream Cherokee Wash

Description

Alternative 2 was selected from the two alternatives evaluated in the project decision matrix. The alternative involves replacing three low water crossings with culverts. This alternative requires raising the road to accommodate the culvert configuration. The proposed culverts were developed with the following improvements: the extent of roadway grading necessary for the construction of the culverts was determined and optimized by creating a 3D profile. The profiles provided the required length, invert elevations, and road elevation of the proposed culverts. Using these variables, the 10-year storm water surface elevation passing through the culvert was determined by normal depth calculations. The culvert profiles are included in **Appendix H.** The final configuration for the culverts is 2-10' x 4' on Crestview Drive and Arroyo Drive and a 3-10'x4' on Desert Jewel Drive. Safety rails based on MAG Standard Detail 145 were included in conceptual design. This project is estimated to cost 6,113,214 USD. See **Appendix G** for the associated conceptual cost estimate.

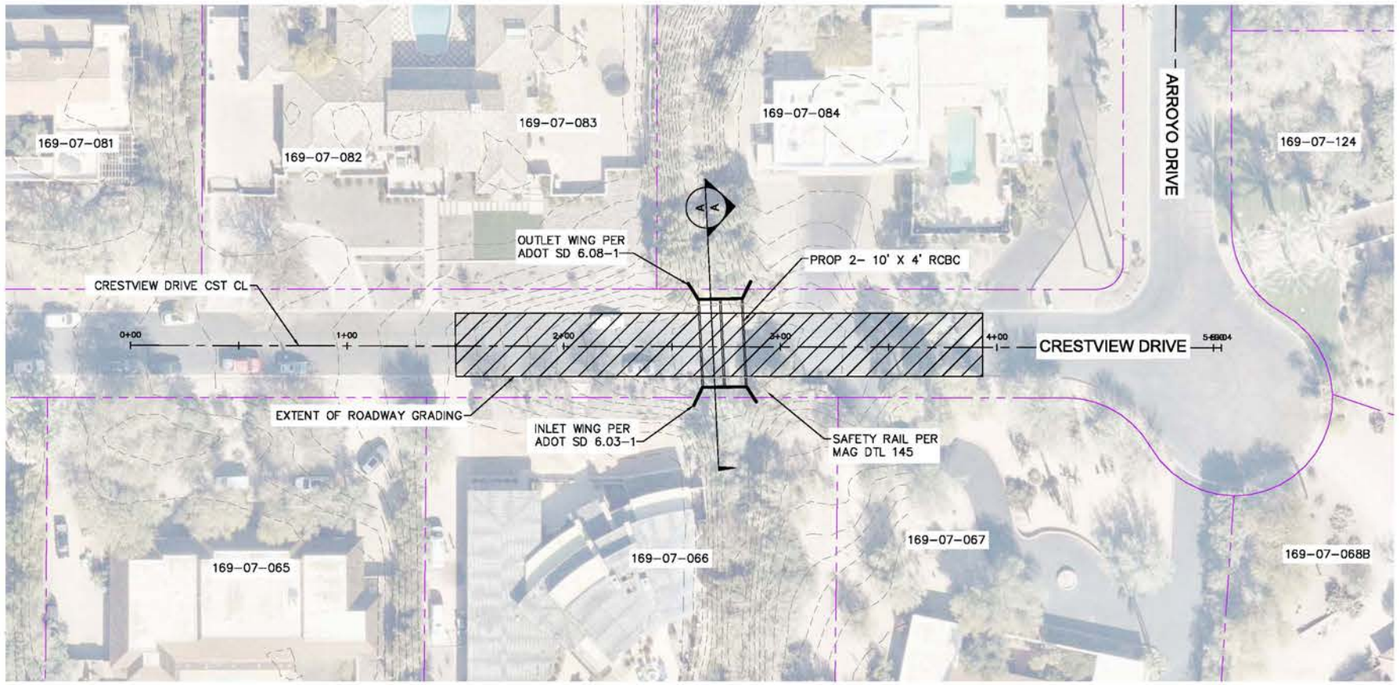
Benefits

The completion of this project would improve public safety and reduce obstruction to emergency vehicle access. In 10-year existing conditions, the maximum flow depths through Crestview Drive, Arroyo Drive, and Desert Jewel Drive are 6 ft, 6.1 ft, and 4.2 ft, respectively per modeling results. These water crossings are hazards to emergency vehicle access and the traveling public. The culvert configuration contains the 2-year storm, and obstructions to emergency vehicles are reduced in the 10-year storm. A cost/benefit ratio was not calculated for this project as the benefits are entirely improved transportation function and emergency access improvement. 10-year existing condition, proposed condition, and depth difference maps, along with conceptual plans, are shown on the following pages. Additional storm event results are included in **Appendix F.**

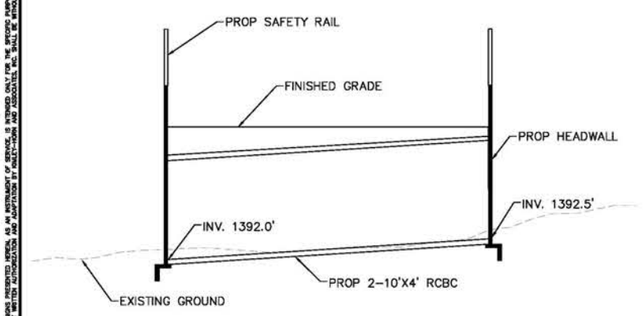
NORTH

GRAPHIC SCALE IN FEET
0 15 30 60

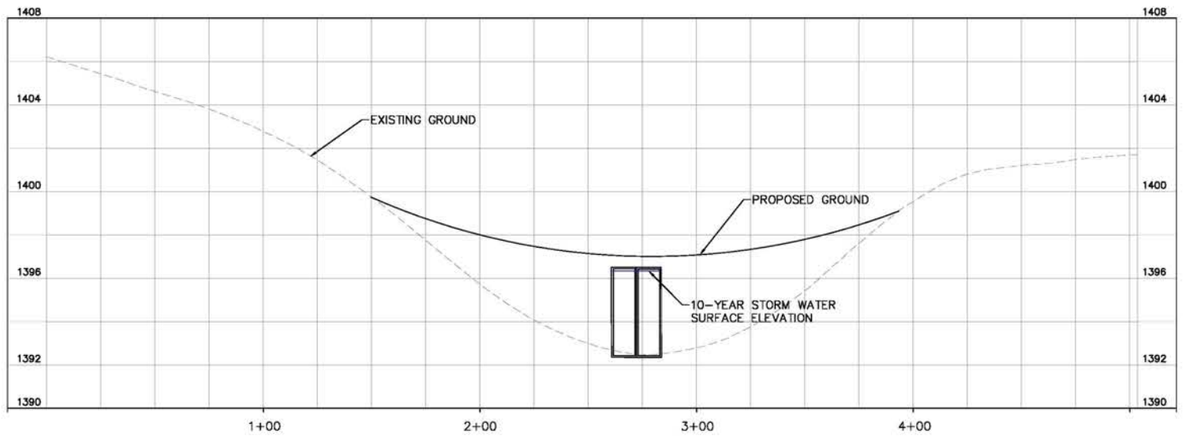
PROFILE VIEW
VERT SCALE: 1"=4'



SECTION A-A
SCALE: 1"=15'



CULVERT PROFILE



NO.	REVISION	DATE

Kimley»Horn

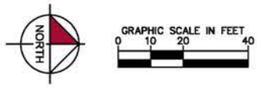
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1961 E. CAMELBACK RD # 400
PHOENIX, ARIZONA 85016 (602) 944-5500

SCALE (H): 1"=30'
SCALE (V): 1"=4'
DESIGNED BY: PTB
DRAWN BY: PTB
CHECKED BY: GSB
DATE: 03/2025

PARADISE VALLEY SWMP
AREA L SELECTED ALTERNATIVE 15% PLANS

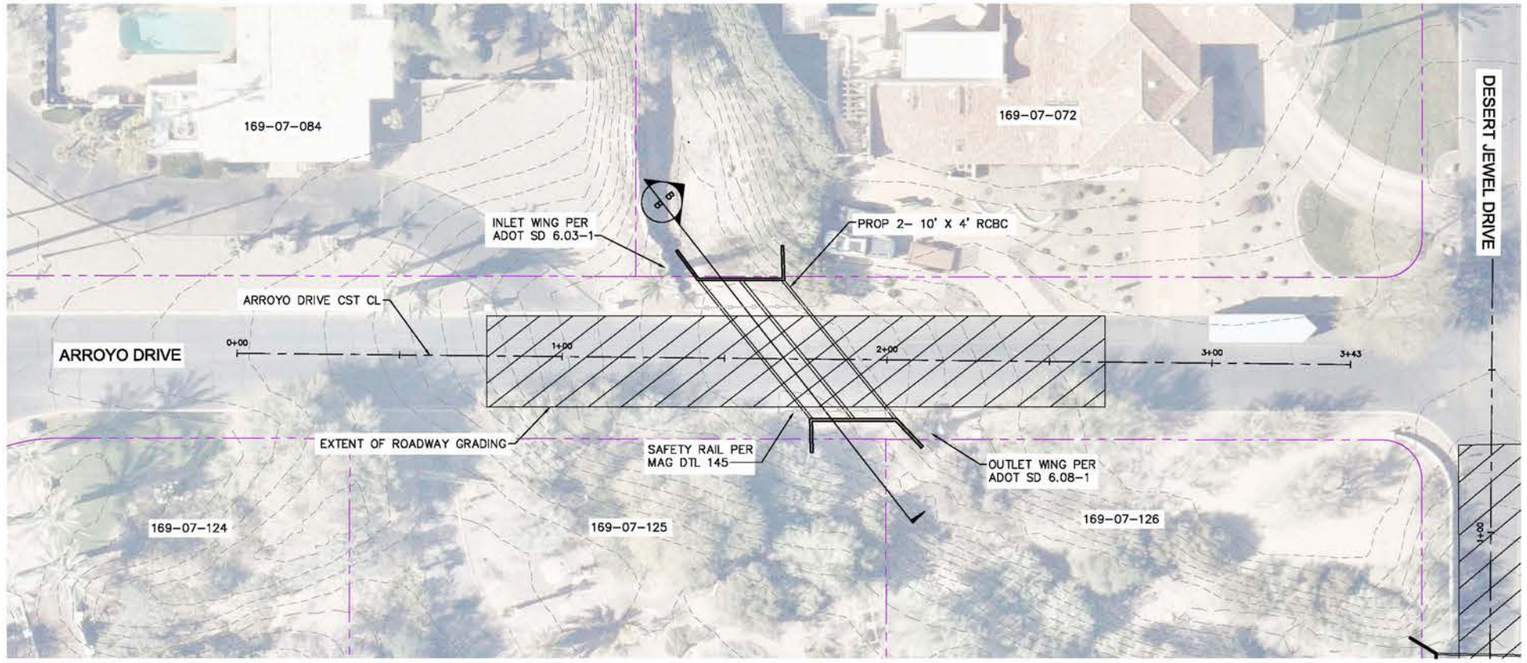
PROJECT NO.
091054031
DRAWING NAME
AREA L
1 OF 3

THESE PLANS, TOGETHER WITH THE CONCEPTS AND DESIGNS PRESENTED HEREIN, AS AN INSTRUMENT OF SERVICE, IS INTENDED ONLY FOR THE SPECIFIC PURPOSE AND CLIENT FOR WHICH IT WAS PREPARED. REUSE OF AND IMPROPER RELIANCE ON THESE PLANS WITHOUT WRITTEN AUTHORIZATION BY KIMLEY-HORN AND ASSOCIATES, INC. SHALL BE WITHOUT LIABILITY TO KIMLEY-HORN AND ASSOCIATES, INC.



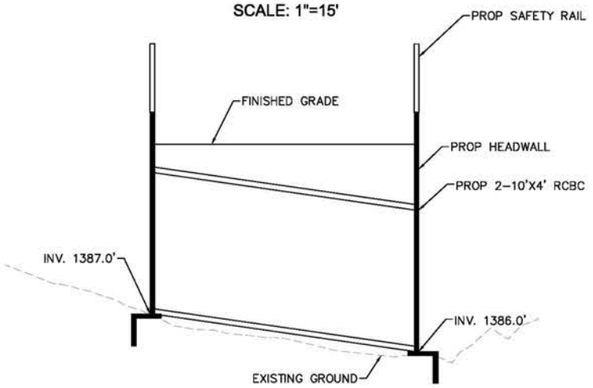
PROFILE VIEW

VERT SCALE: 1"=4'

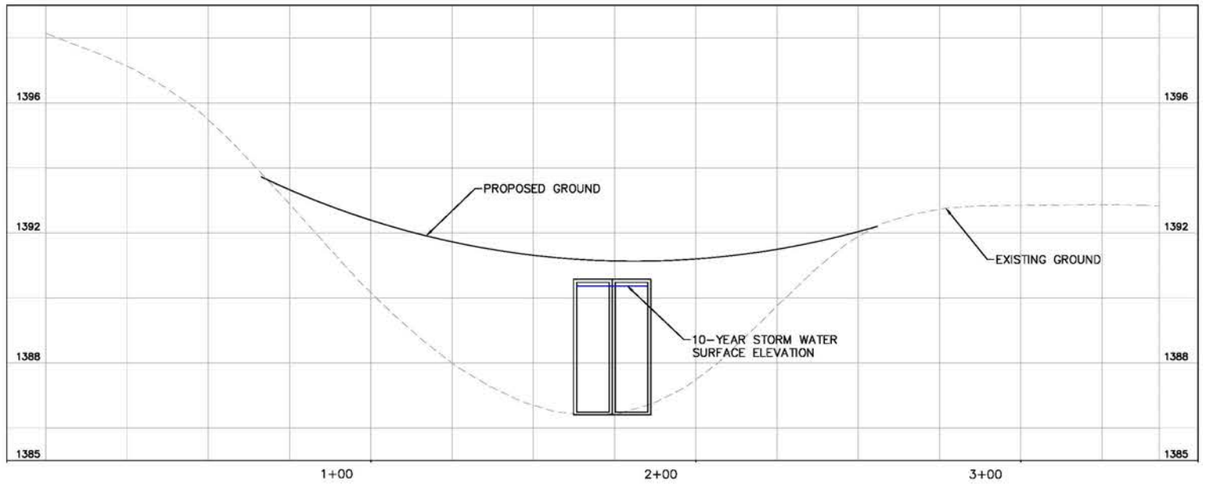


SECTION B-B

SCALE: 1"=15'



CULVERT PROFILE



NO.	REVISION	DATE

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SCALE (H): 1"=30'
SCALE (V): 1"=4'
DESIGNED BY: PTB
DRAWN BY: PTB
CHECKED BY: GSB
DATE: 03/2025

PARADISE VALLEY SWMP
AREA L SELECTED ALTERNATIVE 15% PLANS

PROJECT NO.
091054031

DRAWING NAME
AREA L

2 OF 3

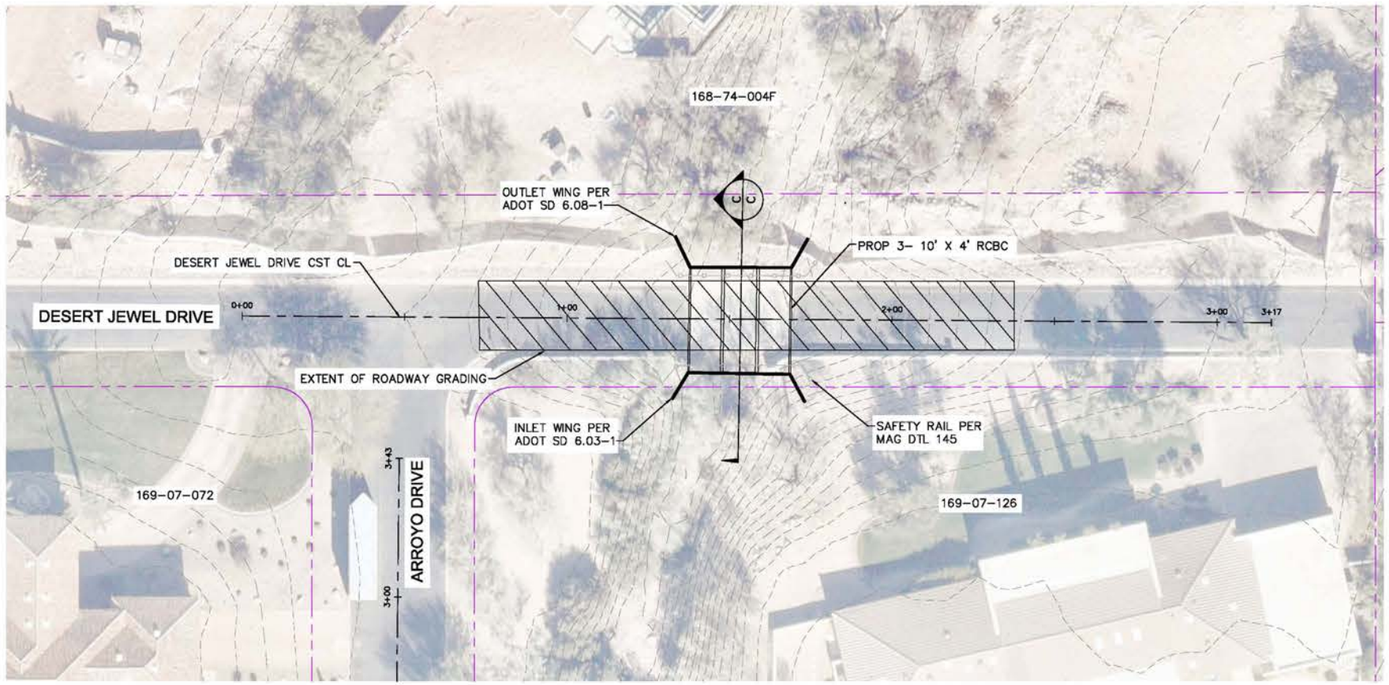
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XREFS: xD: xArea_L_detail
THESE PLANS AND DESIGNS PRESENTED HEREIN, AS AN INSTRUMENT OF SERVICE, IS INTENDED ONLY FOR THE SPECIFIC PURPOSE AND CLIENT FOR WHICH IT WAS PREPARED. REUSE OF AND IMPROPER RELIANCE ON THIS DOCUMENT WITHOUT WRITTEN AUTHORIZATION AND ADAPTATION BY KIMLEY-HORN AND ASSOCIATES, INC. SHALL BE WITHOUT LIABILITY TO KIMLEY-HORN AND ASSOCIATES, INC.

NORTH

GRAPHIC SCALE IN FEET
0 15 30 60

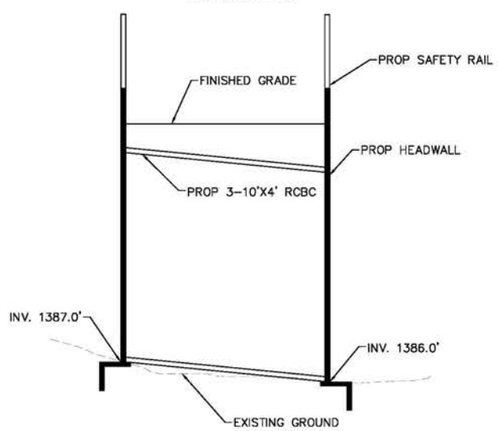
PROFILE VIEW

VERT SCALE: 1"=4'

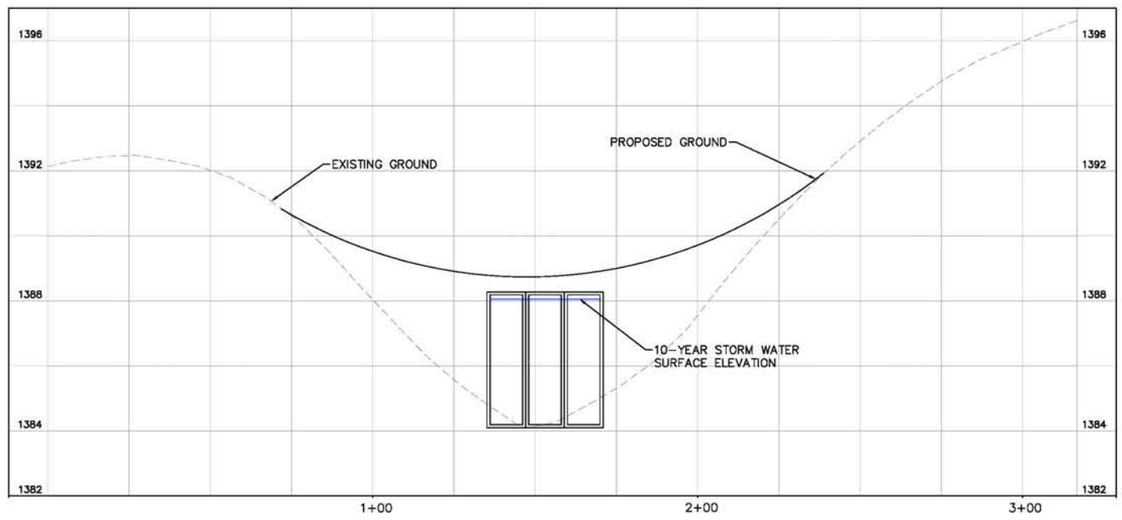


SECTION C-C

SCALE: 1"=15'



CULVERT PROFILE



NO.	REVISION	DATE

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SCALE (H): 1"=30'
SCALE (V): 1"=4'
DESIGNED BY: PTB
DRAWN BY: PTB
CHECKED BY: GSB
DATE: 03/2025

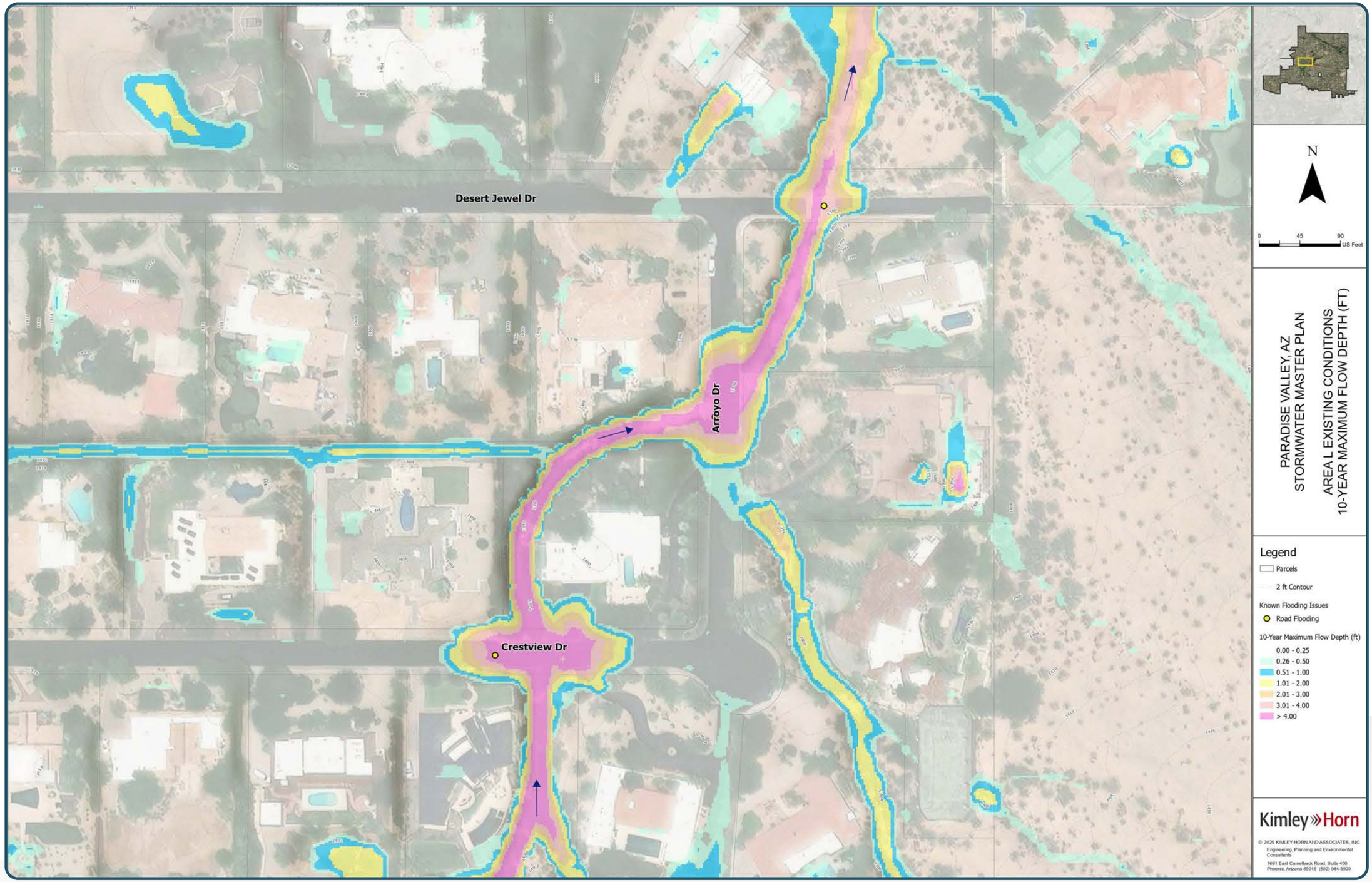
PARADISE VALLEY SWMP
AREA L SELECTED ALTERNATIVE 15% PLANS

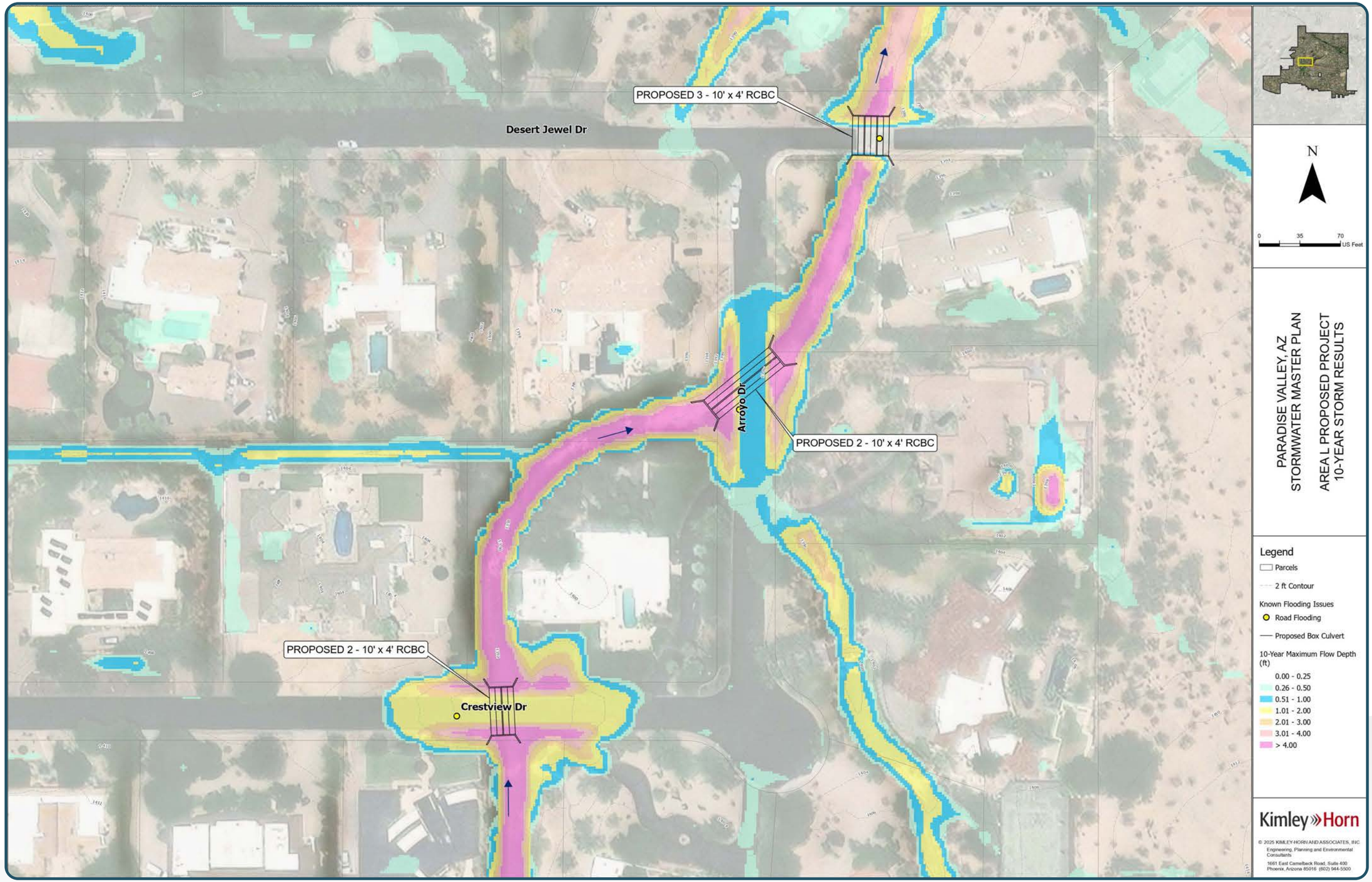
PROJECT NO.
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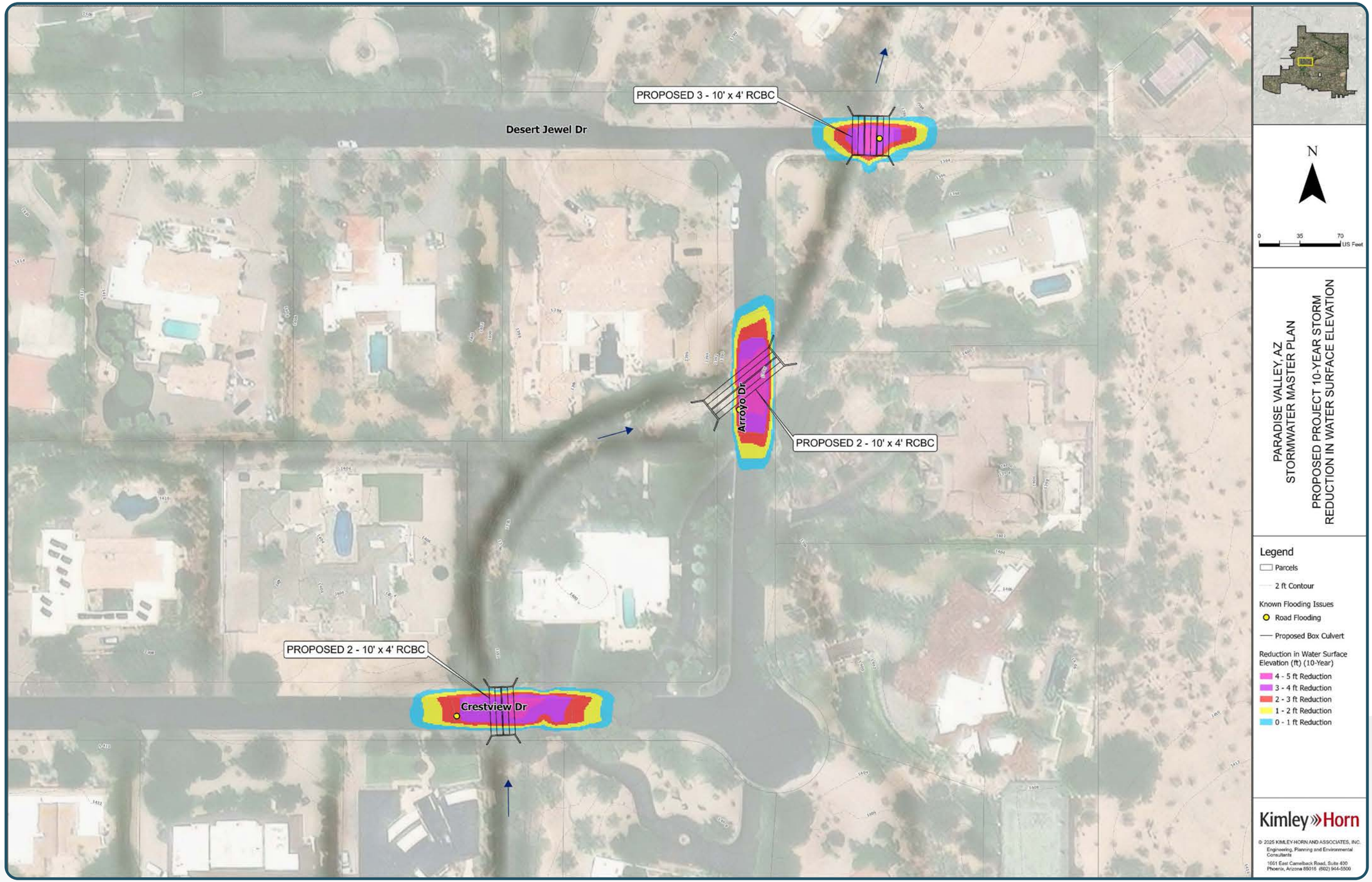
DRAWING NAME
AREA L

3 OF 3

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Desert Jewel Dr
Arroyo Dr
Crestview Dr
N
0
45
90
US Feet
PARADISE VALLEY, AZ
STORMWATER MASTER PLAN
AREA L EXISTING CONDITIONS
10-YEAR MAXIMUM FLOW DEPTH (FT)
Legend
Parcels
2 ft Contour
Known Flooding Issues
Road Flooding
10-Year Maximum Flow Depth (ft)
0.00 - 0.25
0.26 - 0.50
0.51 - 1.00
1.01 - 2.00
2.01 - 3.00
3.01 - 4.00
> 4.00
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Phoenix, Arizona 85016 (602) 944-5500


PROPOSED 3 - 10' x 4' RCBC
Desert Jewel Dr
Arroyo Dr
PROPOSED 2 - 10' x 4' RCBC
PROPOSED 2 - 10' x 4' RCBC
Crestview Dr
N
0
35
70
US Feet
PARADISE VALLEY, AZ
STORMWATER MASTER PLAN
AREA L PROPOSED PROJECT
10-YEAR STORM RESULTS
Legend
Parcels
2 ft Contour
Known Flooding Issues
Road Flooding
Proposed Box Culvert
10-Year Maximum Flow Depth (ft)
0.00 - 0.25
0.26 - 0.50
0.51 - 1.00
1.01 - 2.00
2.01 - 3.00
3.01 - 4.00
> 4.00
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Phoenix, Arizona 85016 (602) 944-5500


PROPOSED 3 - 10' x 4' RCBC
Desert Jewel Dr
Arroyo Dr
PROPOSED 2 - 10' x 4' RCBC
PROPOSED 2 - 10' x 4' RCBC
Crestview Dr
N
0 35 70
US Feet
PARADISE VALLEY, AZ
STORMWATER MASTER PLAN
PROPOSED PROJECT 10-YEAR STORM
REDUCTION IN WATER SURFACE ELEVATION
Legend
Parcels
2 ft Contour
Known Flooding Issues
Road Flooding
Proposed Box Culvert
Reduction in Water Surface Elevation (ft) (10-Year)
4 - 5 ft Reduction
3 - 4 ft Reduction
2 - 3 ft Reduction
1 - 2 ft Reduction
0 - 1 ft Reduction
Kimley»Horn
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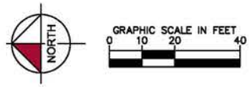
E. Flood Hazard Area N – Downstream Cherokee Wash

Description

Alternative 1 was selected from the two alternatives evaluated in the project decision matrix. The alternative involves replacing four low water crossings with culverts. This alternative requires raising the road to accommodate the culvert configuration. The proposed culverts were developed with the following improvements: the extent of roadway grading necessary for the construction of the culverts was determined and optimized by creating a 3D profile. The profiles provided the required length, invert elevations, and road elevation of the proposed culverts. Using these variables, the 10-year storm water surface elevation passing through the culvert was obtained by performing normal depth calculations. The culvert configuration has the capacity for the 10-year storm. The culvert profiles are included in **Appendix F.** The final configuration for the culverts is a 10-year storm design and consisted of 2-10' x 4' for each culvert location. This project is estimated to cost 1,989,729 USD. See **Appendix G** for the associated conceptual cost estimate

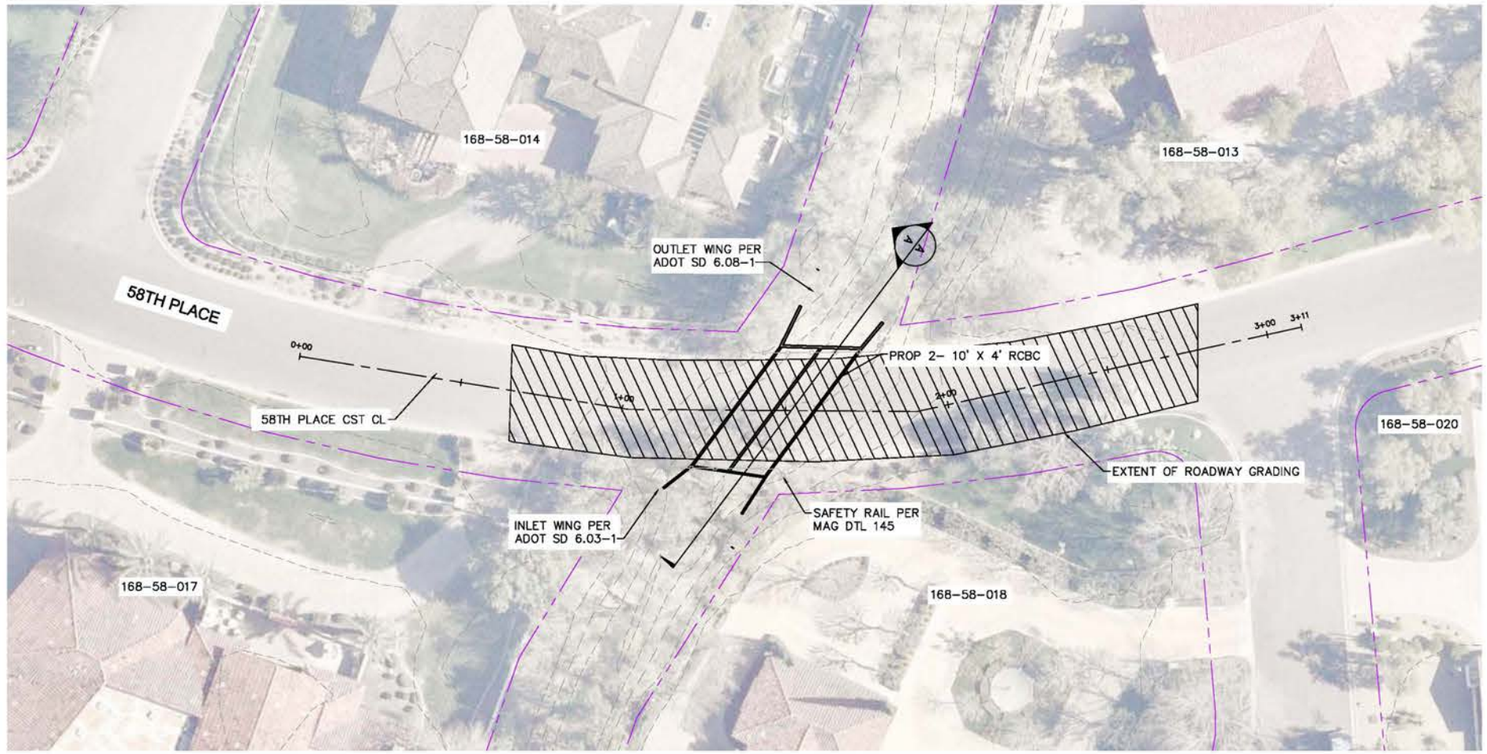
Benefits

The completion of this project would improve public safety and reduce obstruction to emergency vehicle access. In 10-year existing conditions, the maximum flow depths through 58th Place, 59th Place, Morning Glory Rd, and Caballo Lane are 3.9 ft, 3.5 ft, 4.7, and 4.4 ft, respectively per modeling results. In 10-year proposed conditions, maximum flow depths are 0.1 ft, 0.6 ft, 0.6 ft, and 0.2 ft, respectively. A cost/benefit ratio was not calculated for this project as the benefits are entirely improved transportation function and emergency access improvement. 10-year existing condition, proposed condition, and depth difference maps, along with conceptual plans, are shown on the following pages. Additional storm event results are included in **Appendix F.**



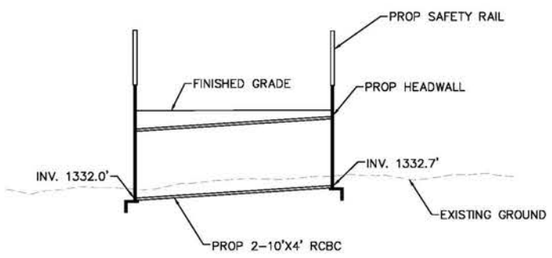
PROFILE VIEW

VERT SCALE: 1"=4'

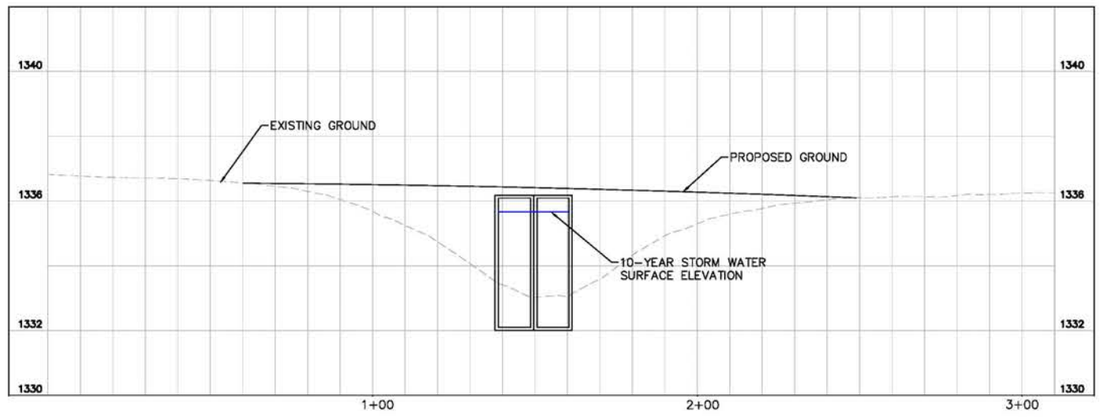


SECTION A-A

SCALE: 1"=15'



CULVERT PROFILE



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1661 E CAMELBACK RD # 400
PHOENIX, ARIZONA 85016 (602) 944-5500

SCALE (H): 1"=20'
SCALE (V): 1"=4'
DESIGNED BY: PTB
DRAWN BY: PTB
CHECKED BY: GSB
DATE: 03/2025

PARADISE VALLEY SWMP
AREA N SELECTED ALTERNATIVE 15% PLANS

PROJECT NO.
091054031

DRAWING NAME
AREA N

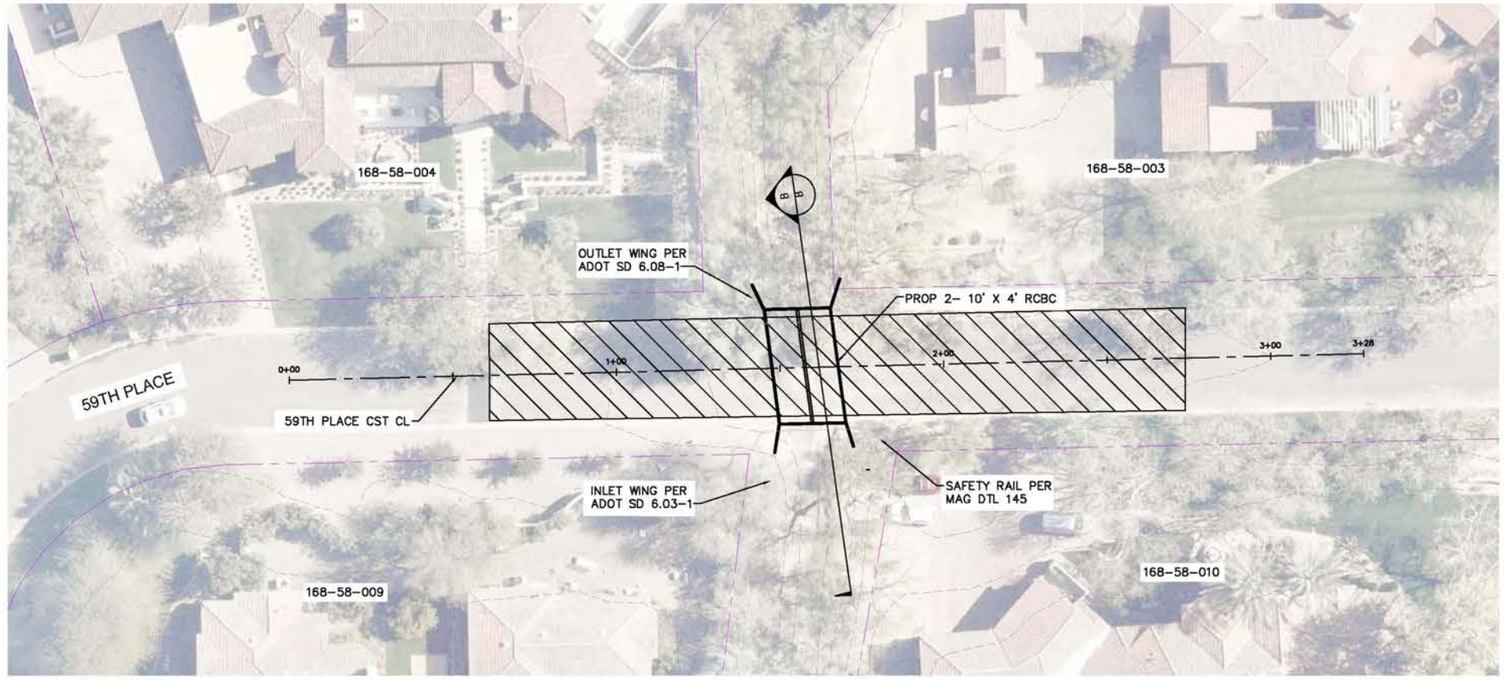
1 OF 4

GRAPHIC SCALE IN FEET
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NORTH

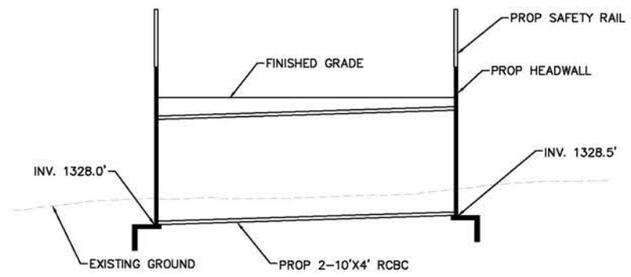
PROFILE VIEW

VERT SCALE: 1"=4'

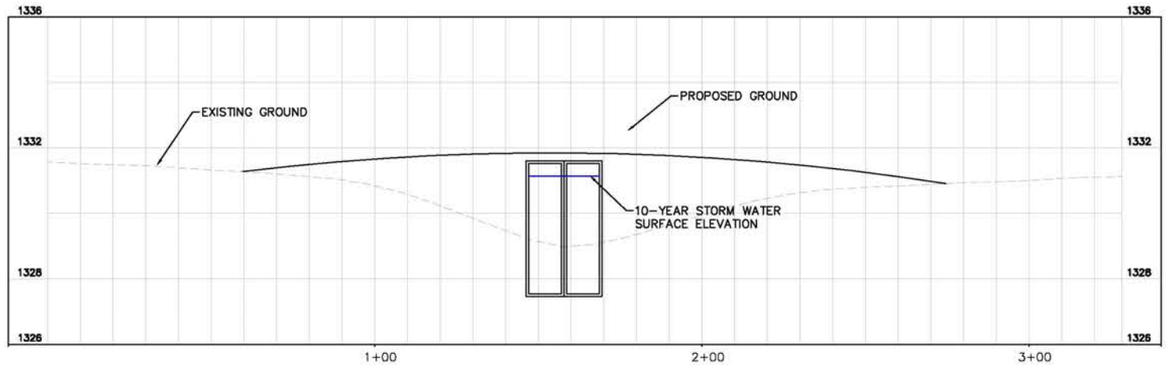


SECTION B-B

SCALE: 1"=10'



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DATE: 03/2025

PARADISE VALLEY SWMP
AREA N SELECTED ALTERNATIVE 15% PLANS

PROJECT NO.
091054031

DRAWING NAME
AREA N

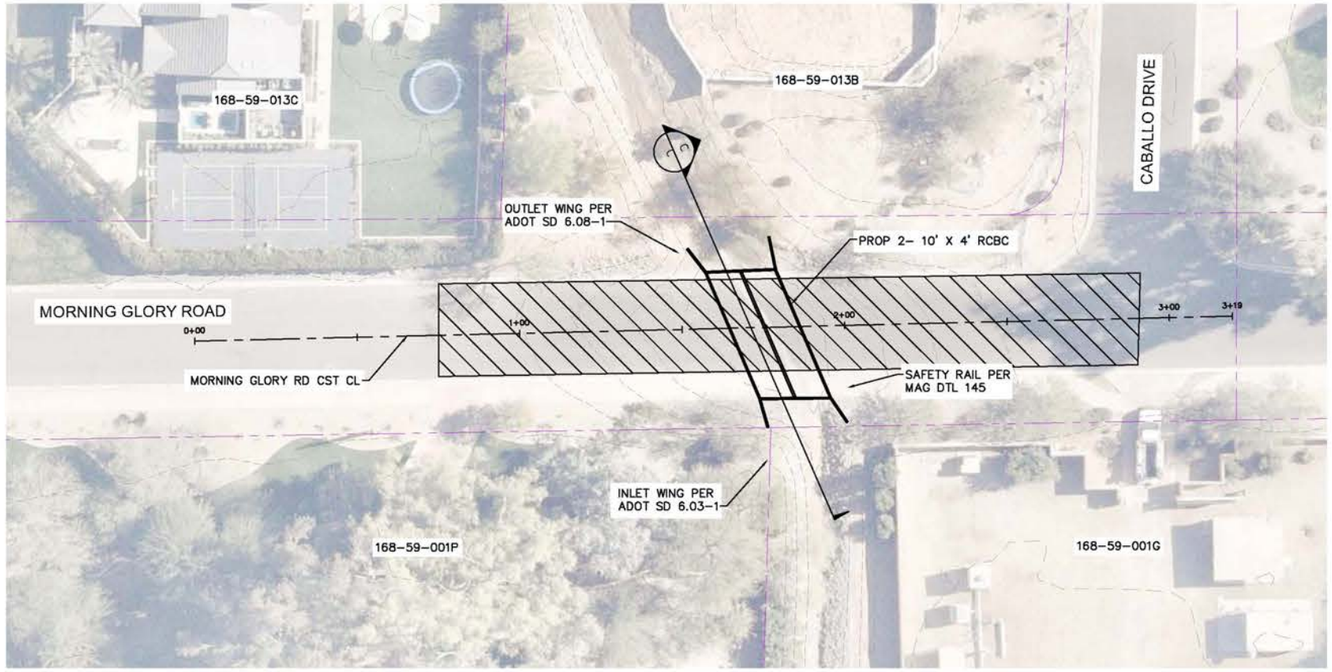
2 OF 4

NORTH

GRAPHIC SCALE IN FEET
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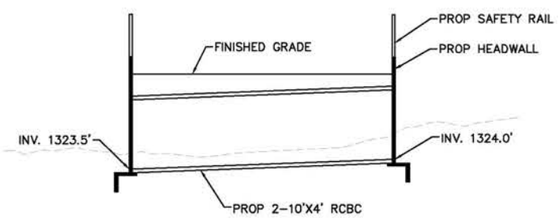
PROFILE VIEW

VERT SCALE: 1"=4'



SECTION C-C

SCALE: 1"=10'



CULVERT PROFILE



NO.	REVISION	DATE

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DATE: 03/2025

PARADISE VALLEY SWMP
AREA N SELECTED ALTERNATIVE 15% PLANS

PROJECT NO.
091054031

DRAWING NAME
AREA N

3 OF 4

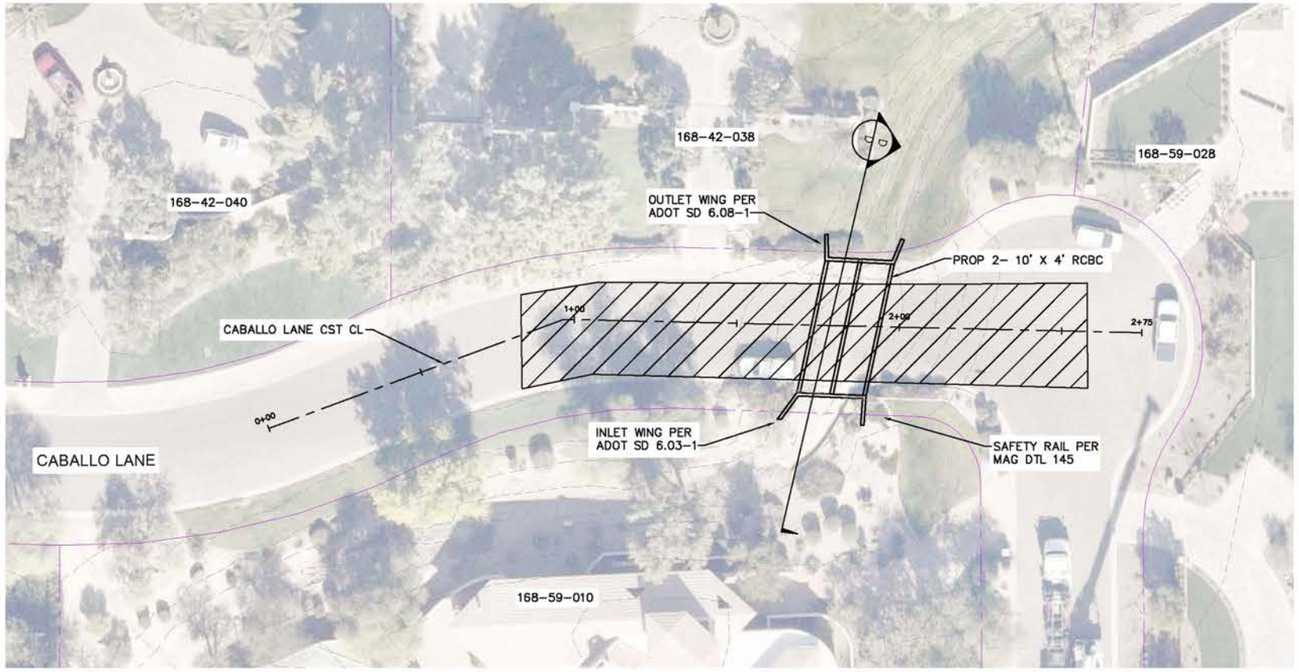
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NORTH

GRAPHIC SCALE IN FEET
0 10 20 40

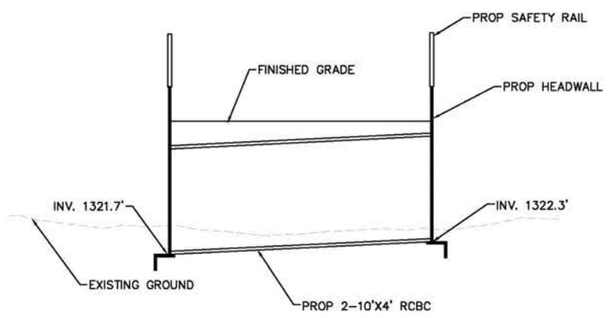
PROFILE VIEW

VERT SCALE: 1"=4'



SECTION D-D

SCALE: 1"=10'



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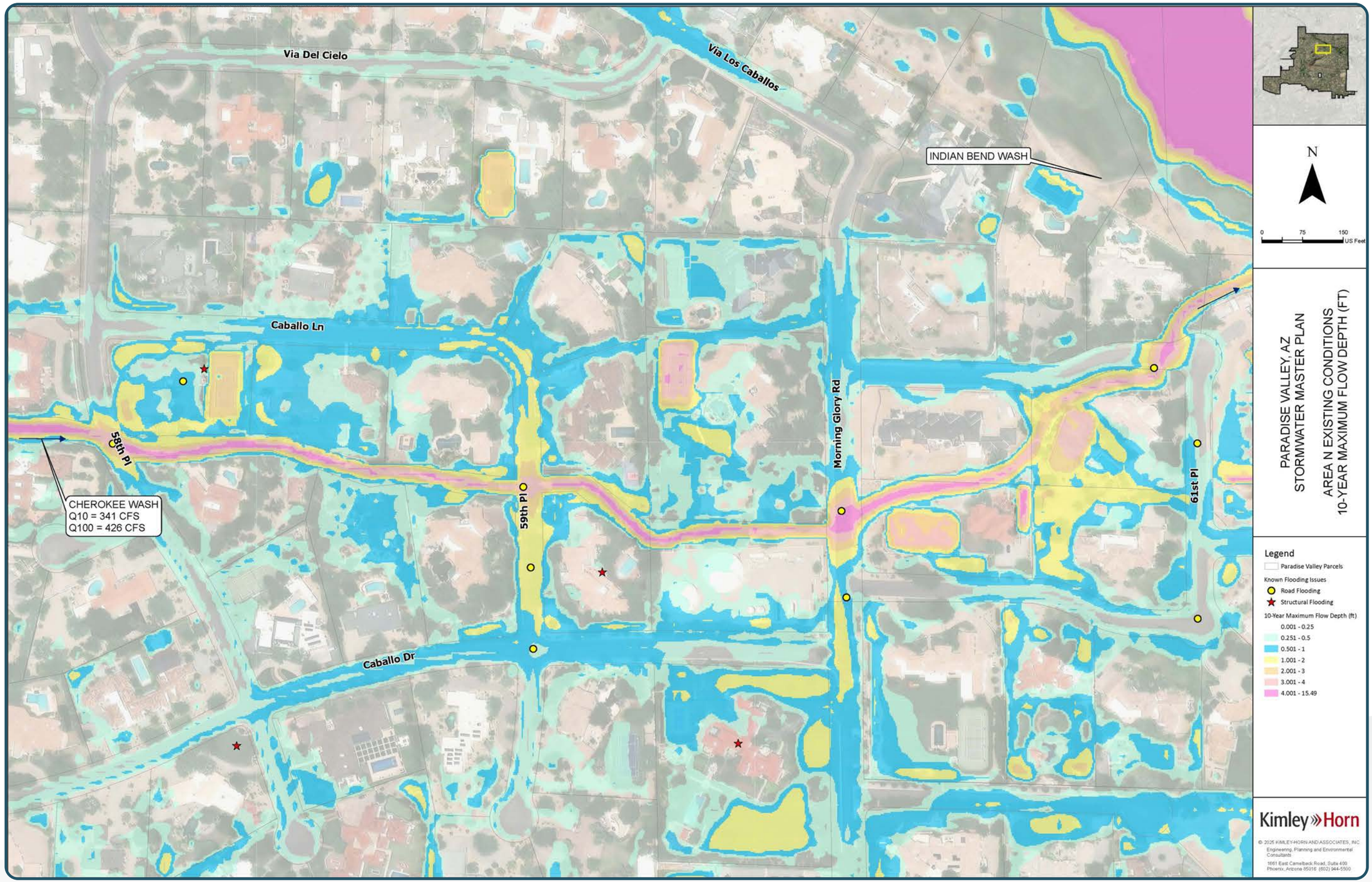
PARADISE VALLEY SWMP
AREA N SELECTED ALTERNATIVE 15% PLANS

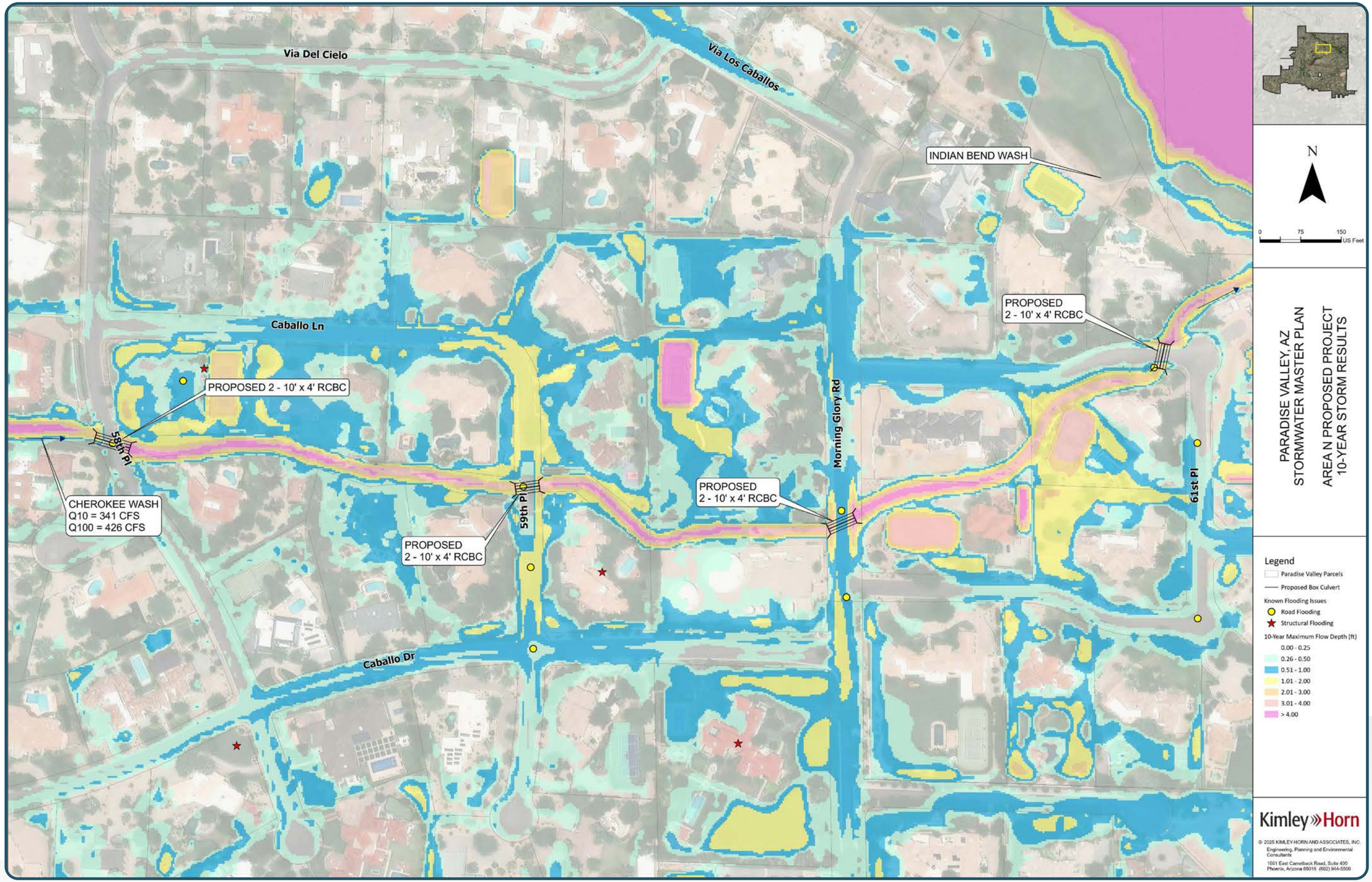
PROJECT NO.
091054031

DRAWING NAME
AREA N

4 OF 4

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Via Del Cielo
Via Los Caballos
INDIAN BEND WASH
Caballo Ln
58th Pl
CHEROKEE WASH
Q10 = 341 CFS
Q100 = 426 CFS
59th Pl
Morning Glory Rd
61st Pl
Caballo Dr
N
0 75 150
US Feet
PARADISE VALLEY, AZ
STORMWATER MASTER PLAN
AREA N EXISTING CONDITIONS
10-YEAR MAXIMUM FLOW DEPTH (FT)
Legend
Paradise Valley Parcels
Known Flooding Issues
Road Flooding
Structural Flooding
10-Year Maximum Flow Depth (ft)
0.001 - 0.25
0.251 - 0.5
0.501 - 1
1.001 - 2
2.001 - 3
3.001 - 4
4.001 - 15.49
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Via Del Cielo
Via Los Caballos
INDIAN BEND WASH
PROPOSED
2 - 10' x 4' RCBC
Caballo Ln
PROPOSED 2 - 10' x 4' RCBC
58th Pl
CHEROKEE WASH
Q10 = 341 CFS
Q100 = 426 CFS
59th Pl
PROPOSED
2 - 10' x 4' RCBC
Morning Glory Rd
PROPOSED
2 - 10' x 4' RCBC
61st Pl
Caballo Dr
N
0 75 150
US Feet
PARADISE VALLEY, AZ
STORMWATER MASTER PLAN
AREA N PROPOSED PROJECT
10-YEAR STORM RESULTS
Legend
Paradise Valley Parcels
Proposed Box Culvert
Known Flooding Issues
Road Flooding
Structural Flooding
10-Year Maximum Flow Depth (ft)
0.00 - 0.25
0.26 - 0.50
0.51 - 1.00
1.01 - 2.00
2.01 - 3.00
3.01 - 4.00
> 4.00
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Via Del Cielo
Via Los Caballos
Caballo Ln
Caballo Dr
Morning Glory Rd
61st Pl
59th Pl
59th Pl
INDIAN BEND WASH
PROPOSED
2 - 10' x 4' RCBC
PROPOSED 2 - 10' x 4' RCBC
CHEROKEE WASH
Q10 = 341 CFS
Q100 = 426 CFS
PROPOSED
2 - 10' x 4' RCBC
PROPOSED
2 - 10' x 4' RCBC
N
0 75 150
US Feet
PARADISE VALLEY, AZ
STORMWATER MASTER PLAN
PROPOSED PROJECT 10-YEAR STORM
REDUCTION IN WATER SURFACE ELEVATION
Legend
Paradise Valley Parcels
Proposed Box Culvert
Known Flooding Issues
Road Flooding
Structural Flooding
Reduction in Water Surface Elevation (ft) (10-Year)
4 - 5 ft Reduction
3 - 4 ft Reduction
2 - 3 ft Reduction
1 - 2 ft Reduction
0 - 1 ft Reduction
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F. Flood Hazard Area O – Lincoln Drive

Description

Alternative 2 was selected from the two alternatives evaluated in the project decision matrix. The alternative involves replacing three undersized culverts at 51st Place, Lincoln Drive, and Desert Fairways Drive. This alternative requires raising the road to accommodate the culvert configuration at two of the locations, 51st Street and Desert Fairways Drive. The proposed culverts were developed with the following improvements: the extent of roadway grading necessary for the construction of the culverts was determined and optimized by creating a 3D profile. The profiles provided the required length, invert elevations, and road elevation of the proposed culverts. Using these variables, the 10-year storm water surface elevation passing through the culvert was determined by performing normal depth calculations. The culvert configurations has the capacity for the 10-year storm. The culvert profiles are included in **Appendix F.** The final configuration for the culverts is a 10-year storm design and consisted of 2-10' x 4' at 51st Place and a 12'x3' culvert at both Lincoln Drive and Desert Fairways Drive. The culvert profiles and 15% plans are included in **Appendix H.** This project is estimated to cost 1,979,147 USD. See **Appendix G** for the associated conceptual cost estimate.

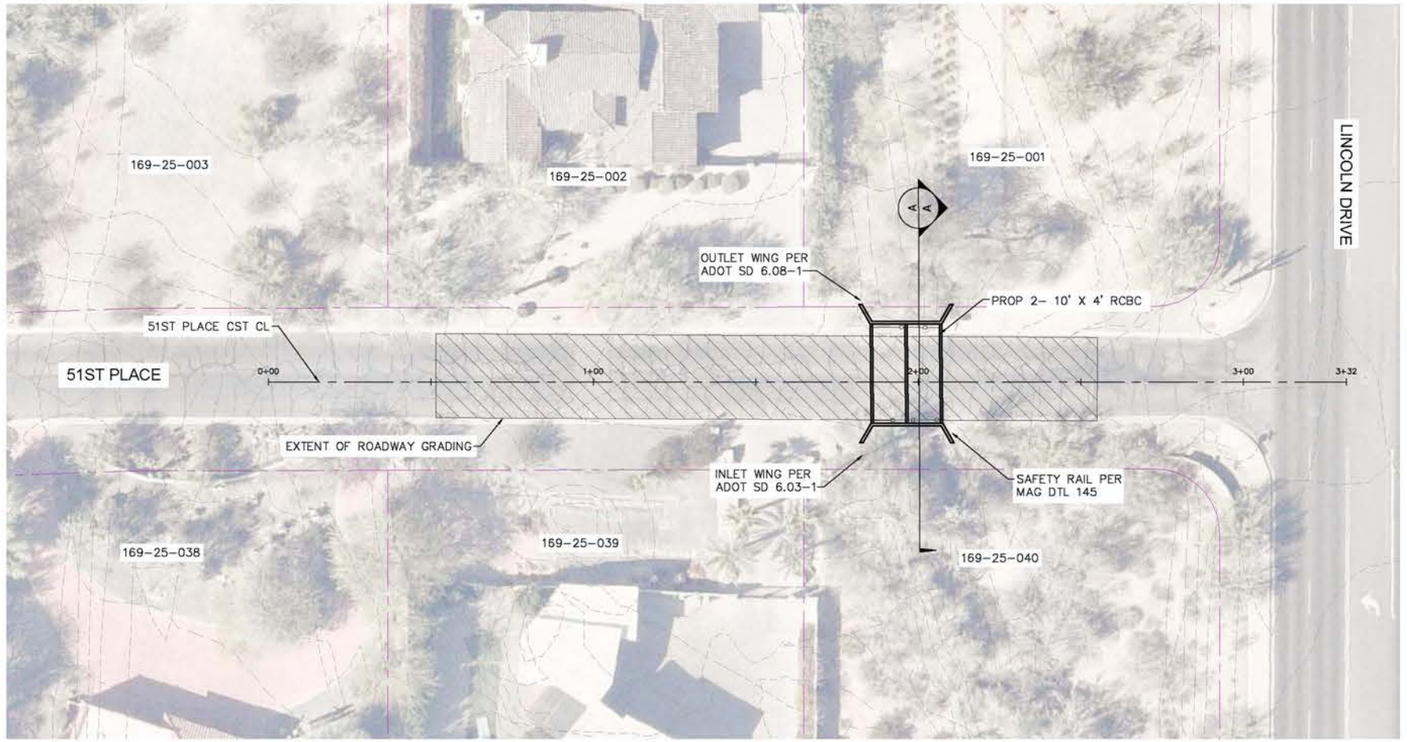
Benefits

The completion of this project would improve public safety and reduce obstructions to emergency vehicle access. In 10-year existing conditions, the maximum flow depths through 51st Place, Lincoln Drive, and Desert Fairways Drive are 3 ft, 0.9 ft, and 1.3 ft, respectively per modeling results. In 10-year proposed conditions, maximum flow depths are 0.8 ft, 0.6 ft, and 0.8 ft, respectively. In the 2-year storm there is no overtopping of the culverts. A cost/benefit ratio was not calculated for this project as the benefits are entirely improved transportation function and emergency access improvement. 10-year existing condition, proposed condition, and depth difference maps, along with conceptual plans, are shown on the following pages. Additional storm event results are included in **Appendix F.**

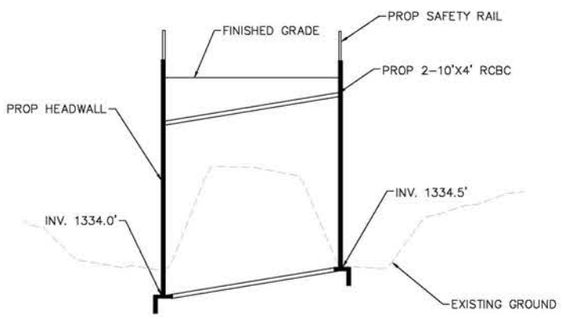
NORTH

GRAPHIC SCALE IN FEET
0 10 20 40

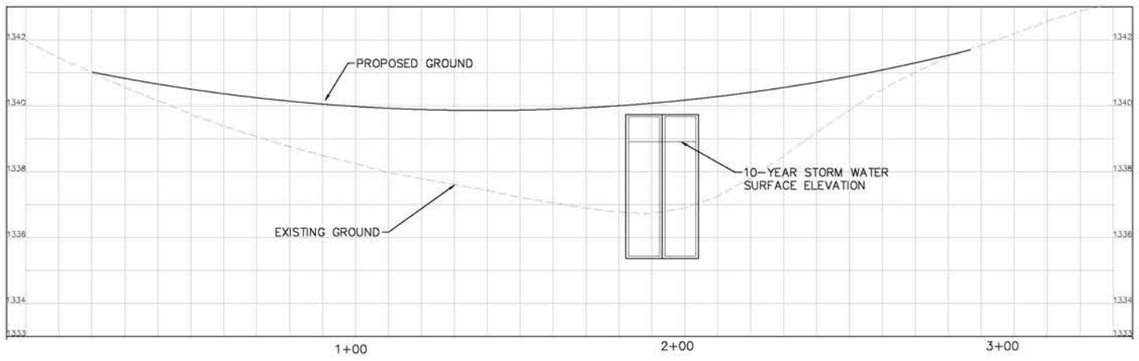
PROFILE VIEW
VERT SCALE: 1"=4'



SECTION A-A
SCALE: 1"=15'



CULVERT PROFILE



NO.	REVISION	DATE

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SCALE (V): 1"=4'
DESIGNED BY: PTB
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CHECKED BY: GSB
DATE: 03/2025

PARADISE VALLEY SWMP
AREA O SELECTED ALTERNATIVE 15% PLANS

PROJECT NO.
091054031

DRAWING NAME
AREA O

1 OF 3

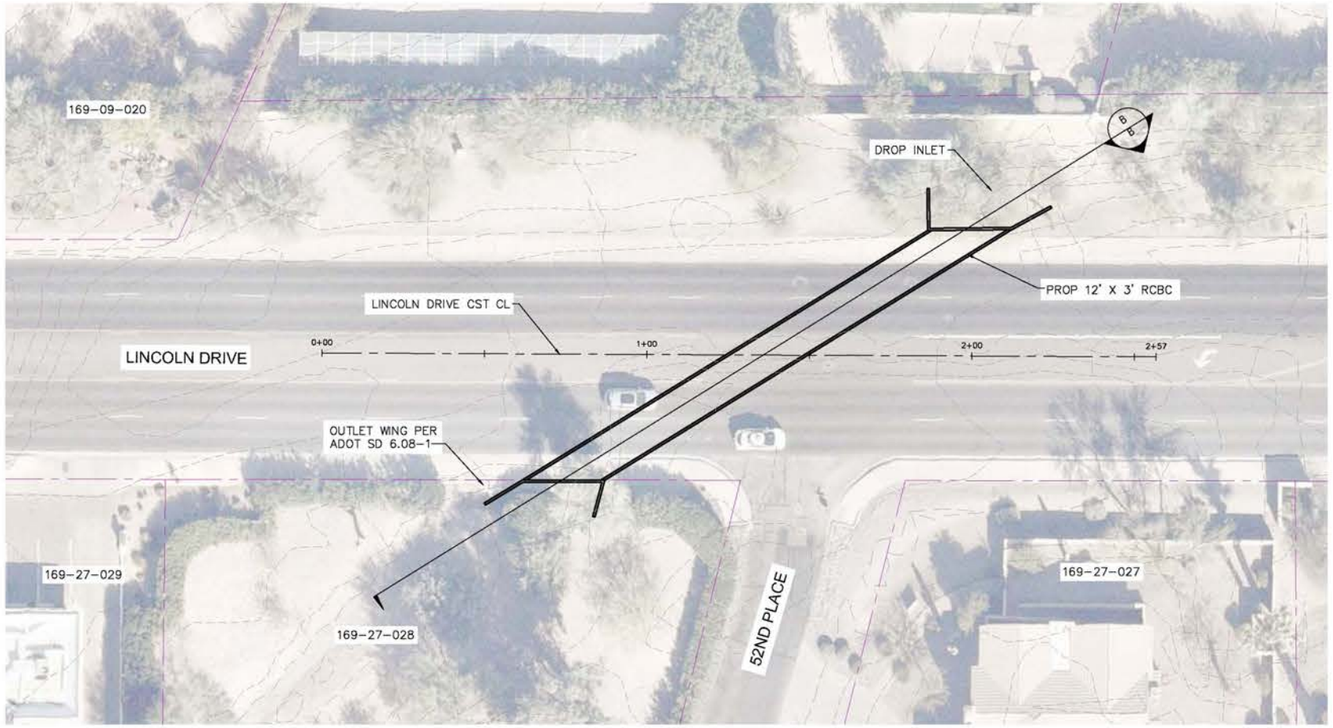
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NORTH

GRAPHIC SCALE IN FEET
0 10 20 40

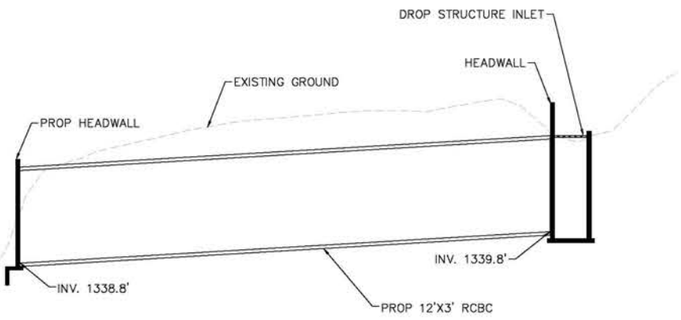
PROFILE VIEW

VERT SCALE: 1"=4'

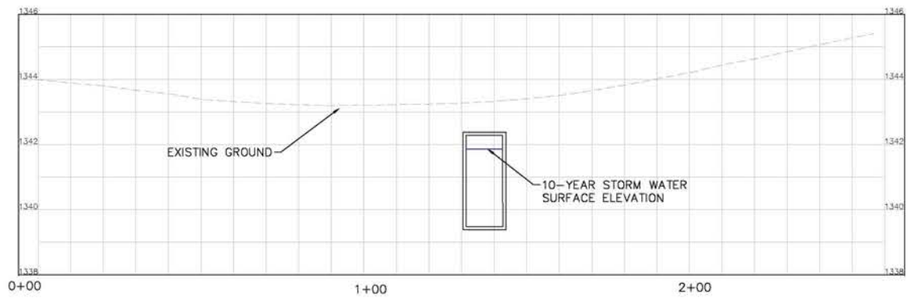


SECTION B-B

SCALE: 1"=30'



CULVERT PROFILE



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SCALE (V): 1"=4'
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DRAWN BY: PTB
CHECKED BY: GSB
DATE: 05/2025

PARADISE VALLEY SWMP
AREA O SELECTED ALTERNATIVE 15% PLANS

PROJECT NO.
091054031

DRAWING NAME
AREA O

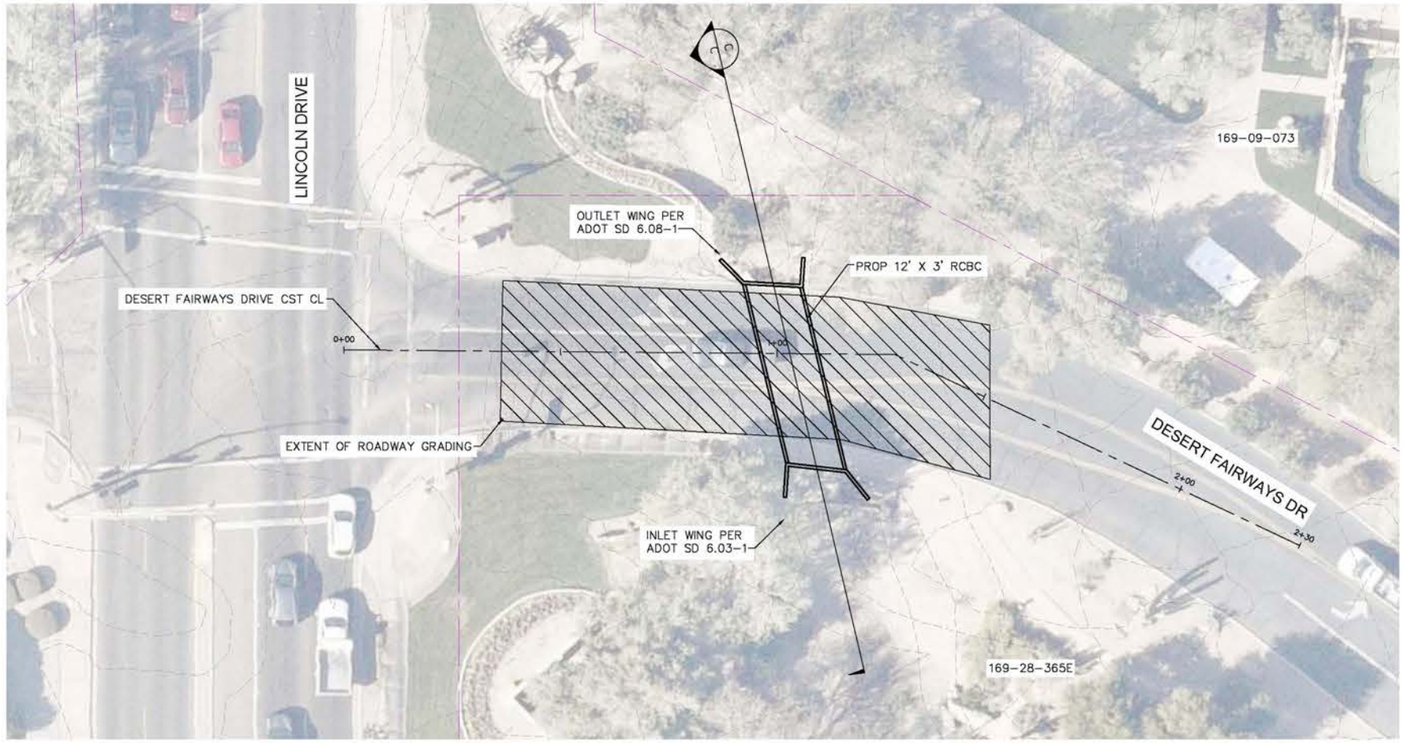
2 OF 3

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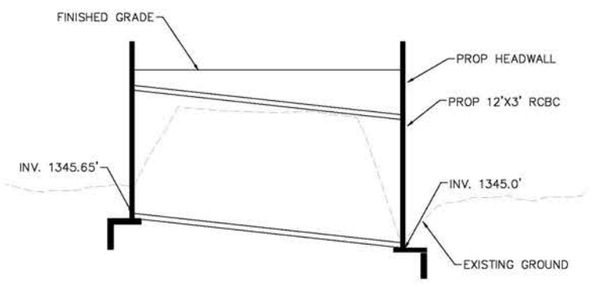
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GRAPHIC SCALE IN FEET
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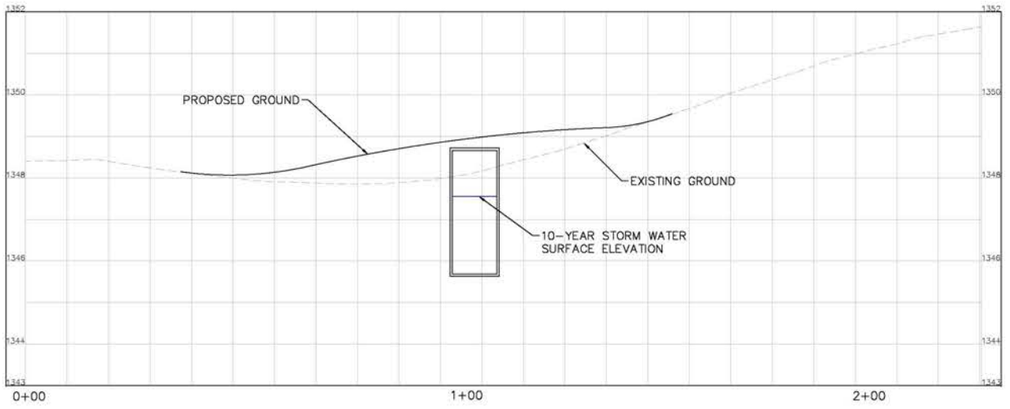
PROFILE VIEW
VERT SCALE: 1"=4'



SECTION C-C
SCALE: 1"=15'



CULVERT PROFILE



NO.	REVISION	DATE

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SCALE (V): 1"=4'
DESIGNED BY: PTB
DRAWN BY: PTB
CHECKED BY: GSB
DATE: 03/2025

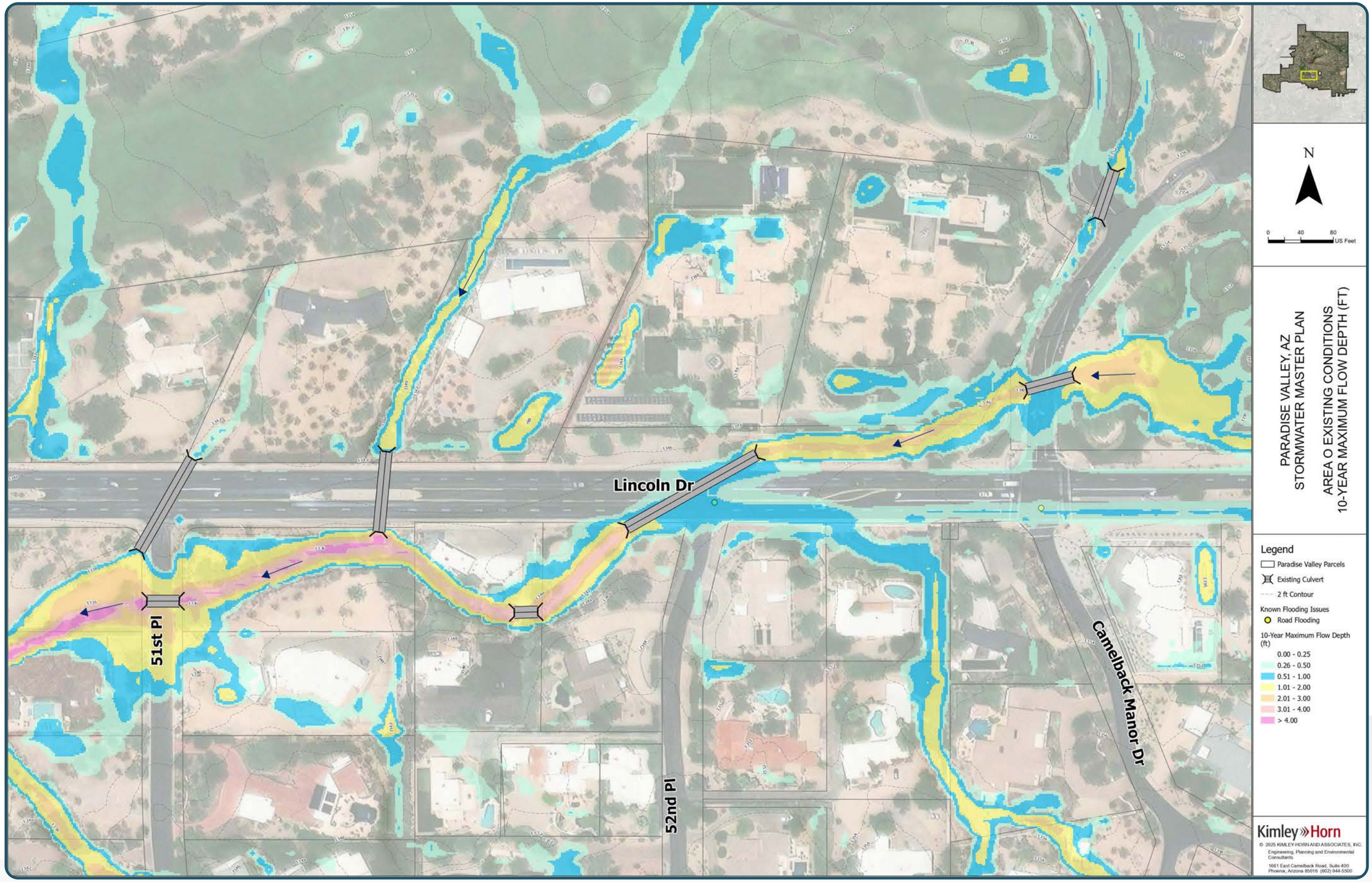
PARADISE VALLEY SWMP
AREA O SELECTED ALTERNATIVE 15% PLANS

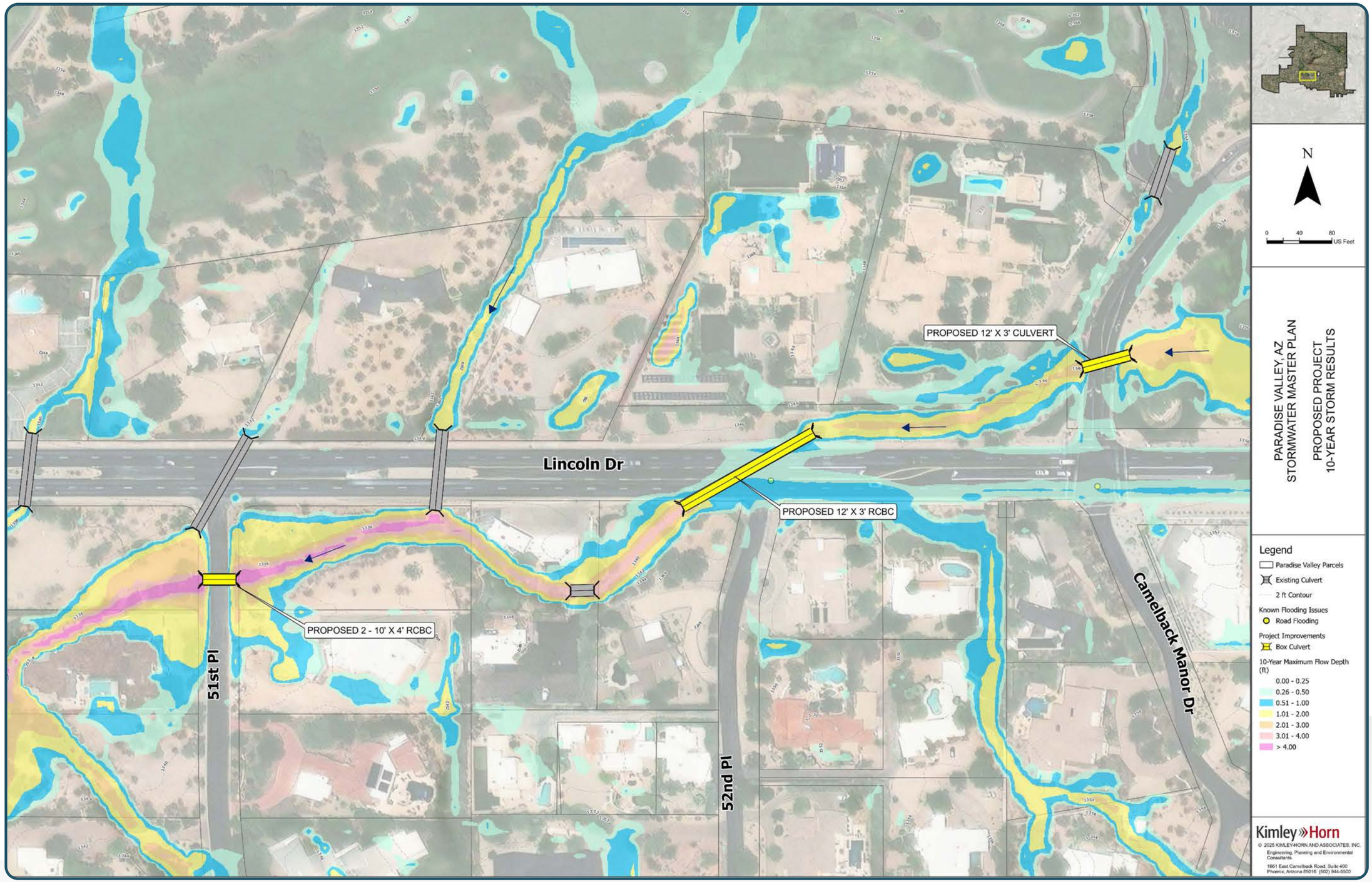
PROJECT NO.
091054031

DRAWING NAME
AREA O

3 OF 3

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Lincoln Dr
51st Pl
52nd Pl
Camelback Manor Dr
N
0 40 80
US Feet
PARADISE VALLEY, AZ
STORMWATER MASTER PLAN
AREA O EXISTING CONDITIONS
10-YEAR MAXIMUM FLOW DEPTH (FT)
Legend
Paradise Valley Parcels
Existing Culvert
2 ft Contour
Known Flooding Issues
Road Flooding
10-Year Maximum Flow Depth (ft)
0.00 - 0.25
0.26 - 0.50
0.51 - 1.00
1.01 - 2.00
2.01 - 3.00
3.01 - 4.00
> 4.00
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Phoenix, Arizona 85016 (602) 944-5500


PROPOSED 12' X 3' CULVERT
Lincoln Dr
PROPOSED 12' X 3' RCBC
PROPOSED 2 - 10' X 4' RCBC
51st Pl
52nd Pl
Camelback Manor Dr
N
0 40 80
US Feet
PARADISE VALLEY, AZ
STORMWATER MASTER PLAN
PROPOSED PROJECT
10-YEAR STORM RESULTS
Legend
Paradise Valley Parcels
Existing Culvert
2 ft Contour
Known Flooding Issues
Road Flooding
Project Improvements
Box Culvert
10-Year Maximum Flow Depth (ft)
0.00 - 0.25
0.26 - 0.50
0.51 - 1.00
1.01 - 2.00
2.01 - 3.00
3.01 - 4.00
> 4.00
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Phoenix, Arizona 85016 (602) 944-5500


PROPOSED 12' X 3' CULVERT
Lincoln Dr
PROPOSED 12' X 3' RCBC
PROPOSED 2 - 10' X 4' RCBC
51st Pl
52nd Pl
Camelback Manor Dr
N
0 40 80
US Feet
PARADISE VALLEY, AZ
STORMWATER MASTER PLAN
PROPOSED PROJECT 10-YEAR STORM
REDUCTION IN WATER SURFACE ELEVATION
Legend
Paradise Valley Parcels
Existing Culvert
2 ft Contour
Known Flooding Issues
Road Flooding
Project Improvements
Box Culvert
Reduction in Water Surface Elevation (ft) (10-Year)
2 - 3 ft Reduction
1 - 2 ft Reduction
0 - 1 ft Reduction
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Engineering, Planning and Environmental Consultants
1661 East Camelback Road, Suite 400
Phoenix, Arizona 85016 (602) 944-5500

IX. GRANT FUNDING OPPORTUNITY

The most accessible grant funding opportunities, both of which the Town has utilized in the past are the Flood Control District of Maricopa County's Small Project Assistance Program (SPAP) and Capital Improvement Project (CIP) cost shares. These programs have limits and are structures as follows:

SPAP

- 75/25 cost share between FCDMC and agency
- $1M limit for design and construction (with some flexibility up to $1.3M)
- Less than 24-month duration for design and construction
- Agency lead

CIP

- 65/35 cost share between FCDMC and agency
- Larger projects (>$1.3M)
- Longer duration for design and construction (>24 months)
- Can be FCDMC lead

In addition to these County sponsored programs, grant funding opportunities are also available at the state and federal level. While programs are constantly evolving and changing, **Table 32** lists opportunities available as of the date of this report, with some of the parameters, due dates, funding levels etc. included.

Table 32: Summary of Grant Funding Opportunities

Grant Name	Agency	Funding Maximum	Required Match	Priorities	Types of Projects
Hazard Pre-Disaster Mitigation Grant Program	FEMA	Up to 10 M USD	75% grant, 25% match	Implementation of sustainable cost-effective measures designed to reduce the risk to individuals and property from future natural hazards.	Hazard mitigation projects and management costs
Hazard Mitigation Grant Program	FEMA	Varies	75% grant, 25% match	Development of hazard mitigation plans and rebuilding in a way that reduces, or mitigates, future disaster losses.	Flood mitigation planning and projects
Safeguarding Tomorrow Revolving Loan Fund Program	FEMA	25% of project total	n/a	Empowerment of entities. Innovative funding solutions.	Hazard mitigation from natural disasters
Flood Mitigation Assistance Program	FEMA	300,000 USD for individual projects and 900,000 USD for community projects	75% grant, 25% match	Reduce or mitigate the risk of repetitive flood damage to buildings ensured by the National Flood Insurance Program	Localized flood control, floodwater storage and diversion, stream restoration, stormwater management
Community Development Block Grant Program	U.S. Department of Housing and Urban Development	Up to 450,000 USD	No Match Required	Assisting under privileged communities	Acquisition, relocation/ demolition, rehabilitation of structures, construction of public facilities, renewable energy resources
Water Infrastructure Finance and Innovation Act Program	EPA	Varies	n/a	Supporting water infrastructure projects	Mitigate impacts of drought, manage stormwater, updating aging infrastructure, PFAS water mitigation

Grant Name	Agency	Funding Maximum	Required Match	Priorities	Types of Projects
Corps Water Infrastructure Financing Program	U.S. Army Corps of Engineers	Provide loans of up 49%	n/a	Supporting water infrastructure projects	Dam safety projects
Public Works and Economic Adjustment Assistance Application Submission and Program	U.S. Economic Development Administration	49% of total project costs	49% grant, 51% match	promoting innovation and competitiveness, preparing American regions for economic growth and success in the worldwide economy	Water and sewer improvements
Sewer Overflow and Stormwater Reuse Municipal Grants program	EPA	344,000 USD	80% grant, 20% match	Facilitating the development of infrastructure capable of coping with the changing climate's impacts, such as precipitation events	Construction of critical stormwater infrastructure, combined sewer overflows, sanitary sewer overflows
Defense Community Infrastructure Program	Department of Defense	Between 250,000 and 20 Million USD	70% grant, 30% match	Addressing deficiencies in community infrastructure supportive of a military installation	Utility Infrastructure, transportation

X. PRIORITIZATION

Prioritization of projects can consider several factors. Project costs can determine which grant funding opportunities may be available. Benefit/cost ratios can determine eligibility for federal opportunities. Mitigation impacts can also influence Town priorities. Give these factors, **Table 33** lists each of the six projects where conceptual plans and cost were developed as part of this Master Plan, with prioritization considerations listed.

Table 33: Project Prioritization

Flood Hazard Area Designation	Project Size (Medium or Large)	Primary Benefit	Cost	BCR	Project Considerations
K	Large	Residential Structures	~ $6.1 M	3.08	The recommended project alternative for Area K has the highest BCR for the projects that primarily benefit residential structures. It is also potentially more cost effective than the Area A project. Because of this, it is ranked as the highest priority large project benefiting private property.
A	Large	Residential Structures	~ $11.6M	2.01	recommended project alternative ties into the ongoing Mockingbird Lane drainage improvements, creating an overall flood mitigation project for the area.
H	Medium	Arterial Roadways	~ $1M	n/a	Area H recommended project alternative may fall within the SPAP cost criteria, making it eligible for a 75% cost share with FCDMC. Because of this, Area H was ranked as the highest priority roadway-oriented project.
O	Large	Arterial and Residential Roadways	~ $2M	n/a	Area O recommended project alternative benefits both an arterial roadway (Lincoln Drive) and residential streets. Because of this, it was ranked higher than Areas L and N.
N	Large	Residential Roadways	~ $2M	n/a	Area N was ranked higher than Area L because of the lower cost for construction.
L	Large	Residential Roadways	~ $6.1M	n/a	Area L benefits residential streets only.

XI. CONCLUSION

The Paradise Valley Master Plan has identified and assessed areas vulnerable to flooding within the Town of Paradise Valley. By using records of flooding from residents and Town staff, previous studies, and comprehensive two-dimensional hydrologic and hydraulic modeling, this report provides detailed insights into flood risks and mitigation strategies for the entire 15-square-mile area.

Based on data collection and flood hazard analyses, the Master Plan identifies nineteen flood hazard areas, with nine prioritized for mitigation based on severity, impact on structures, streets, and emergency access. The nine were designated as the highest-ranking via a decision matrix ranking process. Recommended alternatives have been developed for each of these areas, ensuring efficient use of resources and strategic mitigation of flood hazards.

The six highest-ranking of the nine areas were designated as high-priority, with the recommended alternative for these areas further developed into 15% conceptual plans with an EOPC and cost/benefit analysis. The high-priority areas include Invergordon Road and Mockingbird Lane, 40th Street and Stanford Drive, Mountain View Road, upstream Cherokee Wash, downstream Cherokee Wash, and Lincoln Drive.

The benefit-cost analysis, prioritization, and thorough planning realized in this report offer Paradise Valley a robust framework for flood mitigation. Utilization of grant funding opportunities from local, state, and federal programs can significantly support the implementation of these projects.

In conclusion, this Master Plan sets the stage for Paradise Valley to strategically address flooding issues, assuring community resilience and safety through well-informed, high-priority flood mitigation projects. The Town's commitment to proactive flood hazard management will reduce risks, safeguard property, improve emergency access, and enhance the overall quality of life for its residents.

XII. REFERENCES

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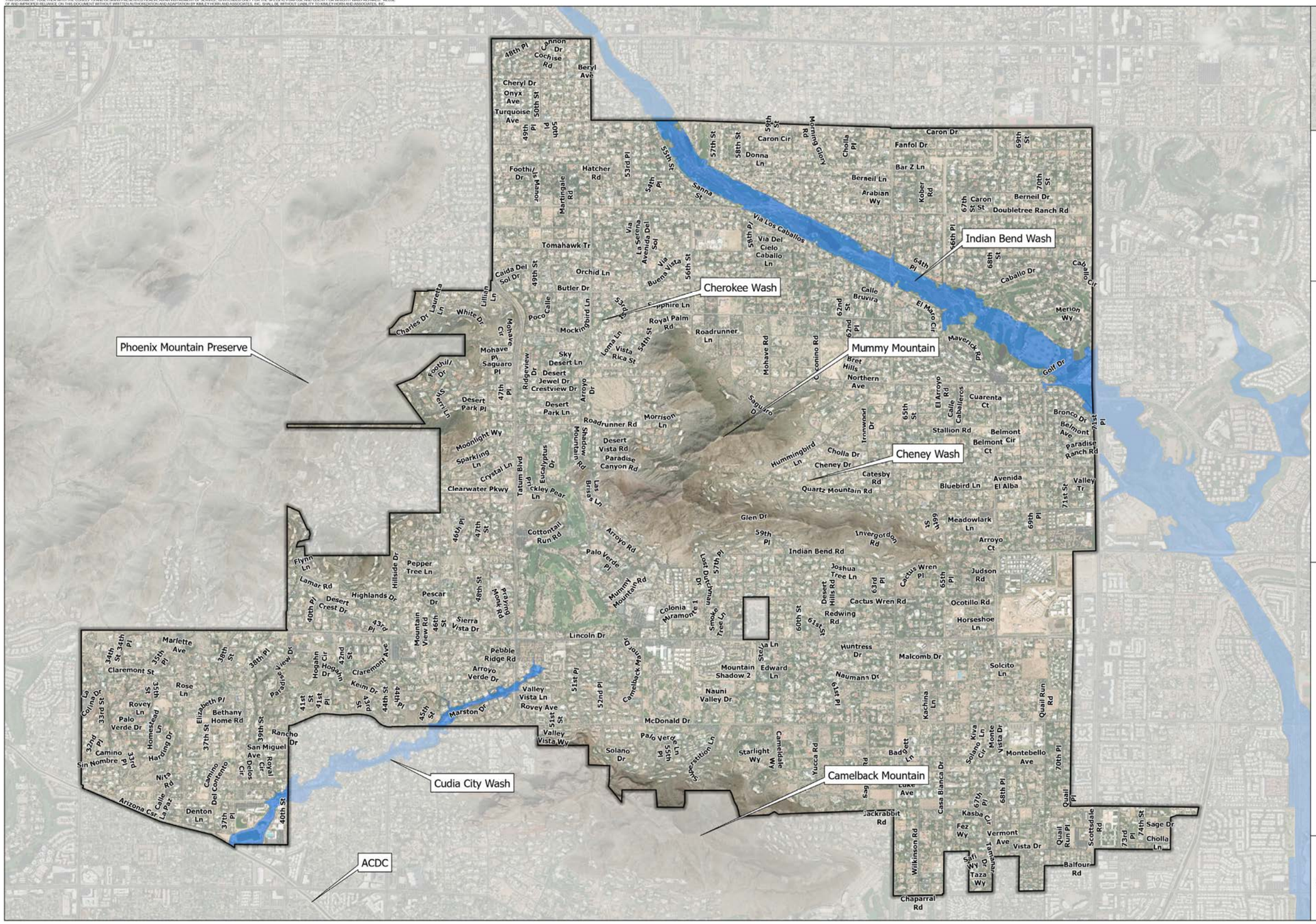
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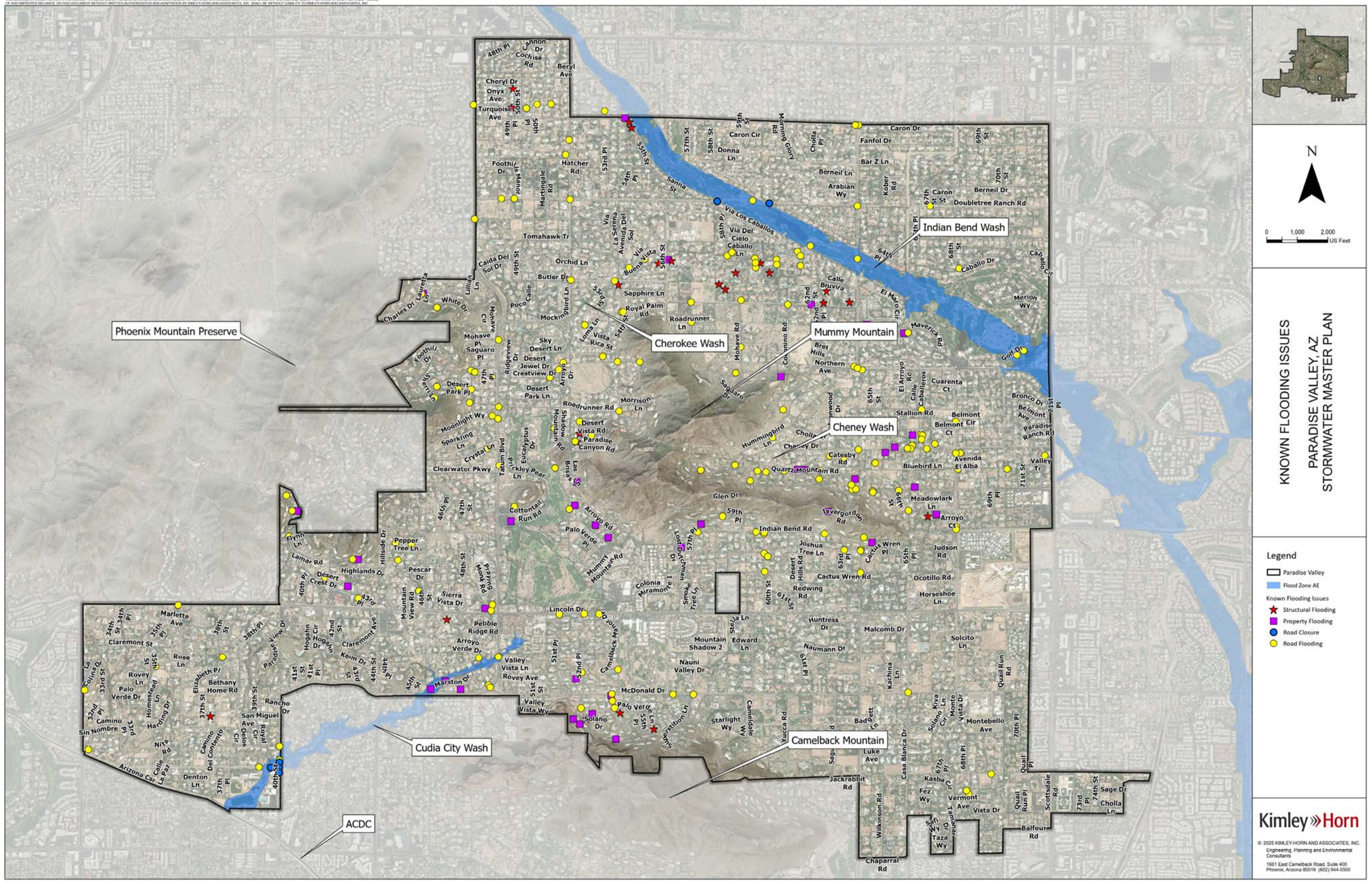
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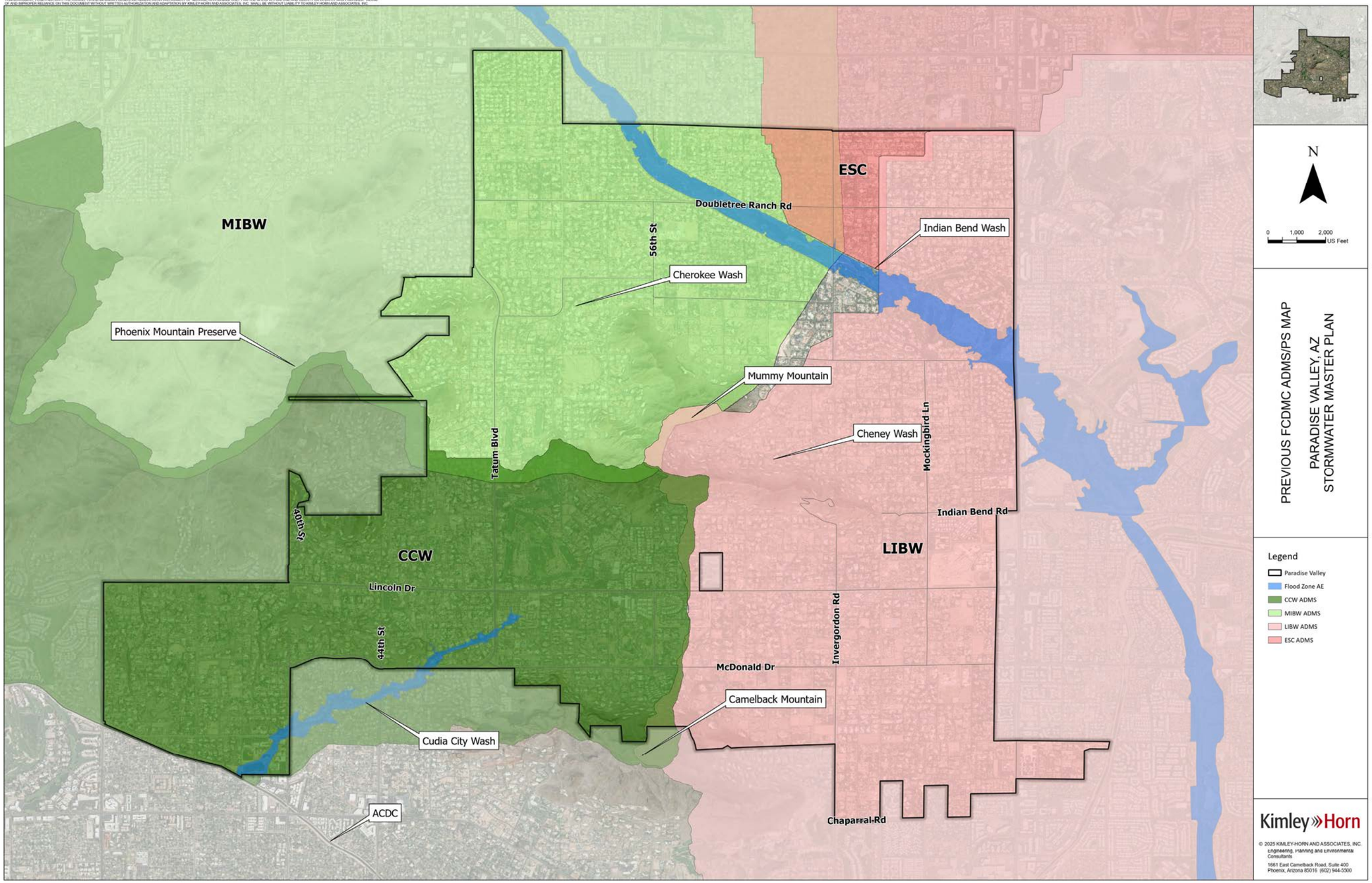
XIII. APPENDIX A – DATA COLLECTION

THIS DOCUMENT, TOGETHER WITH THE CONCEPTS AND DESIGNS PRESENTED HEREIN, AS AN INSTRUMENT OF SERVICE, IS INTENDED ONLY FOR THE SPECIFIC PURPOSE AND CLIENT FOR WHICH IT WAS PREPARED. REUSE OF AND IMPROPER RELIANCE ON THIS DOCUMENT WITHOUT WRITTEN AUTHORIZATION AND ADAPTATION BY KIMLEY-HORN AND ASSOCIATES, INC. SHALL BE WITHOUT LIABILITY TO KIMLEY-HORN AND ASSOCIATES, INC.


Indian Bend Wash
Cherokee Wash
Phoenix Mountain Preserve
Mummy Mountain
Cheney Wash
Cudia City Wash
Camelback Mountain
ACDC
Via Los Caballos
Caron Dr
Caron Cir
Fanfol Dr
Bar Z Ln
Berneil Ln
Arabian Wy
Berneil Dr
Doubletree Ranch Rd
Via Del Cielo Caballo Ln
Caballo Dr
Caballo Ct
Merion Wy
Golf Dr
Maverick Pl
Tomahawk Tr
Orchid Ln
Butler Dr
Sapphire Ln
Royal Palm Rd
Roadrunner Ln
Calle Bruvira
El Mayo Cir
Mockingbird Ln
Poco Calle
Charles Dr
Lauretta Ln
White Dr
Lillian Ln
Caida Del Sol Dr
Mohave Cir
Mohave Pl
Saguaro Pl
Foothill Dr
Sky Desert Ln
Desert Jewel Dr
Crestview Dr
Desert Park Pl
Desert Park Ln
Ridgeview Dr
Arroyo Dr
Roadrunner Rd
Morrison Ln
Moonlight Wy
Sparkling Ln
Crystal Ln
Clearwater Pkwy
Desert Vista Rd
Paradise Canyon Rd
Shadow Mountain Rd
Bristle Cone Ln
Tatum Blvd
Eucalyptus Dr
Pinkley Pear Ln
Loma Vista Rd
Bret Hills
Northern Ave
Mohave Rd
Saguaro Dr
Cocinino Rd
Ironwood Dr
El Arroyo Rd
Calle Caballeros
Cuarenta Ct
Stallion Rd
Belmont Cir
Belmont Ct
Bronco Dr
Belmont Ave
Paradise Ranch Rd
Hummingbird Ln
Cholla Dr
Cheney Dr
Catesby Rd
Quartz Mountain Rd
Bluebird Ln
Avenida El Alba
Valley Tr
Meadowlark Ln
Arroyo Ct
Glen Dr
Cottontail Run Rd
Arroyo Rd
Palo Verde Pl
Mummy Mountain Rd
Indian Bend Rd
Invergordon Rd
Joshua Tree Ln
Desert Hills Rd
Cactus Wren Pl
Cactus Wren Rd
Judson Rd
Ocotillo Rd
Horseshoe Ln
Redwing Rd
Colonia Miramonte 1
Smoke Tree Ln
Lincoln Dr
Stella Ln
Huntress Dr
Malcomb Dr
Solcito Ln
Mountain Shadow 2
Edward Ln
Naumann Dr
Nauni Valley Dr
Kachina Ln
Quail Run Rd
McDonald Dr
Valley Vista Ln
Rovey Ave
Valley Vista Wy
Marston Dr
Pebble Ridge Rd
Arroyo Verde Dr
Camelback Mtn 2
Paradise View Dr
Hogahn Cir
Hogahn Dr
Claremont Ave
Keim Dr
Claremont St
Marlette Ave
Rose Ln
Rovey Ln
Palo Verde Dr
Homestead Ln
Elizabeth Pl
Bethany Home Rd
Harding Dr
Camino Sin Nombre
Colina Dr
La Colina Dr
San Miguel Ave
Royal Palm Cir
Rancho Dr
Del Contento
Camino Del Contento
Nina Rd
Calle La Paz
Arizona Csr
Denton Ln
Solano Dr
Starlight Wy
Camelback Rd
Yucca Rd
Badgett Ln
Casa Blanca Dr
Solano Kiva Ln
Solano Cir
Monte Vista Dr
Montebello Ave
Quail Pl
Quail Run Pl
Scottsdale Rd
Sage Dr
Cholla Ln
Kasba Cir
Fez Wy
Vermont Ave
Vista Dr
Taza Wy
Sari Wy
Tamara Dr
Balfour Rd
Jackrabbit Rd
Wilkinson Rd
Chaparral Rd
Lake Ave
Foothill Dr
Manor Dr
Hatcher Rd
Martingale Rd
Sanna St
Donna Ln
Cholla Pl
Nursing Glory Rd
Kober Rd
Berneil Dr
Caron St
Caron Cir
Pescar Dr
Highlands Dr
Desert Crest Dr
Hillside Dr
Pepper Tree Ln
Lamar Rd
Flynn Ln
Sierra Vista Dr
Mountain View Rd
Pinnacle Peak Rd
Lost Dutchman Dr
Smoke Tree Ln
Camelback Mtn 1
Mockingbird Ln
Via Serena
Avenida Del Sol
Via Buena Vista
Via Los Caballos
Caida Del Sol Dr
Lillian Ln
Charles Dr
Lauretta Ln
White Dr
Poco Calle
Mockingbird Ln
Sapphire Ln
Royal Palm Rd
Roadrunner Ln
Lomo Vista Rd
Rica St
Sky Desert Ln
Desert Jewel Dr
Crestview Dr
Desert Park Pl
Desert Park Ln
Ridgeview Dr
Arroyo Dr
Roadrunner Rd
Morrison Ln
Moonlight Wy
Sparkling Ln
Crystal Ln
Clearwater Pkwy
Desert Vista Rd
Paradise Canyon Rd
Shadow Mountain Rd
Bristle Cone Ln
Tatum Blvd
Eucalyptus Dr
Pinkley Pear Ln

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MIBW
ESC
LIBW
CCW
Doubletree Ranch Rd
56th St
Indian Bend Wash
Cherokee Wash
Phoenix Mountain Preserve
Mummy Mountain
Cheney Wash
Tatum Blvd
Mockingbird Ln
Indian Bend Rd
40th St
Lincoln Dr
44th St
Invergordon Rd
McDonald Dr
Camelback Mountain
Cudia City Wash
ACDC
Chaparral Rd
N
0 1,000 2,000 US Feet
PREVIOUS FCDMC ADMS/PS MAP
PARADISE VALLEY, AZ
STORMWATER MASTER PLAN
Legend
Paradise Valley
Flood Zone AE
CCW ADMS
MIBW ADMS
LIBW ADMS
ESC ADMS
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Phoenix, Arizona 85016 (602) 944-5500

Flooding Issue Tracker

ID	Flooding Issue	Source	Origin	Location	Notes from Source
1	Structural Flooding	Civics Plus - Resident Request	Resident	3711 E. Rancho Dr	Erosion to their landscaping and flooding into driveway and garage
2	Structural Flooding	Hillside Meeting	Resident	6641 E Meadow Lark Lane	Flooding in front yard and in-house flooding
3	Structural Flooding	Cheney Watershed Analysis Report	Resident	6641 E Meadowlark Ln	No additional data included
4	Road Flooding	Hillside Meeting	Resident	5302 N 68th Place	Flooding at N/W Corner of 68th Place and Vermont
5	Road Flooding	Hillside Meeting	Resident	69th Place and Jackrabbit (N/E corner)	Flooding at 69th Place and Jackrabbit (N/E)
6	Road Flooding	Hillside Meeting	Town Staff	67th and Doubletree Ranch	67th and Doubletree Ranch - Severe roadway flooding
7	Road Flooding	Hillside Meeting	Resident	Quartz Mountain Road from La Place Du Sommet to 64th Place	Site conditions for the areas in La Place restrict retention upgrades, offsite flows lead to flood risks on the lower sections of Quartz Mountain Rd
8	Road Flooding	Hillside Meeting	Resident	Hummingbird Lane from 58th Place to 64th place	Offsite flows coming from Quartz Mountain leads to flooding
9	Road Flooding	Hillside Meeting	Resident	7011 N Invergordon Road	Flood Risk to Invergordon Rd. and Joshua Tree Ln.
10	Road Flooding	Road Closure by Town Staff	Town Staff	the Intersection of 40th St and Stanford Dr	Culvert under bridge likely the source of flooding, also noted as 8A in ADMP Cudia City Wash (ongoing)
11	Road Flooding	Road Closure by Town Staff	Town Staff	Doubletree Ranch Rd closed from Via Los Caballos to 60th Street	Located in the Indian Bend Wash Area
12	Road Flooding	Public Works Storm Cleanup Priority List	Town Staff	Stanford Dr and 40th Street	Cudia Wash Crossing on 40th Street. Debris gets stuck in barricade poles
13	Road Flooding	Public Works Storm Cleanup Priority List	Town Staff	Golf Drive at Indian Bend Wash Crossing	Road Inundation/Debris
14	Road Flooding	Public Works Storm Cleanup Priority List	Town Staff	Invergordon Rd at Indian Bend Wash Crossing	Road Inundation/Debris
15	Road Flooding	Public Works Storm Cleanup Priority List	Town Staff	Morning Glory & E Caballo Drive	Road Inundation/Debris
16	Road Flooding	Public Works Storm Cleanup Priority List	Town Staff	N Lauretta Lane and E Charles Drive	Road Inundation/Debris
17	Road Flooding	Public Works Storm Cleanup Priority List	Town Staff	E Quartz Mountain Rd	Road Inundation/Debris
18	Road Flooding	Public Works Storm Cleanup Priority List	Town Staff	N Mohave Road	Road Inundation/Debris
19	Road Flooding	Public Works Storm Cleanup Priority List	Town Staff	Foothills Dr and 47th St	Road Inundation/Debris. Also noted as #7 in ADMP Middle Indian Bend Wash (Ongoing) and Cherokee Wash
20	Road Flooding	Public Works Storm Cleanup Priority List	Town Staff	E Desert Park Place from 47th St to N Sherri Lane	Road Inundation/Debris
21	Road Flooding	Public Works Storm Cleanup Priority List	Town Staff	54th Street and Desert Jewel	Road Inundation/Debris
22	Road Flooding	Public Works Storm Cleanup Priority List	Town Staff	Invergordon Rd and Joshua Tree Lane	Road Inundation/Debris
23	Road Flooding	Public Works Storm Cleanup Priority List	Town Staff	60th Street and Indian Bend Road	Road Inundation/Debris

24	Road Flooding	Public Works Storm Cleanup Priority List	Town Staff	6533 N Praying Monk Road	Road Inundation/Debris
25	Road Flooding	Public Works Storm Cleanup Priority List	Town Staff	Hummingbird Lane and N 66th St	Road Inundation/Debris
26	Road Flooding	Public Works Storm Cleanup Priority List	Town Staff	E Crestview Dr	Road Inundation/Debris. Also noted as 4B in ADMP Middle Indian Bend Wash (Ongoing) and Cherokee Wash
27	Road Flooding	Public Works Storm Cleanup Priority List	Town Staff	Doubletree Ranch Rd and 52nd Street	Road Inundation/Debris
28	Road Flooding	Civics Plus - Resident Request	Resident	6354 E Hummingbird Lane	Edge of street washed out by erosion
29	Road Flooding	Civics Plus - Resident Request	Resident	5024 E Turquoise Ave	8/4/2022 (same place on another date) requested street cleaner
30	Road Flooding	Civics Plus - Resident Request	Resident	5300 Mountain View	Requested street cleaner
31	Road Flooding	Civics Plus - Resident Request	Resident	5024 E Turquoise Ave	9/6/2022 (same place on another date)requested street cleaner
32	Road Flooding	Civics Plus - Resident Request	Resident	6534 N 46th St	Requested street cleaner
33	Road Flooding	Civics Plus - Resident Request	Resident	3201 San Miguel Pl	Requested street cleaner
34	Road Flooding	Civics Plus - Resident Request	Resident	3511 East Rose Lane	Noted water ponding on road in front of house
35	Road Flooding	Civics Plus - Resident Request	Resident	3201 E San Miguel	Requested street cleaner
36	Road Flooding	Civics Plus - Resident Request	Resident	Hummingbird Lane and Quartz Mountain (near the entrance of Le Summit)	Storm drain clogged. Stormwater Runoff from Mummy mountain to the east collects at the intersection. Runoff has eroded the road embankment on the downstream side of Hummingbird Ln. Road Damage has occured along the the shoulder and will continue to cut into the road section. The roadway embankment consists of unprotected native material.
37	Road Flooding	Civics Plus - Resident Request	Resident	8100 N Tatum Blvd	Blocked storm drain grate
38	Road Flooding	Civics Plus - Resident Request	Resident	6217 E. Quartz Mountain Rd	Storm Drain in front of house is clogged
39	Road Flooding	Staff Documented Storm Cleanup Locations	Town Staff	Quartz Mountain Road from Hummingbird to Hummingbird	Additional information not included
40	Road Flooding	Staff Documented Storm Cleanup Locations	Town Staff	Hummingbird from Quartz Mountain Rd to Quartz Mountain Rd	Additional information not included
41	Road Flooding	Staff Documented Storm Cleanup Locations	Town Staff	64th Place and Hummingbird	Additional information not included
42	Road Flooding	Staff Documented Storm Cleanup Locations	Town Staff	Catesby Rd off of Cheney Dr	Additional information not included
43	Road Flooding	Staff Documented Storm Cleanup Locations	Town Staff	66th St off of Cheney Dr.	Additional information not included
44	Road Flooding	Staff Documented Storm Cleanup Locations	Town Staff	Mohave off of Mockingbird	Additional information not included
45	Road Flooding	Staff Documented Storm Cleanup Locations	Town Staff	Coconino off of Mockingbird	Additional information not included
46	Road Flooding	Staff Documented Storm Cleanup Locations	Town Staff	Mummy Mountain Rd off of Mockingbird	Additional information not included
47	Road Flooding	Staff Documented Storm Cleanup Locations	Town Staff	Mummy Mountain Rd and Roadrunner	Additional information not included
48	Road Flooding	Staff Documented Storm Cleanup Locations	Town Staff	Royal Palm and 54th St	Additional information not included
49	Road Flooding	Staff Documented Storm Cleanup Locations	Town Staff	54th St from Royal Palm to Mockingbird	Additional information not included

50	Road Flooding	Staff Documented Storm Cleanup Locations	Town Staff	61st St and Caballo	Additional information not included
51	Road Flooding	Staff Documented Storm Cleanup Locations	Town Staff	59th Place and Caballo	Additional information not included
52	Road Flooding	Staff Documented Storm Cleanup Locations	Town Staff	Charles & Lauretta	Additional information not included
53	Road Flooding	Staff Documented Storm Cleanup Locations	Town Staff	54th St and Desert Jewel.	Additional information not included
54	Road Flooding	Staff Documented Storm Cleanup Locations	Town Staff	54th St and Roadrunner Rd.	Additional information not included
55	Road Flooding	Staff Documented Storm Cleanup Locations	Town Staff	55th St and Desert Jewel.	Additional information not included
56	Road Flooding	Staff Documented Storm Cleanup Locations	Town Staff	Desert Fairways and Shadow Mountain Rd.	Additional information not included
57	Road Flooding	Staff Documented Storm Cleanup Locations	Town Staff	Desert Fairways and Arroyo Rd.	Additional information not included
58	Road Flooding	Staff Documented Storm Cleanup Locations	Town Staff	Desert Fairways from Lincoln Dr to Tatum Blvd.	Additional information not included
59	Road Flooding	Staff Documented Storm Cleanup Locations	Town Staff	Roadrunner Rd from 54th St to Tatum Blvd.	Additional information not included
60	Road Flooding	Staff Documented Storm Cleanup Locations	Town Staff	7837 N 47th St.	Additional information not included
61	Road Flooding	Staff Documented Storm Cleanup Locations	Town Staff	7701 N Moonlight Ln.	Additional information not included
62	Road Flooding	Staff Documented Storm Cleanup Locations	Town Staff	Desert Park Pl from 47th St to Sherri Ln.	Additional information not included
63	Road Flooding	Staff Documented Storm Cleanup Locations	Town Staff	6533 N Praying Monk	Additional information not included
64	Road Flooding	Staff Documented Storm Cleanup Locations	Town Staff	Invergordon and Cactus Wren	Additional information not included
65	Road Flooding	Staff Documented Storm Cleanup Locations	Town Staff	Invergordon and Joshua Tree Ln.	Additional information not included
66	Road Flooding	Staff Documented Storm Cleanup Locations	Town Staff	Joshua Tree Ln and N 63rd Pl.	Additional information not included
67	Road Flooding	Staff Documented Storm Cleanup Locations	Town Staff	Cactus Wren from Invergordon to 60th St.	Additional information not included
68	Road Flooding	Staff Documented Storm Cleanup Locations	Town Staff	60th St and Indian Bend Rd.	Additional information not included
69	Road Flooding	Staff Documented Storm Cleanup Locations	Town Staff	Joshua Tree Ln and 60th St.	Additional information not included
70	Road Flooding	Staff Documented Storm Cleanup Locations	Town Staff	Indian Bend Rd from 60th St to Dead End.	Additional information not included
71	Road Flooding	Staff Documented Storm Cleanup Locations	Town Staff	59th Pl and Indian Bend	Additional information not included
72	Road Flooding	Staff Documented Storm Cleanup Locations	Town Staff	57th Pl and Indian Bend.	Additional information not included
73	Road Flooding	Staff Documented Storm Cleanup Locations	Town Staff	McDonald Dr from Scottsdale Rd to Tatum Blvd.	Additional information not included
74	Road Flooding	Staff Documented Storm Cleanup Locations	Town Staff	54th St. from McDonald Dr. to San Miguel Ave.	Additional information not included
75	Road Flooding	Staff Documented Storm Cleanup Locations	Town Staff	San Miguel Ave. from 54th St to Solano Dr.	Additional information not included
76	Road Flooding	Staff Documented Storm Cleanup Locations	Town Staff	Solano Dr from San Miguel Ave to 54th St.	Additional information not included
77	Road Flooding	Staff Documented Storm Cleanup Locations	Town Staff	Camelback Manor Drive from Lincoln to McDonald	Additional information not included
78	Road Flooding	Staff Documented Storm Cleanup Locations	Town Staff	52nd Place from McDonald to Lincoln	Additional information not included
79	Road Flooding	Staff Documented Storm Cleanup Locations	Town Staff	51st Place from McDonald to Lincoln	Additional information not included

80	Road Flooding	Work Order Listing By Street Report	Town Staff	Mcdonald Dr from Nauni Valley to the roundabout by Tatum Blvd	Storm clean up required
81	Road Flooding	Work Order Listing By Street Report	Town Staff	Invergordon Rd and Mountain View Rd	Cleaned out storm drain trash rack
82	Road Flooding	Work Order Listing By Street Report	Town Staff	7629 Foothill Dr	Filled and compacted erosion
83	Road Flooding	Work Order Listing By Street Report	Town Staff	Tatum and Mcdonald Rd	Filled in erosion by guard rail
84	Road Flooding	Work Order Listing By Street Report	Town Staff	White Dr	Erosion repair
85	Road Flooding	Work Order Listing By Street Report	Town Staff	5913 N La Colina Dr	Storm clean up, erosion repair
86	Road Flooding	Work Order Listing By Street Report	Town Staff	6015 E Joshua Tree	Storm clean up
87	Road Flooding	Work Order Listing By Street Report	Town Staff	4050 E Desert Crest Dr	Storm clean up
88	Road Flooding	Work Order Listing By Street Report	Town Staff	Caballos and 68th St	Cleared debris from wash
89	Road Flooding	Work Order Listing By Street Report	Town Staff	On Mcdonald Rd, east of Casa Blanca	Concrete spill cleaned up
90	Road Flooding	Drainage Improvement Areas - Technical Memo	Town Staff	E. Quartz Mountain Rd South of Cheney Wash	Road receives shallow flows with high velocity that cause erosion and sediment transport/deposits. Repetitive roadway Maintenance issues and public safety complaints.
91	Road Flooding	Drainage Improvement Areas - Technical Memo	Town Staff	7555 N. Hummingbird Ln	Existing low water crossing east of Mummy Mountain that has repetitive maintenance issues and public complaints. Stormwater runoff crosses ove Hummingbird Ln. from south to north and deposits sediment in the roadway.
92	Road Flooding	Drainage Improvement Areas - Technical Memo	Town Staff	5959 E. Hummingbird Ln	Existing low water crossing east of mummy mountain where high velocity flows cross Hummingbird Ln. Road damage has occurred due to the under cutting of the roadway embankment which has caused a dip east of the driveway of 5959 E. Hummingbird Ln. demonstrated in the field observations. The roadway embankment consists of unprotected native material.
93	Road Flooding	Drainage Improvement Areas - Technical Memo	Town Staff	6324 E. Quartz Mountain Rd	Overland sheet flow from the southwest and roadway drainage along Quartz Mountain Rd. combine at this location and are routed to the northwest adjacent to 6324 E. Quartz Mountain Rd by a drainage swale. After a storm event, sediment deposits have to be removed from Quartz Mountain Rd. This is a repetitive maintenance location.
94	Road Flooding	Drainage Improvement Areas - Technical Memo	Town Staff	58th Pl. South of Caballo Ln.	Existing low water crossing near the confluence with Indian Bend Wash that has repretitive maintenance issues.

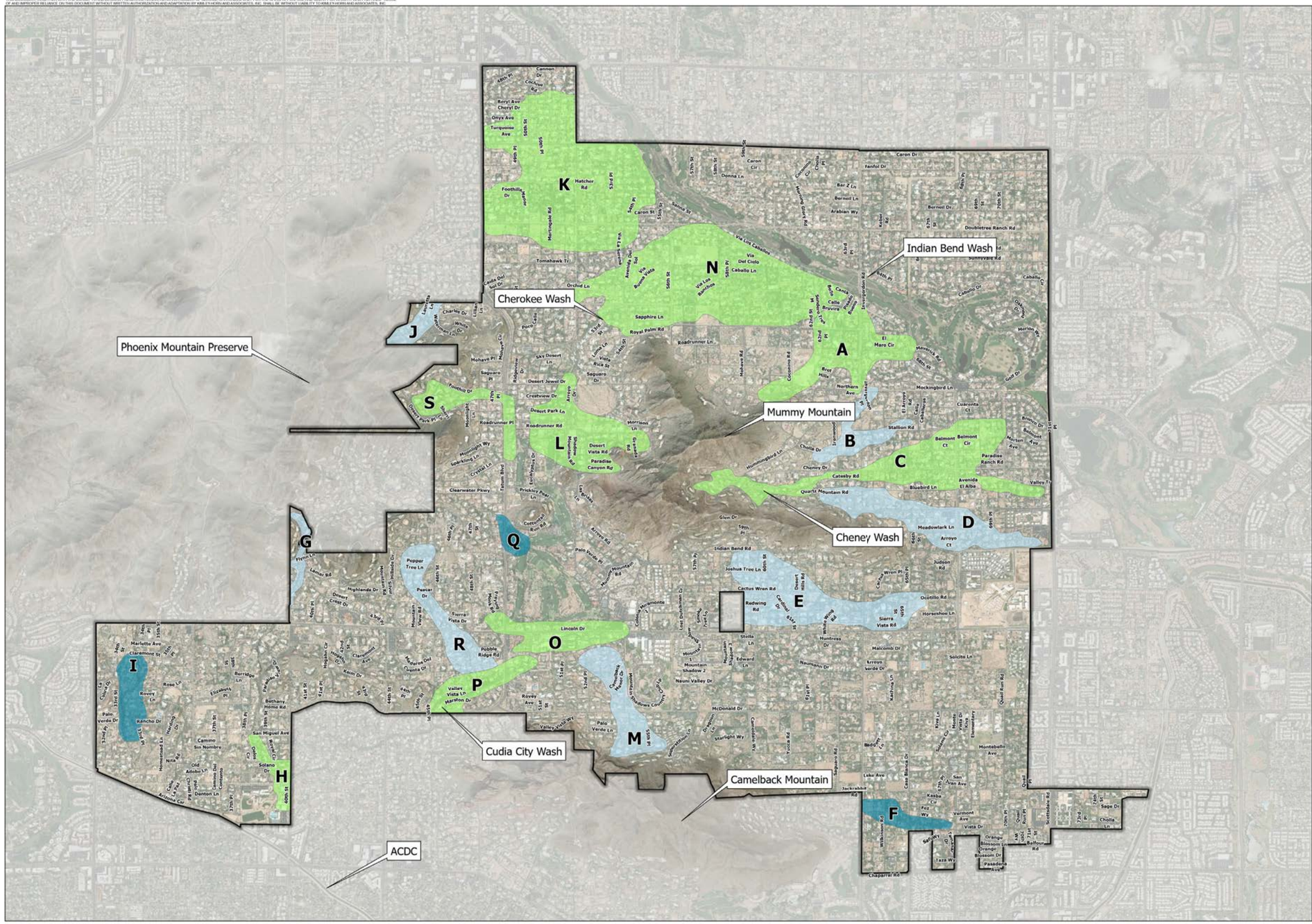
95	Road Flooding	Drainage Improvement Areas - Technical Memo	Town Staff	59th Pl. South of Caballo Ln.	Existing low water crossing near the confluence with Indian Bend Wash that has repretitive maintenance issues.
96	Road Flooding	Drainage Improvement Areas - Technical Memo	Town Staff	Caballo Ln east of Morning Glory Rd	Existing low water crossing near the confluence with Indian Bend Wash that has repretitive maintenance issues.
97	Road Flooding	Drainage Improvement Areas - Technical Memo	Town Staff	E Desert Jewel Dr and N Arroyo Dr	Low water crossing along Cherokee Wash. Repetitive maintenance issues.
98	Road Flooding	Drainage Improvement Areas - Technical Memo	Town Staff	N Arroyo Dr	Low water crossing along Cherokee Wash. Repetitive maintenance issues.
99	Road Flooding	Drainage Improvement Areas - Technical Memo	Town Staff	N 57th Pl and E Glen Dr	High velocity flows that cause erosion, and sediment deposition. Runoff flows south through private property and public roads
100	Road Flooding	Drainage Improvement Areas - Technical Memo	Town Staff	9438 N. 52nd St	Low point on the west side of the road that collects nuisance flows
101	Road Flooding	Drainage Improvement Areas - Technical Memo	Town Staff	3800 E. Berridge Ln. west of N. 38th Pl.	Berridge Ln road is super elevated along the horizontal roadway curve where the eastbound lane is higher than the westbound lane, trapping water from draining into the adjacent wash to the southwest, and causing nuisance ponding and roadway maintenance issues.
102	Road Flooding	Cudia City Wash ADMS	Town Staff	Solano Dr.	Low water crossing causes routine debris and obstructions
103	Road Flooding	Cheney Watershed Analysis Report	Resident	E Mcdonald Dr & N 56th St	Sediment left on road after storm
104	Road Flooding	Cheney Watershed Analysis Report	Resident	E Lincoln Dr & N 51st Pl	Sediment left on road after storm
105	Road Flooding	Cheney Watershed Analysis Report	Resident	E Stanford Dr & Cudia City Wash	Sediment left on road after storm
106	Road Flooding	Cheney Watershed Analysis Report	Resident	Invergordon and Cheney Rd	Additional information not included
107	Road Flooding	Cheney Watershed Analysis Report	Resident	N 66th St and E Cholla Dr	Additional information not included
108	Road Flooding	Cheney Watershed Analysis Report	Resident	N 66th St & E Meadowlark Ln	Additional information not included
109	Road Flooding	Cheney Watershed Analysis Report	Resident	N 68th St & E Bluebird Ln	Additional information not included
110	Road Flooding	Cheney Watershed Analysis Report	Resident	N 68th St & E Cheney Dr	Additional information not included
111	Road Flooding	Cheney Watershed Analysis Report	Resident	N 70th St and E Ave ElAlba	Additional information not included
112	Road Flooding	Cheney Watershed Analysis Report	Resident	N 71st Pl & E Valley Trail	Additional information not included
113	Road Flooding	Cheney Watershed Analysis Report	Resident	E Maverick Rd & N 68th St	Additional information not included
114	Property Flooding	Hillside Meeting	Resident	6659 E Meadow Lark Lane	Flooding in front yard
115	Property Flooding	Hillside Meeting	Resident	7401 N Las Brisas to 7404 N Las Brisas	Flooding Risk from 7401 N Las Brisas
116	Property Flooding	Hillside Meeting	Resident	6006 and 6001E Foothill Dr.	Flood risk to 6006 and 6001E Foothill Dr

117	Property Flooding	Hillside Meeting	Resident	6418 E Joshua Tree Lane	Flooding risk from 7011 N Invergordon and flows west down Joshua Tree onto Invergordon
118	Property Flooding	Hillside Meeting	Resident	7045 N Invergordon Road	Flood risk to Joshua Tree Lane and any homes south on Invergordon
119	Property Flooding	Public Works Storm Cleanup Priority List	Town Staff	54th Street from Mcdonald Drive to San Miguel / San Miguel Ave from 54th St to Solano Drive / Solano Dr from San Miguel to 54th St	Road Inundation/Debris
120	Property Flooding	Drainage Improvement Areas - Technical Memo	Town Staff	7002 N 57th Pl	High velocity flows that cause erosion, and sediment deoposition. Runoff Flows South Through Private Property and public roads
121	Property Flooding	Drainage Improvement Areas - Technical Memo	Town Staff	N 56th St and E Caballo Dr	Existing box culvert crossing at 56th st and cherokee wash and a catch basin inlet at 56th St and Caballo Dr. The roadway drainage along 56th St has overtopped the vertical curb and damaged the adjacent properties.
122	Property Flooding	Drainage Improvement Areas - Technical Memo	Town Staff	Mockingbird Ln and 62nd St	Offsite runoff cascades through properties before reaching the Indian Bend Wash to the north east
123	Property Flooding	Cudia City Wash ADMS	Resident	4741 E Marston Dr	Offsite Flows from the channel impact these homes
124	Property Flooding	Cudia City Wash ADMS	Resident	4700 E Marston Dr	Offsite Flows from the channel impact these homes
125	Property Flooding	Cudia City Wash ADMS	Resident	4730 E Marston Dr	Offsite Flows from the channel impact these homes
126	Property Flooding	Cudia City Wash ADMS	Resident	5501 E San Miguel Ave	Mountain Run-off
127	Property Flooding	Cudia City Wash ADMS	Resident	5200 E Solano Dr	Mountain Run-off
128	Property Flooding	Cudia City Wash ADMS	Resident	5228 E Solano Dr	Mountain Run-off
129	Property Flooding	Cudia City Wash ADMS	Resident	5301 E Palo Verde Dr	Mountain Run-off
130	Property Flooding	Cudia City Wash ADMS	Resident	5401 E Palo Verde Dr	Mountain Run-off
131	Property Flooding	Cudia City Wash ADMS	Resident	E San Miguel Ave	Mountain Run-off
132	Property Flooding	Cudia City Wash ADMS	Resident	E Solano Dr	Mountain Run-off
133	Property Flooding	Cheney Watershed Analysis Report	Resident	6515 E Cheney Dr	Additional information not included
134	Property Flooding	Cheney Watershed Analysis Report	Resident	6520 E Cheney Dr	Additional information not included
135	Property Flooding	Cheney Watershed Analysis Report	Resident	6602 E Cholla Dr	Additional information not included
136	Property Flooding	Cheney Watershed Analysis Report	Resident	6340 E Quartz Mountain Rd	Additional information not included
137	Property Flooding	Cheney Watershed Analysis Report	Resident	6612 E Hummingbird Ln	Additional information not included
138	Property Flooding	Cheney Watershed Analysis Report	Resident	6112 E Quartz Mountain Rd	Additional information not included
139	Property Flooding	Cheney Watershed Analysis Report	Resident	6122 E Quartz Mountain Rd	Additional information not included
140	Property Flooding	Cheney Watershed Analysis Report	Resident	6659 E Meadowlark Ln	Additional information not included
141	Property Flooding	Cheney Watershed Analysis Report	Resident	6451 E El Maro Cir	Additional information not included
142	Property Flooding	Cheney Watershed Analysis Report	Resident	6424 E Maverick Rd	Additional information not included

143	Property Flooding	Cheney Watershed Analysis Report	Resident	6460 E Maverick Rd	Additional information not included
144	Property Flooding	Cheney Watershed Analysis Report	Resident	6532 E Maverick Rd	Additional information not included
145	Property Flooding	Cheney Watershed Analysis Report	Resident	6001 E Foothill Dr N	Additional information not included
146	Structural Flooding	Middle Indian Bend Wash	Town Staff	Mountain View Rd and IBW	Flooding in house before trash rack removed
147	Structural Flooding	Middle Indian Bend Wash	Town Staff	Mountain View Rd and IBW	Flooding in house before trash rack removed
148	Structural Flooding	Middle Indian Bend Wash	Town Staff	Mountain View Rd and IBW	Maintenance yard frequently has debris on property. Local trash rack is clogged
149	Structural Flooding	Middle Indian Bend Wash	Town Staff	Turquoise Ave and 52nd St	Flooding in Home
150	Property Flooding	Middle Indian Bend Wash	Town Staff	Turquoise Ave Cul De Sac	Flooding in Garages in nearby homes
151	Structural Flooding	Middle Indian Bend Wash	Town Staff	49th Pl and Turquoise Ave	Flooding in Home
152	Structural Flooding	Middle Indian Bend Wash	Town Staff	49th Pl and Cheryl Dr	Flooding in Home
153	Road Flooding	Middle Indian Bend Wash	Town Staff	Mockingbird Lane and Mummy Mountain Road	Debris in intersection
154	Structural Flooding	Middle Indian Bend Wash	Town Staff	Cherokee Wash and 55th Pl	Flooding in Home
155	Structural Flooding	Middle Indian Bend Wash	Town Staff	Cherokee Wash and 56th Street	Flooding in Home
156	Structural Flooding	Middle Indian Bend Wash	Town Staff	Mockingbird Lane and 54th Street	Flooding in Home
157	Road Flooding	Middle Indian Bend Wash	Town Staff	Mockingbird Lane and 54th Street	Heavy debris crossing street during storm events
158	Structural Flooding	Middle Indian Bend Wash	Town Staff	Senderostres M and Mockingbird Lane	Flooding in homes
159	Road Flooding	Middle Indian Bend Wash	Town Staff	62nd Street and Inidan Bend Wash	Raised golf cart path creates bowl for flooding
160	Road Flooding	Middle Indian Bend Wash	Town Staff	Morning Glory Rd and Caballo Dr	Major flooding with debris. Car has been stuck here in the past
161	Structural Flooding	Middle Indian Bend Wash	Town Staff	Morning Glory Rd and Caballo Dr	Flooding in homes
162	Structural Flooding	Middle Indian Bend Wash	Town Staff	59th Pl and Caballo Dr	Flooding in homes
163	Road Flooding	Middle Indian Bend Wash	Town Staff	59th Pl and Cherokee Wash	Significant mud and debris during common events
164	Structural Flooding	Middle Indian Bend Wash	Town Staff	58th Pl and Caballo Dr	Flooding in homes
165	Road Flooding	Middle Indian Bend Wash	Town Staff	58th Pl and Cherokee Wash	Significant mud and debris during common events
166	Structural Flooding	Middle Indian Bend Wash	Town Staff	58th Pl and Cherokee Wash	Flooding in homes
167	Road Flooding	Middle Indian Bend Wash	Town Staff	Doubletree Ranch Rd and Indian Bend Wash	Reported flood depths larger than four feet
168	Road Flooding	Middle Indian Bend Wash	Town Staff	Wash Crossing Desert Vista Rd	Debris causing flooding
169	Structural Flooding	Middle Indian Bend Wash	Town Staff	Paradise Canyon Rd and Las Brisas Ln	Flooding in homes
170	Structural Flooding	Middle Indian Bend Wash	Town Staff	Desert Vista Rd and Las Brisas Ln	Flooding in homes
171	Road Flooding	Middle Indian Bend Wash	Town Staff	Desert Vista Rd and Las Brisas Ln	Significant mud and debris during common events
172	Road Flooding	Middle Indian Bend Wash	Town Staff	Invergordon Road and Indian Bend Wash	Roadway overtopping
173	Structural Flooding	Middle Indian Bend Wash	Town Staff	Canta Redondo and Mockingbird Lane	Flooding in homes
174	Road Flooding	Middle Indian Bend Wash	Town Staff	Morning Glory Rd and Caballo Dr	Significant mud and debris are common during storm events
175	Structural Flooding	Middle Indian Bend Wash	Town Staff	Senderostres M and Calle Bruvira	Flooding in homes

176	Structural Flooding	Middle Indian Bend Wash	Town Staff	Mockingbird Lane and 54th Street	Flooding in homes
177	Road Flooding	Middle Indian Bend Wash	Town Staff	53rd Pl and Grovers Ave	Sediment and Debris
178	Road Flooding	Middle Indian Bend Wash	Town Staff	56th Street and Via Buena Vista	Sediment and Debris
179	Road Flooding	Middle Indian Bend Wash	Town Staff	Las Brisas Lane and Paradise Canyon Road	Sediment and Debris
180	Road Flooding	Middle Indian Bend Wash	Town Staff	Tatum Blvd and Foothill Drive	Sediment and Debris
181	Road Flooding	Middle Indian Bend Wash	Town Staff	52nd Street and Berniel Drive	Sediment and Debris
182	Road Flooding	Middle Indian Bend Wash	Town Staff	59th Street and Foothill Drive	Sediment and Debris
183	Road Flooding	Middle Indian Bend Wash	Town Staff	Crystal Ln and Sparkling Ln	Sediment and Debris
184	Road Flooding	Middle Indian Bend Wash	Town Staff	Via Buena Vista and 55th Pl	Sediment and Debris
185	Road Flooding	Middle Indian Bend Wash	Town Staff	Caballo Ln and 58th Pl	Sediment and Debris
186	Road Flooding	Middle Indian Bend Wash	Town Staff	Ave Del Sol and Via Buena Vista	Sediment and Debris
187	Road Flooding	Middle Indian Bend Wash	Town Staff	Mockingbird Lane and 52nd Pl	Sediment and Debris
188	Road Flooding	Middle Indian Bend Wash	Town Staff	59th Pl and Caballo Dr	Sediment and Debris
189	Road Flooding	Middle Indian Bend Wash	Town Staff	Shadow Mountain Rd and Roadrunner Rd	Sediment and Debris
190	Road Flooding	Middle Indian Bend Wash	Town Staff	53rd Street and Loma Ln	Sediment and Debris
191	Road Flooding	Middle Indian Bend Wash	Town Staff	Sherri Lane and Desert Park Pl	Sediment and Debris
192	Road Flooding	Middle Indian Bend Wash	Town Staff	Tatum Blvd and Moonlight Way	Sediment and Debris
193	Road Flooding	Middle Indian Bend Wash	Town Staff	50th St and Mountain View Rd	Sediment and Debris
194	Road Flooding	Public Works Storm Cleanup Priority List	Resident	7039 E Fanfol Dr	Road Inundation/Debris
195	Road Flooding	Reported by Resident	Resident	68th and Vermont	Road Inundation/Debris
196	Road Flooding	Reported by Resident	Resident	69th and Jackrabbit	Road Inundation/Debris

THIS DOCUMENT, TOGETHER WITH THE CONCEPTS AND DESIGNS PRESENTED HEREIN, AS AN INSTRUMENT OF SERVICE, IS INTENDED ONLY FOR THE SPECIFIC PURPOSE AND CLIENT FOR WHICH IT WAS PREPARED. REUSE OF AND IMPROPER RELIANCE ON THIS DOCUMENT WITHOUT WRITTEN AUTHORIZATION AND ADAPTATION BY KIMLEY-HORN AND ASSOCIATES, INC. SHALL BE WITHOUT LIABILITY TO KIMLEY-HORN AND ASSOCIATES, INC.





N

0 1,000 2,000 US Feet

FLOOD HAZARD AREAS
PARADISE VALLEY, AZ
STORMWATER MASTER PLAN

Legend

- Paradise Valley
- Flood Hazard Area Flooding Severity
  - Moderate
  - Nuisance
  - Severe

Kimley»Horn

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Engineering, Planning and Environmental Consultants

1661 East Camelback Road, Suite 400
Phoenix, Arizona 85016 (602) 944-5500

XIV. APPENDIX B – EXISTING INFRASTRUCTURE

EXISTING CULVERT IDENTIFICATION, STORM LEVEL PROTECTION, AND POTENTIAL IMPACTS TO EMERGENCY VEHICLE ACCESS

THIS DOCUMENT, TOGETHER WITH THE CONCEPTS AND DESIGNS PRESENTED HEREIN, AS AN INSTRUMENT OF SERVICE, IS INTENDED ONLY FOR THE SPECIFIC PURPOSE AND CLIENT FOR WHICH IT WAS PREPARED. REUSE OF AND IMPROPER RELIANCE ON THIS DOCUMENT WITHOUT WRITTEN AUTHORIZATION AND ADAPTATION BY KIMLEY-HORN AND ASSOCIATES, INC. SHALL BE WITHOUT LIABILITY TO KIMLEY-HORN AND ASSOCIATES, INC.



N

0 500 1,000 US Feet

EXISTING CULVERT SIZE

PARADISE VALLEY, AZ
STORM WATER MASTER PLAN

DESIGNED BY: PTB
DRAWN BY: PTB
CHECKED BY: GSB

PROJECT NUMBER
091054031

SCALE: 1"= 800'

DATE: DEC 2024

Legend

- Paradise Valley

Culvert Size (in)

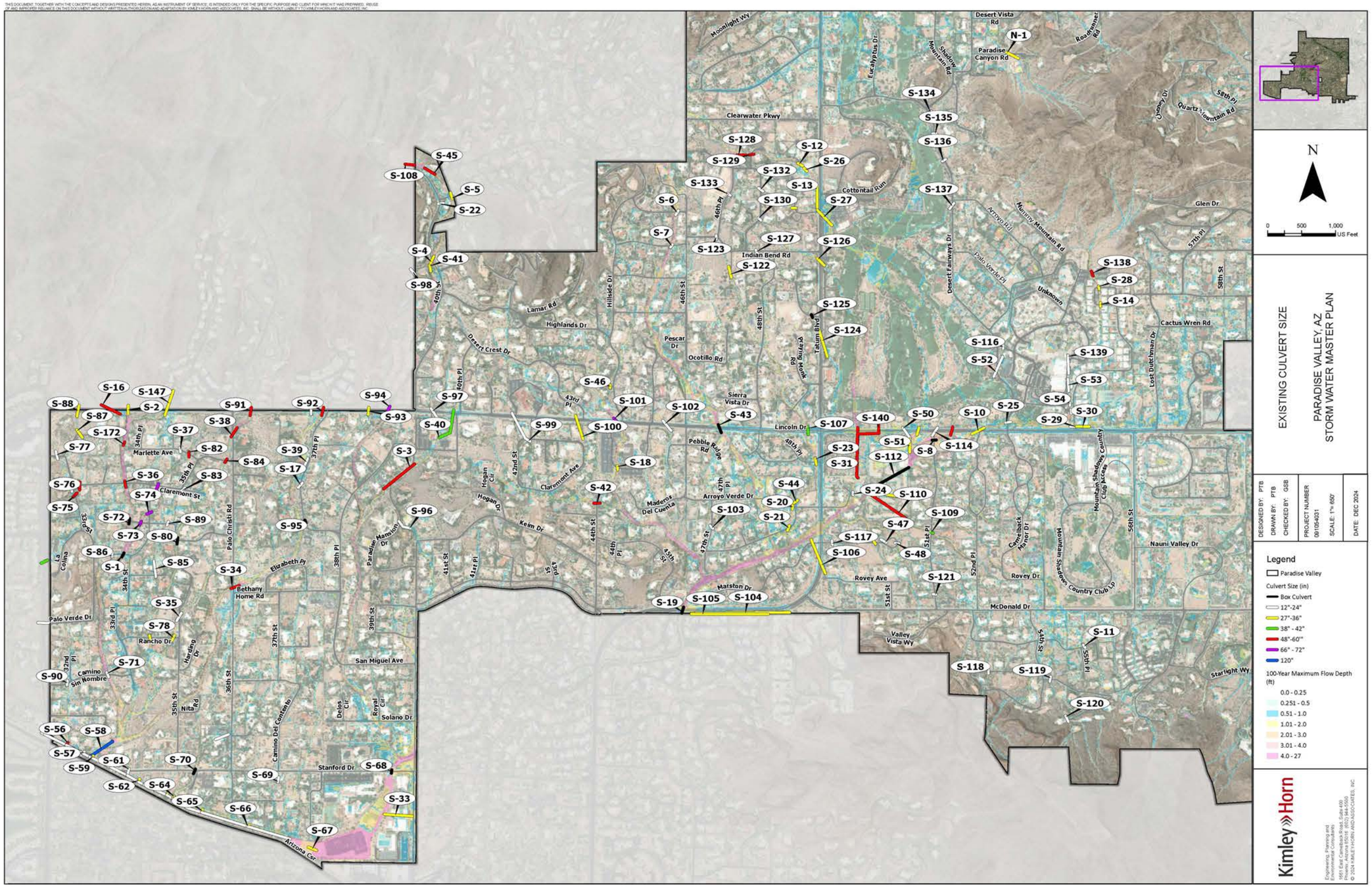
- Box Culvert
- 12"-24"
- 27"-36"
- 38" - 42"
- 48"-60""
- 66" - 72"
- 120"

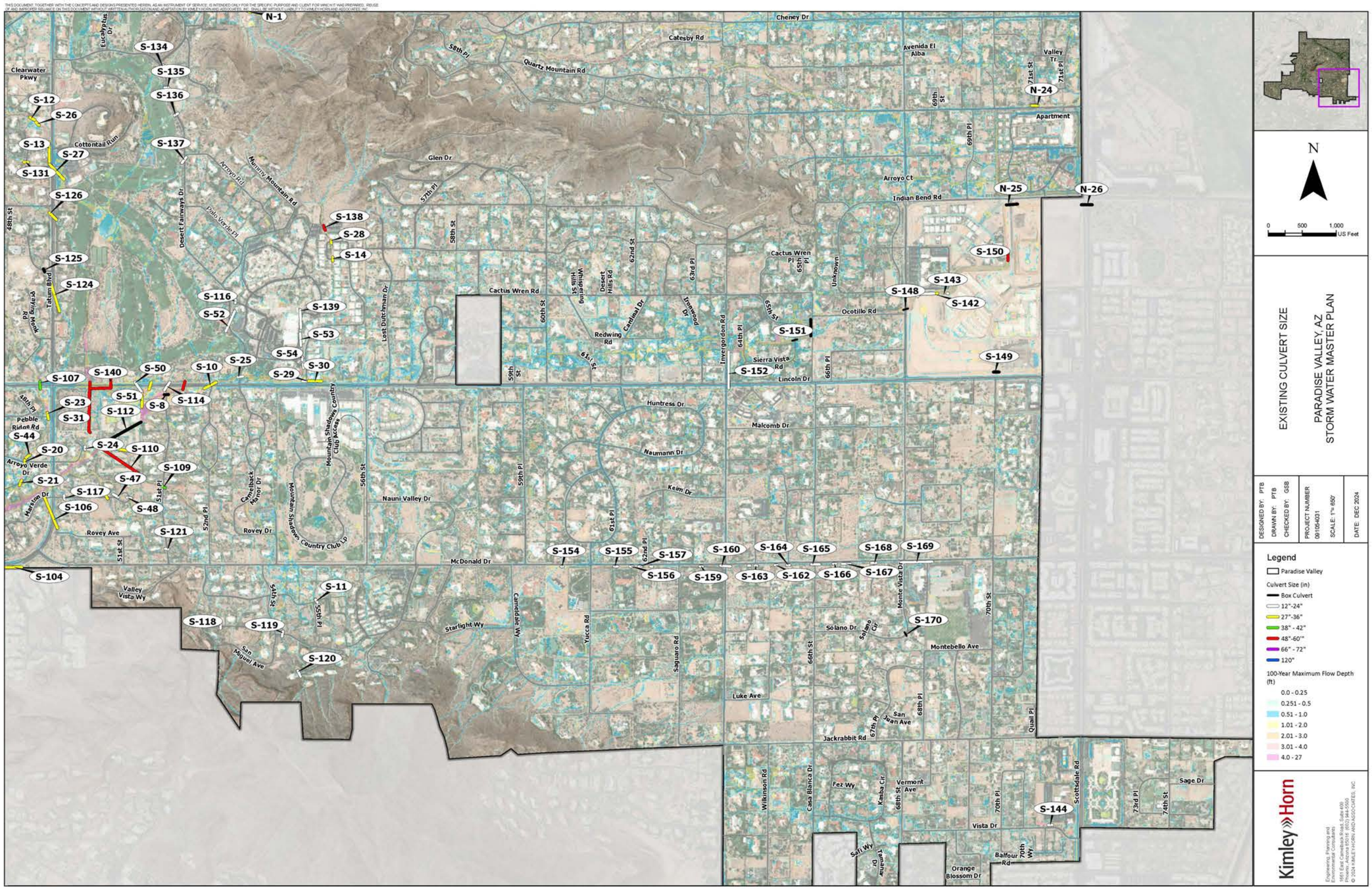
100-Year Maximum Flow Depth (ft)

- 0.0 - 0.25
- 0.251 - 0.5
- 0.51 - 1.0
- 1.01 - 2.0
- 2.01 - 3.0
- 3.01 - 4.0
- 4.0 - 27

Kimley»Horn
Engineering, Planning and Environmental Consultants
1661 East Camelback Road, Suite 400
Phoenix, Arizona 85016 (602) 944-5500

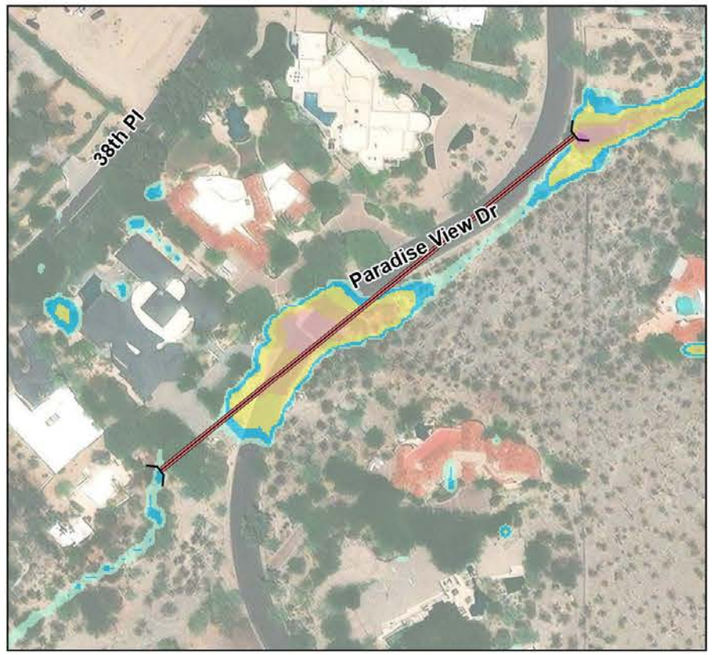
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Paradise Canyon Rd
Roadrunner Rd
Eucalyptus Dr
Shadow Mountain Rd
Clearwater Pkwy
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Indian Bend Rd
Cottontail Run
Arroyo Rd
Mummy Mountain Rd
Desert Fairways Dr
Palo Verde Pl
Unknown
Glen Dr
57th Pl
58th Pl
Quartz Mountain Rd
Cholla Dr
58th St
S-138
S-28
S-14
Cactus Wren Rd
Lost Dutchman Dr
S-125
S-124
Tatum Blvd
Monk Springs Rd
Pescar Dr
Ocotillo Rd
Lamar Rd
Highlands Dr
Hillside Dr
46th St
48th St
40th St
Desert Crest Dr
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Lincoln Dr
Sierra Vista Dr
Pebble Beach Rd
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Claremont St
Palo Christi Rd
Elizabeth Pl
Bethany Home Rd
Palo Verde Dr
Rancho Dr
Camino Sin Nombre
Nita Rd
Camino Del Contento
Stanford Dr
Solano Dr
San Miguel Ave
Arizona Csr
Hogan Cir
Hogan St
Claremont Ave
Kesin Dr
Madonna Del Cuenta
Arroyo Verde Dr
Paradise Mansion Dr
Matson Dr
Rovey Ave
Rovey Dr
McDonald Dr
Valley Vista Wy
Starlight Wy
Nauni Valley Dr
Mountain Shadows Country Club Dr
Mountain Shadows Country Club Access
Cactback Mesa Dr
N
0 500 1,000 US Feet
EXISTING CULVERT SIZE
PARADISE VALLEY, AZ
STORM WATER MASTER PLAN
DESIGNED BY: PTB
DRAWN BY: PTB
CHECKED BY: GSB
PROJECT NUMBER 091054031
SCALE: 1"= 650'
DATE: DEC 2024
Legend
Paradise Valley
Culvert Size (in)
Box Culvert
12"-24"
27"-36"
38" - 42"
48"-60"
66" - 72"
120"
100-Year Maximum Flow Depth (ft)
0.0 - 0.25
0.251 - 0.5
0.51 - 1.0
1.01 - 2.0
2.01 - 3.0
3.01 - 4.0
4.0 - 27
Kimley»Horn
Engineering, Planning and Environmental Consultants
7500 East Camelback Rd, Suite 103
Scottsdale, AZ 85251 (480) 948-5060
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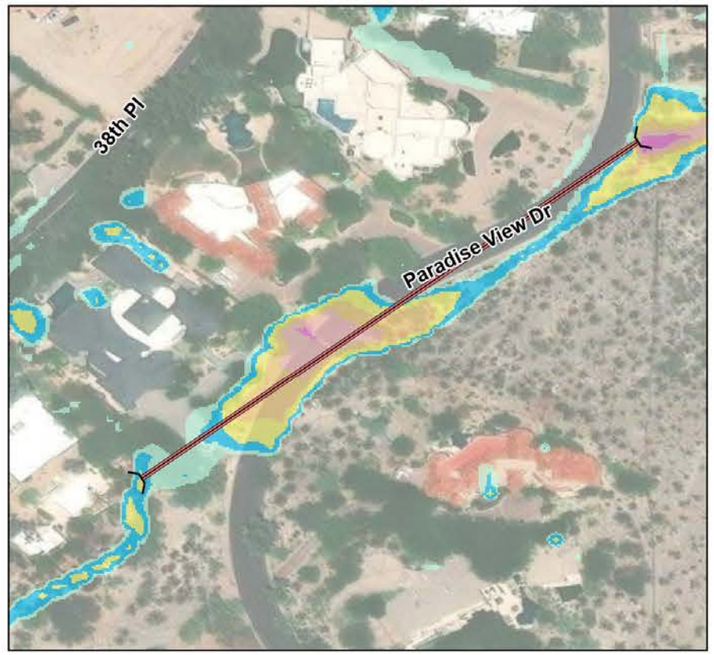

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N-26
Cheney Dr
Catesby Rd
Quartz Mountain Rd
Avenida El Alba
Valley Tr
Apartment
Glen Dr
Arroyo Ct
Indian Bend Rd
Cactus Wren Rd
Ocotillo Rd
Sierra Vista Rd
Lincoln Dr
Huntress Dr
Malcomb Dr
Naumann Dr
Keim Dr
Nauni Valley Dr
McDonald Dr
Starlight Wy
Solano Dr
Montebello Ave
Luke Ave
Jackrabbit Rd
Vista Dr
Orange Blossom Dr
Sage Dr
Clearwater Pkwy
Cottontail Run
Arroyo Rd
Mummy Mountain Rd
Palo Verde Pl
Desert Fairways Dr
48th St
Tatum Blvd
Pebble Ridge Rd
Arroyo Verde Dr
Marston Dr
Rovey Ave
Rovey Dr
Valley Vista Wy
San Miguel Ave
Lost Dutchman Dr
Redwing Rd
Cardinal Dr
Desert Hills Rd
Whispering Hills St
Ironwood Dr
Invergordon Rd
Camelback Manor Dr
Mountain Shadows Country Club Dr
Mountain Shadows Country Club Acres
Camelback Rd
Tierra Buena Ln
Cheney Dr
Valley Tr
Unknown
Monte Vista Dr
Salano Cir
Wilkinson Rd
Casa Blanca Dr
Fez Wy
Kaeba Cir
Vermont Ave
Scottsdale Rd
Balfour Rd
Safi Wy
Tentative Dr
Quail Pl
Sierra Vista Rd
Lincoln Dr
Cactus Wren Pl
Unknown
Legend
Paradise Valley
Culvert Size (in)
Box Culvert
12"-24"
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0.51 - 1.0
1.01 - 2.0
2.01 - 3.0
3.01 - 4.0
4.0 - 27
N
0
500
1,000
US Feet
EXISTING CULVERT SIZE
PARADISE VALLEY, AZ
STORM WATER MASTER PLAN
DESIGNED BY: PTB
DRAWN BY: PTB
CHECKED BY: GSB
PROJECT NUMBER 061054031
SCALE: 1"= 600'
DATE: DEC 2024
Kimley»Horn
Engineering, Planning and Environmental Consultants
1661 East Camelback Road, Suite 255
Phoenix, Arizona 85016 (602) 944-5500
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Possible Emergency Vehicle Access Restriction Areas: S-3

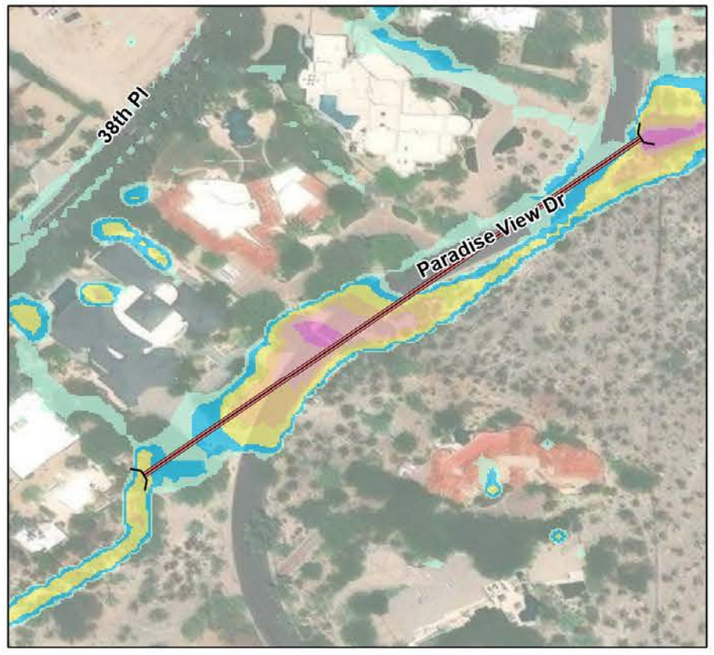
2-Year, 6-Hour



10-Year, 6-Hour



100-Year, 6-Hour



100-Year Maximum Depth Overtopping the Road : 4.3 ft

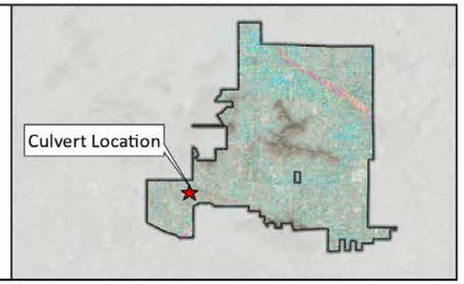
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0 75 150 300 Feet

Legend

Hydraulic Structures
Culvert

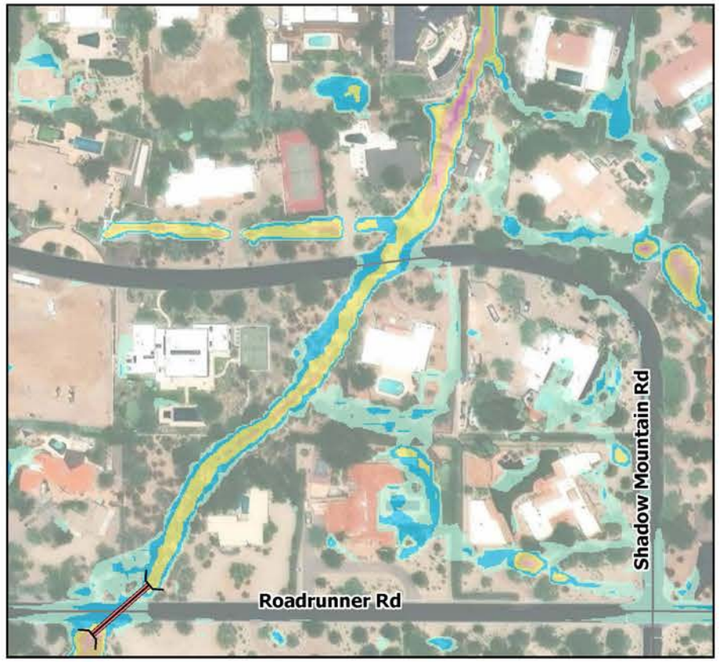
Maximum Water Depth (ft)
0.0 - 0.25
0.251 - 0.5
0.51 - 1.0
1.01 - 2.0
2.01 - 3.0
3.01 - 4.0
4.0 - 27



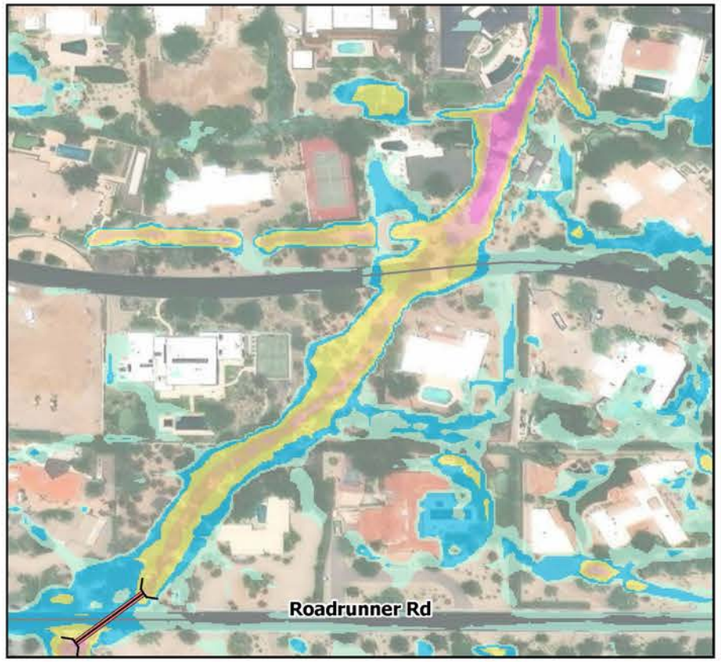
2024 KIMLEY-HORN AND ASSOCIATES, INC.
Engineering, Planning and Environmental Consultants

Possible Emergency Vehicle Access Restriction Areas: Shadow Mountain Rd Low Water Crossing

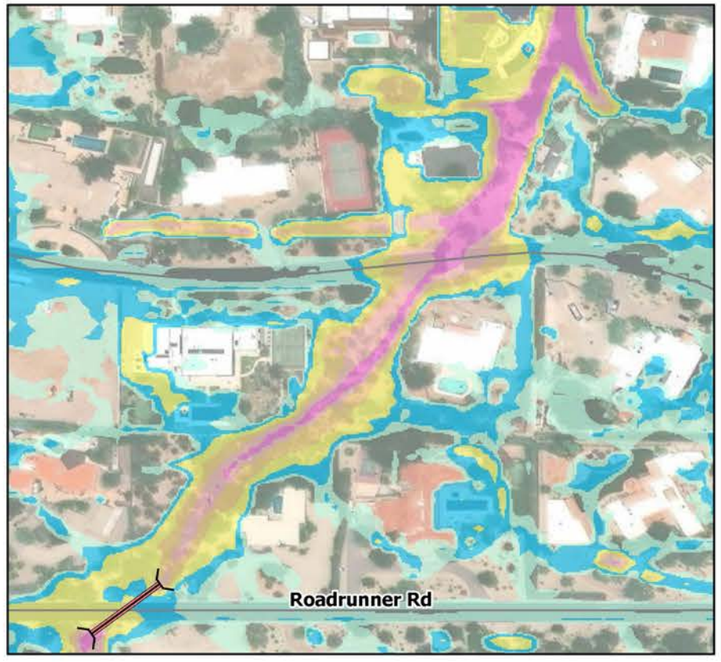
2-Year, 6-Hour



10-Year, 6-Hour



100-Year, 6-Hour



100-Year Maximum Depth Overtopping the Road : 5.1 ft

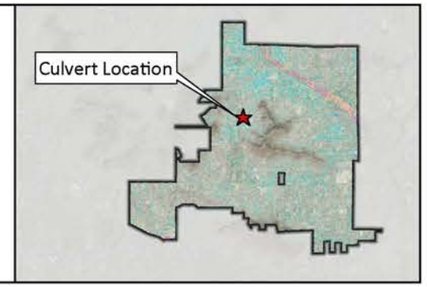
N

0 100 200 400 Feet

Legend

Hydraulic Structures
- Culvert

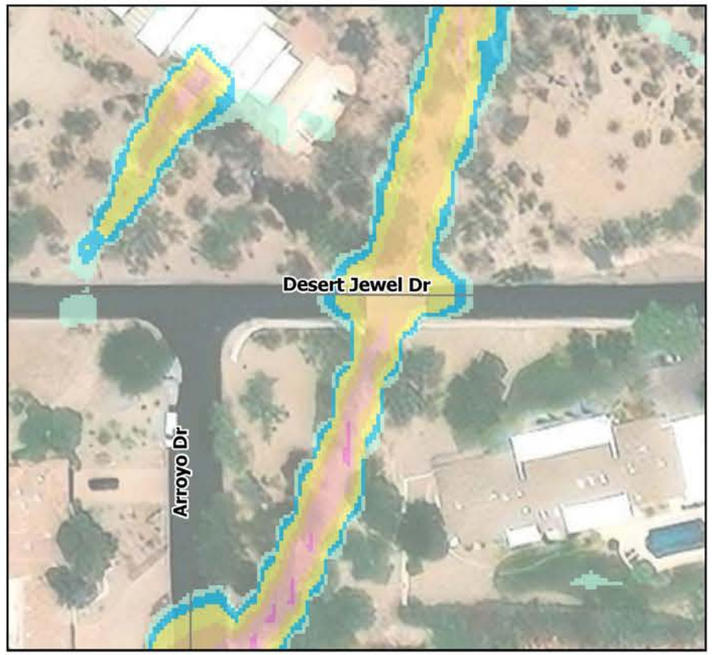
Maximum Water Depth (ft)
- 0.0 - 0.25
- 0.251 - 0.5
- 0.51 - 1.0
- 1.01 - 2.0
- 2.01 - 3.0
- 3.01 - 4.0
- 4.0 - 27



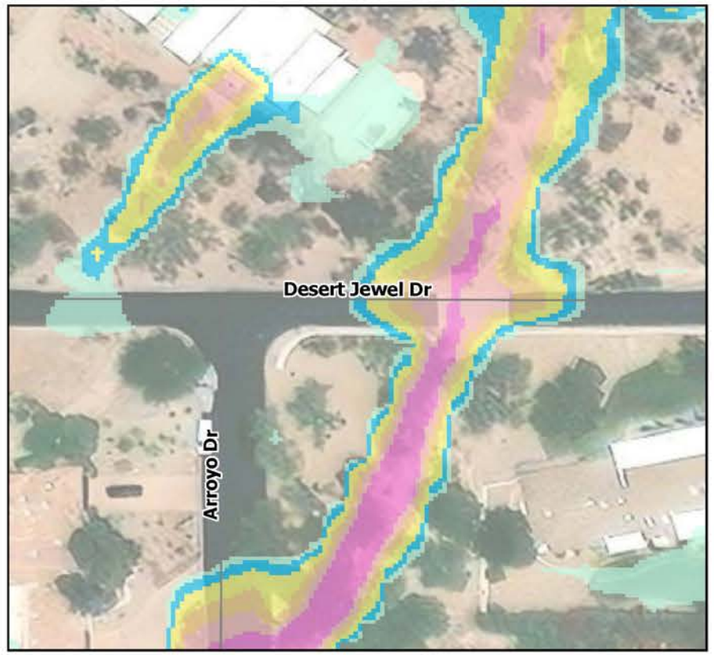
2024 KIMLEY-HORN AND ASSOCIATES, INC.
Engineering, Planning and Environmental Consultants

Possible Emergency Vehicle Access Restriction Areas: Desert Jewel Dr Low Water Crossing

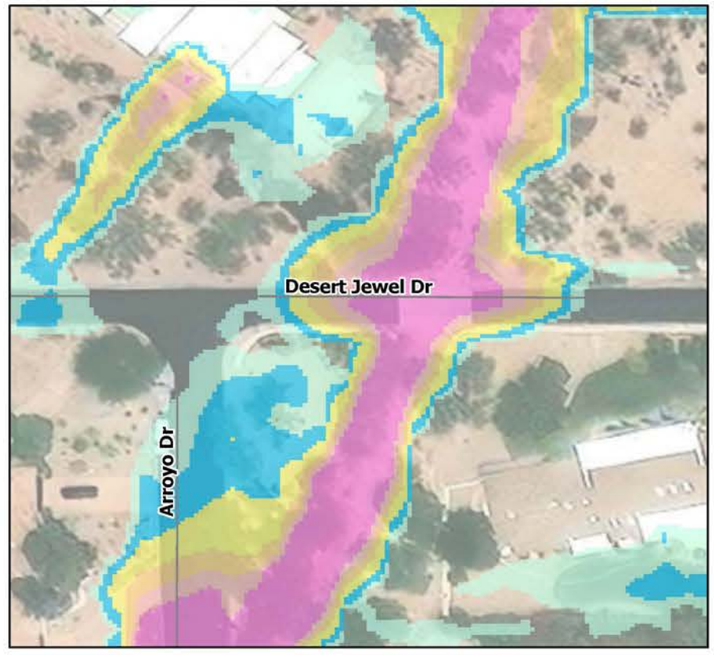
2-Year, 6-Hour



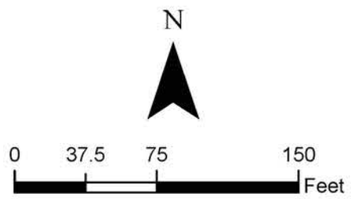
10-Year, 6-Hour



100-Year, 6-Hour



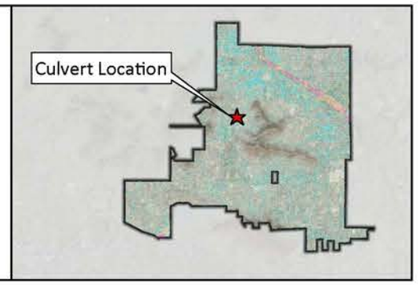
100-Year Maximum Depth Overtopping the Road : 6.1 ft



Legend

Hydraulic Structures
- Culvert

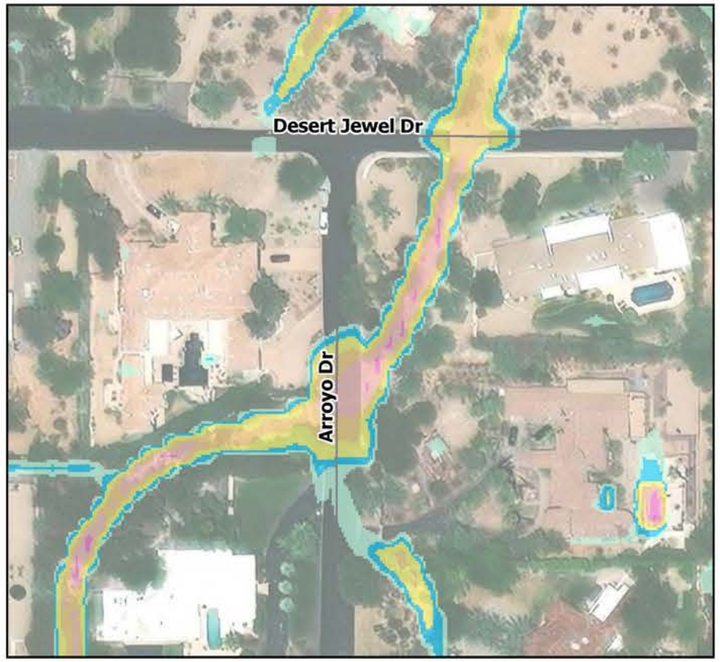
Maximum Water Depth (ft)
- 0.0 - 0.25
- 0.251 - 0.5
- 0.51 - 1.0
- 1.01 - 2.0
- 2.01 - 3.0
- 3.01 - 4.0
- 4.0 - 27



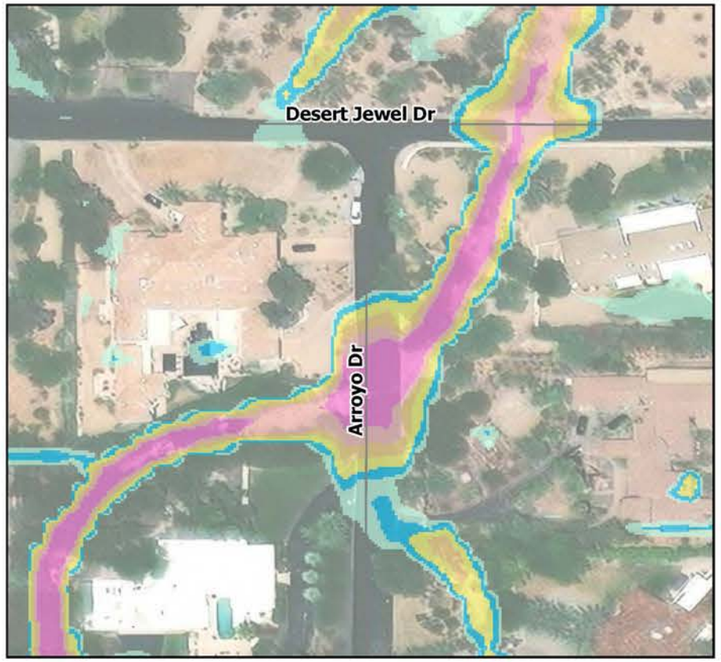
2024 KIMLEY-HORN AND ASSOCIATES, INC.
Engineering, Planning and Environmental Consultants

Possible Emergency Vehicle Access Restriction Areas: Arroyo Dr Low Water Crossing

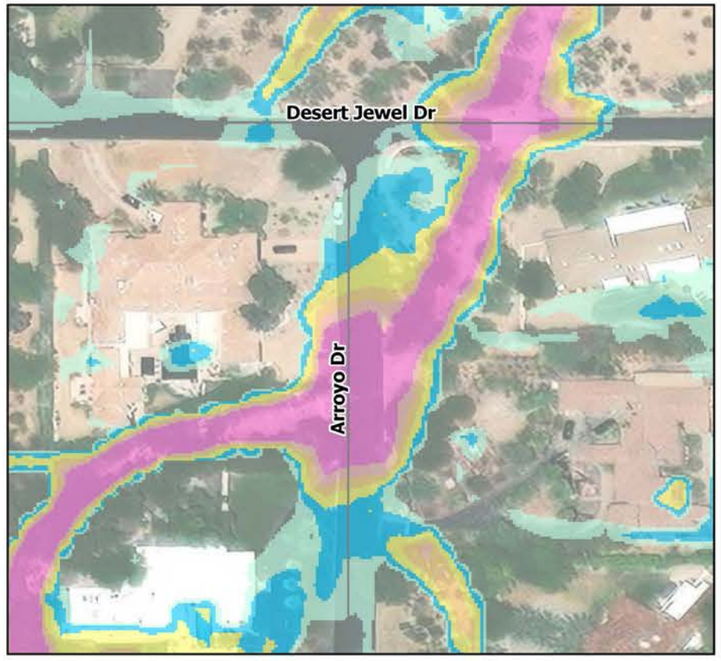
2-Year, 6-Hour



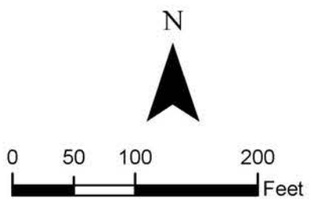
10-Year, 6-Hour



100-Year, 6-Hour

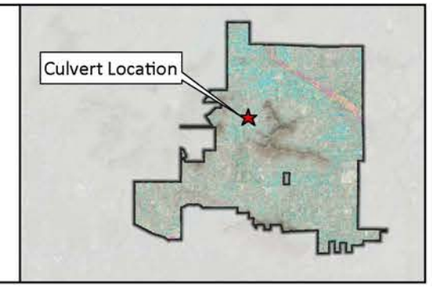


100-Year Maximum Depth Overtopping the Road : 8.0 ft



Legend

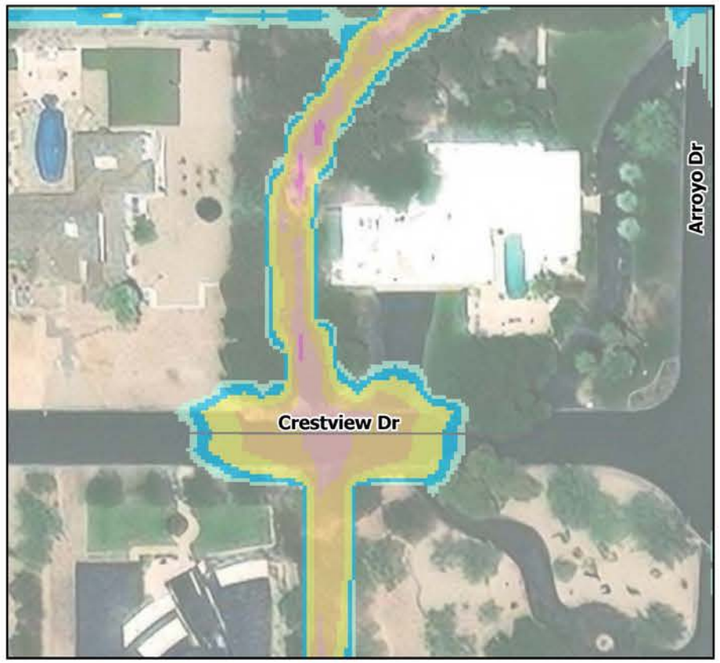
Hydraulic Structures	Maximum Water Depth (ft)	
Culvert	0.0 - 0.25	1.01 - 2.0
	0.251 - 0.5	2.01 - 3.0
	0.51 - 1.0	3.01 - 4.0
		4.0 - 27



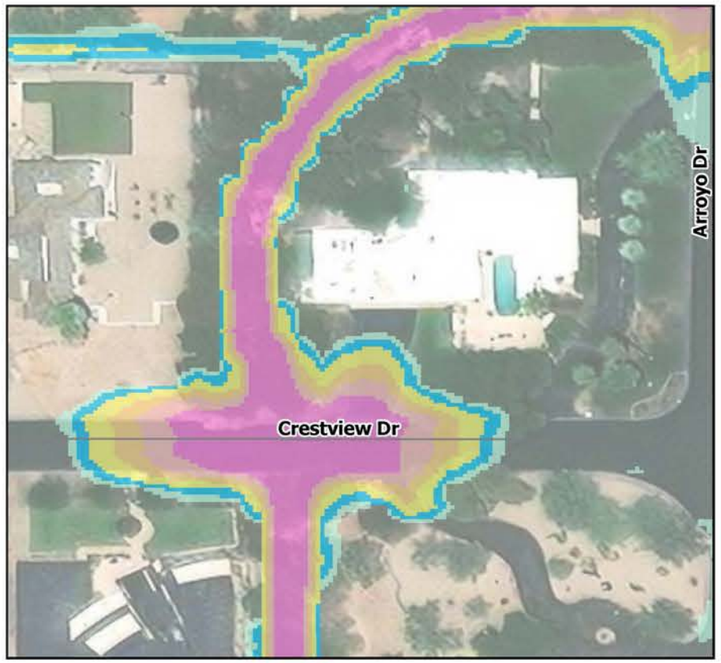
2024 KIMLEY-HORN AND ASSOCIATES, INC.
Engineering, Planning and Environmental Consultants

Possible Emergency Vehicle Access Restriction Areas: Crestview Dr Low Water Crossing

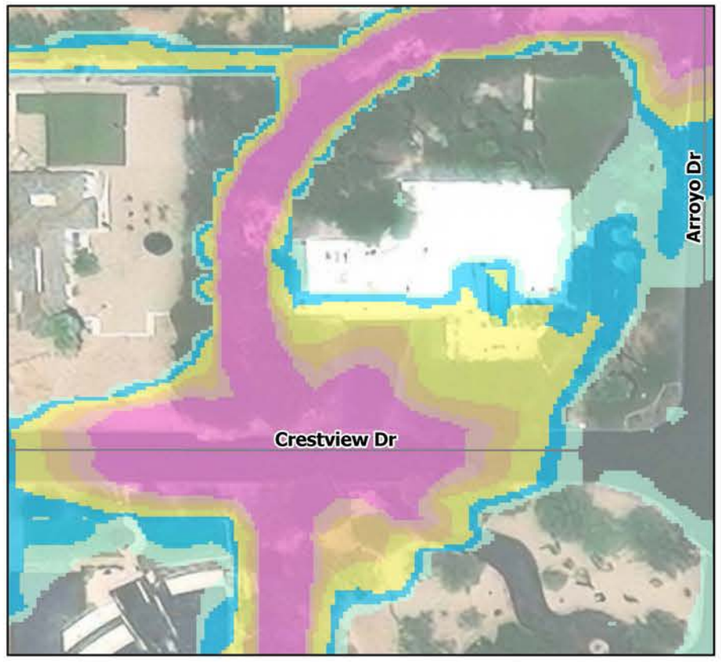
2-Year, 6-Hour



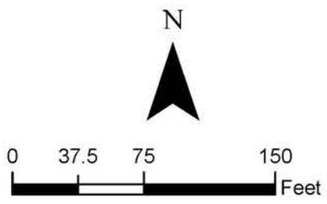
10-Year, 6-Hour



100-Year, 6-Hour



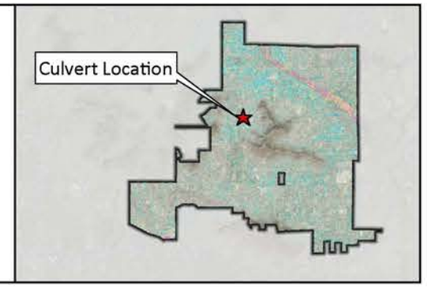
100-Year Maximum Depth Overtopping the Road : 8.4 ft



Legend

Hydraulic Structures
- Culvert

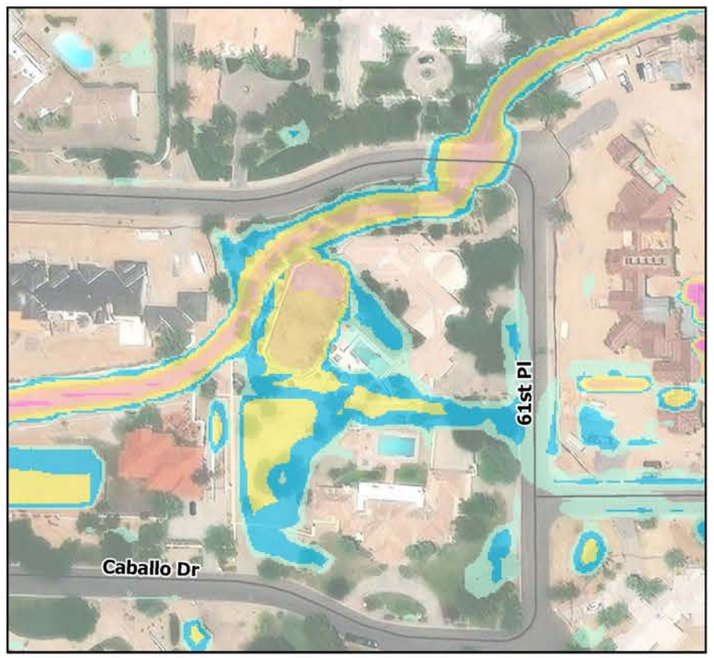
Maximum Water Depth (ft)
- 0.0 - 0.25
- 0.251 - 0.5
- 0.51 - 1.0
- 1.01 - 2.0
- 2.01 - 3.0
- 3.01 - 4.0
- 4.0 - 27



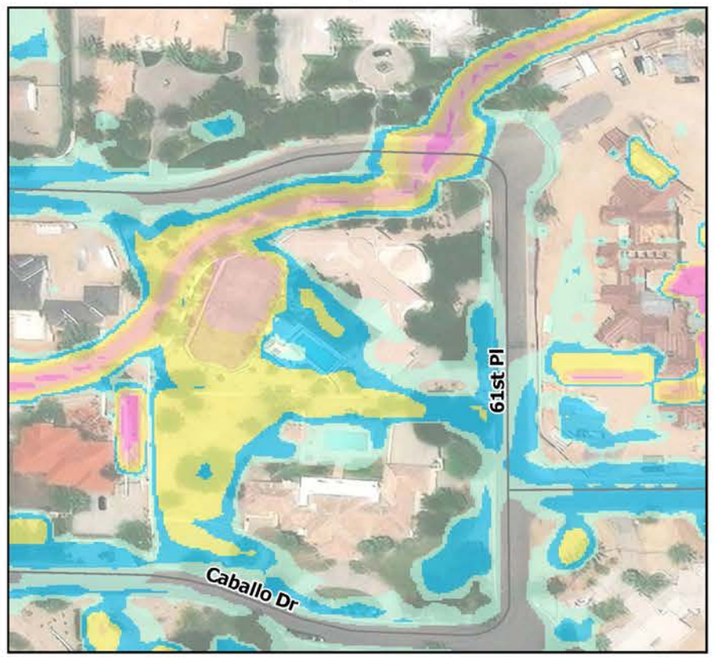
2024 KIMLEY-HORN AND ASSOCIATES, INC.
Engineering, Planning and Environmental Consultants

Possible Emergency Vehicle Access Restriction Areas: Caballo Ln

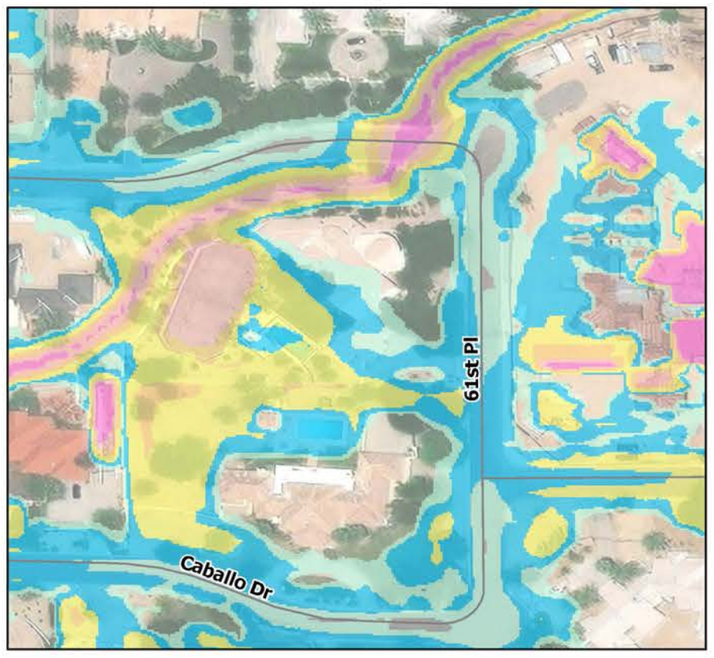
2-Year, 6-Hour



10-Year, 6-Hour



100-Year, 6-Hour



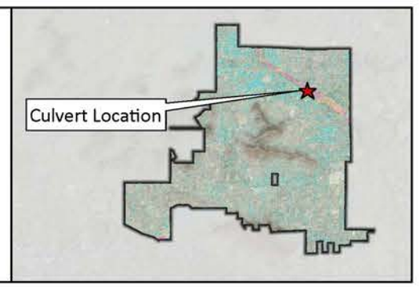
100-Year Maximum Depth Overtopping the Road : 4.7 ft

N

0 75 150 300 Feet

Legend

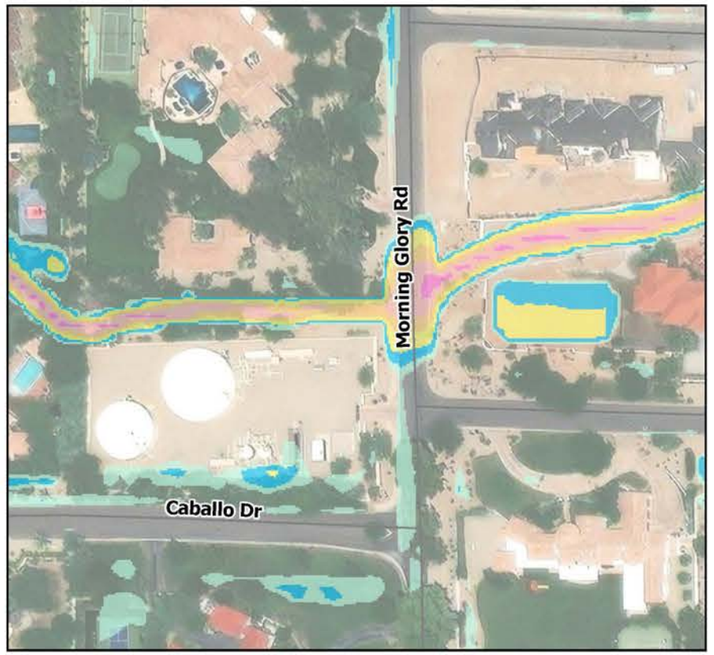
Hydraulic Structures	Maximum Water Depth (ft)	
Culvert	0.0 - 0.25	1.01 - 2.0
	0.251 - 0.5	2.01 - 3.0
	0.51 - 1.0	3.01 - 4.0
		4.0 - 27



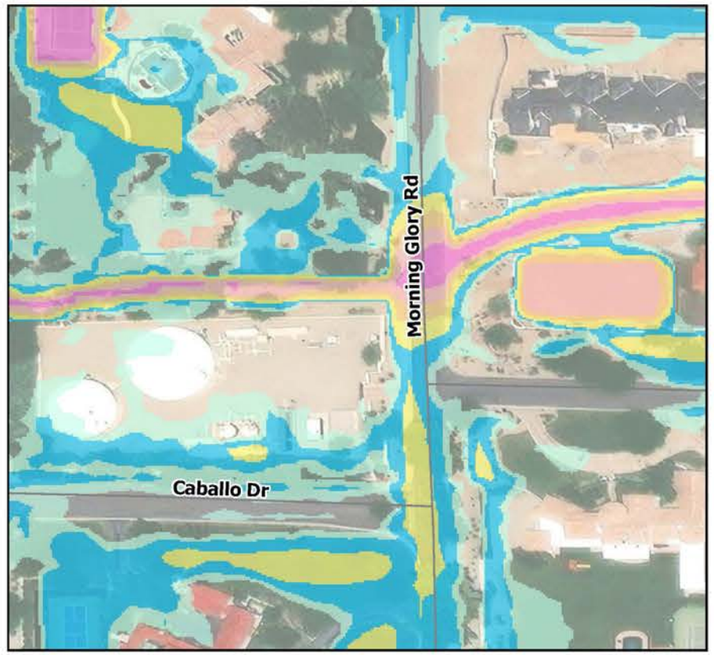
2024 KIMLEY-HORN AND ASSOCIATES, INC.
Engineering, Planning and Environmental Consultants

Possible Emergency Vehicle Access Restriction Areas: Morning Glory Rd Low Water Crossing

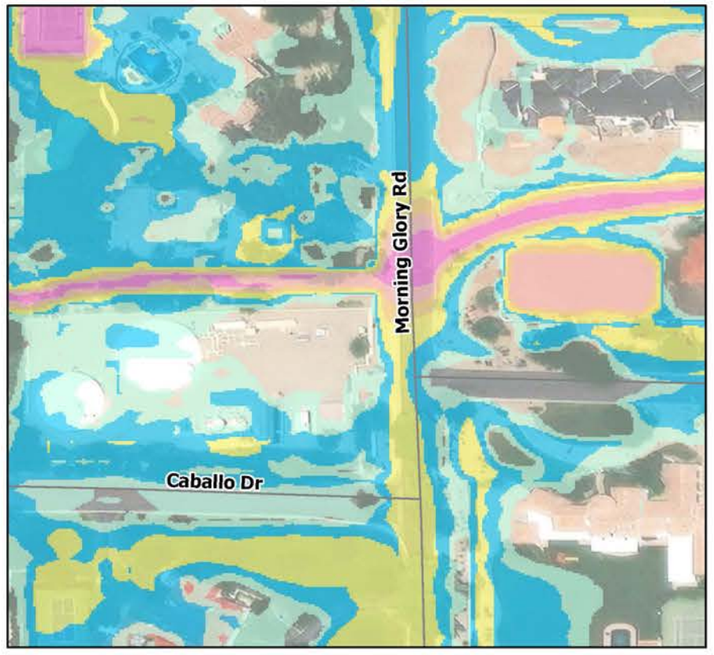
2-Year, 6-Hour



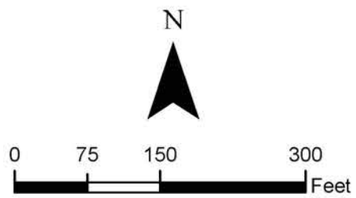
10-Year, 6-Hour



100-Year, 6-Hour



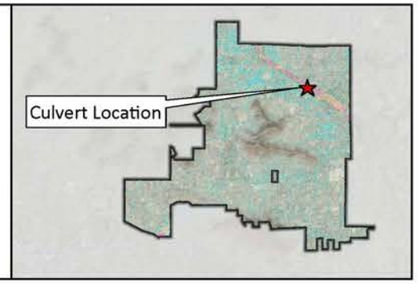
100-Year Maximum Depth Overtopping the Road : 5.3 ft



Legend

Hydraulic Structures
- Culvert

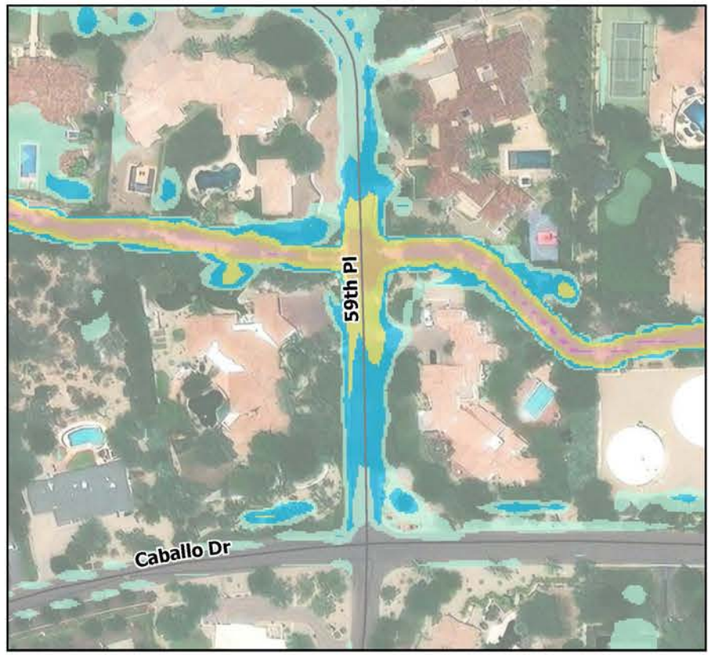
Maximum Water Depth (ft)
- 0.0 - 0.25
- 0.251 - 0.5
- 0.51 - 1.0
- 1.01 - 2.0
- 2.01 - 3.0
- 3.01 - 4.0
- 4.0 - 27



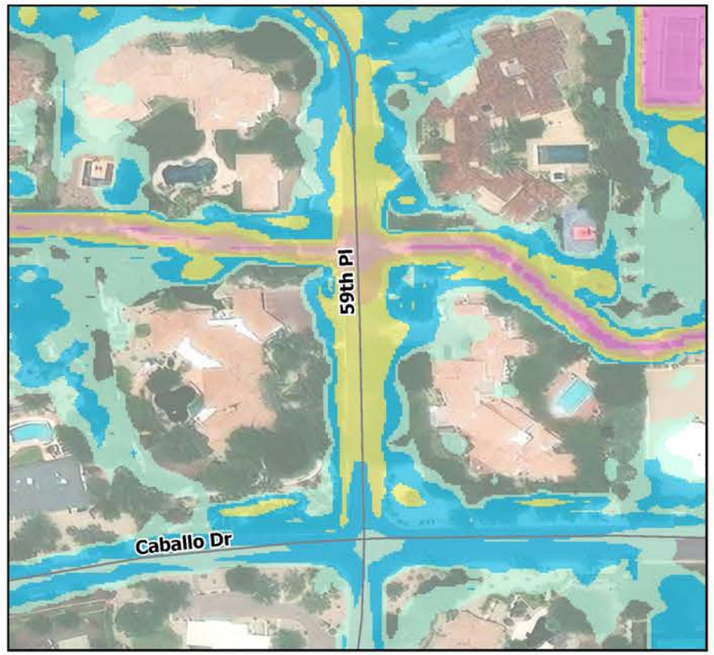
2024 KIMLEY-HORN AND ASSOCIATES, INC.
Engineering, Planning and Environmental Consultants

Possible Emergency Vehicle Access Restriction Areas: 59th Pl Low Water Crossing

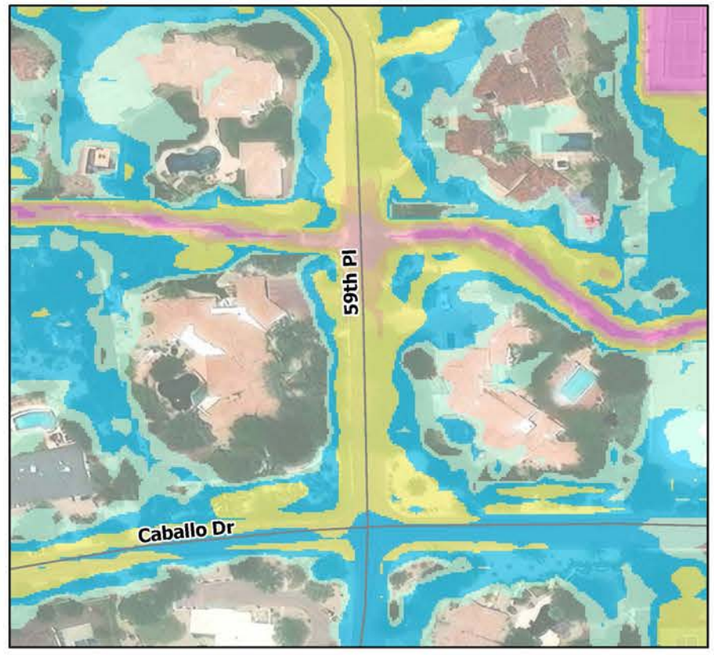
2-Year, 6-Hour



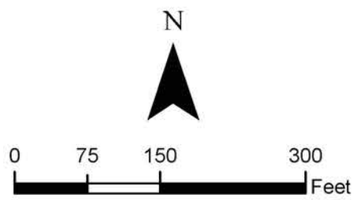
10-Year, 6-Hour



100-Year, 6-Hour

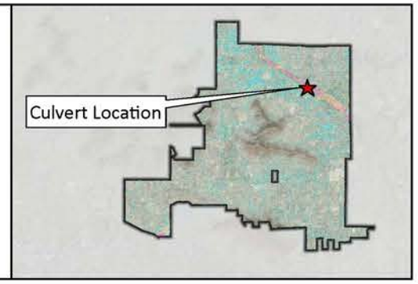


100-Year Maximum Depth Overtopping the Road : 3.8 ft



Legend

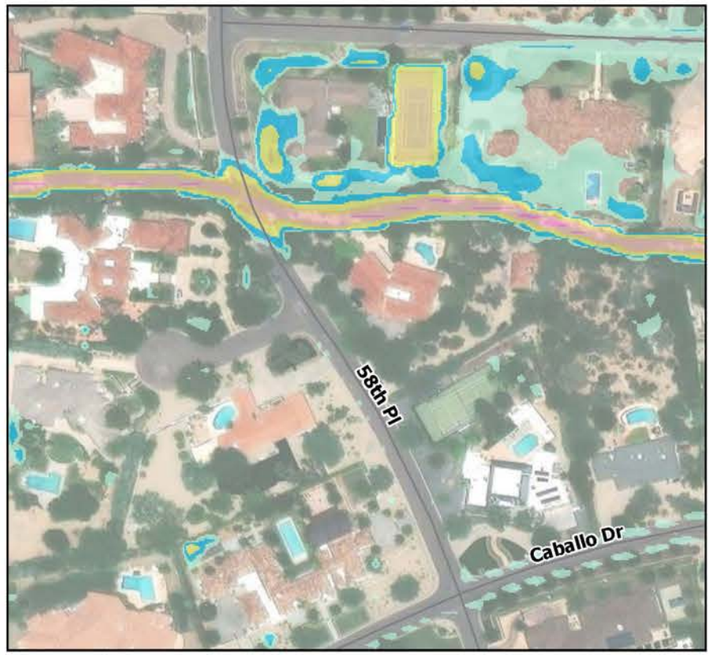
Hydraulic Structures	Maximum Water Depth (ft)	
Culvert	0.0 - 0.25	1.01 - 2.0
	0.251 - 0.5	2.01 - 3.0
	0.51 - 1.0	3.01 - 4.0
		4.0 - 27



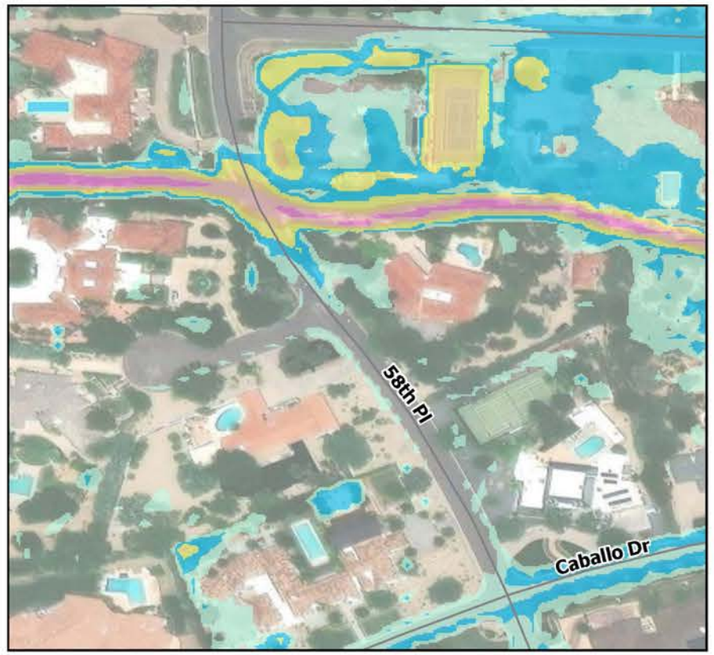
2024 KIMLEY-HORN AND ASSOCIATES, INC.
Engineering, Planning and Environmental Consultants

Possible Emergency Vehicle Access Restriction Areas: 58th Pl Low Water Crossing

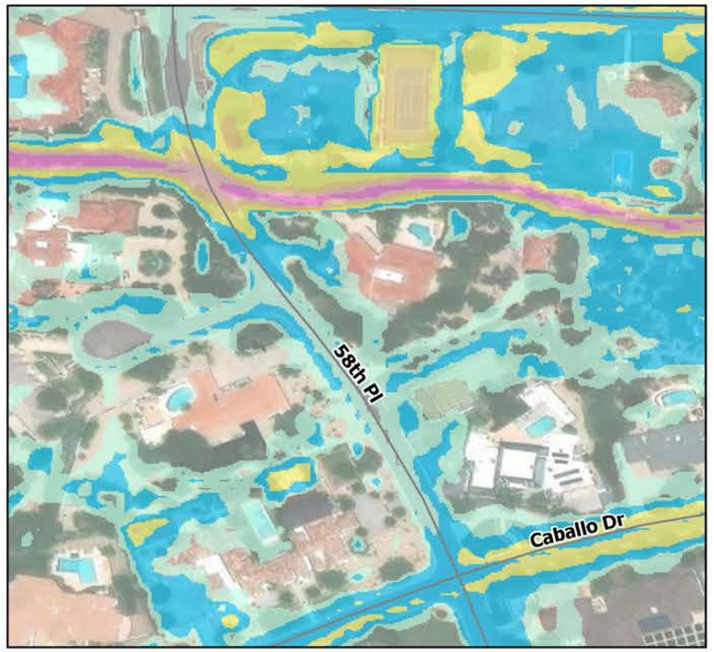
2-Year, 6-Hour



10-Year, 6-Hour



100-Year, 6-Hour



100-Year Maximum Depth Overtopping the Road : 4.2 ft

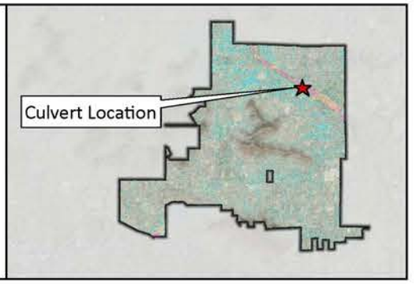
N

0 75 150 300 Feet

Legend

Hydraulic Structures
- Culvert

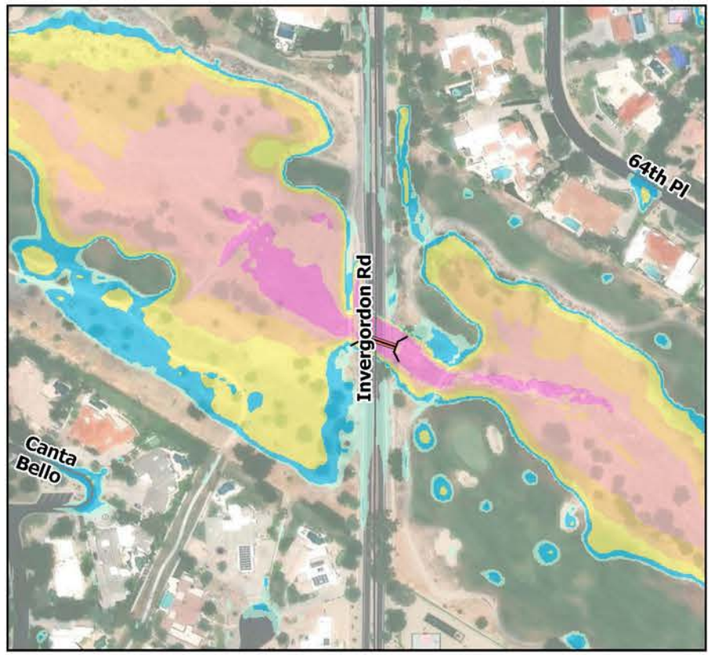
Maximum Water Depth (ft)
- 0.0 - 0.25
- 0.251 - 0.5
- 0.51 - 1.0
- 1.01 - 2.0
- 2.01 - 3.0
- 3.01 - 4.0
- 4.0 - 27



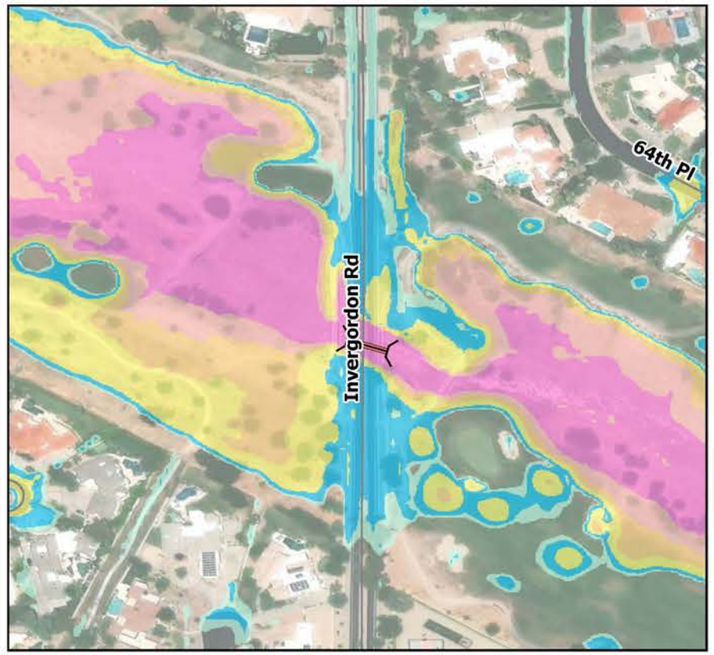
2024 KIMLEY-HORN AND ASSOCIATES, INC.
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Possible Emergency Vehicle Access Restriction Areas: N-21

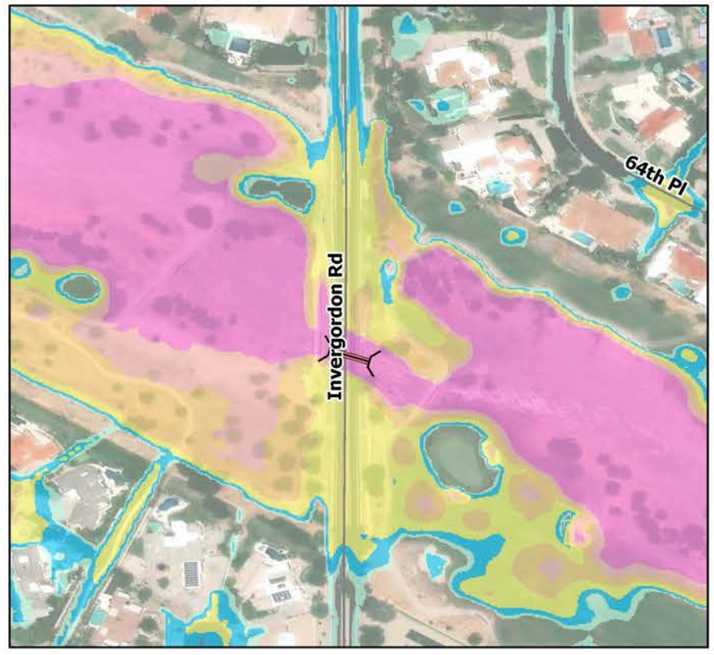
2-Year, 6-Hour



10-Year, 6-Hour



100-Year, 6-Hour



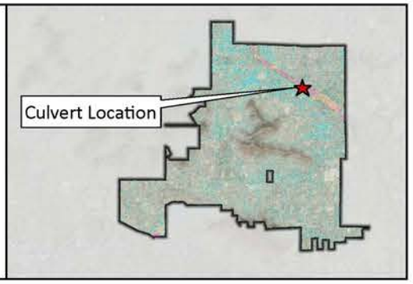
100-Year Maximum Depth Overtopping the Road : 11 ft

N

0 75 150 300 Feet

Legend

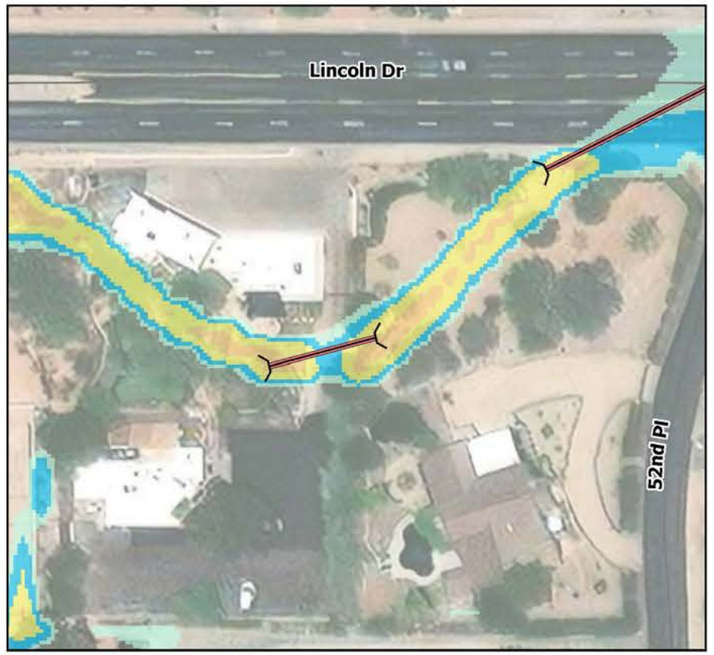
Hydraulic Structures	Maximum Water Depth (ft)	
Culvert	0.0 - 0.25	1.01 - 2.0
	0.251 - 0.5	2.01 - 3.0
	0.51 - 1.0	3.01 - 4.0
		4.0 - 27



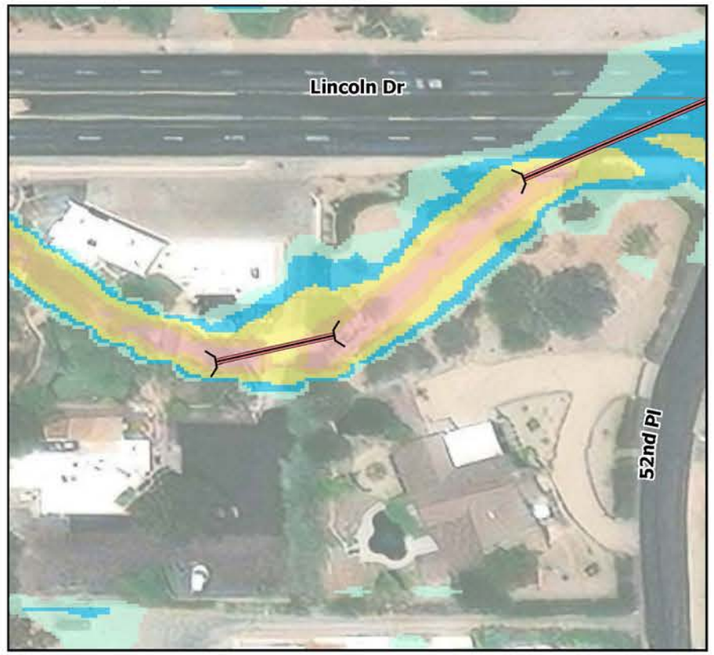
2024 KIMLEY-HORN AND ASSOCIATES, INC.
Engineering, Planning and Environmental Consultants

Possible Emergency Vehicle Access Restriction Areas: S-9

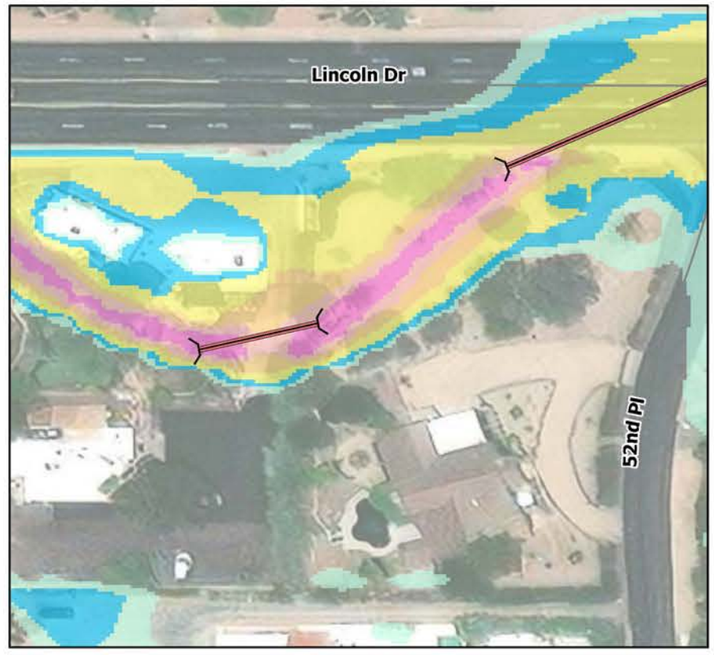
2-Year, 6-Hour



10-Year, 6-Hour



100-Year, 6-Hour



100-Year Maximum Depth Overtopping the Road : 3.6

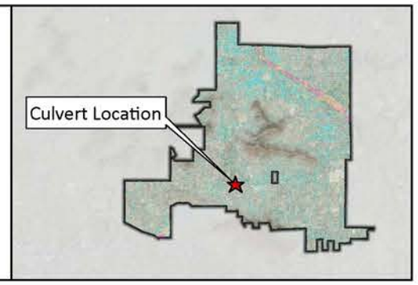
N

0 37.5 75 150 Feet

Legend

Hydraulic Structures
- Culvert

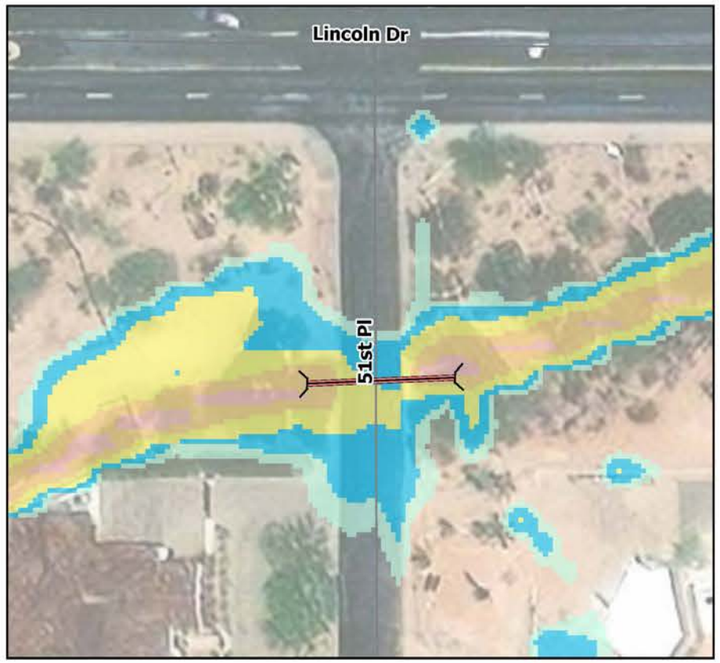
Maximum Water Depth (ft)
- 0.0 - 0.25
- 0.251 - 0.5
- 0.51 - 1.0
- 1.01 - 2.0
- 2.01 - 3.0
- 3.01 - 4.0
- 4.0 - 27



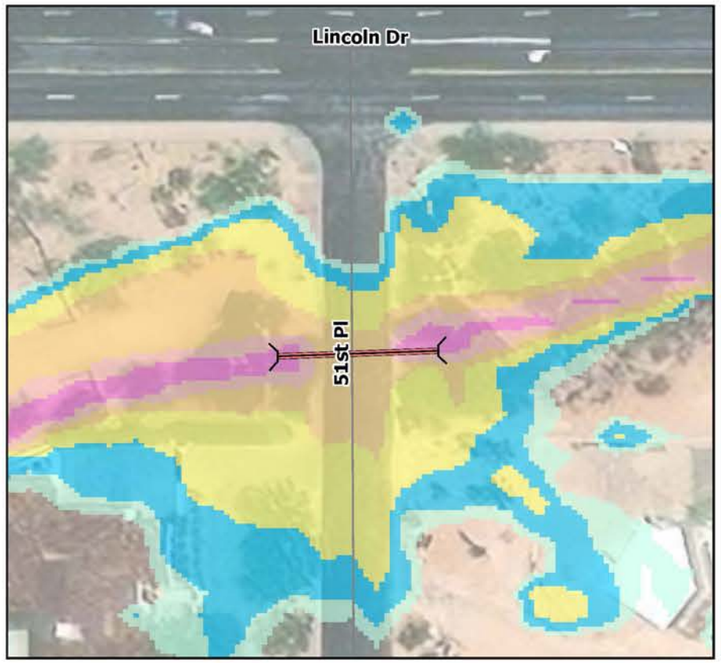
2024 KIMLEY-HORN AND ASSOCIATES, INC.
Engineering, Planning and Environmental Consultants

Possible Emergency Vehicle Access Restriction Areas: S-8

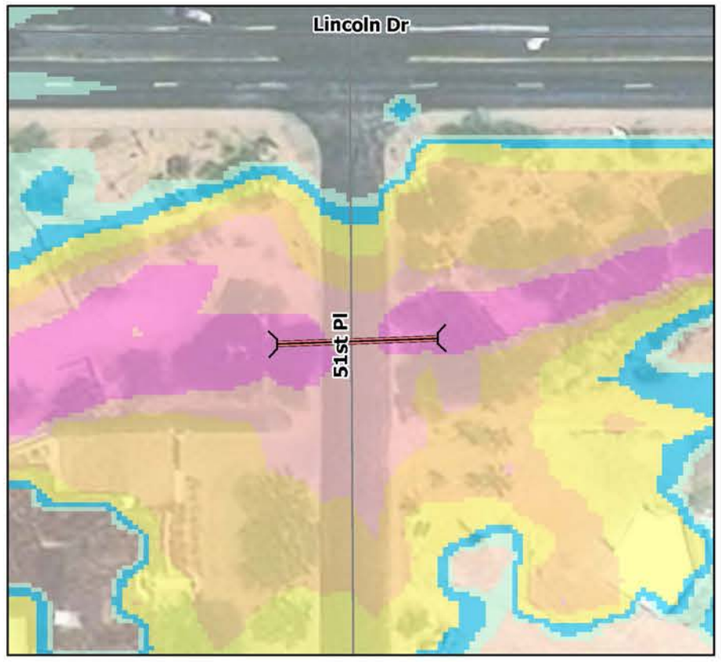
2-Year, 6-Hour



10-Year, 6-Hour



100-Year, 6-Hour



100-Year Maximum Depth Overtopping the Road : 4.8 ft

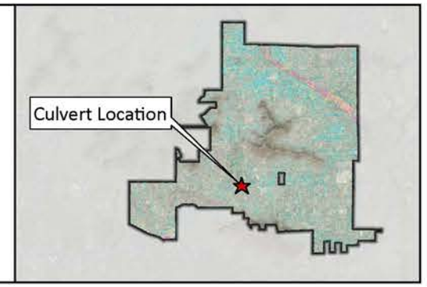
N

0 50 100 200 Feet

Legend

Hydraulic Structures
Culvert

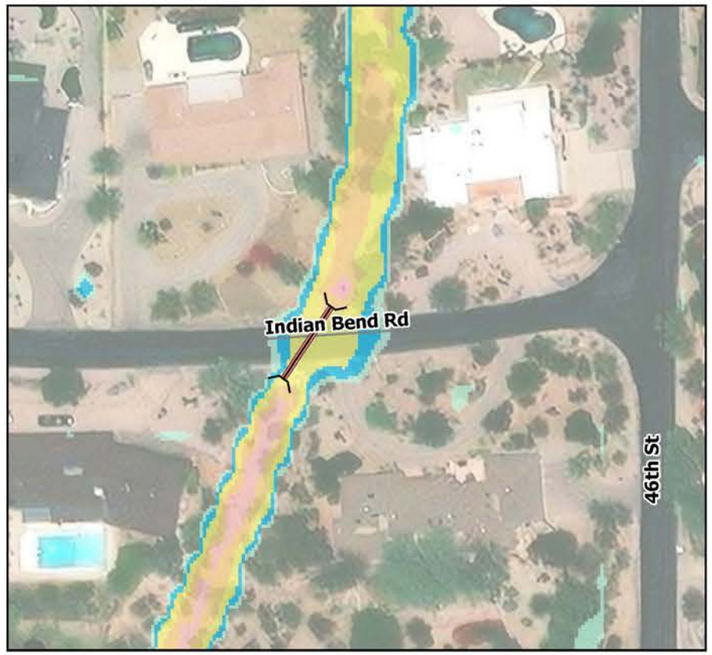
Maximum Water Depth (ft)
0.0 - 0.25
0.251 - 0.5
0.51 - 1.0
1.01 - 2.0
2.01 - 3.0
3.01 - 4.0
4.0 - 27



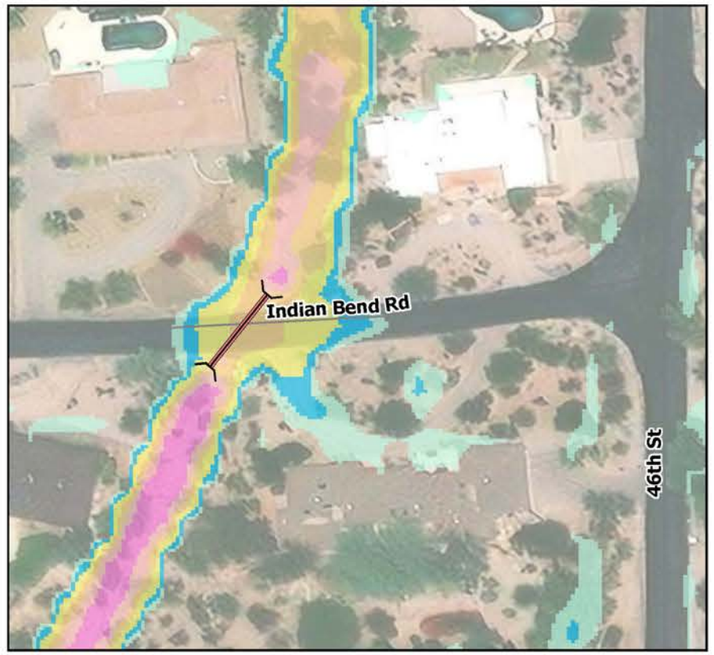
2024 KIMLEY-HORN AND ASSOCIATES, INC.
Engineering, Planning and Environmental Consultants

Possible Emergency Vehicle Access Restriction Areas: S-7

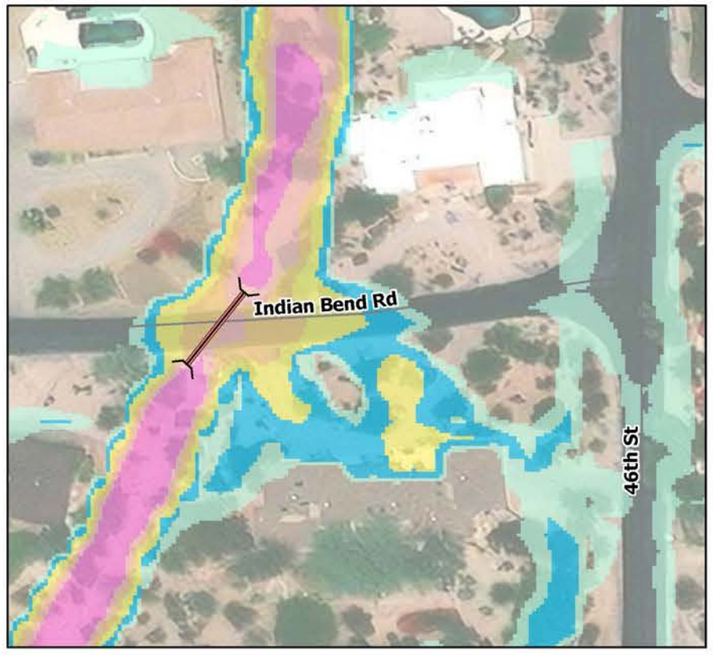
2-Year, 6-Hour



10-Year, 6-Hour



100-Year, 6-Hour



100-Year Maximum Depth Overtopping the Road : 3.6 ft

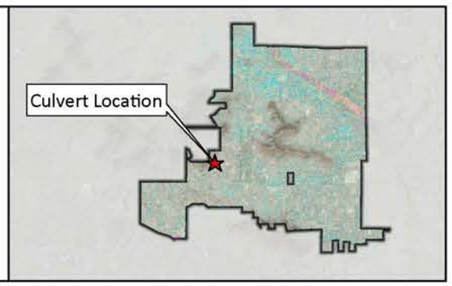
N

0 37.5 75 150
Feet

Legend

Hydraulic Structures
Culvert

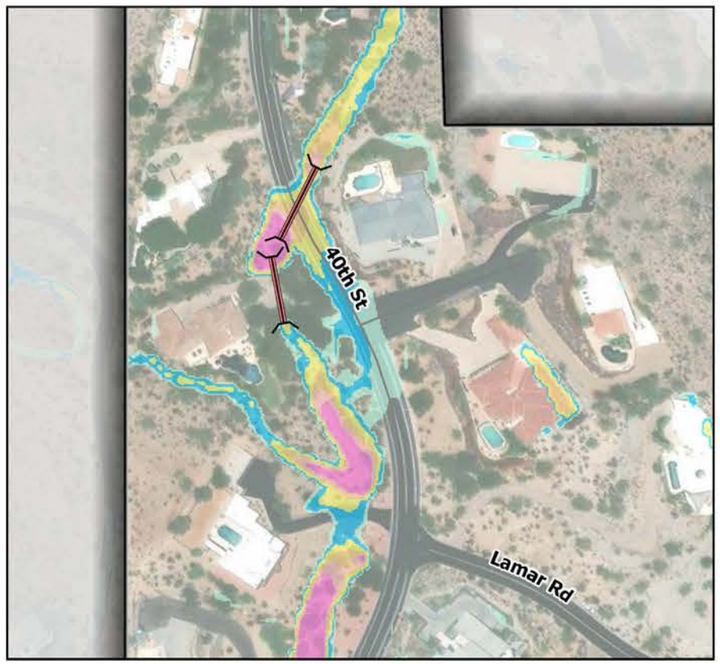
Maximum Water Depth (ft)
0.0 - 0.25
0.251 - 0.5
0.51 - 1.0
1.01 - 2.0
2.01 - 3.0
3.01 - 4.0
4.0 - 27



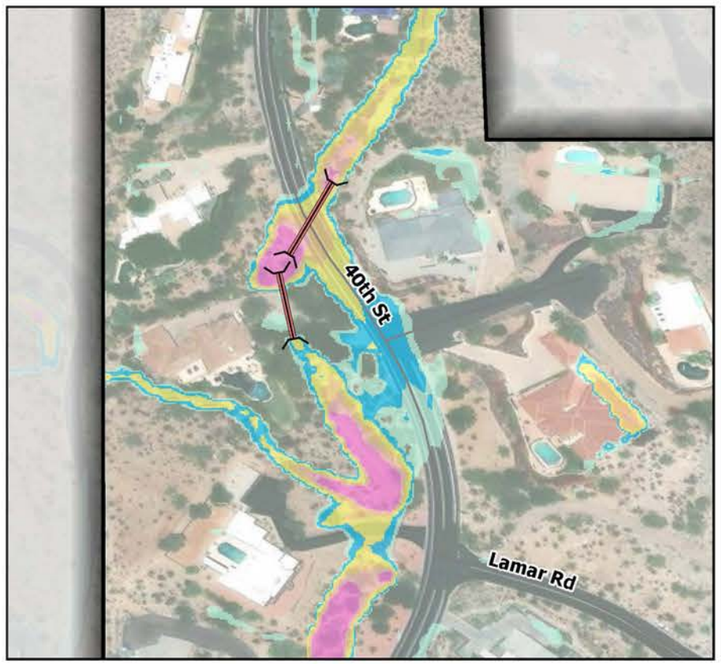
2024 KIMLEY-HORN AND ASSOCIATES, INC.
Engineering, Planning and Environmental Consultants

Possible Emergency Vehicle Access Restriction Areas: S-3

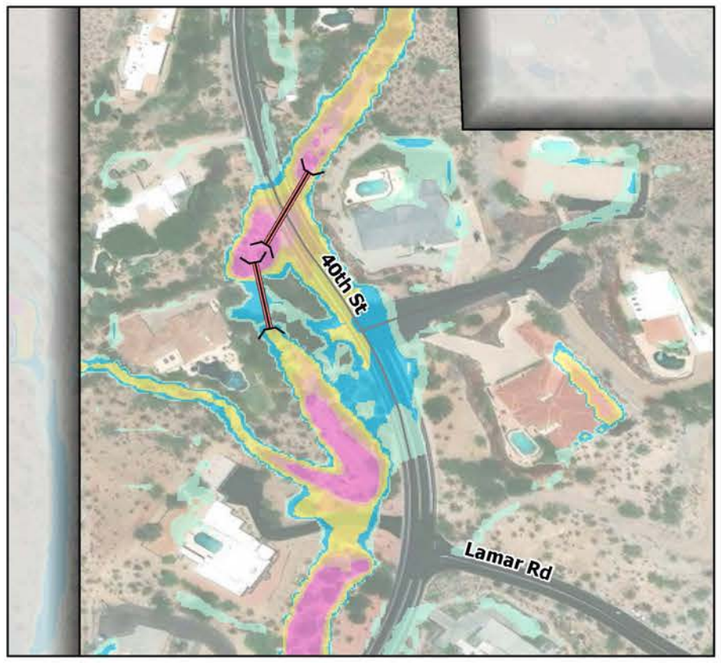
2-Year, 6-Hour



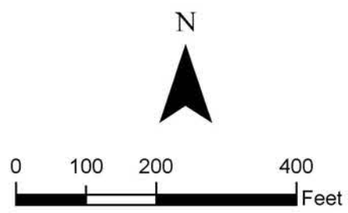
10-Year, 6-Hour



100-Year, 6-Hour



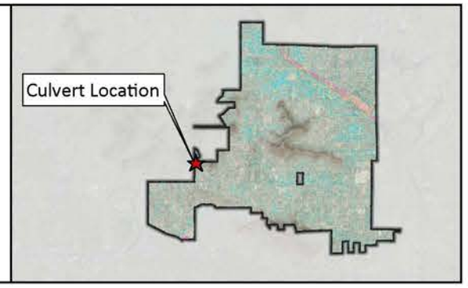
100-Year Maximum Depth Overtopping the Road : 3.9 ft



Legend

Hydraulic Structures
- Culvert

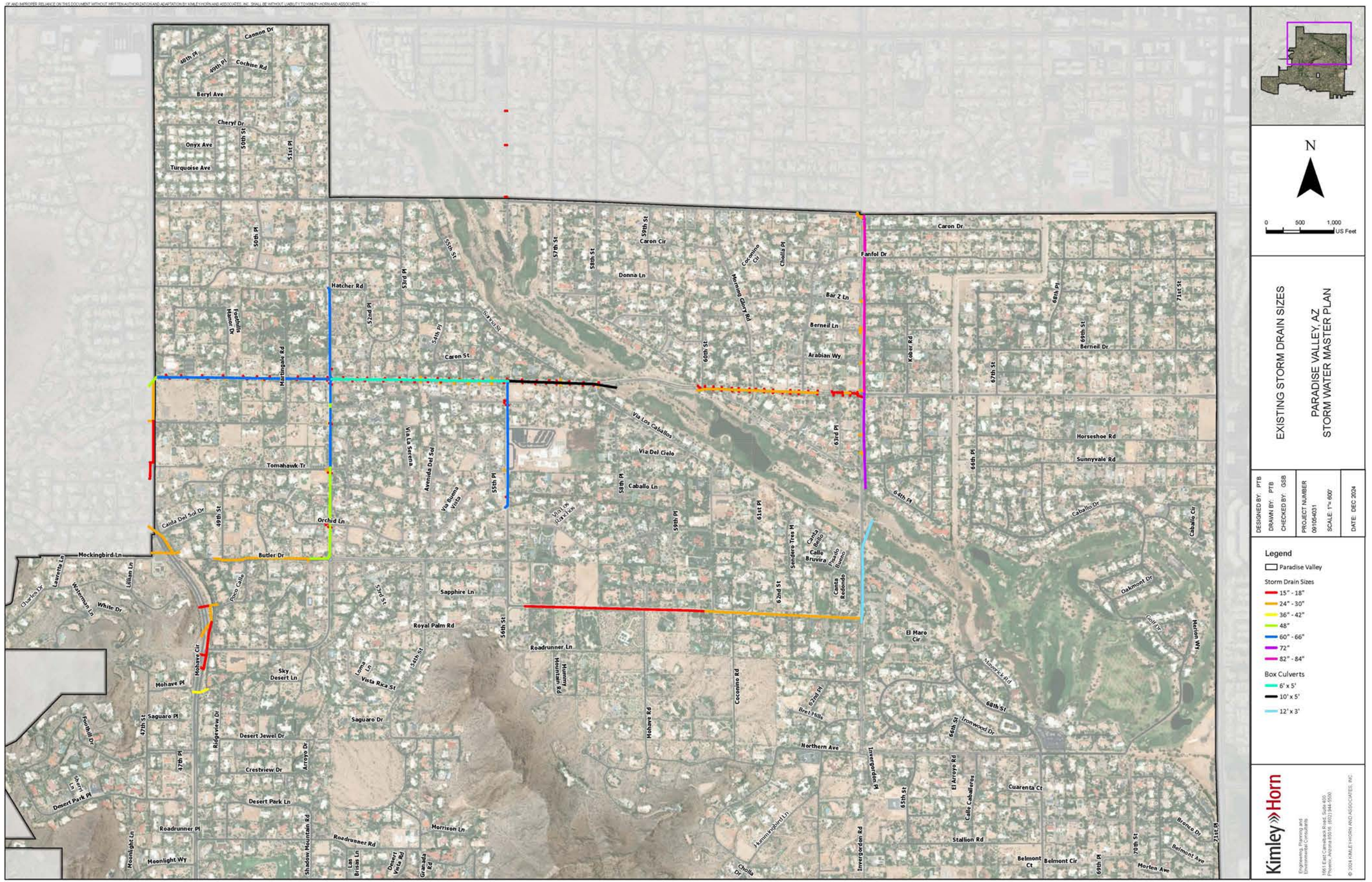
Maximum Water Depth (ft)
- 0.0 - 0.25
- 0.251 - 0.5
- 0.51 - 1.0
- 1.01 - 2.0
- 2.01 - 3.0
- 3.01 - 4.0
- 4.0 - 27



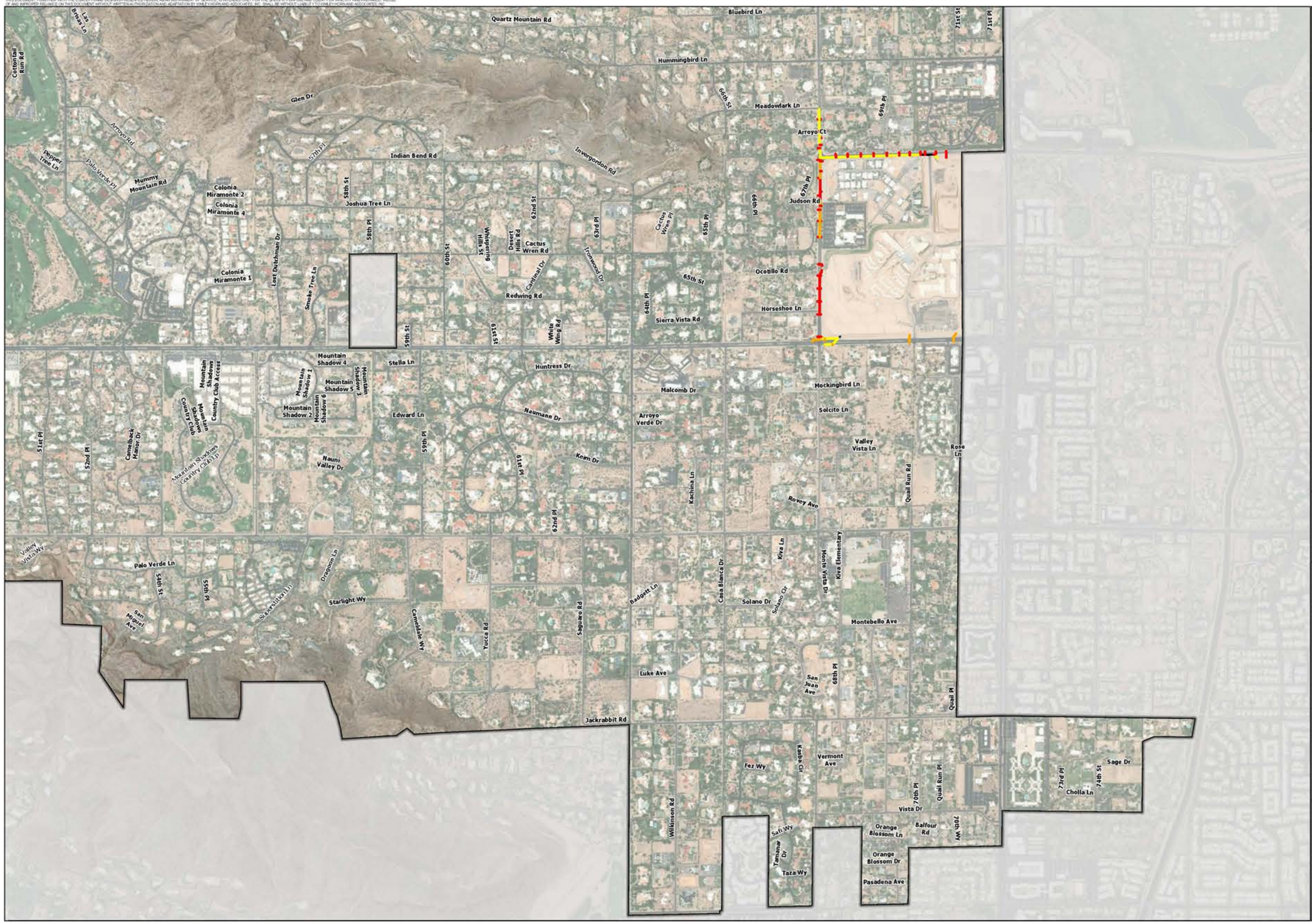
2024 KIMLEY-HORN AND ASSOCIATES, INC.
Engineering, Planning and Environmental Consultants

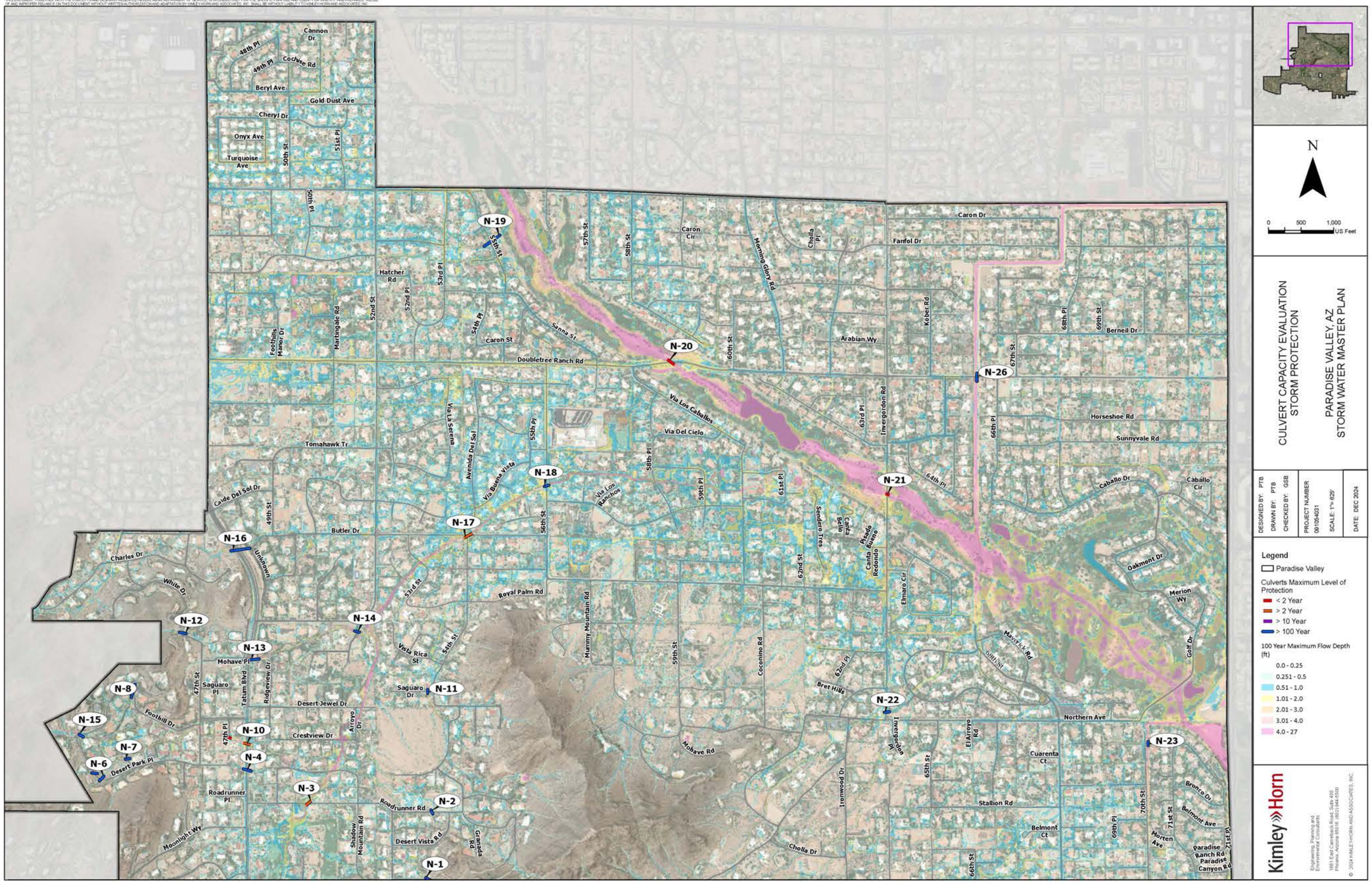
XIV. APPENDIX B – EXISTING INFRASTRUCTURE

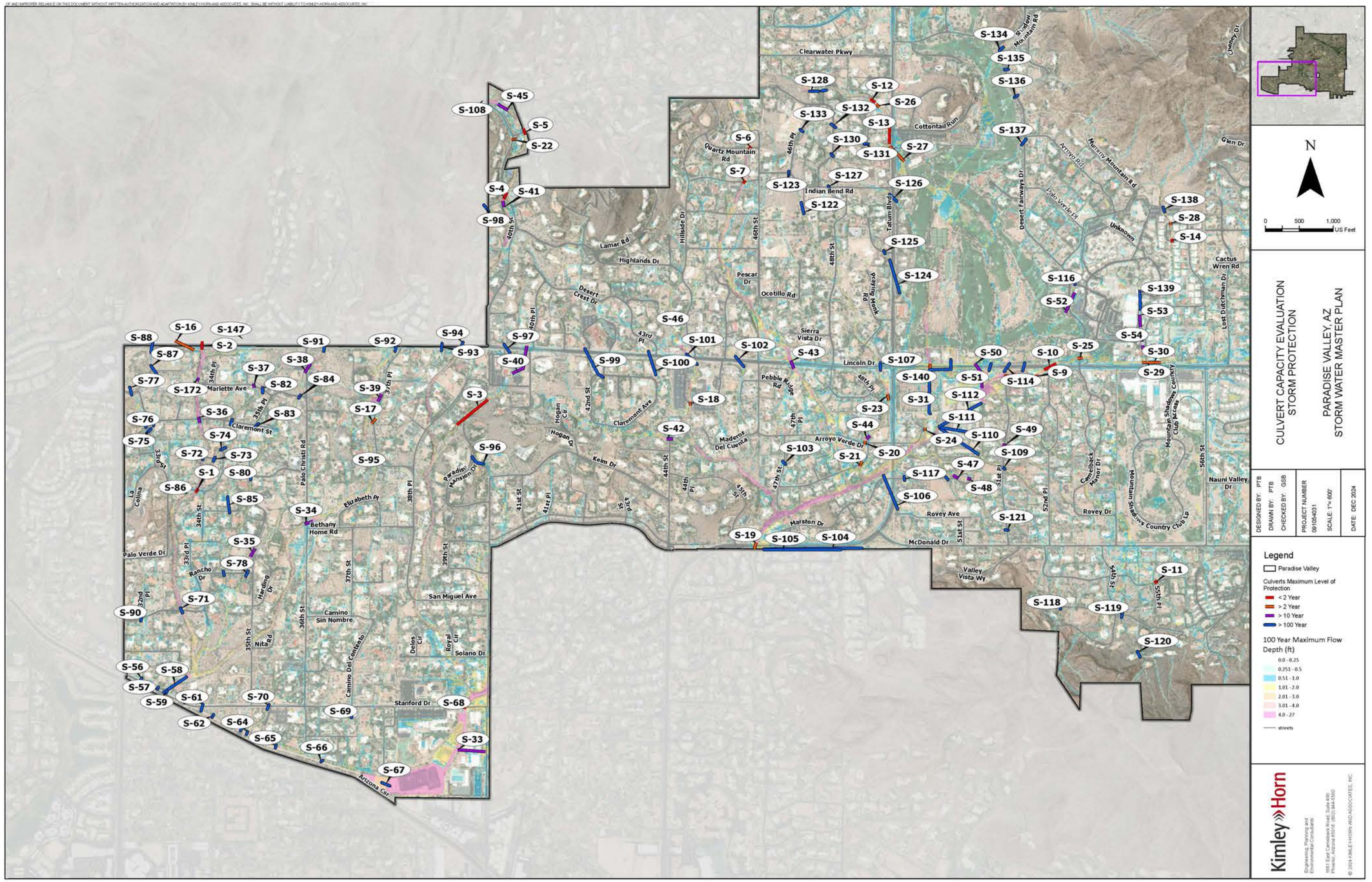
STORM DRAIN IDENTIFICATION, CAPACITY, AND UNDERSIZED INLETS

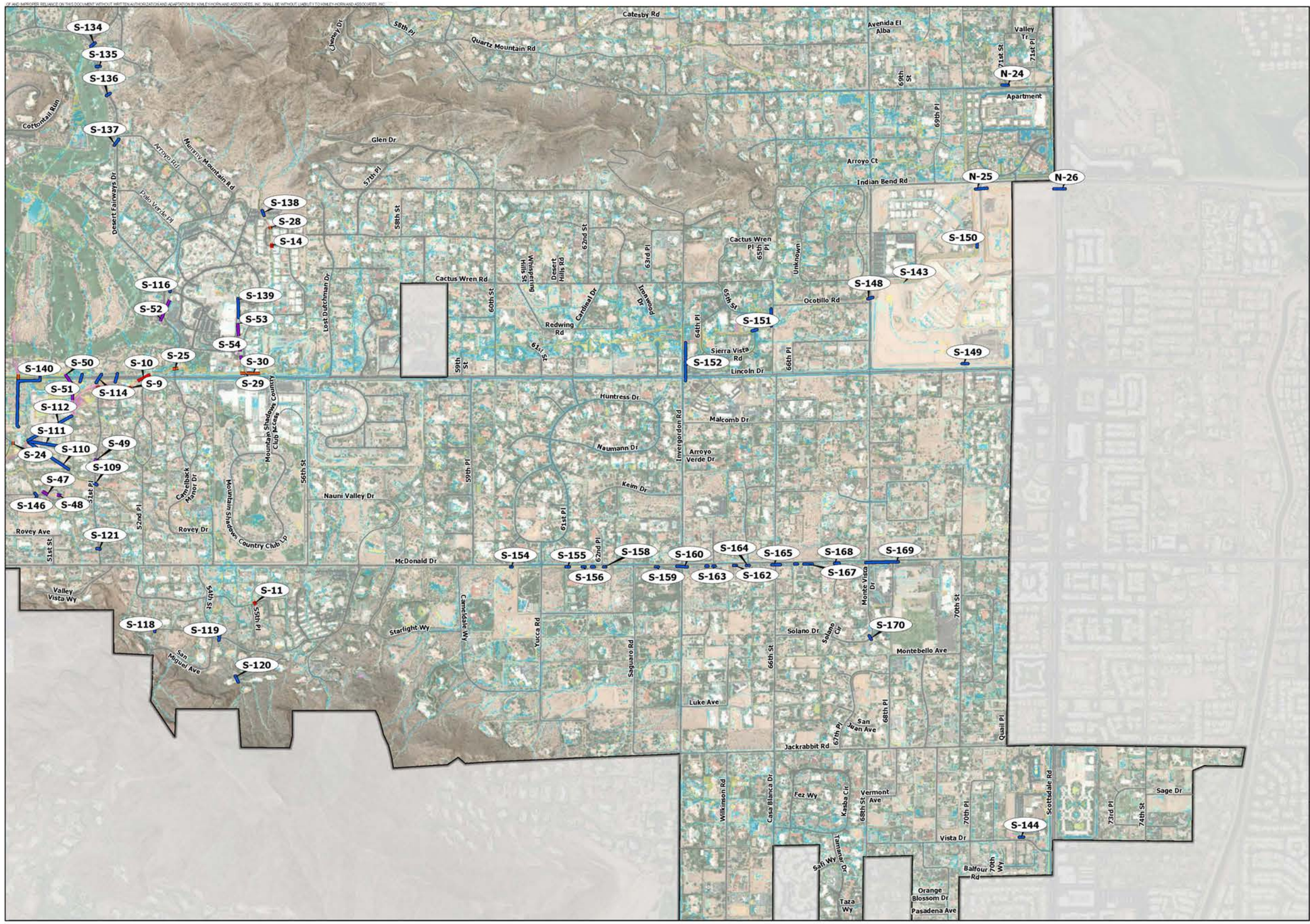

Cannon Dr
48th Pl
49th Pl
Cochise Rd
Beryl Ave
Cheryl Dr
Onyx Ave
Turquoise Ave
50th St
51st Pl
50th Pl
Hatcher Rd
52nd Pl
53rd Pl
54th Pl
Foothills Manor Dr
Hartingale Rd
Caron St
55th St
56th St
57th St
58th St
59th St
Caron Cir
Donna Ln
Cocomino Cir
Chella Pl
Hermosa Glory Rd
Fanfol Dr
Caron Dr
Bar Z Ln
Berneil Ln
Arabian Wy
60th St
Kaler Rd
67th St
68th Pl
69th St
Berneil Dr
71st St
Via Los Caballos
Via Del Cielo
Caballo Ln
58th Pl
59th Pl
61st Pl
63rd Pl
64th Pl
66th Pl
Horseshoe Rd
Sunnyvale Rd
Caballo Dr
Caballo Cir
Sanders Tres M
Canta Bello
Calle Bruviera
Prado Bueno
Canta Redondo
62nd St
Oakmont Dr
Golf Dr
Marion Wy
El Maro Cir
Tomahawk Tr
Via La Serena
Avenida Del Sol
Via Buena Vista
55th Pl
Orchid Ln
Canda Del Sol Dr
49th St
Butler Dr
Mockingbird Ln
Charles Dr
Laurenta Ln
Waterman Ln
Lillian Ln
White Dr
Paso Calle
Mohave Cir
Mohave Pl
Sky Desert Ln
Foothill Dr
47th St
Saguaro Pl
Ridgeview Dr
Desert Jewel Dr
47th Pl
Crestview Dr
Arroyo Dr
Desert Park Pl
Desert Park Ln
Roadrunner Pl
Moonlight Ln
Moonlight Wy
Shadow Mountain Rd
Roadrunner Rd
Las Brisas Ln
Desert Vista Rd
Granada Rd
Morrison Ln
Sapphire Ln
53rd St
Royal Palm Rd
54th St
Loma Ln
Vista Rica St
Saguaro Dr
56th St
Roadrunner Ln
Hummingbird Ln
Mohave Rd
Cocomino Rd
62nd Pl
Bret Hills
Northern Ave
Invergordon Dr
65th St
El Arroyo Rd
Calle Caballeros
Cuarenta Ct
Stallion Rd
Hummingbird Ln
Cholla Dr
Belmont Ct
Belmont Cir
69th Pl
70th St
Morten Ave
Bronco Dr
Belmont Ave
71st St
Mayer Rd
68th St
Ironwood Dr
66th St
N
0
500
1,000
US Feet
EXISTING STORM DRAIN SIZES
PARADISE VALLEY, AZ
STORM WATER MASTER PLAN
DESIGNED BY: PTB
DRAWN BY: PTB
CHECKED BY: GSB
PROJECT NUMBER
081054031
SCALE: 1"= 600'
DATE: DEC 2024
Legend
Paradise Valley
Storm Drain Sizes
15" - 18"
24" - 30"
36" - 42"
48"
60" - 66"
72"
82" - 84"
Box Culverts
6' x 5'
10' x 5'
12' x 3'
Kimley»Horn
Engineering, Planning and Environmental Consultants
1661 East Camelback Road, Suite 400
Phoenix, Arizona 85016 (602) 944-5500
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N
0 500 1,000 US Feet
CULVERT CAPACITY EVALUATION
STORM PROTECTION
PARADISE VALLEY, AZ
STORM WATER MASTER PLAN
DESIGNED BY: PTB
DRAWN BY: PTB
CHECKED BY: GSB
PROJECT NUMBER 061054031
SCALE: 1"= 825'
DATE: DEC 2024
Legend
Paradise Valley
Culverts Maximum Level of Protection
< 2 Year
> 2 Year
> 10 Year
> 100 Year
100 Year Maximum Flow Depth (ft)
0.0 - 0.25
0.251 - 0.5
0.51 - 1.0
1.01 - 2.0
2.01 - 3.0
3.01 - 4.0
4.0 - 27
Kimley»Horn
N-1
N-2
N-3
N-4
N-6
N-7
N-8
N-10
N-11
N-12
N-13
N-14
N-15
N-16
N-17
N-18
N-19
N-20
N-21
N-22
N-23
N-26
Cannon Dr
48th Pl
49th Pl
Cochise Rd
Beryl Ave
Gold Dust Ave
Cheryl Dr
Onyx Ave
Turquoise Ave
50th St
51st Pl
50th Pl
Hatcher Rd
52nd Pl
53rd Pl
54th Pl
55th St
57th St
58th St
Caron Cir
Morning Glory Rd
Cheila Pl
Caron Dr
Fanfol Dr
Kobet Rd
68th Pl
69th St
Berneil Dr
Foothills Mesa Dr
Martingale Rd
52nd St
Caron St
Sanna St
Doubletree Ranch Rd
Arabian Wy
60th St
67th St
Horseshoe Rd
Sunnyvale Rd
Via La Serena
Avenida Del Sol
55th Pl
Via Buena Vista
Via Los Caballos
Via Del Cielo
63rd Pl
Invergordon Rd
66th Pl
Tomahawk Tr
Caide Del Sol Dr
49th St
Butler Dr
56th St
58th Pl
Via Los Rancheros
61st Pl
59th Pl
64th Pl
Caballo Dr
Caballo Cir
Sendero Tres
Cielo Bajo
Rancho Canta Redondo
62nd St
Oakmont Dr
Merion Wy
Charles Dr
Unknown
53rd St
Royal Palm Rd
Hummy Mountain Rd
Elmaro Cir
White Dr
Vista Rica St
54th St
59th St
Coconino Rd
62nd Pl
Bret Hills
Golf Dr
Mohave Pl
Ridgeview Dr
47th St
Saguaro Pl
Tatum Blvd
Saguaro Dr
Desert Jewel Dr
Arroyo Dr
Foothill Dr
47th Pl
Crestview Dr
Desert Park Pl
Roadrunner Pl
Roadrunner Rd
Shadow Mountain Rd
Desert Vista Rd
Granada Rd
Moonlight Wy
Mohave Rd
Ironwood Dr
Ironwood Rd
El Arroyo Rd
65th St
Cuarenta Ct
Stallion Rd
Belmont Ct
Northern Ave
Cholla Dr
66th St
70th St
71st St
69th Pl
Bronco Dr
Belmont Ave
Morten Ave
Paradise Ranch Rd
Paradise Canyon Rd
71st Pl


CULVERT CAPACITY EVALUATION
STORM PROTECTION
PARADISE VALLEY, AZ
STORM WATER MASTER PLAN
N
0 500 1,000 US Feet
DESIGNED BY: PTB
DRAWN BY: PTB
CHECKED BY: GSB
PROJECT NUMBER 069064031
SCALE: 1"= 600'
DATE: DEC 2024
Legend
Paradise Valley
Culverts Maximum Level of Protection
< 2 Year
> 2 Year
> 10 Year
> 100 Year
100 Year Maximum Flow Depth (ft)
0.0 - 0.25
0.251 - 0.5
0.51 - 1.0
1.01 - 2.0
2.01 - 3.0
3.01 - 4.0
4.0 - 27
streets
Kimley»Horn
Engineering, Planning and Environmental Consultants
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Phoenix, Arizona 85016 (602) 944-5500
© 2024 KIMLEY-HORN AND ASSOCIATES, INC.
Clearwater Pkwy
Lamar Rd
Highlands Dr
Desert Crest Dr
Pescar Dr
Ocotillo Rd
Sierra Vista Dr
Pebble Ridge Rd
Lincoln Dr
Indian Bend Rd
Cottontail Run
Quartz Mountain Rd
Arroyo Rd
Murphy Mountain Rd
Glen Dr
Desert Fairways Dr
Palo Verde Pl
Unknown
Cactus Wren Rd
Lost Dutchman Dr
Tatum Blvd
Hillside Dr
Pkwy Rd
Arroyo Verde Dr
Madeira Del Cuenta
Keim Dr
Paradise Mansion Dr
Hogan Cir
Claremont Ave
Marlette Ave
Palo Christi Rd
Elizabeth Pl
Bethany Home Rd
Palo Verde Dr
Rancho Dr
Harding Dr
San Miguel Ave
Camino Sin Nombre
Camino Del Contento
Delos Cir
Royal Cir
Solano Dr
Stanford Dr
Arizona Cir
Marston Dr
McDonald Dr
Valley Vista Wy
Rovey Ave
Rovey Dr
Sandpiper Country Club Ln
Mountain Shadows Country Club Access
Nauni Valley Dr
Cheney Dr
Shadow Mountain Rd
S-1 S-2 S-3 S-4 S-5 S-6 S-7 S-9 S-10 S-11 S-12 S-13 S-14 S-16 S-17 S-18 S-19 S-20 S-21 S-22 S-23 S-24 S-25 S-26 S-27 S-28 S-29 S-30 S-31 S-33 S-34 S-35 S-36 S-37 S-38 S-39 S-40 S-41 S-42 S-43 S-44 S-45 S-46 S-47 S-48 S-49 S-50 S-51 S-52 S-53 S-54 S-56 S-57 S-58 S-59 S-61 S-62 S-64 S-65 S-66 S-67 S-68 S-69 S-70 S-71 S-72 S-73 S-74 S-75 S-76 S-77 S-78 S-80 S-82 S-83 S-84 S-85 S-86 S-87 S-88 S-90 S-91 S-92 S-93 S-94 S-95 S-96 S-97 S-98 S-99 S-100 S-101 S-102 S-103 S-104 S-105 S-106 S-107 S-109 S-110 S-111 S-112 S-114 S-116 S-117 S-118 S-119 S-120 S-121 S-122 S-123 S-124 S-125 S-126 S-127 S-128 S-130 S-131 S-132 S-133 S-134 S-135 S-136 S-137 S-138 S-139 S-140 S-147 S-172



CULVERT CAPACITY EVALUATION
STORM PROTECTION

PARADISE VALLEY, AZ
STORM WATER MASTER PLAN

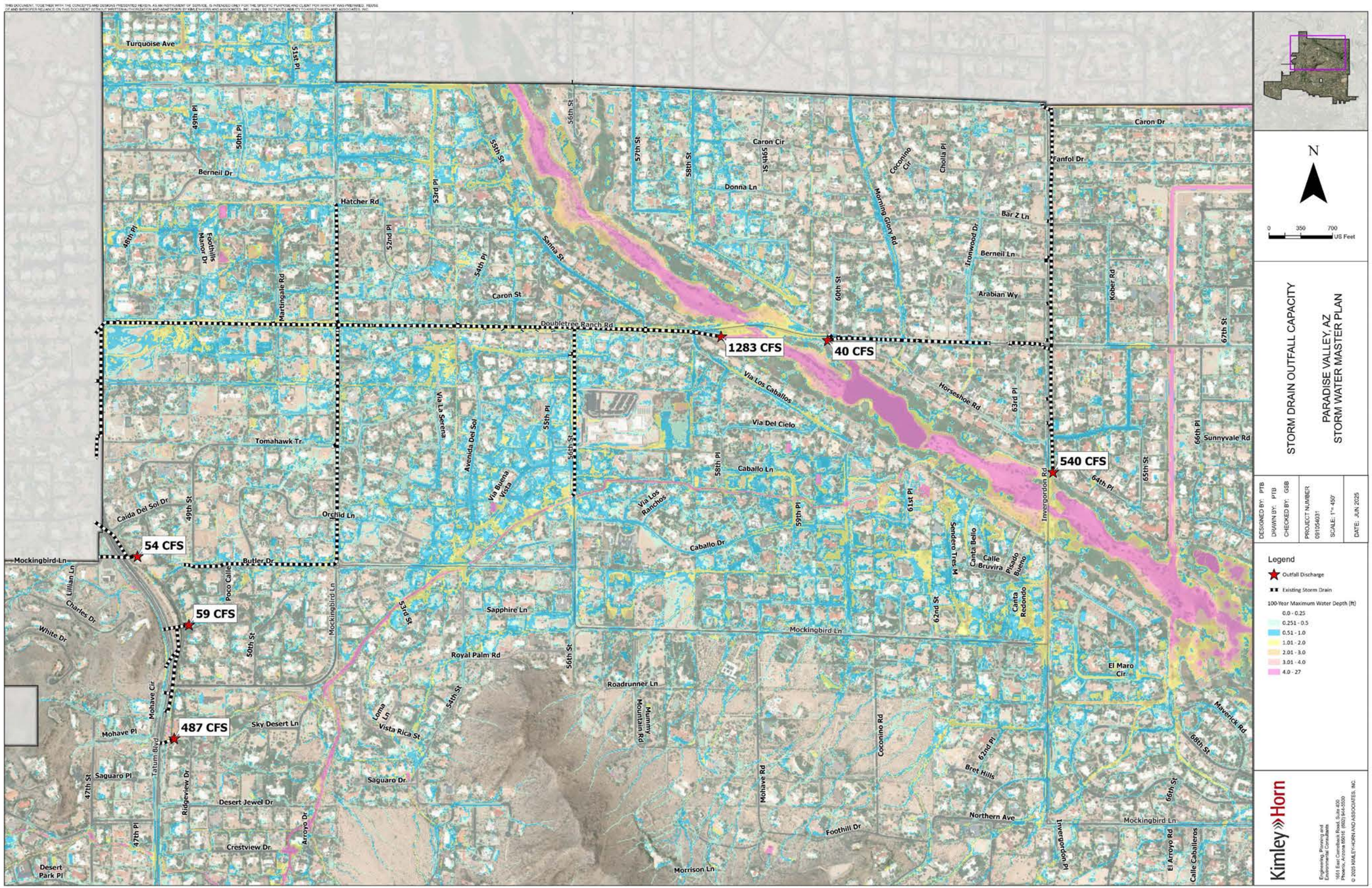
DESIGNED BY: PTB	PROJECT NUMBER 091054031
DRAWN BY: PTB	SCALE: 1"= 600'
CHECKED BY: GSB	DATE: DEC 2024

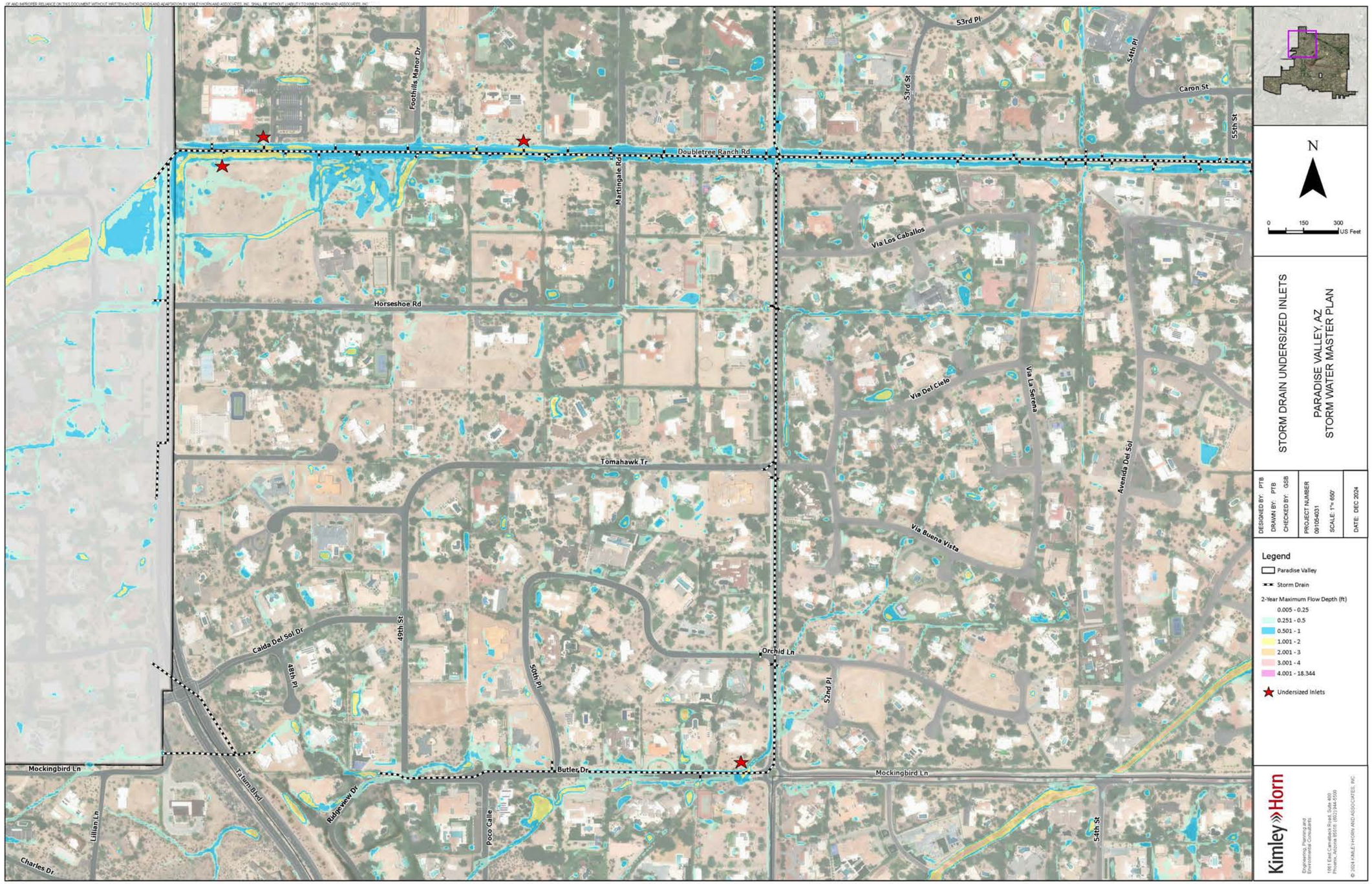
Legend

- Paradise Valley
- Culverts Maximum Level of Protection
  - < 2 Year
  - > 2 Year
  - > 10 Year
  - > 100 Year
- 100 Year Maximum Flow Depth (ft)
  - 0.0 - 0.25
  - 0.251 - 0.5
  - 0.51 - 1.0
  - 1.01 - 2.0
  - 2.01 - 3.0
  - 3.01 - 4.0
  - 4.0 - 27
  - streets

Kimley»Horn
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Phoenix, Arizona 85016 (602) 944-5500

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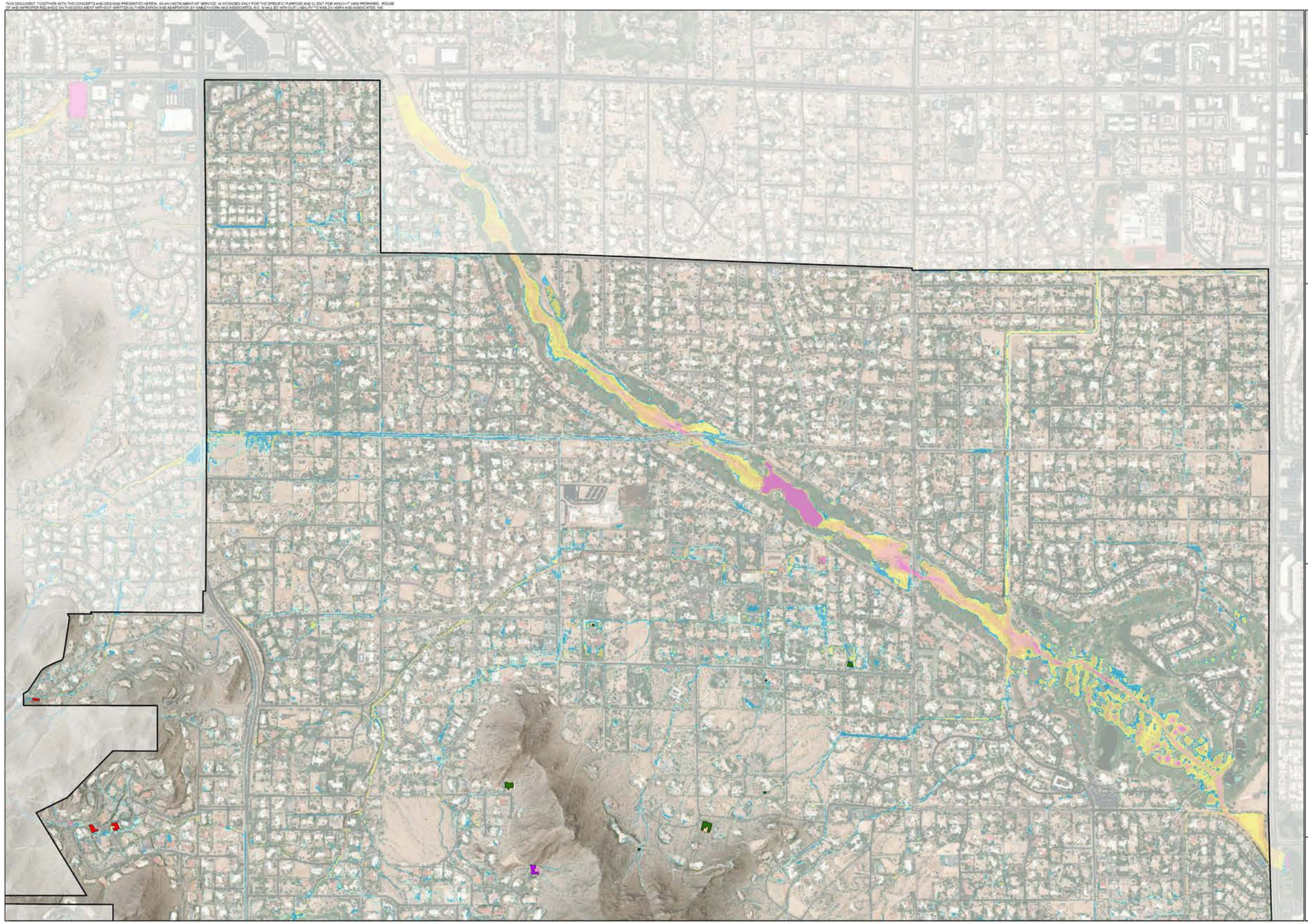

Turquoise Ave
51st Pl
49th Pl
50th Pl
Berneil Dr
Hatcher Rd
48th Pl
Foothills Manor Dr
Martingale Rd
52nd Pl
53rd Pl
55th St
54th Pl
Salma St
Caron St
Doubletree Ranch Rd
56th St
57th St
58th St
59th St
Caron Cir
Donna Ln
Cocomino Cir
Cholla Pl
Morning Glory Rd
Ironwood Dr
Bar Z Ln
Berneil Ln
Arabian Wy
60th St
Fanfol Dr
Caron Dr
Kober Rd
67th St
1283 CFS
40 CFS
Via Los Caballos
Horseshoe Rd
63rd Pl
Via Del Cielo
Caballo Ln
58th Pl
Via Los Ranchos
59th Pl
61st Pl
Caballo Dr
Sendero Tres M
Canta Bello
Calle Brúvira
Pisado Bueno
Canta Redondo
62nd St
Invergordon Rd
540 CFS
64th Pl
65th St
66th Pl
Sunnyvale Rd
Tomahawk Tr
Via La Serena
Avenida Del Sol
Via Buena Vista
55th Pl
Orchid Ln
Caida Del Sol Dr
49th St
54 CFS
Mockingbird Ln
Butler Dr
Poco Calle
Lillian Ln
Charles Dr
White Dr
59 CFS
50th St
Mockingbird Ln
53rd St
Sapphire Ln
Royal Palm Rd
56th St
Roadrunner Ln
Mockingbird Ln
El Maro Cir
Maverick Rd
68th St
Mohave Cir
Mohave Pl
487 CFS
Sky Desert Ln
Tatum Blvd
Saguaro Pl
47th St
Ridgeview Dr
Desert Jewel Dr
Saguaro Dr
Loma Ln
Vista Rica St
54th St
Mummy Mountain Rd
Coconino Rd
Mohave Rd
62nd Pl
Bret Hills
Northern Ave
Foothill Dr
Morrison Ln
Mockingbird Ln
El Arroyo Rd
Calle Caballeros
47th Pl
Arroyo Dr
Crestview Dr
Desert Park Pl
N
0 350 700 US Feet
STORM DRAIN OUTFALL CAPACITY
PARADISE VALLEY, AZ
STORM WATER MASTER PLAN
DESIGNED BY: PTB
DRAWN BY: PTB
CHECKED BY: GSB
PROJECT NUMBER 019104031
SCALE: 1"= 450'
DATE: JUN 2025
Legend
Outfall Discharge
Existing Storm Drain
100-Year Maximum Water Depth (ft)
0.0 - 0.25
0.251 - 0.5
0.51 - 1.0
1.01 - 2.0
2.01 - 3.0
3.01 - 4.0
4.0 - 27
Kimley»Horn
Engineering, Planning and Environmental Consultants
1661 East Camelback Road, Suite 400
Phoenix, Arizona 85016 (602) 944-5500
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Foothills Manor Dr
Doubletree Ranch Rd
Martingale Rd
53rd Pl
53rd St
54th Pl
Caron St
55th St
Via Los Caballos
Horseshoe Rd
Via Del Cielo
Via La Serena
Avenida Del Sol
Tomahawk Tr
Via Buena Vista
Caida Del Sol Dr
48th Pl
49th St
50th Pl
Orchid Ln
52nd Pl
Mockingbird Ln
Tatum Blvd
Butler Dr
Ridgeview Dr
Poco Calle
54th St
Lillian Ln
Charles Dr
N
0 150 300 US Feet
STORM DRAIN UNDERSIZED INLETS
PARADISE VALLEY, AZ
STORM WATER MASTER PLAN
DESIGNED BY: PTB
DRAWN BY: PTB
CHECKED BY: GSB
PROJECT NUMBER 091054031
SCALE: 1"= 650'
DATE: DEC 2024
Legend
Paradise Valley
Storm Drain
2-Year Maximum Flow Depth (ft)
0.005 - 0.25
0.251 - 0.5
0.501 - 1
1.001 - 2
2.001 - 3
3.001 - 4
4.001 - 18.344
Undersized Inlets
Kimley»Horn
Engineering, Planning and Environmental Consultants
1661 East Camelback Road, Suite 400
Phoenix, Arizona 85016 (602) 944-5500
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XV. APPENDIX C – FLOOD HAZARD ANALYSIS

ADJACENT FLOW DEPTH TO BUILDINGS

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N

0 500 1,000 US Feet

ADJACENT FLOW DEPTH TO BUILDINGS
2 YEAR, 6 HOUR STORM

PARADISE VALLEY, AZ
STORMWATER MASTER PLAN

Legend

Adjacent Building Depth
- 6 in - 12 in
- 12 in - 24 in
- > 24 in

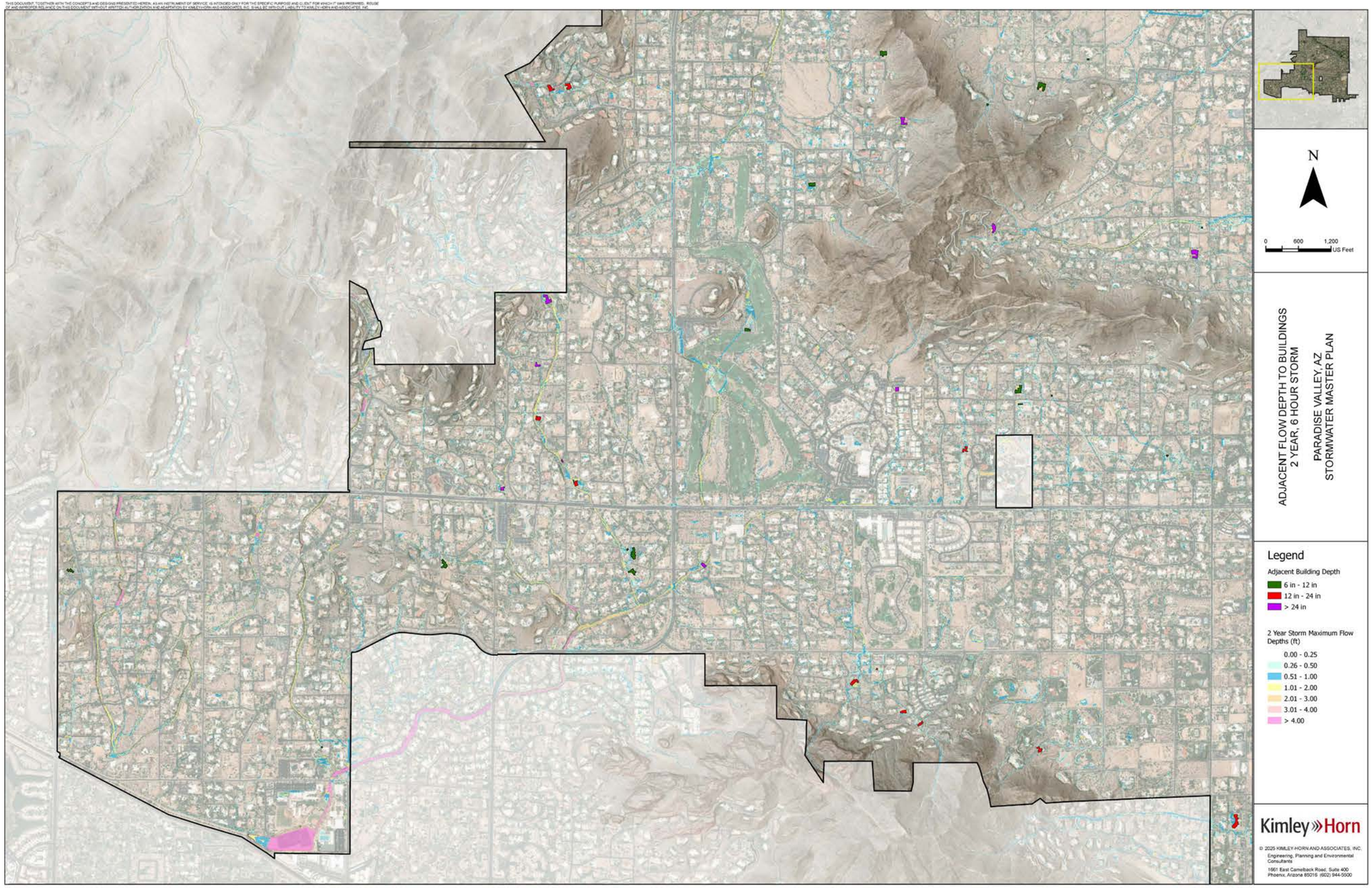
2 Year Storm Maximum Flow Depths (ft)
- 0.00 - 0.25
- 0.26 - 0.50
- 0.51 - 1.00
- 1.01 - 2.00
- 2.01 - 3.00
- 3.01 - 4.00
- > 4.00

Kimley»Horn

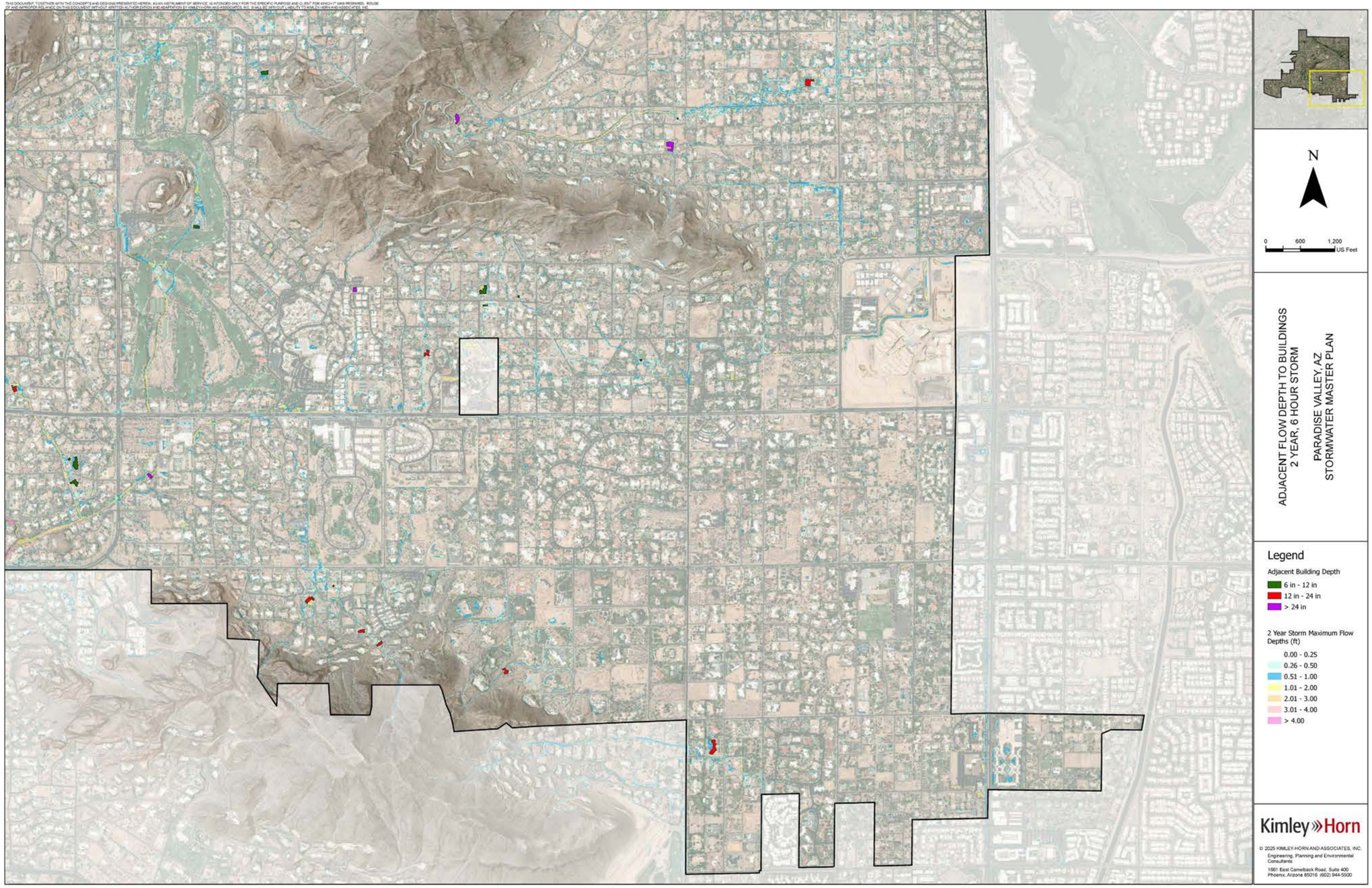
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Engineering, Planning and Environmental Consultants
1661 East Camelback Road, Suite 400
Phoenix, Arizona 85016 (602) 944-5500

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N

0 600 1,200 US Feet

ADJACENT FLOW DEPTH TO BUILDINGS
2 YEAR, 6 HOUR STORM
PARADISE VALLEY, AZ
STORMWATER MASTER PLAN

Legend

Adjacent Building Depth
- 6 in - 12 in
- 12 in - 24 in
- > 24 in

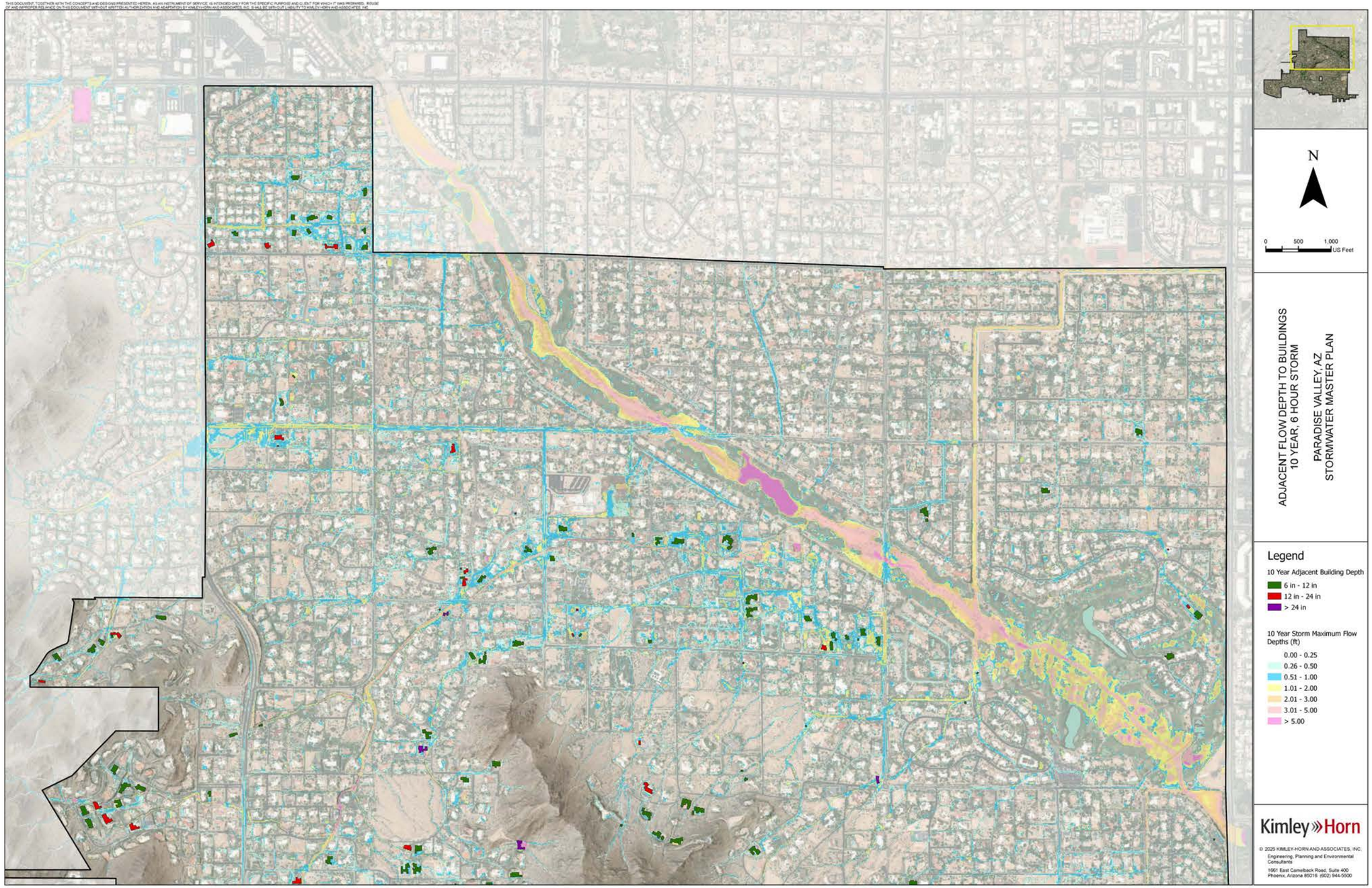
2 Year Storm Maximum Flow Depths (ft)
- 0.00 - 0.25
- 0.26 - 0.50
- 0.51 - 1.00
- 1.01 - 2.00
- 2.01 - 3.00
- 3.01 - 4.00
- > 4.00

Kimley»Horn

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N

0 500 1,000 US Feet

ADJACENT FLOW DEPTH TO BUILDINGS
10 YEAR, 6 HOUR STORM

PARADISE VALLEY, AZ
STORMWATER MASTER PLAN

Legend

10 Year Adjacent Building Depth
- 6 in - 12 in
- 12 in - 24 in
- > 24 in

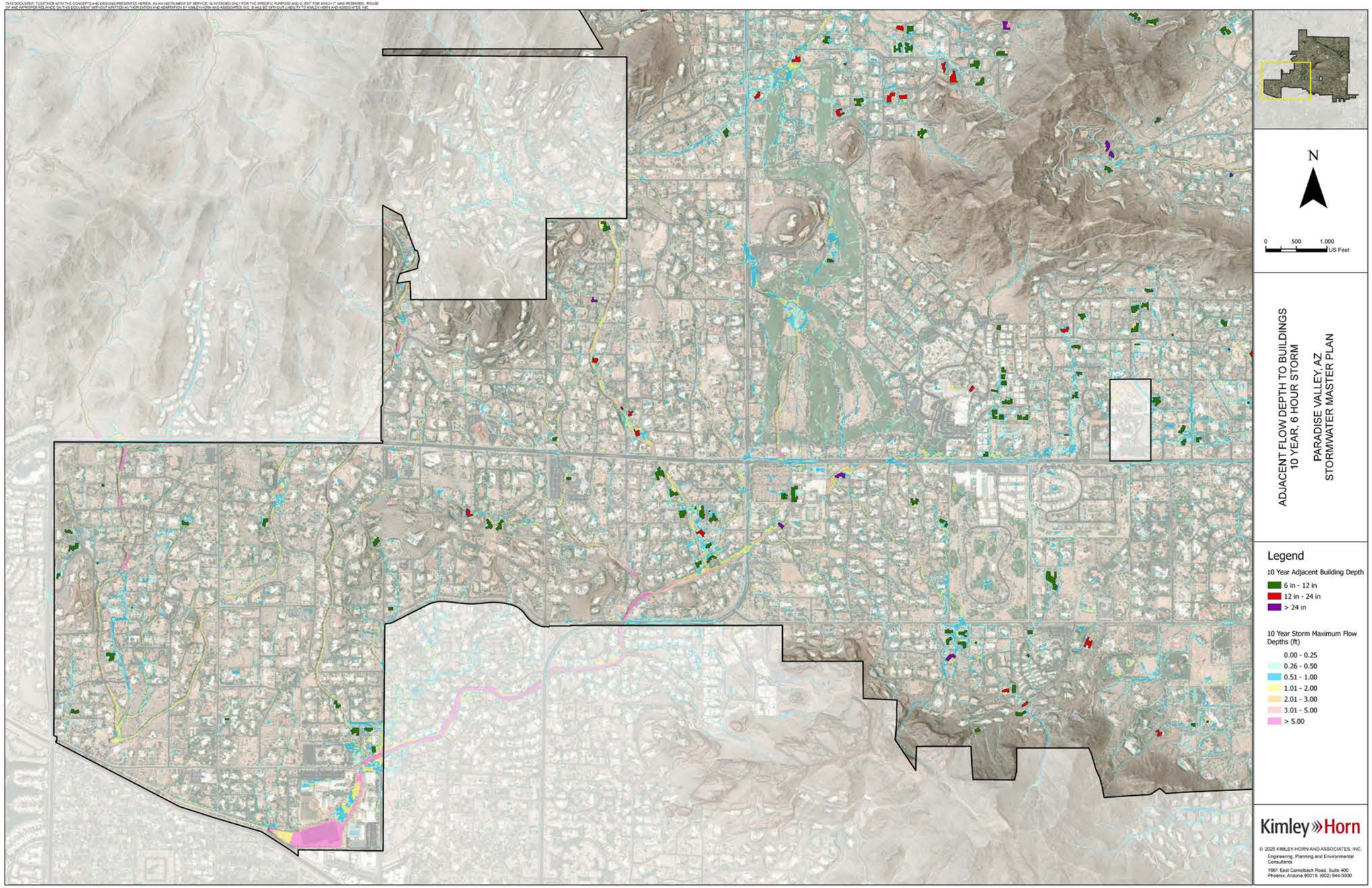
10 Year Storm Maximum Flow Depths (ft)
- 0.00 - 0.25
- 0.26 - 0.50
- 0.51 - 1.00
- 1.01 - 2.00
- 2.01 - 3.00
- 3.01 - 5.00
- > 5.00

Kimley»Horn

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N

0 500 1,000
US Feet

ADJACENT FLOW DEPTH TO BUILDINGS
10 YEAR, 6 HOUR STORM
PARADISE VALLEY, AZ
STORMWATER MASTER PLAN

Legend

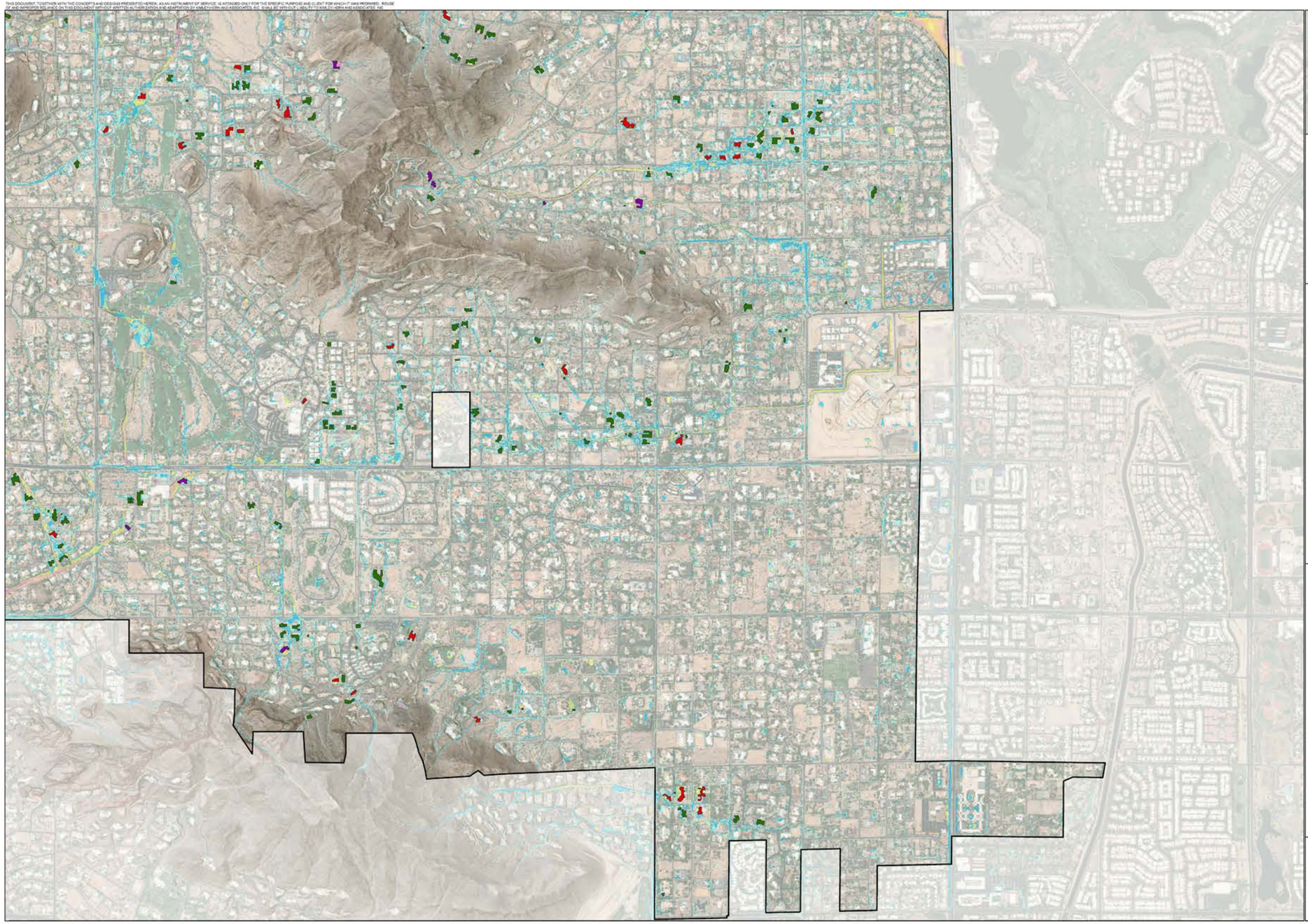
10 Year Adjacent Building Depth
- 6 in - 12 in
- 12 in - 24 in
- > 24 in

10 Year Storm Maximum Flow Depths (ft)
- 0.00 - 0.25
- 0.26 - 0.50
- 0.51 - 1.00
- 1.01 - 2.00
- 2.01 - 3.00
- 3.01 - 5.00
- > 5.00

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N

0 600 1,200
US Feet

ADJACENT FLOW DEPTH TO BUILDINGS
10 YEAR, 6 HOUR STORM
PARADISE VALLEY, AZ
STORMWATER MASTER PLAN

Legend

10 Year Adjacent Building Depth
- 6 in - 12 in
- 12 in - 24 in
- > 24 in

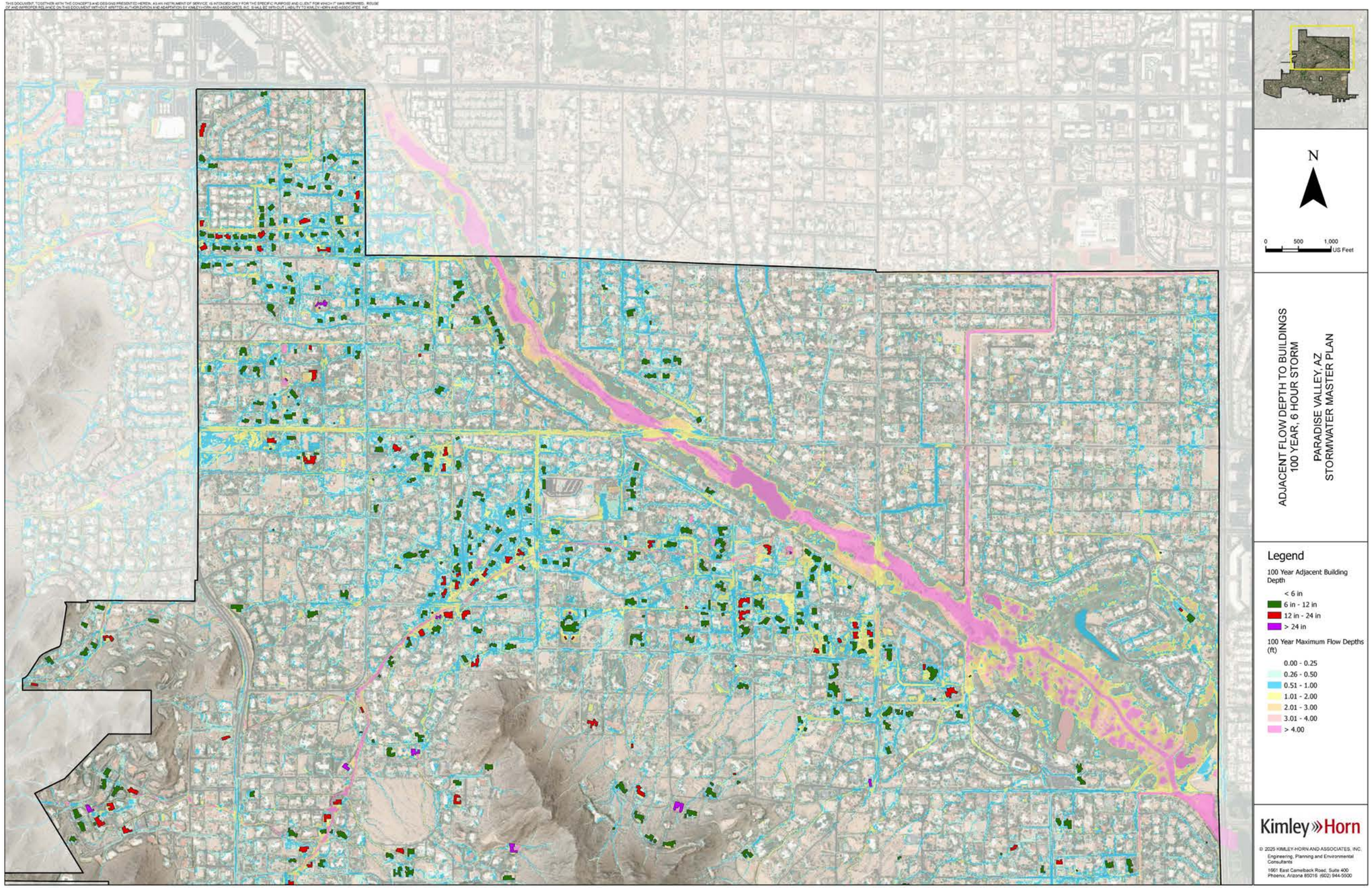
10 Year Storm Maximum Flow Depths (ft)
- 0.00 - 0.25
- 0.26 - 0.50
- 0.51 - 1.00
- 1.01 - 2.00
- 2.01 - 3.00
- 3.01 - 5.00
- > 5.00

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N

0 500 1,000 US Feet

ADJACENT FLOW DEPTH TO BUILDINGS
100 YEAR, 6 HOUR STORM

PARADISE VALLEY, AZ
STORMWATER MASTER PLAN

Legend

100 Year Adjacent Building Depth

- < 6 in
- 6 in - 12 in
- 12 in - 24 in
- > 24 in

100 Year Maximum Flow Depths (ft)

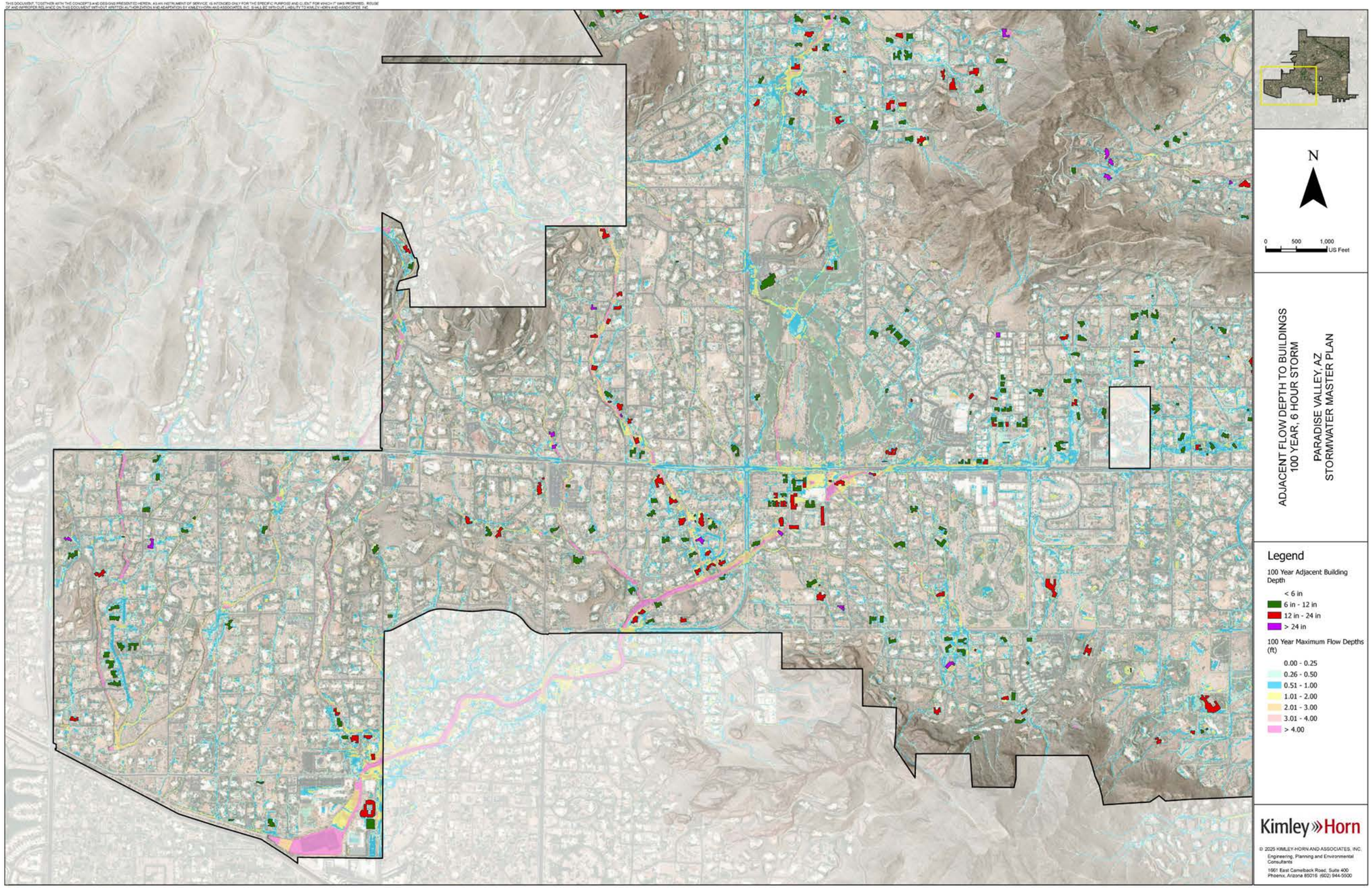
- 0.00 - 0.25
- 0.26 - 0.50
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- 1.01 - 2.00
- 2.01 - 3.00
- 3.01 - 4.00
- > 4.00

Kimley»Horn

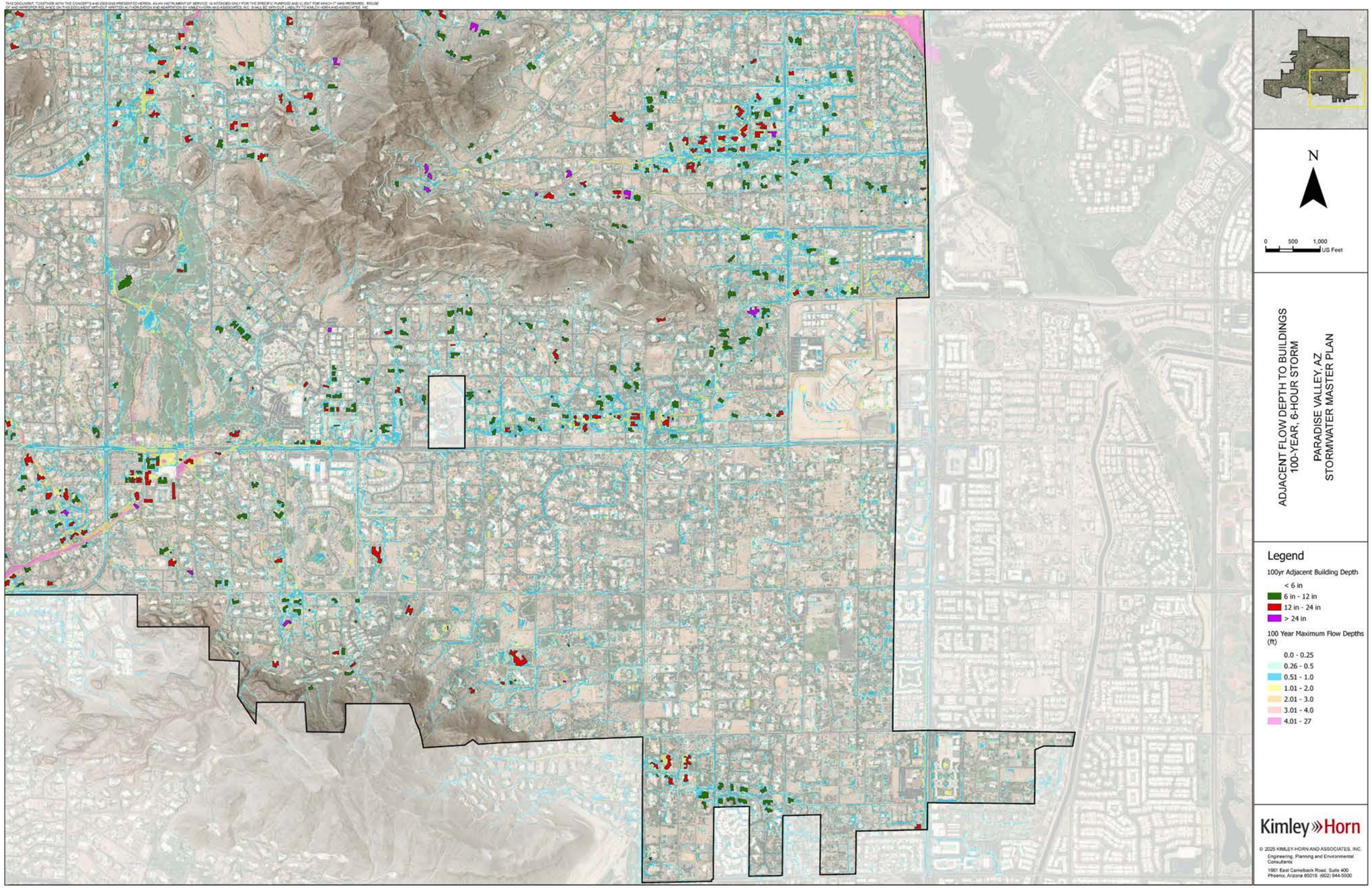
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N

0 500 1,000 US Feet

ADJACENT FLOW DEPTH TO BUILDINGS
100-YEAR, 6-HOUR STORM
PARADISE VALLEY, AZ
STORMWATER MASTER PLAN

Legend

100yr Adjacent Building Depth
- < 6 in
- 6 in - 12 in
- 12 in - 24 in
- > 24 in

100 Year Maximum Flow Depths (ft)
- 0.0 - 0.25
- 0.26 - 0.5
- 0.51 - 1.0
- 1.01 - 2.0
- 2.01 - 3.0
- 3.01 - 4.0
- 4.01 - 27

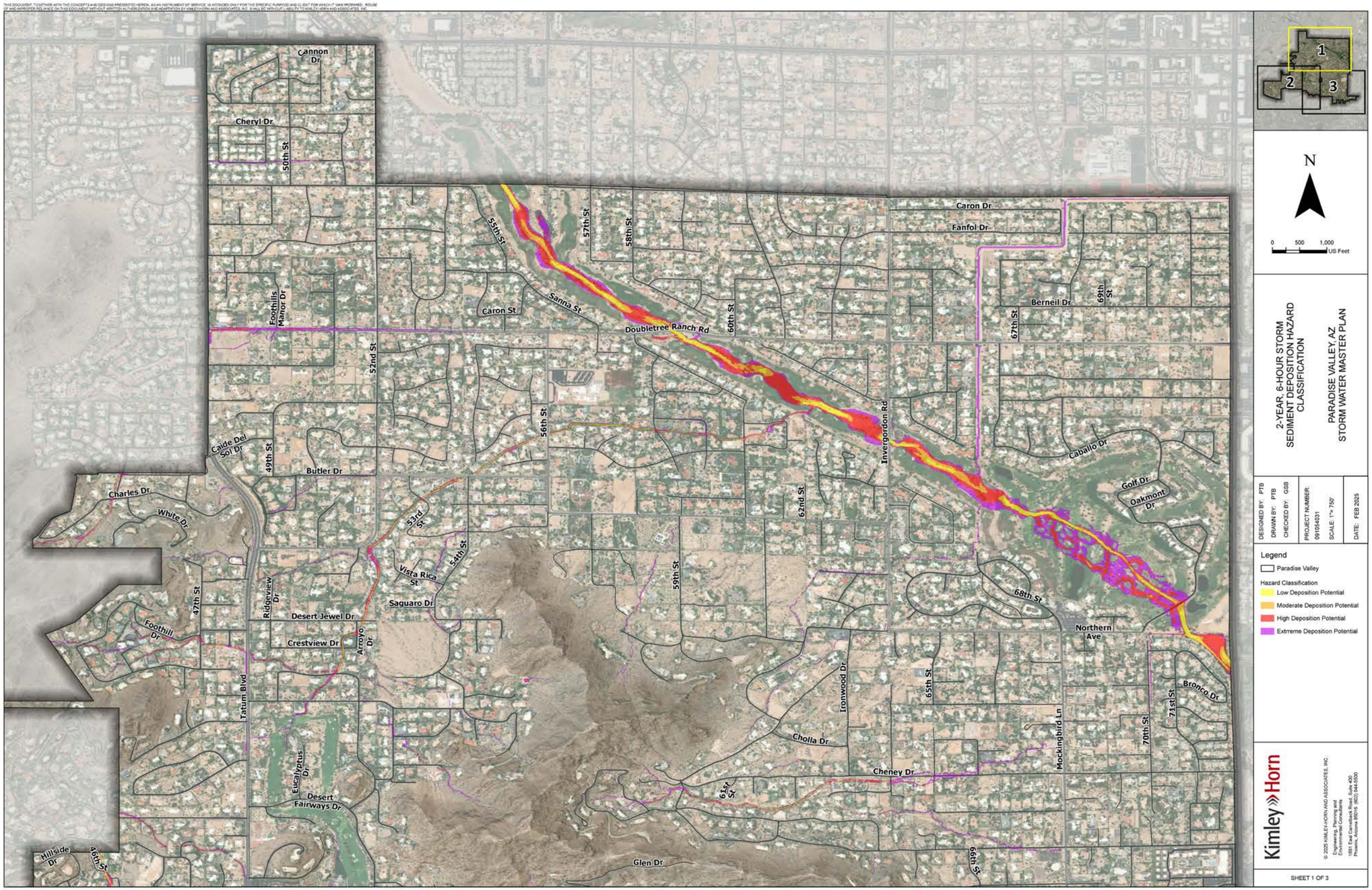
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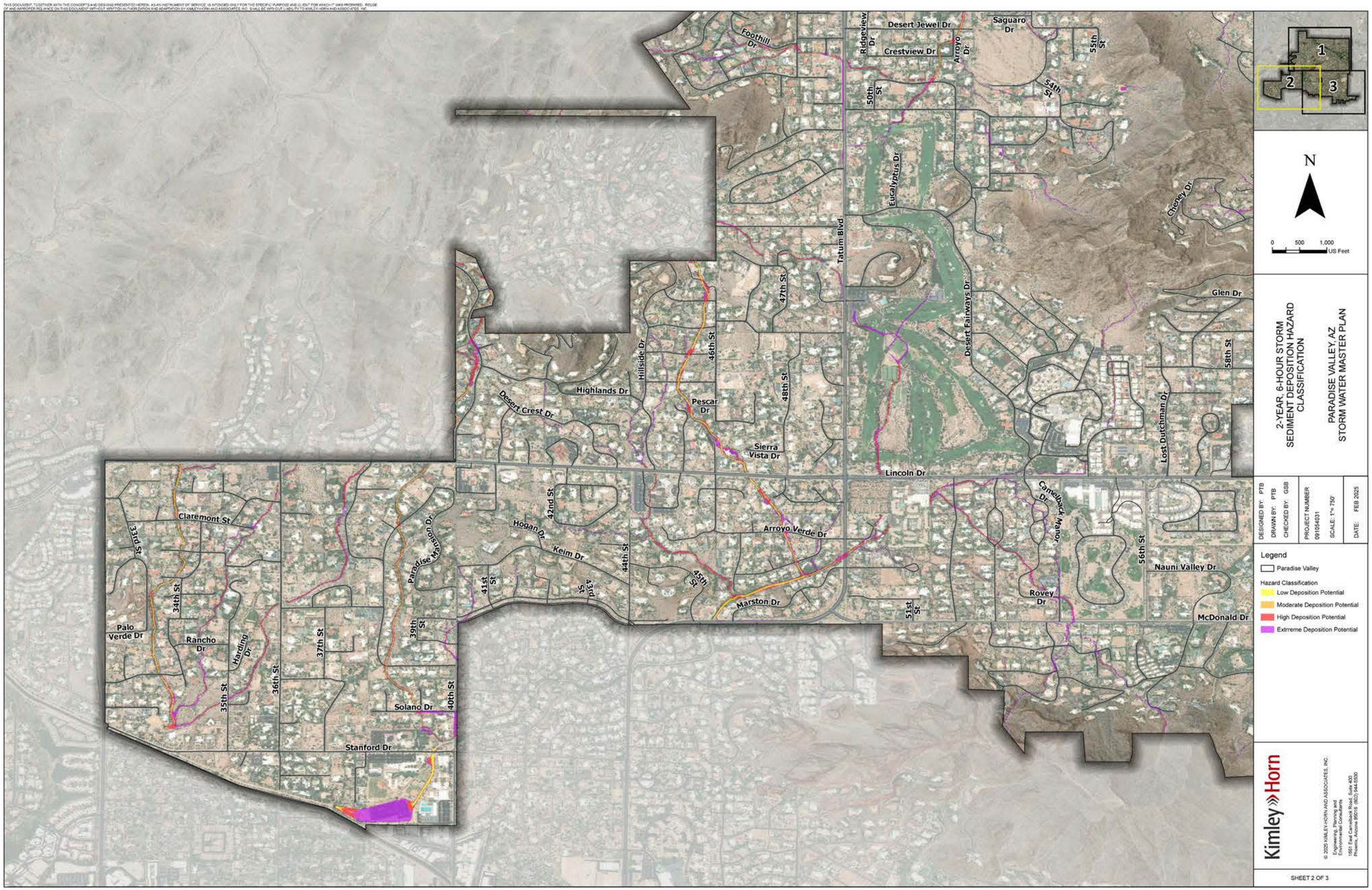
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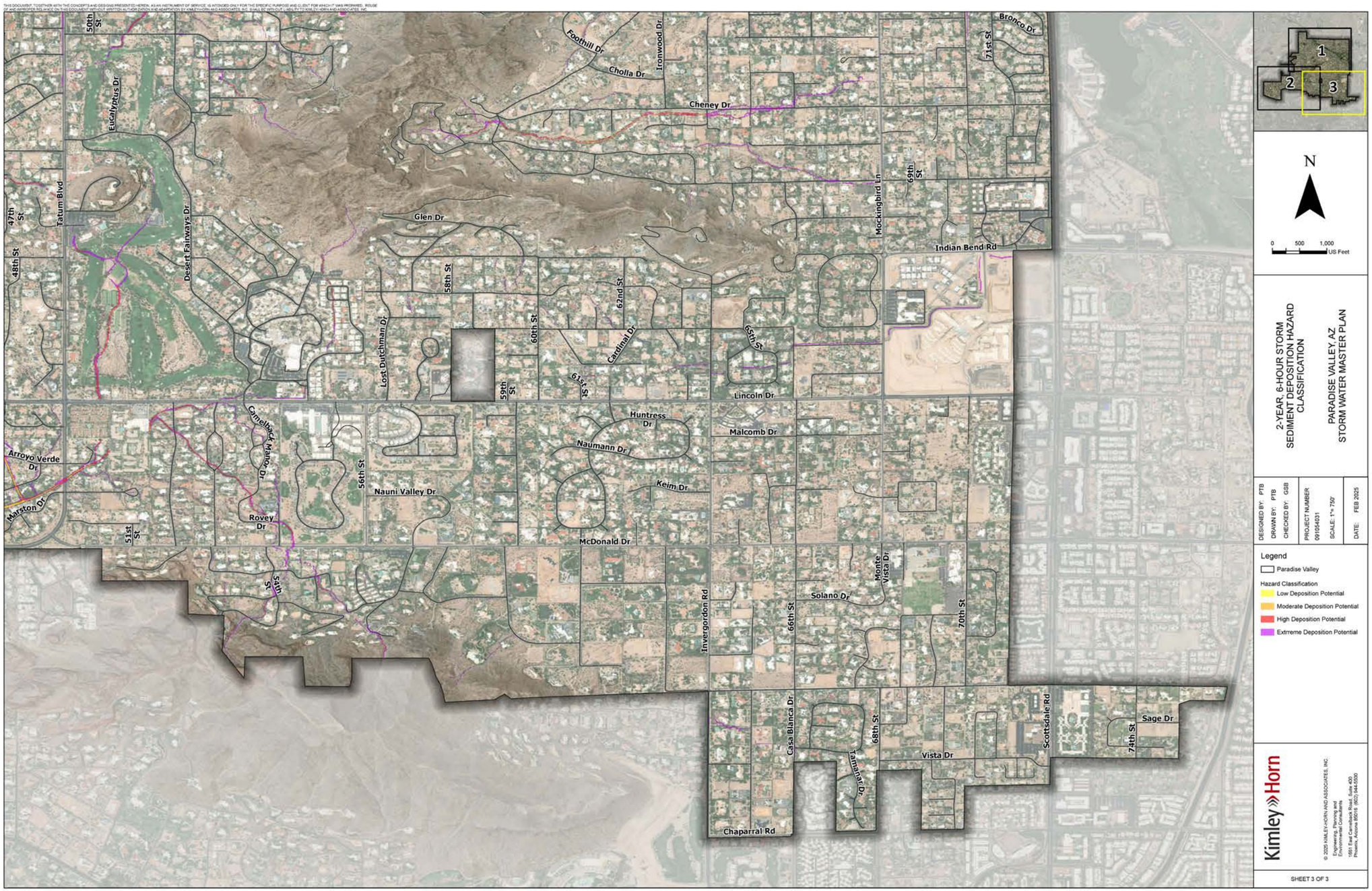
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Phoenix, Arizona 85016 (602) 944-5500

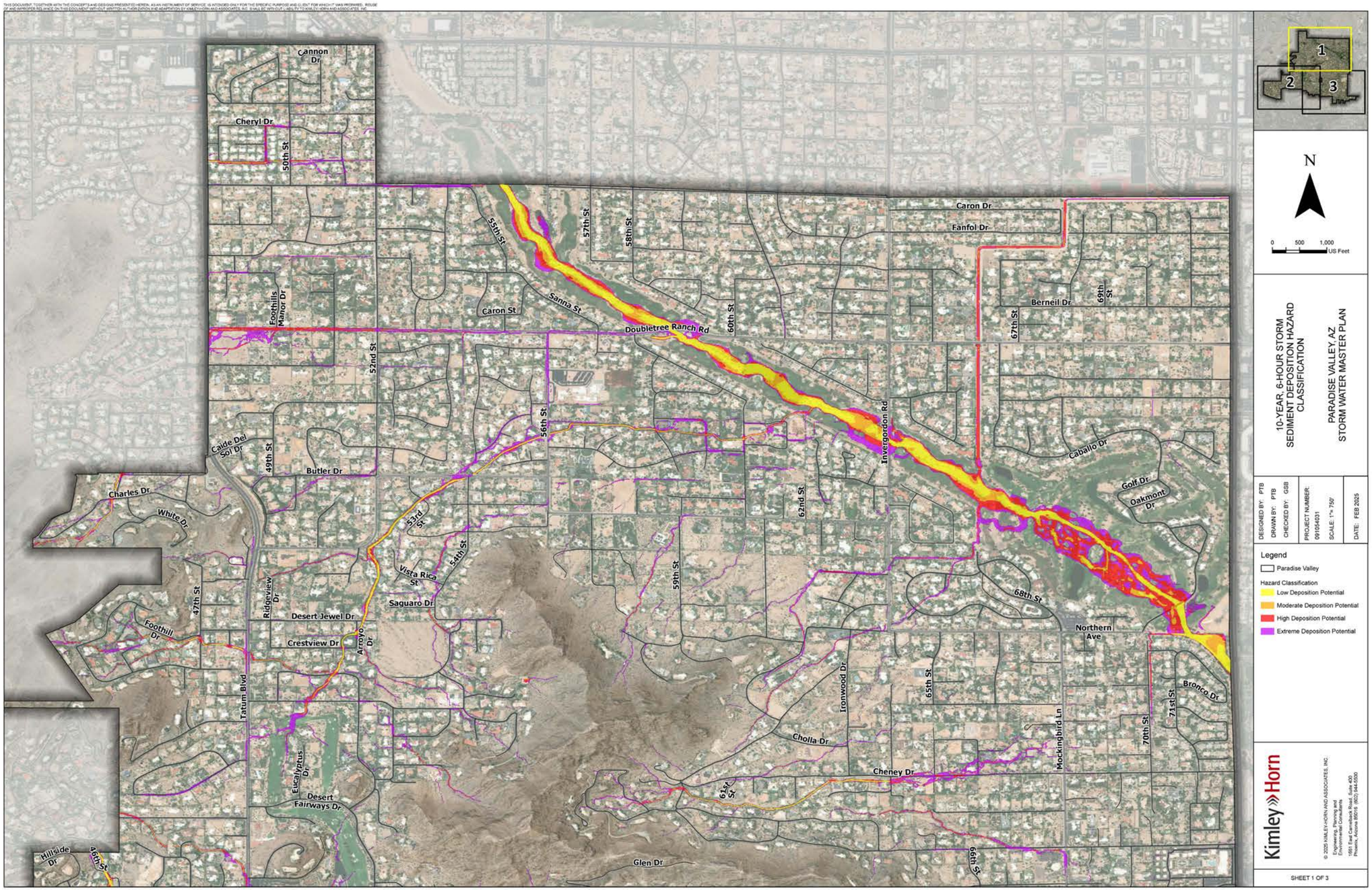
XV. APPENDIX C – FLOOD HAZARD ANALYSIS

SEDIMENT AND EROSION RISK

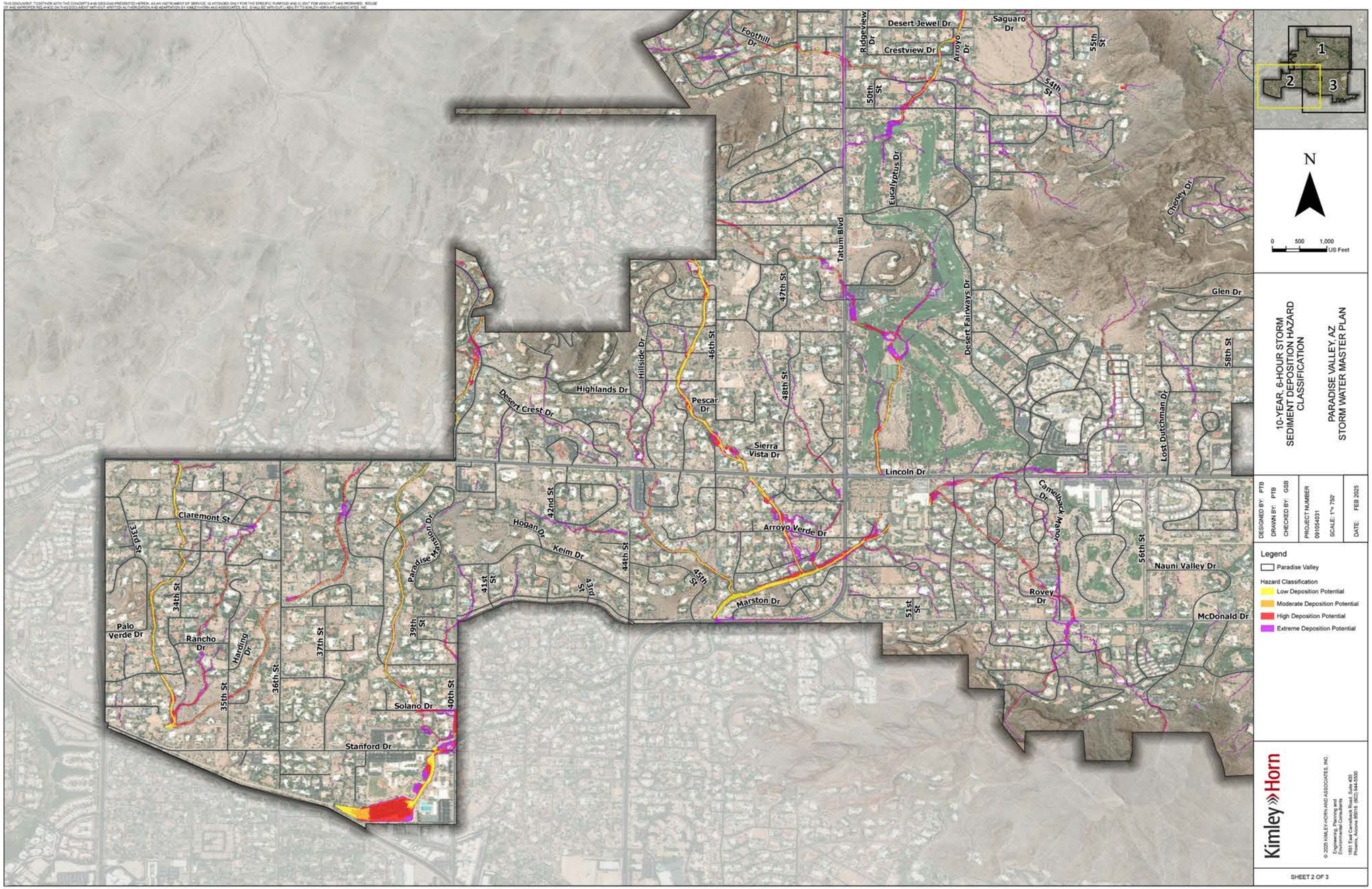

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Cheryl Dr
50th St
55th St
57th St
58th St
Caron Dr
Fanfol Dr
Foothills Manor Dr
Caron St
Sanna St
Doubletree Ranch Rd
60th St
Berneil Dr
67th St
69th St
52nd St
56th St
Invergordon Rd
Caballo Dr
Golf Dr
Oakmont Dr
Calde Del Sol Dr
49th St
Butler Dr
Charles Dr
White Dr
53rd St
54th St
Vista Rica St
62nd St
59th St
68th St
Northern Ave
47th St
Ridgeview Dr
Saguaro Dr
Desert Jewel Dr
Foothill Dr
Crestview Dr
Arroyo Dr
Tatum Blvd
Ironwood Dr
65th St
Bronco Dr
71st St
Cholla Dr
Mockingbird Ln
70th St
Eucalyptus Dr
Desert Fairways Dr
Cheney Dr
61st St
Hillside Dr
46th St
Glen Dr
66th St
1
2
3
N
0 500 1,000 US Feet
2-YEAR, 6-HOUR STORM
SEDIMENT DEPOSITION HAZARD
CLASSIFICATION
PARADISE VALLEY, AZ
STORM WATER MASTER PLAN
DESIGNED BY: PTB
DRAWN BY: PTB
CHECKED BY: GSB
PROJECT NUMBER: 091054031
SCALE: 1"= 750'
DATE: FEB 2025
Legend
Paradise Valley
Hazard Classification
Low Deposition Potential
Moderate Deposition Potential
High Deposition Potential
Extreme Deposition Potential
Kimley»Horn
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SHEET 1 OF 3

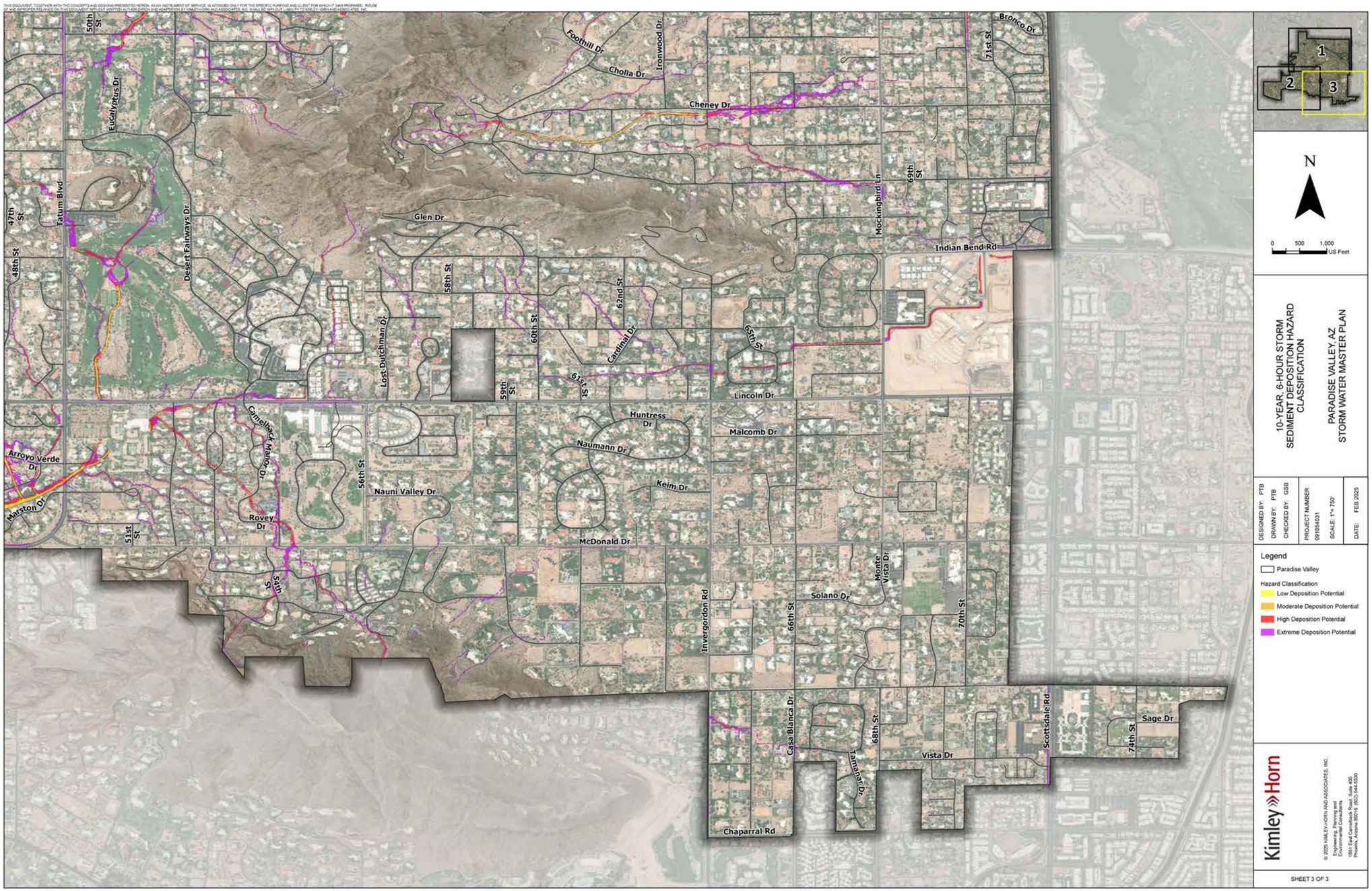

Foothill Dr
Ridgeview Dr
Desert Jewel Dr
Crestview Dr
Arroyo Dr
Saguaro Dr
55th St
54th St
50th St
Eucalyptus Dr
Tatum Blvd
47th St
Desert Fairways Dr
Chaney Dr
Glen Dr
58th St
Lost Dutchman Dr
Hillside Dr
46th St
48th St
Highlands Dr
Desert Crest Dr
Pescar Dr
Sierra Vista Dr
Lincoln Dr
Camelback Manor Dr
56th St
Nauni Valley Dr
Rovey Dr
McDonald Dr
51st St
42nd St
Hogan Dr
Keim Dr
44th St
41st St
43rd St
45th St
Arroyo Verde Dr
Marston Dr
Paradise Mansion Dr
Claremont St
33rd St
34th St
Palo Verde Dr
Rancho Dr
Harding Dr
35th St
36th St
37th St
39th St
40th St
Solano Dr
Stanford Dr
1
2
3
N
0 500 1,000 US Feet
2-YEAR, 6-HOUR STORM
SEDIMENT DEPOSITION HAZARD
CLASSIFICATION
PARADISE VALLEY, AZ
STORM WATER MASTER PLAN
DESIGNED BY: PTB
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SHEET 2 OF 3

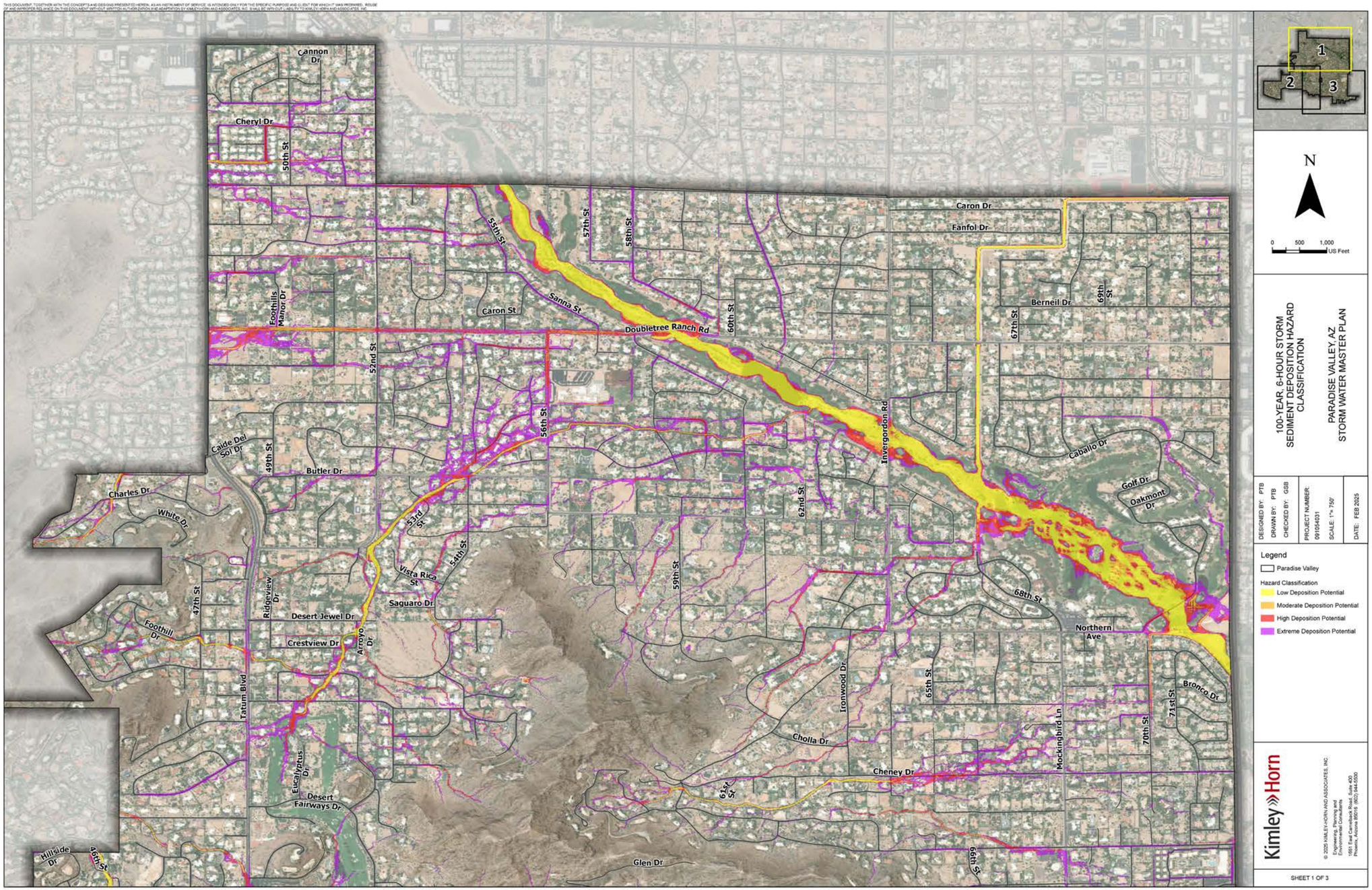

50th St
Eucalyptus Dr
Foothill Dr
Cholla Dr
Ironwood Dr
Cheney Dr
Bronco Dr
71st St
47th St
Tatum Blvd
48th St
Desert Fairways Dr
Glen Dr
Mockingbird Ln
69th St
Indian Bend Rd
58th St
62nd St
Lost Dutchman Dr
60th St
Cardinal Dr
65th St
59th St
61st St
Lincoln Dr
Huntress Dr
Malcomb Dr
Naumann Dr
Keim Dr
Camelback Mano Dr
56th St
Nauni Valley Dr
Arroyo Verde Dr
Marston Dr
Rovey Dr
51st St
McDonald Dr
54th St
Invergordon Rd
Monte Vista Dr
Solano Dr
66th St
70th St
Casa Blanca Dr
68th St
Tamarral Dr
Vista Dr
Scottsdale Rd
74th St
Sage Dr
Chaparral Rd
1
2
3
N
0 500 1,000
US Feet
2-YEAR, 6-HOUR STORM
SEDIMENT DEPOSITION HAZARD
CLASSIFICATION
PARADISE VALLEY, AZ
STORM WATER MASTER PLAN
DESIGNED BY: PTB
DRAWN BY: PTB
CHECKED BY: GSB
PROJECT NUMBER
091054031
SCALE: 1" = 750'
DATE: FEB 2025
Legend
Paradise Valley
Hazard Classification
Low Deposition Potential
Moderate Deposition Potential
High Deposition Potential
Extreme Deposition Potential
Kimley»Horn
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SHEET 3 OF 3

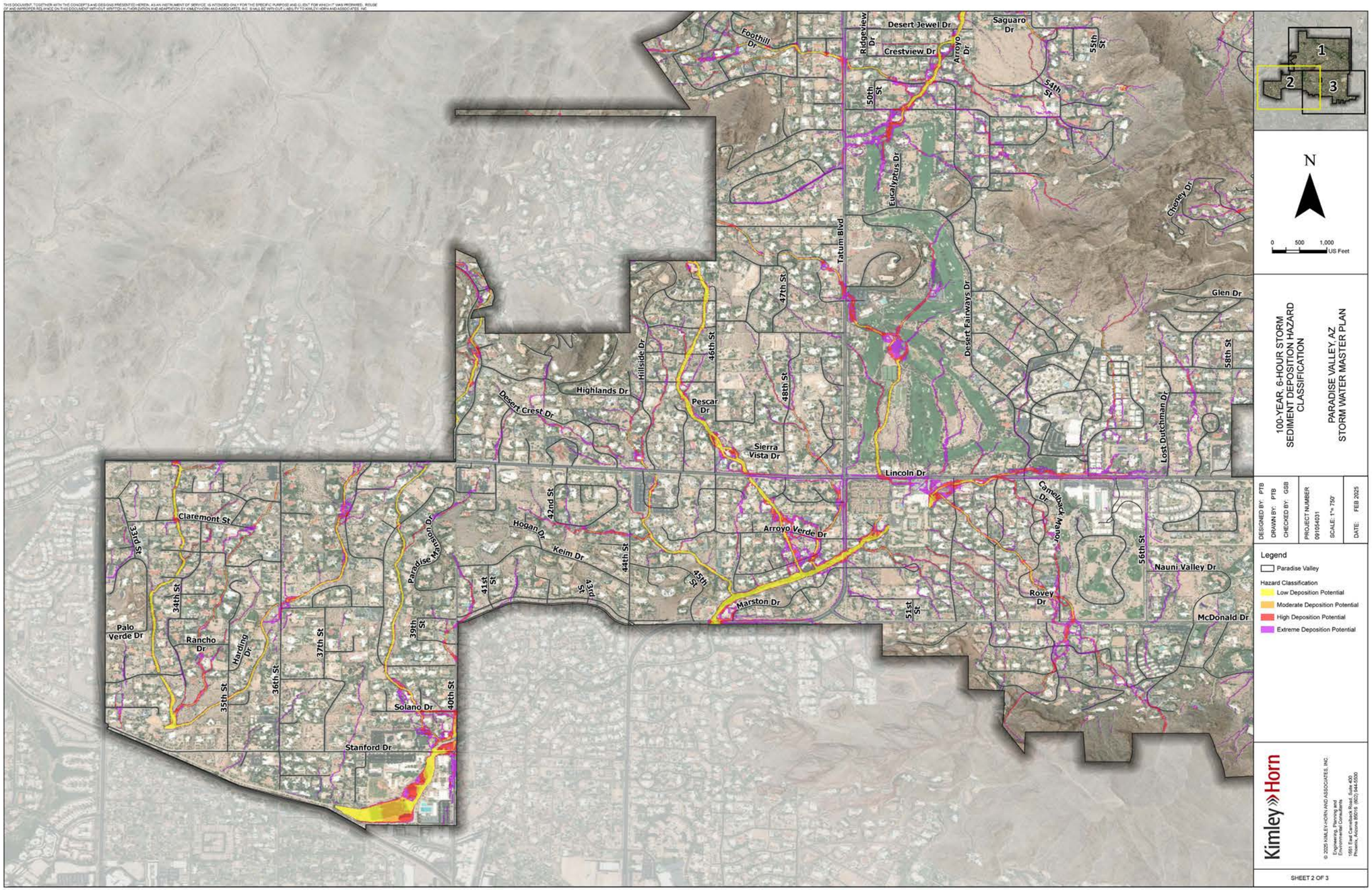

Cannon Dr
Cheryl Dr
50th St
55th St
57th St
58th St
Caron Dr
Fanfol Dr
Foothills Manor Dr
Caron St
Sanna St
Doubletree Ranch Rd
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Berneil Dr
67th St
69th St
52nd St
56th St
Invergordon Rd
Caballo Dr
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Oakmont Dr
Calde Del Sol Dr
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Butler Dr
Charles Dr
White Dr
53rd St
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Vista Rica St
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68th St
Saguaro Dr
Ridgeview Dr
47th St
Desert Jewel Dr
Foothill Dr
Crestview Dr
Arroyo Dr
Northern Ave
Ironwood Dr
65th St
Bronco Dr
Tatum Blvd
Cholla Dr
Mockingbird Ln
70th St
71st St
Eucalyptus Dr
Cheney Dr
61st St
Desert Fairways Dr
Hillside Dr
46th St
Glen Dr
66th St
1
2
3
N
0 500 1,000 US Feet
10-YEAR, 6-HOUR STORM
SEDIMENT DEPOSITION HAZARD
CLASSIFICATION
PARADISE VALLEY, AZ
STORM WATER MASTER PLAN
DESIGNED BY: PTB
DRAWN BY: PTB
CHECKED BY: GSB
PROJECT NUMBER: 091064031
SCALE: 1"= 750'
DATE: FEB 2025
Legend
Paradise Valley
Hazard Classification
Low Deposition Potential
Moderate Deposition Potential
High Deposition Potential
Extreme Deposition Potential
Kimley»Horn
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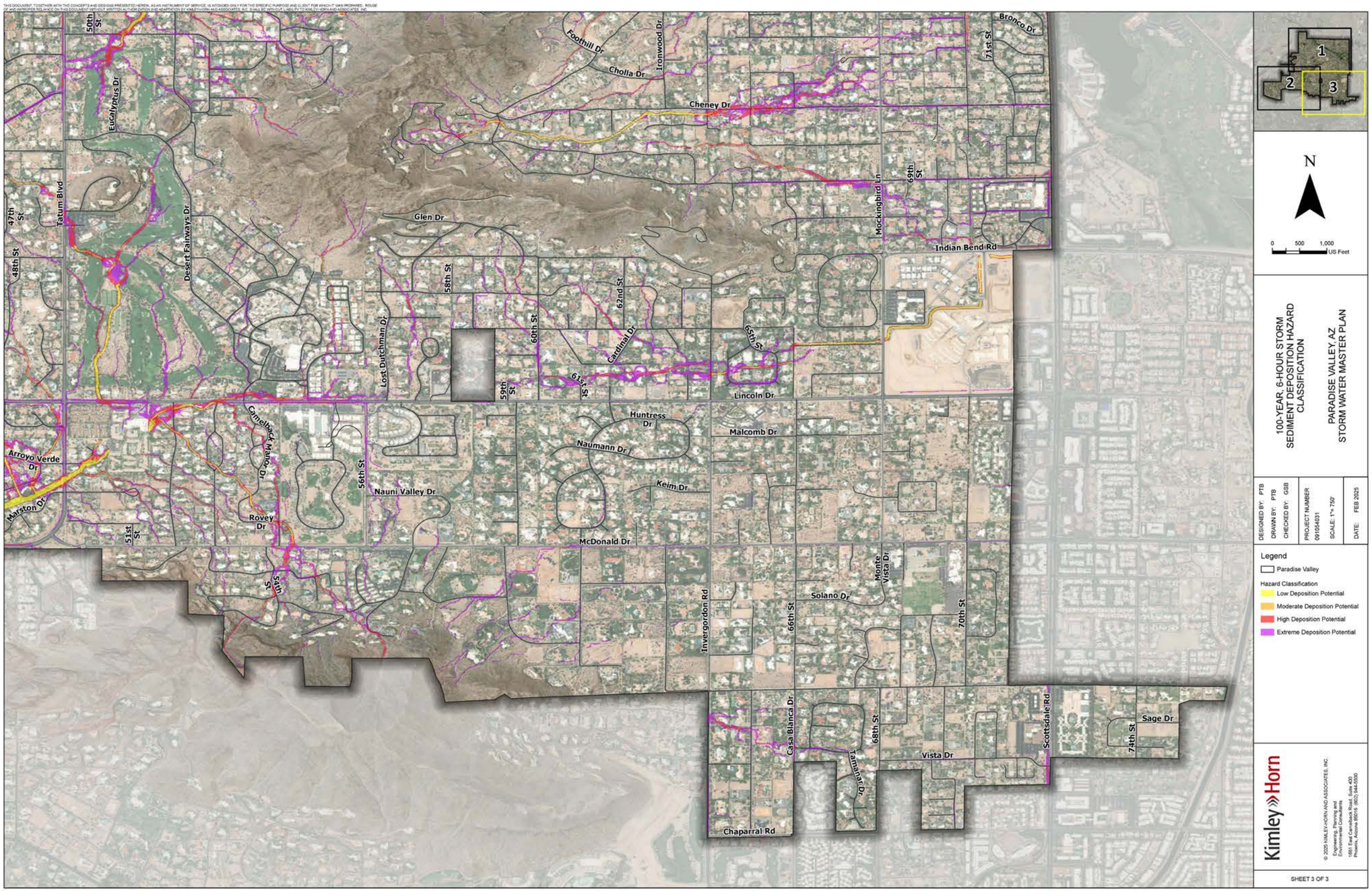
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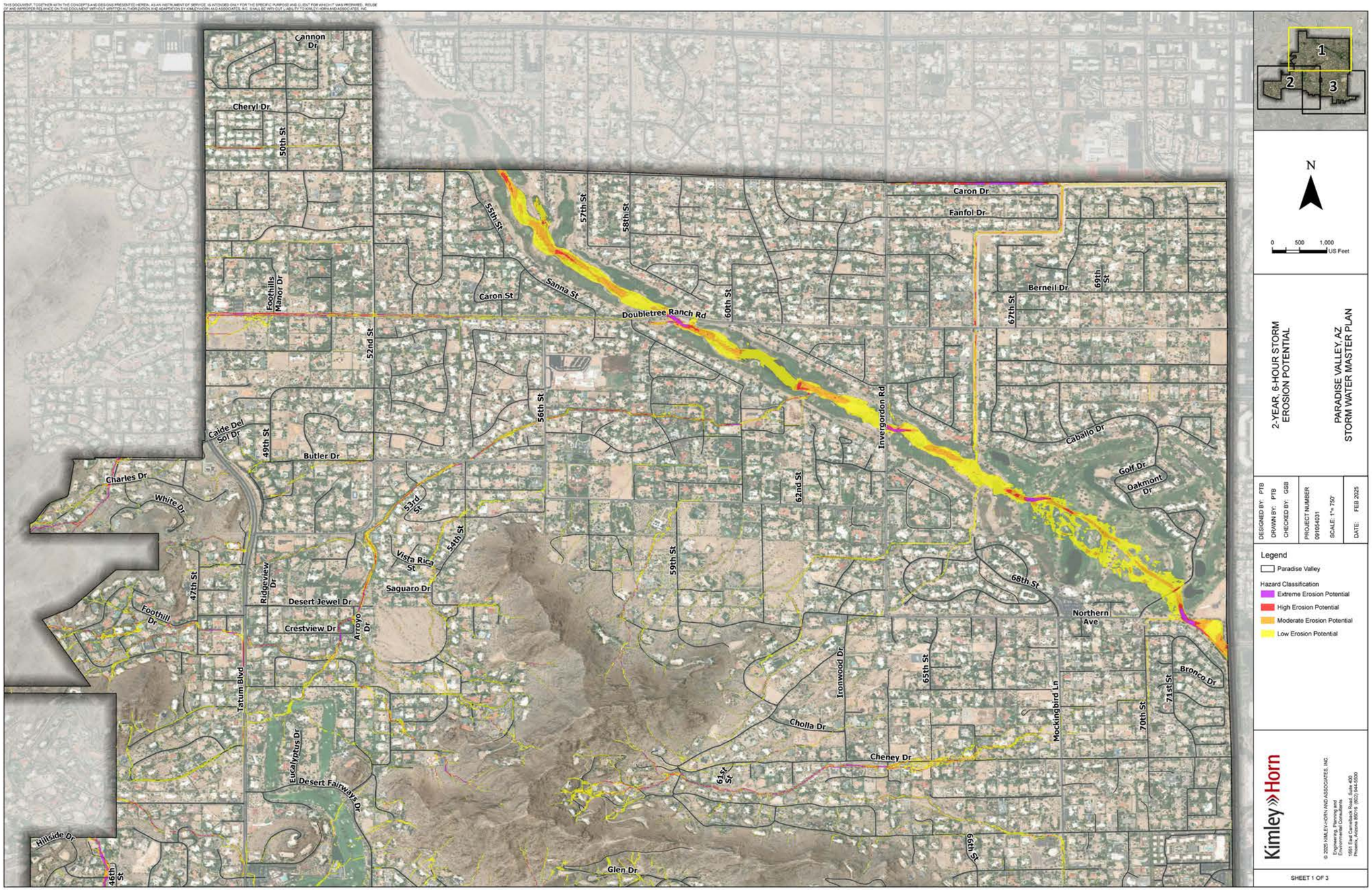


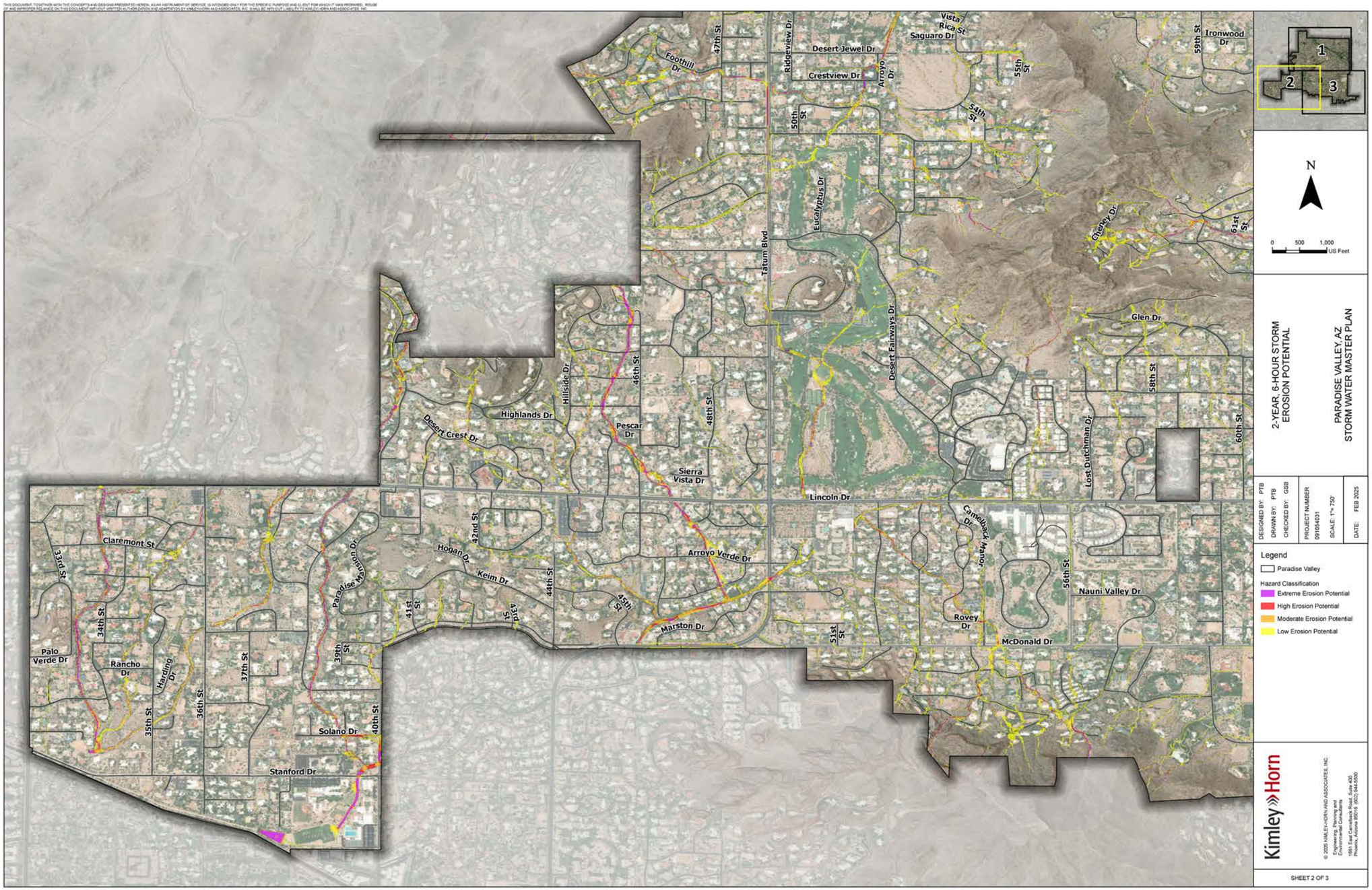

50th St
Foothill Dr
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Bronco Dr
71st St
Eucalyptus Dr
Cheney Dr
47th St
Tatum Blvd
Desert Fairways Dr
Glen Dr
Mockingbird Ln
69th St
Indian Bend Rd
48th St
58th St
62nd St
60th St
Lost Dutchman Dr
Cardinal Dr
65th St
59th St
61st St
Lincoln Dr
Huntress Dr
Malcomb Dr
Camelback Manor Dr
Naumann Dr
Arroyo Verde Dr
56th St
Nauni Valley Dr
Keim Dr
Marston Dr
Rovey Dr
51st St
McDonald Dr
54th St
Monte Vista Dr
Invergordon Rd
66th St
Solano Dr
70th St
Casa Blanca Dr
68th St
Tamarral Dr
Vista Dr
Scottsdale Rd
74th St
Sage Dr
Chaparral Rd
1
2
3
N
0
500
1,000
US Feet
10-YEAR, 6-HOUR STORM
SEDIMENT DEPOSITION HAZARD
CLASSIFICATION
PARADISE VALLEY, AZ
STORM WATER MASTER PLAN
DESIGNED BY: PTB
DRAWN BY: PTB
CHECKED BY: GSB
PROJECT NUMBER
091054031
SCALE: 1" = 750'
DATE: FEB 2025
Legend
Paradise Valley
Hazard Classification
Low Deposition Potential
Moderate Deposition Potential
High Deposition Potential
Extreme Deposition Potential
Kimley»Horn
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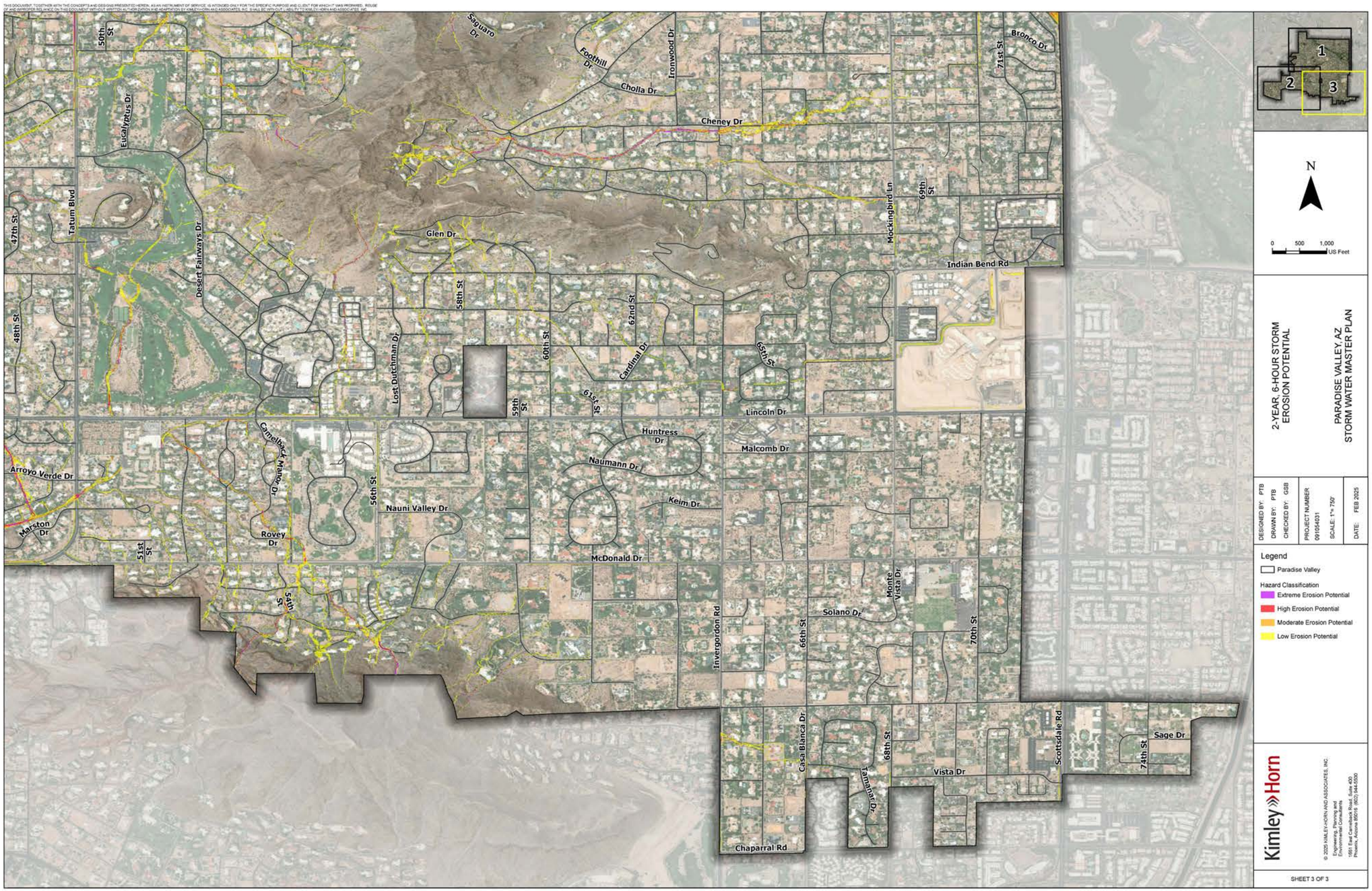

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100-YEAR, 6-HOUR STORM
SEDIMENT DEPOSITION HAZARD
CLASSIFICATION
PARADISE VALLEY, AZ
STORM WATER MASTER PLAN
DESIGNED BY: PTB
DRAWN BY: PTB
CHECKED BY: GSB
PROJECT NUMBER: 091054031
SCALE: 1"= 750'
DATE: FEB 2025
Legend
Paradise Valley
Hazard Classification
Low Deposition Potential
Moderate Deposition Potential
High Deposition Potential
Extreme Deposition Potential
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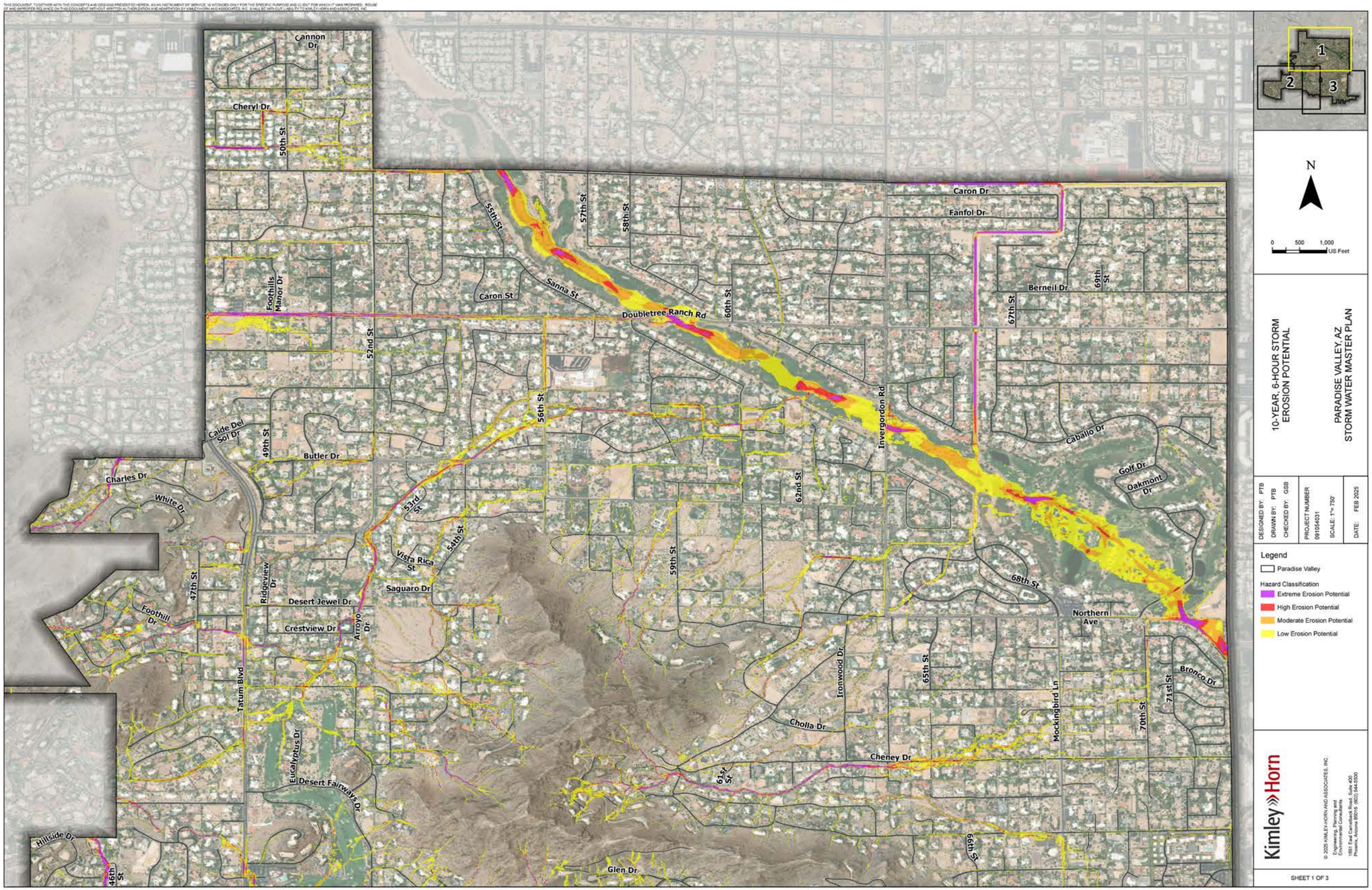

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Highlands Dr
Desert Crest Dr
Pescar Dr
48th St
Sierra Vista Dr
Lincoln Dr
Camelback Manor Dr
Claremont St
33rd St
34th St
Palo Verde Dr
Rancho Dr
Harding Dr
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Paradise Mansion Dr
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Solano Dr
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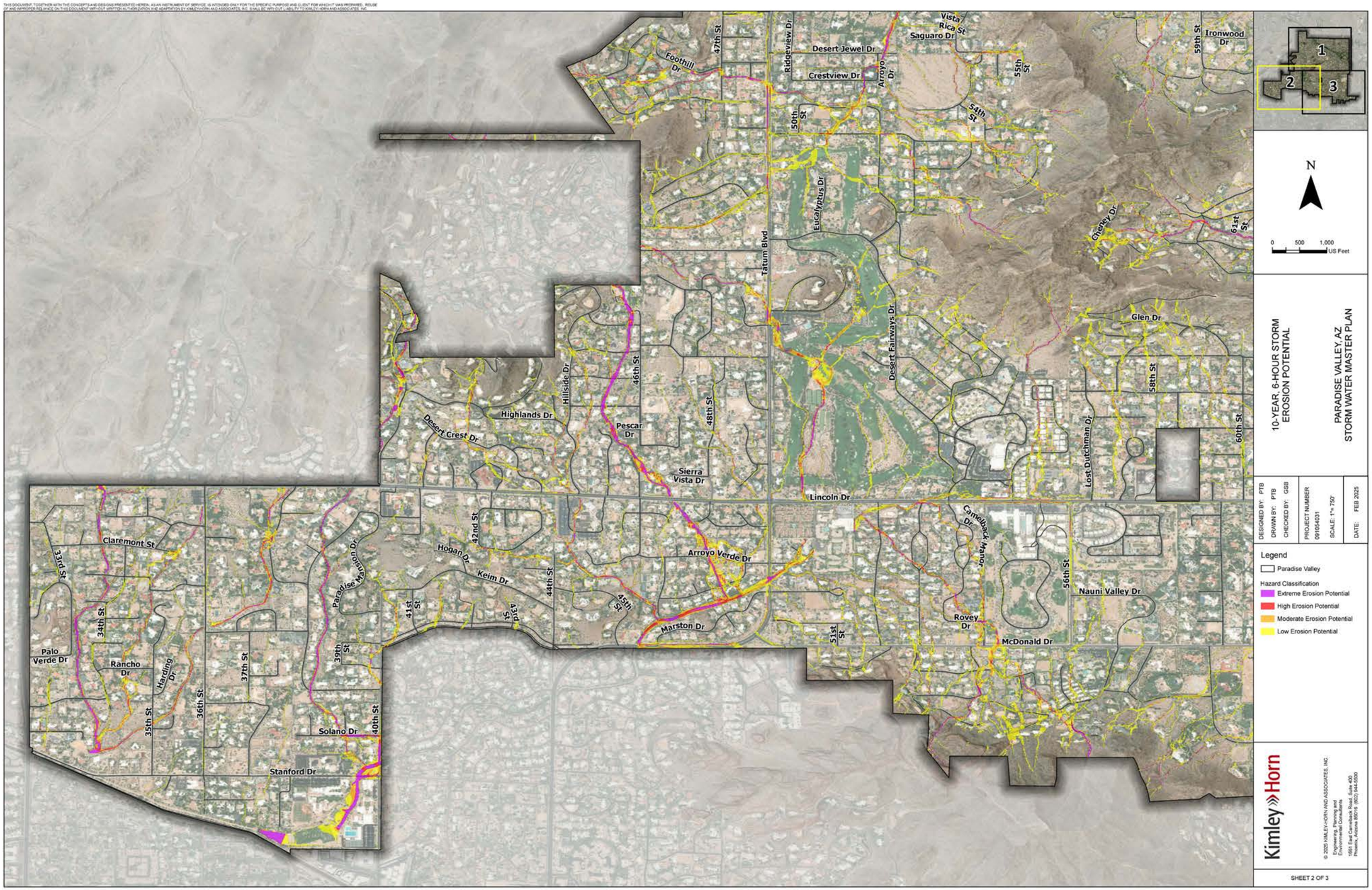

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Casa Blanca Dr
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2-YEAR, 6-HOUR STORM
EROSION POTENTIAL
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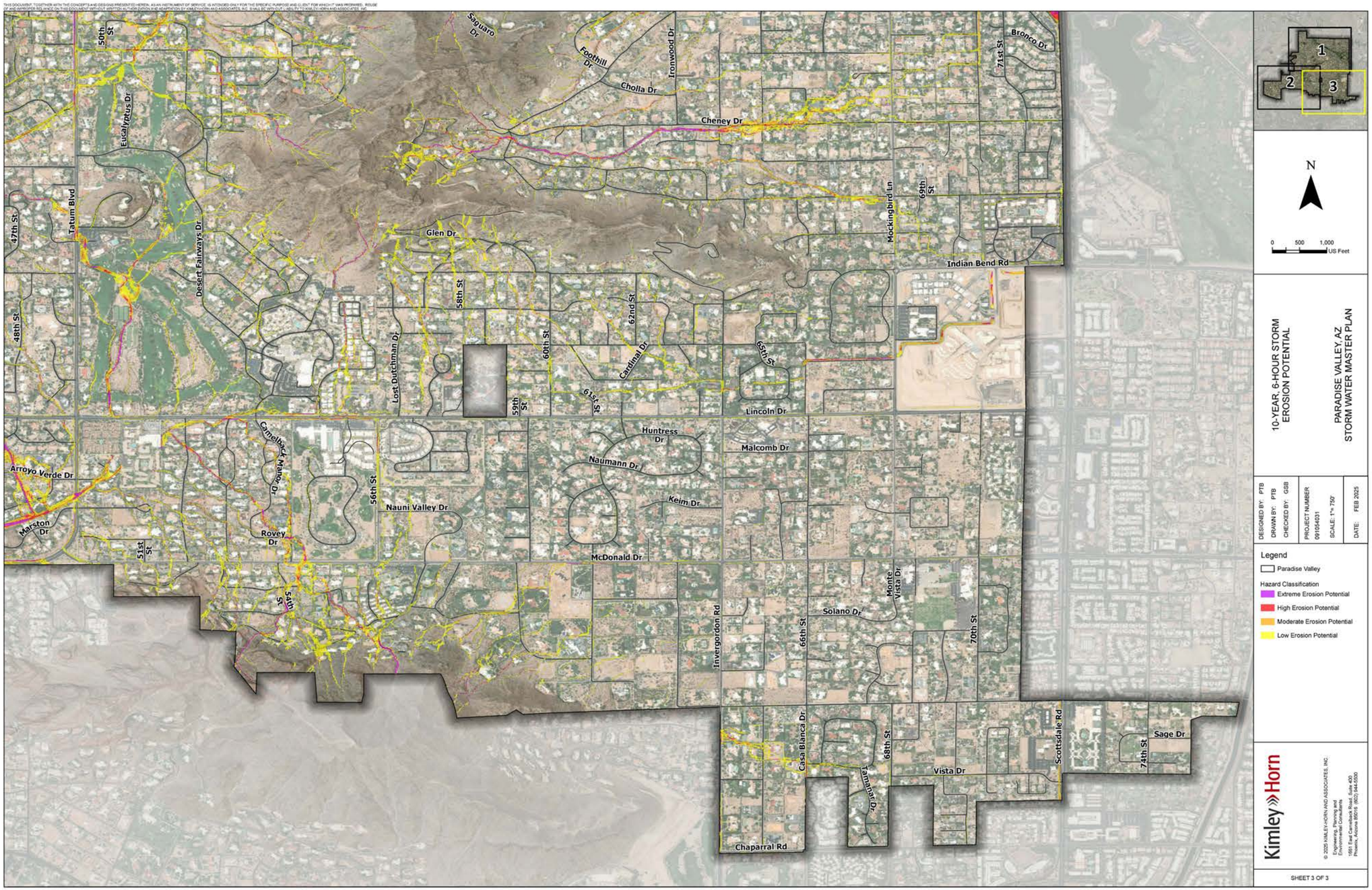

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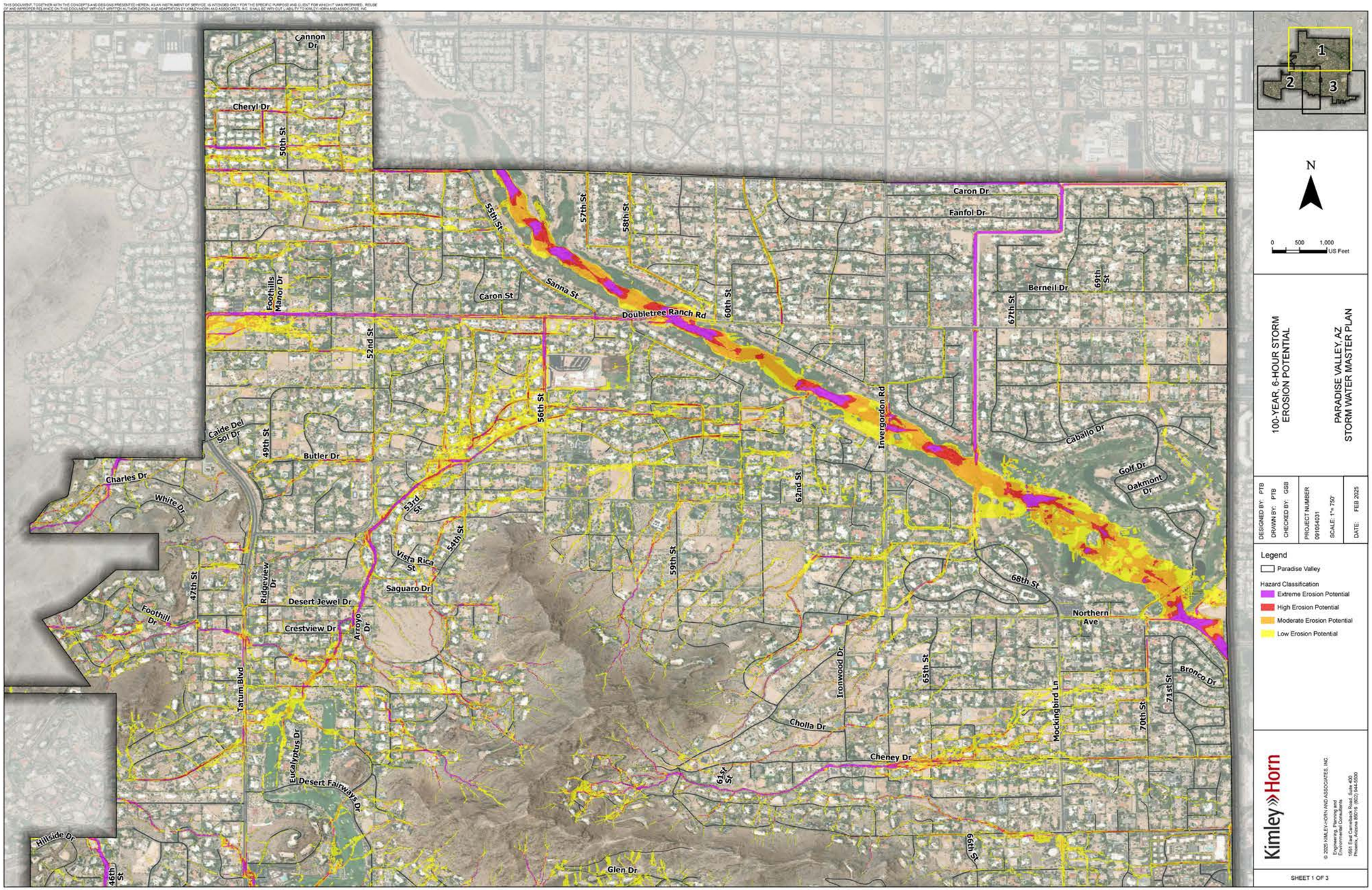

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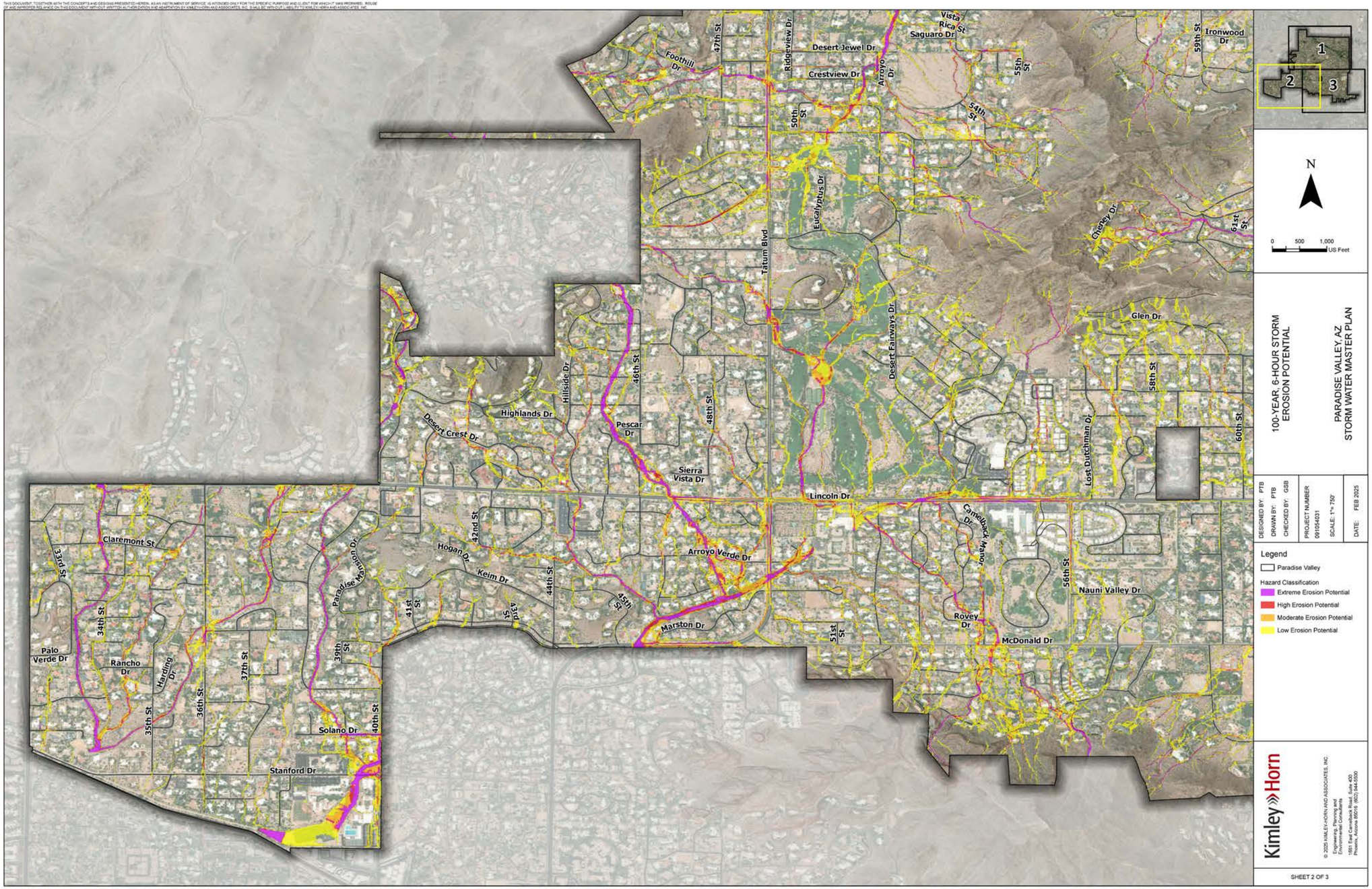
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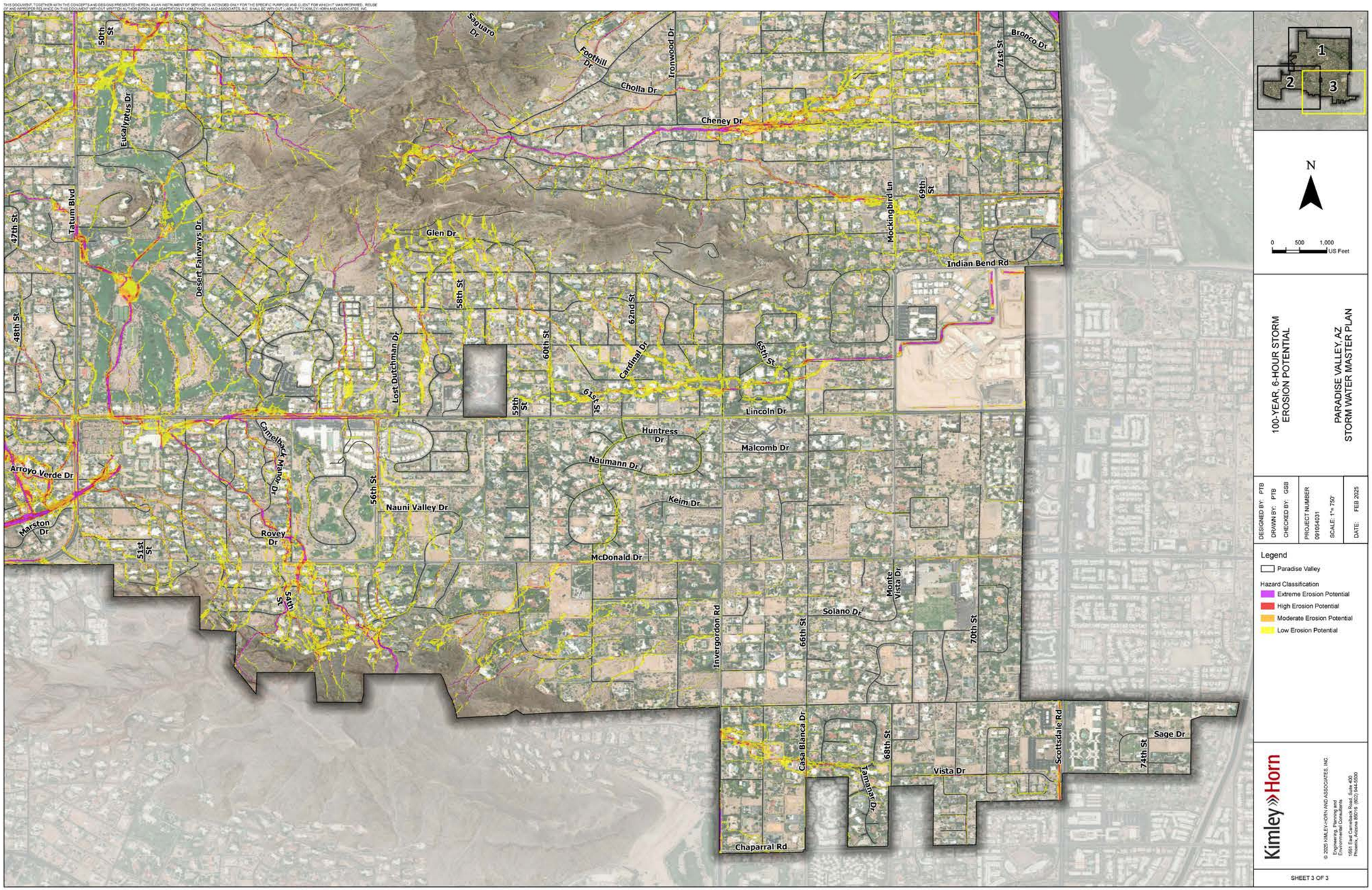
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10-YEAR, 6-HOUR STORM EROSION POTENTIAL
PARADISE VALLEY, AZ STORM WATER MASTER PLAN
DESIGNED BY: PTB
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Legend
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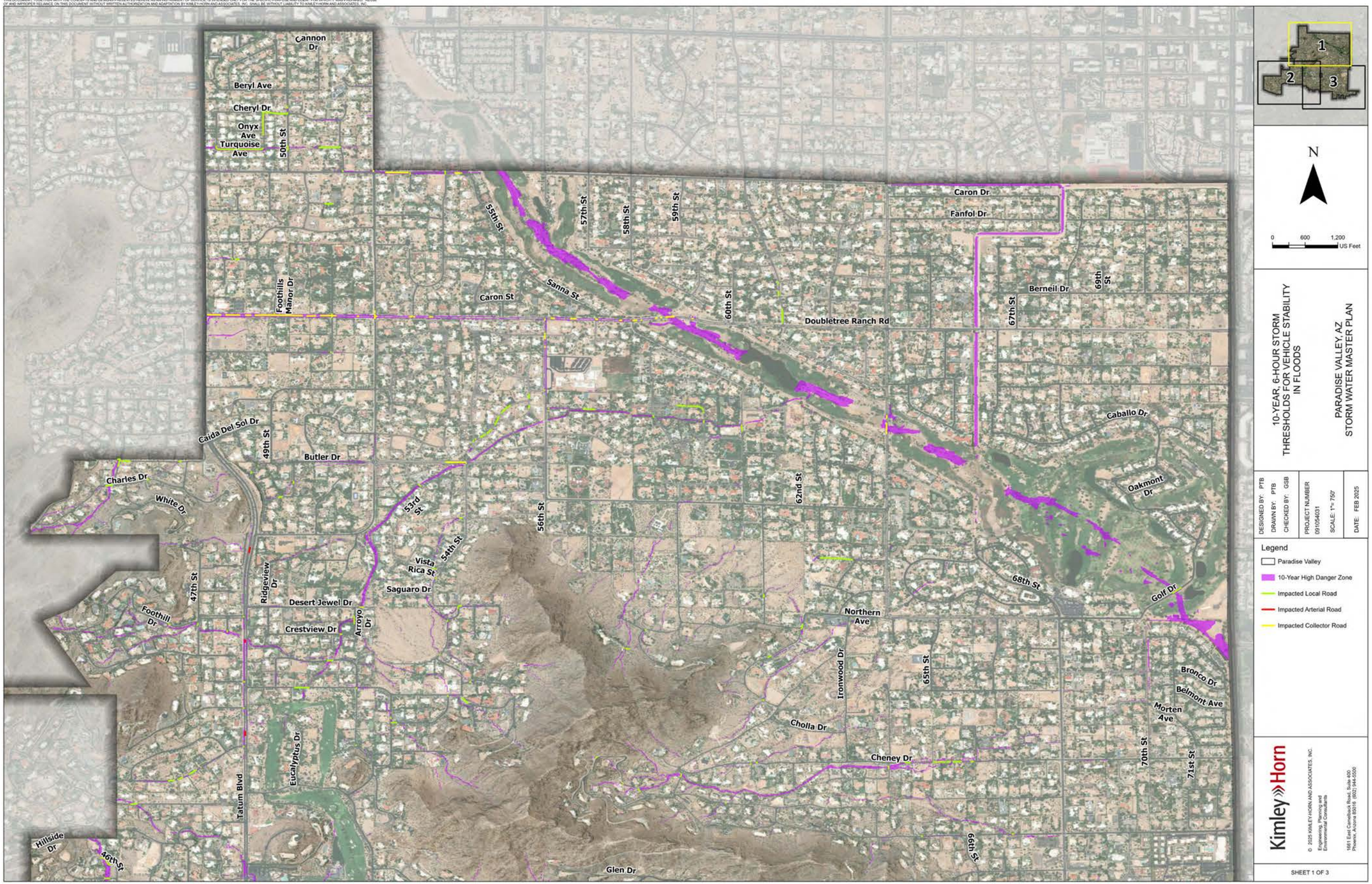



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XV. APPENDIX C – FLOOD HAZARD ANALYSIS

PASSENGER VEHICLE RISK

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10-YEAR, 6-HOUR STORM
THRESHOLDS FOR VEHICLE STABILITY
IN FLOODS

PARADISE VALLEY, AZ
STORM WATER MASTER PLAN

DESIGNED BY: PTB	PROJECT NUMBER 091054031	SCALE: 1"= 750'	DATE: FEB 2025
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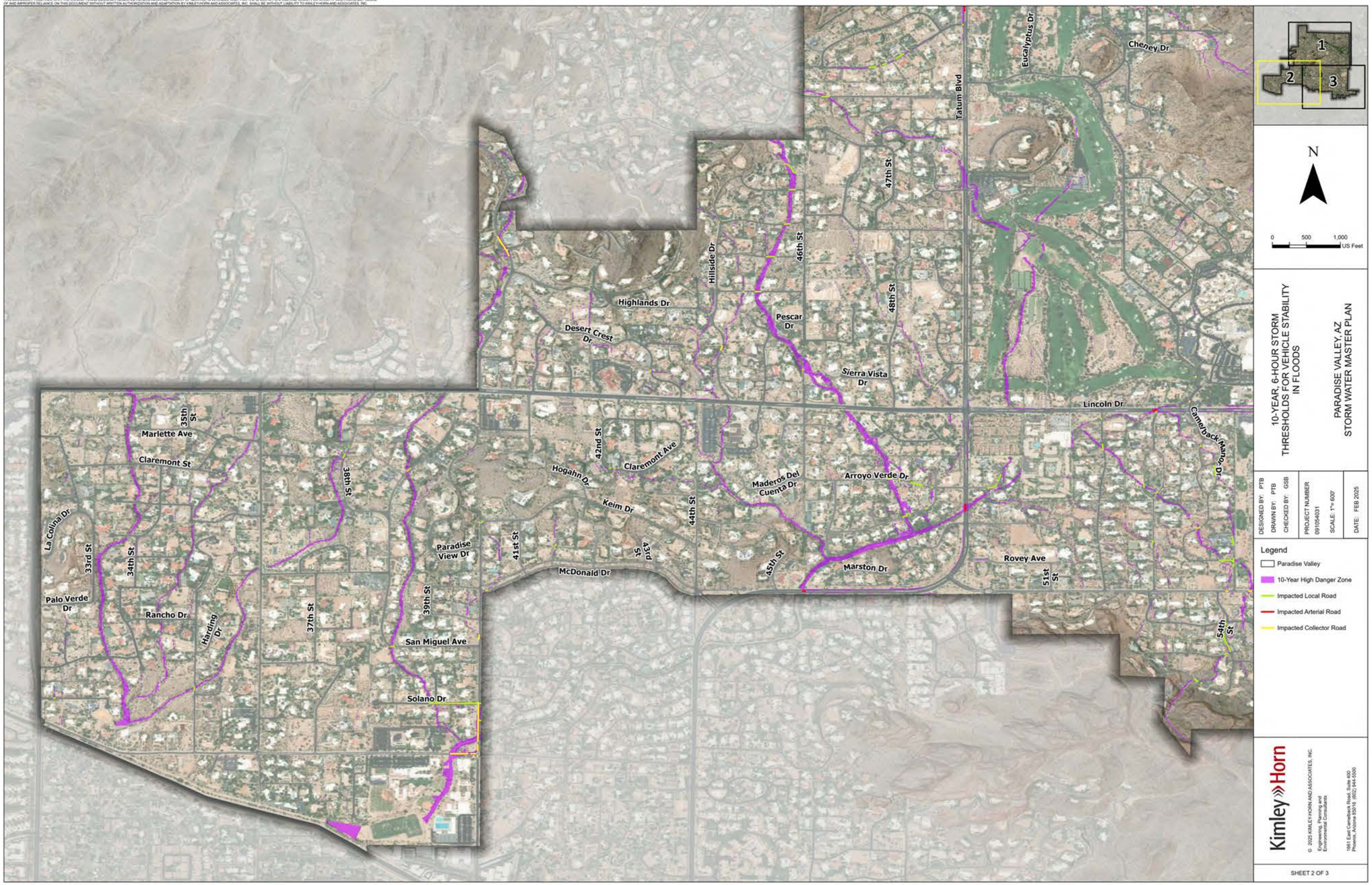
Legend

- Paradise Valley
- 10-Year High Danger Zone
- Impacted Local Road
- Impacted Arterial Road
- Impacted Collector Road

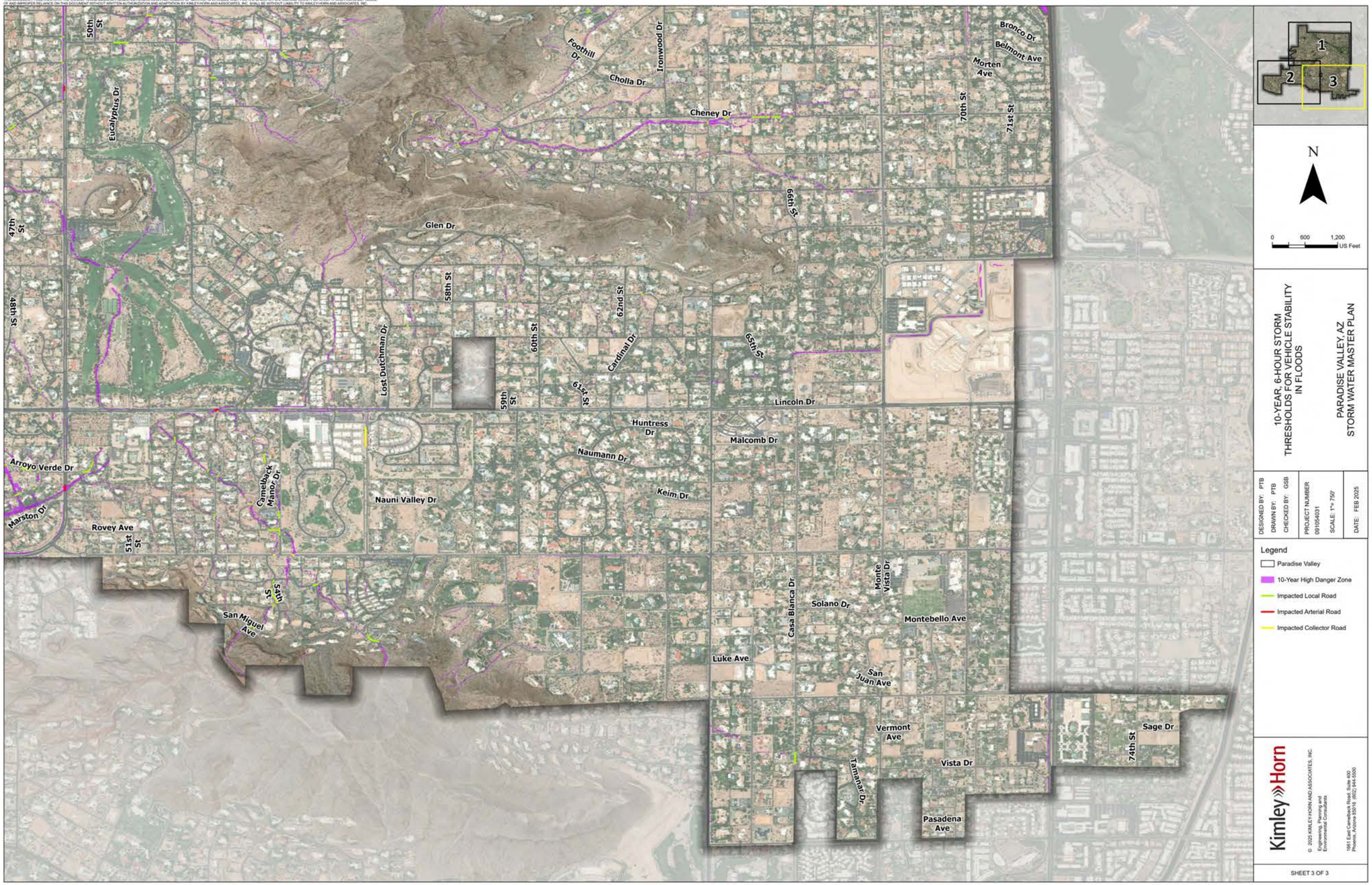
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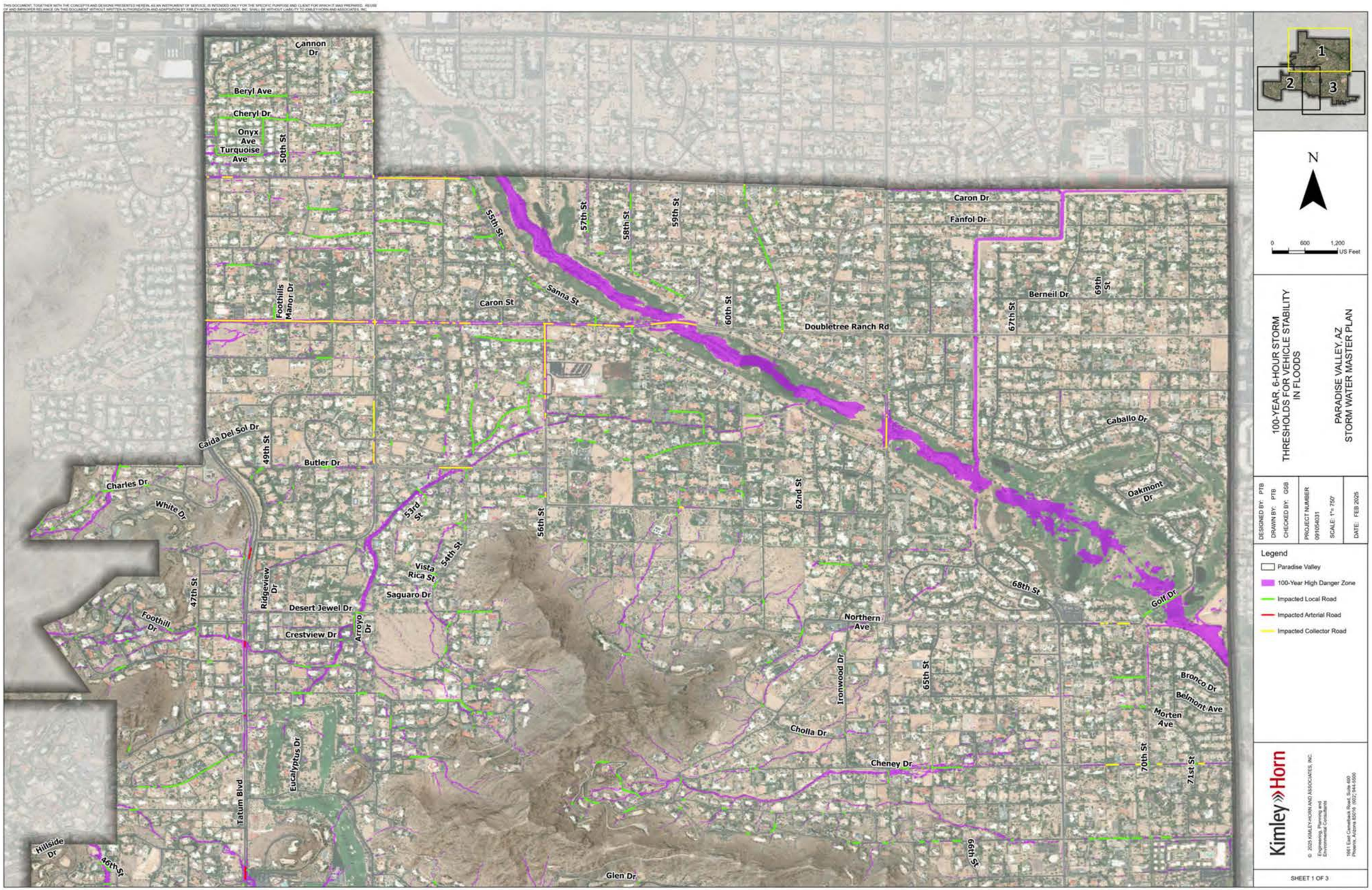
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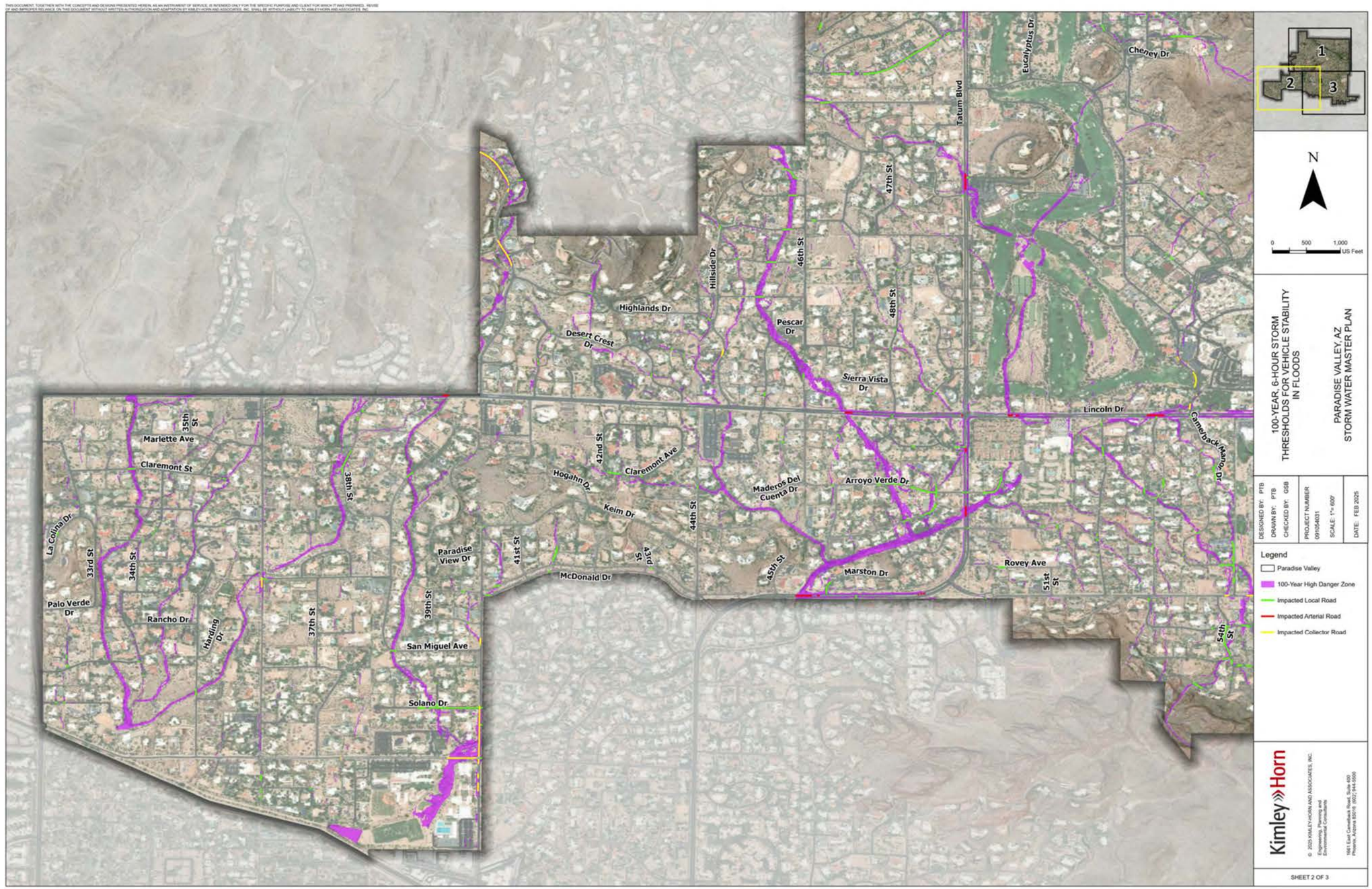
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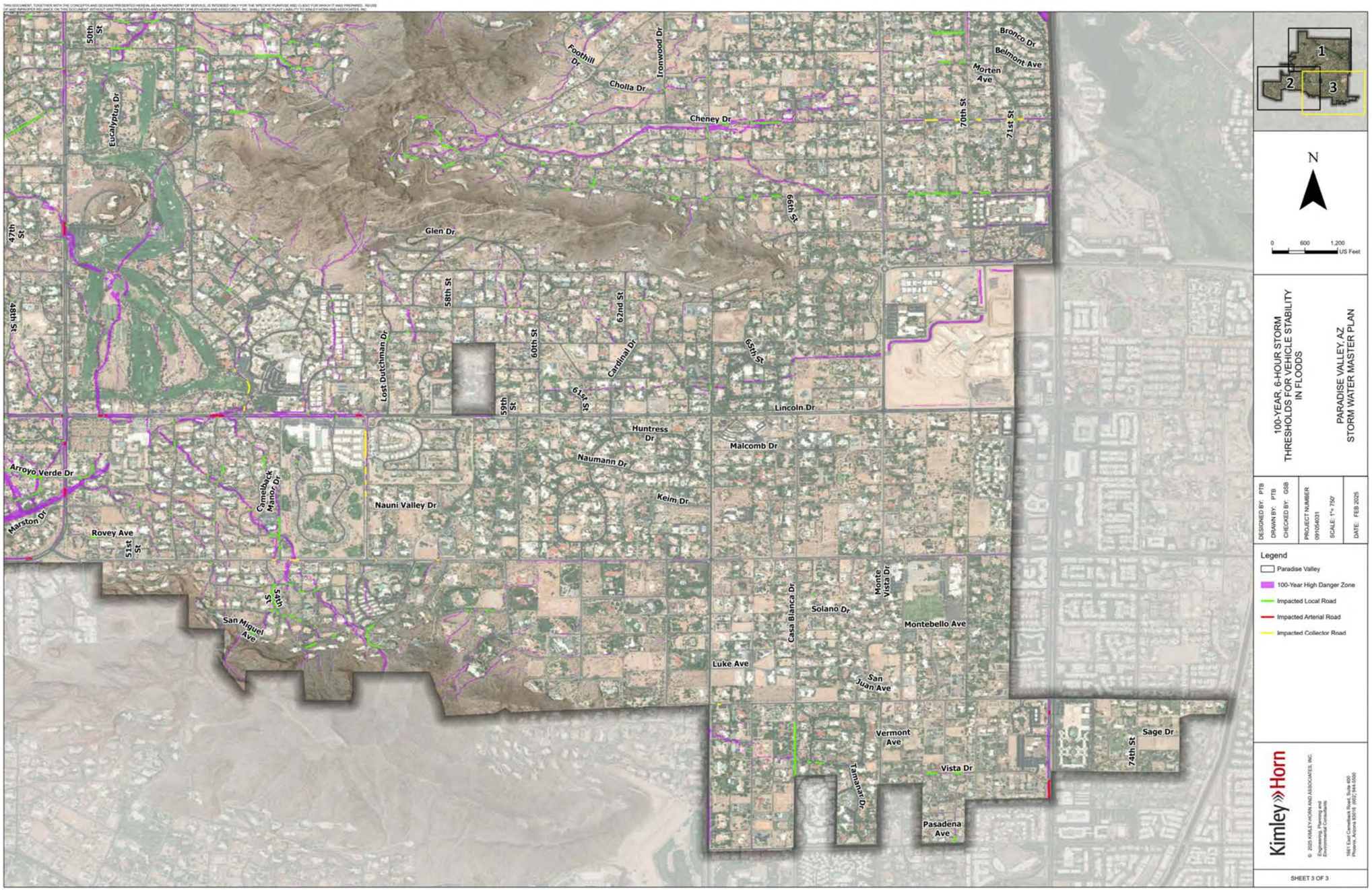


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59th St
Caron Dr
Fanfol Dr
Caron St
Sanna St
60th St
Doubletree Ranch Rd
67th St
Berneil Dr
69th St
Caida Del Sol Dr
49th St
Butler Dr
Charles Dr
White Dr
53rd St
54th St
56th St
62nd St
Caballo Dr
Oakmont Dr
Vista Rica St
Saguaro Dr
Desert Jewel Dr
Crestview Dr
Arroyo Dr
47th St
Ridgeview Dr
Foothill Dr
68th St
Golf Dr
Northern Ave
Ironwood Dr
65th St
Bronco Dr
Belmont Ave
Morten Ave
Cholla Dr
Cheney Dr
70th St
71st St
Tatum Blvd
Eucalyptus Dr
Hillside Dr
46th St
Glen Dr
1
2
3
N
0
600
1,200
US Feet
100-YEAR, 6-HOUR STORM
THRESHOLDS FOR VEHICLE STABILITY
IN FLOODS
PARADISE VALLEY, AZ
STORM WATER MASTER PLAN
DESIGNED BY: PTB
DRAWN BY: PTB
CHECKED BY: GSB
PROJECT NUMBER
091054031
SCALE: 1" = 750'
DATE: FEB 2025
Legend
Paradise Valley
100-Year High Danger Zone
Impacted Local Road
Impacted Arterial Road
Impacted Collector Road
Kimley»Horn
© 2025 KIMLEY-HORN AND ASSOCIATES, INC.
Engineering, Planning and
Environmental Consultants
1661 East Camelback Road, Suite 400
Phoenix, Arizona 85016 (602) 944-5500
SHEET 1 OF 3


Tatum Blvd
Eucalyptus Dr
Cheney Dr
47th St
46th St
48th St
Hillside Dr
Highlands Dr
Desert Crest Dr
Pescar Dr
Sierra Vista Dr
Lincoln Dr
Camelback Rd
Arroyo Verde Dr
Maderos Del Cuenta Dr
Marston Dr
Rovey Ave
51st St
54th St
45th St
44th St
42nd St
Claremont Ave
Hogahn Dr
Keim Dr
41st St
40th St
McDonald Dr
Paradise View Dr
35th St
Marlette Ave
Claremont St
38th St
La Colina Dr
33rd St
34th St
Palo Verde Dr
Rancho Dr
Harding Dr
37th St
39th St
San Miguel Ave
Solano Dr
1
2
3
N
0
500
1,000
US Feet
100-YEAR, 6-HOUR STORM
THRESHOLDS FOR VEHICLE STABILITY
IN FLOODS
PARADISE VALLEY, AZ
STORM WATER MASTER PLAN
DESIGNED BY: PTB
DRAWN BY: PTB
CHECKED BY: GSB
PROJECT NUMBER
091054031
SCALE: 1"= 800'
DATE: FEB 2025
Legend
Paradise Valley
100-Year High Danger Zone
Impacted Local Road
Impacted Arterial Road
Impacted Collector Road
Kimley»Horn
SHEET 2 OF 3


50th St
Eucalyptus Dr
47th St
48th St
Foothill Dr
Cholla Dr
Ironwood Dr
Cheney Dr
Bronco Dr
Belmont Ave
Morten Ave
70th St
71st St
66th St
Glen Dr
58th St
62nd St
60th St
Cardinal Dr
65th St
Lost Dutchman Dr
59th St
61st St
Lincoln Dr
Huntress Dr
Malcomb Dr
Naumann Dr
Keim Dr
Nauni Valley Dr
Arroyo Verde Dr
Camelback Manor Dr
Marston Dr
Rovey Ave
51st St
54th St
San Miguel Ave
Luke Ave
Casa Blanca Dr
Solano Dr
Monte Vista Dr
Montebello Ave
San Juan Ave
Vermont Ave
Tamanar Dr
Vista Dr
Pasadena Ave
74th St
Sage Dr
1
2
3
N
0
600
1,200
US Feet
100-YEAR, 6-HOUR STORM
THRESHOLDS FOR VEHICLE STABILITY
IN FLOODS
PARADISE VALLEY, AZ
STORM WATER MASTER PLAN
DESIGNED BY: PTB
DRAWN BY: PTB
CHECKED BY: GSB
PROJECT NUMBER
069054031
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Paradise Valley
100-Year High Danger Zone
Impacted Local Road
Impacted Arterial Road
Impacted Collector Road
Kimley»Horn
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Engineering, Planning and
Environmental Consultants
1661 East Camelback Road, Suite 400
Phoenix, Arizona 85016 (602) 944-5500
SHEET 3 OF 3

XVI. APPENDIX D – FLOOD HAZARD AREAS

FLOOD HAZARD AREA PRIORITY MATRIX

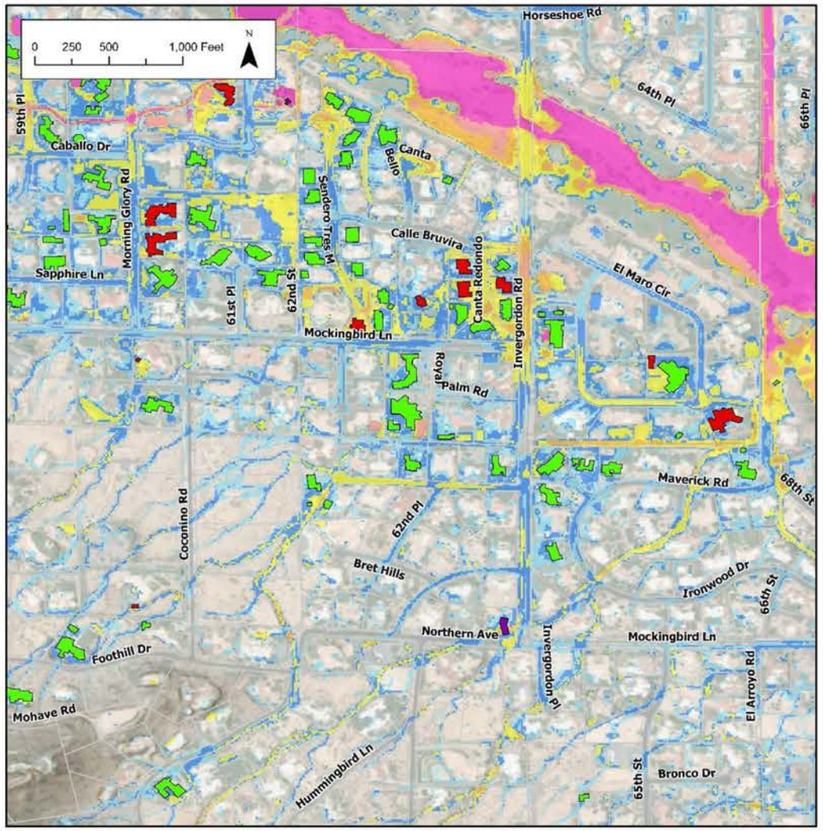
	Severity of Flooding	Potential Stuctures Protected	Potential Streets Protected	Emergency Access	Multi-use Oppurtunities	Total Raw Score	Total Weighted Score
Priority Weighting 1 - 5	5	5	4	3	1		
Area N	3	3	3	2	1	12	49
Area A	3	2	3	2	2	12	45
Area O	3	2	3	2	2	12	45
Area K	3	3	3	0	1	10	43
Area L	3	2	2	2	2	11	41
Area H	3	1	3	2	2	11	40
Area P	3	1	3	2	1	10	39
Area C	2	3	3	0	2	10	39
Area E	2	3	3	0	1	9	38
Area S	3	1	2	2	2	10	36
Area R	3	1	2	2	2	10	36
Area D	2	2	3	0	1	8	33
Area G	3	1	1	2	2	9	32
Area M	2	1	2	0	2	7	25
Area B	2	1	2	0	2	7	25
Area J	2	1	1	0	2	6	21

XVI. APPENDIX D – FLOOD HAZARD AREAS

FLOOD HAZARD AREA DATA SHEETS

PARADISE VALLEY STORM WATER MASTER PLAN

FLOOD HAZARD AREA: A

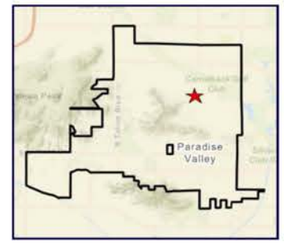


100yr Adjacent Building Depth
- 6 in - 12 in
- 12 in - 24 in
- > 24 in

100yr, 6hr Max Flow Depths (ft)
- 0.0 - 0.25
- 0.26 - 0.5
- 0.51 - 1.0
- 1.01 - 2.0
- 2.01 - 3.0
- 3.01 - 4.0
- 4.01 - 27

LOCATION DESCRIPTION

LOCATION: *Invergordon Road and Mockingbird Lane*



PROBLEM DESCRIPTION:

- *Identified as a problem in the 2017 Cheney Watershed Study and remains a significant flood hazard*
- *Flow breakout with depths over 3 ft at Invergordon Road and Calle Bruvira*

FLOOD HAZARD IMPACT: *Road overtopping, structure/property flooding, potential impact to emergency services*

PROPERTY OWNERSHIP: *Residential and Town Right of Way*

POTENTIAL UTILITY CONFLICTS: *Invergordon Road and Mockingbird Lane storm drains/dry utilities*

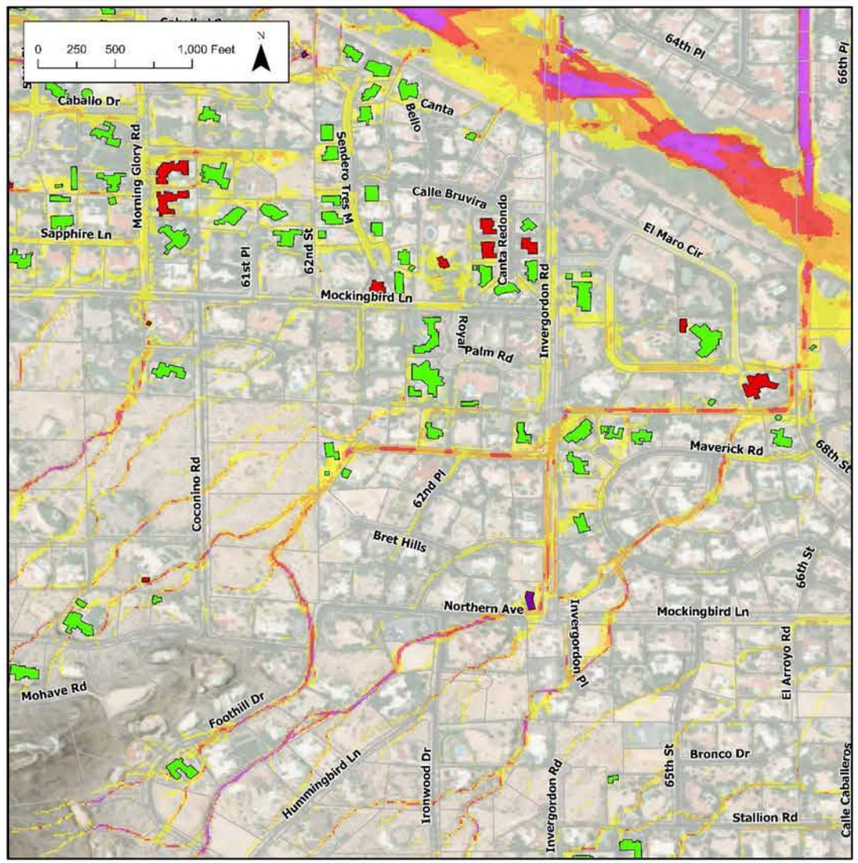
POTENTIAL MITIGATION ALTERNATIVES

- *Storm Drain*
- *Sedimentation Basins*
- *Roadside Ditch*

IDENTIFIED FLOOD RISKS AND HAZARD CHARACTERIZATIONS

Number of Impacted Structures	43
Number of Hydraulic Structures Identified as Undersized	0
Maximum Depth on Road	3.67 ft
Streets Overtopped by > 0.5 ft	6 Local; 2 Collector
Potential Impact to Emergency Service Access	Yes
Flood Hazard Designation	Severe Flooding

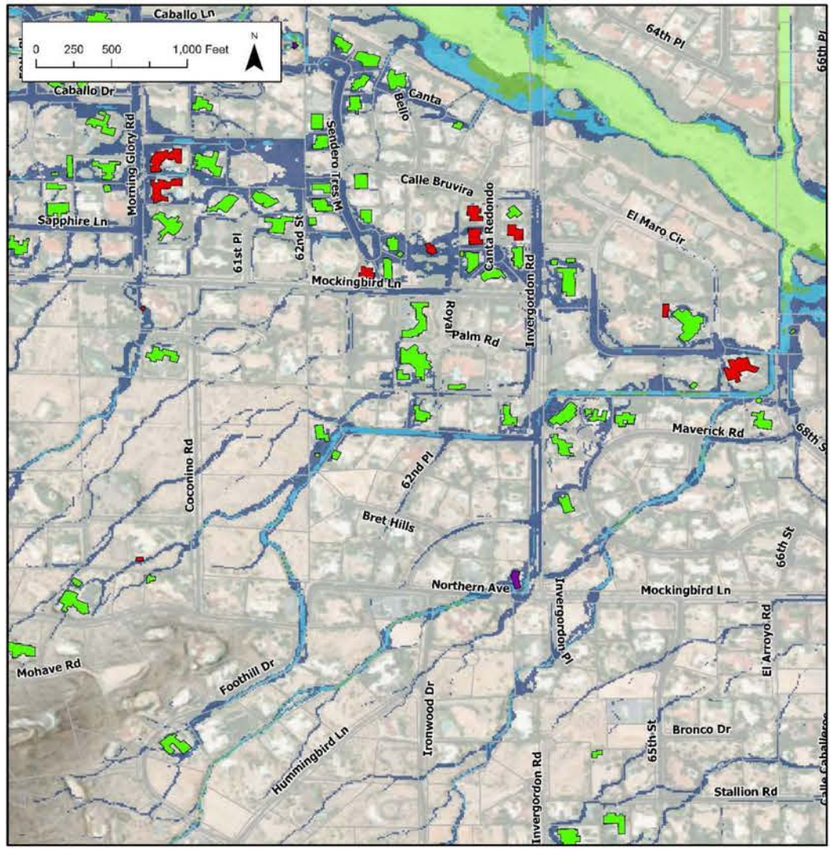
AREA A EROSION POTENTIAL MAP



100yr Adjacent Building Depth
- 6 in - 12 in
- 12 in - 24 in
- > 24 in

Erosion Potential
- Extreme Erosion Potential
- High Erosion Potential
- Moderate Erosion Potential
- Low Erosion Potential

AREA A SEDIMENT DEPOSTION POTENTIAL MAP

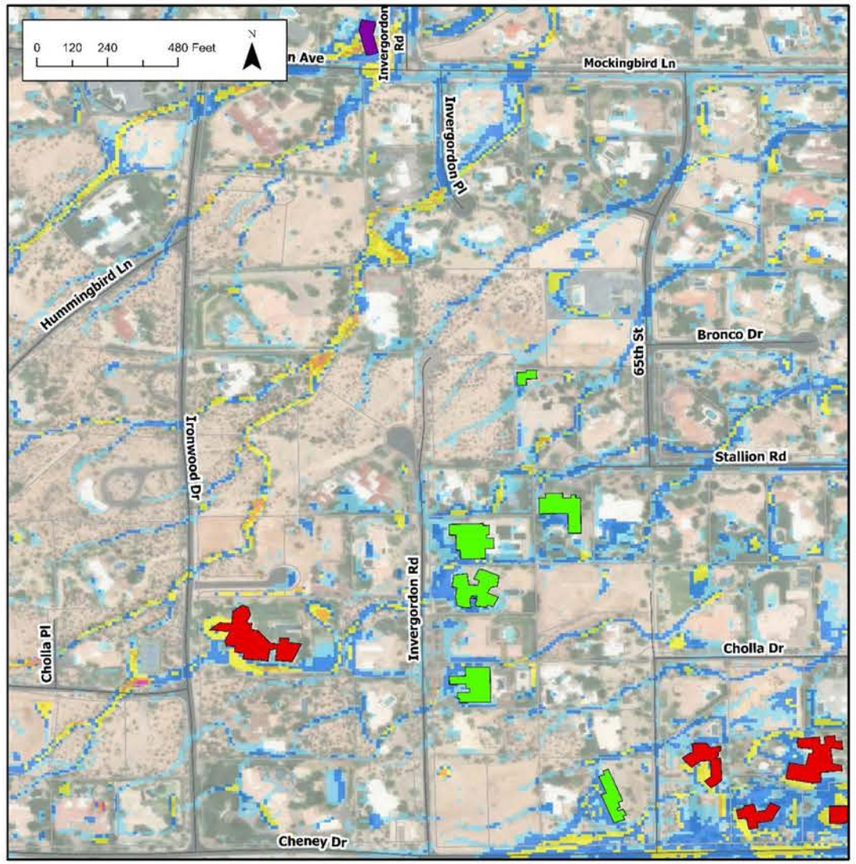


100yr Adjacent Building Depth
- 6 in - 12 in
- 12 in - 24 in
- > 24 in

Sediment Deposition Potential
- Low Deposition Potential
- Moderate Deposition Potential
- High Deposition Potential
- Extreme Deposition Potential

PARADISE VALLEY STORM WATER MASTER PLAN

FLOOD HAZARD AREA: B



100yr Adjacent Building Depth
- 6 in - 12 in
- 12 in - 24 in
- > 24 in

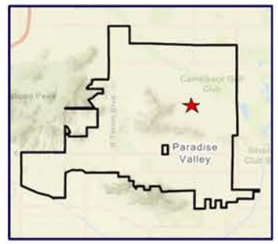
100yr, 6hr Max Flow Depths (ft)
- 0.0 - 0.25
- 0.26 - 0.5
- 0.51 - 1.0
- 1.01 - 2.0
- 2.01 - 3.0
- 3.01 - 4.0
- 4.01 - 27

LOCATION DESCRIPTION

LOCATION: *Ironwood Drive and Cholla Place*

PROBLEM DESCRIPTION:

- *Identified as a problem in the 2017 Cheney Watershed Study and flooding remains a nuisance to residents*
- *Flows from Mummy Mountain overtop multiple streets and deposit sediment*



FLOOD HAZARD IMPACT: *Road overtopping and post-storm clean up, structure/property flooding*

PROPERTY OWNERSHIP: *Residential and Town Right of Way*

POTENTIAL UTILITY CONFLICTS: *Mockingbird Lane storm drains, dry utilities*

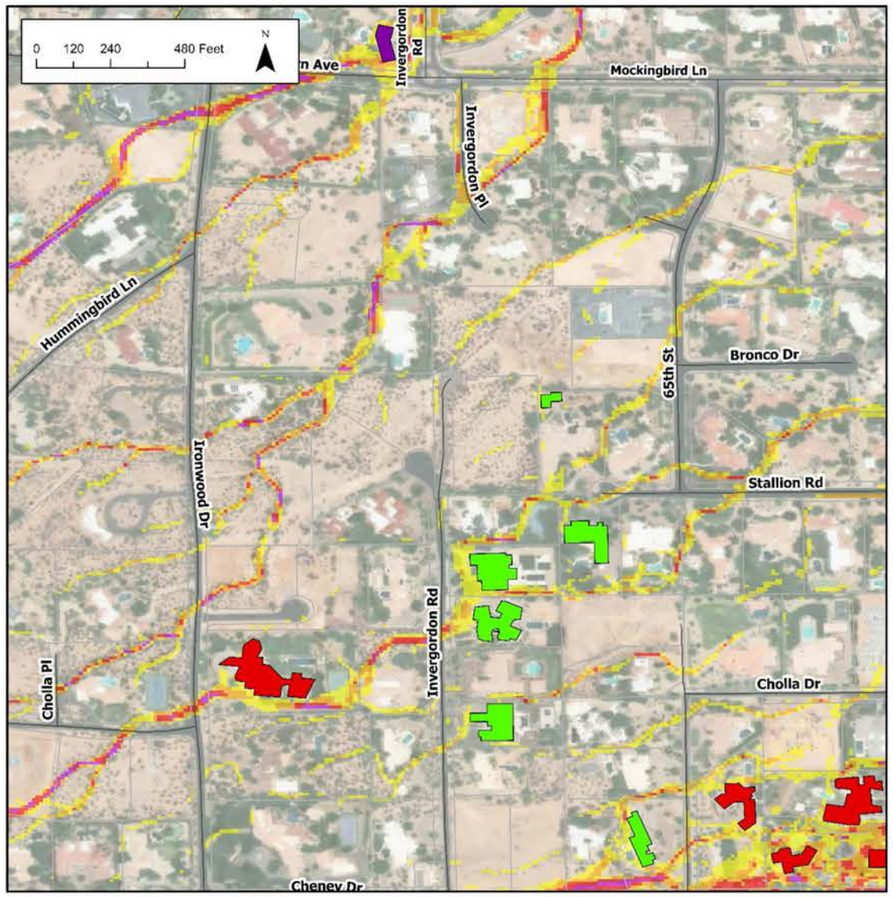
POTENTIAL MITIGATION ALTERNATIVES

- *Storm Drain*
- *Sediment Basins*

IDENTIFIED FLOOD RISKS AND HAZARD CHARACTERIZATIONS

Number of Potentially Impacted Structures	4
Number of Hydraulic Structures Identified as Undersized	0
Maximum Depth on Roads	0.71 ft
Streets Overtopped by > 0.5 ft	2 Local; 1 Collector
Potential to Impact Emergency Service Access	No
Flood Hazard Designation	Moderate Flooding

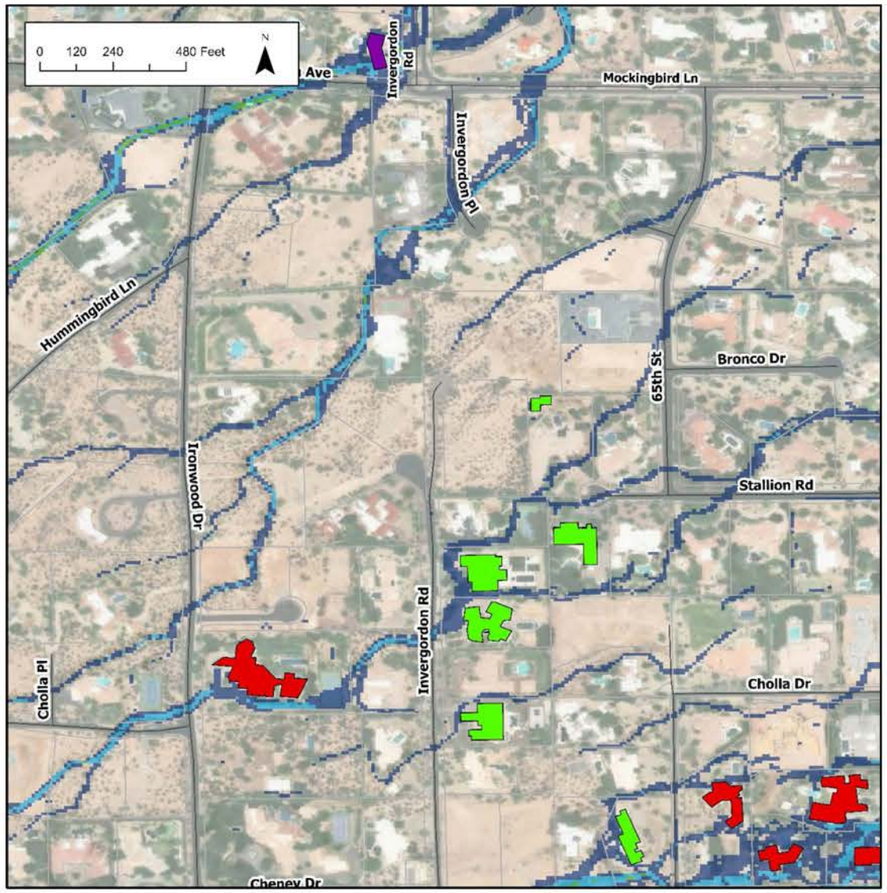
AREA B EROSION POTENTIAL MAP



100yr Adjacent Building Depth
- 6 in - 12 in
- 12 in - 24 in
- > 24 in

Erosion Potential
- Extreme Erosion Potential
- High Erosion Potential
- Moderate Erosion Potential
- Low Erosion Potential

AREA B SEDIMENT DEPOSTION POTENTIAL MAP

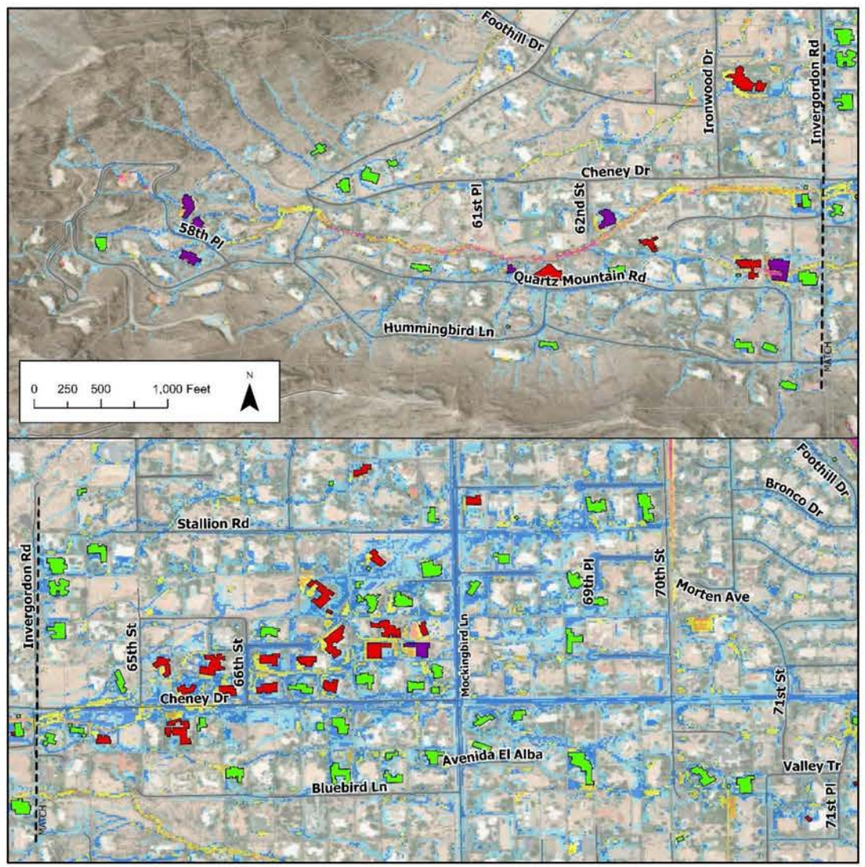


100yr Adjacent Building Depth
- 6 in - 12 in
- 12 in - 24 in
- > 24 in

Sediment Deposition Potential
- Low Deposition Potential
- Moderate Deposition Potential
- High Deposition Potential
- Extreme Deposition Potential

PARADISE VALLEY STORM WATER MASTER PLAN

FLOOD HAZARD AREA: C

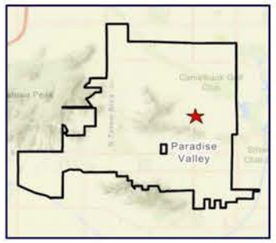


100yr Adjacent Building Depth
- 6 in - 12 in
- 12 in - 24 in
- > 24 in

100yr, 6hr Max Flow Depths (ft)
- 0.0 - 0.25
- 0.26 - 0.5
- 0.51 - 1.0
- 1.01 - 2.0
- 2.01 - 3.0
- 3.01 - 4.0
- 4.01 - 27

LOCATION DESCRIPTION

LOCATION: *Along Cheney Dr from 58th Place to 71st Place*



PROBLEM DESCRIPTION:

- *Identified as a problem in the 2017 Cheney Watershed Study and in the 2017 LIBW ADMP, it and remains a significant flood hazard*
- *Flows from Cheney Wash break out at Invergordon Road and fan out into the surrounding neighborhood*

FLOOD HAZARD IMPACT: *Road overtopping, structure/property flooding*

PROPERTY OWNERSHIP: *Residential and Town Right of Way*

POTENTIAL UTILITY CONFLICTS: *Cheney Drive and Mockingbird Lane dry utilities*

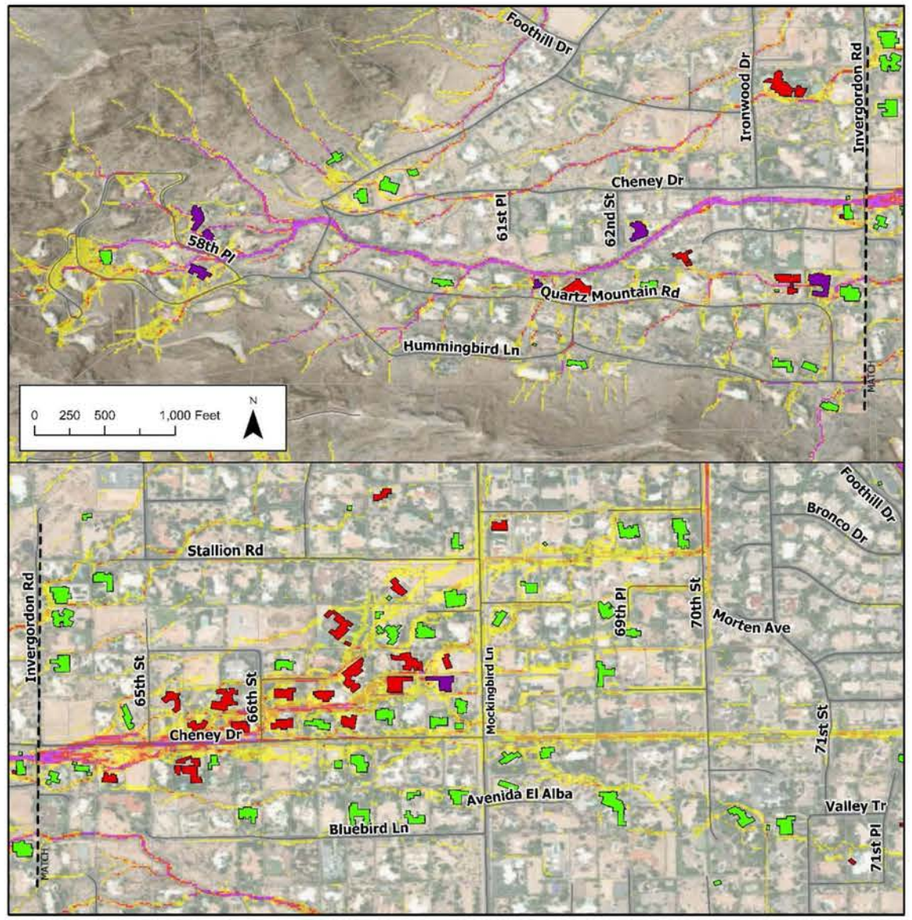
POTENTIAL MITIGATION ALTERNATIVES

- *Storm Drain*
- *Channel Embankments*
- *Sediment Basins*

IDENTIFIED FLOOD RISKS AND HAZARD CHARACTERIZATIONS

Number of Potentially Impacted Structures	70
Number of Hydraulic Structures Identified as Undersized	0
Maximum Depth on Roads	1.37 ft
Streets Overtopped by > 0.5 ft	2 Local; 1 Collector
Potential to Impact Emergency Service Access	No
Flood Hazard Designation	Moderate Flooding

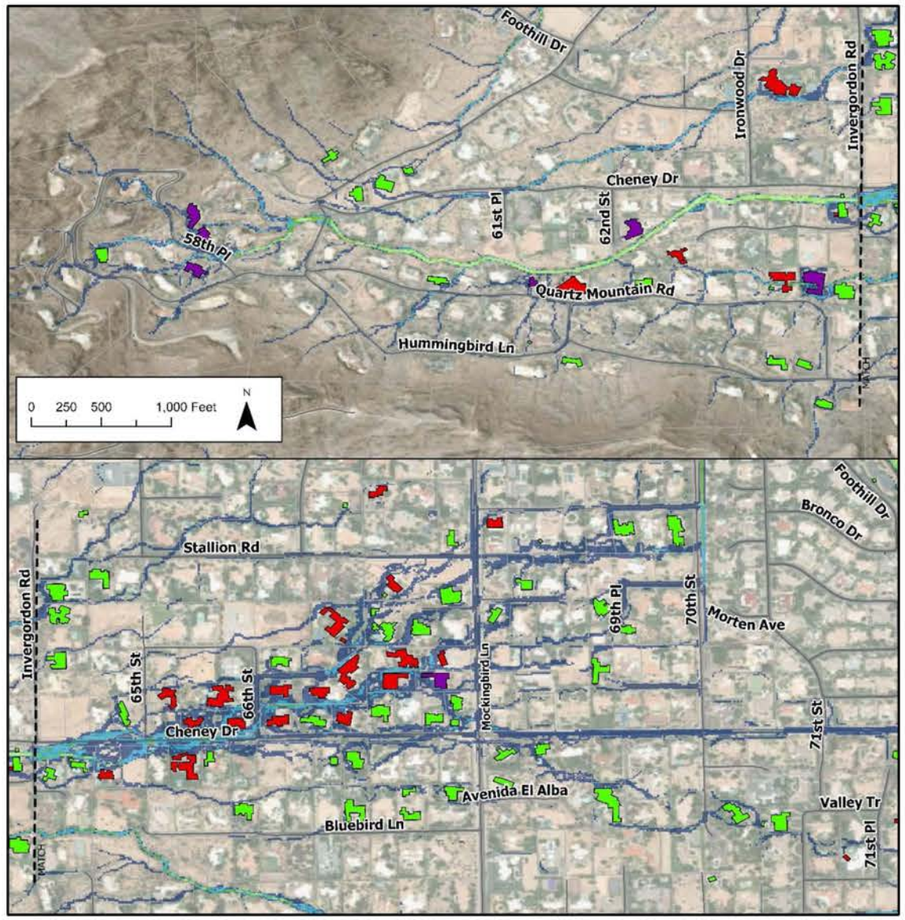
AREA C EROSION POTENTIAL MAP



100yr Adjacent Building Depth
- 6 in - 12 in
- 12 in - 24 in
- > 24 in

Erosion Potential
- Extreme Erosion Potential
- High Erosion Potential
- Moderate Erosion Potential
- Low Erosion Potential

AREA C SEDIMENT DEPOSTION POTENTIAL MAP

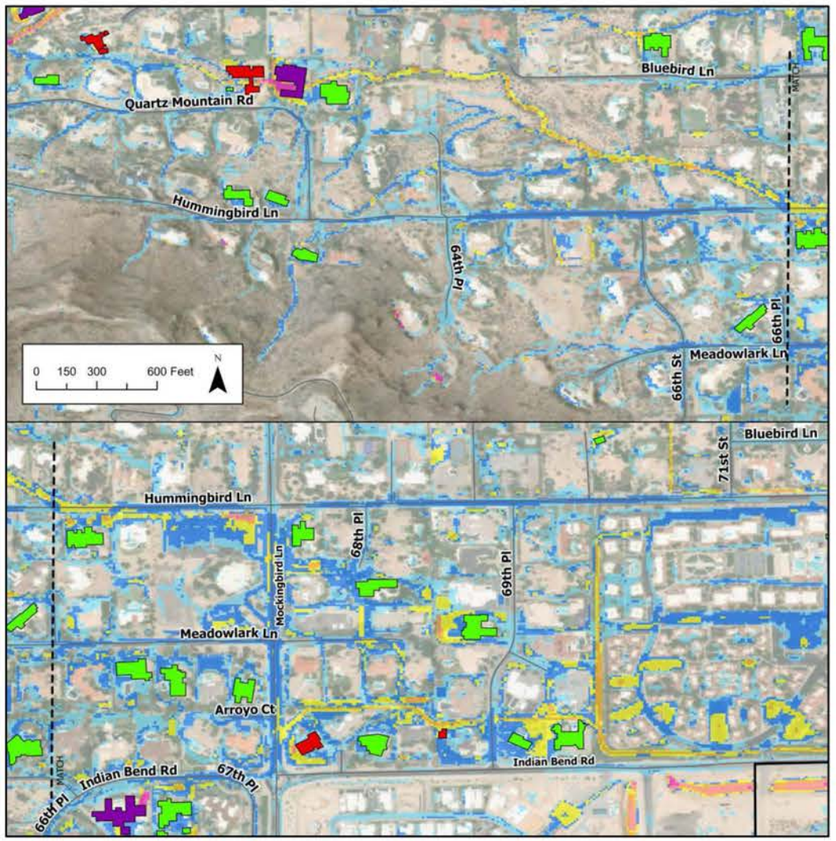


100yr Adjacent Building Depth
- 6 in - 12 in
- 12 in - 24 in
- > 24 in

Sediment Deposition Potential
- Low Deposition Potential
- Moderate Deposition Potential
- High Deposition Potential
- Extreme Deposition Potential

PARADISE VALLEY STORM WATER MASTER PLAN

FLOOD HAZARD AREA: D

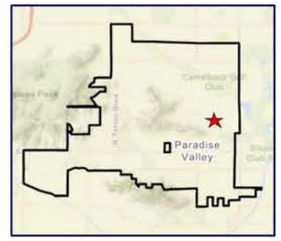


100yr Adjacent Building Depth
- 6 in - 12 in
- 12 in - 24 in
- > 24 in

100yr, 6hr Max Flow Depths (ft)
- 0.0 - 0.25
- 0.26 - 0.5
- 0.51 - 1.0
- 1.01 - 2.0
- 2.01 - 3.0
- 3.01 - 4.0
- 4.01 - 27

LOCATION DESCRIPTION

LOCATION: *Hummingbird Ln and Mockingbird Lane*



PROBLEM DESCRIPTION:

- *Identified as a problem in the 2017 LIBW ADMP and the 2017 Cheney Watershed Study, remains a flood hazard*
- *Flows from Mummy Mountain breakout with depths of 1 ft at Hummingbird Ln and fans out into the surrounding neighborhood*

FLOOD HAZARD IMPACT: *Road overtopping, structure/property flooding*

PROPERTY OWNERSHIP: *Residential and Town Right of Way*

POTENTIAL UTILITY CONFLICTS: *Mockingbird storm drains, dry utilities*

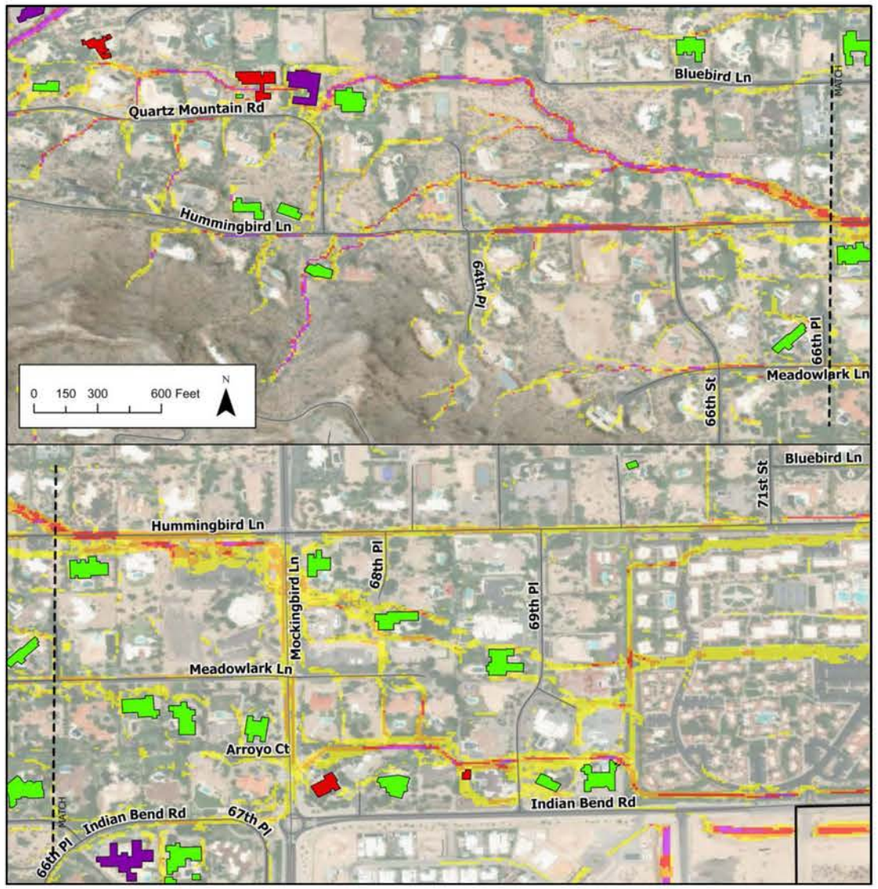
POTENTIAL MITIGATION ALTERNATIVES

- *Storm Drain*
- *Sedimentation Basin*

IDENTIFIED FLOOD RISKS AND HAZARD CHARACTERIZATIONS

Number of Impacted Structures	*20*
Number of Hydraulic Structures Identified as Undersized	0
Maximum Depth on Roads	1.16 ft
Streets Overtopped by > 0.5 ft	1 Local; 2 Collector
Potential to Impact Emergency Service Access	No
Flood Hazard Designation	Moderate Flooding

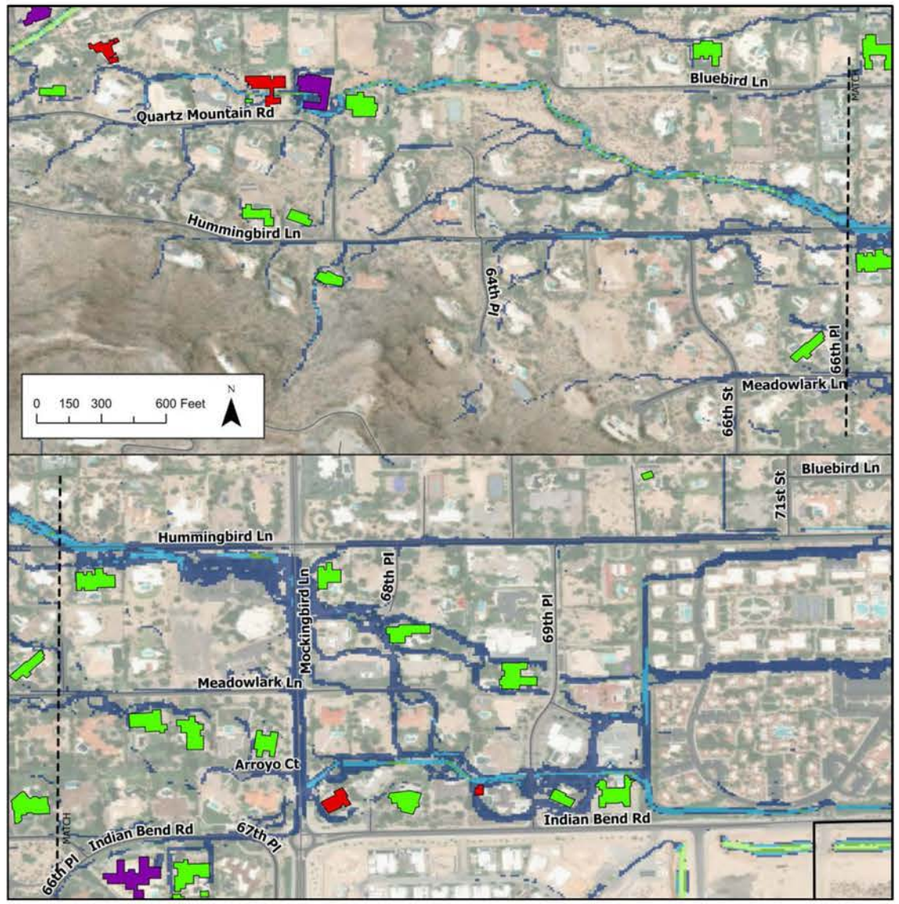
AREA D EROSION POTENTIAL MAP



100yr Adjacent Building Depth
- 6 in - 12 in
- 12 in - 24 in
- > 24 in

Erosion Potential
- Extreme Erosion Potential
- High Erosion Potential
- Moderate Erosion Potential
- Low Erosion Potential

AREA D SEDIMENT DEPOSTION POTENTIAL MAP

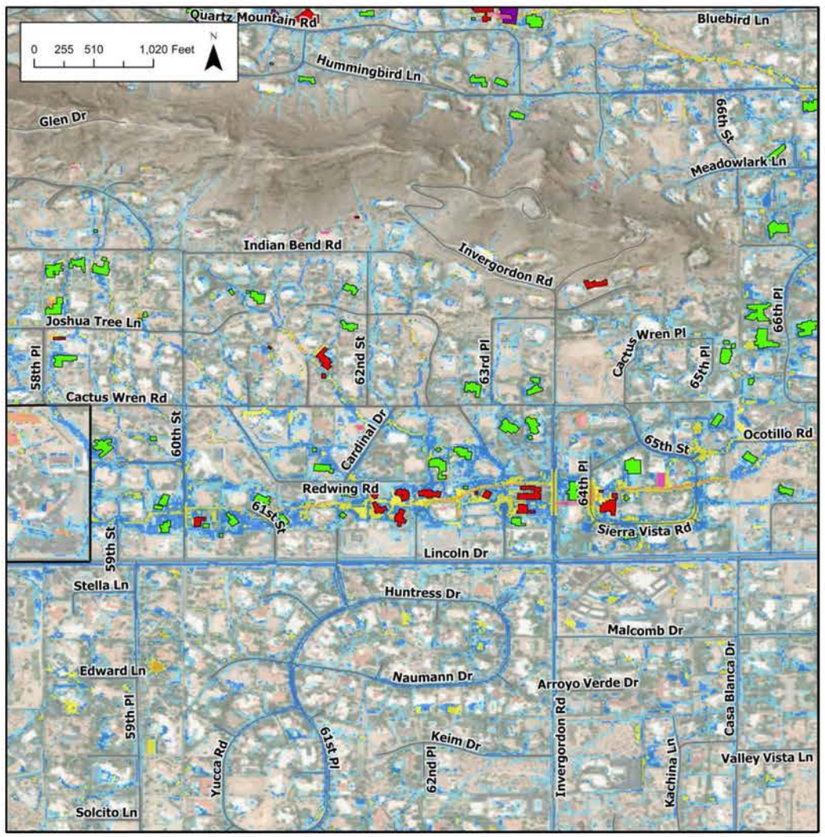


100yr Adjacent Building Depth
- 6 in - 12 in
- 12 in - 24 in
- > 24 in

Sediment Deposition Potential
- Low Deposition Potential
- Moderate Deposition Potential
- High Deposition Potential
- Extreme Deposition Potential

PARADISE VALLEY STORM WATER MASTER PLAN

FLOOD HAZARD AREA: E

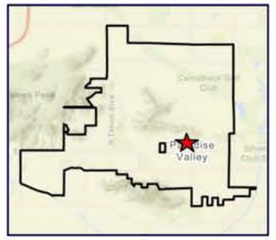


100yr Adjacent Building Depth
- 6 in - 12 in
- 12 in - 24 in
- > 24 in

100yr, 6hr Max Flow Depths (ft)
- 0.0 - 0.25
- 0.26 - 0.5
- 0.51 - 1.0
- 1.01 - 2.0
- 2.01 - 3.0
- 3.01 - 4.0
- 4.01 - 27

LOCATION DESCRIPTION

LOCATION: *Lincoln Drive from 58th Place to 66th Place*



PROBLEM DESCRIPTION:

- *Identified as a problem in the 2017 LIBW ADMP and remains a flood hazard*
- *Flows from Mummy Mountain collect and travel east through the neighborhood just north of Lincoln Dr. and overtops Invergordon Rd and 60th St by over 1 ft*

FLOOD HAZARD IMPACT: *Road overtopping, structure/property flooding*

PROPERTY OWNERSHIP: *Residential and Town Right of Way*

POTENTIAL UTILITY CONFLICTS: *Invergordon Rd storm drain/dry utilities, 60th St dry utilities*

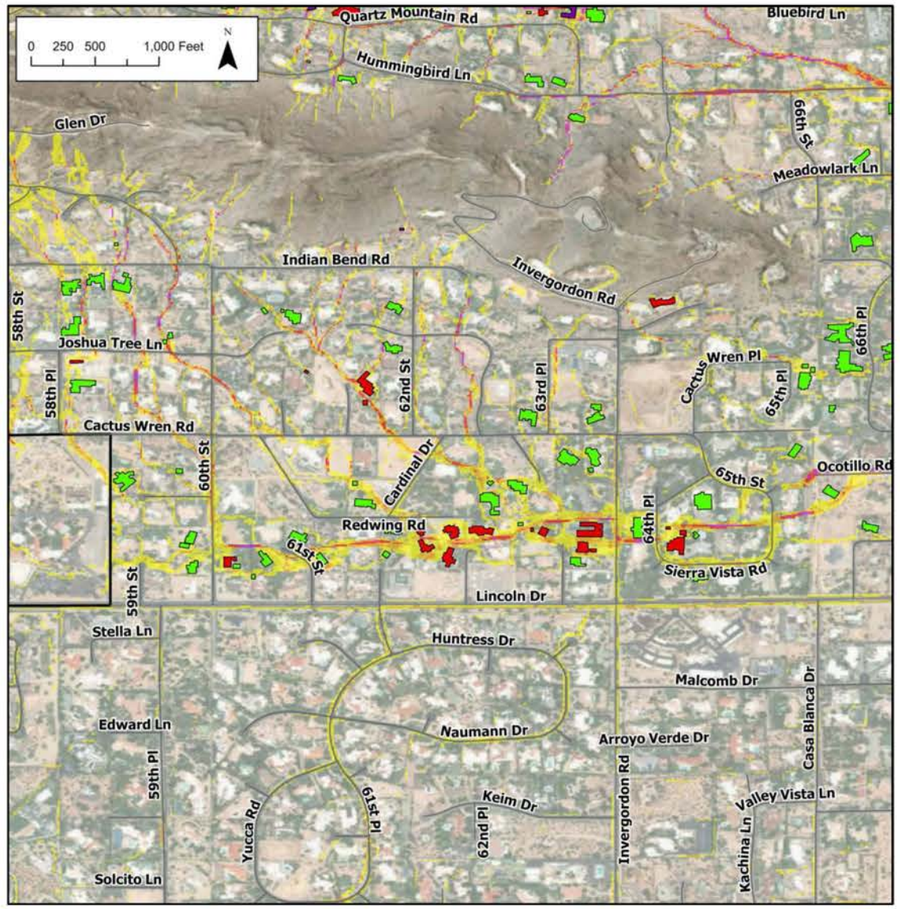
POTENTIAL MITIGATION ALTERNATIVES

- *Storm Drain*
- *Permeable Pavement*

IDENTIFIED FLOOD RISKS AND HAZARD CHARACTERIZATIONS

Number of Impacted Structures	*52*
Number of Hydraulic Structures Identified as Undersized	0
Maximum Depth on Roads	1.19 ft
Streets Overtopped by > 0.5 ft	5 Local; 2 Collector
Potential to Impact Emergency Service Access	No
Flood Hazard Designation	Moderate Flooding

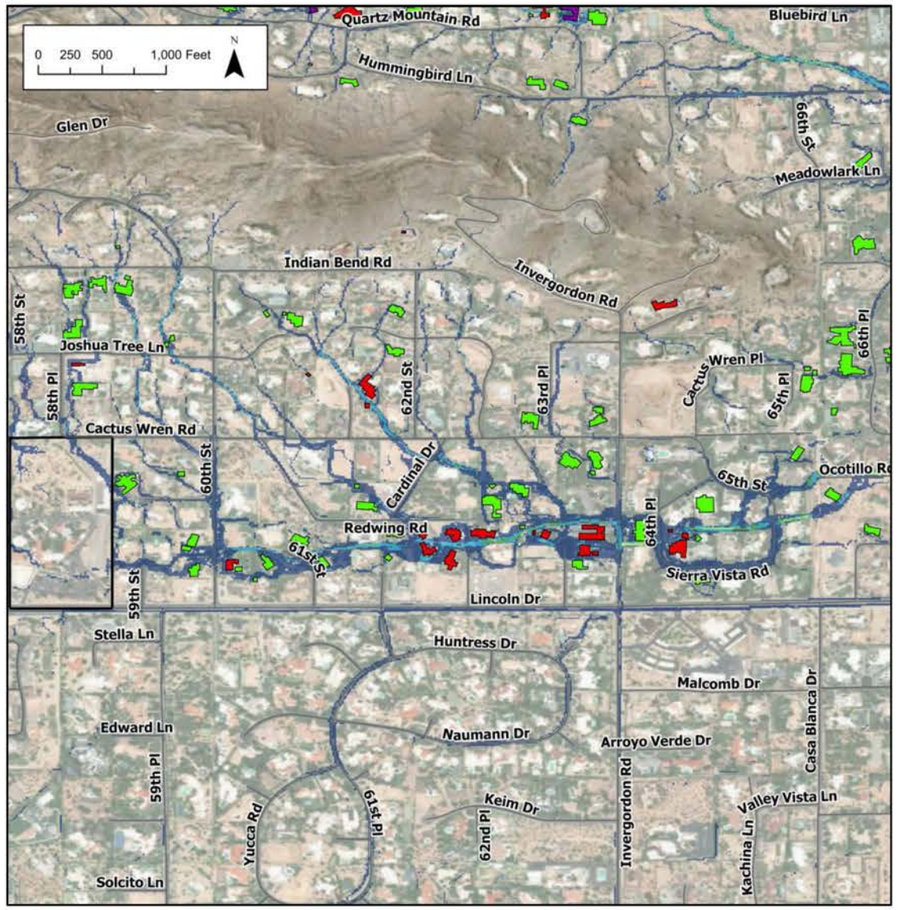
AREA E EROSION POTENTIAL MAP



100yr Adjacent Building Depth
- 6 in - 12 in
- 12 in - 24 in
- > 24 in

Erosion Potential
- Extreme Erosion Potential
- High Erosion Potential
- Moderate Erosion Potential
- Low Erosion Potential

AREA E SEDIMENT DEPOSTION POTENTIAL MAP

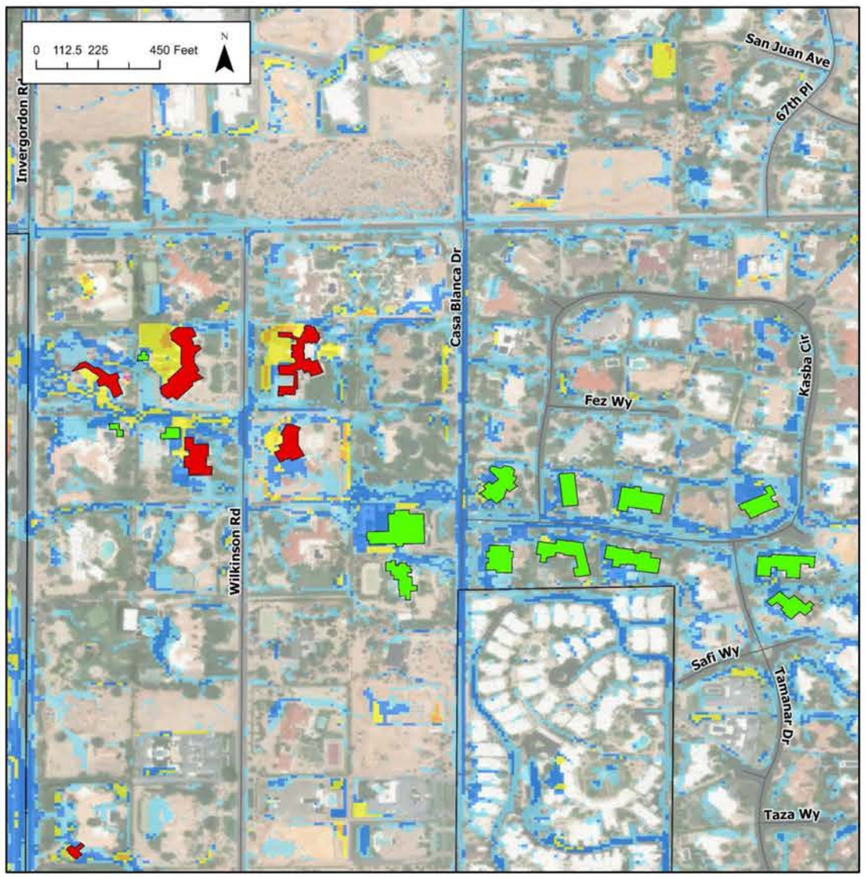


100yr Adjacent Building Depth
- 6 in - 12 in
- 12 in - 24 in
- > 24 in

Sediment Deposition Potential
- Low Deposition Potential
- Moderate Deposition Potential
- High Deposition Potential
- Extreme Deposition Potential

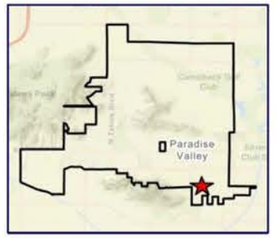
PARADISE VALLEY STORM WATER MASTER PLAN

FLOOD HAZARD AREA: F



LOCATION DESCRIPTION

LOCATION: *Jackrabbit Road from Invergordon Road to 67th Place*



PROBLEM DESCRIPTION:

- *Identified as a problem in the 2017 LIBW ADMP and remains a flooding nuisance*
- *Flows from Camelback Mountain collect and travel east through the neighborhood just South of Jackrabbit Rd.*

FLOOD HAZARD IMPACT: *Road overtopping, structure/property flooding*

PROPERTY OWNERSHIP: *Residential and Town Right of Way*

POTENTIAL UTILITY CONFLICTS: *Casa Blanca Dr dry utilities*

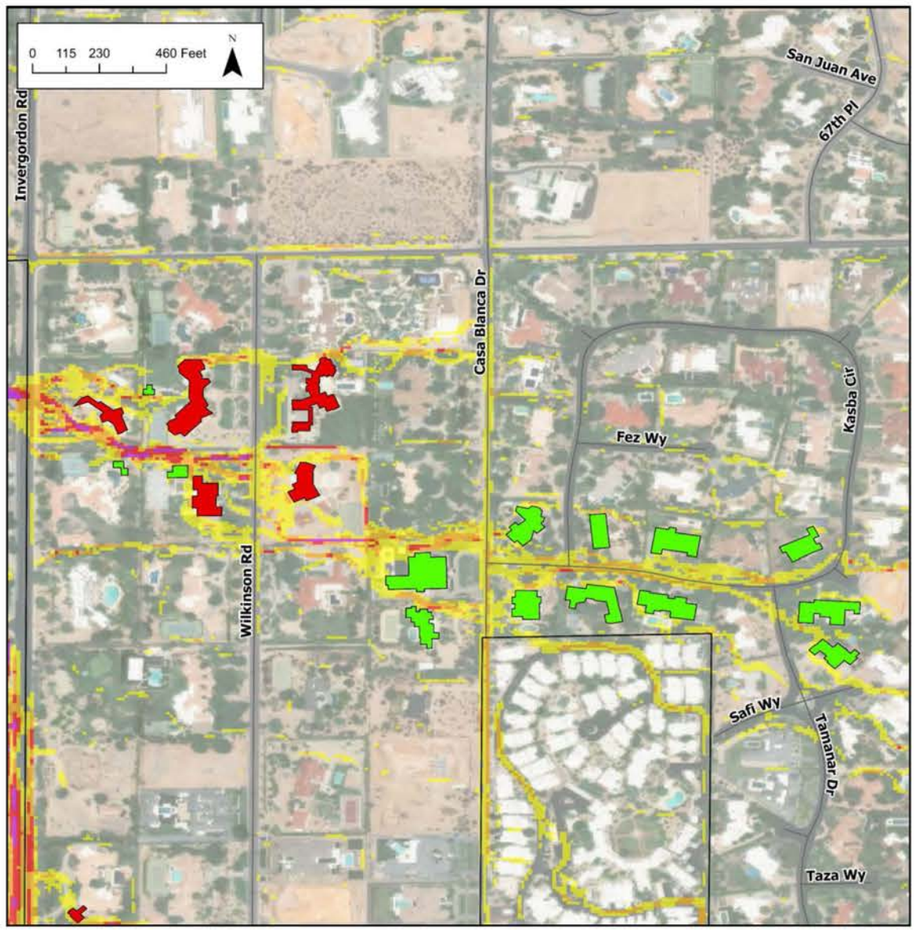
POTENTIAL MITIGATION ALTERNATIVES

- *Storm Drain*

IDENTIFIED FLOOD RISKS AND HAZARD CHARACTERIZATIONS

Number of Impacted Structures	*15*
Number of Hydraulic Structures Identified as Undersized	0
Maximum Depth on Roads	0.8 ft
Streets Overtopped by > 0.5 ft	5 Local; 0 Collector
Potential to Impact Emergency Service Access	No
Flood Hazard Designation	Nuisance Flooding

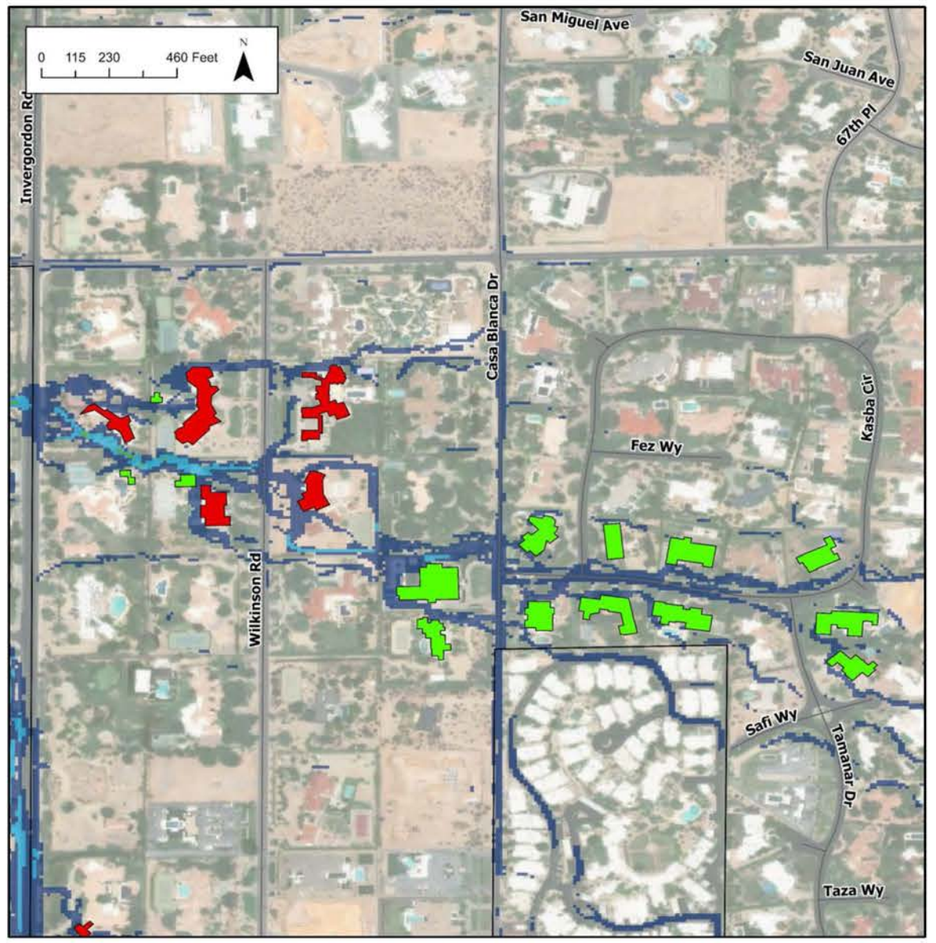
AREA F EROSION POTENTIAL MAP



100yr Adjacent Building Depth
- 6 in - 12 in
- 12 in - 24 in
- > 24 in

Erosion Potential
- Extreme Erosion Potential
- High Erosion Potential
- Moderate Erosion Potential
- Low Erosion Potential

AREA F SEDIMENT DEPOSTION POTENTIAL MAP

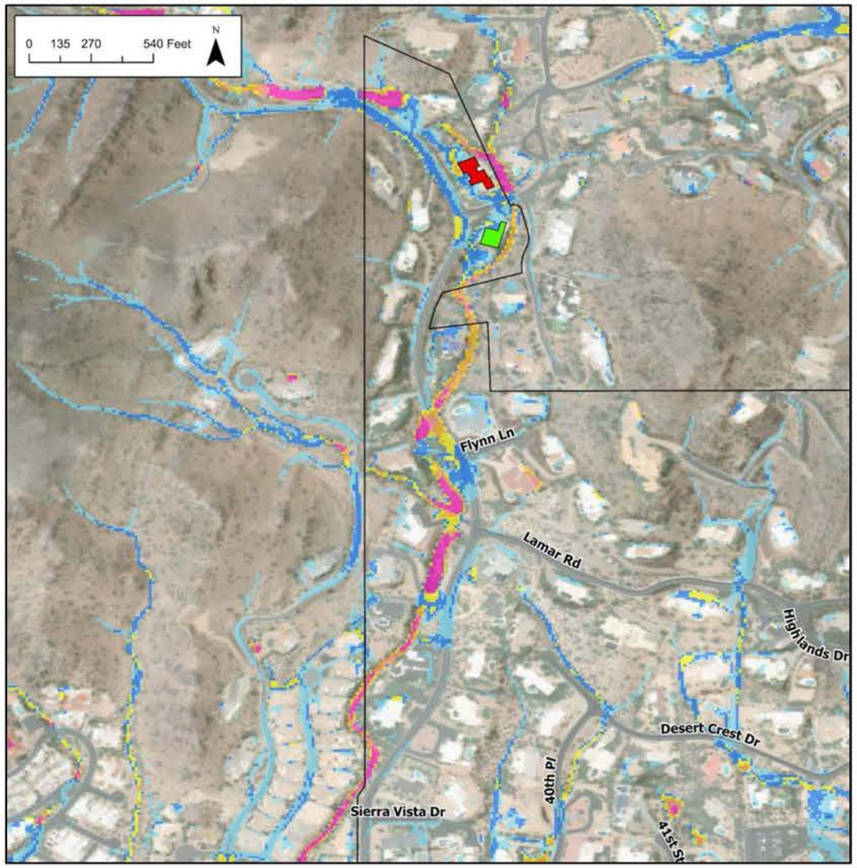


100yr Adjacent Building Depth
- 6 in - 12 in
- 12 in - 24 in
- > 24 in

Sediment Deposition Potential
- Low Deposition Potential
- Moderate Deposition Potential
- High Deposition Potential
- Extreme Deposition Potential

PARADISE VALLEY STORM WATER MASTER PLAN

FLOOD HAZARD AREA: G



LOCATION DESCRIPTION

LOCATION: *40th Street and Flynn Lane*



PROBLEM DESCRIPTION:

- *Identified as a problem in the 2020 Cudia City Wash ADMS and remains a flooding hazard*
- *Flows from Piestewa Mountain overtop 40th St by over 2 ft*

FLOOD HAZARD IMPACT: *Road overtopping, structure/property flooding*

PROPERTY OWNERSHIP: *Residential and Town Right of Way*

POTENTIAL UTILITY CONFLICTS: *40th St dry utilities*

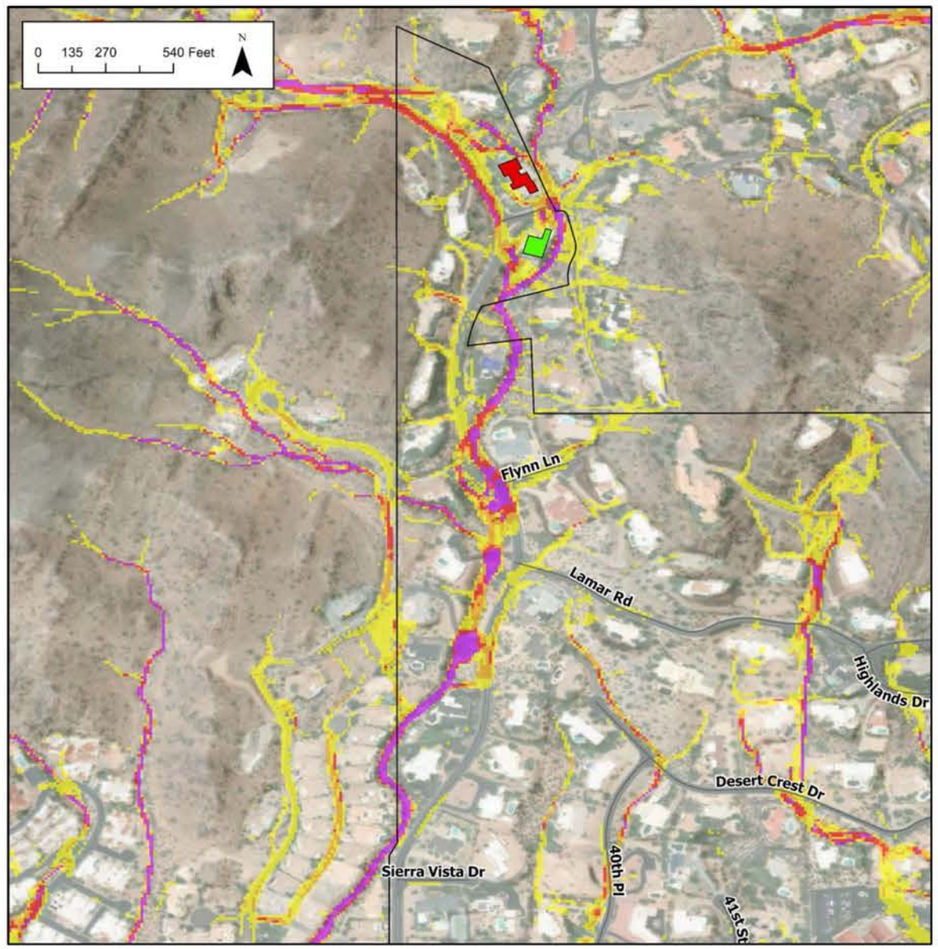
POTENTIAL MITIGATION ALTERNATIVES

- *Storm Drain*
- *Culverts*

IDENTIFIED FLOOD RISKS AND HAZARD CHARACTERIZATIONS

Number of Impacted Structures	*2*
Number of Hydraulic Structures Identified as Undersized	3
Maximum Depth on Roads	2.21 ft
Streets Overtopped by > 0.5 ft	2 Local; 0 Collector
Potential to Impact Emergency Service Access	No
Flood Hazard Designation	Moderate Flooding

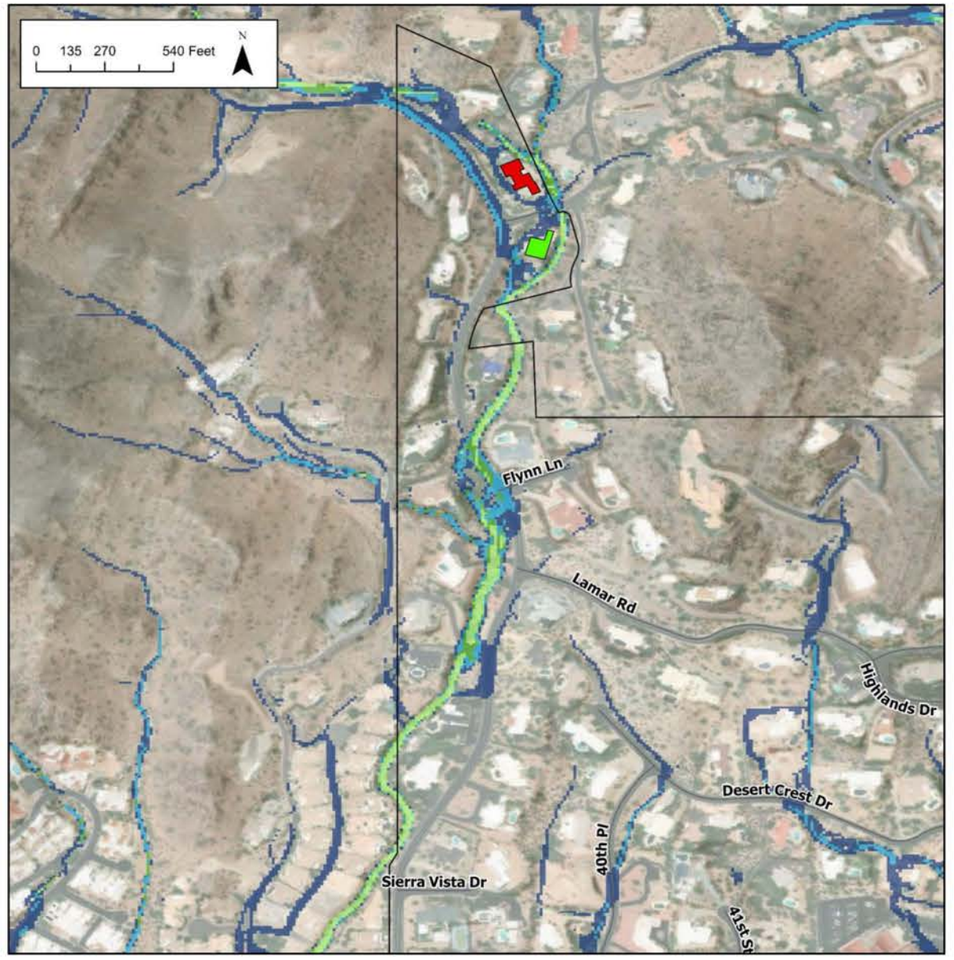
AREA G EROSION POTENTIAL MAP



100yr Adjacent Building Depth
- 6 in - 12 in
- 12 in - 24 in
- > 24 in

Erosion Potential
- Extreme Erosion Potential
- High Erosion Potential
- Moderate Erosion Potential
- Low Erosion Potential

AREA G SEDIMENT DEPOSTION POTENTIAL MAP

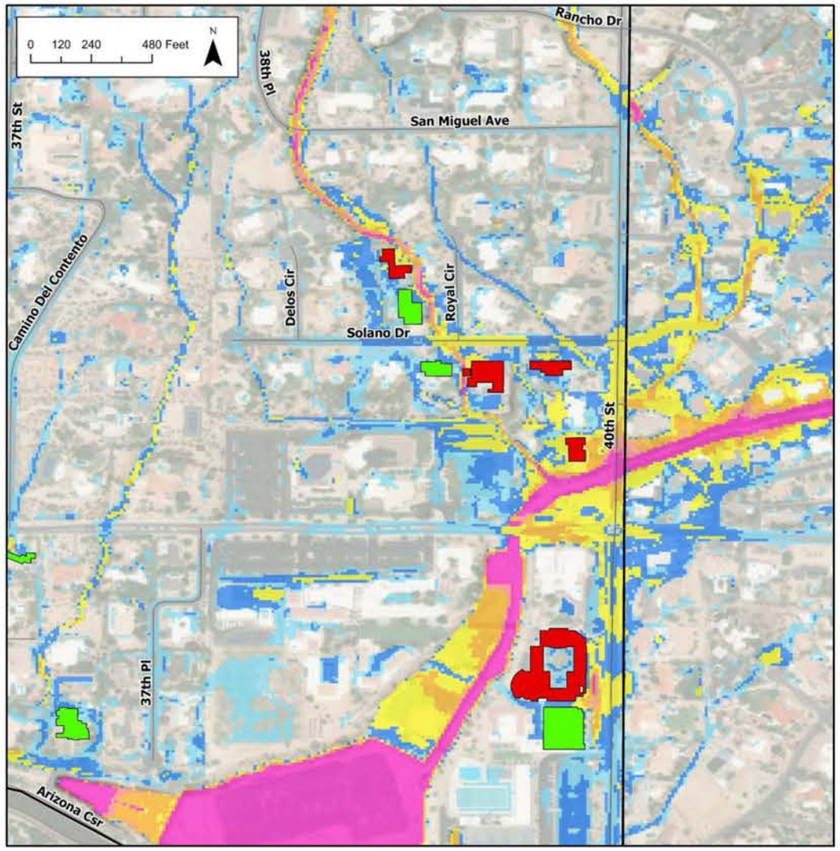


100yr Adjacent Building Depth
- 6 in - 12 in
- 12 in - 24 in
- > 24 in

Sediment Deposition Potential
- Low Deposition Potential
- Moderate Deposition Potential
- High Deposition Potential
- Extreme Deposition Potential

PARADISE VALLEY STORM WATER MASTER PLAN

FLOOD HAZARD AREA: H



100yr Adjacent Building Depth
- 6 in - 12 in
- 12 in - 24 in
- > 24 in

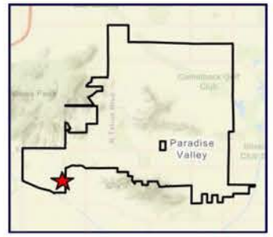
100yr, 6hr Max Flow Depths (ft)
- 0.0 - 0.25
- 0.26 - 0.5
- 0.51 - 1.0
- 1.01 - 2.0
- 2.01 - 3.0
- 3.01 - 4.0
- 4.01 - 27

LOCATION DESCRIPTION

LOCATION: *40th Street and Stanford Drive*

PROBLEM DESCRIPTION:

- *Identified as a problem in the 2020 Cudia City Wash ADMS and remains a significant flooding hazard. Vehicles have been stuck in the low water crossing during flooding*
- *Cudia City Wash overtop 40th St by greater than 4 ft*
- *Road closures during major flood events*



FLOOD HAZARD IMPACT: *Road overtopping, structure/property flooding*

PROPERTY OWNERSHIP: *Residential and Town Right of Way*

POTENTIAL UTILITY CONFLICTS: *40th St and Stanford Dr dry utilities*

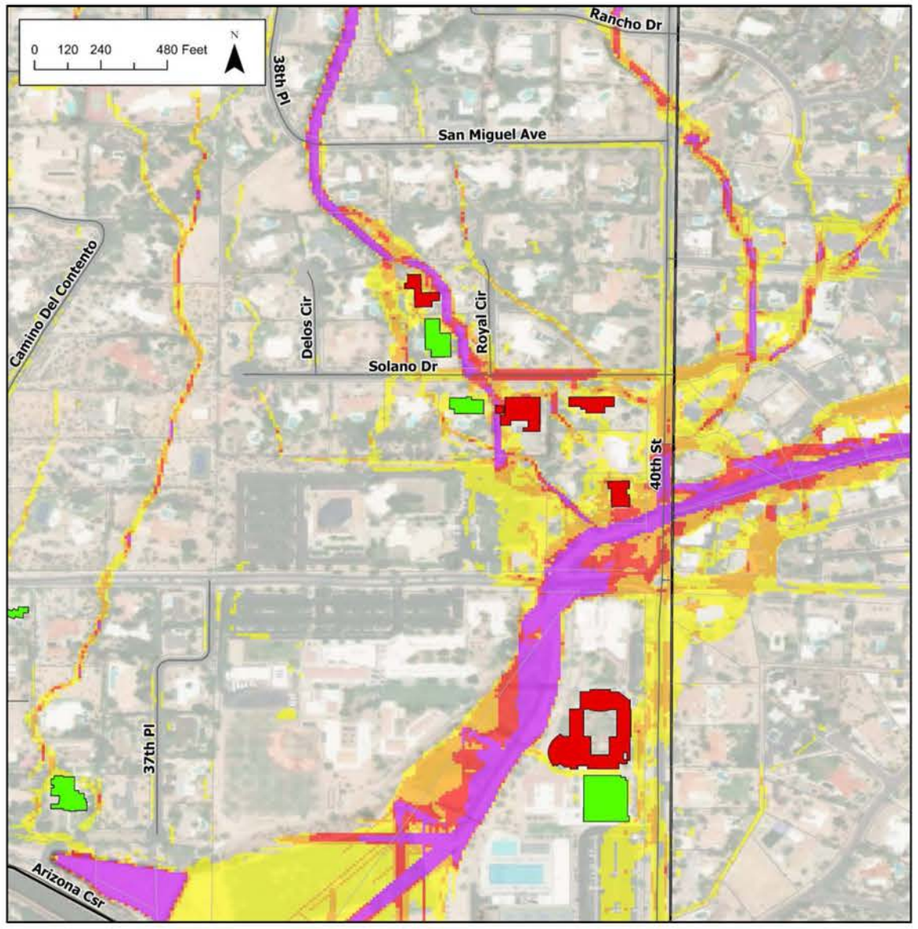
POTENTIAL MITIGATION ALTERNATIVES

- *Storm Drain*
- *Culverts*

IDENTIFIED FLOOD RISKS AND HAZARD CHARACTERIZATIONS

Number of Impacted Structures	*9*
Number of Hydraulic Structures Identified as Undersized	1
Maximum Depth on Roads	5.23 ft
Streets Overtopped by > 0.5 ft	2 Local; 2 Collector
Potential to Impact Emergency Service Access	Yes
Flood Hazard Designation	Severe Flooding

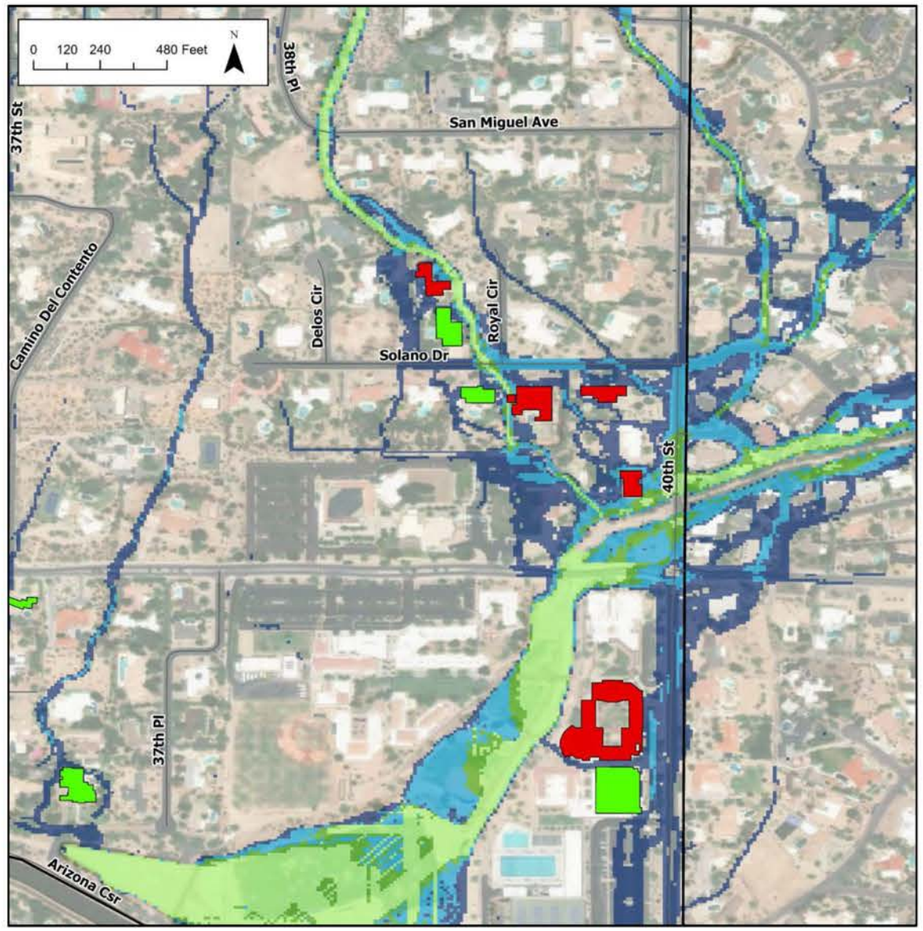
AREA H EROSION POTENTIAL MAP



100yr Adjacent Building Depth
- 6 in - 12 in
- 12 in - 24 in
- > 24 in

Erosion Potential
- Extreme Erosion Potential
- High Erosion Potential
- Moderate Erosion Potential
- Low Erosion Potential

AREA H SEDIMENT DEPOSTION POTENTIAL MAP

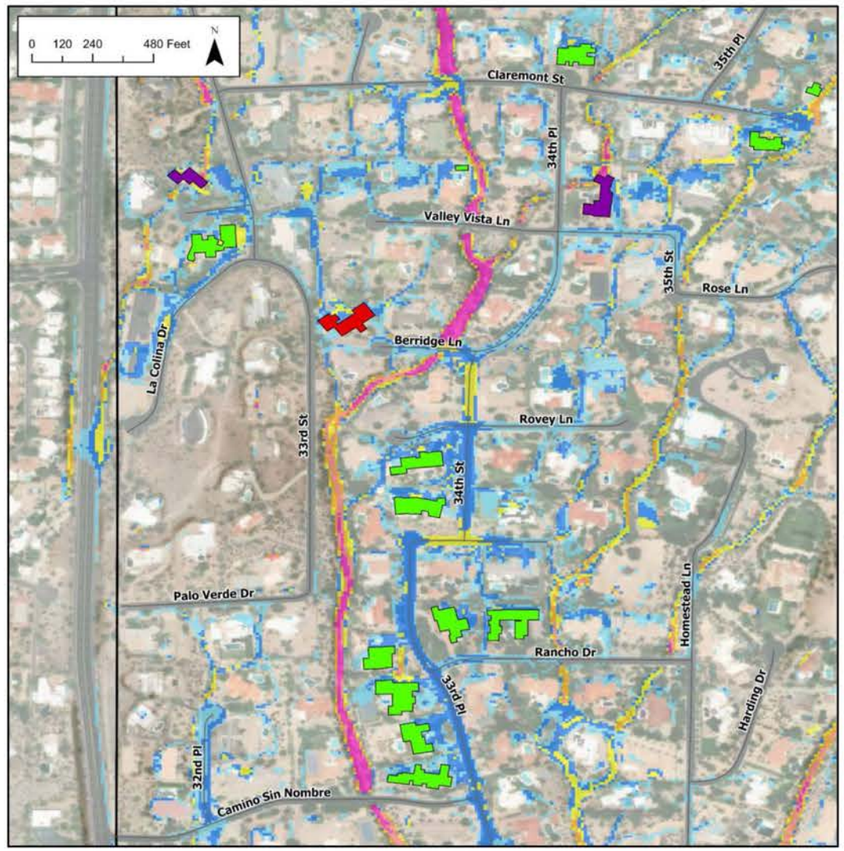


100yr Adjacent Building Depth
- 6 in - 12 in
- 12 in - 24 in
- > 24 in

Sediment Deposition Potential
- Low Deposition Potential
- Moderate Deposition Potential
- High Deposition Potential
- Extreme Deposition Potential

PARADISE VALLEY STORM WATER MASTER PLAN

FLOOD HAZARD AREA: I

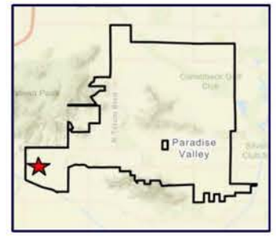


100yr Adjacent Building Depth
- 6 in - 12 in
- 12 in - 24 in
- > 24 in

100yr, 6hr Max Flow Depths (ft)
- 0.0 - 0.25
- 0.26 - 0.5
- 0.51 - 1.0
- 1.01 - 2.0
- 2.01 - 3.0
- 3.01 - 4.0
- 4.01 - 27

LOCATION DESCRIPTION

LOCATION: *Claremont Street and 34th Place*



PROBLEM DESCRIPTION:

- *Identified as a problem in the 2020 Cudia City Wash ADMS and remains a nuisance flooding hazard.*
- *Undersized existing infrastructure*

FLOOD HAZARD IMPACT: *Road overtopping, structure/property flooding*

PROPERTY OWNERSHIP: *Residential and Town Right of Way*

POTENTIAL UTILITY CONFLICTS: *Claremont Street dry utilities*

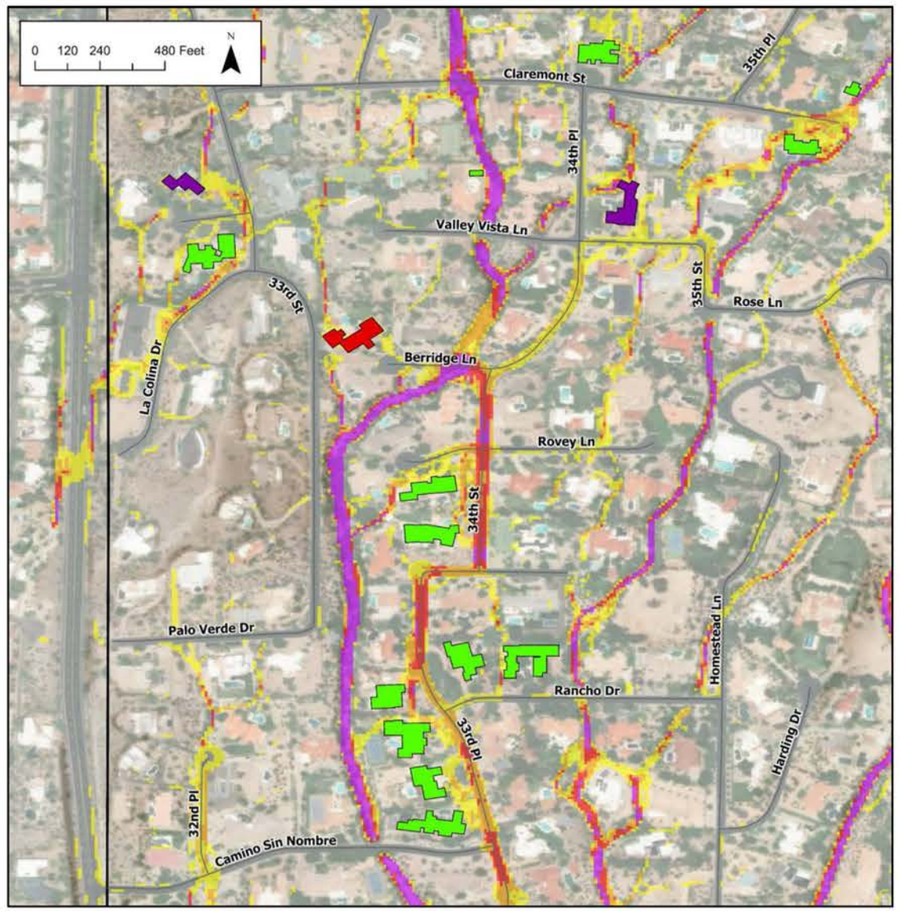
POTENTIAL MITIGATION ALTERNATIVES

- *Storm Drain*
- *Culverts*

IDENTIFIED FLOOD RISKS AND HAZARD CHARACTERIZATIONS

Number of Impacted Structures	*10*
Number of Hydraulic Structures Identified as Undersized	3
Maximum Depth on Roads	0.8 ft
Streets Overtopped by > 0.5 ft	4 Local; 0 Collector
Potential to Impact Emergency Service Access	No
Flood Hazard Designation	Nuisance Flooding

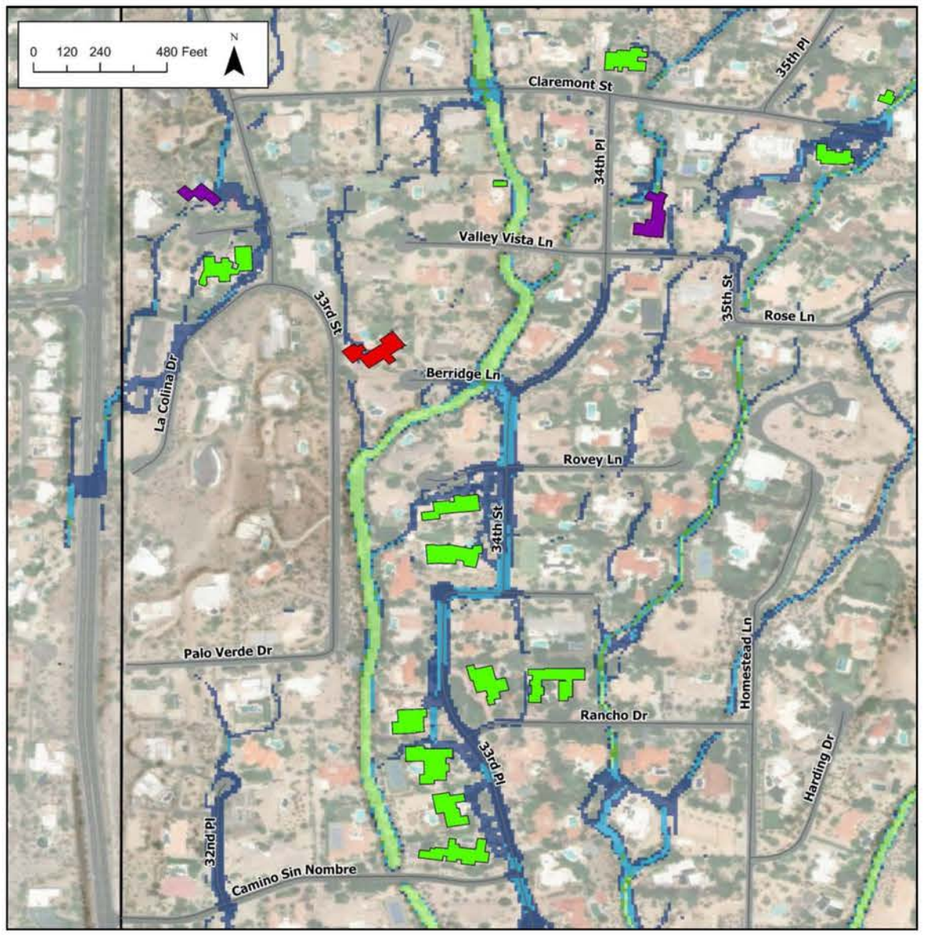
AREA I EROSION POTENTIAL MAP



100yr Adjacent Building Depth
- 6 in - 12 in
- 12 in - 24 in
- > 24 in

Erosion Potential
- Extreme Erosion Potential
- High Erosion Potential
- Moderate Erosion Potential
- Low Erosion Potential

AREA I SEDIMENT DEPOSTION POTENTIAL MAP

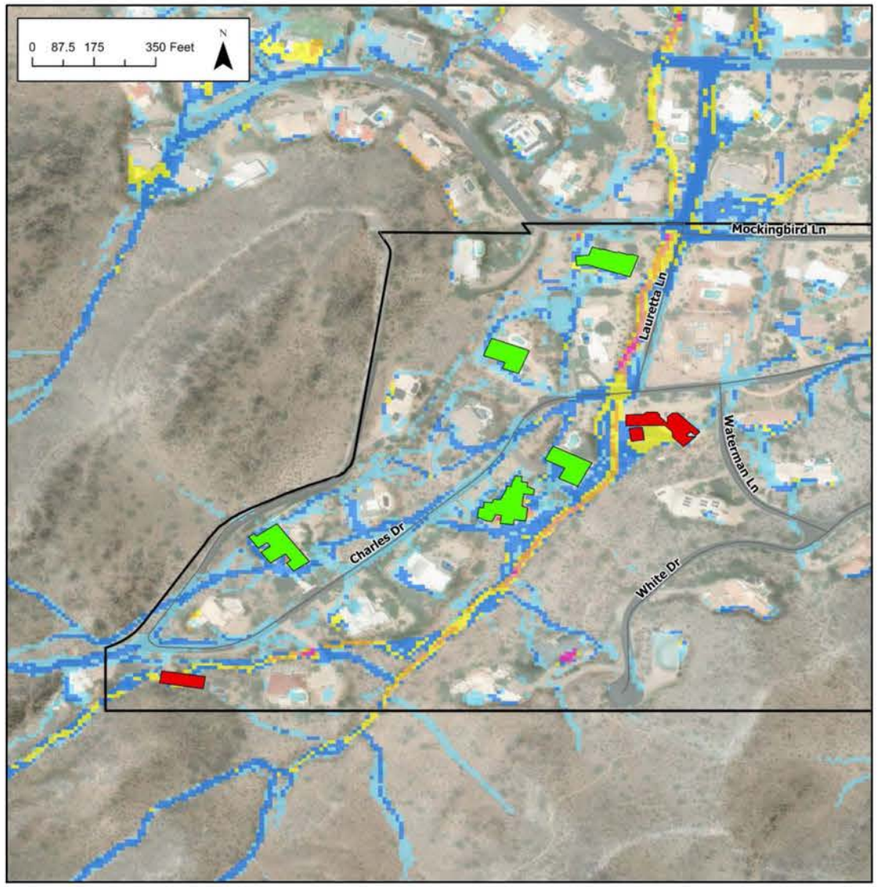


100yr Adjacent Building Depth
- 6 in - 12 in
- 12 in - 24 in
- > 24 in

Sediment Deposition Potential
- Low Deposition Potential
- Moderate Deposition Potential
- High Deposition Potential
- Extreme Deposition Potential

PARADISE VALLEY STORM WATER MASTER PLAN

FLOOD HAZARD AREA: J

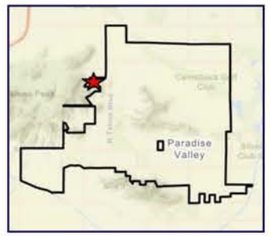


LOCATION DESCRIPTION

LOCATION: *40th Street and Charles Drive and Lauretta Lane*

PROBLEM DESCRIPTION:

- *Identified as a problem in the 2019 Drainage Improvement Areas Technical Memorandum*
- *The existing low water crossing conveys runoff from the Phoenix Mountain Preserve. The crossing has led to erosion and sediment deposition that required routine roadway maintenance.*



FLOOD HAZARD IMPACT: *Road overtopping, structure/property flooding*

PROPERTY OWNERSHIP: *Residential and Town Right of Way*

POTENTIAL UTILITY CONFLICTS: *Charles Drive dry utilities*

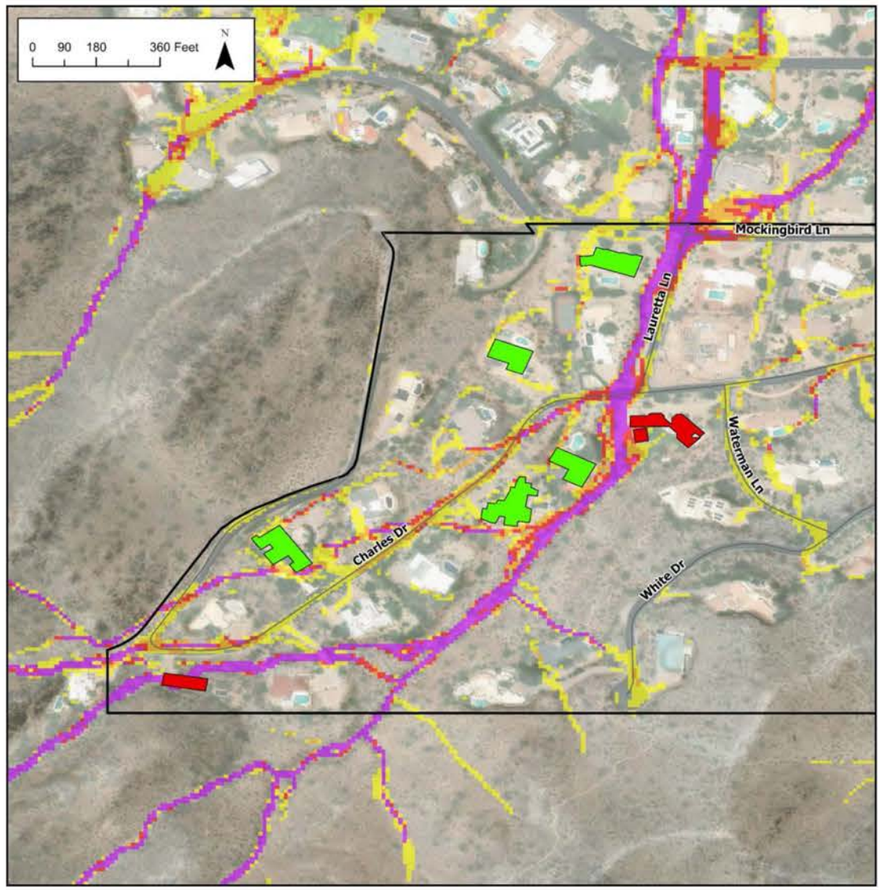
POTENTIAL MITIGATION ALTERNATIVES

- *Storm Drain*
- *Culverts*

IDENTIFIED FLOOD RISKS AND HAZARD CHARACTERIZATIONS

Number of Impacted Structures	*8*
Number of Hydraulic Structures Identified as Undersized	0
Maximum Depth on Roads	1.16 ft
Streets Overtopped by > 0.5 ft	3 Local; 0 Collector
Potential to Impact Emergency Service Access	No
Flood Hazard Designation	Moderate Flooding

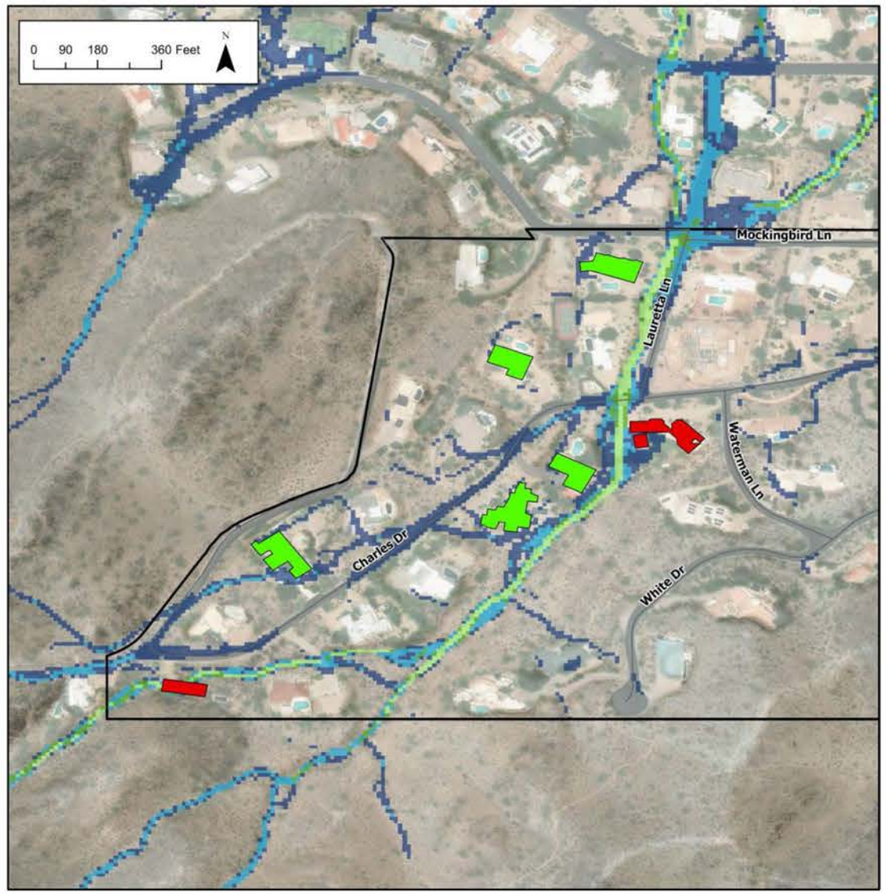
AREA J EROSION POTENTIAL MAP



100yr Adjacent Building Depth
- 6 in - 12 in
- 12 in - 24 in
- > 24 in

Erosion Potential
- Extreme Erosion Potential
- High Erosion Potential
- Moderate Erosion Potential
- Low Erosion Potential

AREA J SEDIMENT DEPOSTION POTENTIAL MAP

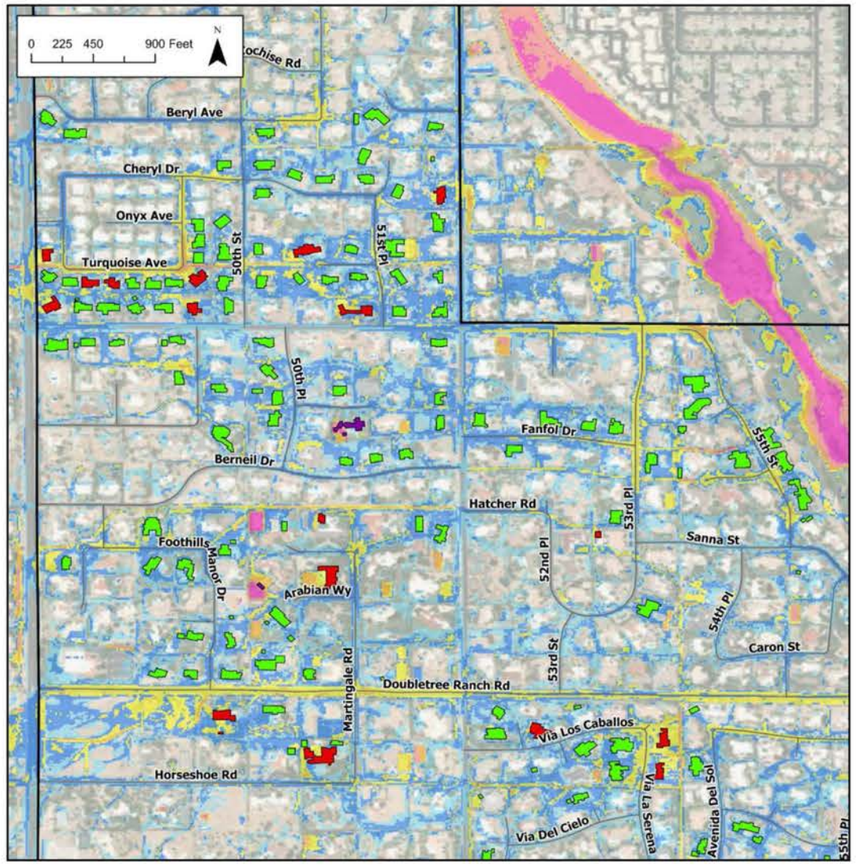


100yr Adjacent Building Depth
- 6 in - 12 in
- 12 in - 24 in
- > 24 in

Sediment Deposition Potential
- Low Deposition Potential
- Moderate Deposition Potential
- High Deposition Potential
- Extreme Deposition Potential

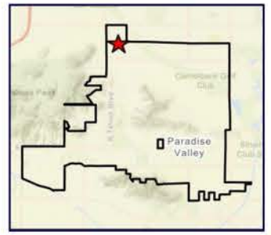
PARADISE VALLEY STORM WATER MASTER PLAN

FLOOD HAZARD AREA: K



LOCATION DESCRIPTION

LOCATION: *52nd St and Doubletree Ranch Rd*



PROBLEM DESCRIPTION:

- *Significant flows coming from Piestewa Mountain flow through the neighborhood in Northern Paradise Valley, especially along Turquoise Ave. Little existing infrastructure is currently present to relieve the flooding in this area*
- *In the southern section of Area K, Existing storm drain was identified as under sized*

FLOOD HAZARD IMPACT: *Road overtopping, structure/property flooding*

PROPERTY OWNERSHIP: *Residential and Town Right of Way*

POTENTIAL UTILITY CONFLICTS: *Doubletree Ranch Rd storm drains, 52nd St dry utilities*

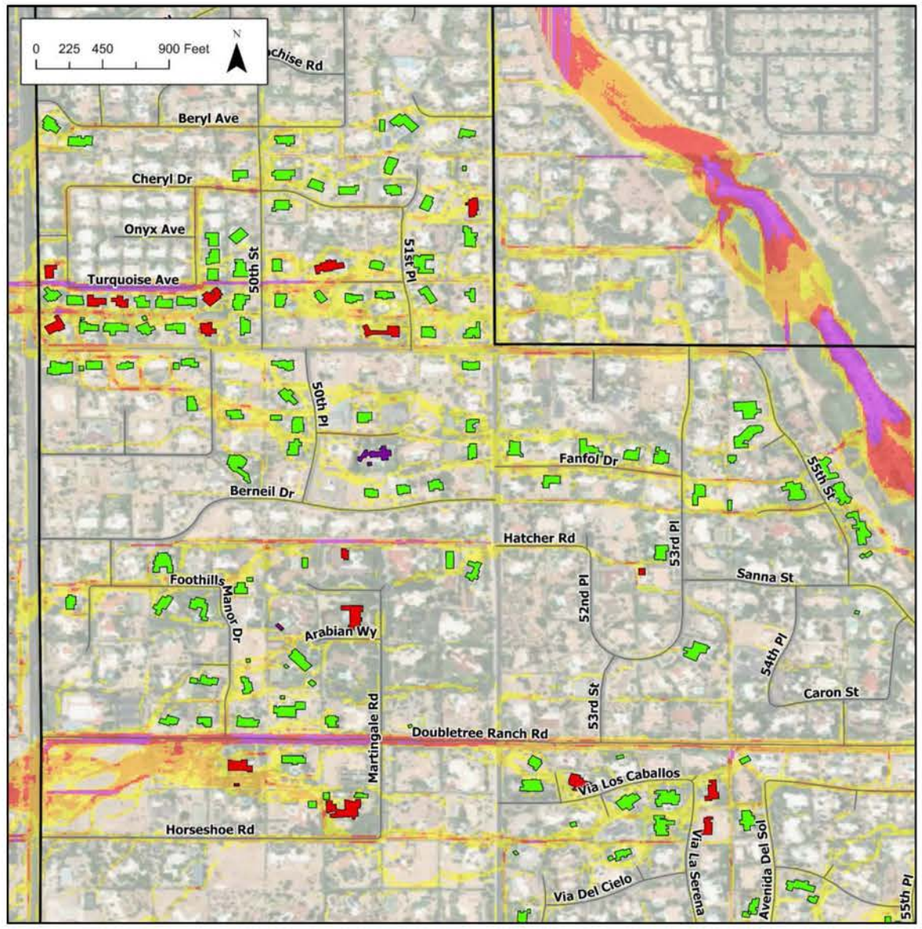
POTENTIAL MITIGATION ALTERNATIVES

- *Storm Drain*
- *Culverts*

IDENTIFIED FLOOD RISKS AND HAZARD CHARACTERIZATIONS

Number of Impacted Structures	*141*
Number of Hydraulic Structures Identified as Undersized	1
Maximum Depth on Roads	2.37 ft
Streets Overtopped by > 0.5 ft	13 Local; 2 Collector
Potential to Impact Emergency Service Access	No
Flood Hazard Designation	Severe Flooding

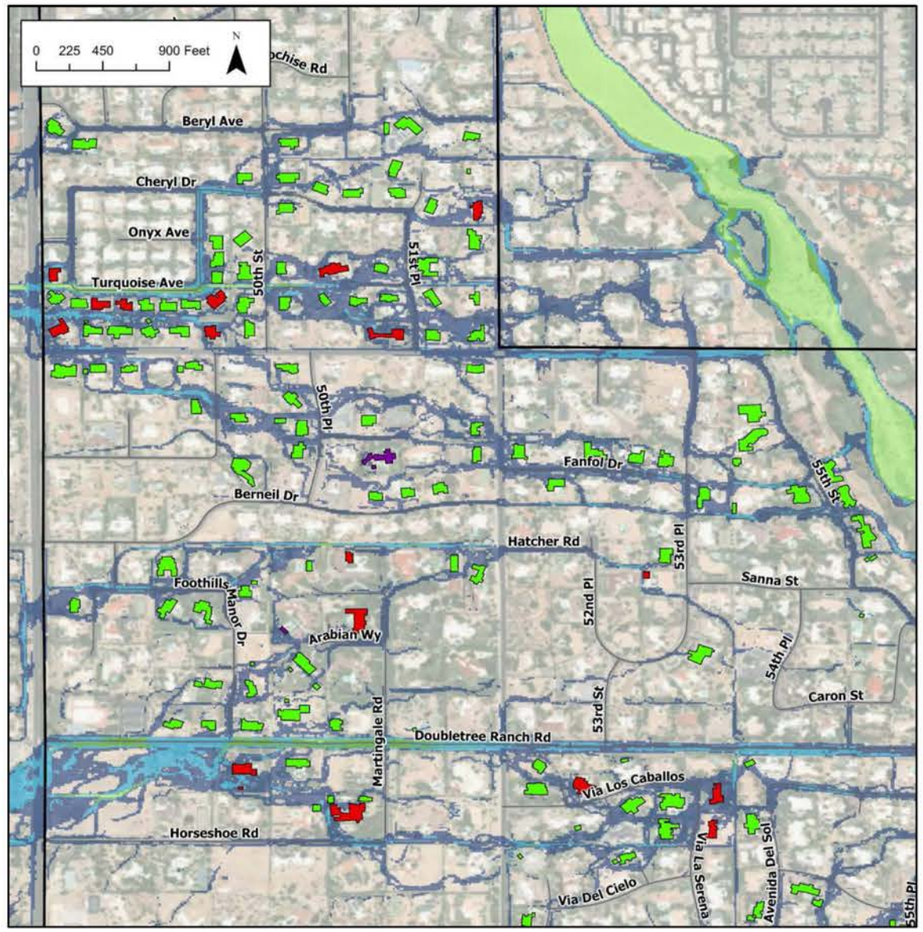
AREA K EROSION POTENTIAL MAP



100yr Adjacent Building Depth
- 6 in - 12 in
- 12 in - 24 in
- > 24 in

Erosion Potential
- Extreme Erosion Potential
- High Erosion Potential
- Moderate Erosion Potential
- Low Erosion Potential

AREA K SEDIMENT DEPOSTION POTENTIAL MAP

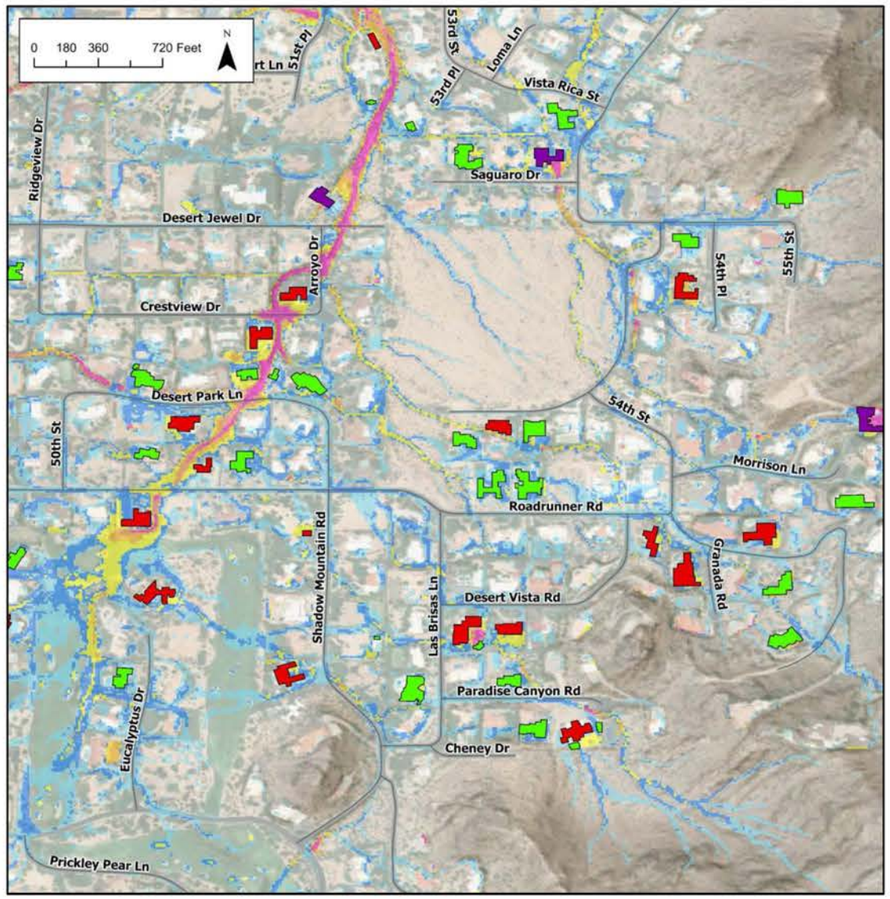


100yr Adjacent Building Depth
- 6 in - 12 in
- 12 in - 24 in
- > 24 in

Sediment Deposition Potential
- Low Deposition Potential
- Moderate Deposition Potential
- High Deposition Potential
- Extreme Deposition Potential

PARADISE VALLEY STORM WATER MASTER PLAN

FLOOD HAZARD AREA: L



100yr Adjacent Building Depth
- 6 in - 12 in
- 12 in - 24 in
- > 24 in

100yr, 6hr Max Flow Depths (ft)
- 0.0 - 0.25
- 0.26 - 0.5
- 0.51 - 1.0
- 1.01 - 2.0
- 2.01 - 3.0
- 3.01 - 4.0
- 4.01 - 27

LOCATION DESCRIPTION

LOCATION: *40th Desert Jewel Dr and Arroyo Dr*



PROBLEM DESCRIPTION:

- *Identified as a problem in the 2019 Drainage Improvement Area Technical Memorandum*
- *Existing low water crossings are undersized to carry the discharge from Cherokee Wash and lead to frequent road maintenance*

FLOOD HAZARD IMPACT: *Road overtopping, structure/property flooding*

PROPERTY OWNERSHIP: *Residential and Town Right of Way*

POTENTIAL UTILITY CONFLICTS: *Desert Jewel Dr, Arroyo Dr, and Crestview Dr dry utilities*

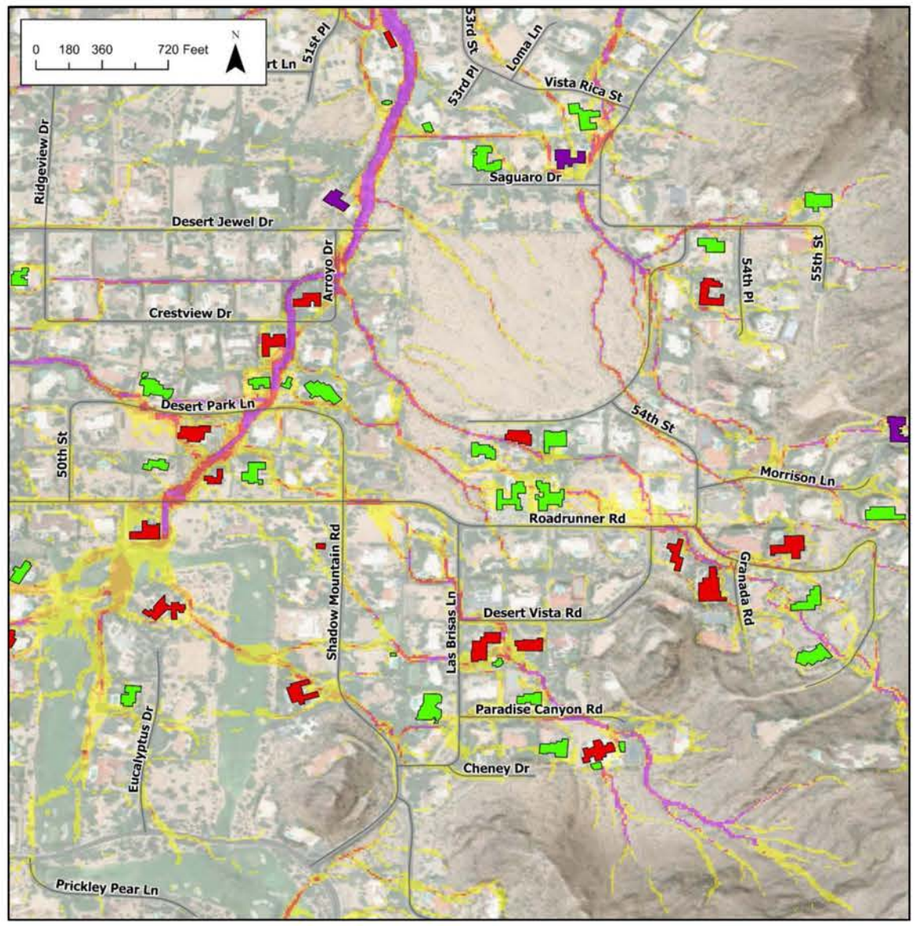
POTENTIAL MITIGATION ALTERNATIVES

- *Storm Drain*
- *Culverts*

IDENTIFIED FLOOD RISKS AND HAZARD CHARACTERIZATIONS

Number of Impacted Structures	*35*
Number of Hydraulic Structures Identified as Undersized	1
Maximum Depth on Roads	6.7 ft
Streets Overtopped by > 0.5 ft	5 Local; 0 Collector
Potential to Impact Emergency Service Access	Yes
Flood Hazard Designation	Severe Flooding

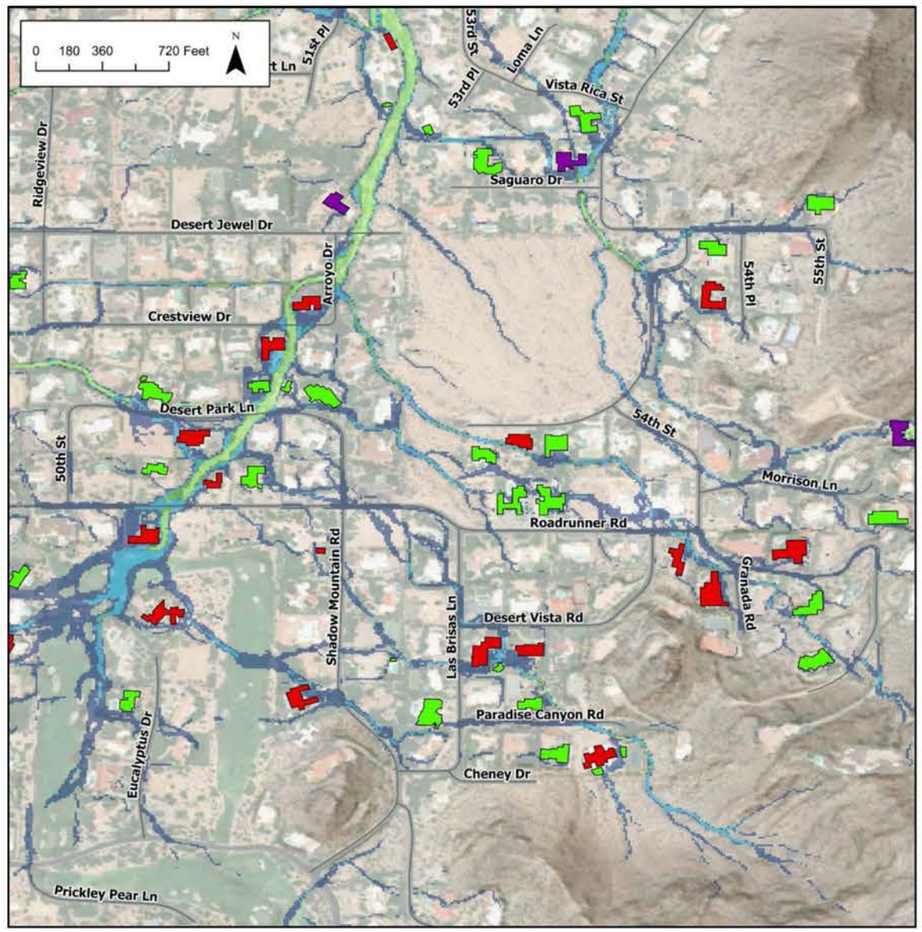
AREA L EROSION POTENTIAL MAP



100yr Adjacent Building Depth
- 6 in - 12 in
- 12 in - 24 in
- > 24 in

Erosion Potential
- Extreme Erosion Potential
- High Erosion Potential
- Moderate Erosion Potential
- Low Erosion Potential

AREA L SEDIMENT DEPOSTION POTENTIAL MAP

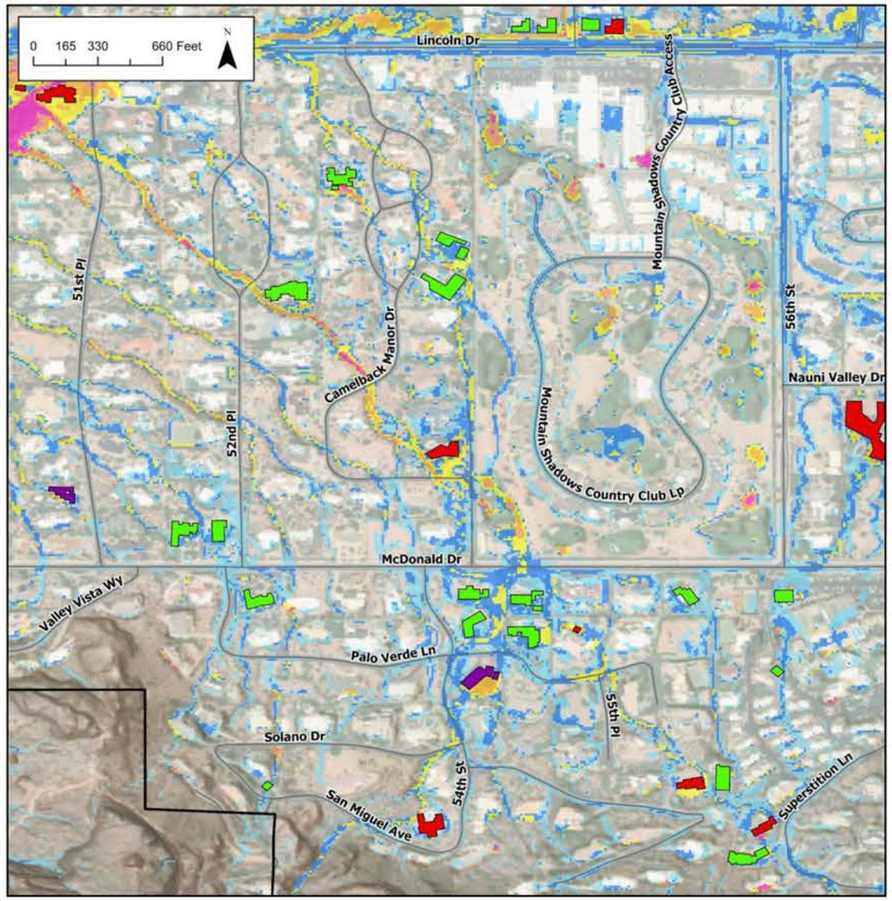


100yr Adjacent Building Depth
- 6 in - 12 in
- 12 in - 24 in
- > 24 in

Sediment Deposition Potential
- Low Deposition Potential
- Moderate Deposition Potential
- High Deposition Potential
- Extreme Deposition Potential

PARADISE VALLEY STORM WATER MASTER PLAN

FLOOD HAZARD AREA: M

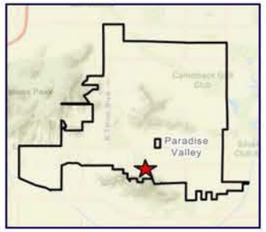


LOCATION DESCRIPTION

LOCATION: *McDonald Drive and 54th Street*

PROBLEM DESCRIPTION:

- *Identified as a problem in the 2020 Cudia City Wash ADMS and the 2019 Drainage Improvement Areas Technical Memorandum, remains a flooding nuisance*
- *Flows from Camelback Mountain overtop local roads, depositing sediment and debris*



FLOOD HAZARD IMPACT: *Road overtopping, structure/property flooding*

PROPERTY OWNERSHIP: *Residential and Town Right of Way*

POTENTIAL UTILITY CONFLICTS: *McDonald Dr dry utilities*

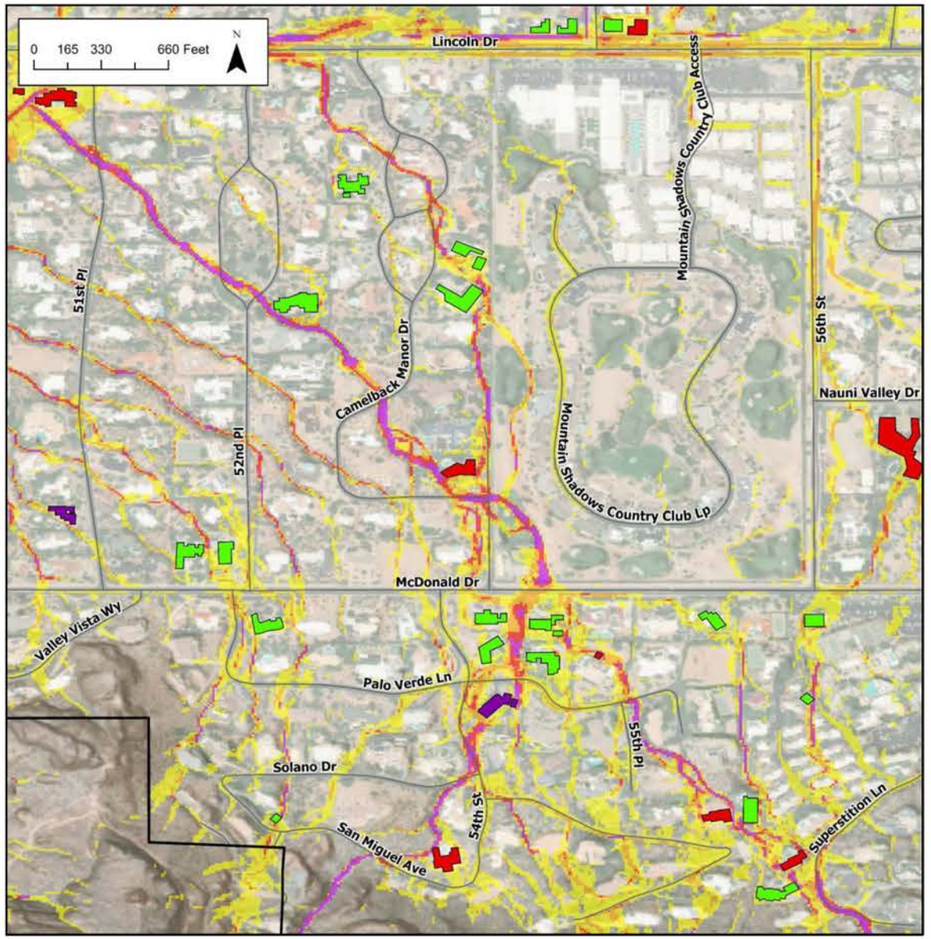
POTENTIAL MITIGATION ALTERNATIVES

- *Storm Drain*
- *Culverts*

IDENTIFIED FLOOD RISKS AND HAZARD CHARACTERIZATIONS

Number of Impacted Structures	*19*
Number of Hydraulic Structures Identified as Undersized	1
Maximum Depth on Roads	1.0 ft
Streets Overtopped by > 0.5 ft	6 Local; 1 Collector
Potential to Impact Emergency Service Access	No
Flood Hazard Designation	Moderate Flooding

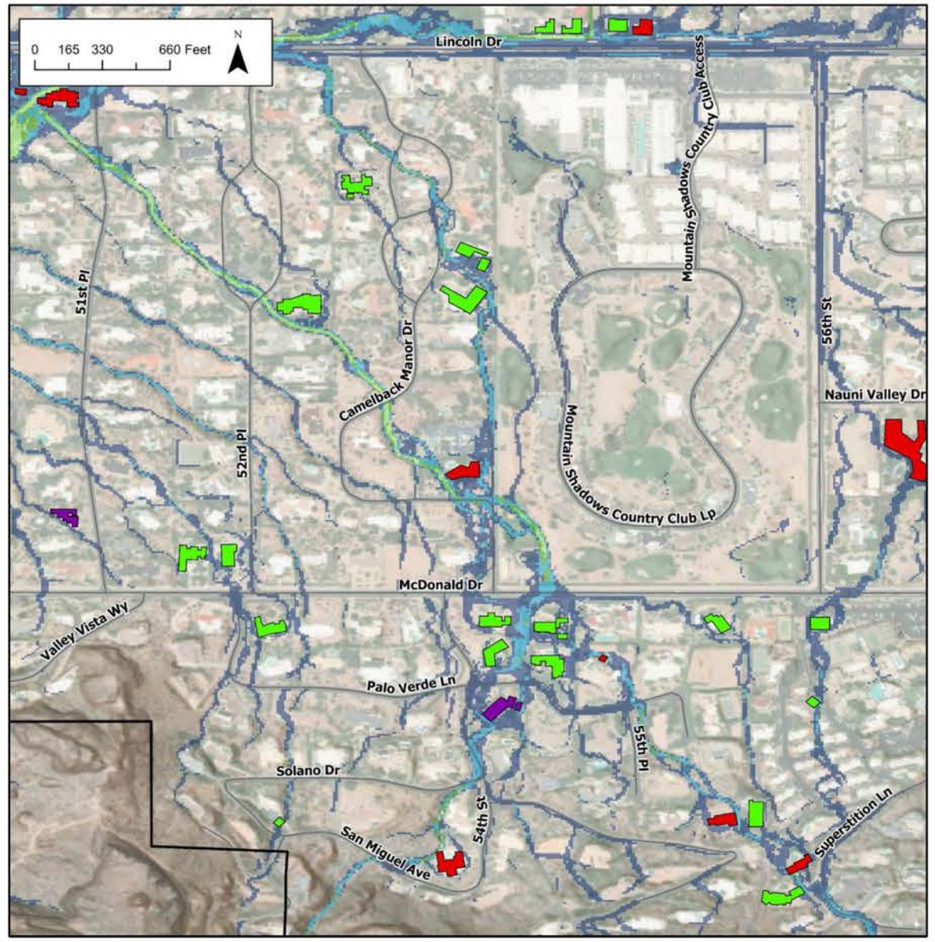
AREA M EROSION POTENTIAL MAP



100yr Adjacent Building Depth
- 6 in - 12 in
- 12 in - 24 in
- > 24 in

Erosion Potential
- Extreme Erosion Potential
- High Erosion Potential
- Moderate Erosion Potential
- Low Erosion Potential

AREA M SEDIMENT DEPOSTION POTENTIAL MAP

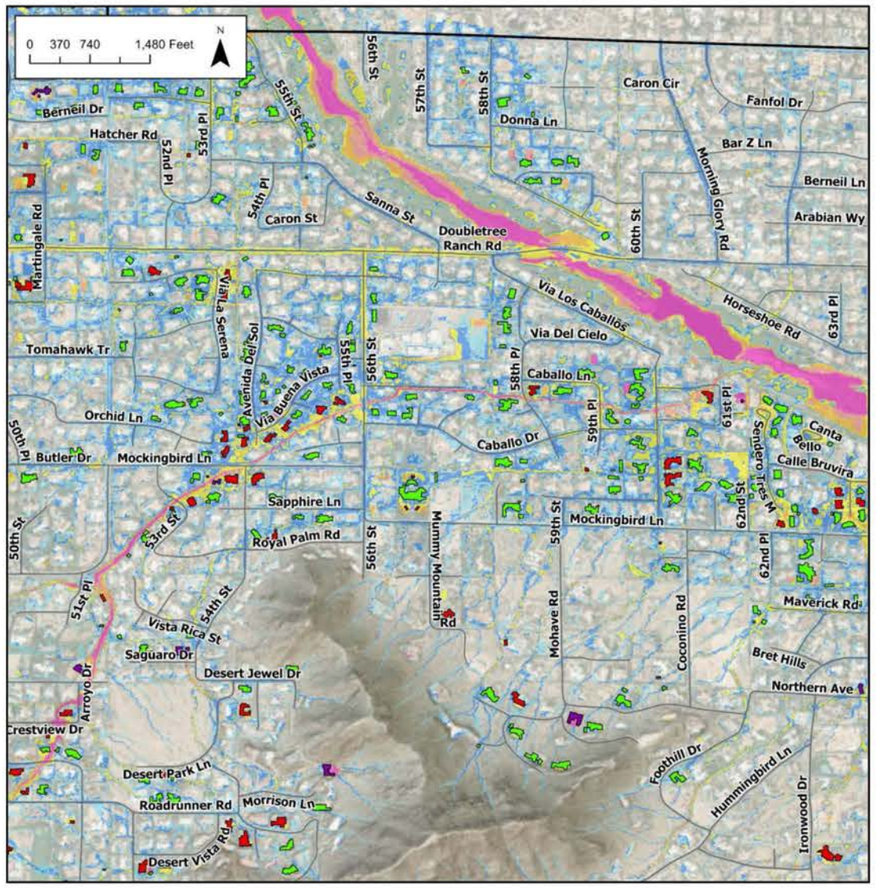


100yr Adjacent Building Depth
- 6 in - 12 in
- 12 in - 24 in
- > 24 in

Sediment Deposition Potential
- Low Deposition Potential
- Moderate Deposition Potential
- High Deposition Potential
- Extreme Deposition Potential

PARADISE VALLEY STORM WATER MASTER PLAN

FLOOD HAZARD AREA: N



100yr Adjacent Building Depth
- 6 in - 12 in
- 12 in - 24 in
- > 24 in

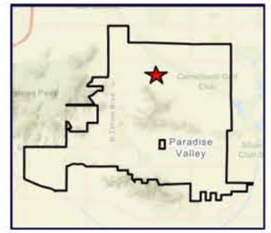
100yr, 6hr Max Flow Depths (ft)
- 0.0 - 0.25
- 0.26 - 0.5
- 0.51 - 1.0
- 1.01 - 2.0
- 2.01 - 3.0
- 3.01 - 4.0
- 4.01 - 27

LOCATION DESCRIPTION

LOCATION: *56th Street and Mockingbird Lane*

PROBLEM DESCRIPTION:

- *Identified as a problem by residents and town staff. Breakouts from Cherokee Wash flood homes and streets before out falling to Indian Bend Wash*
- *Existing Infrastructure identified as undersized*



FLOOD HAZARD IMPACT: *Road overtopping, structure/property flooding*

PROPERTY OWNERSHIP: *Residential and Town Right of Way*

POTENTIAL UTILITY CONFLICTS: *Mockingbird Lane and 56th Street storm drains, dry utilities*

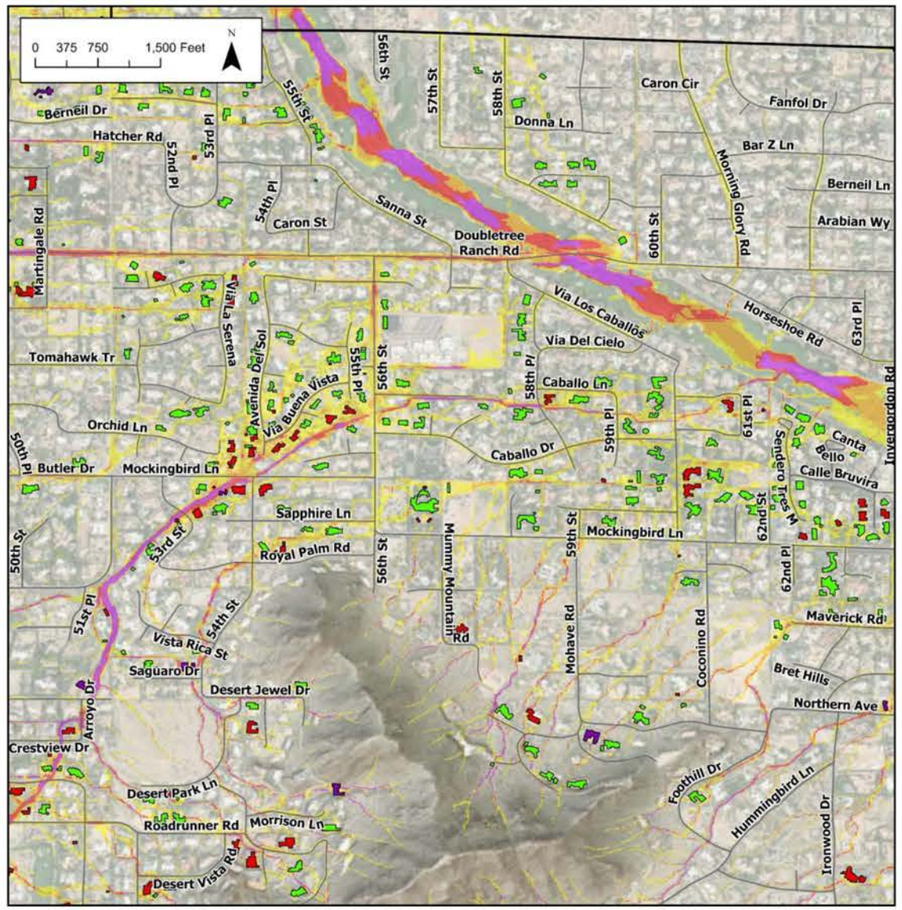
POTENTIAL MITIGATION ALTERNATIVES

- *Storm Drain*
- *Culverts*

IDENTIFIED FLOOD RISKS AND HAZARD CHARACTERIZATIONS

Number of Impacted Structures	*123*
Number of Hydraulic Structures Identified as Undersized	1
Maximum Depth on Roads	3.67 ft
Streets Overtopped by > 0.5 ft	8 Local; 2 Collector
Potential to Impact Emergency Service Access	Yes
Flood Hazard Designation	Severe Flooding

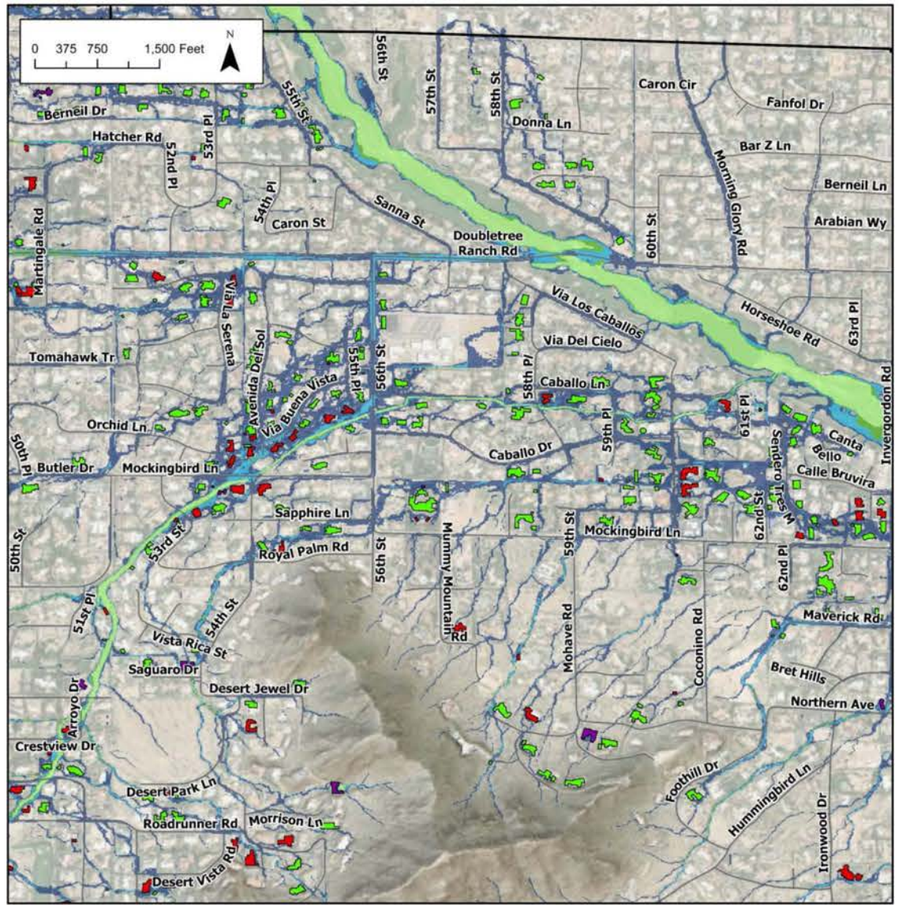
AREA N EROSION POTENTIAL MAP



100yr Adjacent Building Depth
- 6 in - 12 in
- 12 in - 24 in
- > 24 in

Erosion Potential
- Extreme Erosion Potential
- High Erosion Potential
- Moderate Erosion Potential
- Low Erosion Potential

AREA N SEDIMENT DEPOSTION POTENTIAL MAP

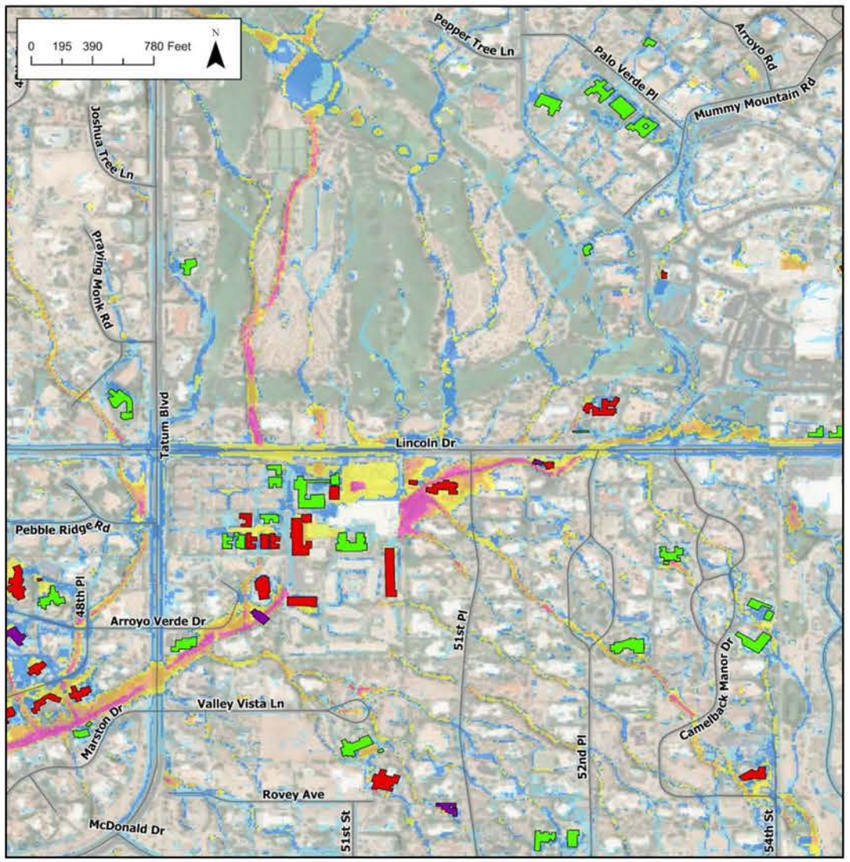


100yr Adjacent Building Depth
- 6 in - 12 in
- 12 in - 24 in
- > 24 in

Sediment Deposition Potential
- Low Deposition Potential
- Moderate Deposition Potential
- High Deposition Potential
- Extreme Deposition Potential

PARADISE VALLEY STORM WATER MASTER PLAN

FLOOD HAZARD AREA: O



100yr Adjacent Building Depth
- 6 in - 12 in
- 12 in - 24 in
- > 24 in

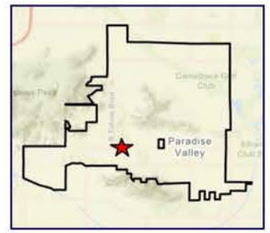
100yr, 6hr Max Flow Depths (ft)
- 0.0 - 0.25
- 0.26 - 0.5
- 0.51 - 1.0
- 1.01 - 2.0
- 2.01 - 3.0
- 3.01 - 4.0
- 4.01 - 27

LOCATION DESCRIPTION

LOCATION: *Lincoln Drive and 51st Place*

PROBLEM DESCRIPTION:

- *Identified as a problem in the 2020 Cudia City Wash ADMS and remains a significant flooding hazard. Sediment deposition makes maintenance and cleanup routine after storm events*
- *Cudia City Wash overtop 40th St by greater than 4 ft*



FLOOD HAZARD IMPACT: *Road overtopping, structure/property flooding*

PROPERTY OWNERSHIP: *Residential and Town Right of Way*

POTENTIAL UTILITY CONFLICTS: *Lincoln Dr and Tatum Blvd dry utilities*

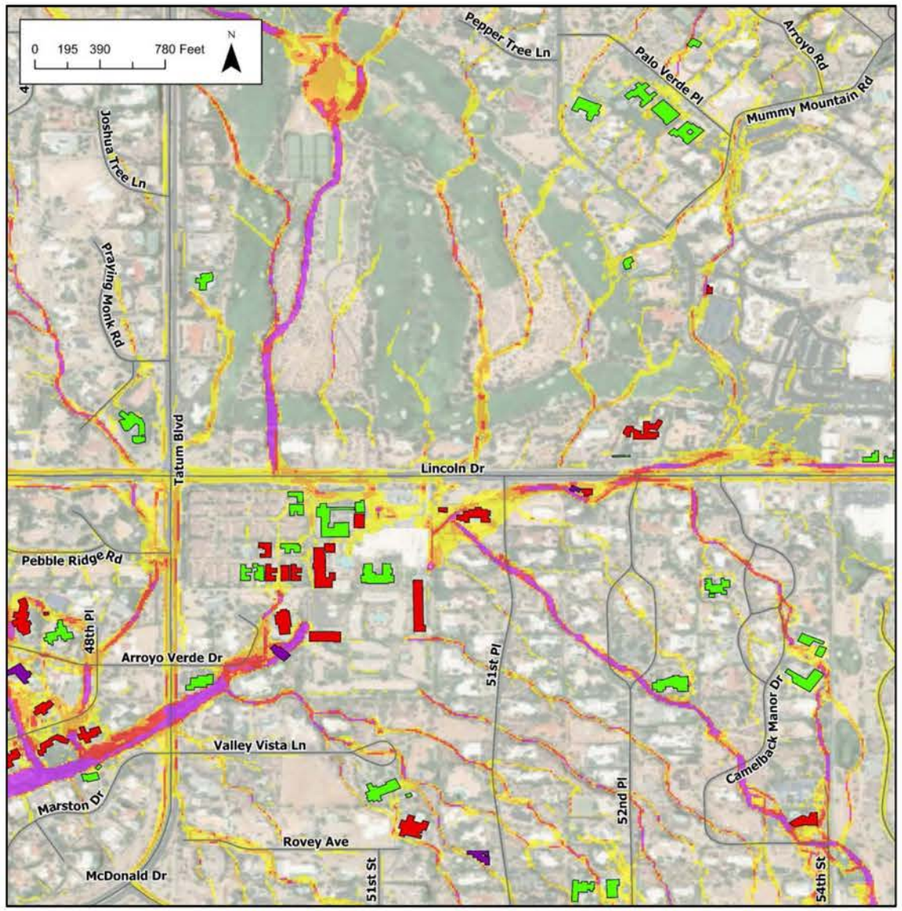
POTENTIAL MITIGATION ALTERNATIVES

- *Storm Drain*
- *Culverts*

IDENTIFIED FLOOD RISKS AND HAZARD CHARACTERIZATIONS

Number of Impacted Structures	*22*
Number of Hydraulic Structures Identified as Undersized	6
Maximum Depth on Roads	3.18 ft
Streets Overtopped by > 0.5 ft	4 Local; 2 Collector
Potential to Impact Emergency Service Access	No
Flood Hazard Designation	Severe Flooding

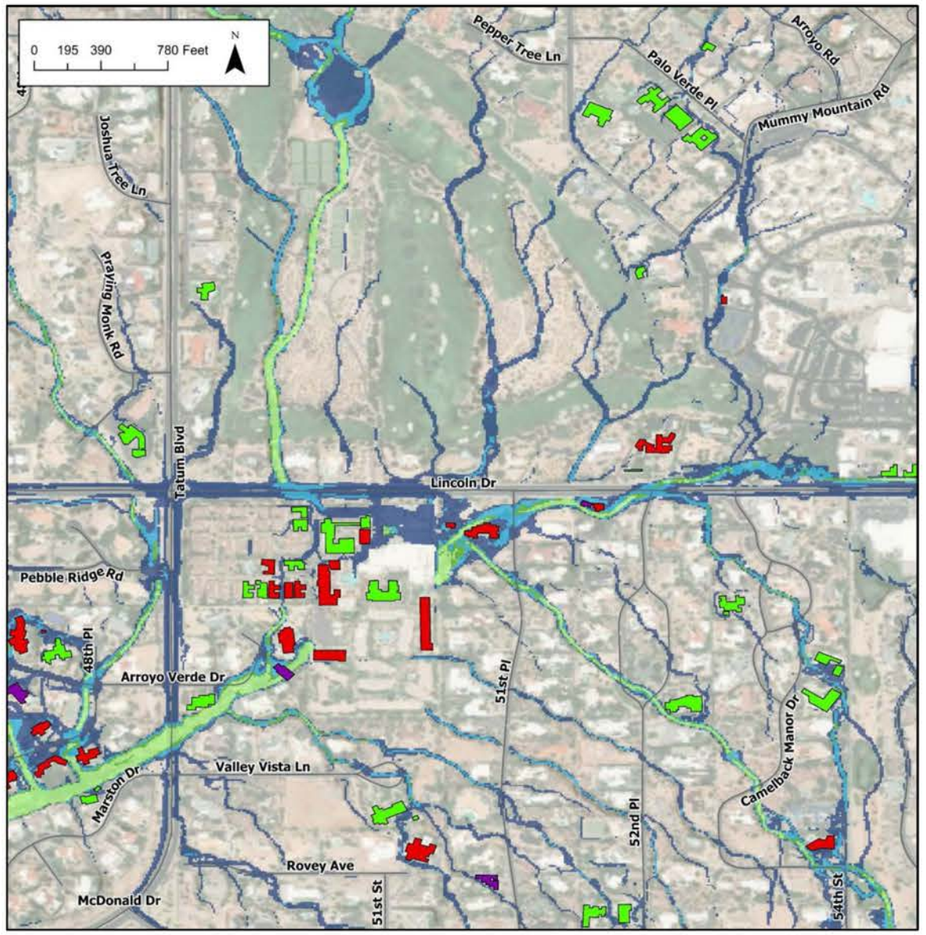
AREA O EROSION POTENTIAL MAP



100yr Adjacent Building Depth
- 6 in - 12 in
- 12 in - 24 in
- > 24 in

Erosion Potential
- Extreme Erosion Potential
- High Erosion Potential
- Moderate Erosion Potential
- Low Erosion Potential

AREA O SEDIMENT DEPOSTION POTENTIAL MAP

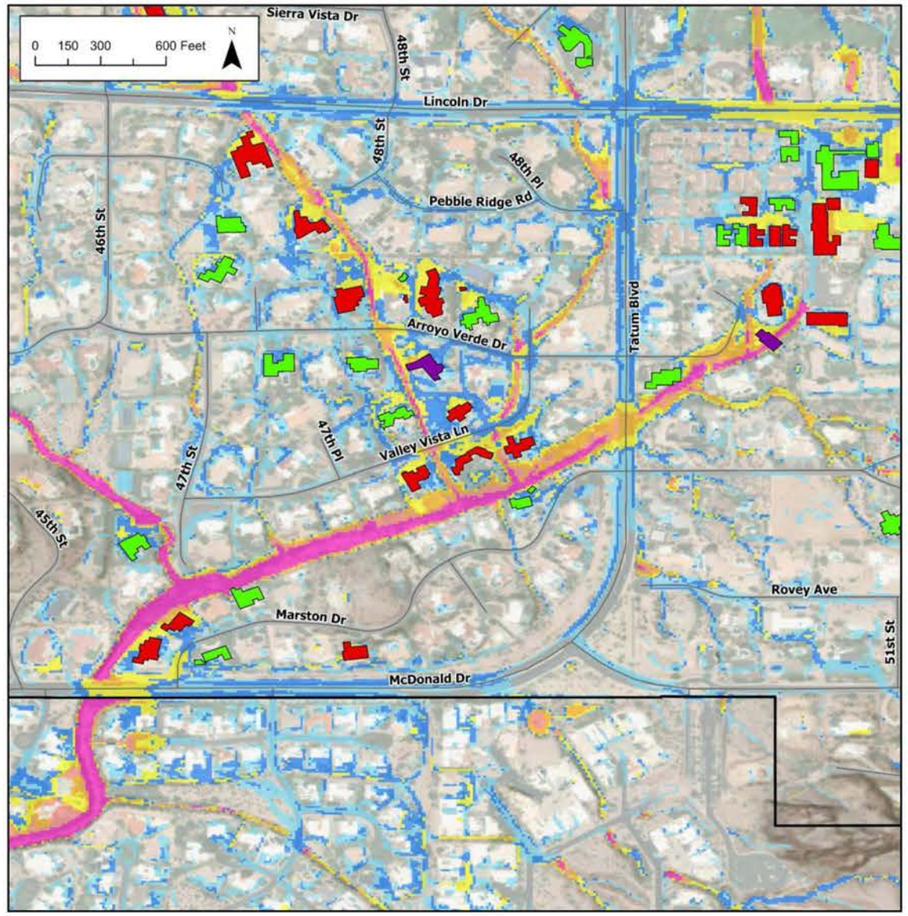


100yr Adjacent Building Depth
- 6 in - 12 in
- 12 in - 24 in
- > 24 in

Sediment Deposition Potential
- Low Deposition Potential
- Moderate Deposition Potential
- High Deposition Potential
- Extreme Deposition Potential

PARADISE VALLEY STORM WATER MASTER PLAN

FLOOD HAZARD AREA: P



100yr Adjacent Building Depth
- 6 in - 12 in
- 12 in - 24 in
- > 24 in

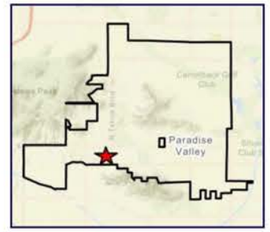
100yr, 6hr Max Flow Depths (ft)
- 0.0 - 0.25
- 0.26 - 0.5
- 0.51 - 1.0
- 1.01 - 2.0
- 2.01 - 3.0
- 3.01 - 4.0
- 4.01 - 27

LOCATION DESCRIPTION

LOCATION: *Tatum Blvd and McDonald Dr*

PROBLEM DESCRIPTION:

- *Identified as a problem in the 2020 Cudia City Wash ADMS and remains a significant flooding hazard.*
- *Existing low water crossing at Tatum Blvd becomes inundated with significant sediment deposition. The existing culvert at McDonald Rd identified as undersized*



FLOOD HAZARD IMPACT: *Road overtopping, structure/property flooding*

PROPERTY OWNERSHIP: *Residential and Town Right of Way*

POTENTIAL UTILITY CONFLICTS: *Tatum Blvd and McDonald Dr dry utilities*

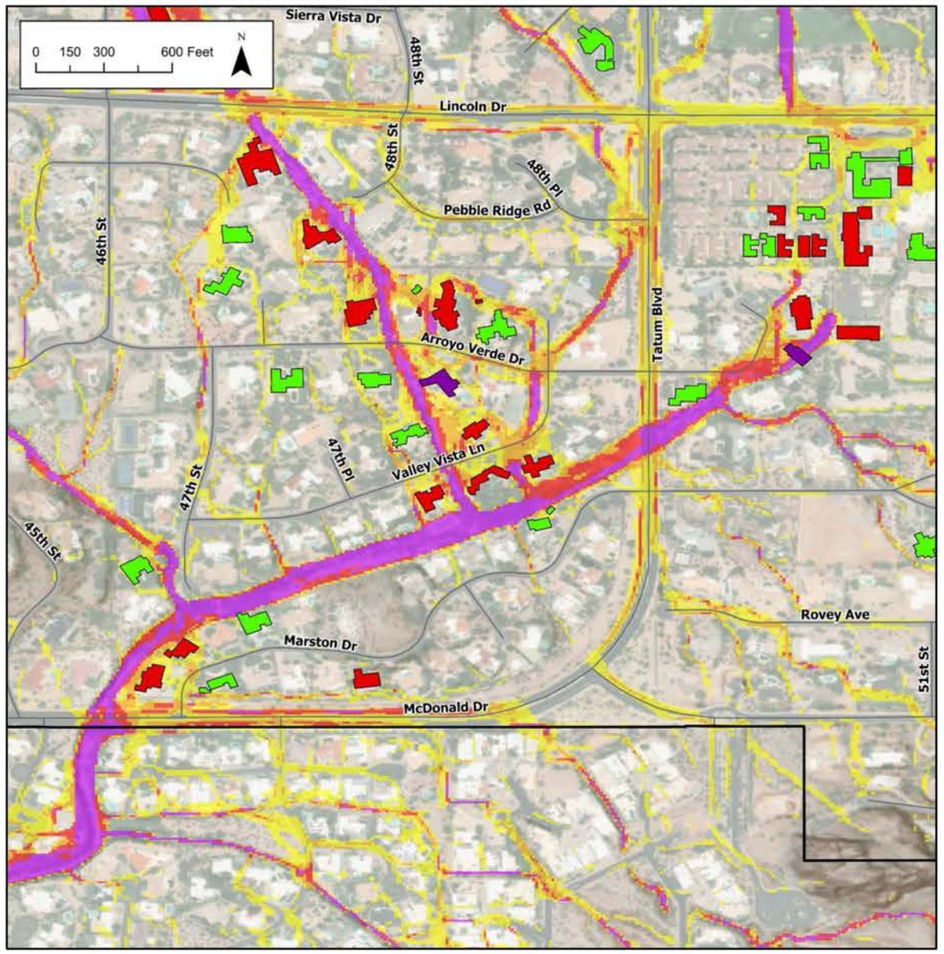
POTENTIAL MITIGATION ALTERNATIVES

- *Storm Drain*
- *Culverts*

IDENTIFIED FLOOD RISKS AND HAZARD CHARACTERIZATIONS

Number of Impacted Structures	*17*
Number of Hydraulic Structures Identified as Undersized	3
Maximum Depth on Roads	2.9 ft
Streets Overtopped by > 0.5 ft	2 Local; 1 Collector
Potential to Impact Emergency Service Access	No
Flood Hazard Designation	Severe Flooding

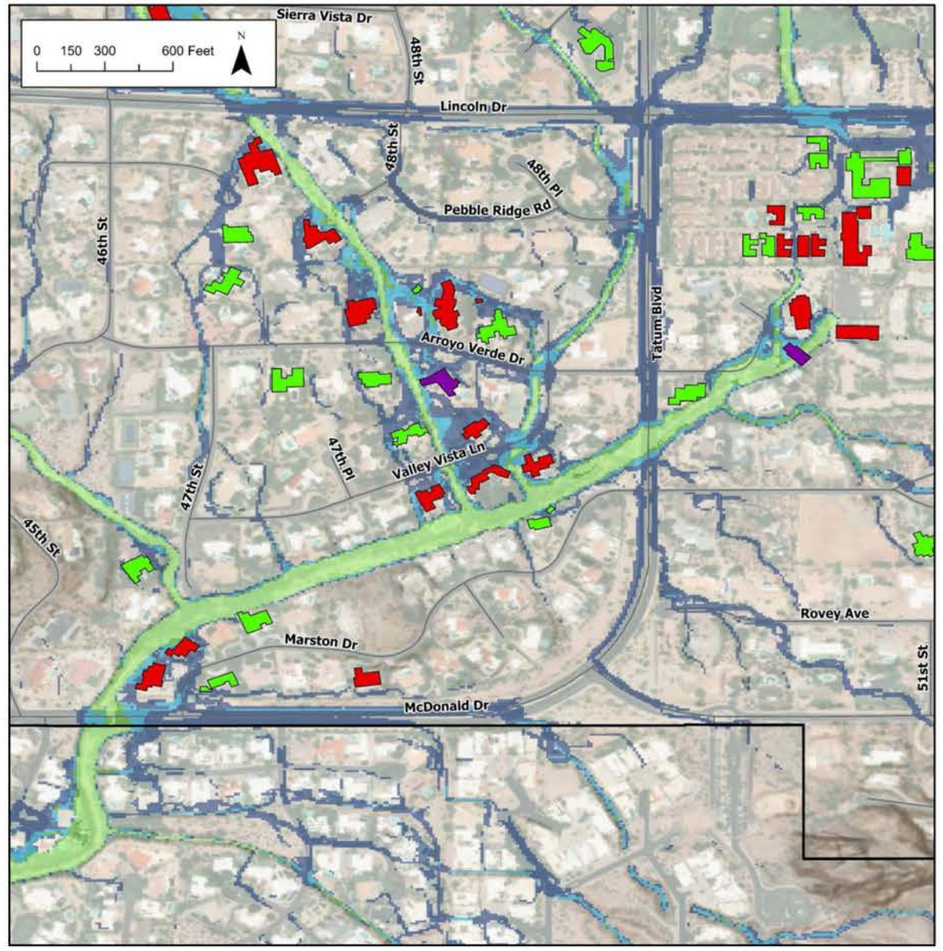
AREA P EROSION POTENTIAL MAP



100yr Adjacent Building Depth
- 6 in - 12 in
- 12 in - 24 in
- > 24 in

Erosion Potential
- Extreme Erosion Potential
- High Erosion Potential
- Moderate Erosion Potential
- Low Erosion Potential

AREA P SEDIMENT DEPOSTION POTENTIAL MAP

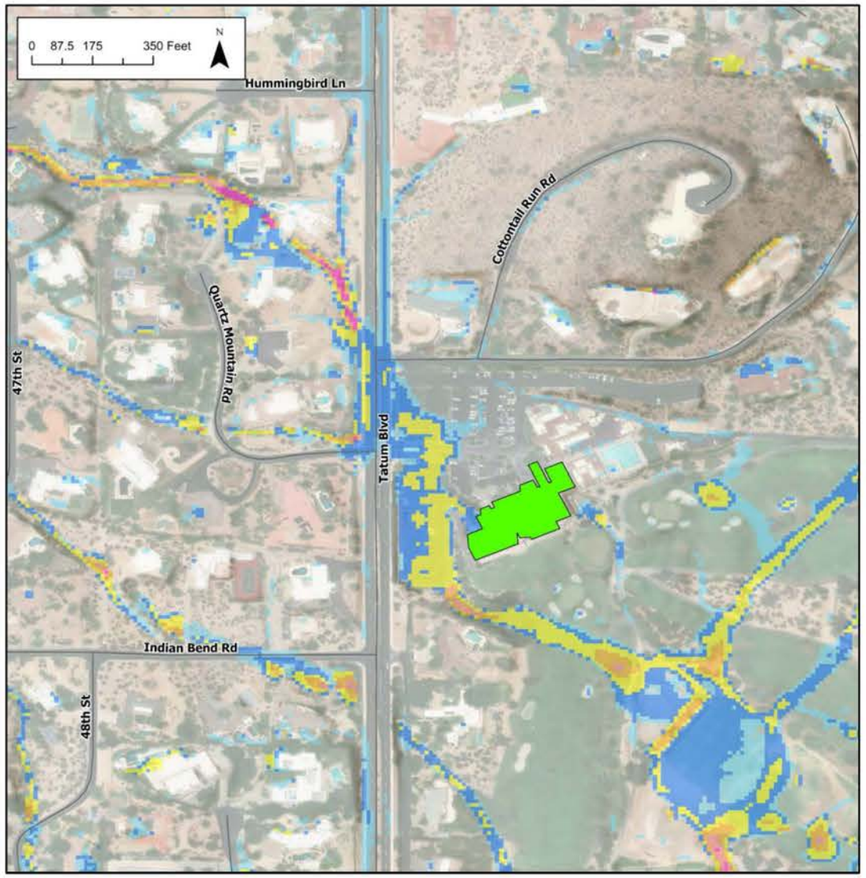


100yr Adjacent Building Depth
- 6 in - 12 in
- 12 in - 24 in
- > 24 in

Sediment Deposition Potential
- Low Deposition Potential
- Moderate Deposition Potential
- High Deposition Potential
- Extreme Deposition Potential

PARADISE VALLEY STORM WATER MASTER PLAN

FLOOD HAZARD AREA: Q



100yr Adjacent Building Depth
- 6 in - 12 in
- 12 in - 24 in
- > 24 in

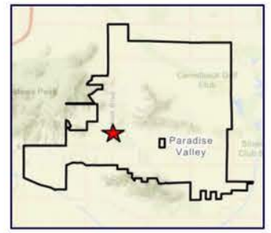
100yr, 6hr Max Flow Depths (ft)
- 0.0 - 0.25
- 0.26 - 0.5
- 0.51 - 1.0
- 1.01 - 2.0
- 2.01 - 3.0
- 3.01 - 4.0
- 4.01 - 27

LOCATION DESCRIPTION

LOCATION: *Tatum Blvd and Cottontail Run Rd*

PROBLEM DESCRIPTION:

- *Identified as a problem in the 2020 Cudia City Wash ADMS and remains a significant flooding hazard. Vehicles have been stuck in the low water crossing during flooding*



FLOOD HAZARD IMPACT: *Road overtopping, structure/property flooding*

PROPERTY OWNERSHIP: *Residential and Town Right of Way*

POTENTIAL UTILITY CONFLICTS: *Tatum Blvd dry utilities*

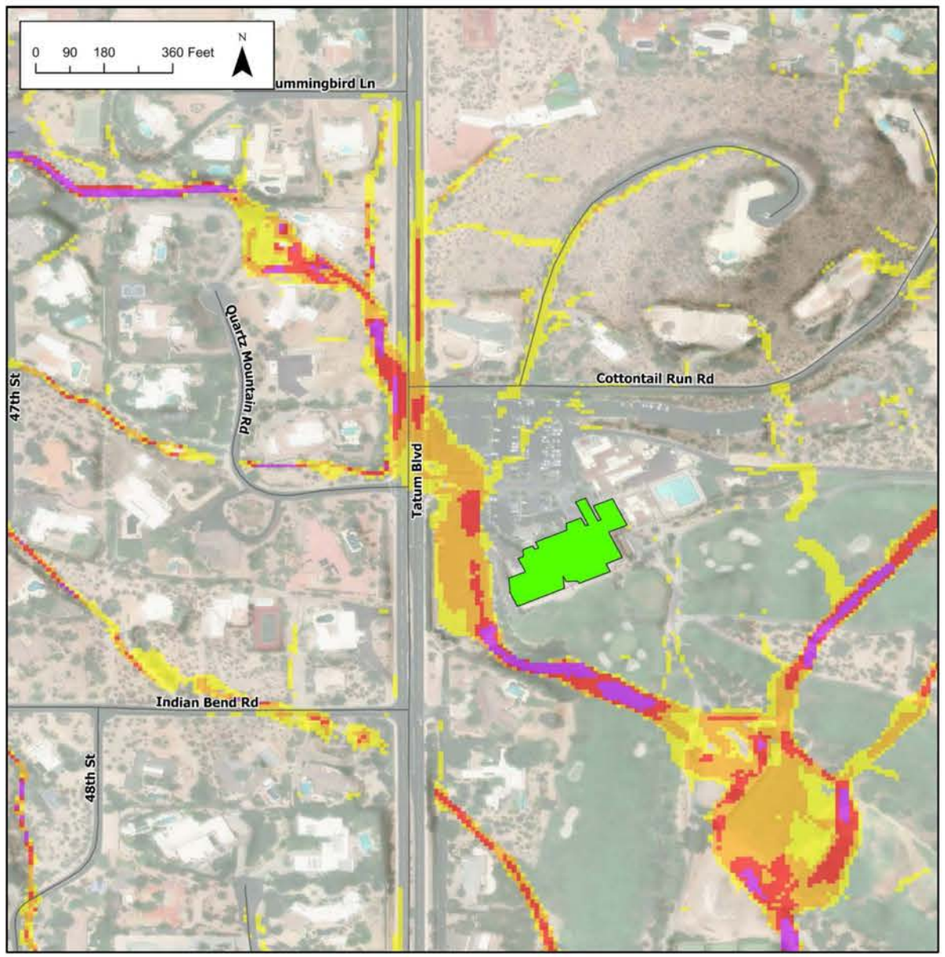
POTENTIAL MITIGATION ALTERNATIVES

- *Storm Drain*
- *Culverts*

IDENTIFIED FLOOD RISKS AND HAZARD CHARACTERIZATIONS

Number of Impacted Structures	*0*
Number of Hydraulic Structures Identified as Undersized	2
Maximum Depth on Roads	0.78 ft
Streets Overtopped by > 0.5 ft	0 Local; 1 Collector
Potential to Impact Emergency Service Access	No
Flood Hazard Designation	Nuisance Flooding

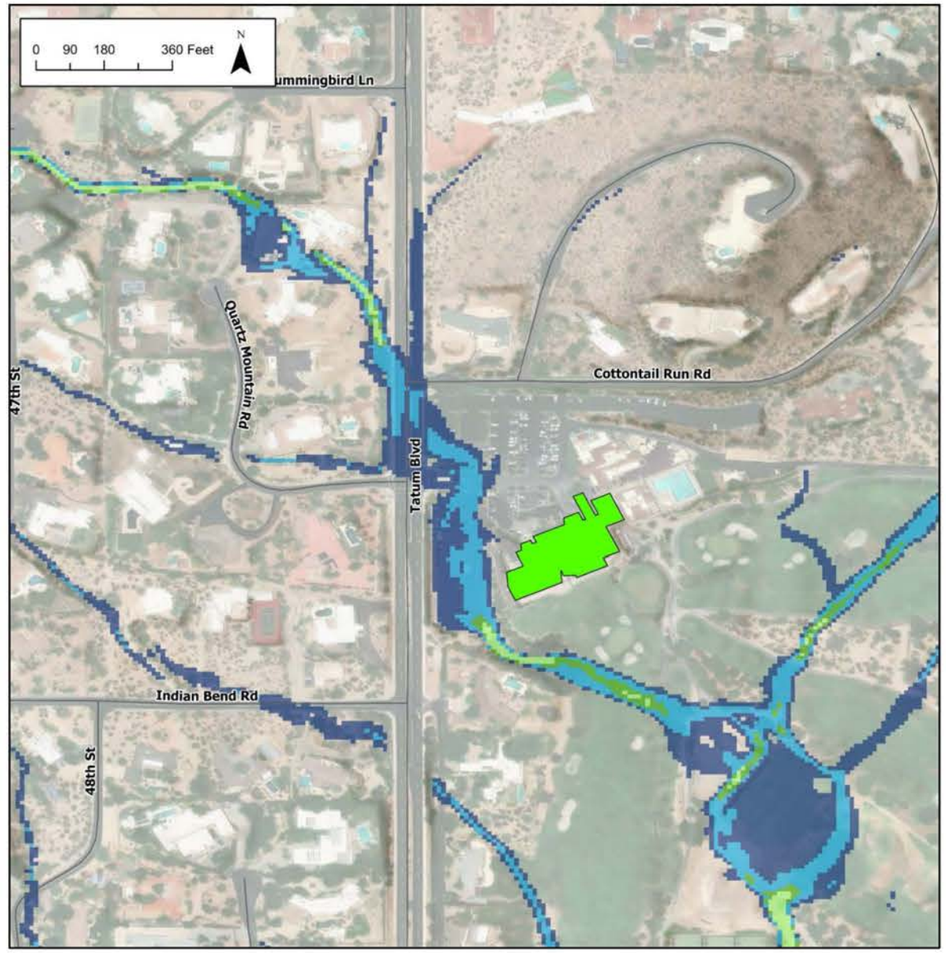
AREA Q EROSION POTENTIAL MAP



100yr Adjacent Building Depth
- 6 in - 12 in
- 12 in - 24 in
- > 24 in

Erosion Potential
- Extreme Erosion Potential
- High Erosion Potential
- Moderate Erosion Potential
- Low Erosion Potential

AREA Q SEDIMENT DEPOSTION POTENTIAL MAP

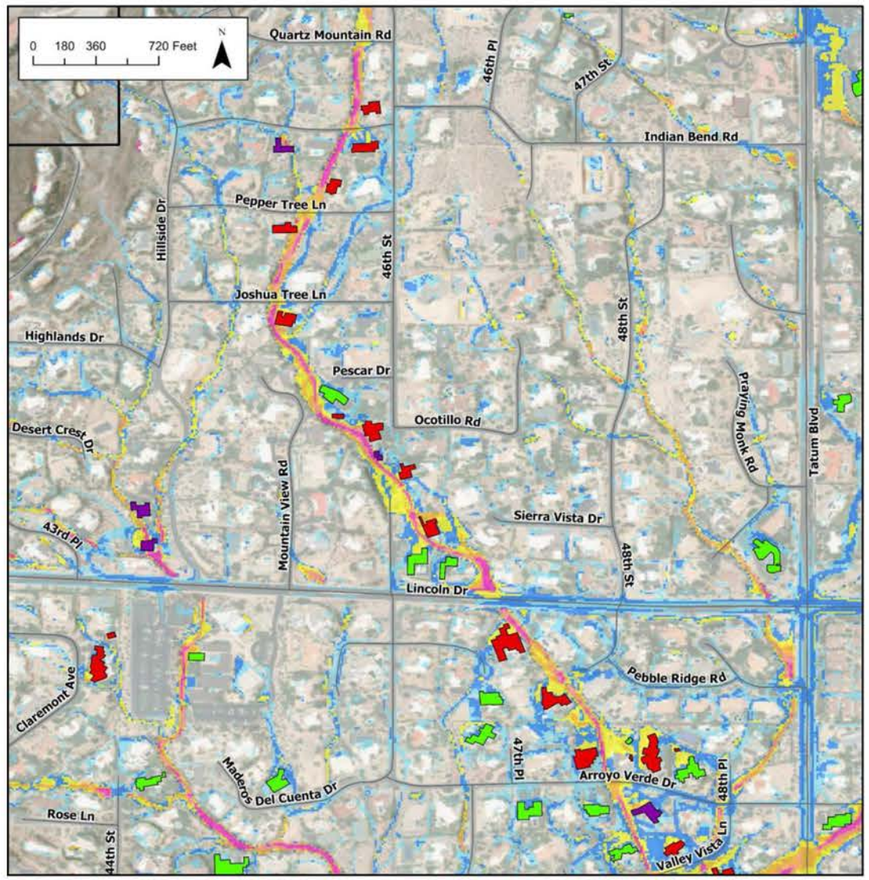


100yr Adjacent Building Depth
- 6 in - 12 in
- 12 in - 24 in
- > 24 in

Sediment Deposition Potential
- Low Deposition Potential
- Moderate Deposition Potential
- High Deposition Potential
- Extreme Deposition Potential

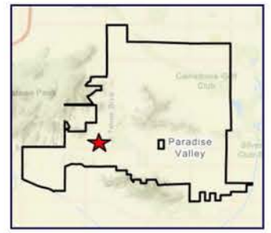
PARADISE VALLEY STORM WATER MASTER PLAN

FLOOD HAZARD AREA: R



LOCATION DESCRIPTION

LOCATION: *46th Street and Lincoln Drive*



PROBLEM DESCRIPTION:

- *Identified as a problem in the 2020 Cudia City Wash ADMS and remains a flooding hazard.*
- *Existing drainage infrastructure is undersized*

FLOOD HAZARD IMPACT: *Road overtopping, structure/property flooding*

PROPERTY OWNERSHIP: *Residential and Town Right of Way*

POTENTIAL UTILITY CONFLICTS: *Lincoln Dr dry utilities*

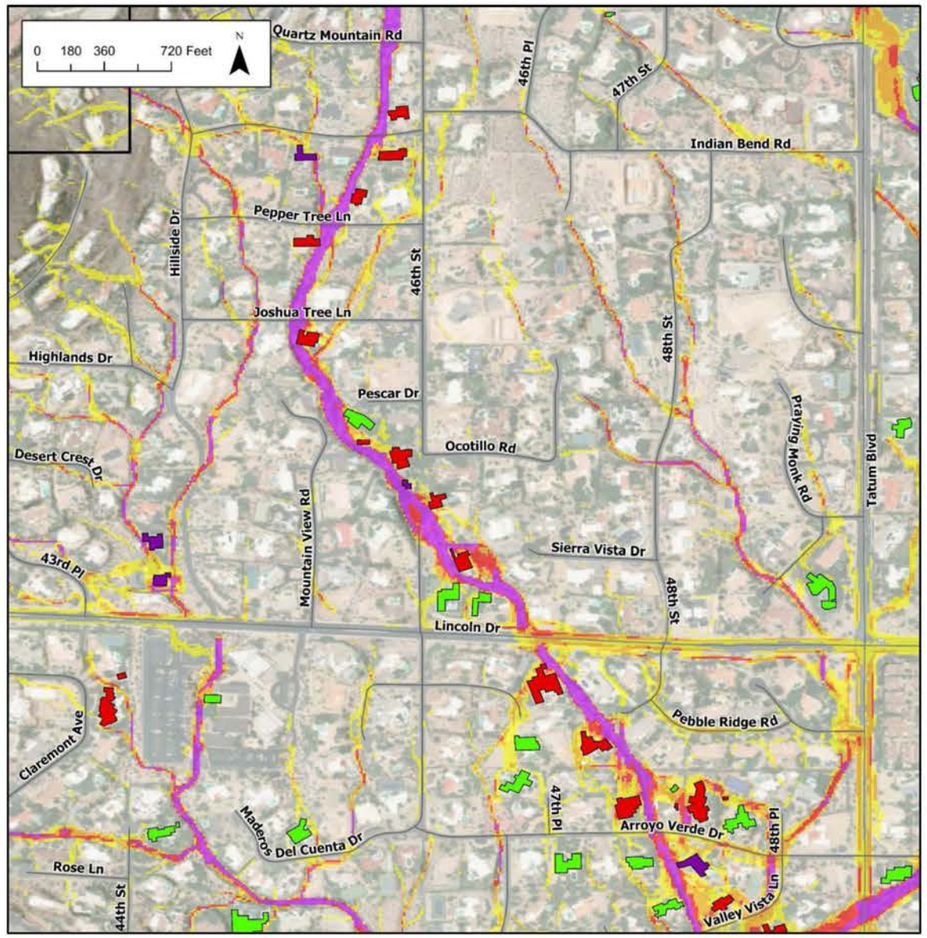
POTENTIAL MITIGATION ALTERNATIVES

- *Storm Drain*
- *Culverts*

IDENTIFIED FLOOD RISKS AND HAZARD CHARACTERIZATIONS

Number of Impacted Structures	*27*
Number of Hydraulic Structures Identified as Undersized	3
Maximum Depth on Roads	2.13 ft
Streets Overtopped by > 0.5 ft	5 Local; 1 Collector
Potential to Impact Emergency Service Access	No
Flood Hazard Designation	Moderate Flooding

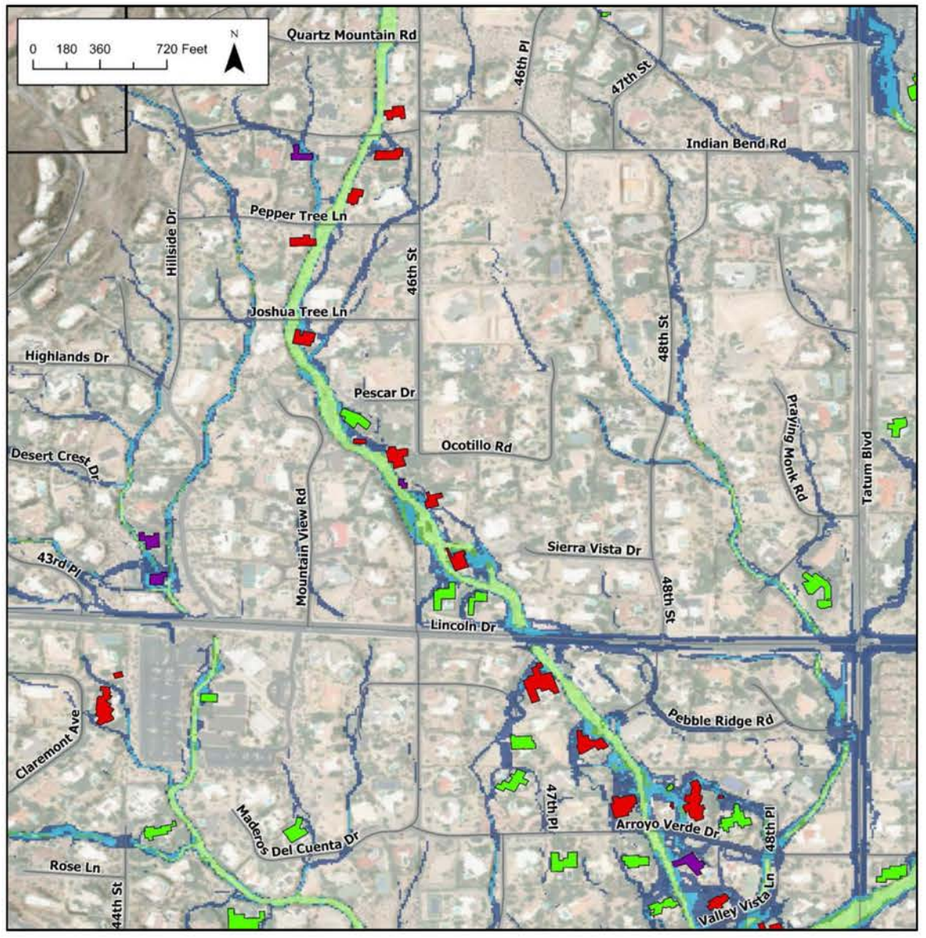
AREA R EROSION POTENTIAL MAP



100yr Adjacent Building Depth
- 6 in - 12 in
- 12 in - 24 in
- > 24 in

Erosion Potential
- Extreme Erosion Potential
- High Erosion Potential
- Moderate Erosion Potential
- Low Erosion Potential

AREA R SEDIMENT DEPOSTION POTENTIAL MAP

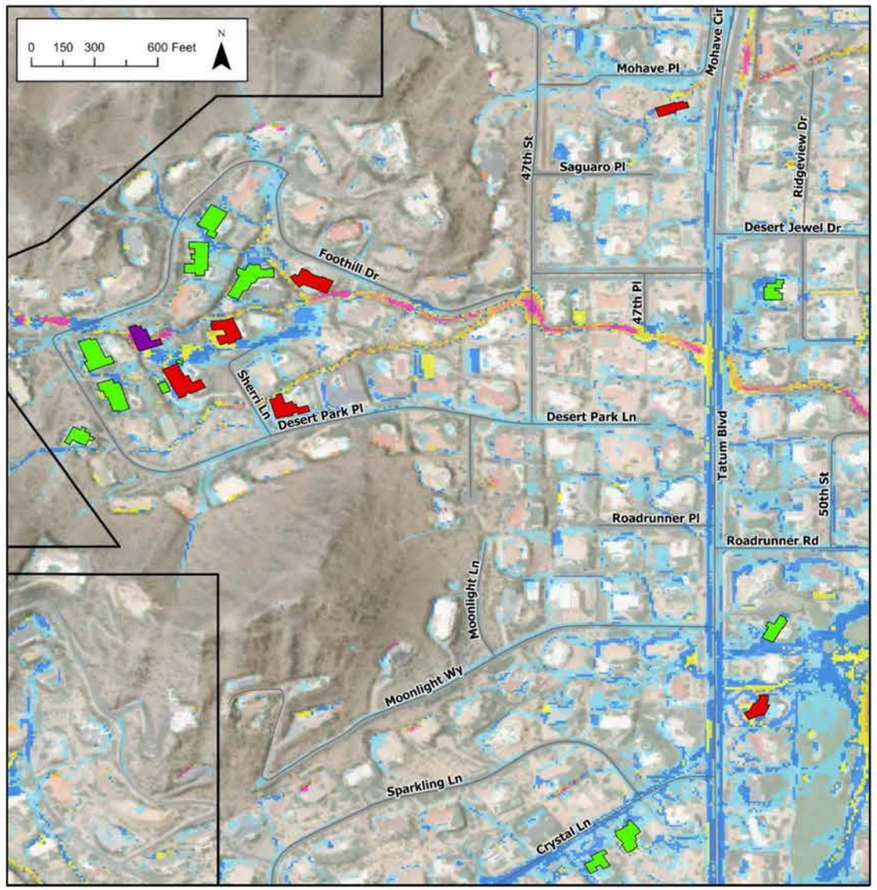


100yr Adjacent Building Depth
- 6 in - 12 in
- 12 in - 24 in
- > 24 in

Sediment Deposition Potential
- Low Deposition Potential
- Moderate Deposition Potential
- High Deposition Potential
- Extreme Deposition Potential

PARADISE VALLEY STORM WATER MASTER PLAN

FLOOD HAZARD AREA: S



100yr Adjacent Building Depth
- 6 in - 12 in
- 12 in - 24 in
- > 24 in

100yr, 6hr Max Flow Depths (ft)
- 0.0 - 0.25
- 0.26 - 0.5
- 0.51 - 1.0
- 1.01 - 2.0
- 2.01 - 3.0
- 3.01 - 4.0
- 4.01 - 27

LOCATION DESCRIPTION

LOCATION: *47th Street and Foothill Drive*

PROBLEM DESCRIPTION:

- *Identified as a problem in the 2019 Drainage Problem Areas Technical Memorandum, remaining a significant flooding hazard during major flood events*
- *Mountain runoff overtops 47th St by greater than 4 ft*



FLOOD HAZARD IMPACT: *Road overtopping, structure/property flooding*

PROPERTY OWNERSHIP: *Residential and Town Right of Way*

POTENTIAL UTILITY CONFLICTS: *Tatum Blvd storm drain and dry utilities*

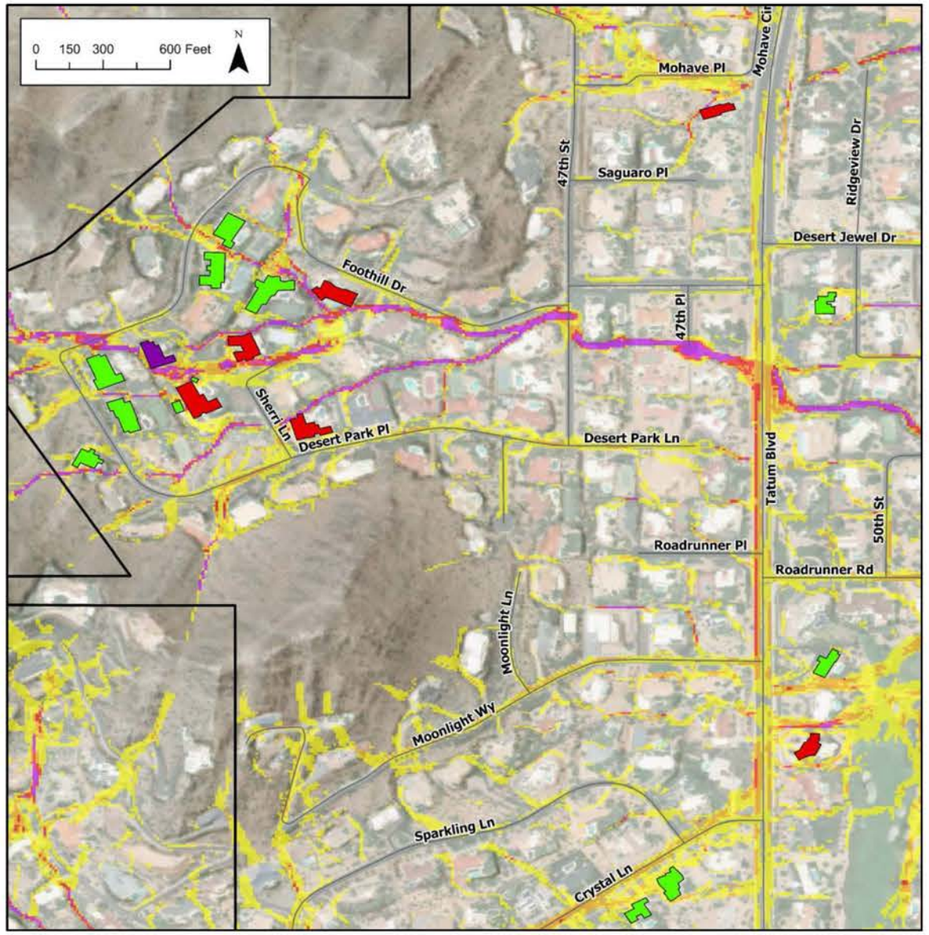
POTENTIAL MITIGATION ALTERNATIVES

- *Storm Drain*
- *Culverts*

IDENTIFIED FLOOD RISKS AND HAZARD CHARACTERIZATIONS

Number of Impacted Structures	*14*
Number of Hydraulic Structures Identified as Undersized	2
Maximum Depth on Roads	4.32 ft
Streets Overtopped by > 0.5 ft	1 Local; 1 Collector
Potential to Impact Emergency Service Access	Yes
Flood Hazard Designation	Severe Flooding

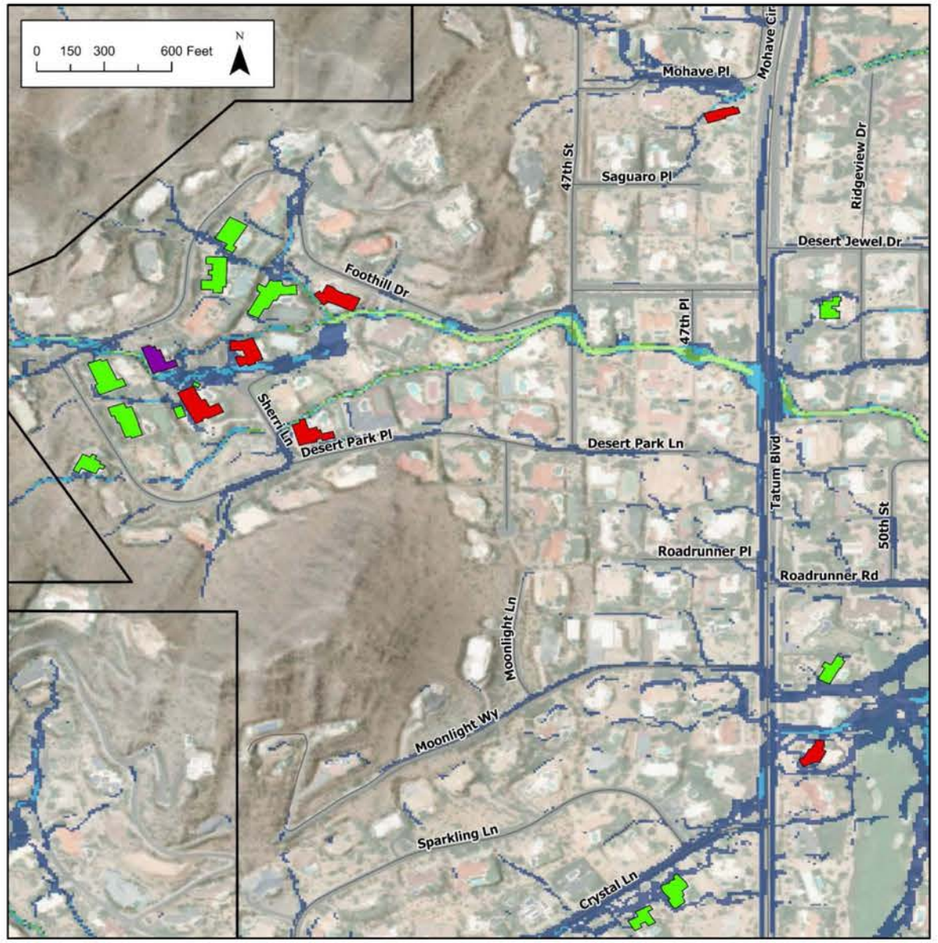
AREA S EROSION POTENTIAL MAP



100yr Adjacent Building Depth
- 6 in - 12 in
- 12 in - 24 in
- > 24 in

Erosion Potential
- Extreme Erosion Potential
- High Erosion Potential
- Moderate Erosion Potential
- Low Erosion Potential

AREA S SEDIMENT DEPOSTION POTENTIAL MAP



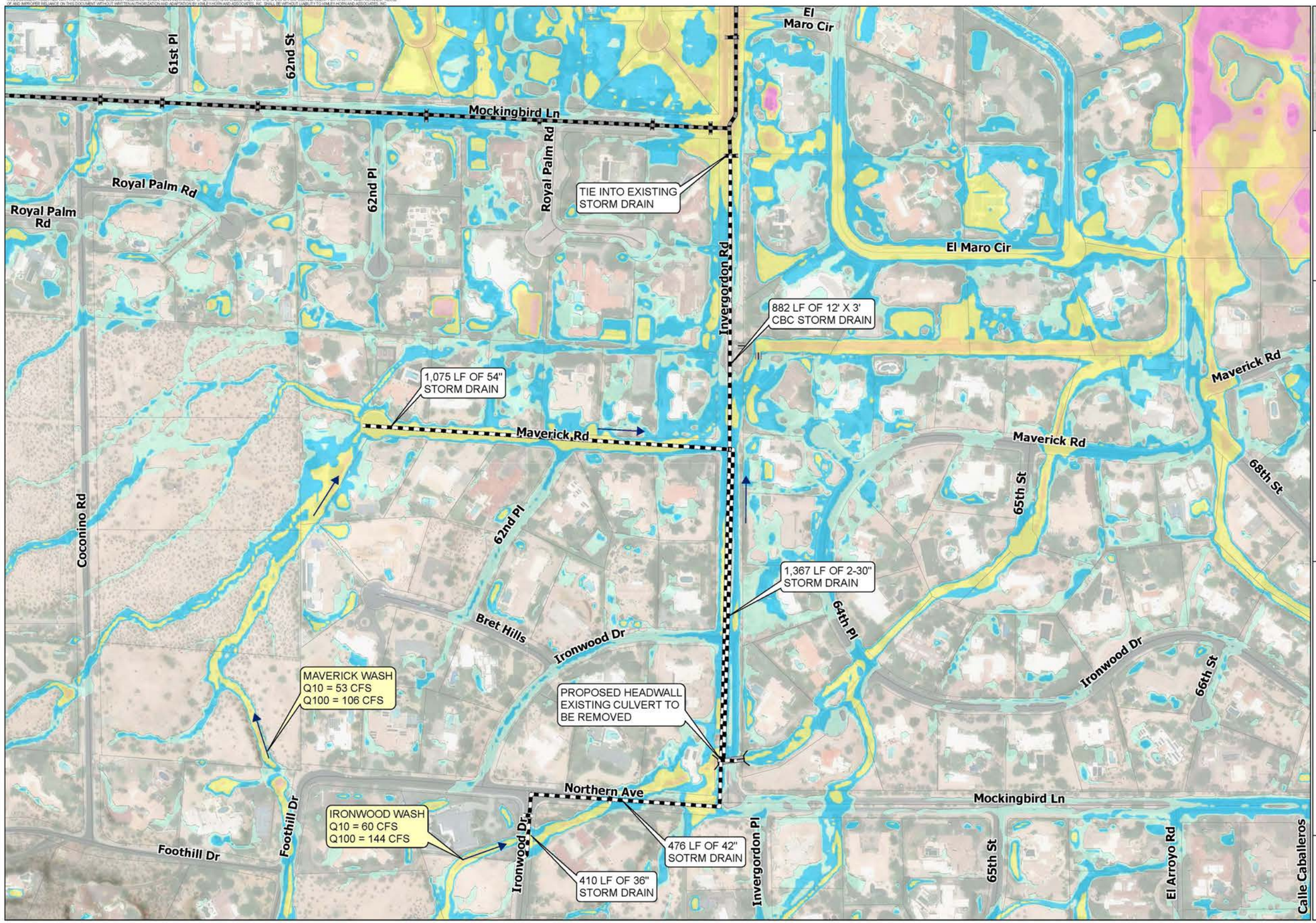
100yr Adjacent Building Depth
- 6 in - 12 in
- 12 in - 24 in
- > 24 in

Sediment Deposition Potential
- Low Deposition Potential
- Moderate Deposition Potential
- High Deposition Potential
- Extreme Deposition Potential

XVII. APPENDIX E – PROJECT ALTERNATIVES, EOPC, AND MATRIX

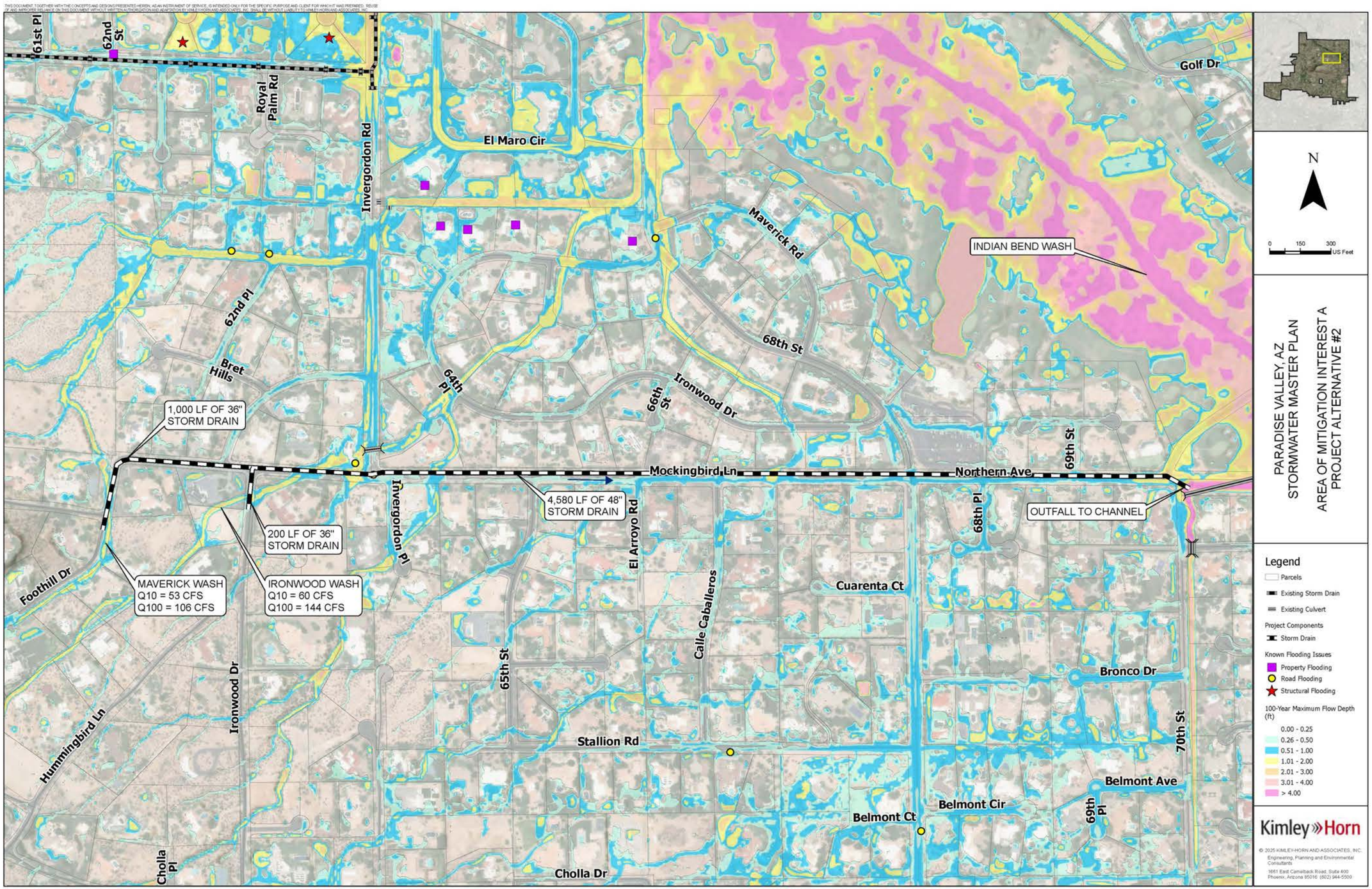
FLOOD HAZARD AREA A ALTERNATIVES

THIS DOCUMENT, TOGETHER WITH THE CONCEPTS AND DESIGNS PRESENTED HEREIN, AS AN INSTRUMENT OF SERVICE, IS INTENDED ONLY FOR THE SPECIFIC PURPOSE AND CLIENT FOR WHICH IT WAS PREPARED. REUSE OF AND IMPROPER RELIANCE ON THIS DOCUMENT WITHOUT WRITTEN AUTHORIZATION AND ADAPTATION BY KIMLEY-HORN AND ASSOCIATES, INC. SHALL BE WITHOUT LIABILITY TO KIMLEY-HORN AND ASSOCIATES, INC.



Conceptual Cost Estimate for Alternative 1

Item	Description	Unit	Quantity	Unit Price	Cost
1	12' x 3' RCBC	LF	1,770	$1,250	$2,212,500
2	36" RCP Storm Drain	LF	1,050	$320	$336,000
3	Storm Drain Connection	EA	1	$3,500	$3,500
4	Catch Basin	EA	21	$12,000	$252,000
5	Manhole	EA	25	$10,000	$250,000
6	Inlet Structure	EA	2	$25,000	$50,000
				Subtotal	3,104,000
7	SWPPP (2%)	LS	1	$62,080	$62,080
8	Mobilization/Demobilization (10%)	LS	1	$310,400	$310,400
9	Design (12%)	LS	1	$372,480	$372,480
10	Construction Management (10%)	LS	1	$310,400	$310,400
11	Utilities (3%)	LS	1	$93,120	$93,120
12	Traffic Control (3%)	LS	1	$93,120	$93,120
				Subtotal	$4,345,600
				Contingency (15%)	$651,840
				Total	$4,997,440


61st Pl
62nd St
Royal Palm Rd
Invergordon Rd
El Maro Cir
Golf Dr
Maverick Rd
INDIAN BEND WASH
62nd Pl
Bret Hills
64th Pl
66th St
Ironwood Dr
68th St
69th St
1,000 LF OF 36" STORM DRAIN
Mockingbird Ln
Northern Ave
4,580 LF OF 48" STORM DRAIN
OUTFALL TO CHANNEL
200 LF OF 36" STORM DRAIN
Invergordon Pl
El Arroyo Rd
68th Pl
Foothill Dr
MAVERICK WASH
Q10 = 53 CFS
Q100 = 106 CFS
IRONWOOD WASH
Q10 = 60 CFS
Q100 = 144 CFS
Cuarenta Ct
Calle Caballeros
65th St
Ironwood Dr
Hummingbird Ln
Bronco Dr
70th St
Stallion Rd
Belmont Ave
Belmont Cir
Belmont Ct
69th Pl
Cholla Pl
Cholla Dr
N
0 150 300 US Feet
AREA OF MITIGATION INTEREST A
PROJECT ALTERNATIVE #2
PARADISE VALLEY, AZ
STORMWATER MASTER PLAN
Legend
Parcels
Existing Storm Drain
Existing Culvert
Project Components
Storm Drain
Known Flooding Issues
Property Flooding
Road Flooding
Structural Flooding
100-Year Maximum Flow Depth (ft)
0.00 - 0.25
0.26 - 0.50
0.51 - 1.00
1.01 - 2.00
2.01 - 3.00
3.01 - 4.00
> 4.00
Kimley»Horn
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Engineering, Planning and Environmental Consultants
1661 East Camelback Road, Suite 400
Phoenix, Arizona 85016 (602) 944-5500

Conceptual Cost Estimate for Alternative 2

Item	Description	Unit	Quantity	Unit Price	Cost
1	36" RCP Storm Drain	LF	1,200	$320	$384,000
2	48" RCP Storm Drain	LF	4,580	$525	$2,404,500
3	Outlet Structure	EA	1	$2,100	$2,100
4	Catch Basin	EA	27	$12,000	$324,000
5	Manhole	EA	32	$10,000	$320,000
				Subtotal	3,434,600
6	SWPPP (1%)	LS	1	$34,346	$34,346
7	Mobilization/Demobilization (10%)	LS	1	$343,460	$343,460
8	Design (12%)	LS	1	$412,152	$412,152
9	Construction Management (10%)	LS	1	$343,460	$343,460
10	Utilities (3%)	LS	1	$103,038	$103,038
11	Traffic Control (3%)	LS	1	$103,038	$103,038
				Subtotal	$4,774,094
				Contingency (15%)	$716,114
				Total	$5,490,208

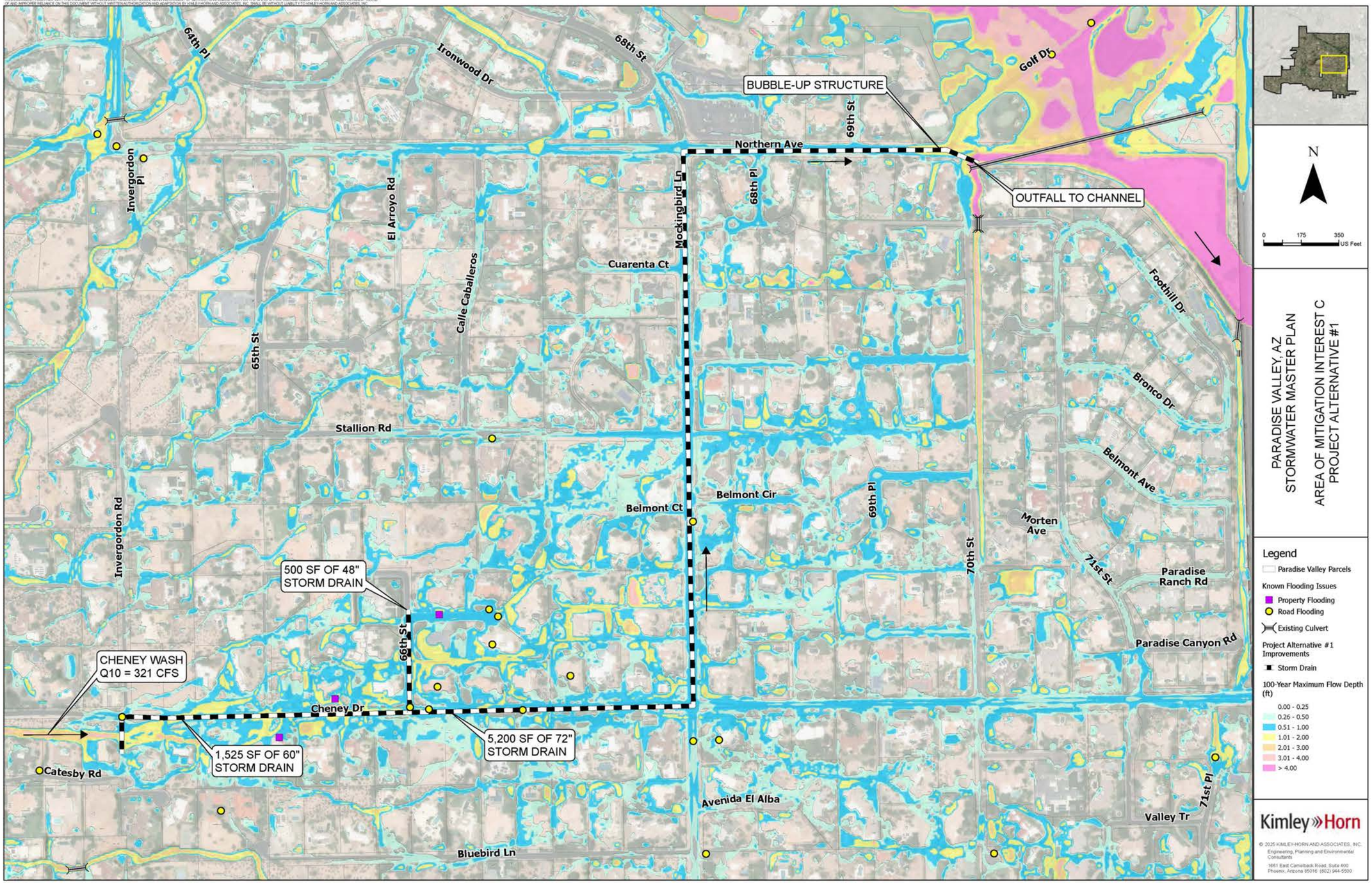
Area A Project Matrix

	Potential Stuctures Protected	Design and Construction Cost	Potential Streets Protected	GSI Benefits	Project Partnership	Multi-use Opportunities	O&M Constraints and Costs	Utility Constraints	Total Raw Score	Total Weighted Score	Significant R/W Acquisition
Priority Weighting 1 - 5	5	5	4	1	4	2	3	3			
Alternative 1	**1**	**2**	**2**	**1**	**2**	**1**	**2**	**1**	**12**	**43**	**No**
Alternative 2	**1**	**1**	**2**	**1**	**2**	**1**	**2**	**1**	**11**	**38**	**No**
Ranking Criteria	1 - 1 to 30 structures 2 - 31 to 50 structures 3 - > 51 structures	1 - Most expensive 2 - Least expensive	1 - Local street benefits only 2 - Collector street or local streets benefit 3 - Multiple collector streets and local streets benefit	1 - No opportunities 2 - Some opportunities	1 -Grant funding or partnerships unlikely 2 - Local partnerships/grant eligible 3 - Local and Federal partnerships/grant eligible	1 - No opportunities 2 - Some opportunities	1 - Maintenance after every storm event 2 - Maintenance at standard intervals	1 - Major constraints 2 - Minor constraints	19 - Highest achievable score	67 - Highest achievable score	

XVII. APPENDIX E – PROJECT ALTERNATIVES, EOPC, AND MATRIX

FLOOD HAZARD AREA C ALTERNATIVES

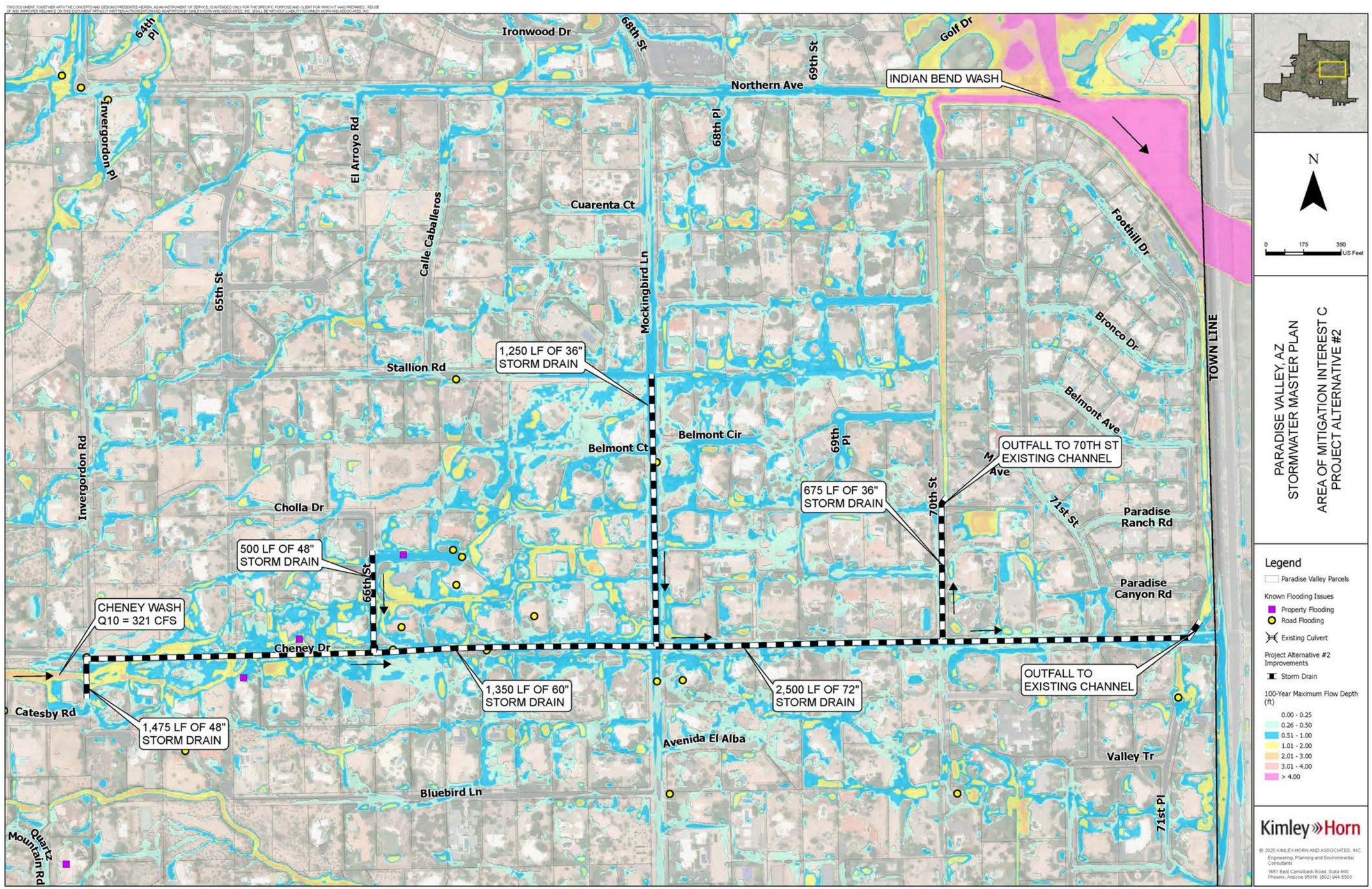
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1661 East Camelback Road, Suite 400
Phoenix, Arizona 85016 (602) 944-5500

Conceptual Cost Estimate for Alternative 1

Item	Description	Unit	Quantity	Unit Price	Cost
1	48" RCP	LF	500	$525	$262,500
2	60" RCP	LF	1,525	$785	$1,197,125
3	72" RCP	LF	5,200	$1,200	$6,240,000
4	Manhole	EA	37	$10,000	$370,000
5	Catch Basin	EA	22	$32,000	$704,000
6	Removal of Concrete Sidewalks and Slabs	SF	8,050	$12	$96,600
				Sub Total	$8,870,225
7	SWPPP (1%)	LS	1	$88,702	$88,702
8	Mobilization/Demobilization (15%)	LS	1	$1,330,534	$1,330,534
9	Design (10%)	LS	1	$887,023	$887,023
10	Construction Management (10%)	LS	1	$887,023	$887,023
11	Utilities (3%)	LS	1	$266,107	$266,107
12	Traffic Control (5%)	LS	1	$443,511	$443,511
				Subtotal	$12,773,124
				Contingency (15%)	$1,915,969
				Total	$14,689,093



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Conceptual Cost Estimate for Alternative 2

Item	Description	Unit	Quantity	Unit Price	Cost
1	60" RCP	LF	1,350	$785	$1,059,750
2	36" RCP	LF	1,950	$320	$624,000
3	48" RCP	LF	1,975	$525	$1,036,875
4	72" RCP	LF	2,500	$1,200	$3,000,000
5	Manhole	EA	36	$10,000	$360,000
6	Catch Basin	EA	24	$32,000	$768,000
7	Removal of Concrete Sidewalks and Slabs	SF	7,825	$12	$93,900
				Sub Total	$6,942,525
8	SWPPP	LS	1	$20,000	$20,000
9	Mobilization/Demobilization (15%)	LS	1	$1,041,379	$1,041,379
10	Design (12%)	LS	1	$833,103	$833,103
11	Construction Management (10%)	LS	1	$694,253	$694,253
12	Utilities (2%)	LS	1	$138,851	$138,851
13	Traffic Control (3%)	LS	1	$208,276	$208,276
				Subtotal	$9,878,386
				Contingency (15%)	$1,481,758
				Total	$11,360,143

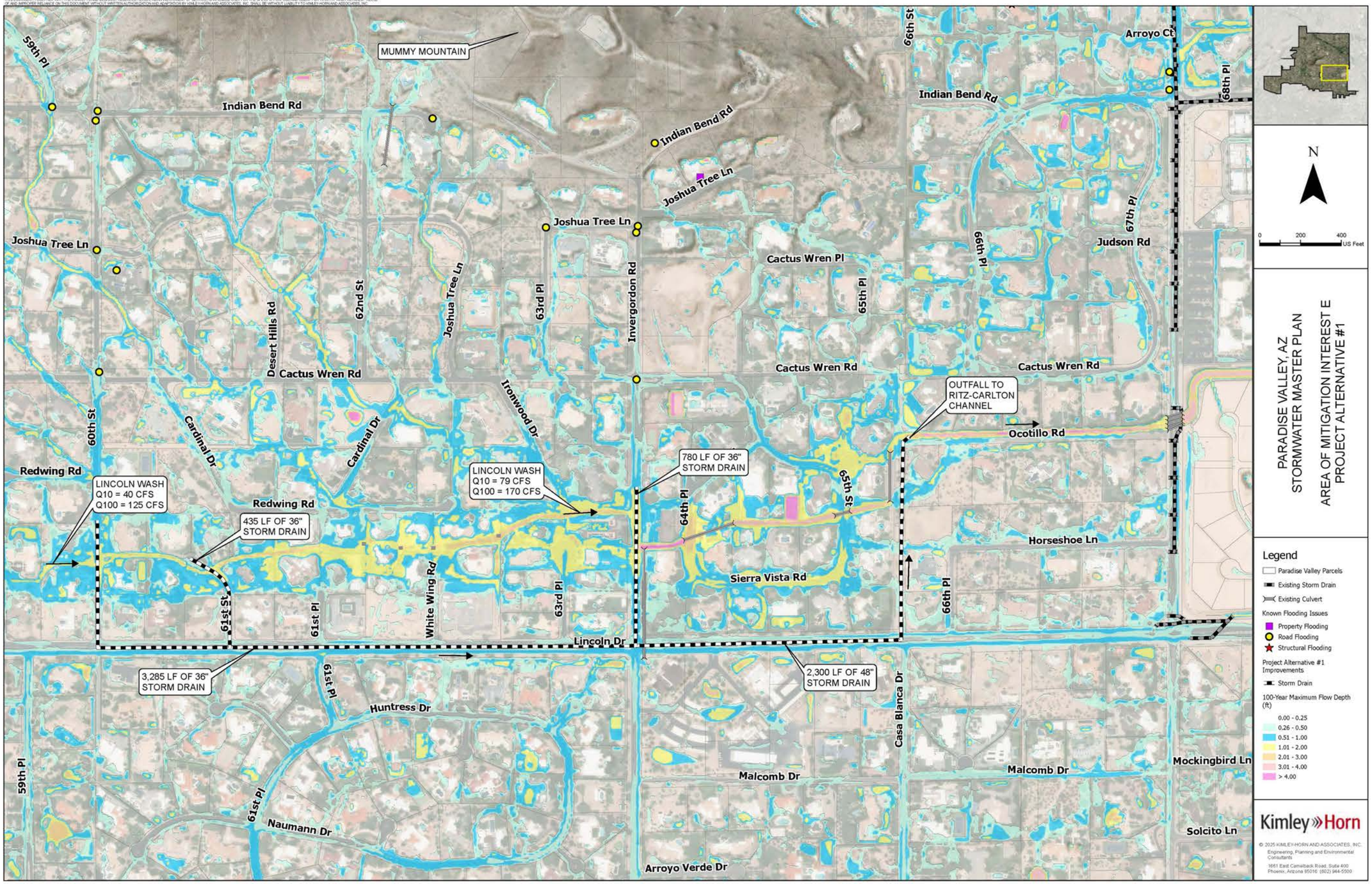
Area C Project Matrix

	Potential Stuctures Protected	Design and Construction Cost	Potential Streets Protected	GSI Benefits	Project Partnership	Multi-use Opportunities	O&M Constraints and Costs	Utility Constraints	Total Raw Score	Total Weighted Score	Significant R/W Aqusition
Priority Weighting 1 - 5	5	5	4	1	4	2	3	3			
Alternative 1	3	1	3	1	1	1	2	1	13	48	No
Alternative 2	3	2	3	1	1	1	2	1	14	53	No
Ranking Criteria	1 - 1 to 30 structures 2 - 31 to 50 structures 3 - > 51 structures	1 - Most expensive 2 - Least expensive	1 - Local street benefits only 2 - Collector street or local streets benefit 3 - Multiple collector streets and local streets benefit	1 - No opportunities 2 - Some opportunities	1 -Grant funding or partnerships unlikely 2 - Local partnerships/grant eligible 3 - Local and Federal partnerships/grant eligible	1 - No opportunities 2 - Some opportunities	1 - Maintenance after every storm event 2 - Maintenance at standard intervals	1 - Major constraints 2 - Minor constraints	19 - Highest achievable score	67 - Highest achievable score	

XVII. APPENDIX E – PROJECT ALTERNATIVES, EOPC, AND MATRIX

FLOOD HAZARD AREA E ALTERNATIVES

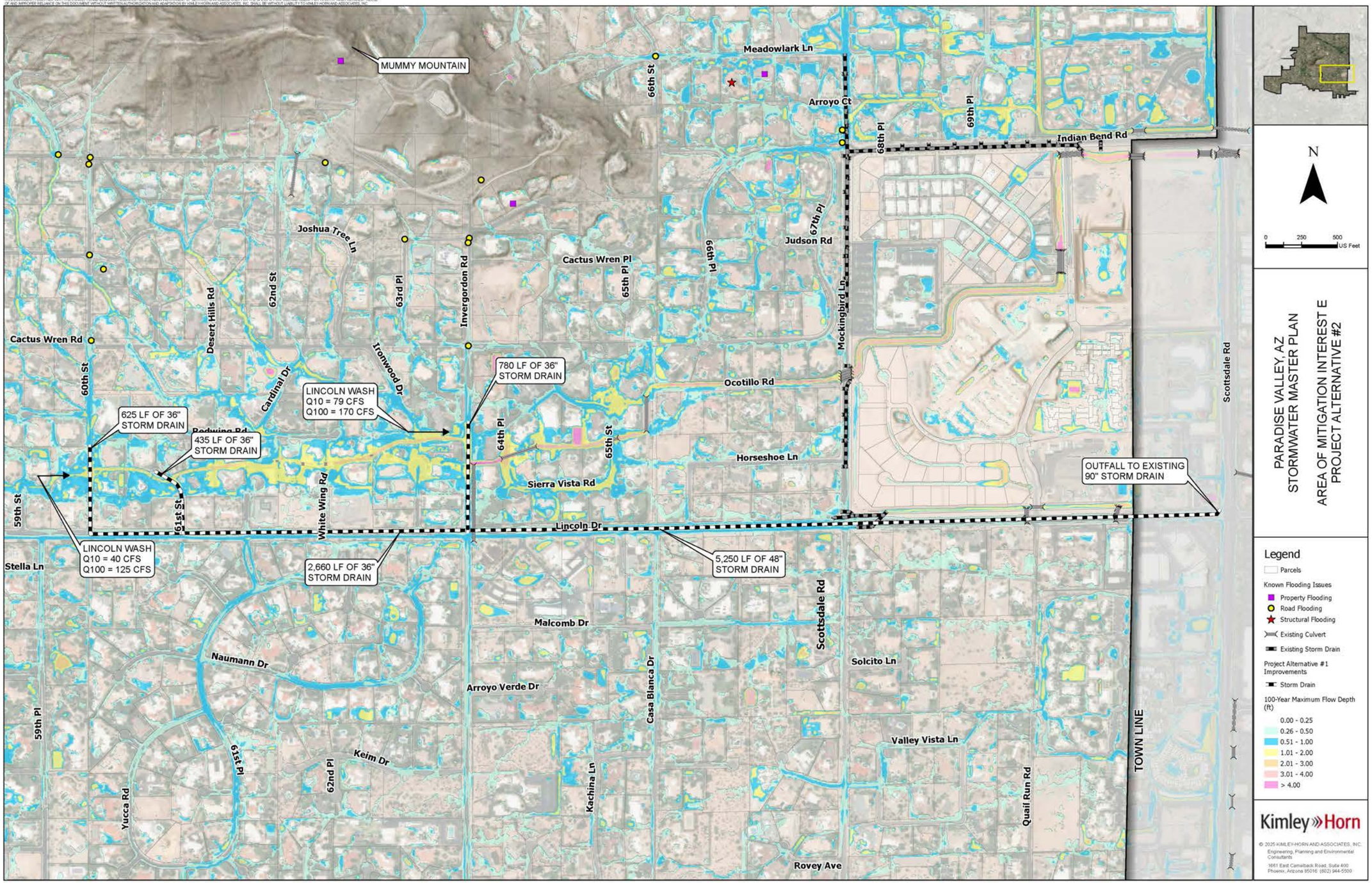
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Conceptual Cost Estimate for Alternative 1

Item	Description	Unit	Quantity	Unit Price	Cost
1	36" Storm Drain Pipe	LF	4,500	$320	$1,440,000
2	48" Storm Drain Pipe	LF	2,300	$525	$1,207,500
3	Manhole	EA	45	$12,000	$540,000
4	Outlet Structure	EA	1	$1,200	$1,200
5	Catch Basin	EA	25	$10,000	$250,000
				Subtotal	$3,438,700
8	SWPPP (1%)	LS	1	$34,387	$34,387
9	Mobilization/Demobilization (15%)	LS	1	$515,805	$515,805
10	Design (12%)	LS	1	$412,644	$412,644
11	Construction Management (10%)	LS	1	$343,870	$343,870
12	Utilities (2%)	LS	1	$68,774	$68,774
13	Traffic Control (2%)	LS	1	$68,774	$68,774
				Subtotal	$4,882,954
				Contingency (20%)	$976,591
				Total	$5,859,545

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Conceptual Cost Estimate for Alternative 2

Item	Description	Unit	Quantity	Unit Price	Cost
1	36" Storm Drain Pipe	LF	4,500	$320	$1,440,000
2	48" Storm Drain Pipe	LF	5,250	$525	$2,756,250
5	Manhole	EA	52	$12,000	$624,000
6	Outlet Structure	EA	1	$1,200	$1,200
7	Catch Basin	EA	25	$10,000	$250,000
				Subtotal	$5,071,450
8	SWPPP (1%)	LS	1	$50,715	$50,715
9	Mobilization/Demobilization (15%)	LS	1	$760,718	$760,718
10	Design (12%)	LS	1	$608,574	$608,574
11	Construction Management (10%)	LS	1	$507,145	$507,145
12	Utilities (2%)	LS	1	$101,429	$101,429
13	Traffic Control (2%)	LS	1	$101,429	$101,429
				Subtotal	$7,201,459
				Subtotal	$7,201,459
				Contingency (20%)	$1,440,292
				Total	$8,641,751

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Conceptual Cost Estimate for Alternative 3

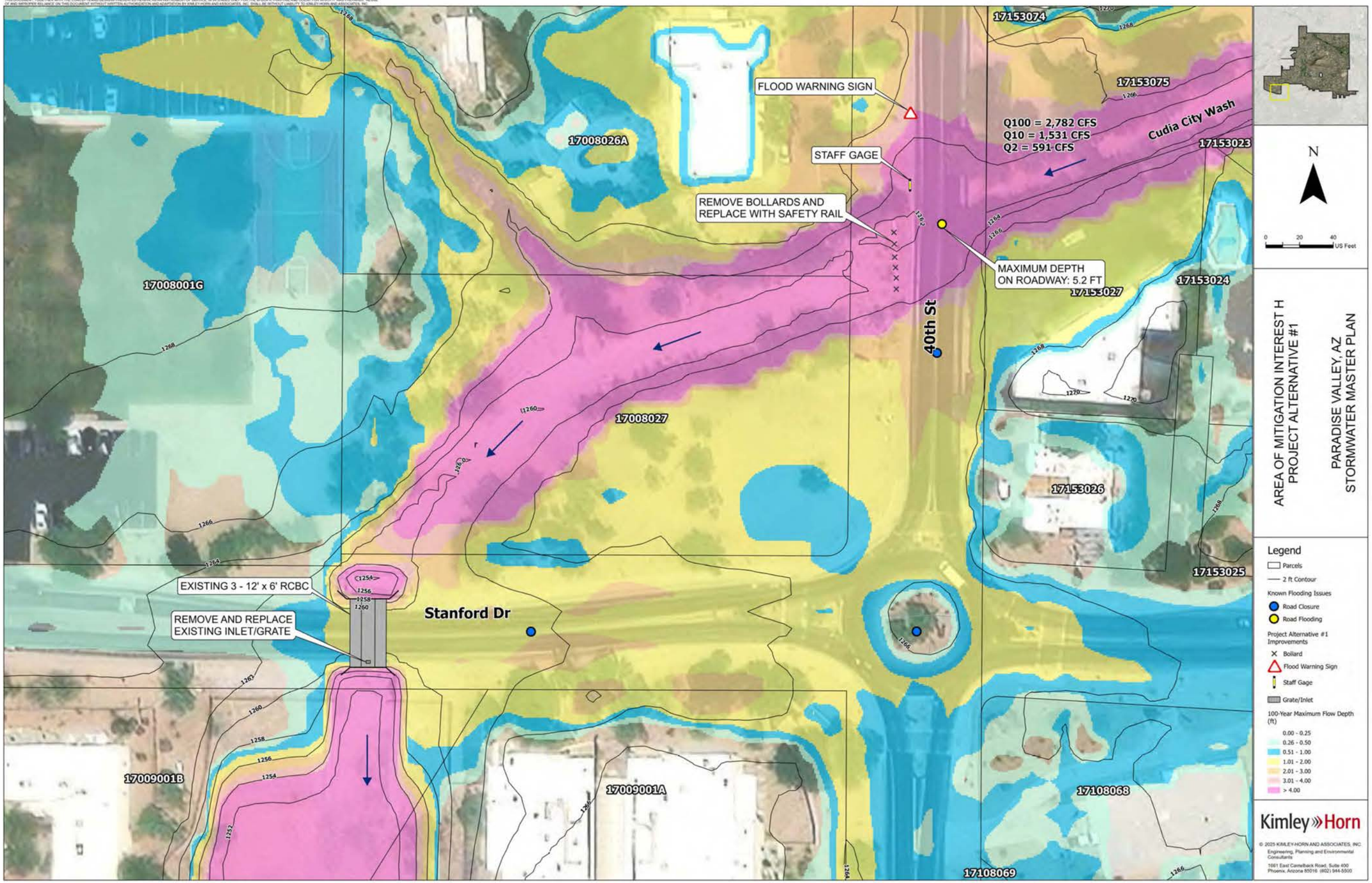
Item	Description	Unit	Quantity	Unit Price	Cost
1	Permeable Pavement	LF	7,900	$28	$221,200
2	Removal of Existing Pavement	SY	52,600	$10	$526,000
				Subtotal	$747,200
3	SWPPP (1%)	LS	1	$7,472	$7,472
4	Mobilization/Demobilization (15%)	LS	1	$112,080	$112,080
5	Design (12%)	LS	1	$89,664	$89,664
6	Construction Management (10%)	LS	1	$74,720	$74,720
7	Utilities (8%)	LS	1	$59,776	$59,776
8	Traffic Control (10%)	LS	1	$74,720	$74,720
				Subtotal	$1,165,632
				Contingency (20%)	$233,126
				Total	$1,398,758

Area E Project Matrix

	Potential Stuctures Protected	Design and Construction Cost	Potential Streets Protected	GSI Benefits	Project Partnership	Multi-use Opportunities	O&M Constraints and Costs	Utility Constraints	Total Raw Score	Total Weighted Score	Significant R/W Acquisition
Priority Weighting 1 - 5	5	5	4	1	4	2	3	3			
Alternative 1	**3**	**2**	**3**	**1**	**2**	**1**	**2**	**1**	**15**	**57**	**No**
Alternative 2	**3**	**1**	**3**	**1**	**1**	**1**	**2**	**1**	**13**	**48**	**No**
Alternative 3	**3**	**3**	**3**	**2**	**2**	**1**	**2**	**2**	**18**	**66**	**No**
Ranking Criteria	1 - 1 to 30 structures 2 - 31 to 50 structures 3 - > 51 structures	1 - Most expensive 2 - Median cost 3 - Least expensive	1 - Local street benefits only 2 - Collector street or local streets benefit 3 - Multiple collector streets and local streets benefit	1 - No opportunities 2 - Some opportunities	1 -Grant funding or partnerships unlikely 2 - Local partnerships/grant eligible 3 - Local and Federal partnerships/grant eligible	1 - No opportunities 2 - Some opportunities	1 - Maintenance after every storm event 2 - Maintenance at standard intervals	1 - Major constraints 2 - Minor constraints	20 - Maximum possible score	72 - Maximum possible score	

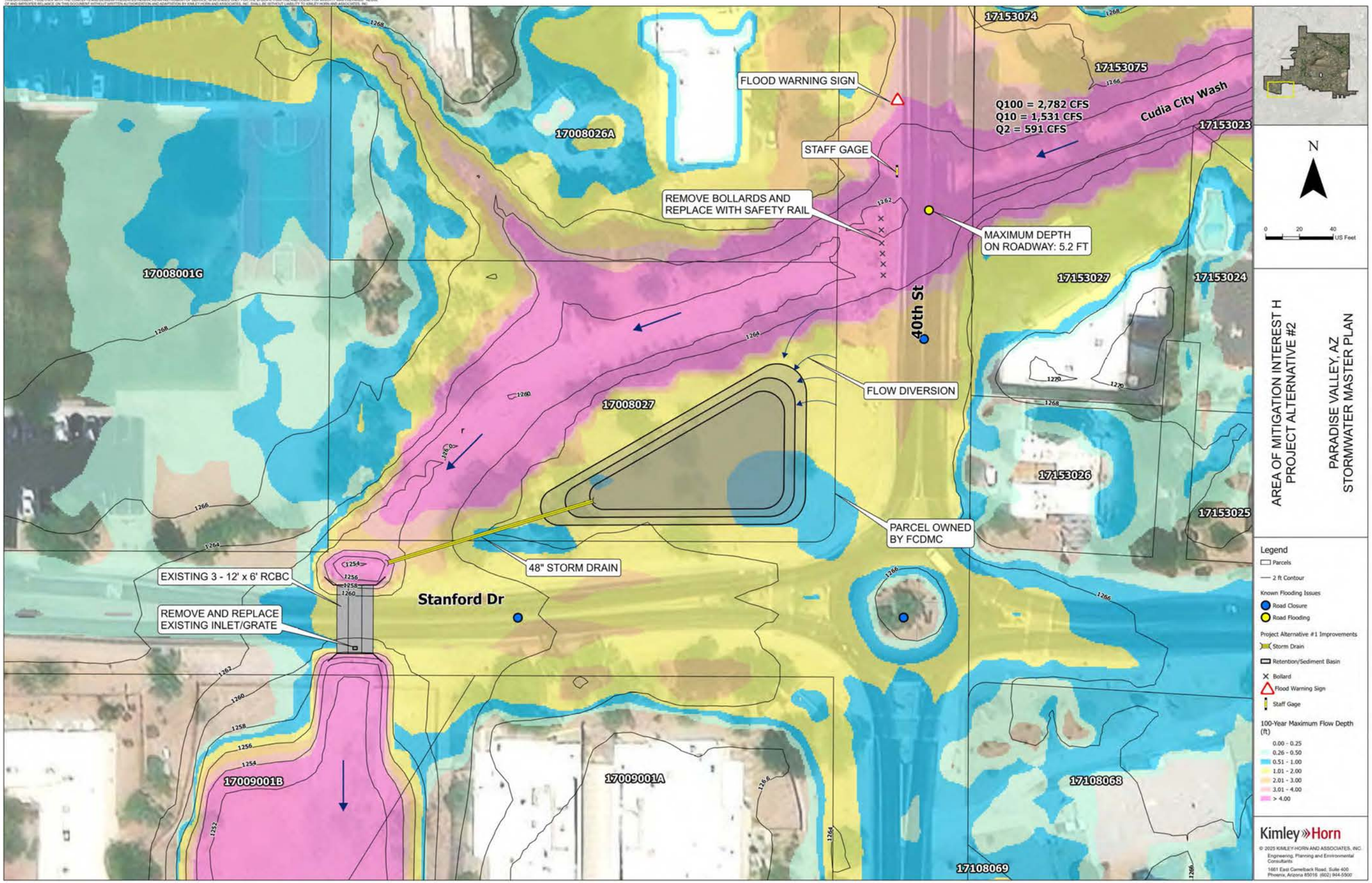
XVII. APPENDIX E – PROJECT ALTERNATIVES, EOPC, AND MATRIX

FLOOD HAZARD AREA H ALTERNATIVES


FLOOD WARNING SIGN
STAFF GAGE
REMOVE BOLLARDS AND REPLACE WITH SAFETY RAIL
MAXIMUM DEPTH ON ROADWAY: 5.2 FT
Q100 = 2,782 CFS
Q10 = 1,531 CFS
Q2 = 591 CFS
Cudia City Wash
40th St
Stanford Dr
EXISTING 3 - 12' x 6' RCBC
REMOVE AND REPLACE EXISTING INLET/GRATE
17008026A
17008001G
17008027
17009001B
17009001A
17153074
17153075
17153023
17153024
17153027
17153026
17153025
17108068
17108069
N
0 20 40 US Feet
AREA OF MITIGATION INTEREST H
PROJECT ALTERNATIVE #1
PARADISE VALLEY, AZ
STORMWATER MASTER PLAN
Legend
Parcels
2 ft Contour
Known Flooding Issues
Road Closure
Road Flooding
Project Alternative #1 Improvements
Bollard
Flood Warning Sign
Staff Gage
Grate/Inlet
100-Year Maximum Flow Depth (ft)
0.00 - 0.25
0.26 - 0.50
0.51 - 1.00
1.01 - 2.00
2.01 - 3.00
3.01 - 4.00
> 4.00
Kimley»Horn
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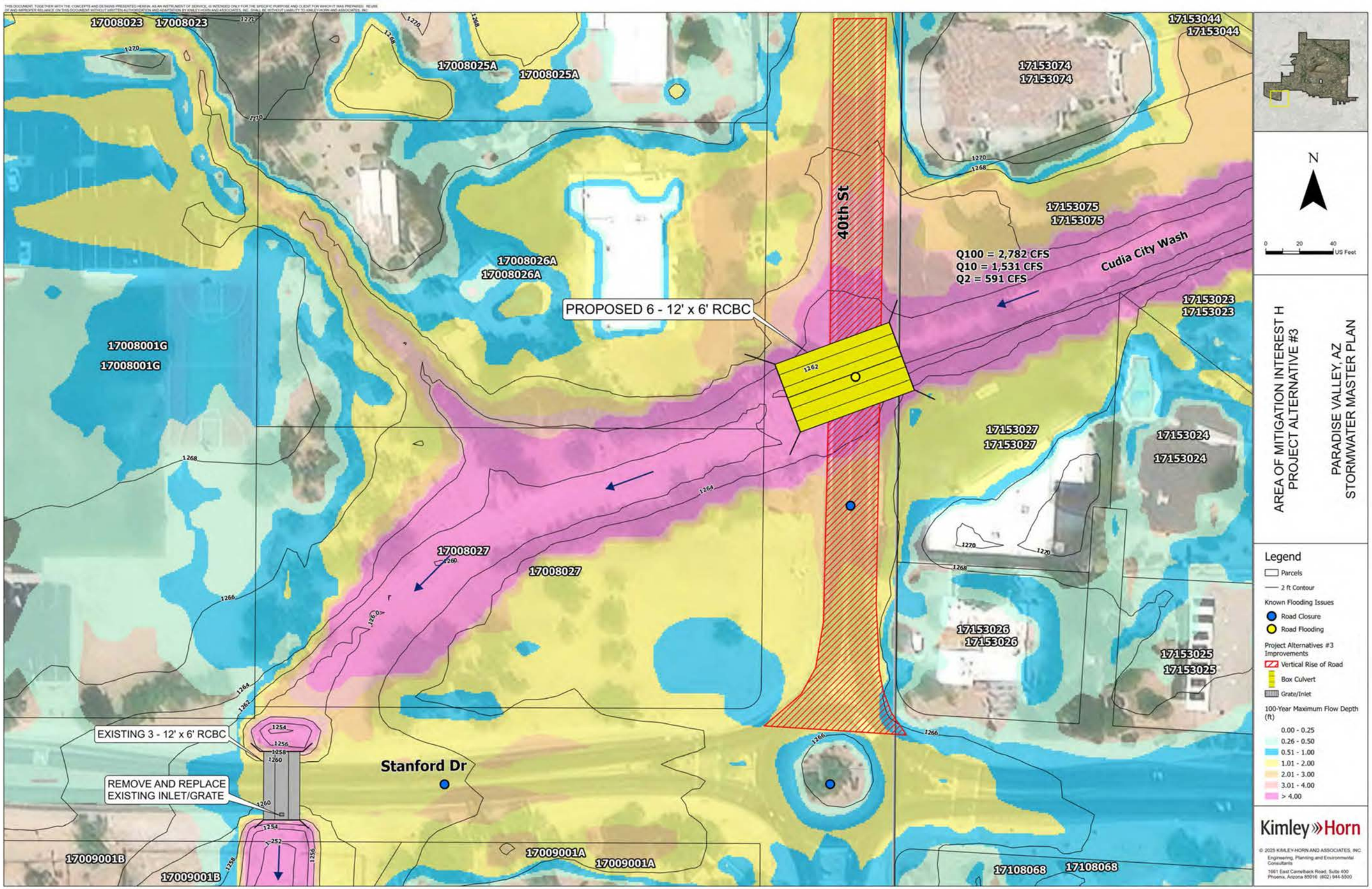
Conceptual Cost Estimate for Alternative 1

Item	Description	Unit	Quantity	Unit Price	Cost
1	Staff Gage	EA	1	$150	$150
2	Flood Warning Sign	EA	1	$250	$250
3	Protective Railing	LF	50	$175	$8,750
4	Removal of Curb and Gutter	LF	3	$250	$750
5	Curb & Gutter	LF	3	$100	$300
6	Concrete Sidewalk	SF	10	$35	$350
7	Storm Drain Pipe 36"	SF	15	$375	$5,625
8	Remove Bollards	EA	6	$260	$1,560
9	Removal of Pipe	LF	15	$75	$1,125
				Sub Total	$18,860
10	SWPPP	LS	1	$1,000	$1,000
11	Mobilization/Demobilization	LS	1	$15,000	$15,000
12	Design	LS	1	$15,000	$15,000
13	Construction Management	LS	1	$5,000	$5,000
14	Utilities	LS	1	$1,000	$1,000
15	Traffic Control	LS	1	$1,000	$1,000
				Subtotal	$56,860
				Contingency (20%)	$11,372
				Total	$68,232


FLOOD WARNING SIGN
STAFF GAGE
REMOVE BOLLARDS AND REPLACE WITH SAFETY RAIL
MAXIMUM DEPTH ON ROADWAY: 5.2 FT
Q100 = 2,782 CFS
Q10 = 1,531 CFS
Q2 = 591 CFS
Cudia City Wash
40th St
FLOW DIVERSION
PARCEL OWNED BY FCDMC
48" STORM DRAIN
EXISTING 3 - 12' x 6' RCBC
REMOVE AND REPLACE EXISTING INLET/GRATE
Stanford Dr
17008026A
17008001G
17008027
17009001B
17009001A
17153074
17153075
17153023
17153027
17153024
17153026
17153025
17108068
17108069
N
0 20 40 US Feet
AREA OF MITIGATION INTEREST H
PROJECT ALTERNATIVE #2
PARADISE VALLEY, AZ
STORMWATER MASTER PLAN
Legend
Parcels
2 ft Contour
Known Flooding Issues
Road Closure
Road Flooding
Project Alternative #1 Improvements
Storm Drain
Retention/Sediment Basin
Bollard
Flood Warning Sign
Staff Gage
100-Year Maximum Flow Depth (ft)
0.00 - 0.25
0.26 - 0.50
0.51 - 1.00
1.01 - 2.00
2.01 - 3.00
3.01 - 4.00
> 4.00
Kimley»Horn
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Conceptual Cost Estimate for Alternative 2

Item	Description	Unit	Quantity	Unit Price	Cost
1	Storm Drain Outlet	EA	1	$1,500	$1,500
2	Storm Drain Pipe 48"	LF	110	$410	$45,100
3	Manhole	EA	1	$10,000	$10,000
4	Staff Gage	EA	1	$150	$150
5	Flood Warning Sign	EA	1	$250	$250
6	Protective Railing	LF	50	$175	$8,750
7	Removal of Curb and Gutter	LF	3	$250	$750
8	Curb & Gutter	LF	3	$100	$300
9	Concrete Sidewalk	SF	10	$35	$350
10	Storm Drain Pipe 36"	SF	15	$375	$5,625
11	Remove Bollards	EA	6	$260	$1,560
12	Removal of Pipe	LF	15	$75	$1,125
13	Riprap	CY	5	$120	$600
14	Channel Excavation	CY	8,595	$25	$214,875
15	Diversion Structure	LS	1	$45,000	$45,000
16	Basin Excavation	CY	8,470	$18	$152,460
17	Landscaping	LS	1	$7,000	$7,000
				Sub Total	$495,395
18	SWPPP (3%)	LS	1	$14,862	$14,862
19	Mobilization/Demobilization	LS	1	$75,000	$75,000
20	Design (15%)	LS	1	$74,309	$74,309
21	Construction Management (10%)	LS	1	$49,540	$49,540
22	Utilities (2%)	LS	1	$9,908	$9,908
23	Traffic Control (3%)	LS	1	$14,862	$14,862
				Subtotal	$733,875
				Contingency (20%)	$146,775
				Total	$880,650


17008023
17008023
17008025A
17008025A
17153044
17153044
17153074
17153074
40th St
17153075
17153075
Q100 = 2,782 CFS
Q10 = 1,531 CFS
Q2 = 591 CFS
Cudia City Wash
17008026A
17008026A
PROPOSED 6 - 12' x 6' RCBC
17153023
17153023
17008001G
17008001G
17153027
17153027
17153024
17153024
17008027
17008027
17153026
17153026
17153025
17153025
EXISTING 3 - 12' x 6' RCBC
REMOVE AND REPLACE
EXISTING INLET/GRATE
Stanford Dr
17009001B
17009001B
17009001A
17009001A
17108068
17108068
N
0 20 40 US Feet
AREA OF MITIGATION INTEREST H
PROJECT ALTERNATIVE #3
PARADISE VALLEY, AZ
STORMWATER MASTER PLAN
Legend
Parcels
2 ft Contour
Known Flooding Issues
Road Closure
Road Flooding
Project Alternatives #3 Improvements
Vertical Rise of Road
Box Culvert
Grate/Inlet
100-Year Maximum Flow Depth (ft)
0.00 - 0.25
0.26 - 0.50
0.51 - 1.00
1.01 - 2.00
2.01 - 3.00
3.01 - 4.00
> 4.00
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Conceptual Cost Estimate for Alternative 3

Item	Description	Unit	Quantity	Unit Price	Cost
1	Manhole	EA	3	$10,000	$30,000
2	6 - 12' x 6' RCBC	LF	40	$21,000	$840,000
3	New Wingwalls	LS	1	$30,000	$30,000
4	Removal of Curb and Gutter	LF	3	$250	$750
5	Curb & Gutter	LF	3	$100	$300
6	Concrete Sidewalk	SF	10	$35	$350
7	Storm Drain Pipe 36"	SF	15	$375	$5,625
8	Safety Rail	LF	220	$100	$22,000
9	Removal of Pipe	LF	15	$75	$1,125
10	Riprap	CY	250	$100	$25,000
11	Channel Excavation & Haul	CY	130	$55	$7,150
12	Roadway Profile Raise	SF	13,300	$20	$266,000
				Sub Total	$1,228,300
13	SWPPP (5%)	LS	1	$61,415	$61,415
14	Mobilization/Demobilization (15%)	LS	1	$184,245	$184,245
15	Design (12%)	LS	1	$147,396	$147,396
16	Construction Management (10%)	LS	1	$122,830	$122,830
17	Utilities (5%)	LS	1	$61,415	$61,415
18	Traffic Control (5%)	LS	1	$61,415	$61,415
				Subtotal	$1,867,016
				Contingency (20%)	$373,403
				Total	$2,240,419

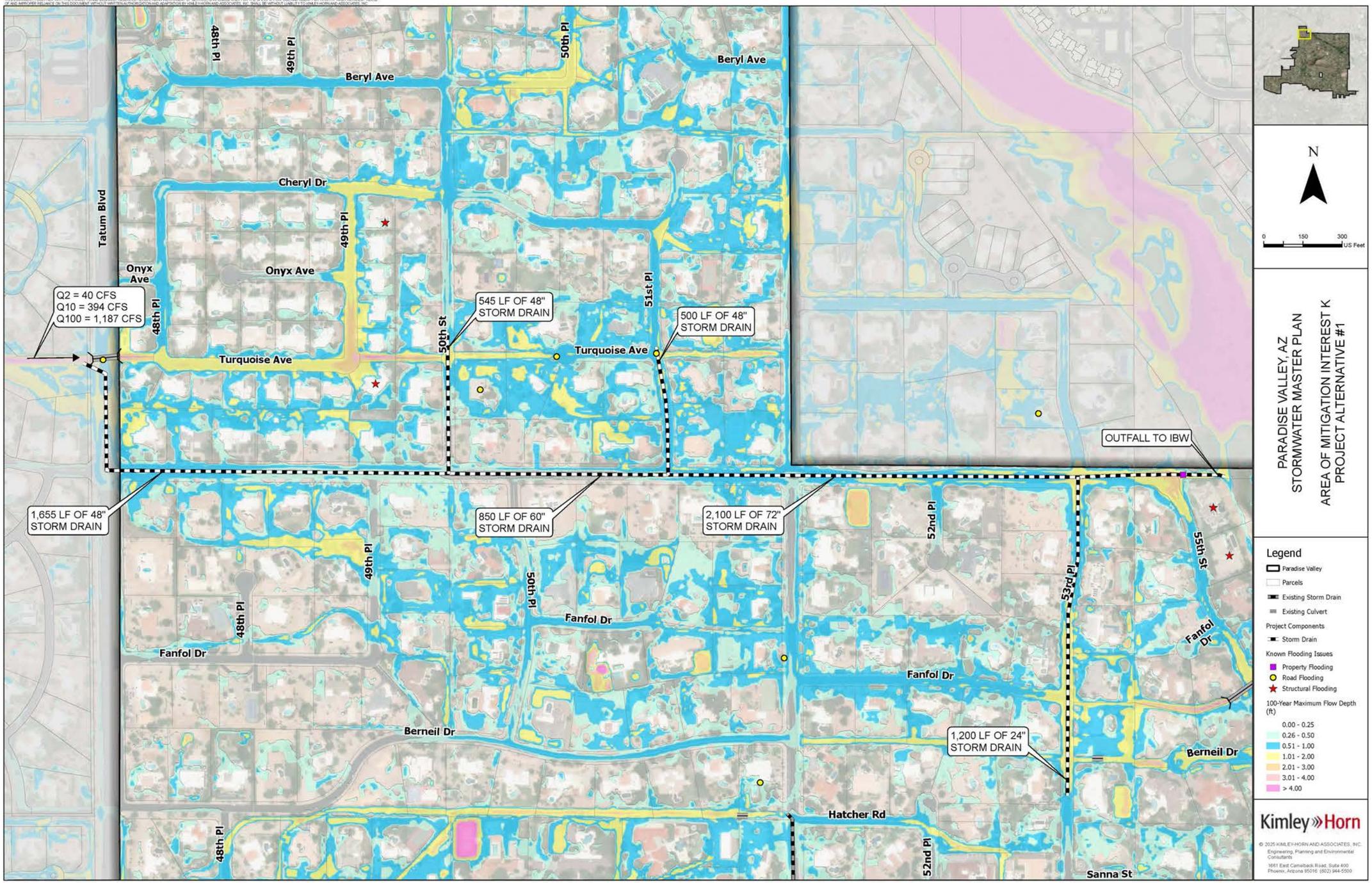
Area H Project Matrix

	Potential Stuctures Protected	Potential Streets Protected	Design and Construction Cost	GSI Benefits	Project Partnership	Multi-use Opportunities	O&M Constraints and Costs	Utility Constraints	Total Raw Score	Total Weighted Score	Significant R/W Aqusition
Priority Weighting 1 - 5	5	4	5	1	4	2	3	3			
Alternative 1	**1**	**1**	**3**	**1**	**1**	**1**	**2**	**2**	**12**	**43**	**Yes**
Alternative 2	**1**	**2**	**2**	**1**	**2**	**2**	**1**	**2**	**13**	**45**	**No**
Alternative 3	**1**	**2**	**1**	**1**	**2**	**1**	**2**	**1**	**11**	**38**	**No**
Ranking Criteria	1 - 1 to 30 structures 2 - 31 to 50 structures 3 - > 51 structures	1 - Local street benefits only 2 - Collector street or local streets benefit 3 - Multiple collector streets and local streets benefit	1 - Most expensive 2 - Median cost 3 - Least expensive	1 - No opportunities 2 - Some opportunities	1 -Grant funding or partnerships unlikely 2 - Local partnerships/grant eligible 3 - Local and Federal partnerships/grant eligible	1 - No opportunities 2 - Some opportunities	1 - Maintenance after every storm event 2 - Maintenance at standard intervals	1 - Major constraints 2 - Minor constraints	20 - Maximum Possible Score	72 - Maximum Possible Score	

XVII. APPENDIX E – PROJECT ALTERNATIVES, EOPC, AND MATRIX

FLOOD HAZARD AREA K ALTERNATIVES

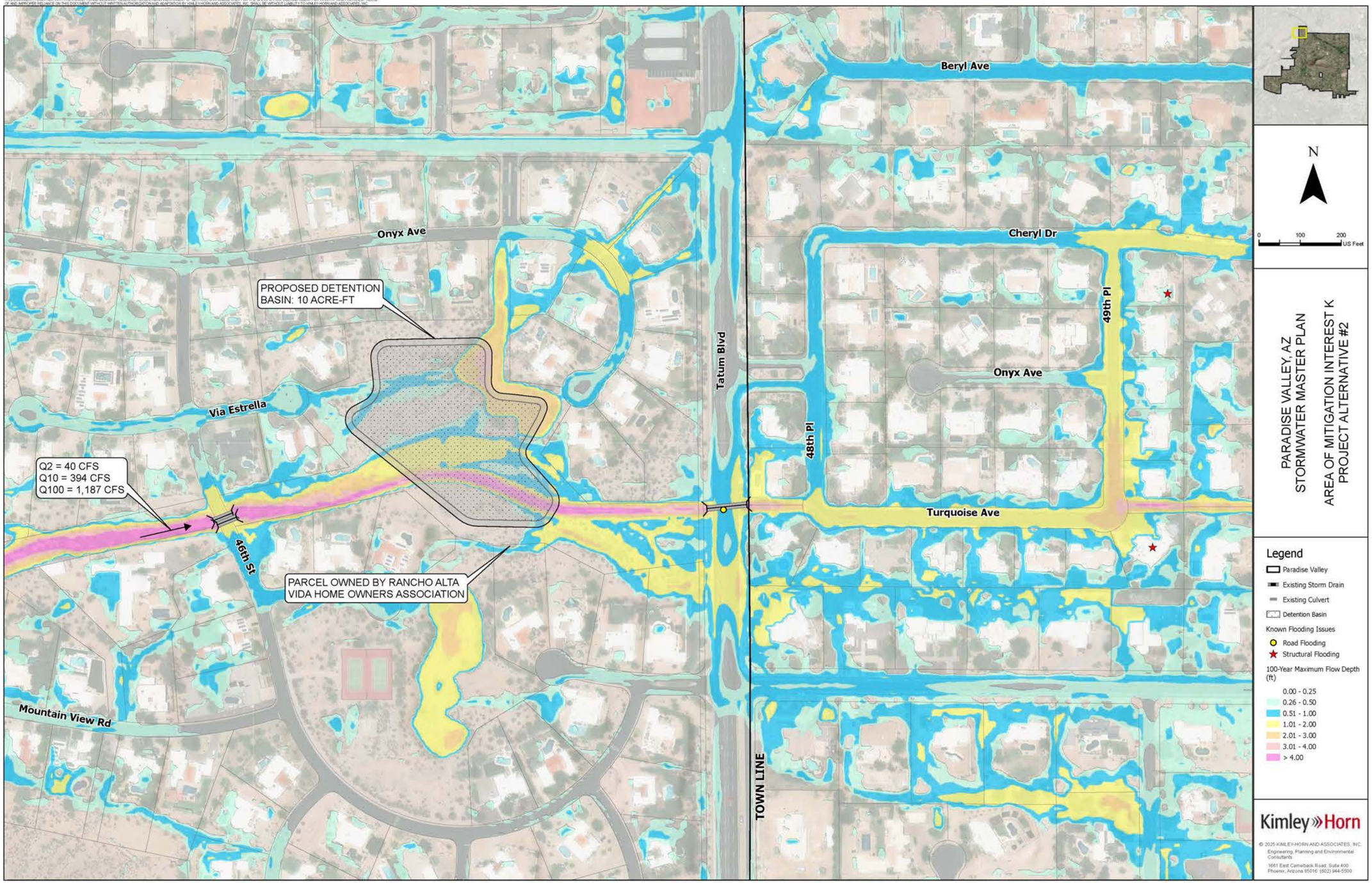
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Conceptual Cost Estimate for Alternative 1

Item	Description	Unit	Quantity	Unit Price	Cost
1	60" Storm Drain	LF	850	$785	$667,250
2	48" Storm Drain	LF	2,700	$600	$1,620,000
3	24" Storm Drain	LF	1,200	$280	$336,000
4	72" Storm Drain	LF	2,100	$975	$2,047,500
5	Inlet Structure	EA	1	$2,300	$2,300
6	Outlet Structure	EA	1	$2,300	$2,300
7	Manhole	EA	43	$10,000	$430,000
8	Catch Basin	EA	36	$12,000	$432,000
				Subtotal	$5,537,350
9	SWPPP (1%)	LS	1	$55,374	$55,374
10	Mobilization/Demobilization (10%)	LS	1	$553,735	$553,735
11	Design (7%)	LS	1	$387,615	$387,615
12	Construction Management (8%)	LS	1	$442,988	$442,988
13	Utilities (2%)	LS	1	$110,747	$110,747
14	Traffic Control (2%)	LS	1	$110,747	$110,747
				Subtotal	$7,198,555
				Contingency (15%)	$1,079,783
				Total	$8,278,338

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Conceptual Cost Estimate for Alternative 2

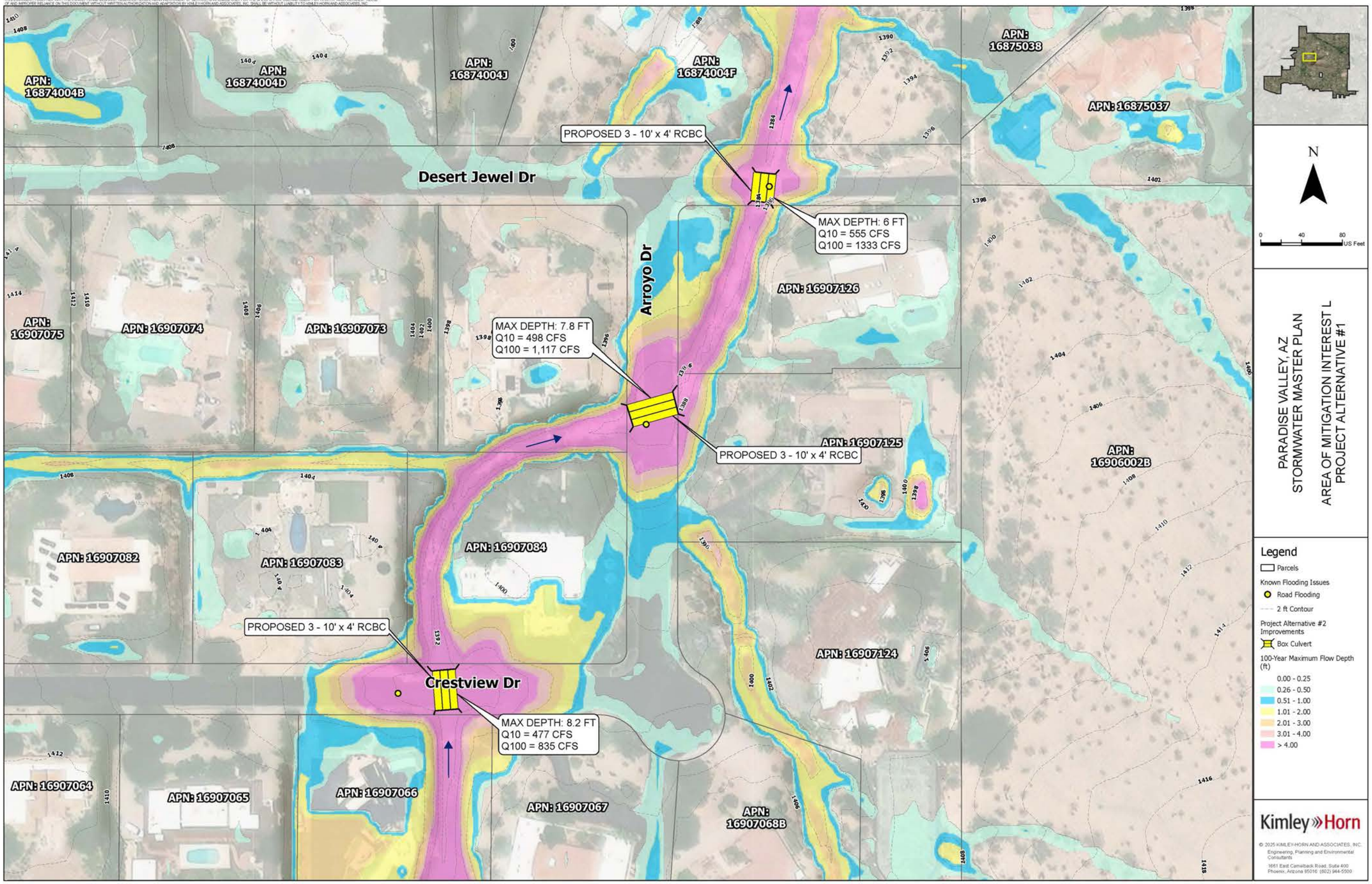
Item	Description	Unit	Quantity	Unit Price	Cost
1	Basin Excavation	CY	25,300	$42	$1,062,600
2	Landscaping	AC	4	$12,000	$48,000
3	Clearing and Grubbing	AC	4	$5,000	$20,000
				Subtotal	$1,130,600
4	SWPPP (2%)	LS	1	$22,612	$22,612
5	Mobilization/Demobilization (12%)	LS	1	$135,672	$135,672
6	Design (7%)	LS	1	$79,142	$79,142
7	Construction Management (10%)	LS	1	$113,060	$113,060
8	Utilities (2%)	LS	1	$22,612	$22,612
9	Traffic Control (1%)	LS	1	$11,306	$11,306
				Subtotal	$1,515,004
				Contingency (15%)	$227,251
				Total	$1,742,255

	Potential Stuctures Protected	Design and Construction Cost	Potential Streets Protected	GSI Benefits	Project Partnership	Multi-use Opportunities	O&M Constraints and Costs	Utility Constraints	Total Raw Score	Total Weighted Score	Significant R/W Acquisition
Priority Weighting 1 - 5	5	5	4	1	4	2	3	3			
Alternative 1	1	1	3	1	2	1	2	1	12	22	No
Alternative 2	1	2	3	2	2	2	2	2	16	26	Yes
Ranking Criteria	1 - 1 to 30 structures 2 - 31 to 50 structures 3 - > 51 structures	1 - Most expensive 2 - Least expensive	1 - Local street benefits only 2 - Collector street or local streets benefit 3 - Multiple collector streets and local streets benefit	1 - No opportunities 2 - Some opportunities	1 -Grant funding or partnerships unlikely 2 - Local partnerships/grant eligible 3 - Local and Federal partnerships/grant eligible	1 - No opportunities 2 - Some opportunities	1 - Maintenance after every storm event 2 - Maintenance at standard intervals	1 - Major constraints 2 - Minor constraints	19 - Highest achievable score	67 - Highest achievable score	

XVII. APPENDIX E – PROJECT ALTERNATIVES, EOPC, AND MATRIX

FLOOD HAZARD AREA L ALTERNATIVES

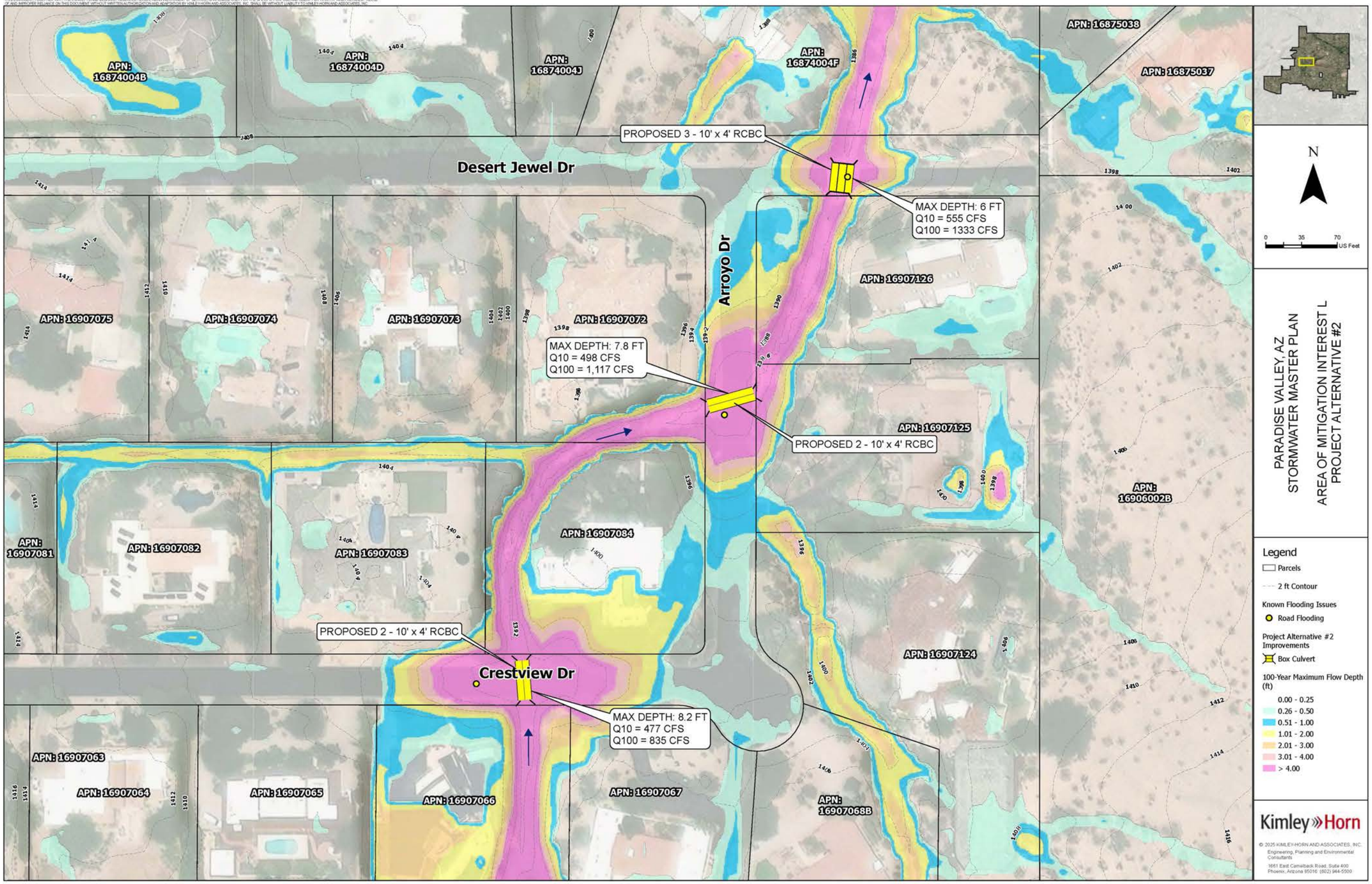
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Conceptual Cost Estimate for Alternative 1

Item	Description	Unit	Quantity	Unit Price	Cost
1	3 - 10' x 4' RCBC	LF	140	$3,400	$476,000
2	Headwalls	EA	6	$10,000	$60,000
3	Grouted Riprap	CY	21	$470	$9,870
4	Demolition	SY	501	$58	$29,058
5	Earthwork/Sediment Basin	CY	900	$45	$40,500
6	Pavement Replacement	TON	165	$475	$78,375
				Sub Total	$693,803
7	SWPPP (5%)	LS	1	$34,690	$34,690
8	Mobilization/Demobilization (15%)	LS	1	$104,070	$104,070
9	Design (15%)	LS	1	$104,070	$104,070
10	Construction Management (12%)	LS	1	$83,256	$83,256
11	Utilities (5%)	LS	1	$34,690	$34,690
12	Traffic Control (5%)	LS	1	$34,690	$34,690
				Subtotal	$1,089,271
				Contingency (20%)	$217,854
				Total	$1,307,125

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Conceptual Cost Estimate for Alternative 2

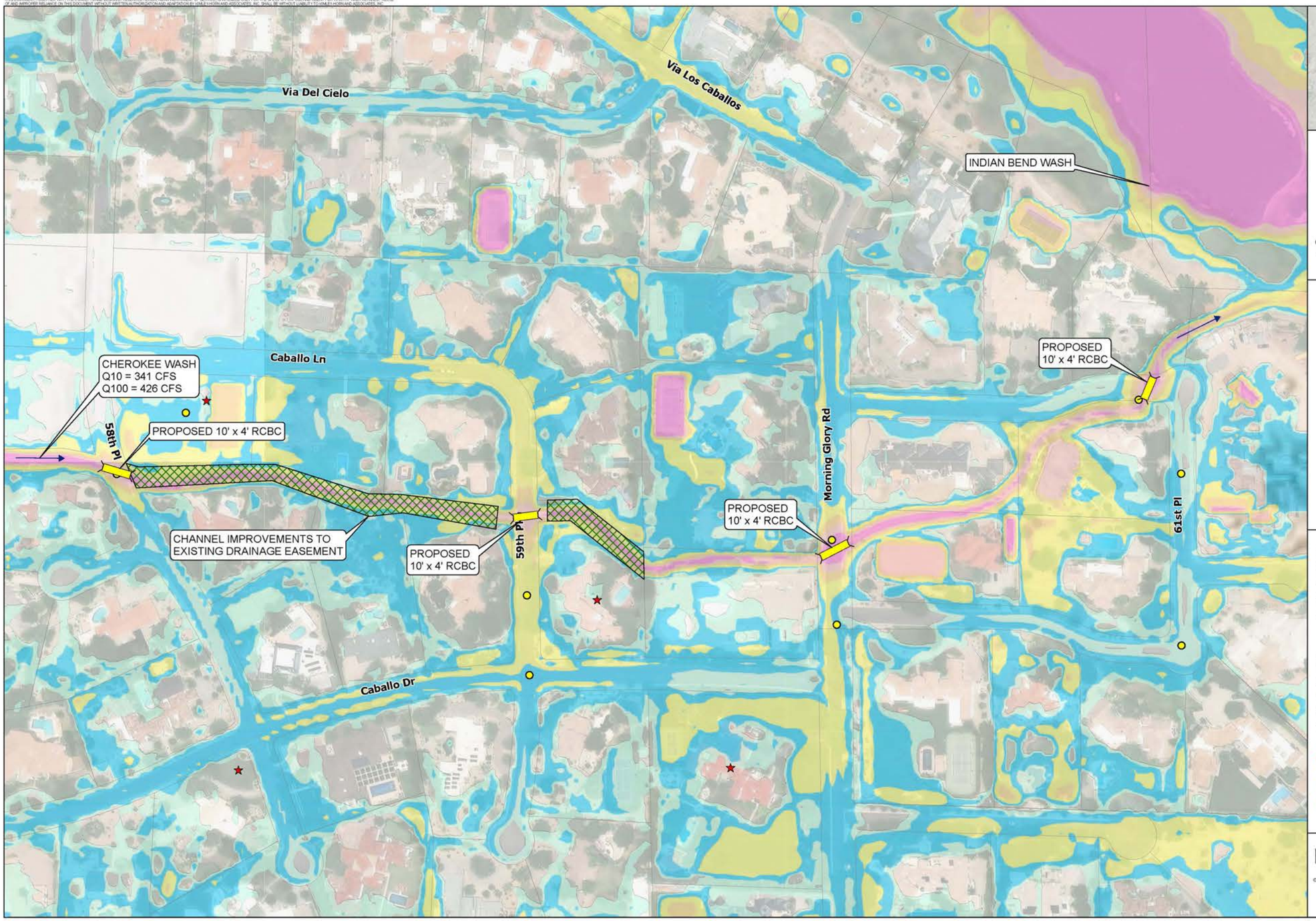
Item	Description	Unit	Quantity	Unit Price	Cost
1	2 - 10' x 4' RCBC	LF	110	$2,300	$253,000
2	3 - 10' x 4' RCBC	LF	30	$3,400	$102,000
3	Headwalls	EA	6	$10,000	$60,000
4	Grouted Riprap	CY	21	$470	$9,870
5	Demolition	SY	501	$58	$29,058
6	Earthwork/Sediment Basin	CY	780	$45	$35,100
7	Pavement Replacement	TON	165	$475	$78,375
				Sub Total	$567,403
8	SWPPP (5%)	LS	1	$28,370	$28,370
9	Mobilization/Demobilization	LS	1	$100,000	$100,000
10	Design	LS	1	$100,000	$100,000
11	Construction Management (15%)	LS	1	$85,110	$85,110
12	Utilities (5%)	LS	1	$28,370	$28,370
13	Traffic Control (5%)	LS	1	$28,370	$28,370
				Subtotal	$937,624
				Contingency (20%)	$187,525
				Total	$1,125,149

	Potential Stuctures Protected	Design and Construction Cost	Potential Streets Protected	GSI Benefits	Project Partnership	Multi-use Opportunities	O&M Constraints and Costs	Utility Constraints	Total Raw Score	Total Weighted Score	Significant R/W Acquisition?
Priority Weighting 1 - 5	5	5	4	1	4	2	3	3			
Alternative 1	1	1	1	1	2	1	2	2	11	17	No
Alternative 2	1	2	1	1	2	1	2	2	12	18	No
Ranking Criteria	1 - 1 to 30 structures 2 - 31 to 50 structures 3 - > 51 structures	1 - Most expensive 2 - Least Expensive	1 - Local street benefits only 2 - Collector street or local streets benefit 3 - Multiple collector streets and local streets benefit	1 - No opportunities 2 - Some opportunities	1 -Grant funding or partnerships unlikely 2 - Local partnerships/grant eligible 3 - Local and Federal partnerships/grant eligible	1 - No opportunities 2 - Some opportunities	1 - Maintenance after every storm event 2 - Maintenance at standard intervals	1 - Major constraints 2 - Minor constraints	19 - Maximum Possible Score	67 - Maximum Possible Score	

XVII. APPENDIX E – PROJECT ALTERNATIVES, EOPC, AND MATRIX

FLOOD HAZARD AREA N ALTERNATIVES

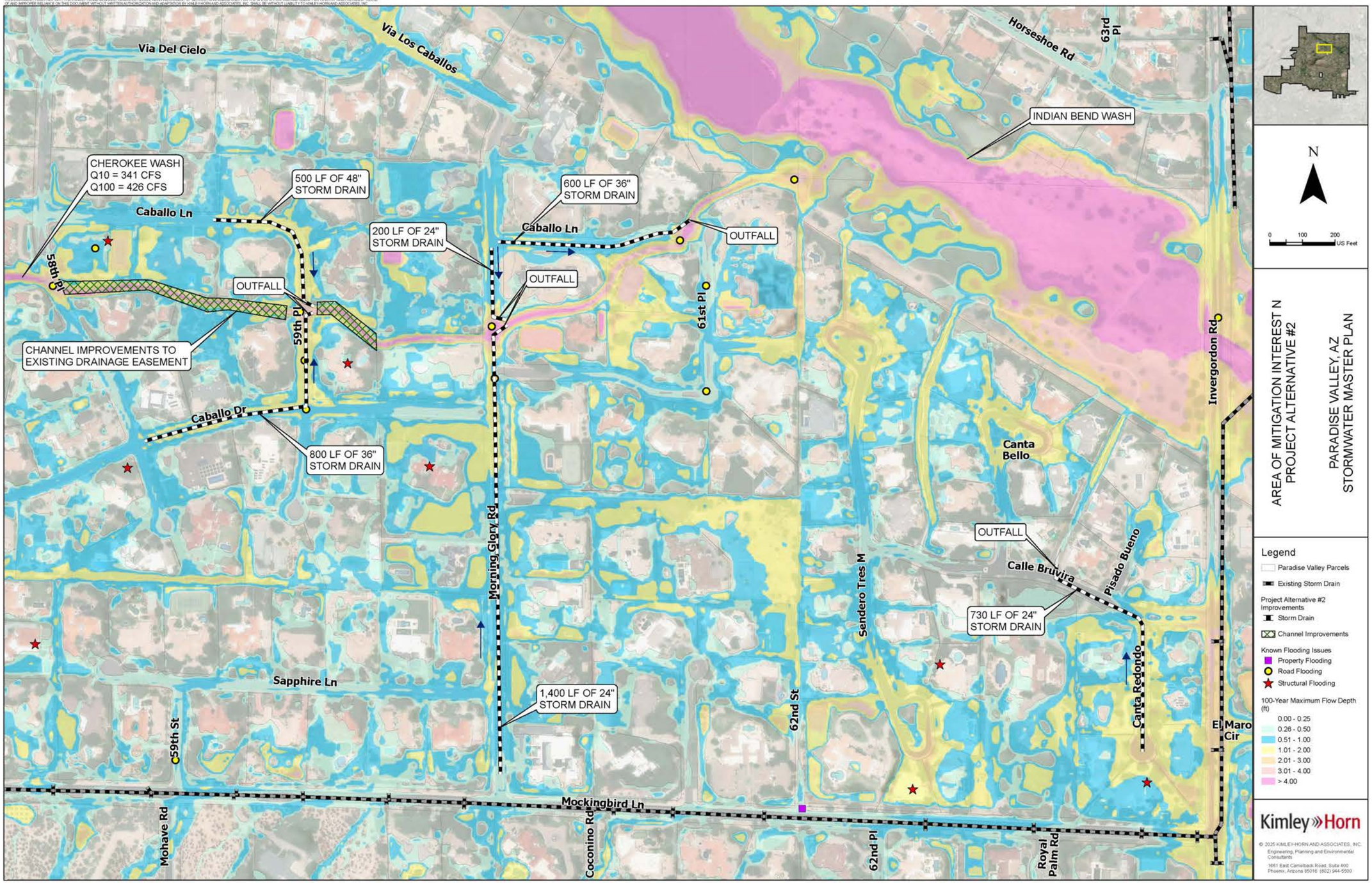
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Conceptual Cost Estimate for Alternative 1

Item	Description	Unit	Quantity	Unit Price	Cost
1	4 - 10' x 4' RCBC	LF	200	$7,200	$1,440,000
2	Headwall	EA	8	$8,000	$64,000
3	Grouted Riprap	CY	32	$480	$15,360
4	Pavement Removal and Replacement	LF	800	$150	$120,000
6	Clearing and Grubbing	AC	1	$25,000	$25,000
7	Channel Grading	LS	1	$15,000	$15,000
				Subtotal	$1,679,360
8	SWPPP (3%)	LS	1	$50,381	$50,381
9	Mobilization/Demobilization (12%)	LS	1	$201,523	$201,523
10	Design (10%)	LS	1	$167,936	$167,936
11	Construction Management (10%)	LS	1	$167,936	$167,936
12	Utilities (5%)	LS	1	$83,968	$83,968
13	Traffic Control (5%)	LS	1	$83,968	$83,968
				Subtotal	$2,435,072
				Subtotal	$2,435,072
				Contingency (15%)	$365,261
				Total	$2,800,333

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Conceptual Cost Estimate for Alternative 2

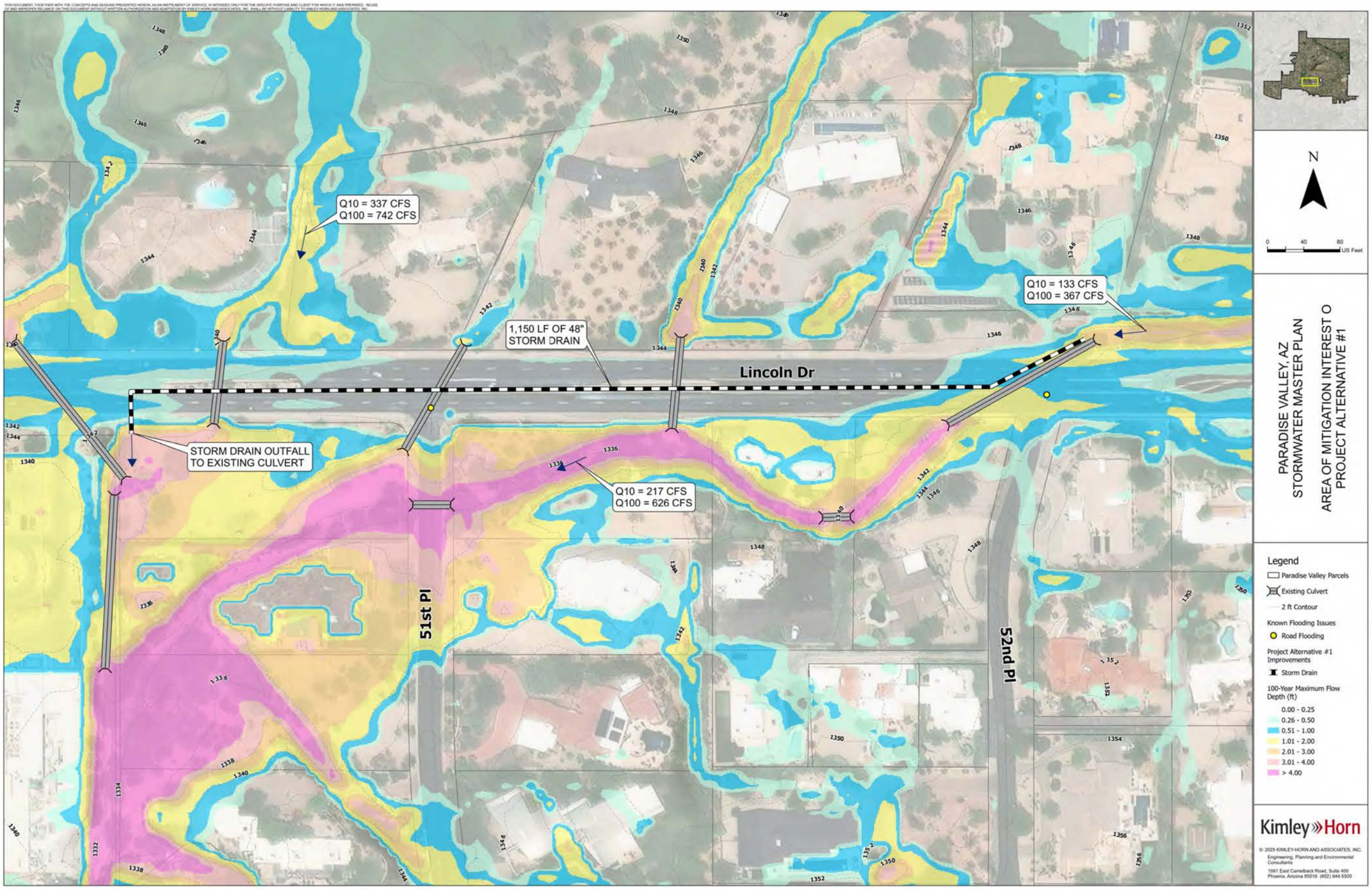
Item	Description	Unit	Quantity	Unit Price	Cost
1	36" RCP Storm Drain	LF	3,810	$420	$1,600,200
2	48" RCP Storm Drain	LF	525	$600	$315,000
3	Outlet structure	EA	5	$2,100	$10,500
4	Catch Basin	EA	21	$12,000	$252,000
5	Manhole	EA	24	$10,000	$240,000
6	Clearing and Grubbing	AC	1	$25,000	$25,000
7	Channel Grading	LS	1	$15,000	$15,000
				Subtotal	2,457,700
6	SWPPP (2%)	LS	1	$49,154	$49,154
7	Mobilization/Demobilization (10%)	LS	1	$245,770	$245,770
8	Design (12%)	LS	1	$294,924	$294,924
9	Construction Management (10%)	LS	1	$245,770	$245,770
10	Utilities (3%)	LS	1	$73,731	$73,731
11	Traffic Control (3%)	LS	1	$73,731	$73,731
				Subtotal	$3,440,780
				Contingency (15%)	$516,117
				Total	$3,956,897

Area N

	Potential Stuctures Protected	Design and Construction Cost	Potential Streets Protected	GSI Benefits	Project Partnership	Multi-use Opportunities	O&M Constraints and Costs	Utility Constraints	Total Raw Score	Total Weighted Score	Significant R/W Aqusition
Priority Weighting 1 - 5	5	5	4	1	4	2	3	3			
Alternative 1	**1**	**2**	**2**	**1**	**2**	**1**	**2**	**1**	**12**	**43**	**No**
Alternative 2	**1**	**1**	**2**	**1**	**2**	**1**	**2**	**1**	**11**	**38**	**No**
Ranking Criteria	1 - 1 to 30 structures 2 - 31 to 50 structures 3 - > 51 structures	1 - Most expensive 2 - Least expensive	1 - Local street benefits only 2 - Collector street or local streets benefit 3 - Multiple collector streets and local streets benefit	1 - No opportunities 2 - Some opportunities	1 -Grant funding or partnerships unlikely 2 - Local partnerships/grant eligible 3 - Local and Federal partnerships/grant eligible	1 - No opportunities 2 - Some opportunities	1 - Maintenance after every storm event 2 - Maintenance at standard intervals	1 - Major constraints 2 - Minor constraints	19 - Highest achievable score	67 - Highest achievable score	

XVII. APPENDIX E – PROJECT ALTERNATIVES, EOPC, AND MATRIX

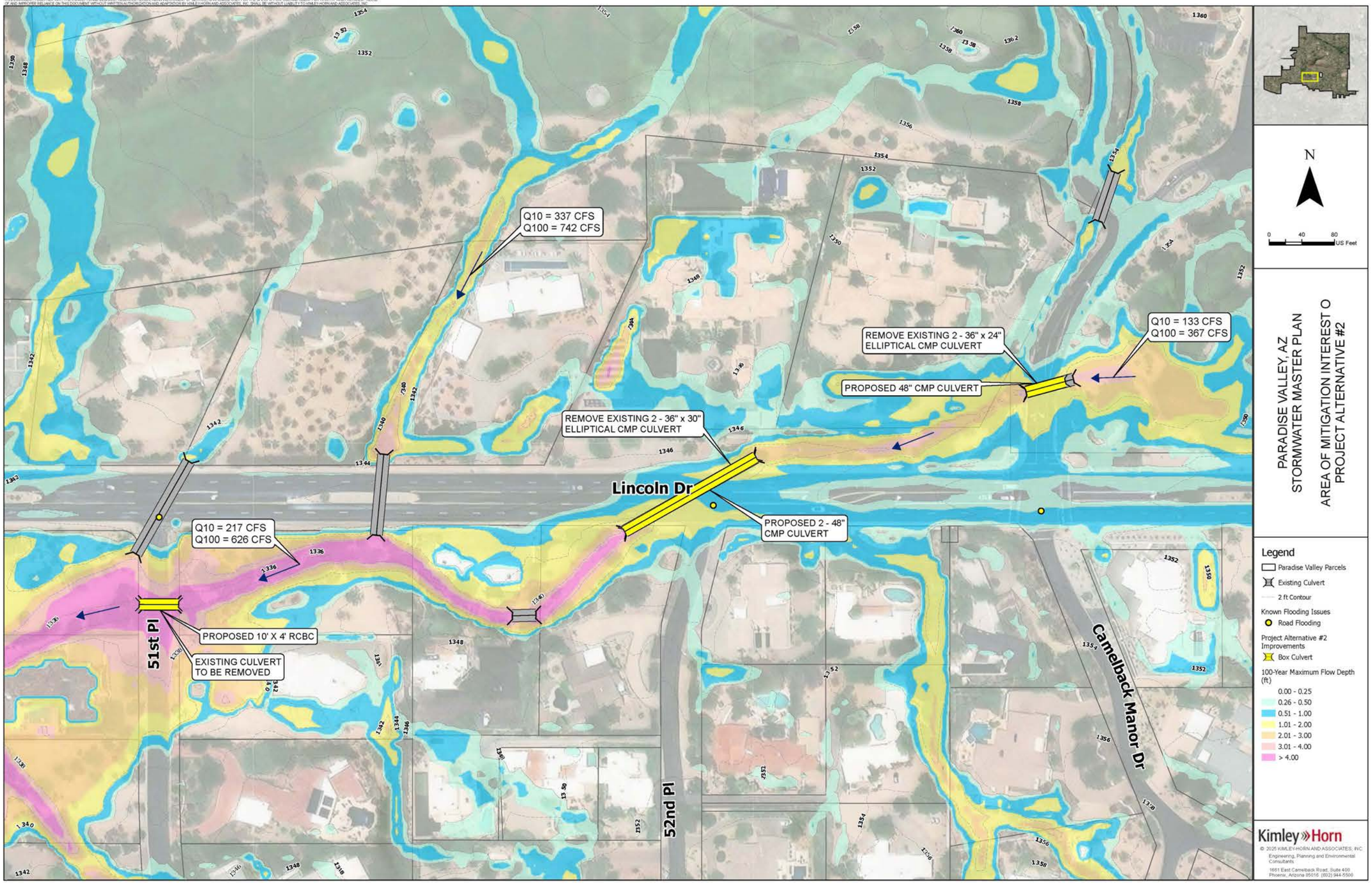
FLOOD HAZARD AREA O ALTERNATIVES


Q10 = 337 CFS
Q100 = 742 CFS
1,150 LF OF 48" STORM DRAIN
Lincoln Dr
Q10 = 133 CFS
Q100 = 367 CFS
STORM DRAIN OUTFALL TO EXISTING CULVERT
Q10 = 217 CFS
Q100 = 626 CFS
51st Pl
52nd Pl
N
0 40 80 US Feet
PARADISE VALLEY, AZ
STORMWATER MASTER PLAN
AREA OF MITIGATION INTEREST O
PROJECT ALTERNATIVE #1
Legend
Paradise Valley Parcels
Existing Culvert
2 ft Contour
Known Flooding Issues
Road Flooding
Project Alternative #1 Improvements
Storm Drain
100-Year Maximum Flow Depth (ft)
0.00 - 0.25
0.26 - 0.50
0.51 - 1.00
1.01 - 2.00
2.01 - 3.00
3.01 - 4.00
> 4.00
Kimley»Horn
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Engineering, Planning and Environmental Consultants
1661 East Camelback Road, Suite 400
Phoenix, Arizona 85016 (602) 944-5500

Conceptual Cost Estimate for Alternative 1

Item	Description	Unit	Quantity	Unit Price	Cost
1	Storm Drain 60"	LF	1,150	$780	$897,000
2	Catch Basin	EA	5	$10,000	$50,000
3	Inlet/Oulet Structure	EA	2	$3,600	$7,200
4	Remove and Replace Pavement	LF	1,200	$120	$144,000
5	Manhole	EA	6	$10,000	$60,000
				Subtotal	$1,158,200
6	SWPPP (5%)	LS	1	$57,910	$57,910
7	Mobilization/Demobilization (15%)	LS	1	$173,730	$173,730
8	Design (15%)	LS	1	$173,730	$173,730
9	Construction Management (12%)	LS	1	$138,984	$138,984
10	Utilities (10%)	LS	1	$115,820	$115,820
11	Traffic Control (10%)	LS	1	$115,820	$115,820
				Subtotal	$1,934,194
				Subtotal	$1,934,194
				Contingency (20%)	$386,839
				Total	$2,321,033

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Conceptual Cost Estimate for Alternative 2

Item	Description	Unit	Quantity	Unit Price	Cost
1	10' x 4' RCBC	LF	150	$1,950	$292,500
2	48" RCP Culvert	LF	555	$570	$316,350
4	Headwalls	EA	6	$12,000	$72,000
5	Grouted Riprap	CY	22	$470	$10,340
6	Excavation	CY	1,050	$65	$68,250
7	Remove and Replace Pavement	LF	315	$220	$69,300
				Subtotal	$828,740
8	SWPPP (5%)	LS	1	$41,437	$41,437
9	Mobilization/Demobilization (15%)	LS	1	$124,311	$124,311
10	Design (10%)	LS	1	$124,311	$124,311
11	Construction Management (10%)	LS	1	$82,874	$82,874
12	Utilities (12%)	LS	1	$99,449	$99,449
13	Traffic Control (15%)	LS	1	$124,311	$124,311
				Subtotal	$1,425,433
				Contingency (25%)	$356,358
				Total	$1,781,791

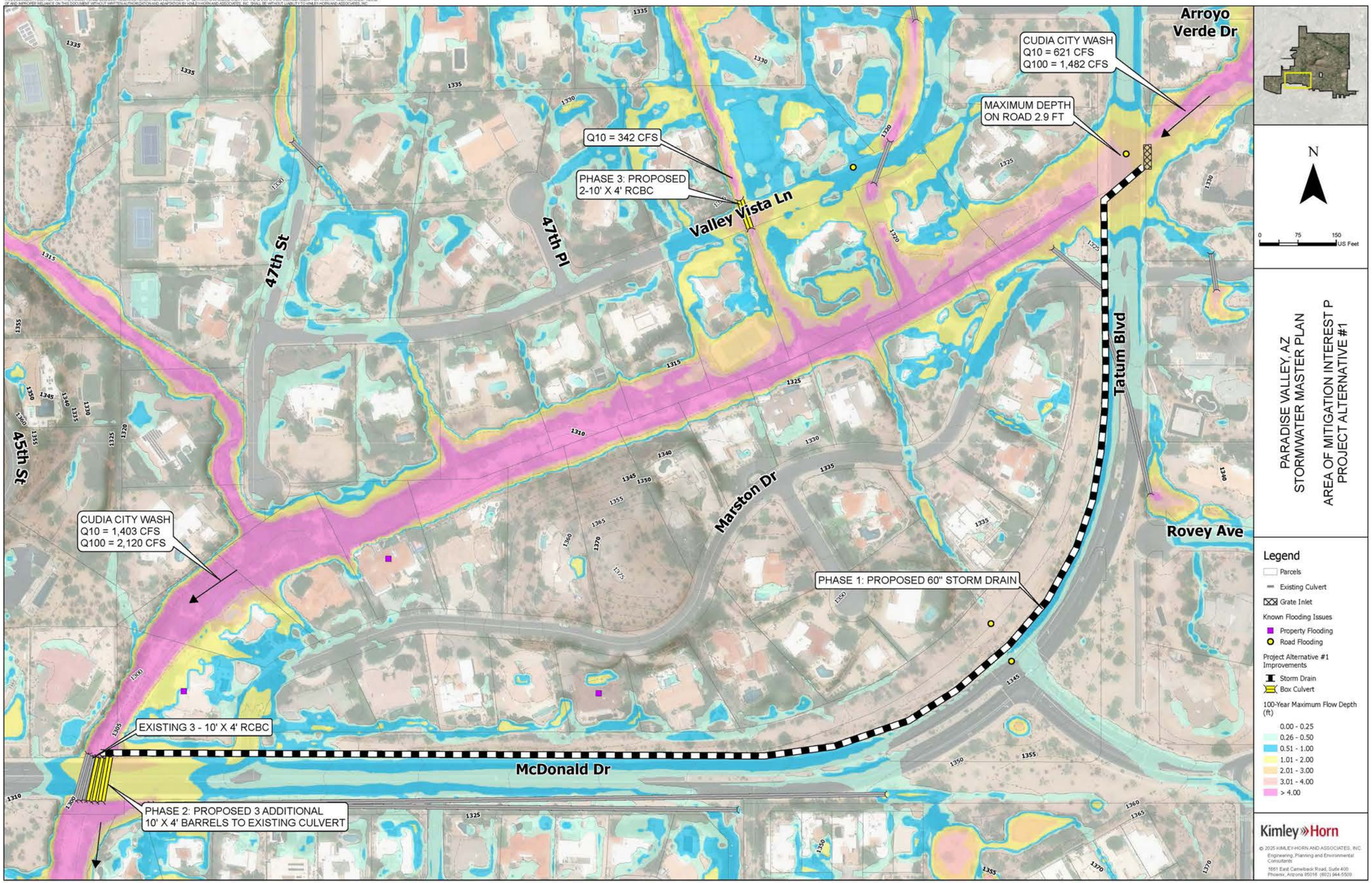
Area O Project Matrix

	Potential Stuctures Protected	Design and Construction Cost	Potential Streets Protected	GSI Benefits	Project Partnership	Multi-use Opportunities	O&M Constraints and Costs	Utility Constraints	Total Raw Score	Total Weighted Score	Significant R/W Acquisition?
Priority Weighting 1 - 5	5	5	4	1	4	2	3	3			
Alternative 1	1	1	2	1	2	1	2	1	11	38	No
Alternative 2	1	2	2	1	2	1	2	1	12	43	No
Ranking Criteria	1 - 1 to 30 structures 2 - 31 to 50 structures 3 - > 51 structures	1 - Most expensive 2 - Least expensive	1 - Local street benefits only 2 - Collector street or local streets benefit 3 - Multiple collector streets and local streets benefit	1 - No opportunities 2 - Some opportunities	1 -Grant funding or partnerships unlikely 2 - Local partnerships/grant eligible 3 - Local and Federal partnerships/grant eligible	1 - No opportunities 2 - Some opportunities	1 - Maintenance after every storm event 2 - Maintenance at standard intervals	1 - Major constraints 2 - Minor constraints	19 - Maximum possible score	67 - Maximum possible score	

XVII. APPENDIX E – PROJECT ALTERNATIVES, EOPC, AND MATRIX

FLOOD HAZARD AREA H ALTERNATIVES

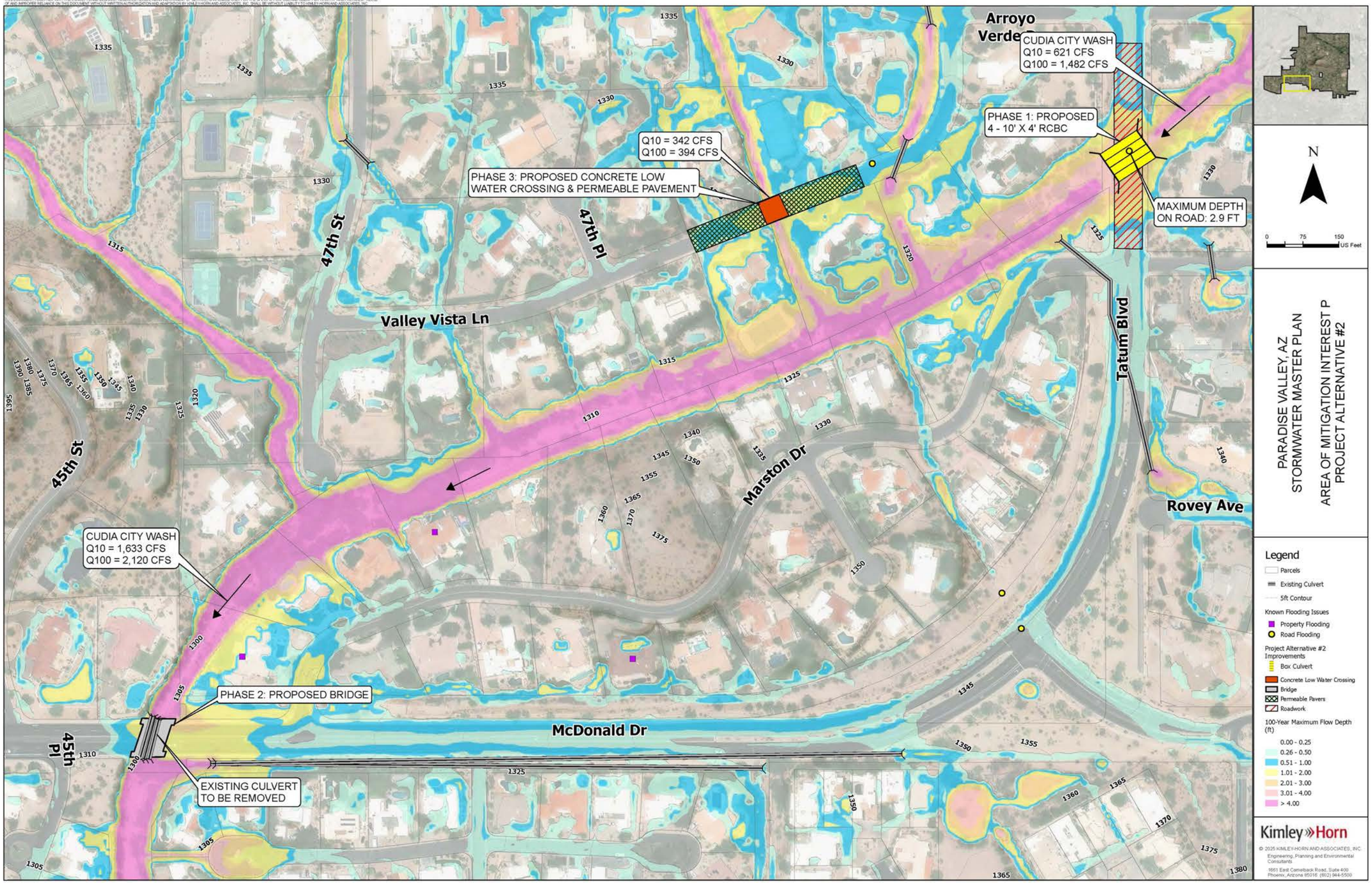
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Conceptual Cost Estimate for Alternative 1

Item	Description	Unit	Quantity	Unit Price	Cost
	Phase 1: Tatum Boulevard Storm Drain				
1	Storm Drain (36") & Trenching	LF	2900	$1,300	$3,770,000
2	Outlet Structure	EA	1	$5,000	$5,000
3	Inlet Structure	EA	1	$3,500	$3,500
4	Remove and Replace Pavement	SY	35	$185	$6,475
5	Channel Excavation & Haul	CY	16,250	$20	$325,000
6	Clearing and Grubbing	AC	4.85	$4,000	$19,400
7	Landscaping	AC	4.85	$7,450	$36,133
				Subtotal	$4,165,508
8	SWPPP (1%)	LS	1	$41,655	$41,655
9	Mobilization/Demobilization (10%)	LS	1	$416,551	$416,551
10	Design (10%)	LS	1	$416,551	$416,551
11	Construction Management (10%)	LS	1	$416,551	$416,551
12	Utilities (3%)	LS	1	$124,965	$124,965
13	Traffic Control (3%)	LS	1	$124,965	$124,965
				Subtotal	$5,706,745
				Contingency (20%)	$1,141,349
				Total	$6,848,094
	Phase 2: McDonald Drive Culvert Expansion				
1	1 - 10' x 4' RCBC	LF	90	$2,200	$198,000
2	Drainage Excavation	CY	575	$185	$106,375
3	Pavement Removal and Replacment	SY	167	$185	$30,895
4	Headwall Extension	EA	2	$10,000	$20,000
				Subtotal	$355,270
5	SWPPP (5%)	LS	1	$17,764	$17,764
6	Mobilization/Demobilization	LS	1	$100,000	$100,000
7	Design	LS	1	$75,000	$75,000
8	Construction Management (15%)	LS	1	$53,291	$53,291
9	Utilities (8%)	LS	1	$28,422	$28,422
10	Traffic Control (8%)	LS	1	$28,422	$28,422
				Subtotal	$658,167
				Contingency (20%)	$131,633
				Total	$789,801
	Phase 3: Valley Vista Culvert				
1	36" RCP	LF	35	$435	$15,225
2	Headwall	EA	2	$1,200	$2,400
3	Grouted Riprap	CY	15	$270	$4,050
4	Remove and Replace Pavement	SY	20	$185	$3,700
5	Excavation	CY	32	$120	$3,840
				Subtotal	$29,215
6	SWPPP (5%)	LS	1	$1,461	$1,461
7	Mobilization/Demobilization	LS	1	$5,000	$5,000
8	Design	LS	1	$5,000	$5,000
9	Construction Management (10%)	LS	1	$2,922	$2,922
10	Utilities (5%)	LS	1	$1,461	$1,461
11	Traffic Control (5%)	LS	1	$1,461	$1,461
				Subtotal	$46,519
				Contingency (20%)	$9,304
				Total	$55,823

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Conceptual Cost Estimate for Alternative 2

Item	Description	Unit	Quantity	Unit Price	Cost
	Phase 1: Tatum Boulevard Culvert				
1	4 - 10' x 4' RCBC	LF	110	$6,400	$704,000
2	Inlet	EA	1	$20,000	$20,000
3	Outlet	EA	1	$20,000	$20,000
4	Channel Excavation & Haul	CY	1,100	$55	$60,500
5	Manhole	EA	3	$10,000	$30,000
6	Roadway Profile Raise	LF	500	$550	$275,000
7	Riprap	CY	250	$100	$25,000
				Subtotal	$1,134,500
8	SWPPP (3%)	LS	1	$34,035	$34,035
9	Mobilization/Demobilization (10%)	LS	1	$113,450	$113,450
10	Design (10%)	LS	1	$113,450	$113,450
11	Construction Management (10%)	LS	1	$113,450	$113,450
12	Utilities (7%)	LS	1	$79,415	$79,415
13	Traffic Control (5%)	LS	1	$56,725	$56,725
				Subtotal	$1,645,025
				Contingency (20%)	$329,005
				Total	$1,974,030
	Phase 2: McDonald Drive Bridge				
1	Removal of Stuctural Concrete	CY	425	$305	$129,625
2	Precast, Prestressed Concrete Bridge Member	LF	100	$850	$85,000
3	Pedestrian-Traffic Bridge Railing	LF	120	$380	$45,600
4	Structural Concrete	CY	650	$2,750	$1,787,500
				Subtotal	$2,047,725
5	SWPPP (1%)	LS	1	$20,477	$20,477
6	Mobilization/Demobilization (10%)	LS	1	$204,773	$204,773
7	Design (10%)	LS	1	$204,773	$204,773
8	Construction Management (10%)	LS	1	$204,773	$204,773
9	Utilities (3%)	LS	1	$61,432	$61,432
10	Traffic Control (2%)	LS	1	$40,955	$40,955
				Subtotal	$2,784,908
				Contingency (20%)	$556,982
				Total	$3,341,890
	Phase 3: Valley Vista Low Water Crossing				
1	Removal of Existing Pavement	SY	970	$10	$9,700
2	Permeable Pavement	LF	375	$32	$12,000
3	Portland Cement Concrete Pavement	SY	100	$120	$12,000
				Subtotal	$33,700
4	SWPPP (3%)	LS	1	$1,011	$1,011
5	Mobilization/Demobilization	LS	1	$3,370	$3,370
6	Design (10%)	LS	1	$3,370	$3,370
7	Construction Management (10%)	LS	1	$3,370	$3,370
8	Utilities (5%)	LS	1	$1,685	$1,685
9	Traffic Control (3%)	LS	1	$1,011	$1,011
				Subtotal	$47,517
				Contingency (20%)	$9,503
				Total	$57,020

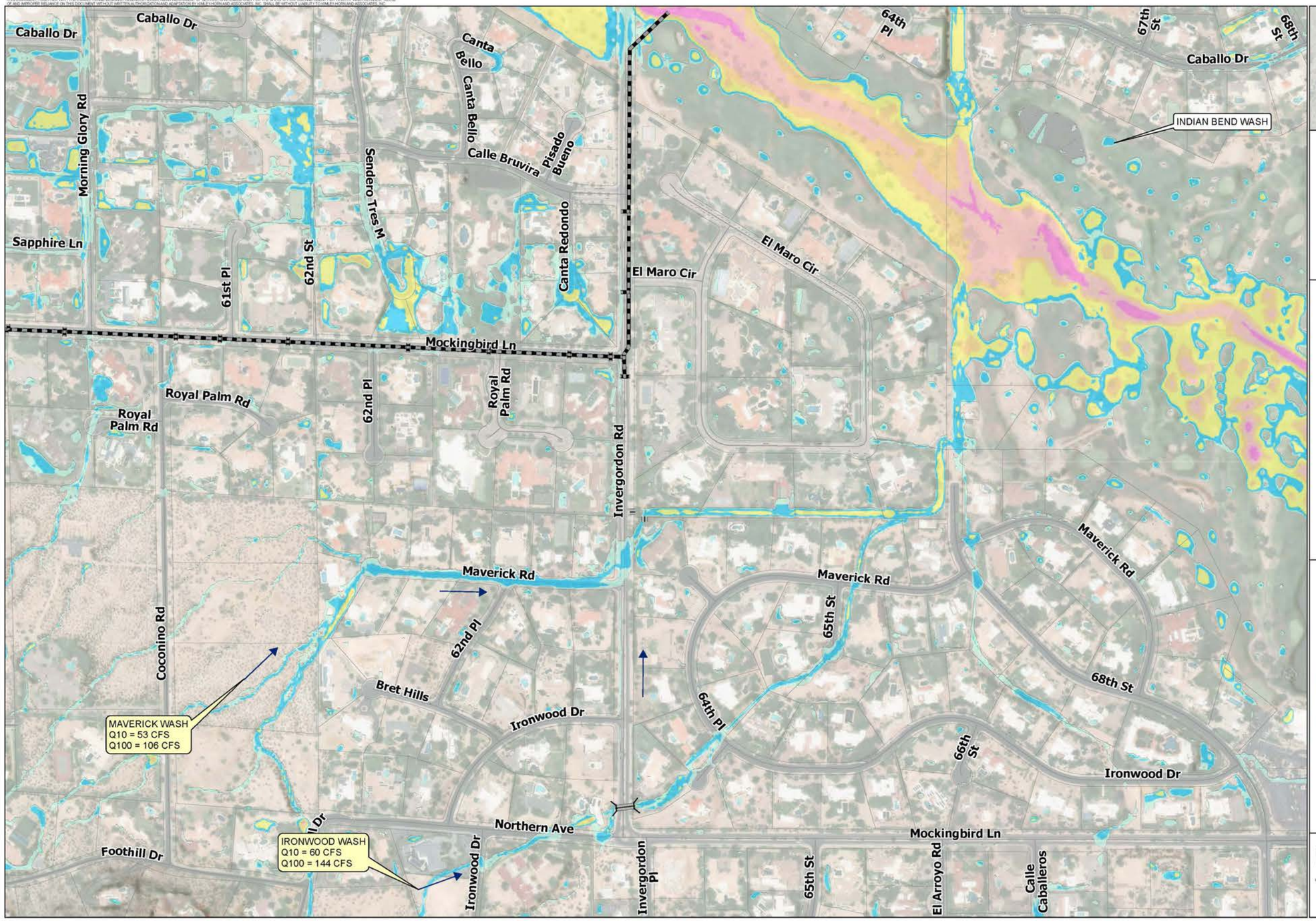
Area P Project Matrix

	Potential Stuctures Protected	Design and Construction Cost	Potential Streets Protected	GSI Benefits	Project Partnership	Multi-use Opportunities	O&M Constraints and Costs	Utility Constraints	Total Raw Score	Total Weighted Score	Significant R/W Acquisition?
Priority Weighting 1 - 5	5	5	4	1	4	2	3	3			
Phase 1: Alternative 1	1	1	2	1	2	1	2	1	11	38	No
Phase 1: Alternative 2	1	2	2	1	2	1	2	1	12	43	No
Phase 2: Alternative 1	1	2	2	1	2	1	2	1	12	43	No
Phase 2: Alternative 2	1	1	2	1	2	1	2	1	11	38	No
Phase 3: Alternative 1	1	2	1	1	2	1	2	2	12	42	No
Phase 3: Alternative 2	1	1	1	2	2	1	2	2	12	38	No
Ranking Criteria	1 - 1 to 30 structures 2 - 31 to 50 structures 3 - > 51 structures	1 - Most expensive 2 - Least expensive	1 - Local street benefits only 2 - Collector street or local streets benefit 3 - Multiple collector streets and local streets benefit	1 - No opportunities 2 - Some opportunities	1 - Grant funding or partnerships unlikely 2 - Local partnerships/grant eligible 3 - Local and Federal partnerships/grant eligible	1 - No opportunities 2 - Some opportunities	1 - Maintenance after every storm event 2 - Maintenance at standard intervals	1 - Major constraints 2 - Minor constraints	19 - Maximum Possible Score	67 - Maximum Possible Score	

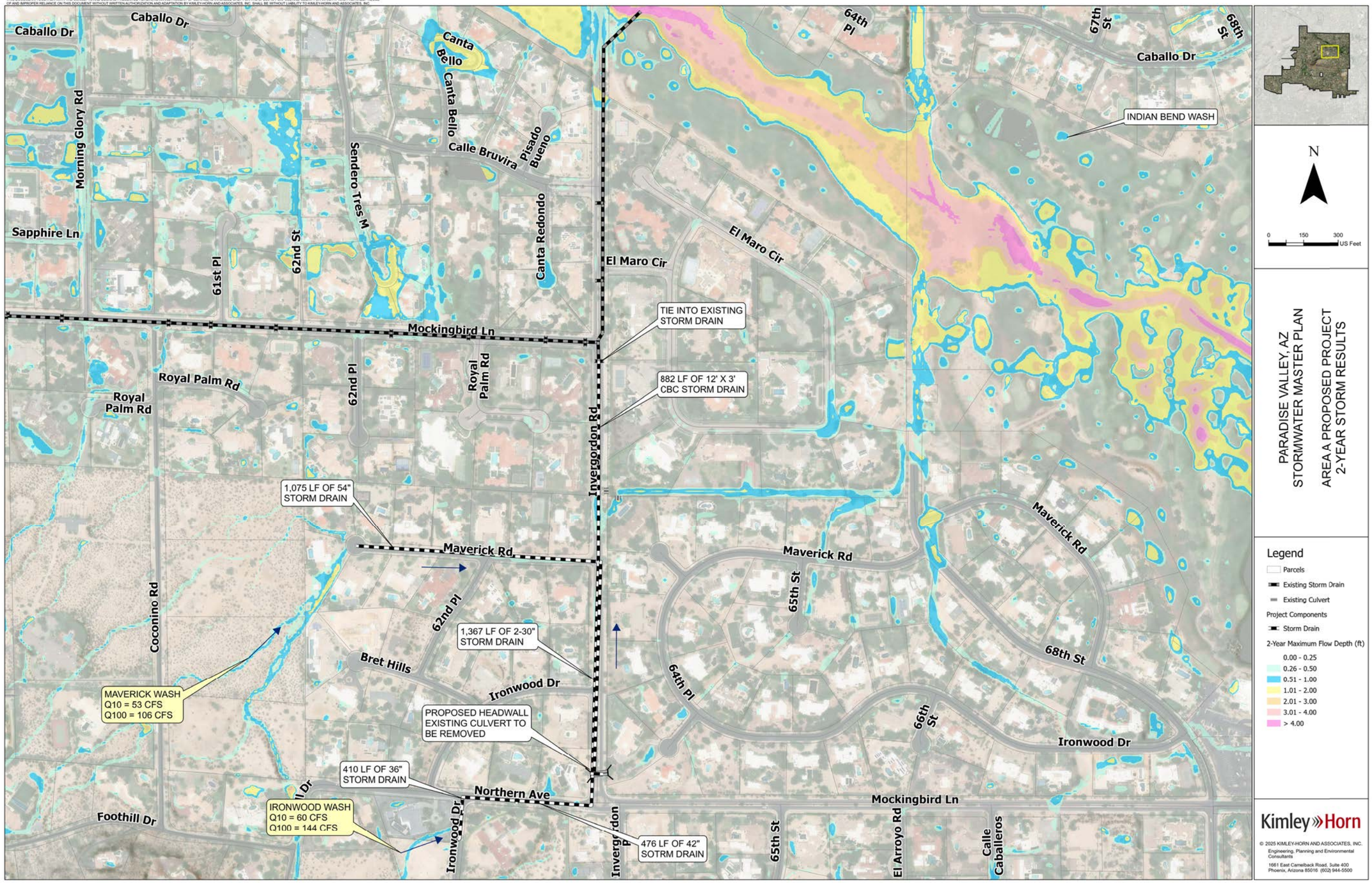
XVIII. APPENDIX F – HIGHEST PRIORITY PROJECTS ANTICIPATED PERFORMANCE

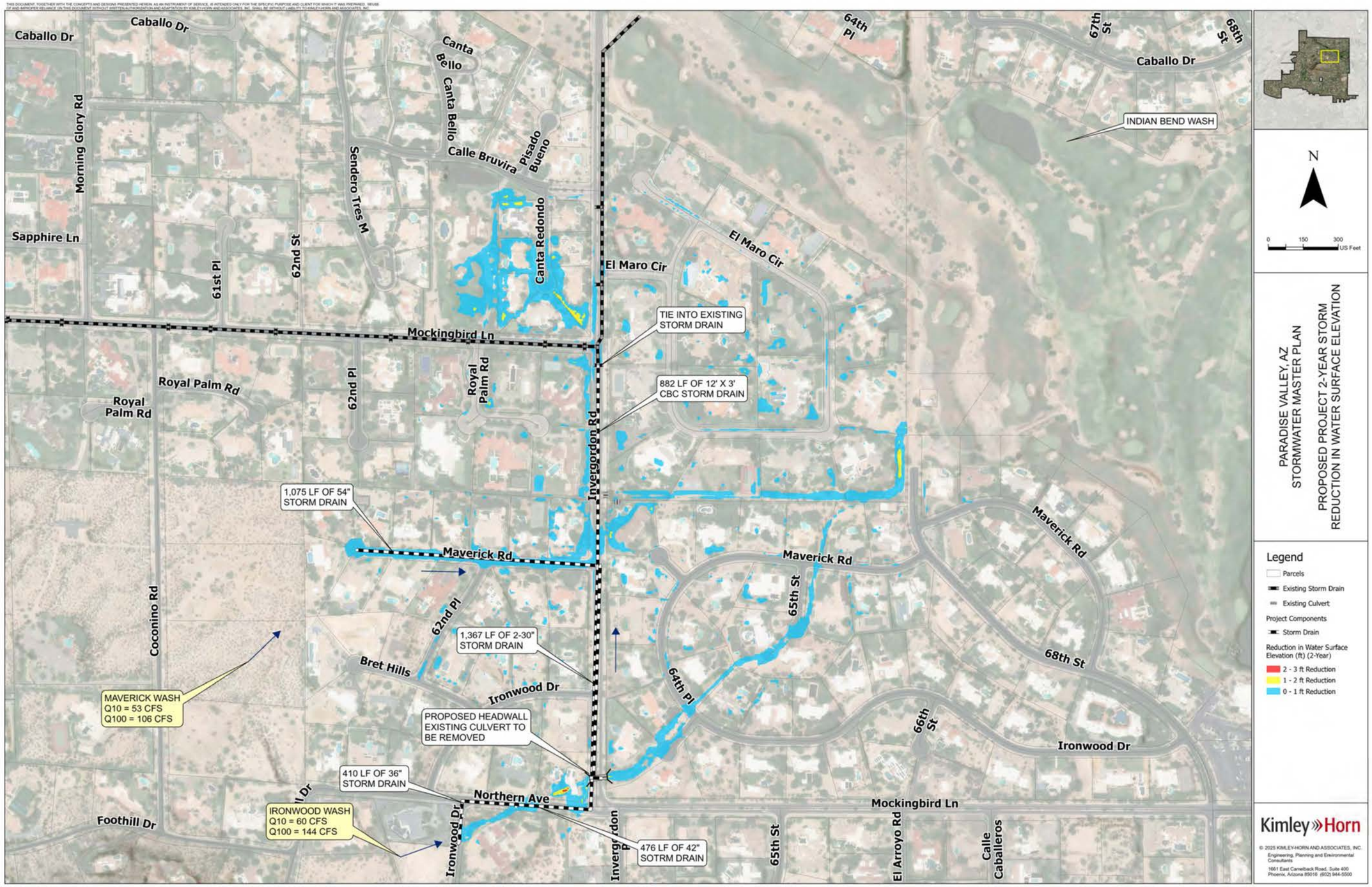
FLOOD HAZARD AREA A

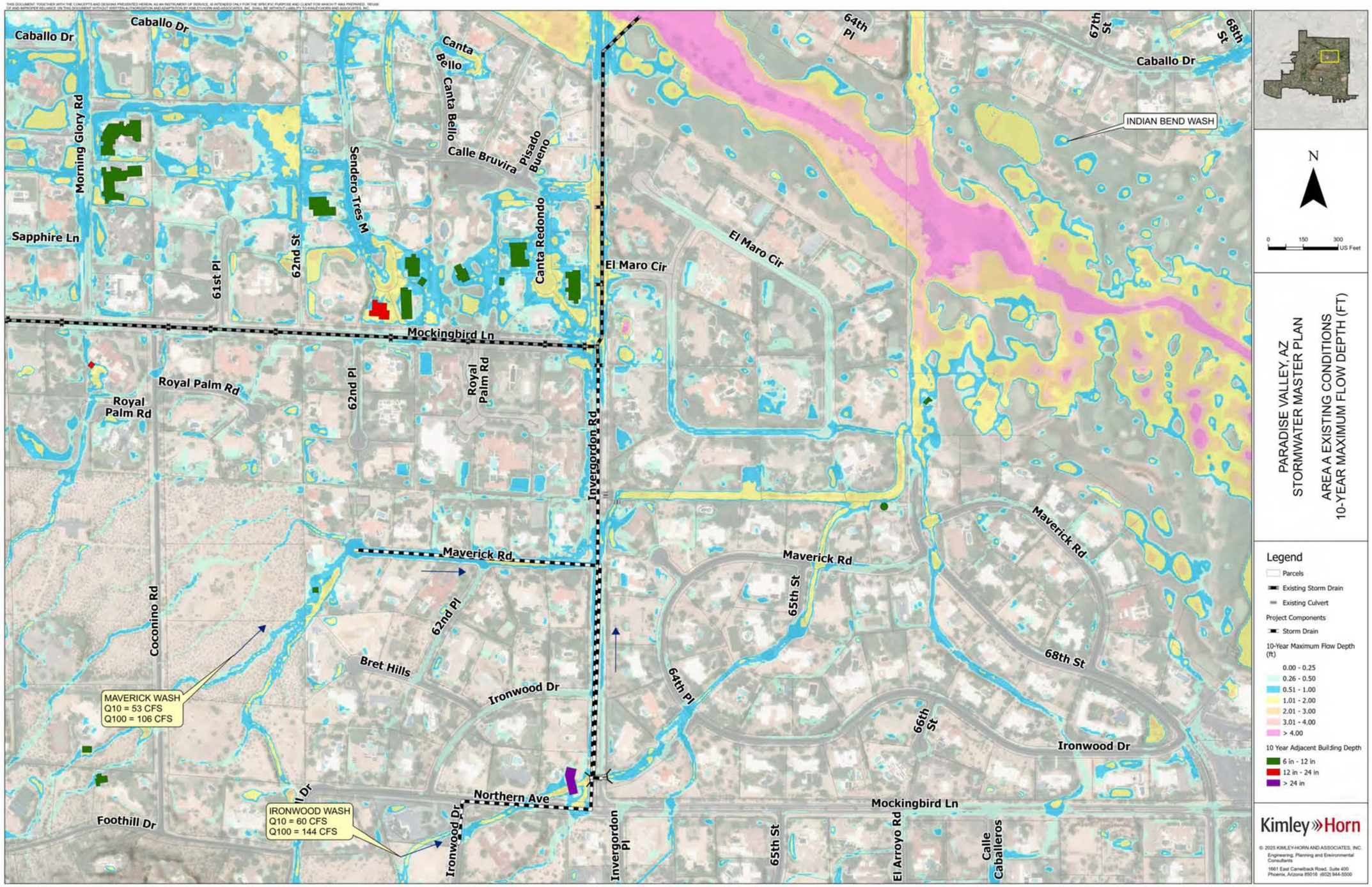
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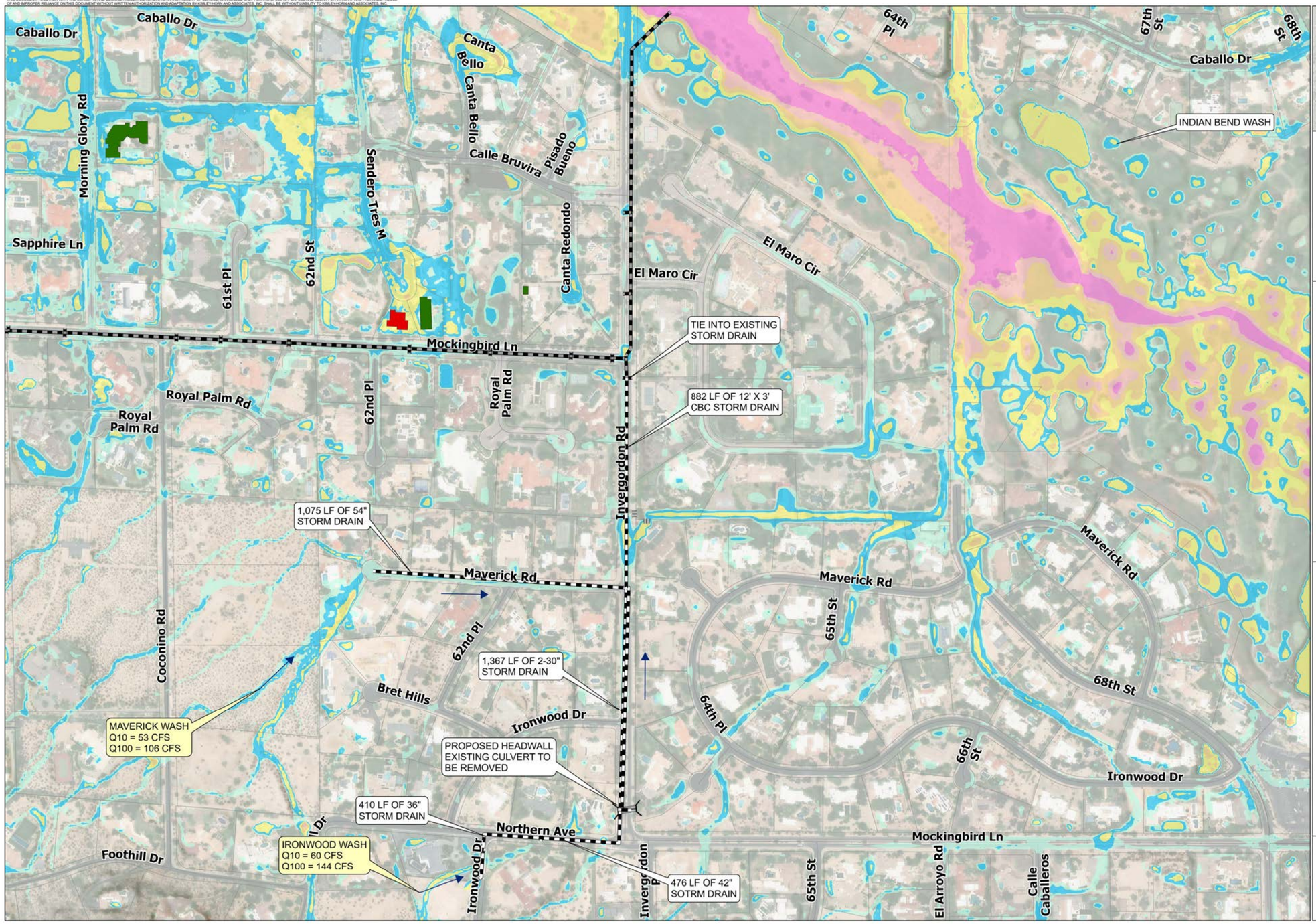
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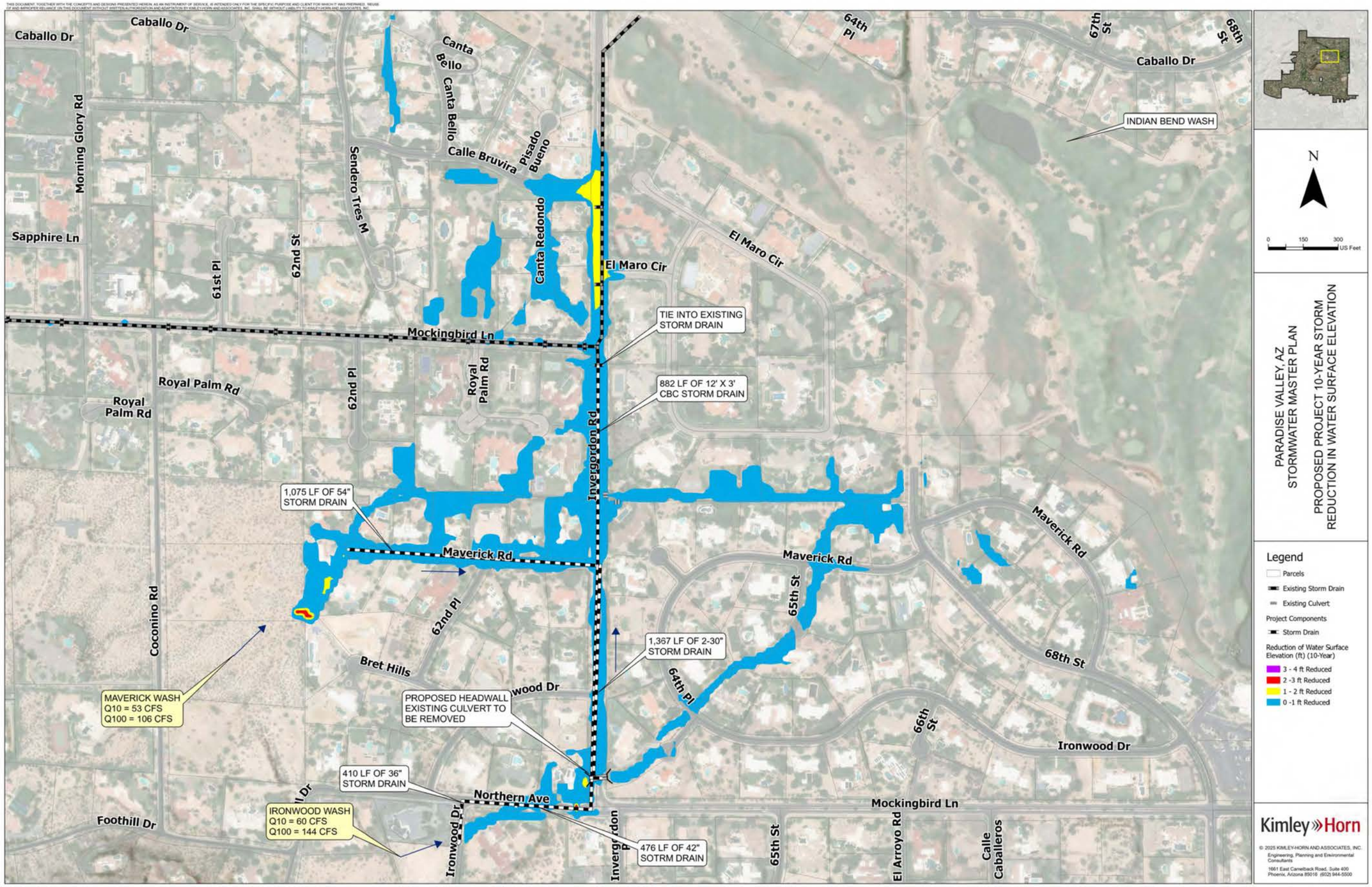


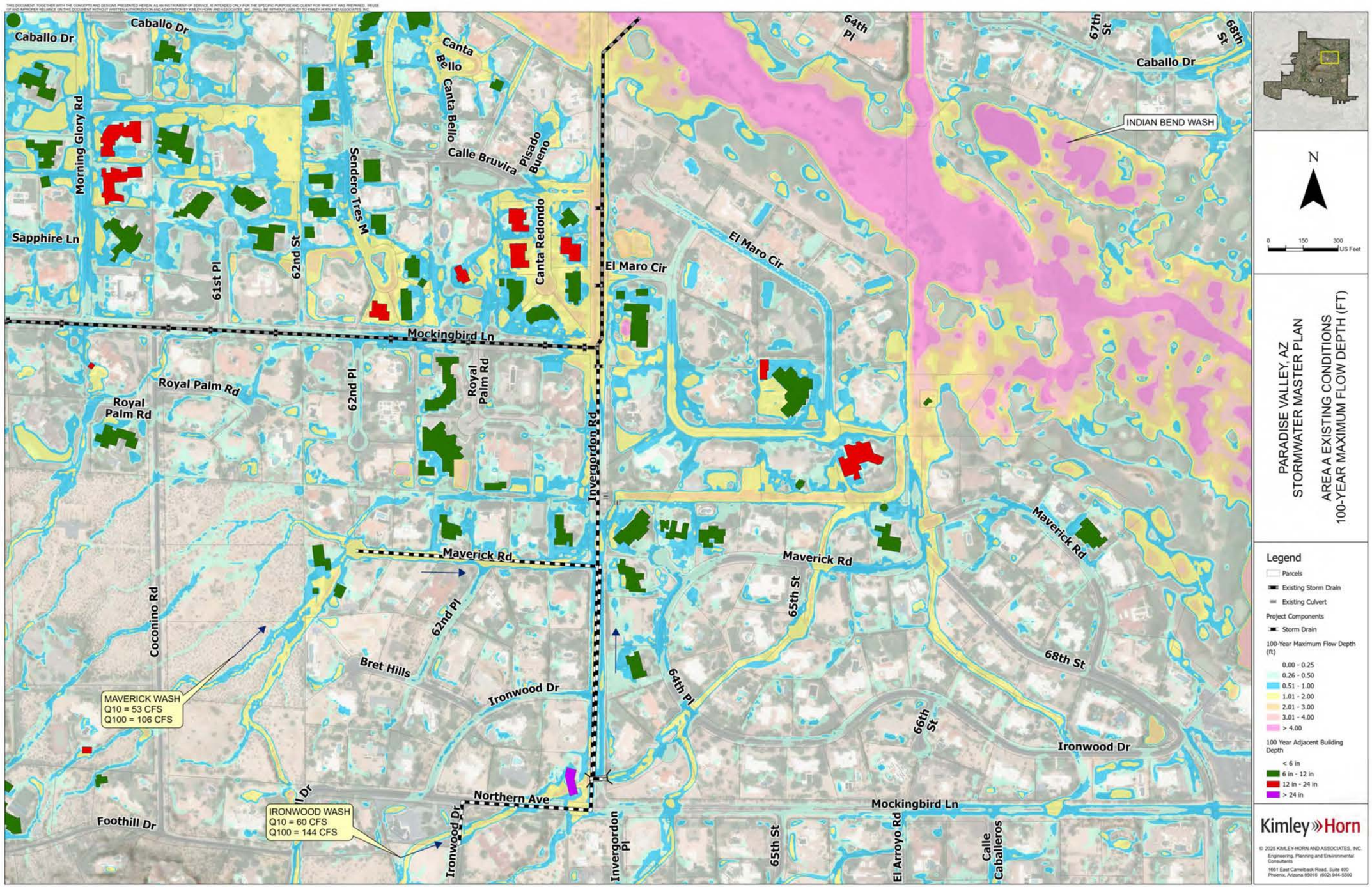

Caballo Dr
Morning Glory Rd
Sapphire Ln
61st Pl
62nd St
Sendero Tres M
Canta Bello
Calle Bruvira
Pisado Bueno
Canta Redondo
El Maro Cir
64th Pl
67th St
68th St
INDIAN BEND WASH
Mockingbird Ln
Royal Palm Rd
62nd Pl
Invergordon Rd
TIE INTO EXISTING STORM DRAIN
882 LF OF 12' X 3' CBC STORM DRAIN
1,075 LF OF 54" STORM DRAIN
Maverick Rd
65th St
66th St
68th St
Coconino Rd
Bret Hills
Ironwood Dr
1,367 LF OF 2-30" STORM DRAIN
MAVERICK WASH
Q10 = 53 CFS
Q100 = 106 CFS
PROPOSED HEADWALL EXISTING CULVERT TO BE REMOVED
410 LF OF 36" STORM DRAIN
Northern Ave
IRONWOOD WASH
Q10 = 60 CFS
Q100 = 144 CFS
476 LF OF 42" SOTRM DRAIN
Foothill Dr
El Arroyo Rd
Calle Caballeros
N
0 150 300 US Feet
PARADISE VALLEY, AZ
STORMWATER MASTER PLAN
PROPOSED PROJECT 2-YEAR STORM
REDUCTION IN WATER SURFACE ELEVATION
Legend
Parcels
Existing Storm Drain
Existing Culvert
Project Components
Storm Drain
Reduction in Water Surface Elevation (ft) (2-Year)
2 - 3 ft Reduction
1 - 2 ft Reduction
0 - 1 ft Reduction
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Northern Ave
Foothill Dr
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El Arroyo Rd
MAVERICK WASH
Q10 = 53 CFS
Q100 = 106 CFS
IRONWOOD WASH
Q10 = 60 CFS
Q100 = 144 CFS
N
0 150 300
US Feet
PARADISE VALLEY, AZ
STORMWATER MASTER PLAN
AREA A EXISTING CONDITIONS
10-YEAR MAXIMUM FLOW DEPTH (FT)
Legend
Parcels
Existing Storm Drain
Existing Culvert
Project Components
Storm Drain
10-Year Maximum Flow Depth (ft)
0.00 - 0.25
0.26 - 0.50
0.51 - 1.00
1.01 - 2.00
2.01 - 3.00
3.01 - 4.00
> 4.00
10 Year Adjacent Building Depth
6 in - 12 in
12 in - 24 in
> 24 in
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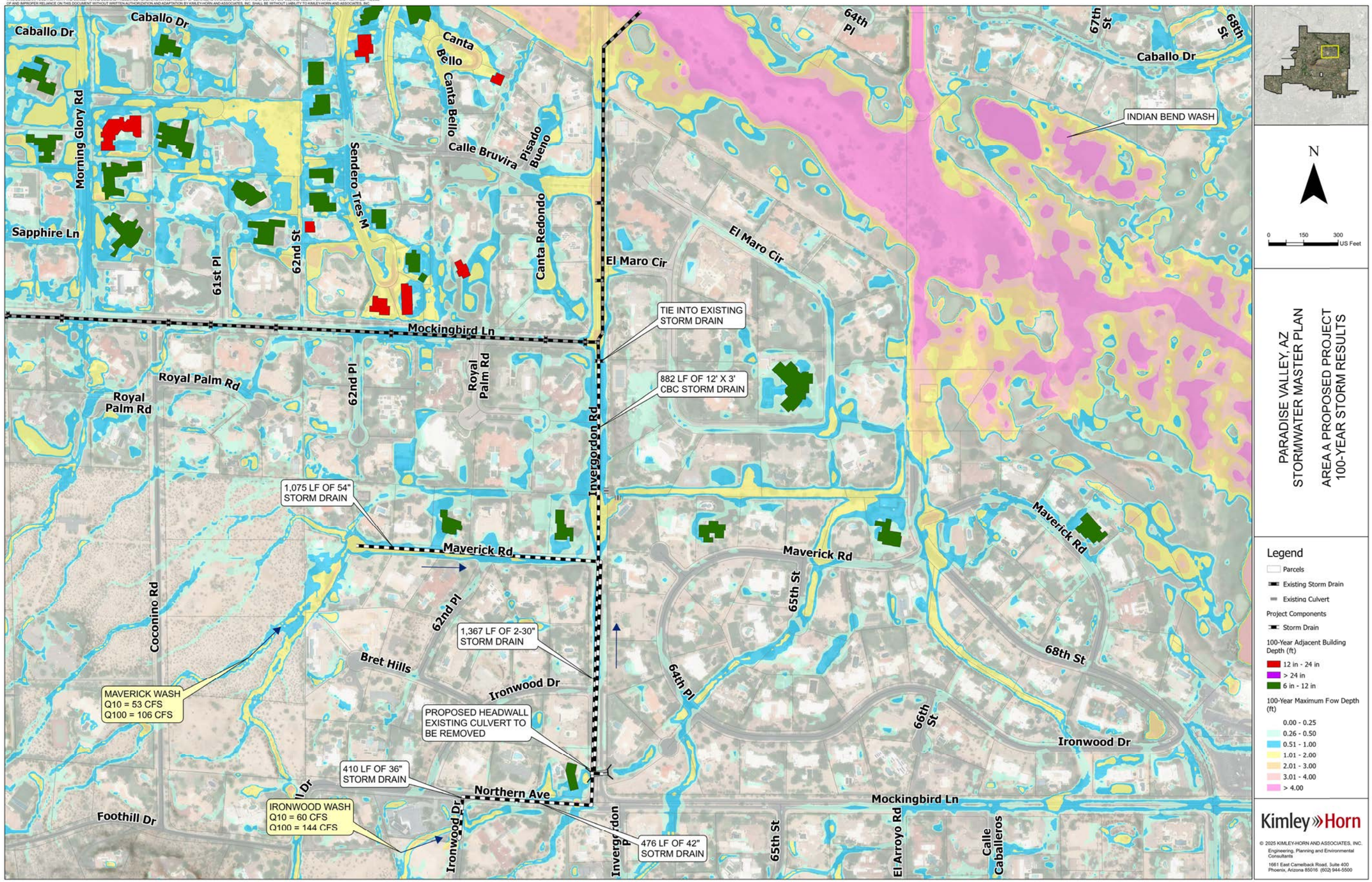
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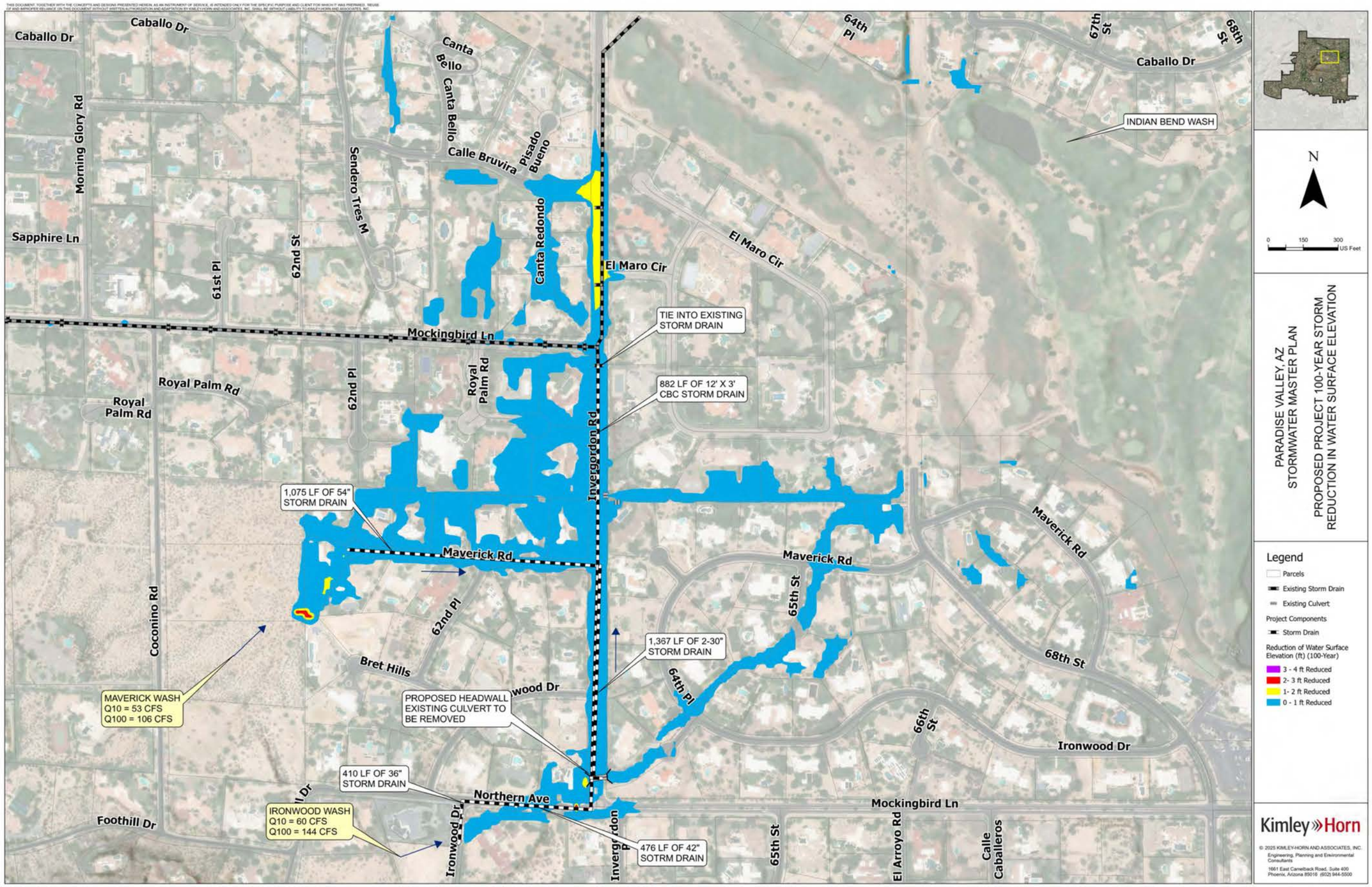

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Canta Redondo
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67th St
68th St
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TIE INTO EXISTING STORM DRAIN
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1,075 LF OF 54" STORM DRAIN
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1,367 LF OF 2-30" STORM DRAIN
Coconino Rd
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Ironwood Dr
66th St
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EXISTING CULVERT TO
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410 LF OF 36" STORM DRAIN
Northern Ave
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Q10 = 60 CFS
Q100 = 144 CFS
476 LF OF 42" SOTRM DRAIN
Foothill Dr
Calle Caballeros
El Arroyo Rd
N
0 150 300 US Feet
PARADISE VALLEY, AZ
STORMWATER MASTER PLAN
PROPOSED PROJECT 10-YEAR STORM
REDUCTION IN WATER SURFACE ELEVATION
Legend
Parcels
Existing Storm Drain
Existing Culvert
Project Components
Storm Drain
Reduction of Water Surface Elevation (ft) (10-Year)
3 - 4 ft Reduced
2 -3 ft Reduced
1 - 2 ft Reduced
0 -1 ft Reduced
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IRONWOOD WASH
Q10 = 60 CFS
Q100 = 144 CFS
N
0 150 300
US Feet
PARADISE VALLEY, AZ
STORMWATER MASTER PLAN
AREA A EXISTING CONDITIONS
100-YEAR MAXIMUM FLOW DEPTH (FT)
Legend
Parcels
Existing Storm Drain
Existing Culvert
Project Components
Storm Drain
100-Year Maximum Flow Depth (ft)
0.00 - 0.25
0.26 - 0.50
0.51 - 1.00
1.01 - 2.00
2.01 - 3.00
3.01 - 4.00
> 4.00
100 Year Adjacent Building Depth
< 6 in
6 in - 12 in
12 in - 24 in
> 24 in
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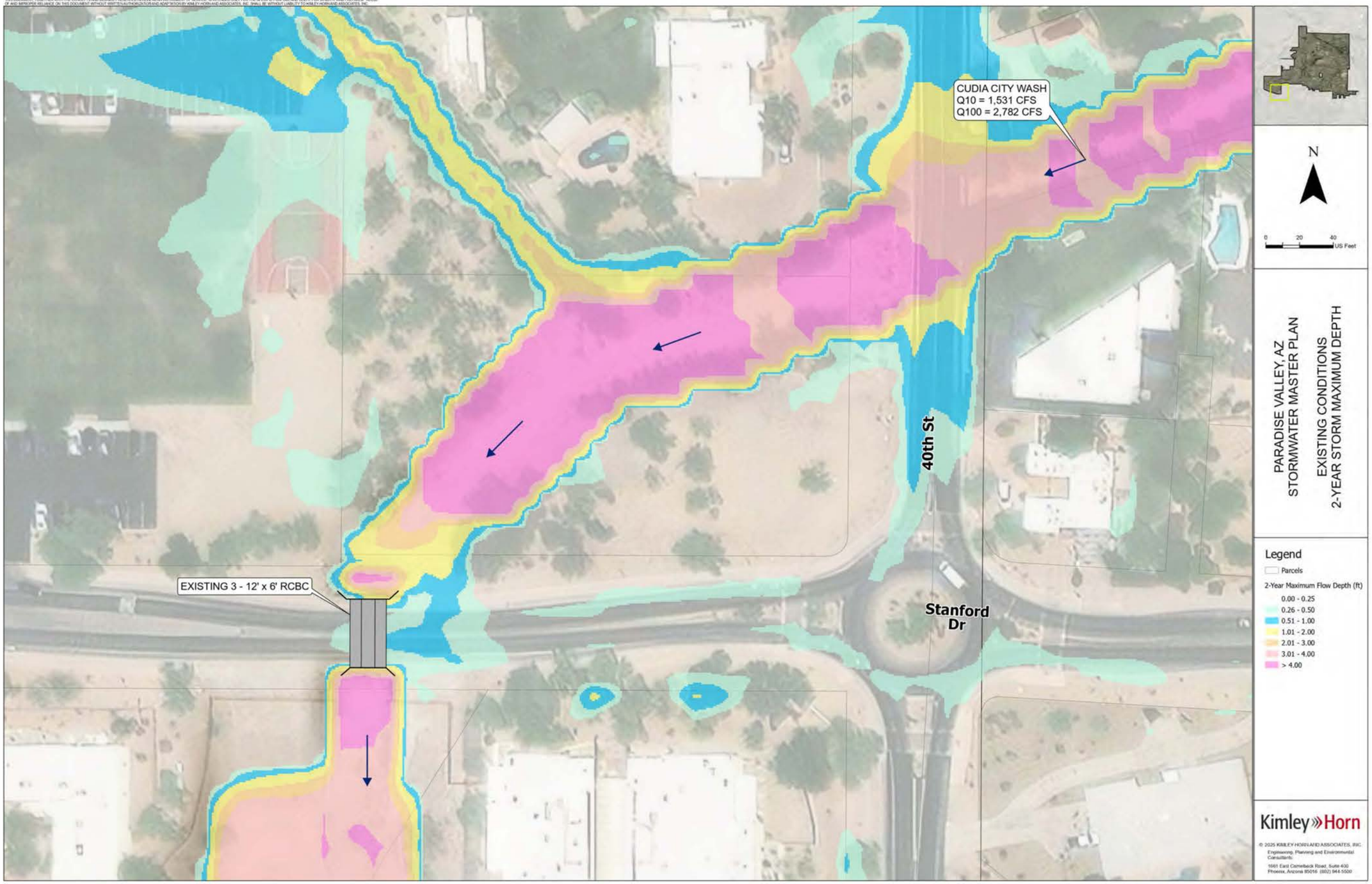
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0 150 300 US Feet
PARADISE VALLEY, AZ
STORMWATER MASTER PLAN
PROPOSED PROJECT 100-YEAR STORM
REDUCTION IN WATER SURFACE ELEVATION
Legend
Parcels
Existing Storm Drain
Existing Culvert
Project Components
Storm Drain
Reduction of Water Surface Elevation (ft) (100-Year)
3 - 4 ft Reduced
2- 3 ft Reduced
1- 2 ft Reduced
0 - 1 ft Reduced
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XVIII. APPENDIX F – HIGHEST PRIORITY PROJECTS ANTICIPATED PERFORMANCE

FLOOD HAZARD AREA H

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FLOOD WARNING SIGN

CUDIA CITY WASH
Q10 = 1,531 CFS
Q100 = 2,782 CFS

STAFF GAGE

REMOVE BOLLARDS AND
REPLACE WITH SAFETY RAIL

40th St

FLOOD CONTROL BASIN

EXISTING 3 - 12' x 6' RCBC

REMOVE AND REPLACE
EXISTING INLET/GRATE

Stanford
Dr

1266 1266
1264 1265 1263 1261
1261 1262 1267
1259 1260 1261 1262 1263 1264

N

0 20 40 US Feet

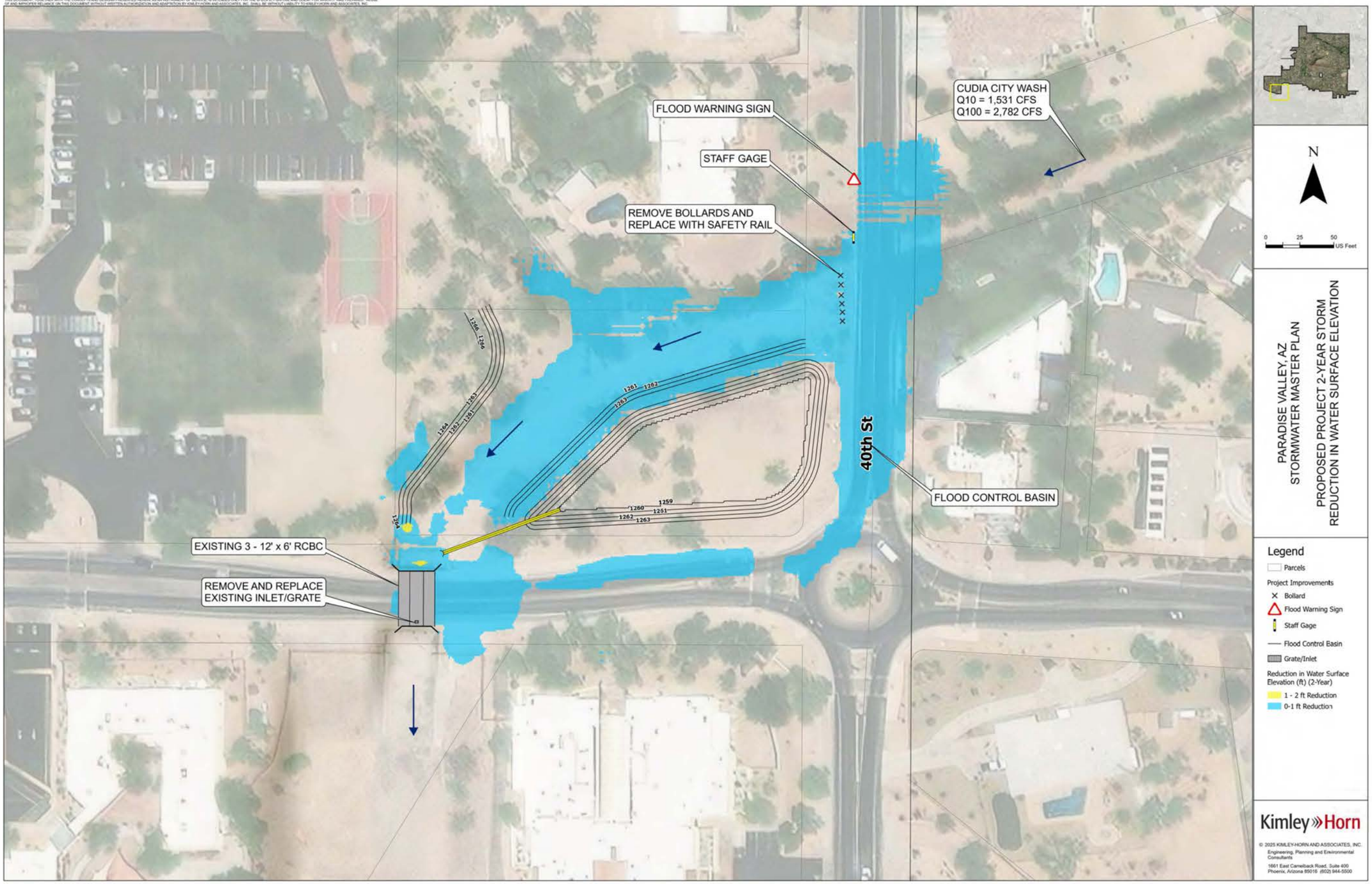
PARADISE VALLEY, AZ
STORMWATER MASTER PLAN
PROPOSED PROJECT
2-YEAR STORM MAX DEPTH RESULTS

Legend
Parcels
Project Improvements
Bollard
Flood Warning Sign
Staff Gage
Flood Control Basin
Grate/Inlet
2-Year Maximum Flow Depth (ft)
0.00 - 0.25
0.26 - 0.50
0.51 - 1.00
1.01 - 2.00
2.01 - 3.00
3.01 - 4.00
> 4.00

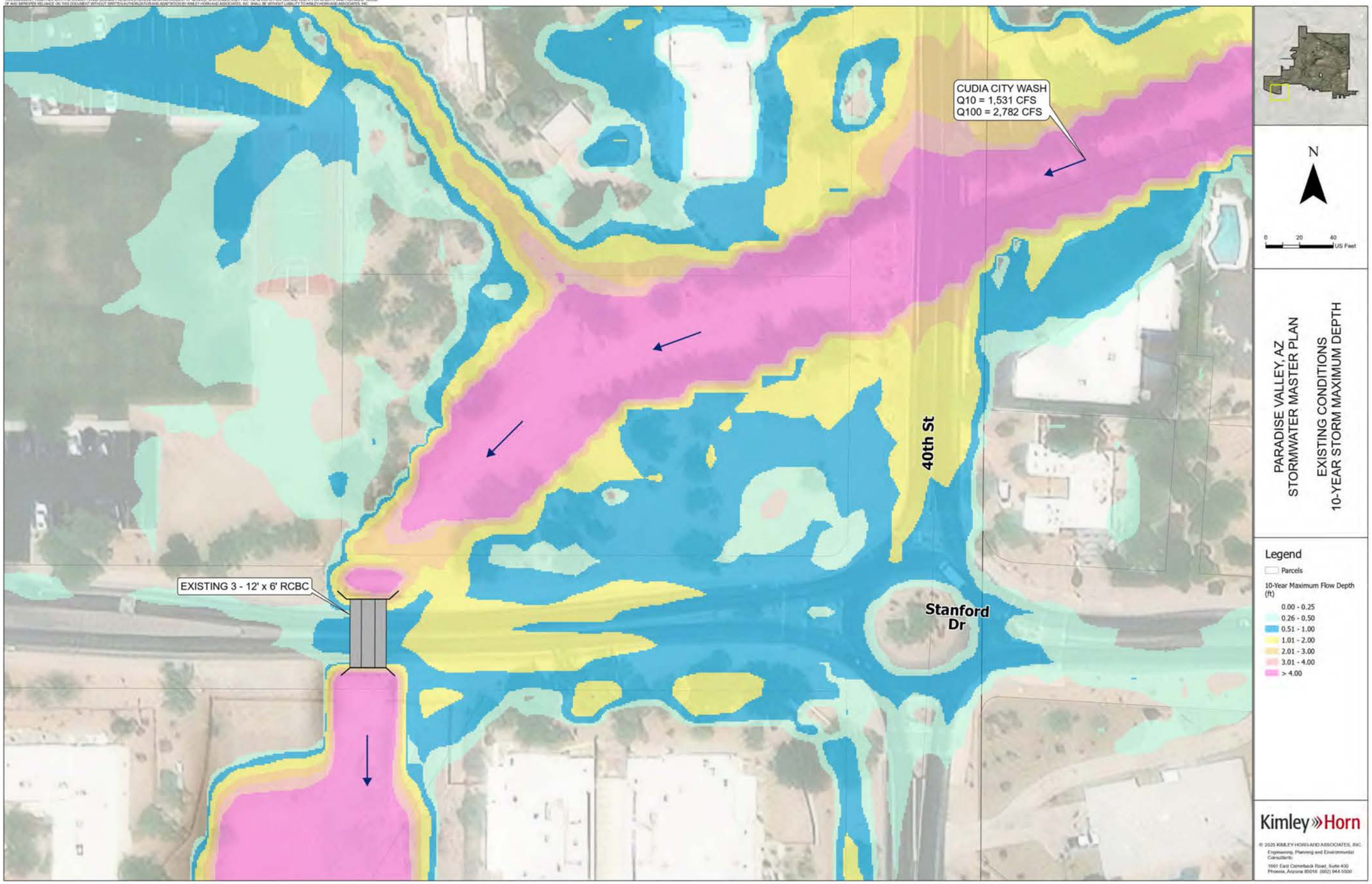
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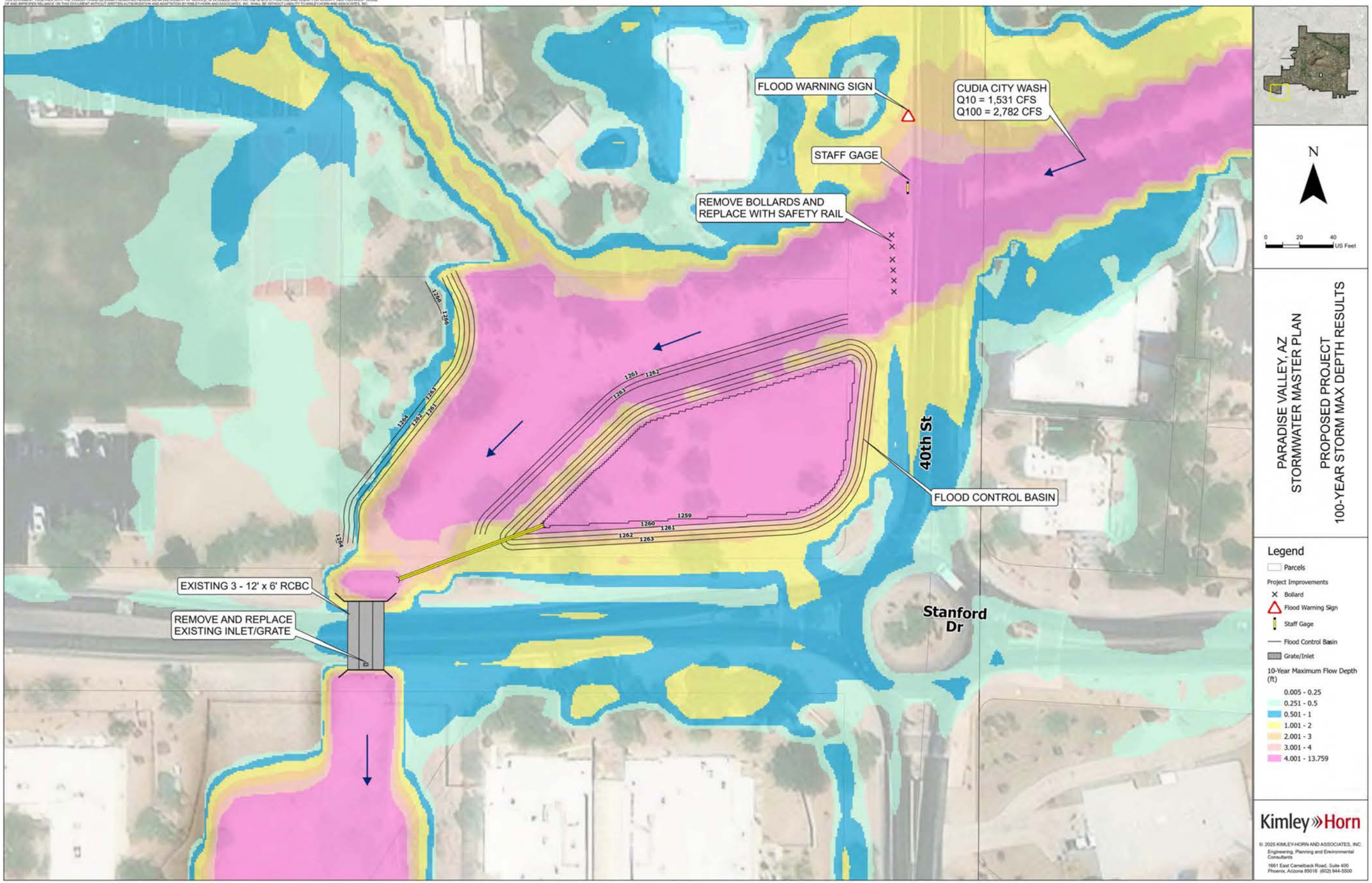
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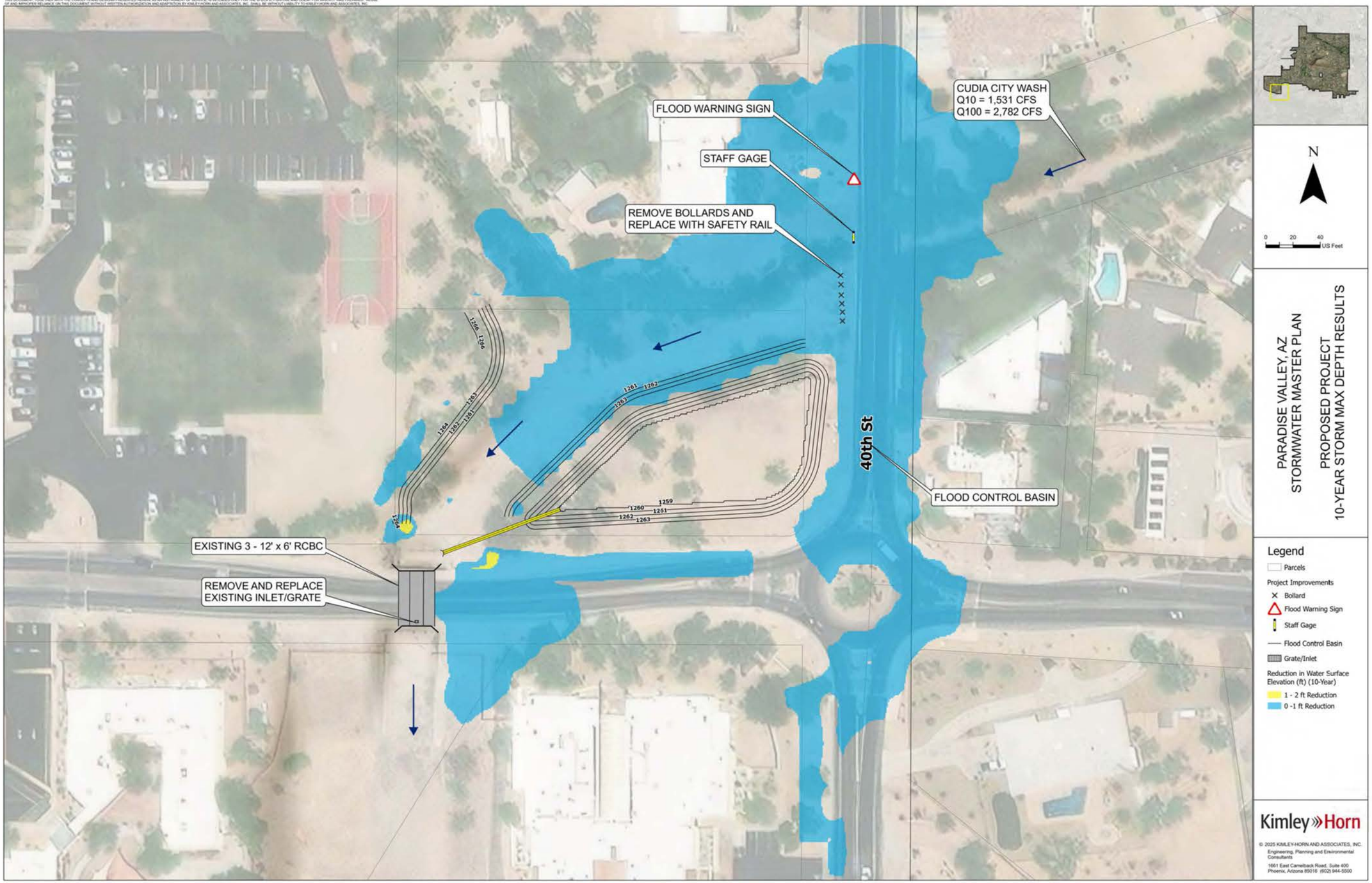


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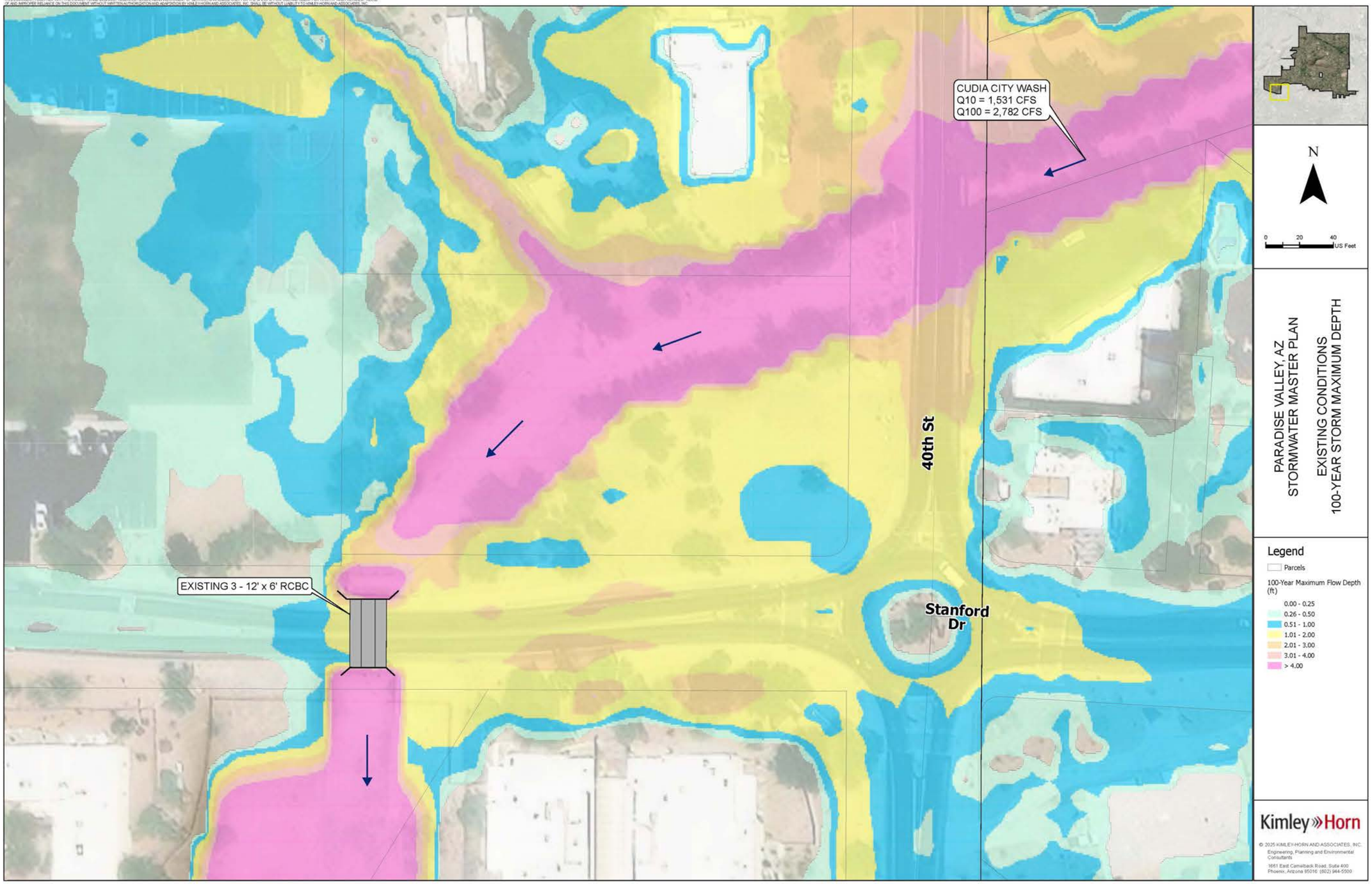


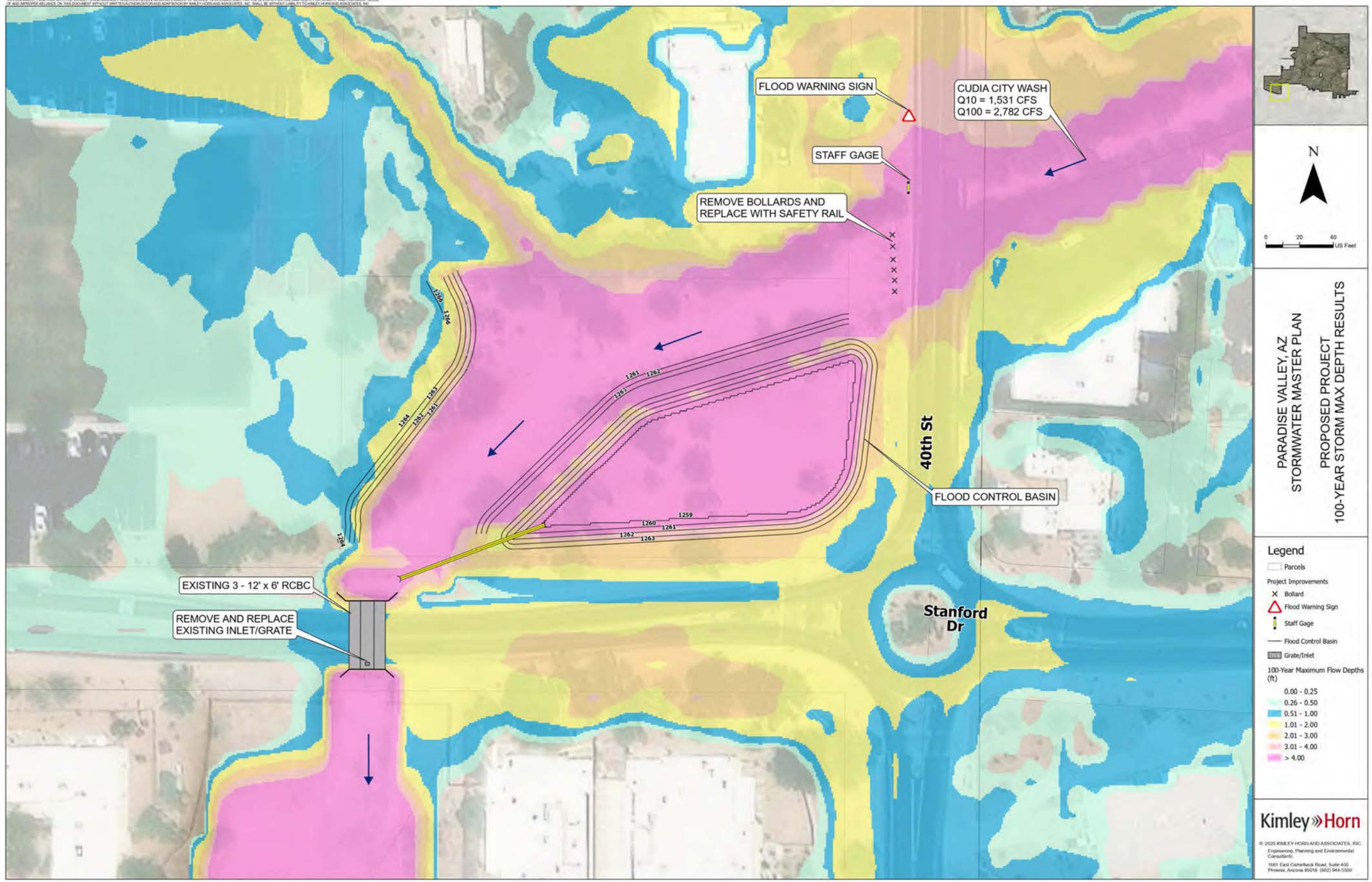

FLOOD WARNING SIGN
CUDIA CITY WASH
Q10 = 1,531 CFS
Q100 = 2,782 CFS
STAFF GAGE
REMOVE BOLLARDS AND
REPLACE WITH SAFETY RAIL
40th St
FLOOD CONTROL BASIN
EXISTING 3 - 12' x 6' RCBC
REMOVE AND REPLACE
EXISTING INLET/GRATE
Stanford
Dr
N
0 20 40
US Feet
PARADISE VALLEY, AZ
STORMWATER MASTER PLAN
PROPOSED PROJECT
100-YEAR STORM MAX DEPTH RESULTS
Legend
Parcels
Project Improvements
Bollard
Flood Warning Sign
Staff Gage
Flood Control Basin
Grate/Inlet
10-Year Maximum Flow Depth (ft)
0.005 - 0.25
0.251 - 0.5
0.501 - 1
1.001 - 2
2.001 - 3
3.001 - 4
4.001 - 13.759
Kimley»Horn
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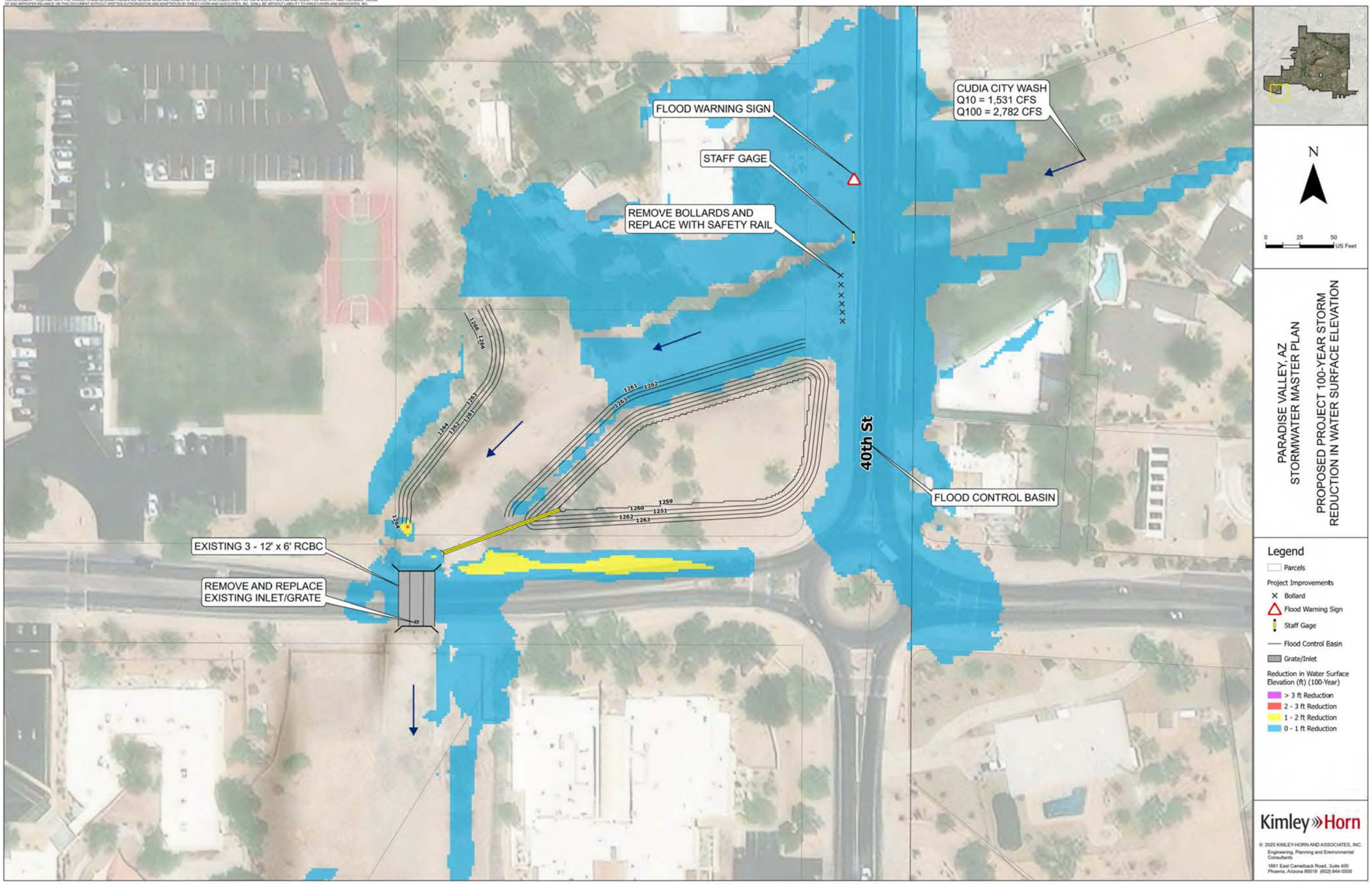


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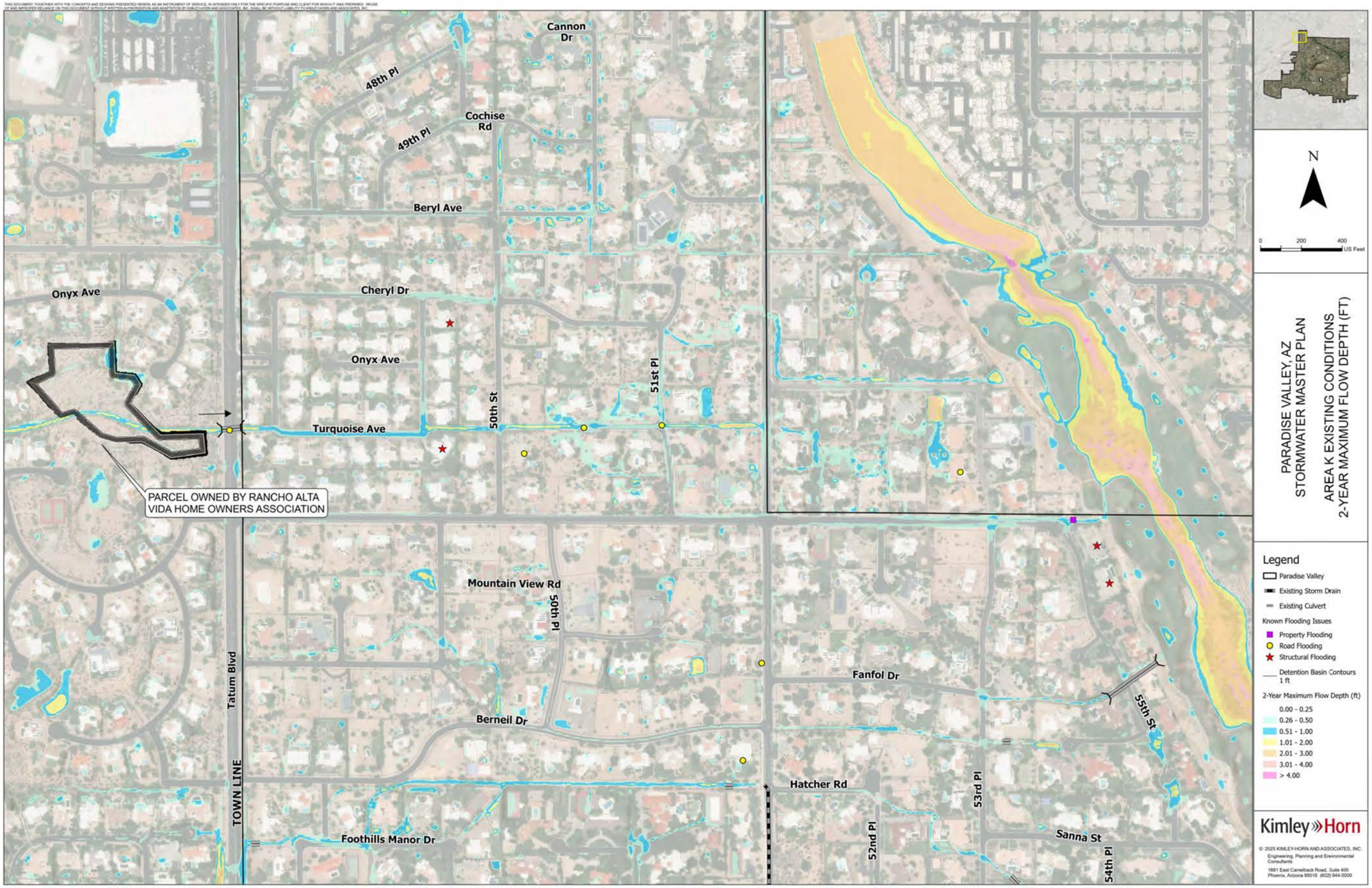

FLOOD WARNING SIGN
CUDIA CITY WASH
Q10 = 1,531 CFS
Q100 = 2,782 CFS
STAFF GAGE
REMOVE BOLLARDS AND
REPLACE WITH SAFETY RAIL
40th St
FLOOD CONTROL BASIN
EXISTING 3 - 12' x 6' RCBC
REMOVE AND REPLACE
EXISTING INLET/GRATE
Stanford
Dr
N
0 20 40
US Feet
PARADISE VALLEY, AZ
STORMWATER MASTER PLAN
PROPOSED PROJECT
100-YEAR STORM MAX DEPTH RESULTS
Legend
Parcels
Project Improvements
Bollard
Flood Warning Sign
Staff Gage
Flood Control Basin
Grate/Inlet
100-Year Maximum Flow Depths (ft)
0.00 - 0.25
0.26 - 0.50
0.51 - 1.00
1.01 - 2.00
2.01 - 3.00
3.01 - 4.00
> 4.00
Kimley»Horn

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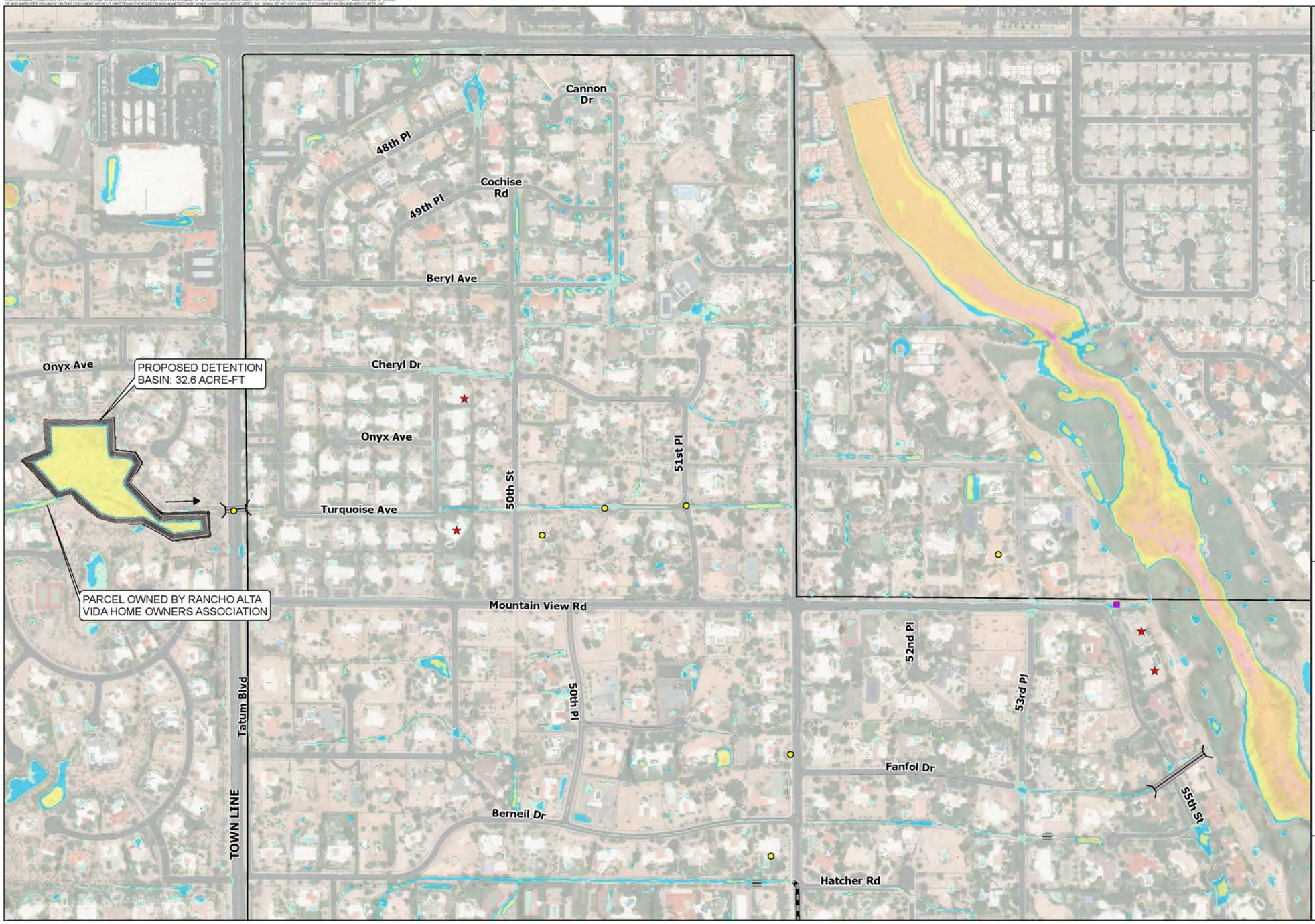


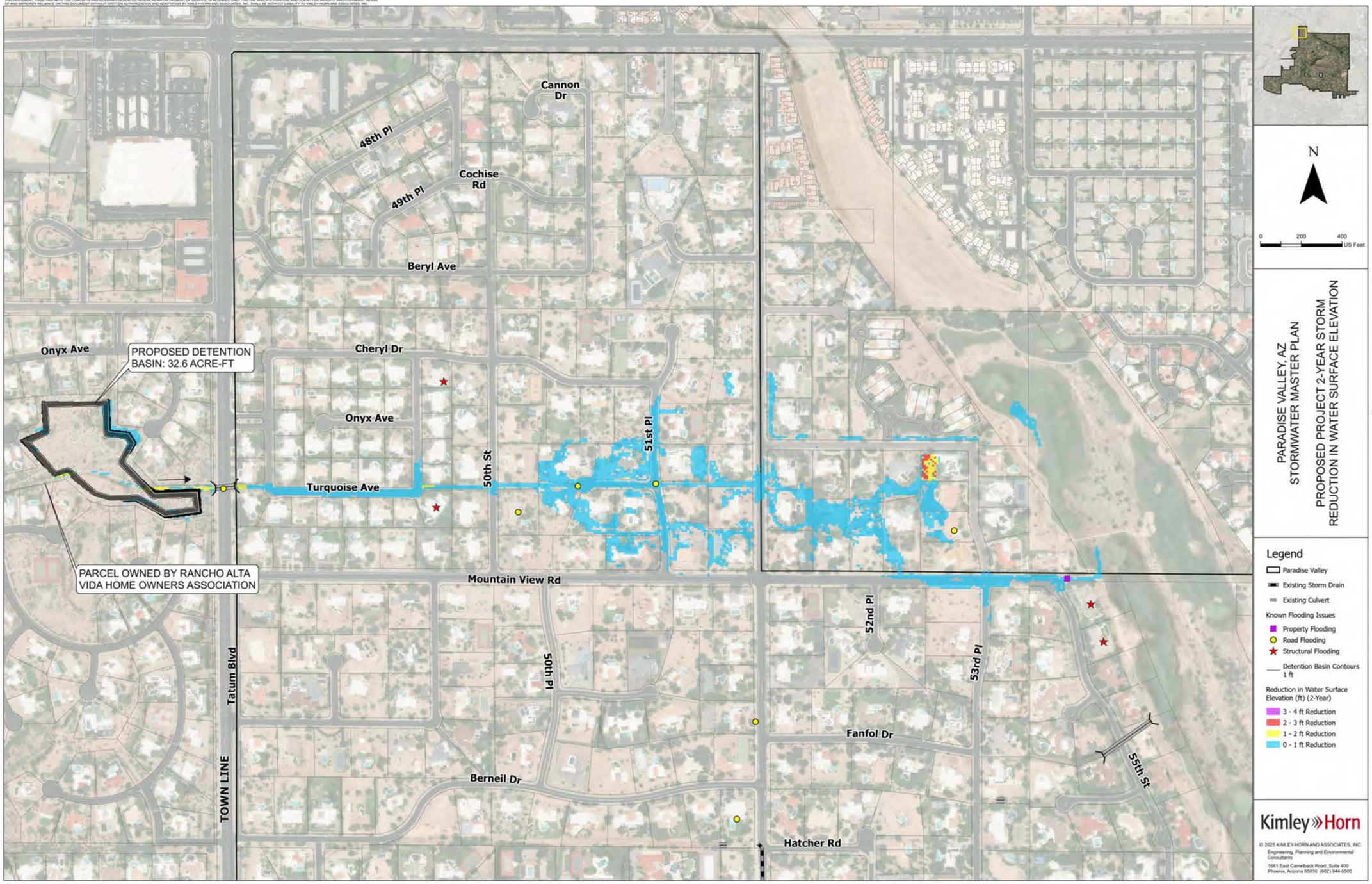
XVIII. APPENDIX F – HIGHEST PRIORITY PROJECTS ANTICIPATED PERFORMANCE

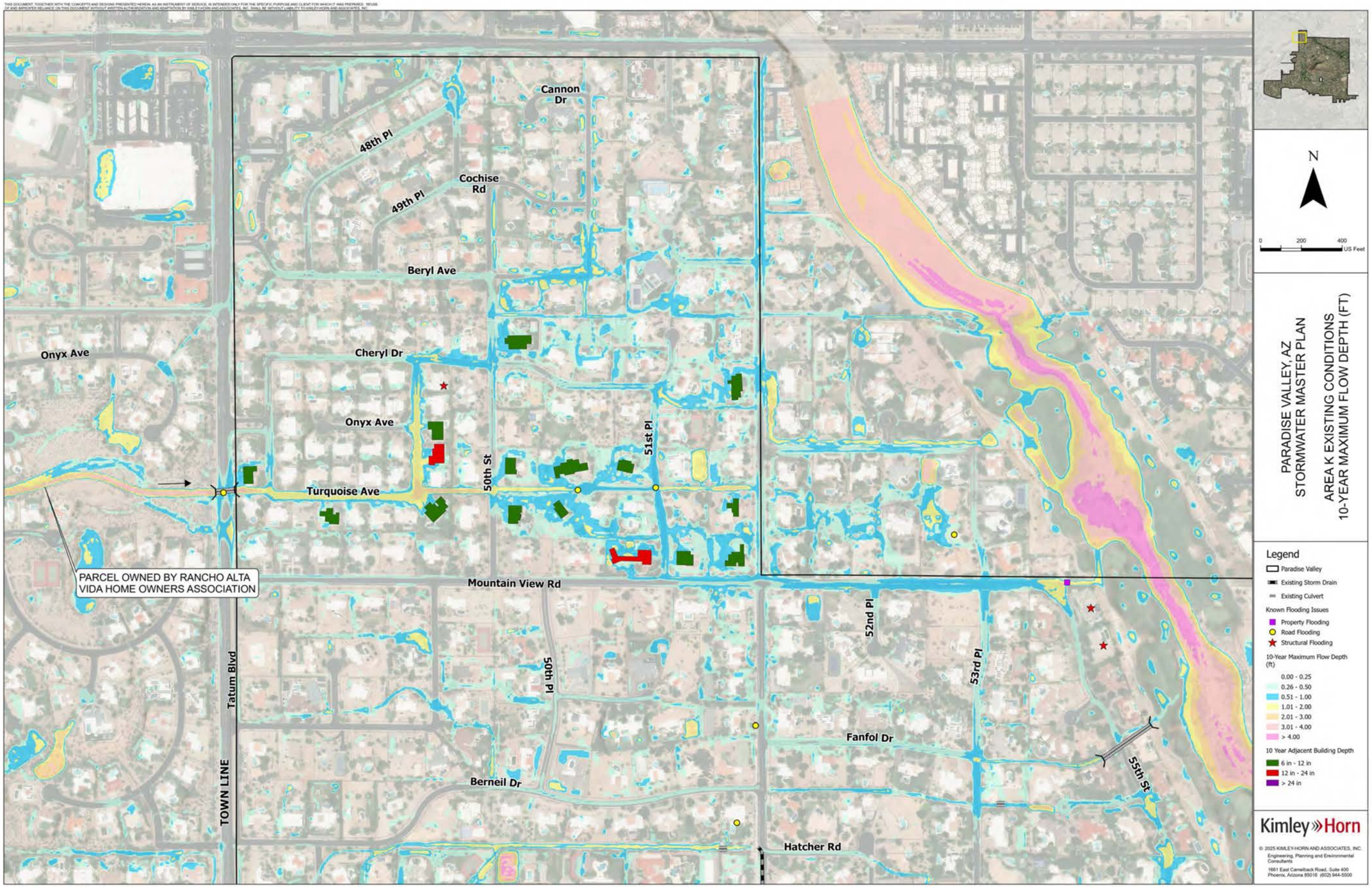
FLOOD HAZARD AREA K


Cannon Dr
48th Pl
49th Pl
Cochise Rd
Beryl Ave
Cheryl Dr
Onyx Ave
Onyx Ave
50th St
51st Pl
Turquoise Ave
PARCEL OWNED BY RANCHO ALTA VIDA HOME OWNERS ASSOCIATION
Mountain View Rd
50th Pl
Tatum Blvd
TOWN LINE
Berneil Dr
Foothills Manor Dr
Fanfol Dr
Hatcher Rd
52nd Pl
53rd Pl
55th St
Sanna St
54th Pl
N
0
200
400
US Feet
PARADISE VALLEY, AZ
STORMWATER MASTER PLAN
AREA K EXISTING CONDITIONS
2-YEAR MAXIMUM FLOW DEPTH (FT)
Legend
Paradise Valley
Existing Storm Drain
Existing Culvert
Known Flooding Issues
Property Flooding
Road Flooding
Structural Flooding
Detention Basin Contours 1 ft
2-Year Maximum Flow Depth (ft)
0.00 - 0.25
0.26 - 0.50
0.51 - 1.00
1.01 - 2.00
2.01 - 3.00
3.01 - 4.00
> 4.00
Kimley»Horn
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Engineering, Planning and Environmental Consultants
1661 East Camelback Road, Suite 400
Phoenix, Arizona 85016 (602) 944-5500

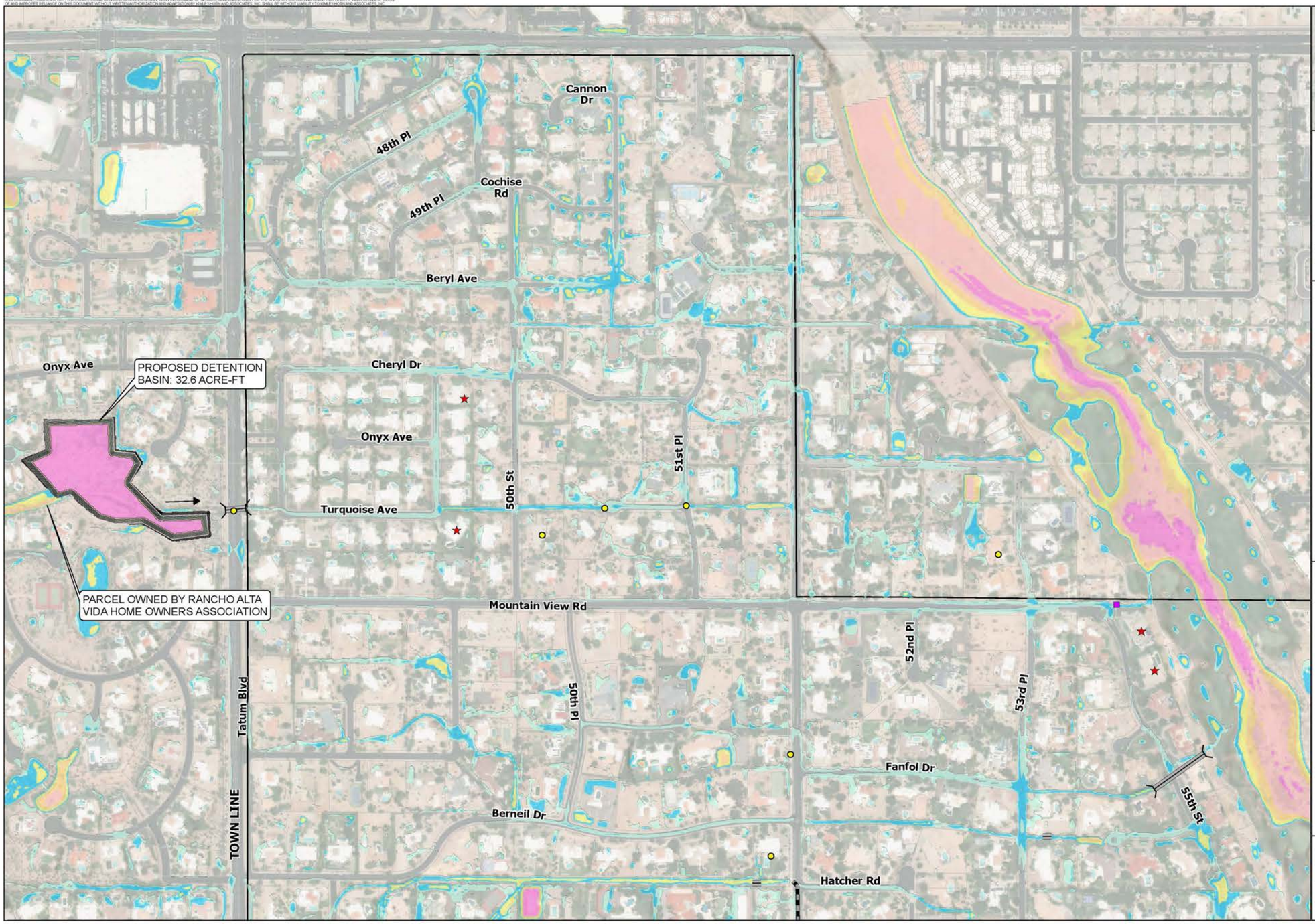
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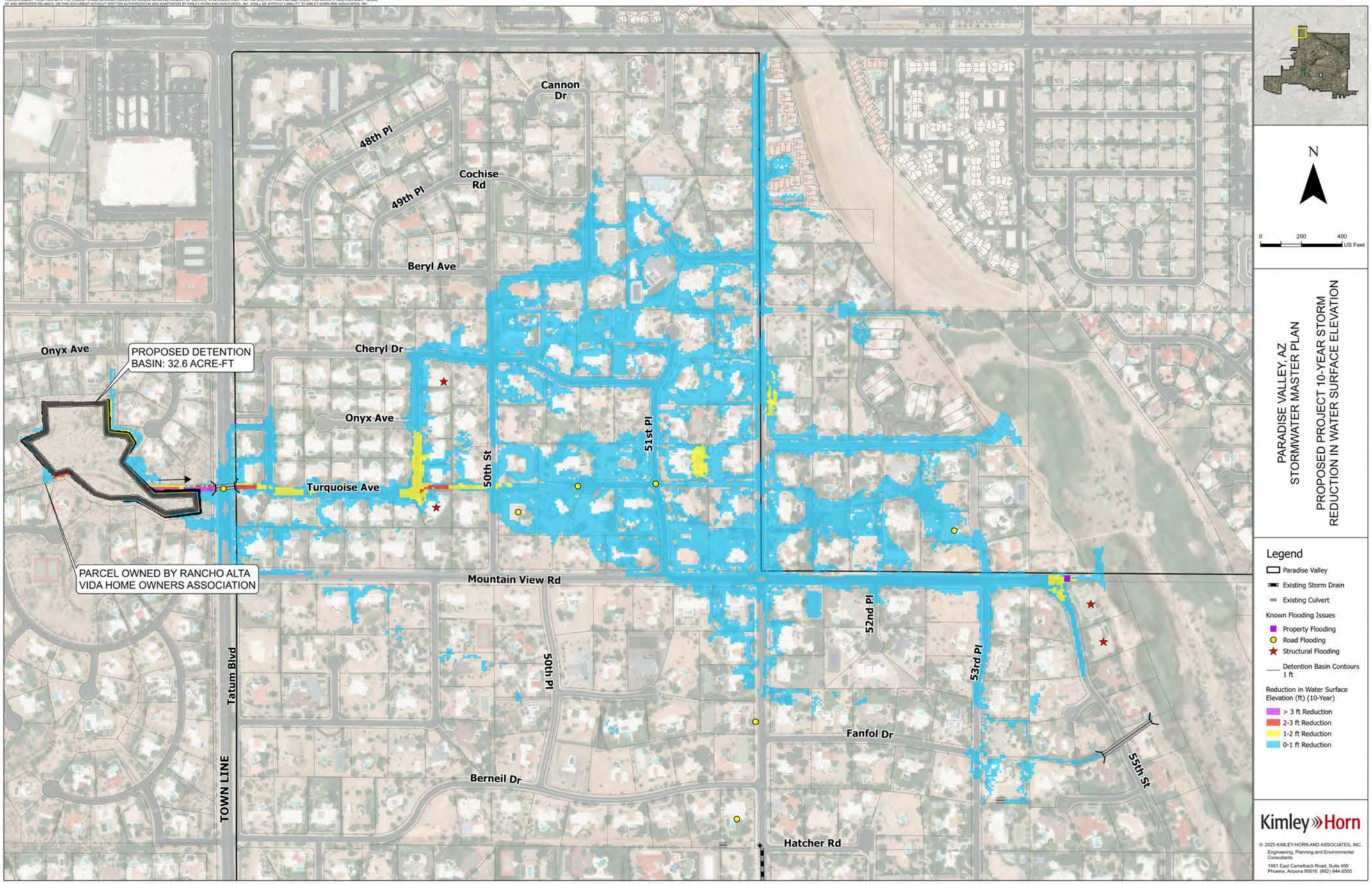


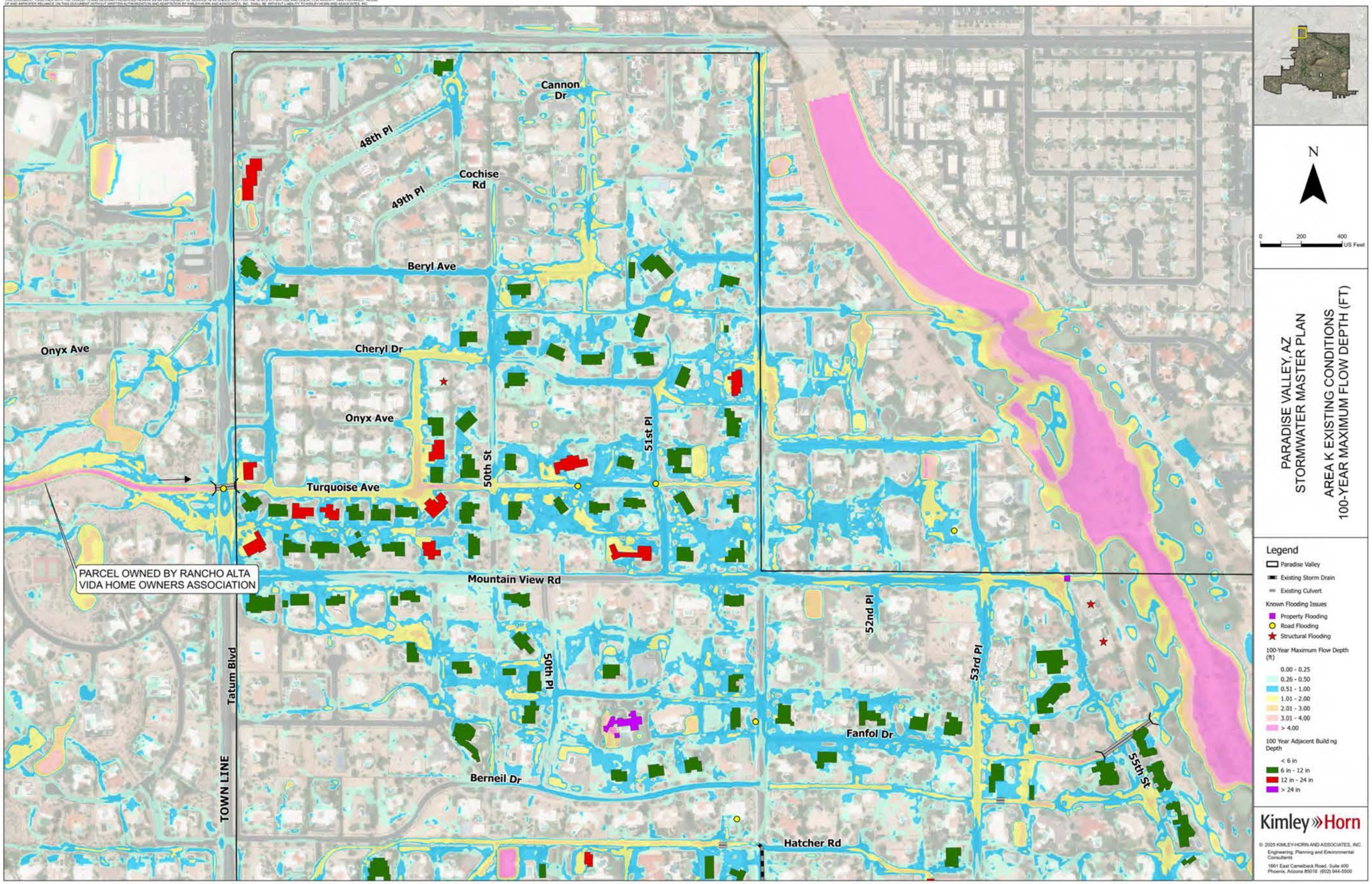

Cannon Dr
48th Pl
49th Pl
Cochise Rd
Beryl Ave
Cheryl Dr
Onyx Ave
PROPOSED DETENTION BASIN: 32.6 ACRE-FT
PARCEL OWNED BY RANCHO ALTA VIDA HOME OWNERS ASSOCIATION
Turquoise Ave
50th St
51st Pl
Mountain View Rd
52nd Pl
53rd Pl
55th St
50th Pl
Tatum Blvd
TOWN LINE
Fanfol Dr
Berneil Dr
Hatcher Rd
N
0 200 400 US Feet
PARADISE VALLEY, AZ
STORMWATER MASTER PLAN
PROPOSED PROJECT 2-YEAR STORM
REDUCTION IN WATER SURFACE ELEVATION
Legend
Paradise Valley
Existing Storm Drain
Existing Culvert
Known Flooding Issues
Property Flooding
Road Flooding
Structural Flooding
Detention Basin Contours 1 ft
Reduction in Water Surface Elevation (ft) (2-Year)
3 - 4 ft Reduction
2 - 3 ft Reduction
1 - 2 ft Reduction
0 - 1 ft Reduction
Kimley»Horn
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Phoenix, Arizona 85016 (602) 944-5500

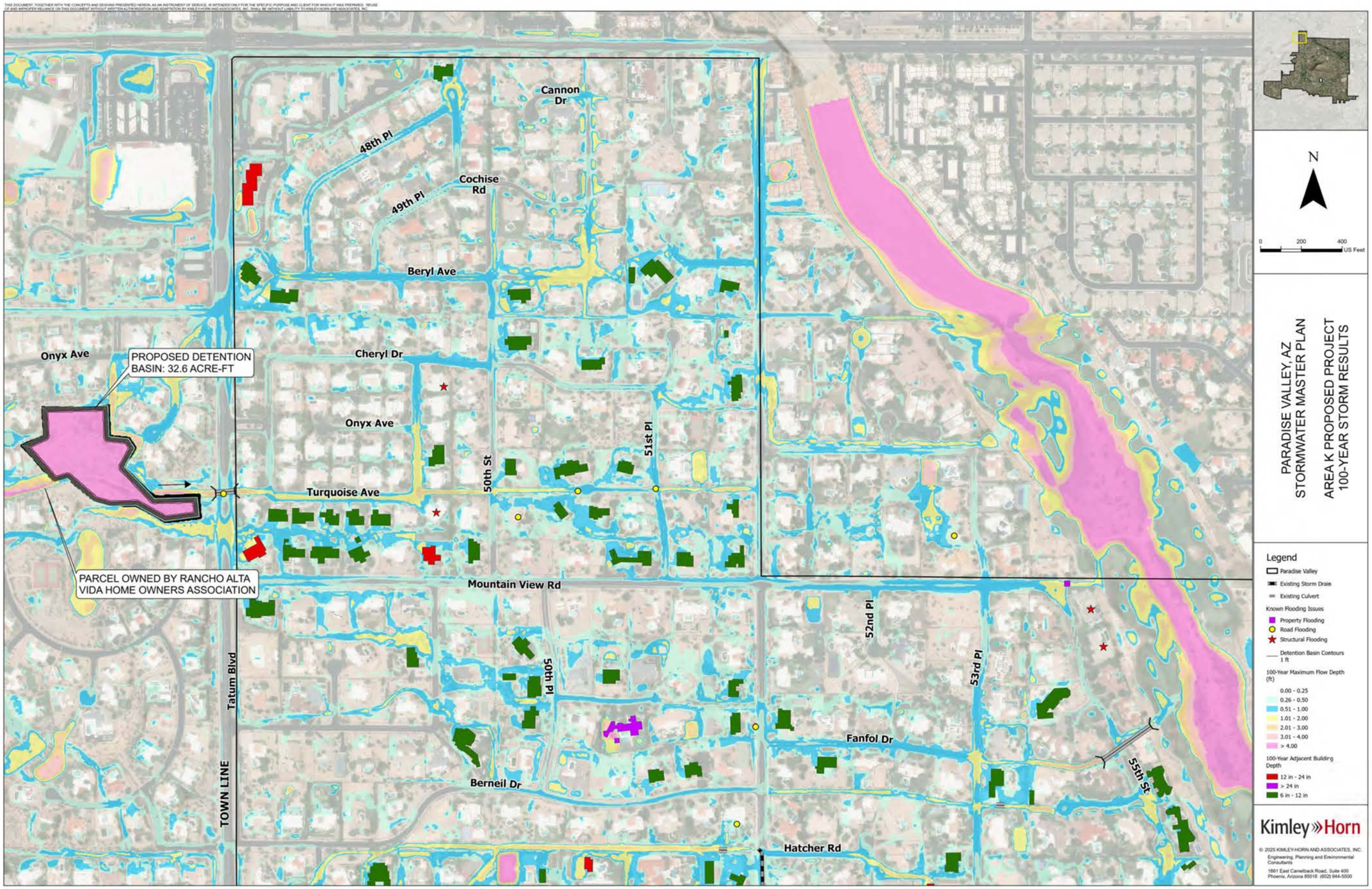

Cannon Dr
48th Pl
49th Pl
Cochise Rd
Beryl Ave
Onyx Ave
Cheryl Dr
Onyx Ave
51st Pl
50th St
Turquoise Ave
PARCEL OWNED BY RANCHO ALTA VIDA HOME OWNERS ASSOCIATION
Mountain View Rd
52nd Pl
53rd Pl
50th Pl
Tatum Blvd
TOWN LINE
Fanfol Dr
55th St
Berneil Dr
Hatcher Rd
N
0 200 400 US Feet
PARADISE VALLEY, AZ
STORMWATER MASTER PLAN
AREA K EXISTING CONDITIONS
10-YEAR MAXIMUM FLOW DEPTH (FT)
Legend
Paradise Valley
Existing Storm Drain
Existing Culvert
Known Flooding Issues
Property Flooding
Road Flooding
Structural Flooding
10-Year Maximum Flow Depth (ft)
0.00 - 0.25
0.26 - 0.50
0.51 - 1.00
1.01 - 2.00
2.01 - 3.00
3.01 - 4.00
> 4.00
10 Year Adjacent Building Depth
6 in - 12 in
12 in - 24 in
> 24 in
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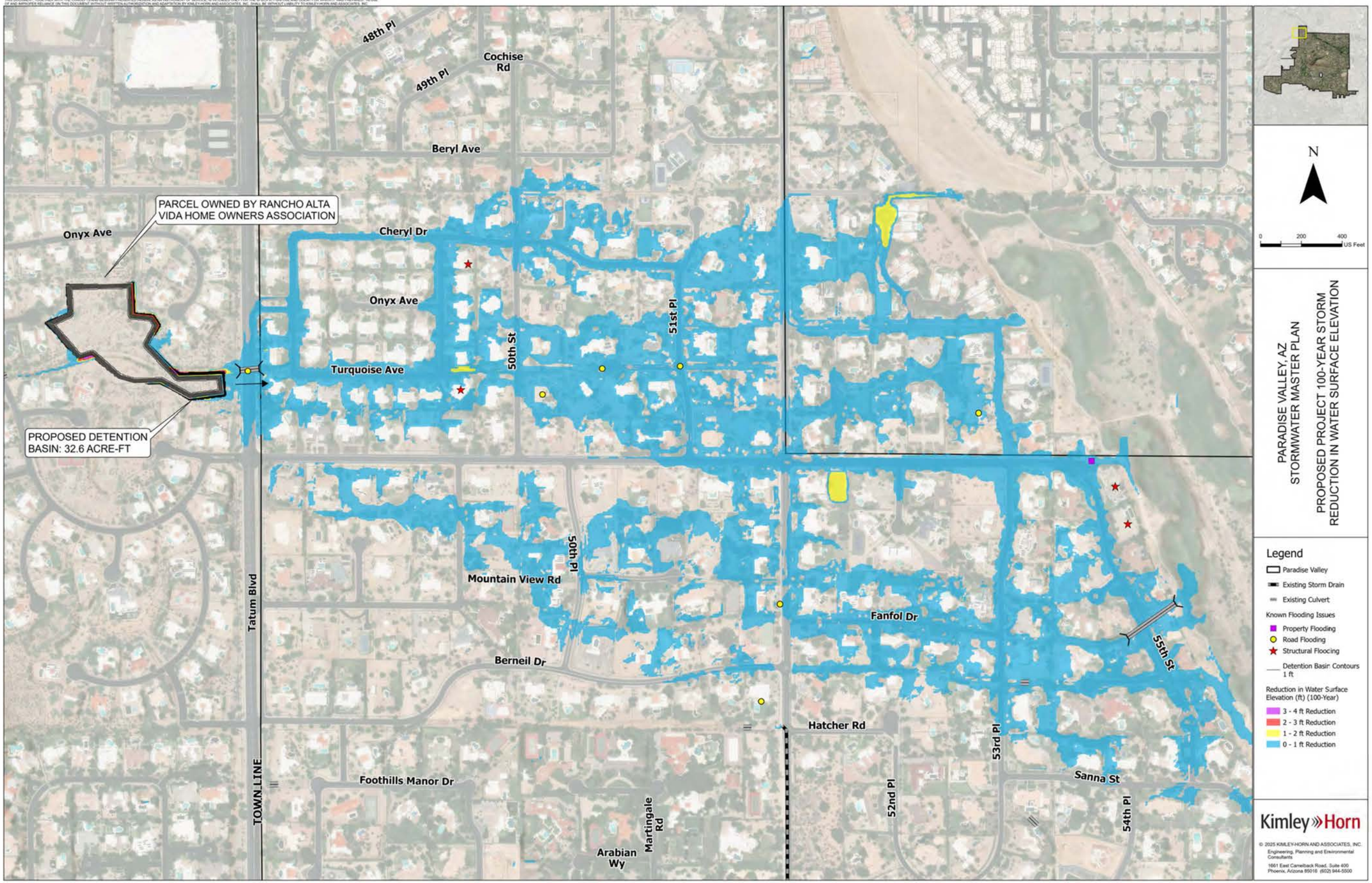
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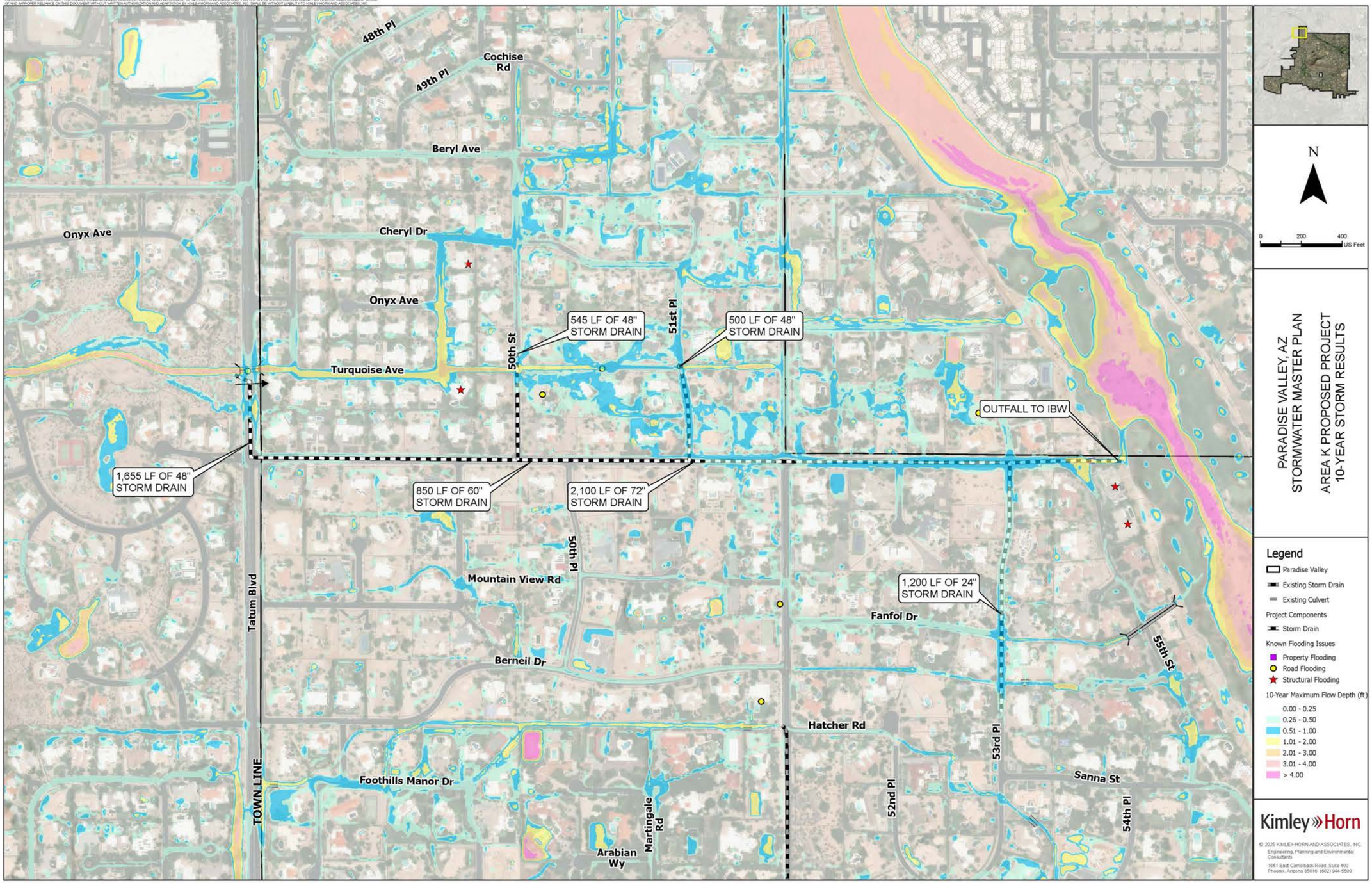

Cannon Dr
48th Pl
49th Pl
Cochise Rd
Beryl Ave
Cheryl Dr
Onyx Ave
PROPOSED DETENTION BASIN: 32.6 ACRE-FT
Turquoise Ave
50th St
51st Pl
PARCEL OWNED BY RANCHO ALTA VIDA HOME OWNERS ASSOCIATION
Mountain View Rd
Tatum Blvd
TOWN LINE
50th Pl
52nd Pl
53rd Pl
Fanfol Dr
55th St
Berneil Dr
Hatcher Rd
N
0 200 400 US Feet
PARADISE VALLEY, AZ
STORMWATER MASTER PLAN
PROPOSED PROJECT 10-YEAR STORM
REDUCTION IN WATER SURFACE ELEVATION
Legend
Paradise Valley
Existing Storm Drain
Existing Culvert
Known Flooding Issues
Property Flooding
Road Flooding
Structural Flooding
Detention Basin Contours 1 ft
Reduction in Water Surface Elevation (ft) (10-Year)
> 3 ft Reduction
2-3 ft Reduction
1-2 ft Reduction
0-1 ft Reduction
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Cannon Dr
48th Pl
49th Pl
Cochise Rd
Beryl Ave
Cheryl Dr
Onyx Ave
Onyx Ave
50th St
51st Pl
Turquoise Ave
PARCEL OWNED BY RANCHO ALTA VIDA HOME OWNERS ASSOCIATION
Mountain View Rd
Tatum Blvd
TOWN LINE
50th Pl
52nd Pl
53rd Pl
Fanfol Dr
55th St
Berneil Dr
Hatcher Rd
N
0
200
400
US Feet
PARADISE VALLEY, AZ
STORMWATER MASTER PLAN
AREA K EXISTING CONDITIONS
100-YEAR MAXIMUM FLOW DEPTH (FT)
Legend
Paradise Valley
Existing Storm Drain
Existing Culvert
Known Flooding Issues
Property Flooding
Road Flooding
Structural Flooding
100-Year Maximum Flow Depth (ft)
0.00 - 0.25
0.26 - 0.50
0.51 - 1.00
1.01 - 2.00
2.01 - 3.00
3.01 - 4.00
> 4.00
100 Year Adjacent Build ng Depth
< 6 in
6 in - 12 in
12 in - 24 in
> 24 in
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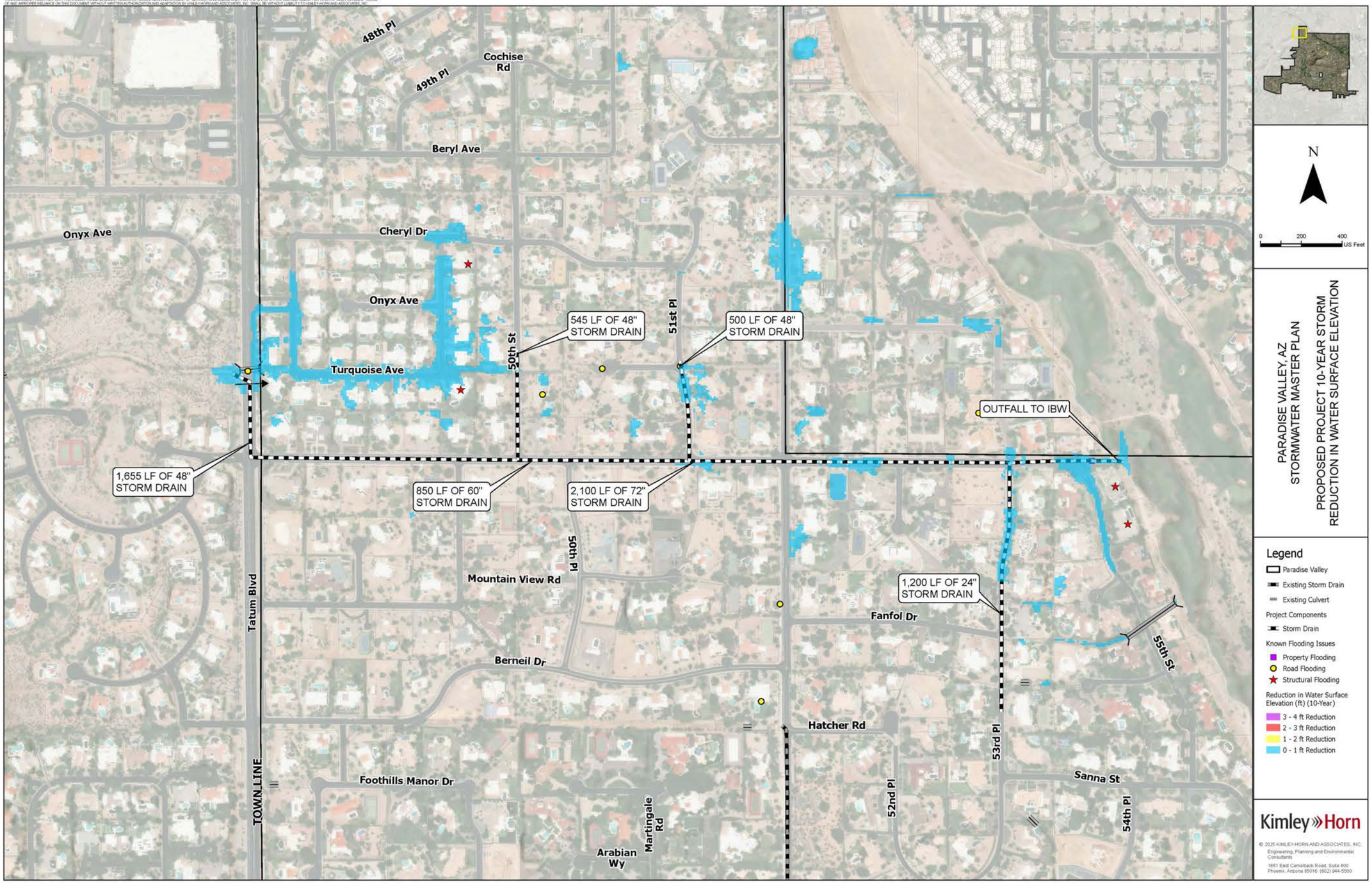

Cannon Dr
48th Pl
49th Pl
Cochise Rd
Beryl Ave
Cheryl Dr
Onyx Ave
PROPOSED DETENTION BASIN: 32.6 ACRE-FT
PARCEL OWNED BY RANCHO ALTA VIDA HOME OWNERS ASSOCIATION
Turquoise Ave
50th St
51st Pl
Mountain View Rd
Tatum Blvd
TOWN LINE
50th Pl
52nd Pl
53rd Pl
Fanfol Dr
55th St
Berneil Dr
Hatcher Rd
N
0 200 400 US Feet
PARADISE VALLEY, AZ
STORMWATER MASTER PLAN
AREA K PROPOSED PROJECT
100-YEAR STORM RESULTS
Legend
Paradise Valley
Existing Storm Drain
Existing Culvert
Known Flooding Issues
Property Flooding
Road Flooding
Structural Flooding
Detention Basin Contours 1 ft
100-Year Maximum Flow Depth (ft)
0.00 - 0.25
0.26 - 0.50
0.51 - 1.00
1.01 - 2.00
2.01 - 3.00
3.01 - 4.00
> 4.00
100-Year Adjacent Building Depth
12 in - 24 in
> 24 in
6 in - 12 in
Kimley»Horn
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48th Pl
49th Pl
Cochise Rd
Beryl Ave
PARCEL OWNED BY RANCHO ALTA VIDA HOME OWNERS ASSOCIATION
Onyx Ave
Cheryl Dr
Onyx Ave
50th St
51st Pl
Turquoise Ave
PROPOSED DETENTION BASIN: 32.6 ACRE-FT
Tatum Blvd
50th Pl
Mountain View Rd
Berneil Dr
Fanfol Dr
55th St
Hatcher Rd
53rd Pl
Sanna St
TOWN LINE
Foothills Manor Dr
Martingale Rd
52nd Pl
54th Pl
Arabian Wy
N
0 200 400 US Feet
PARADISE VALLEY, AZ
STORMWATER MASTER PLAN
PROPOSED PROJECT 100-YEAR STORM
REDUCTION IN WATER SURFACE ELEVATION
Legend
Paradise Valley
Existing Storm Drain
Existing Culvert
Known Flooding Issues
Property Flooding
Road Flooding
Structural Flooding
Detention Basin Contours 1 ft
Reduction in Water Surface Elevation (ft) (100-Year)
3 - 4 ft Reduction
2 - 3 ft Reduction
1 - 2 ft Reduction
0 - 1 ft Reduction
Kimley»Horn
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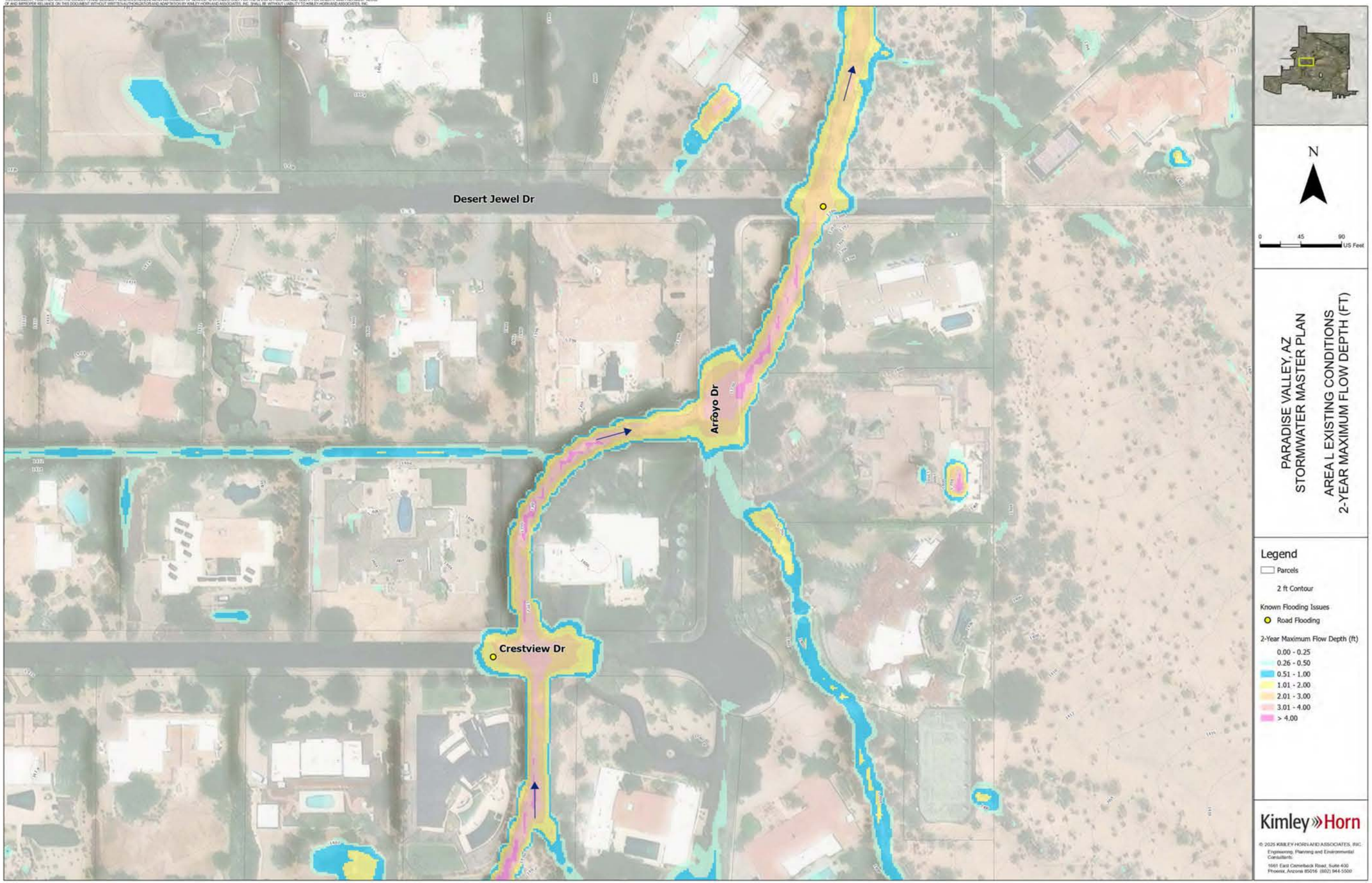
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XVIII. APPENDIX F – HIGHEST PRIORITY PROJECTS ANTICIPATED PERFORMANCE

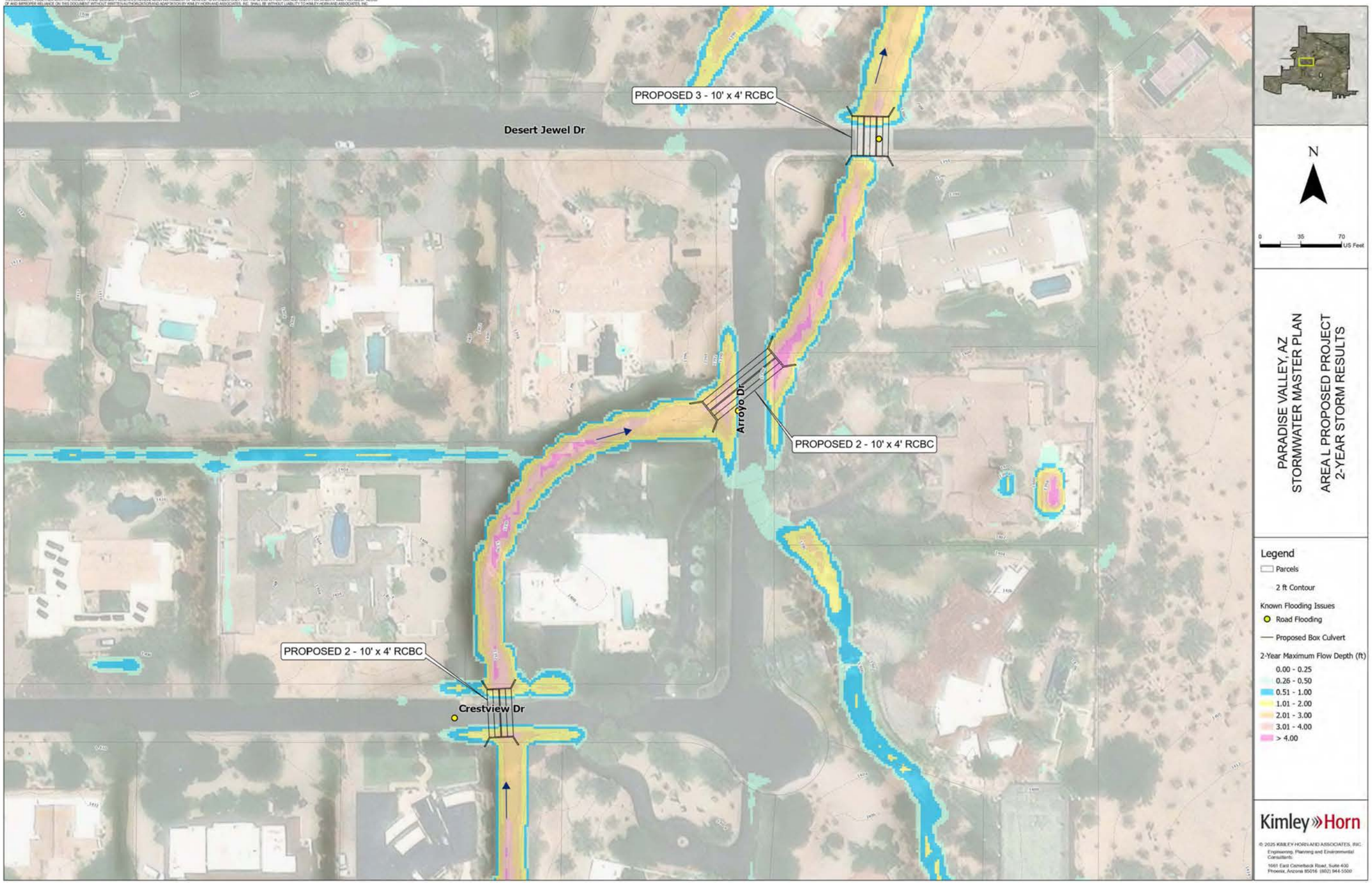
FLOOD HAZARD AREA L

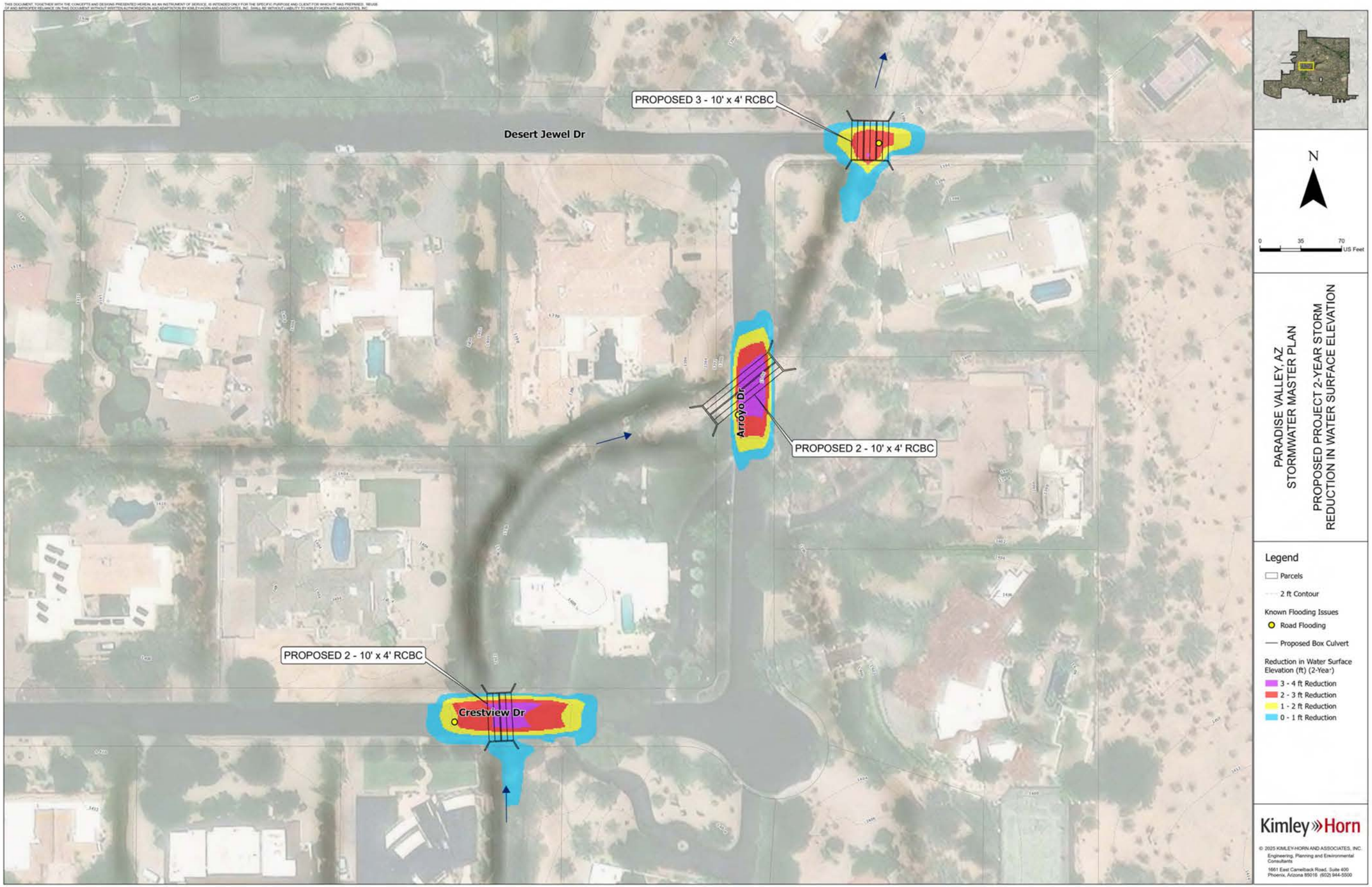
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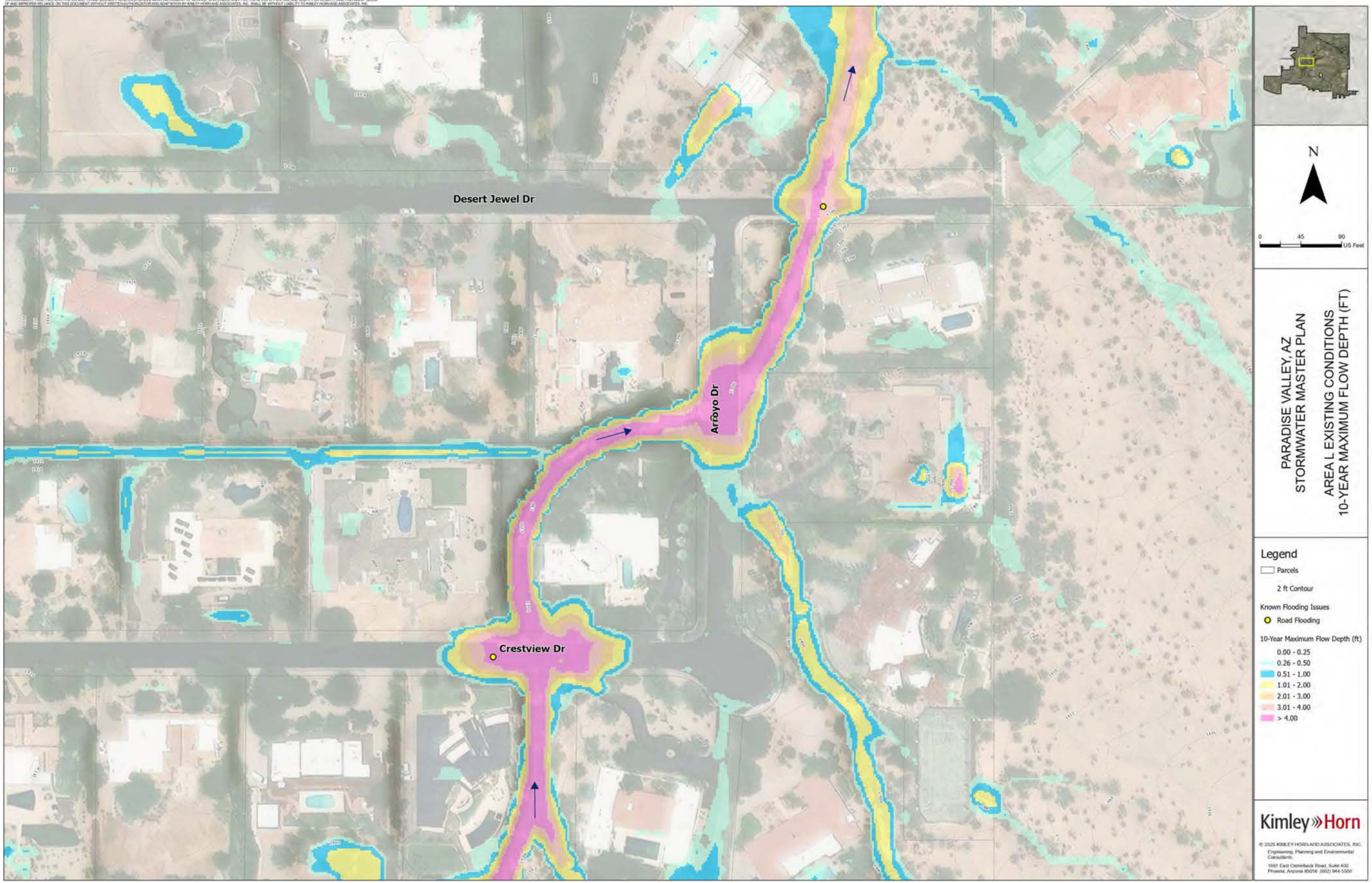
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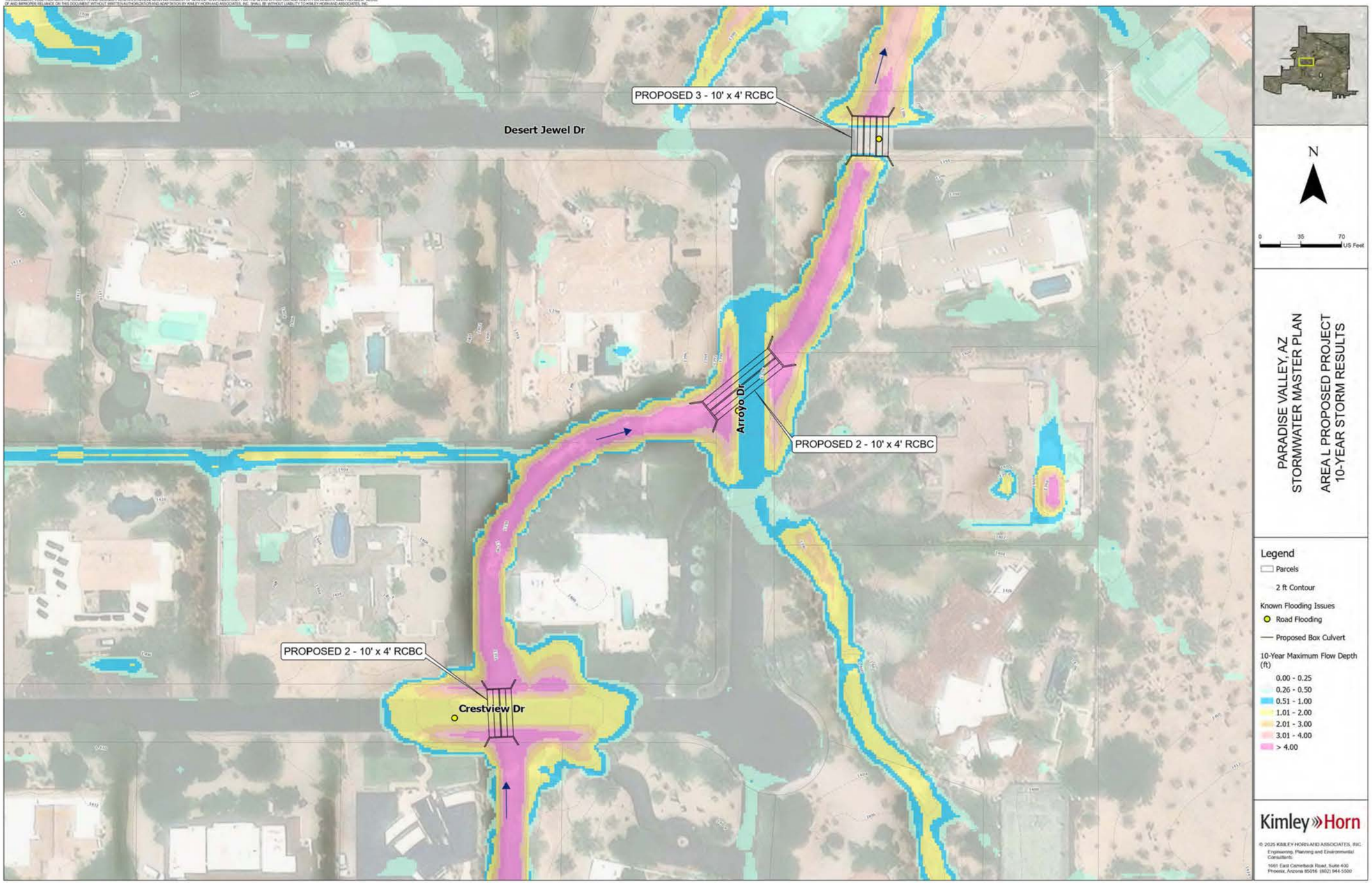

PROPOSED 3 - 10' x 4' RCBC
Desert Jewel Dr
Arroyo Dr
PROPOSED 2 - 10' x 4' RCBC
PROPOSED 2 - 10' x 4' RCBC
Crestview Dr
N
0
35
70
US Feet
PARADISE VALLEY, AZ
STORMWATER MASTER PLAN
PROPOSED PROJECT 2-YEAR STORM
REDUCTION IN WATER SURFACE ELEVATION
Legend
Parcels
2 ft Contour
Known Flooding Issues
Road Flooding
Proposed Box Culvert
Reduction in Water Surface Elevation (ft) (2-Year)
3 - 4 ft Reduction
2 - 3 ft Reduction
1 - 2 ft Reduction
0 - 1 ft Reduction
Kimley»Horn
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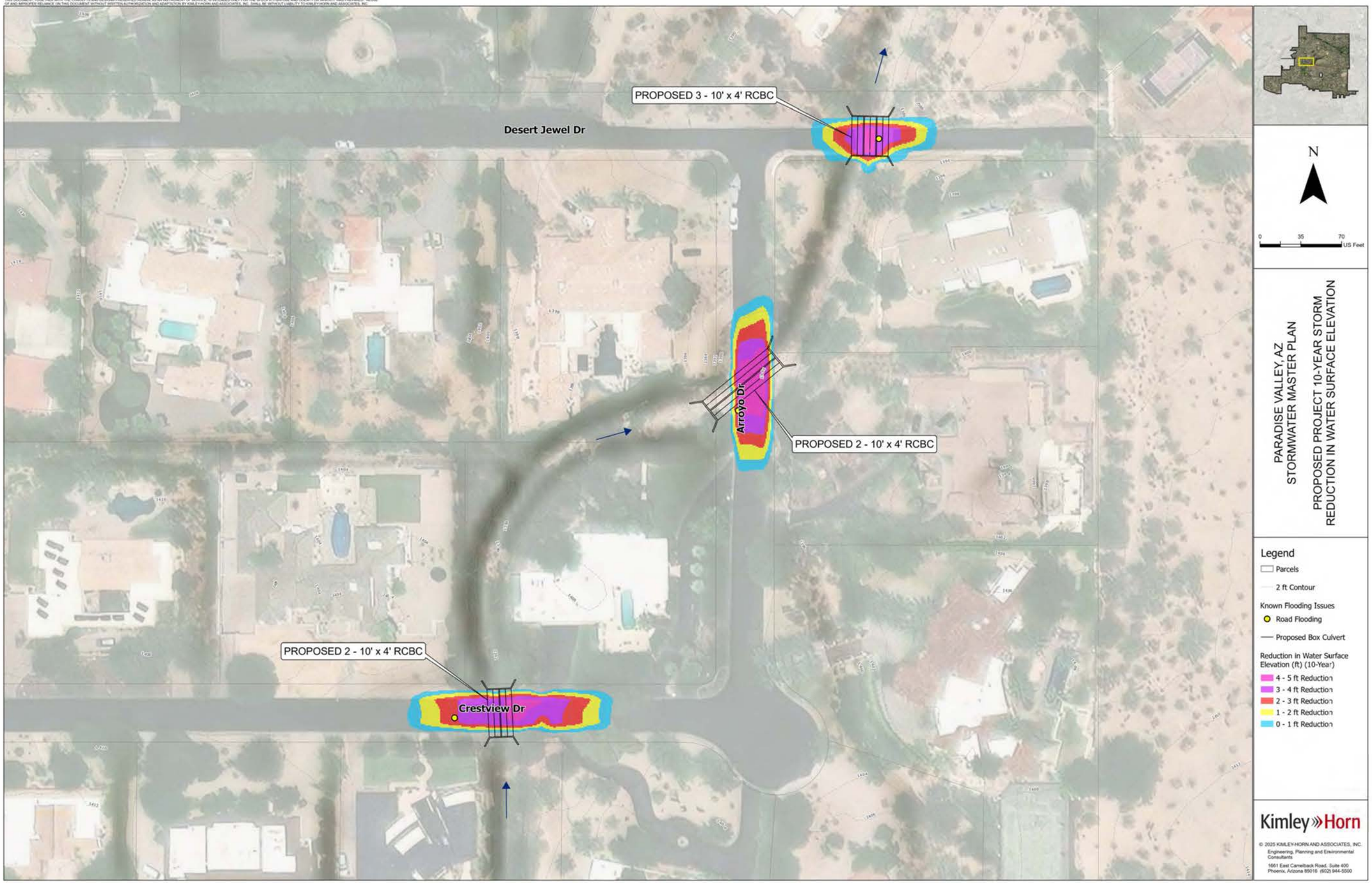
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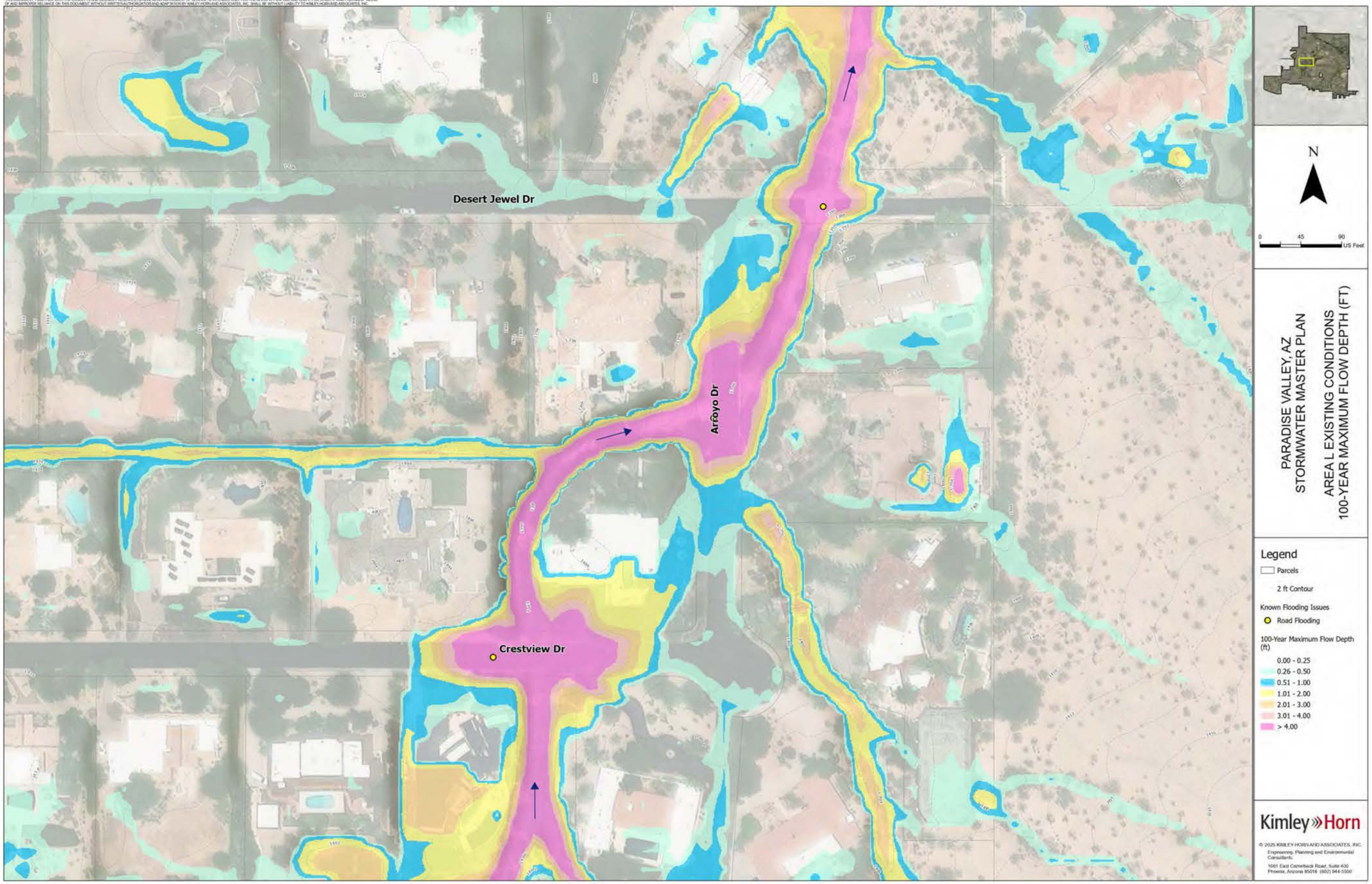
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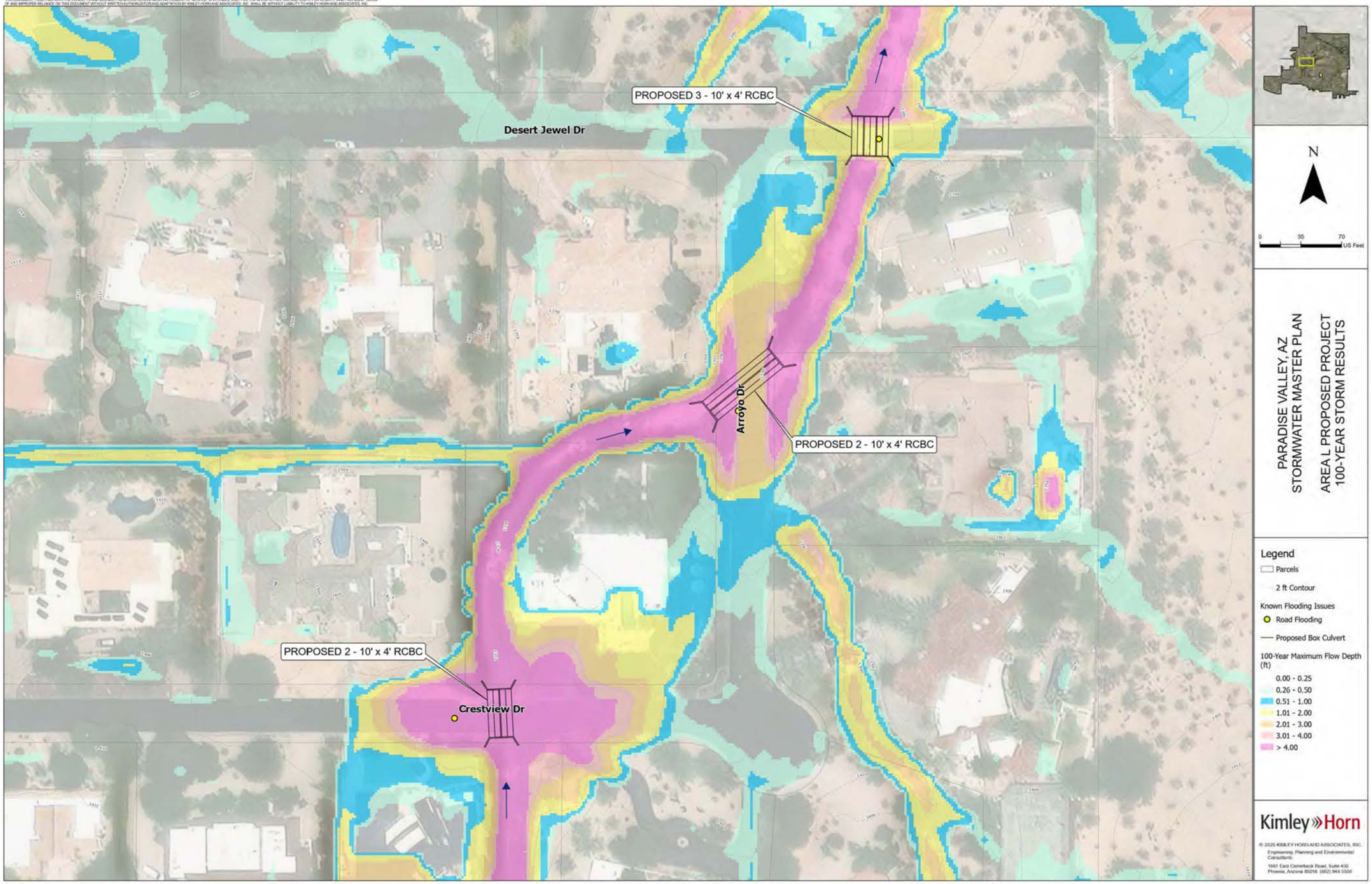

PROPOSED 3 - 10' x 4' RCBC
Desert Jewel Dr
Arroyo Dr
PROPOSED 2 - 10' x 4' RCBC
PROPOSED 2 - 10' x 4' RCBC
Crestview Dr
N
0 35 70
US Feet
PARADISE VALLEY, AZ
STORMWATER MASTER PLAN
PROPOSED PROJECT 10-YEAR STORM
REDUCTION IN WATER SURFACE ELEVATION
Legend
Parcels
2 ft Contour
Known Flooding Issues
Road Flooding
Proposed Box Culvert
Reduction in Water Surface Elevation (ft) (10-Year)
4 - 5 ft Reduction
3 - 4 ft Reduction
2 - 3 ft Reduction
1 - 2 ft Reduction
0 - 1 ft Reduction
Kimley»Horn
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1661 East Camelback Road, Suite 400
Phoenix, Arizona 85016 (602) 944-5500

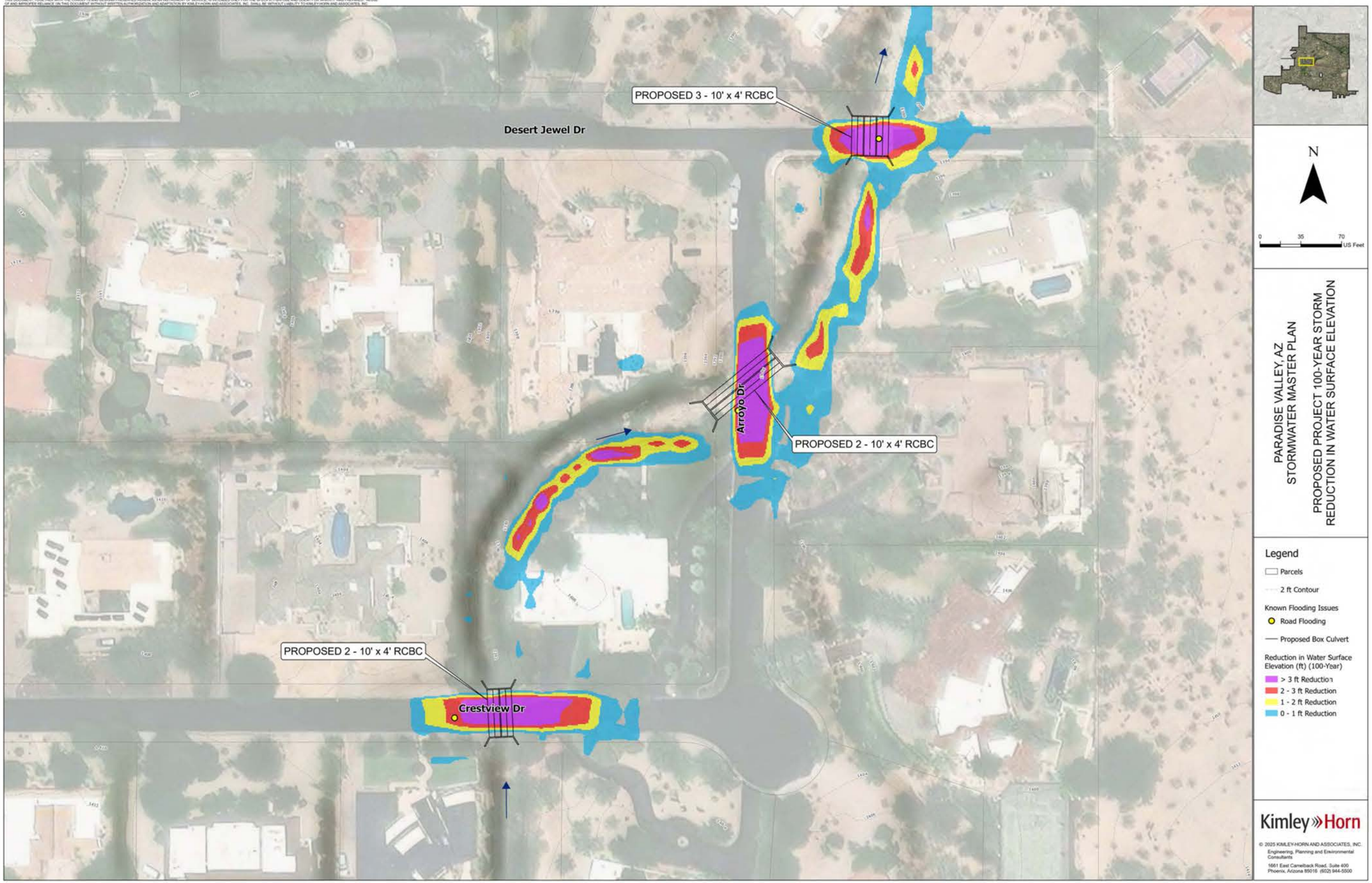
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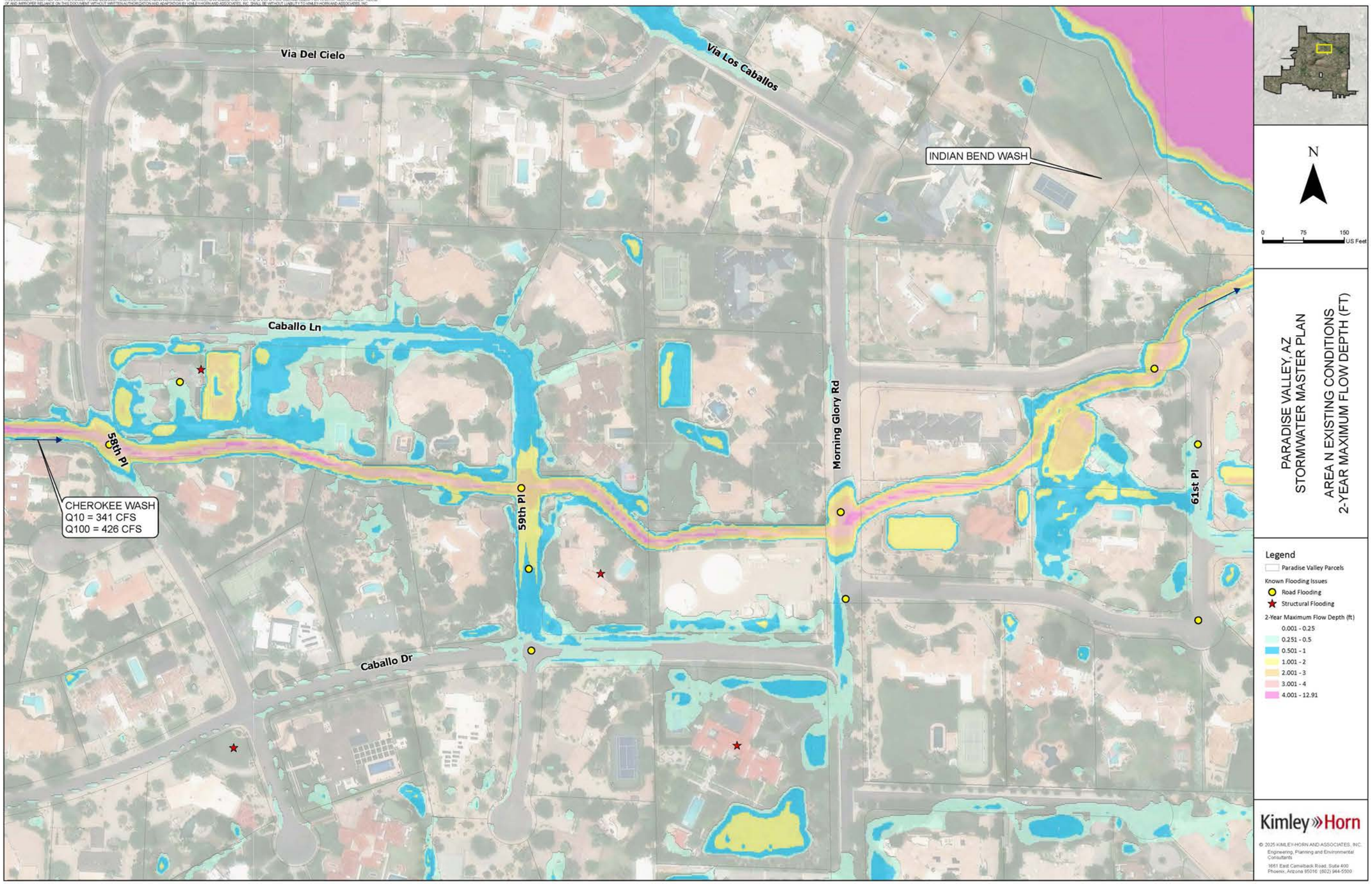



PROPOSED 3 - 10' x 4' RCBC
Desert Jewel Dr
Arroyo Dr
PROPOSED 2 - 10' x 4' RCBC
PROPOSED 2 - 10' x 4' RCBC
Crestview Dr
N
0
35
70
US Feet
PARADISE VALLEY, AZ
STORMWATER MASTER PLAN
PROPOSED PROJECT 100-YEAR STORM
REDUCTION IN WATER SURFACE ELEVATION
Legend
Parcels
2 ft Contour
Known Flooding Issues
Road Flooding
Proposed Box Culvert
Reduction in Water Surface Elevation (ft) (100-Year)
> 3 ft Reduction
2 - 3 ft Reduction
1 - 2 ft Reduction
0 - 1 ft Reduction
Kimley»Horn
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Engineering, Planning and Environmental Consultants
1661 East Camelback Road, Suite 400
Phoenix, Arizona 85016 (602) 944-5500

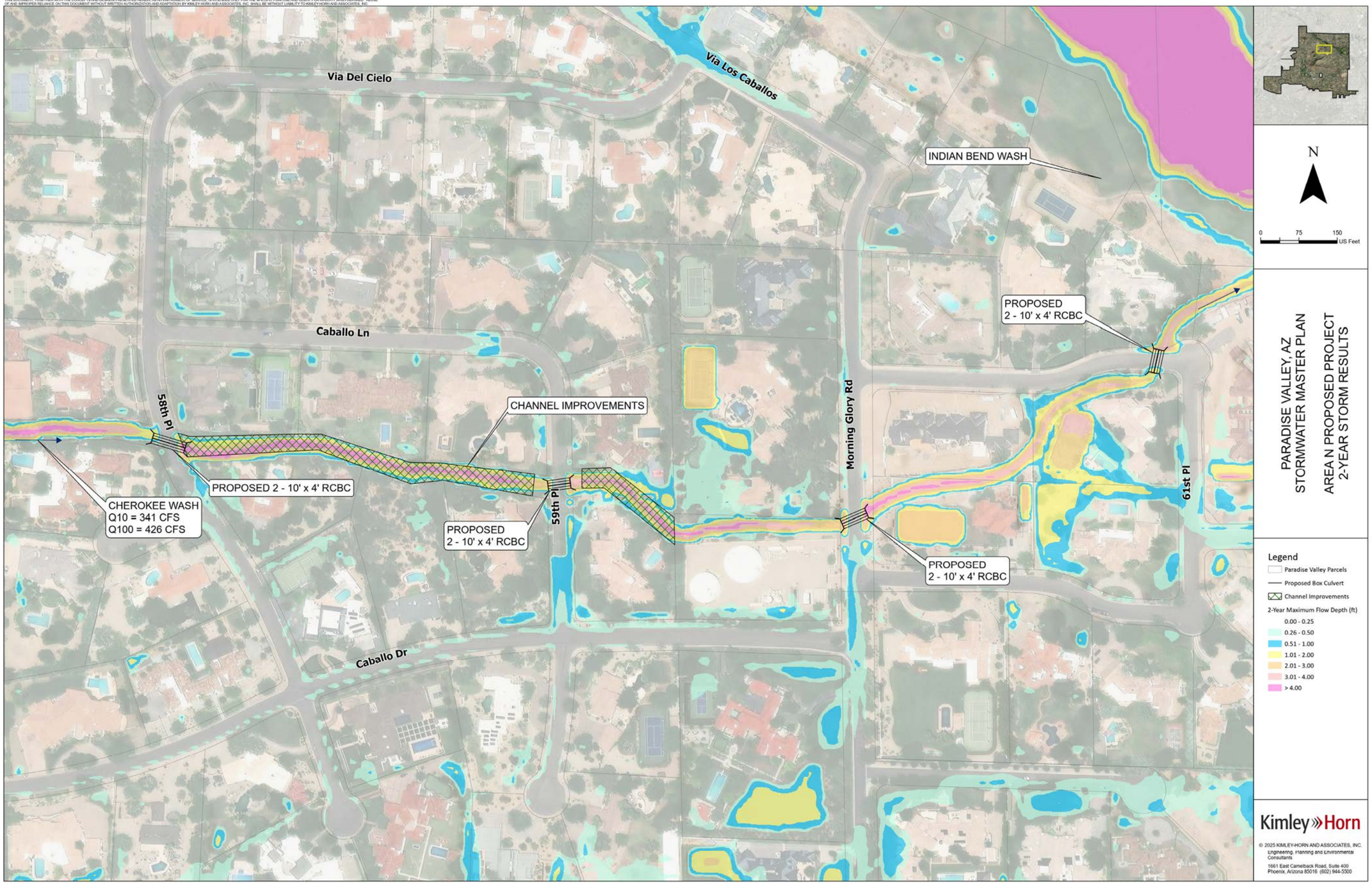
XVIII. APPENDIX F – HIGHEST PRIORITY PROJECTS ANTICIPATED PERFORMANCE

FLOOD HAZARD AREA N

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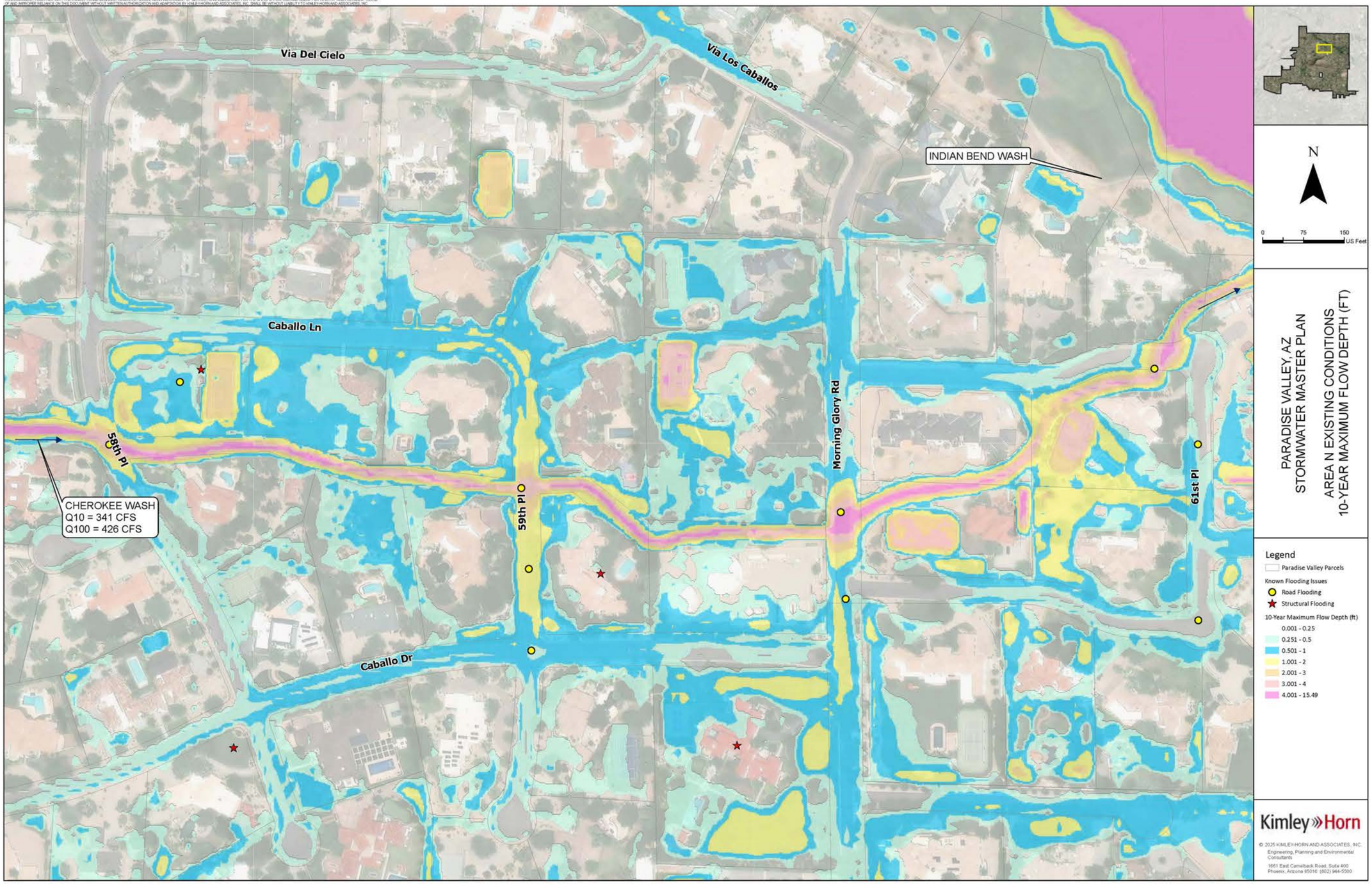


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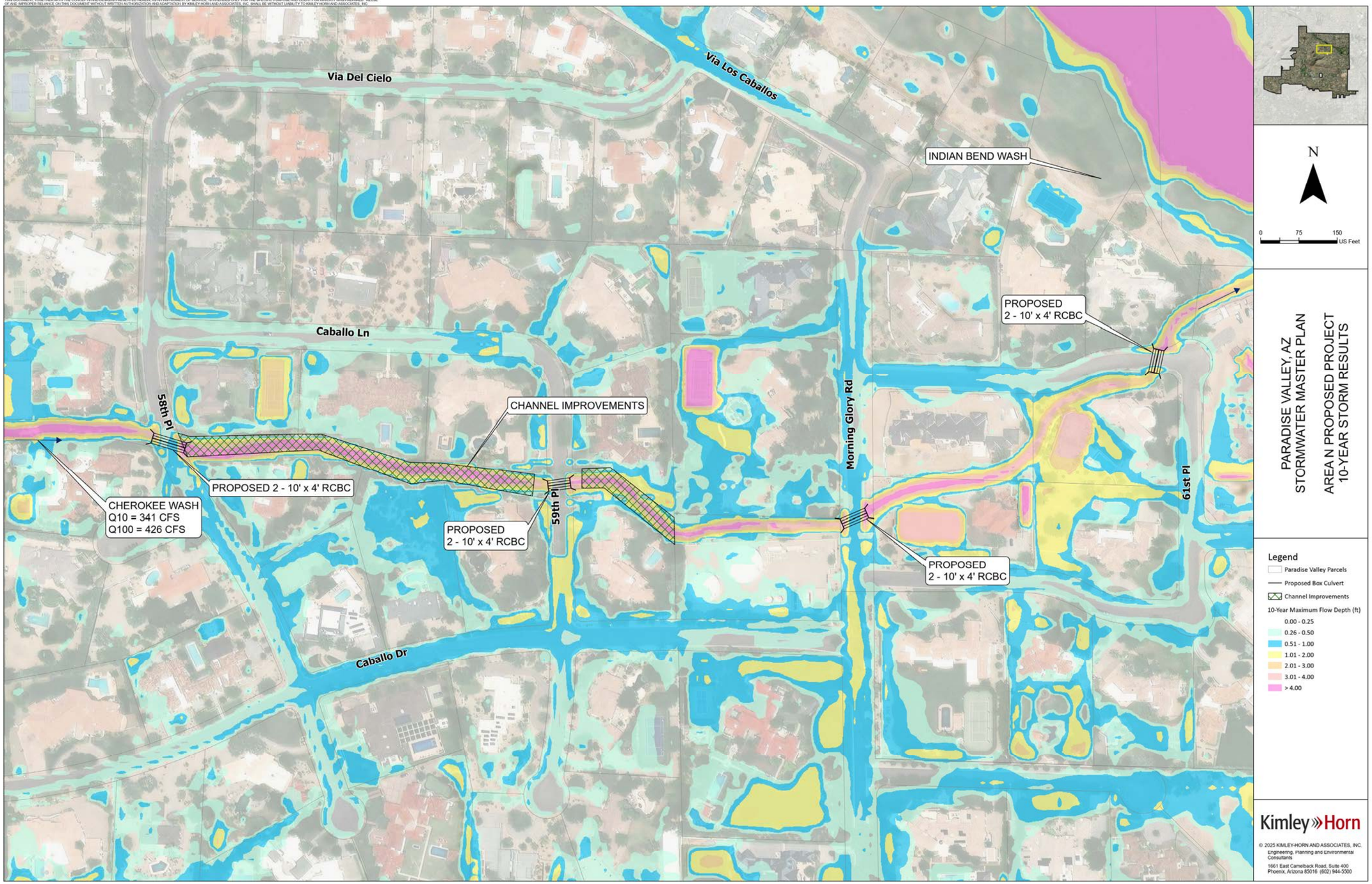



Via Del Cielo
Via Los Caballos
INDIAN BEND WASH
Caballo Ln
PROPOSED 2 - 10' x 4' RCBC
58th Pl
CHEROKEE WASH
Q10 = 341 CFS
Q100 = 426 CFS
59th Pl
PROPOSED
2 - 10' x 4' RCBC
Morning Glory Rd
PROPOSED
2 - 10' x 4' RCBC
61st Pl
Caballo Dr
N
0 75 150 US Feet
PARADISE VALLEY, AZ
STORMWATER MASTER PLAN
PROPOSED PROJECT 2-YEAR STORM
REDUCTION IN WATER SURFACE ELEVATION
Legend
Paradise Valley Parcels
Proposed Box Culvert
Known Flooding Issues
Road Flooding
Structural Flooding
Reduction in Water Sur'ace Elevation (ft) (2-Year)
3 - 4 ft Reduction
2 - 3 ft Reduction
1 - 2 ft Reduction
0 - 1 ft Reduction
Kimley»Horn
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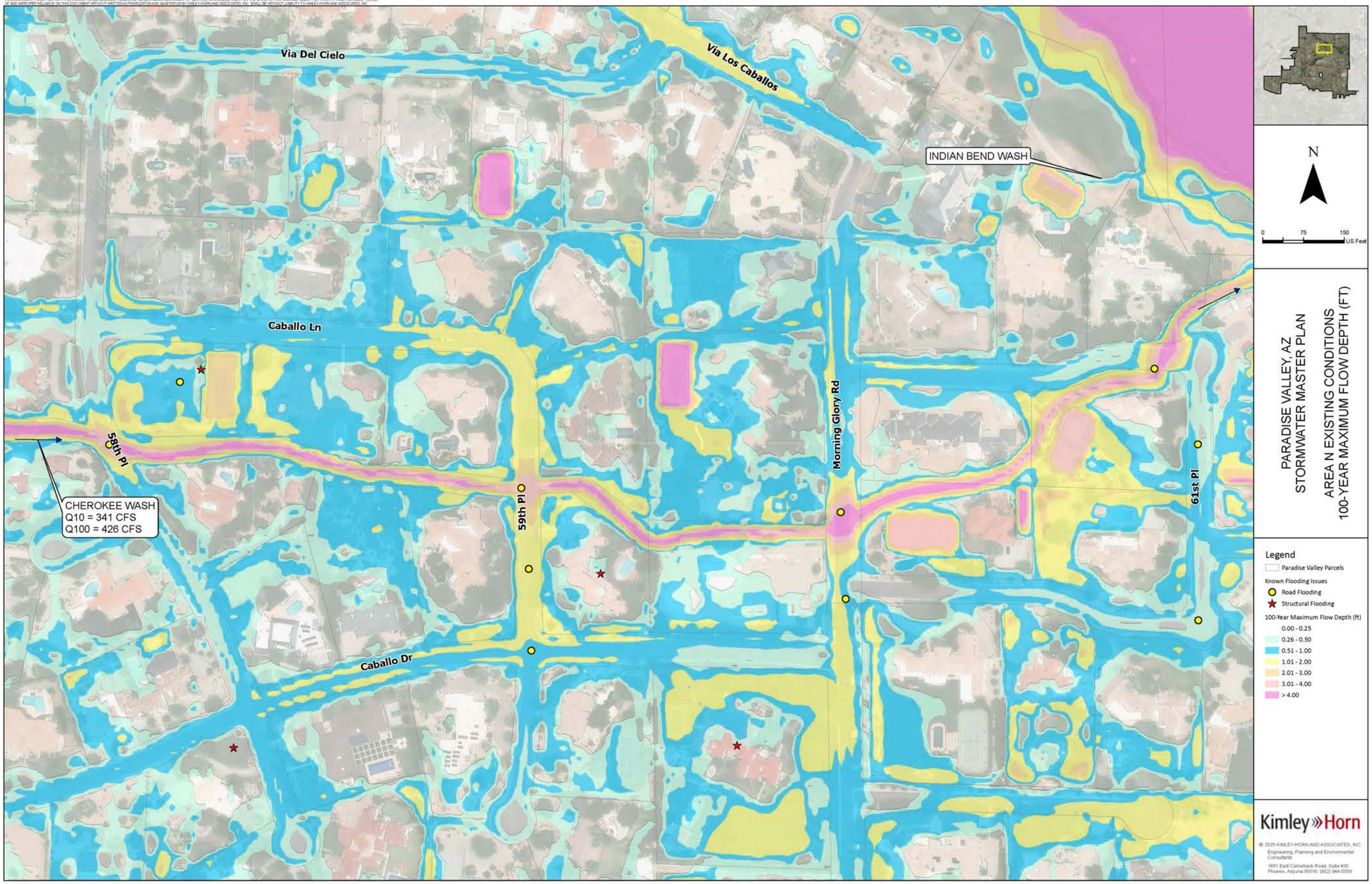


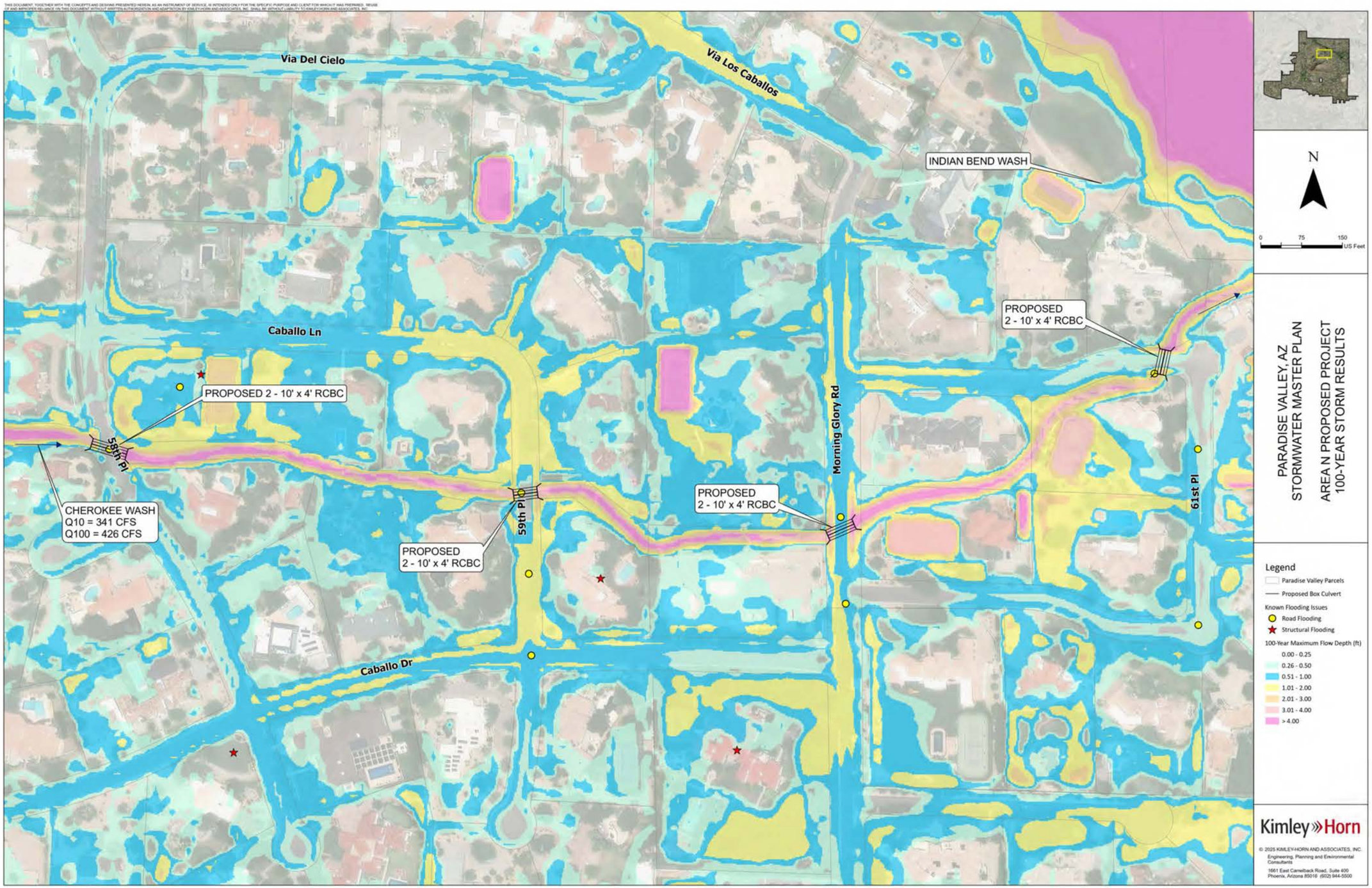
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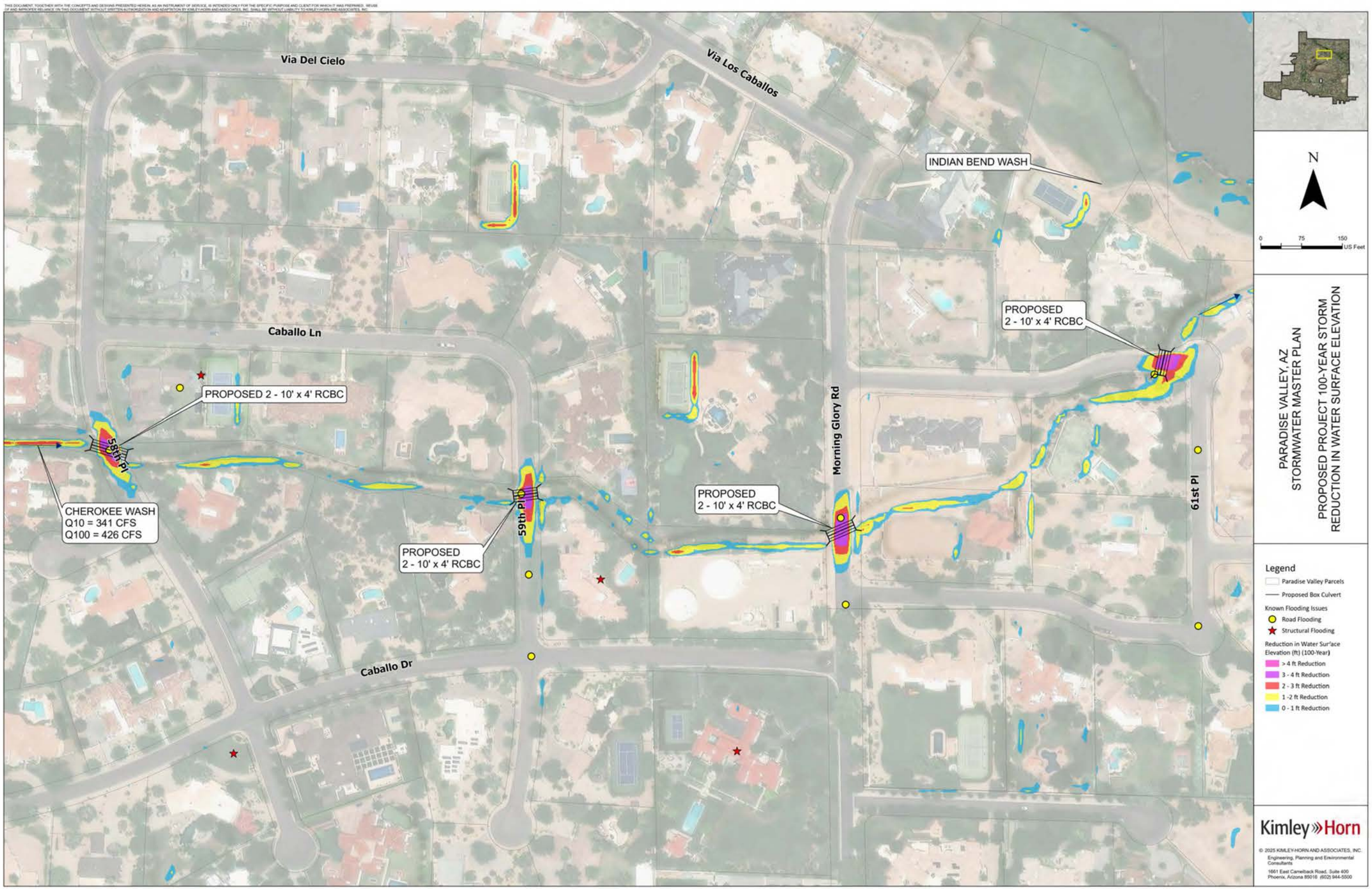



Via Del Cielo
Via Los Caballos
Caballo Ln
Caballo Dr
Morning Glory Rd
59th Pl
61st Pl
INDIAN BEND WASH
PROPOSED
2 - 10' x 4' RCBC
PROPOSED 2 - 10' x 4' RCBC
PROPOSED
2 - 10' x 4' RCBC
PROPOSED
2 - 10' x 4' RCBC
CHEROKEE WASH
Q10 = 341 CFS
Q100 = 426 CFS
N
0 75 150
US Feet
PARADISE VALLEY, AZ
STORMWATER MASTER PLAN
PROPOSED PROJECT 10-YEAR STORM
REDUCTION IN WATER SURFACE ELEVATION
Legend
Paradise Valley Parcels
Proposed Box Culvert
Known Flooding Issues
Road Flooding
Structural Flooding
Reduction in Water Sur'ace Elevation (ft) (10-Year)
4 - 5 ft Reduction
3 - 4 ft Reduction
2 - 3 ft Reduction
1 - 2 ft Reduction
0 - 1 ft Reduction
Kimley»Horn
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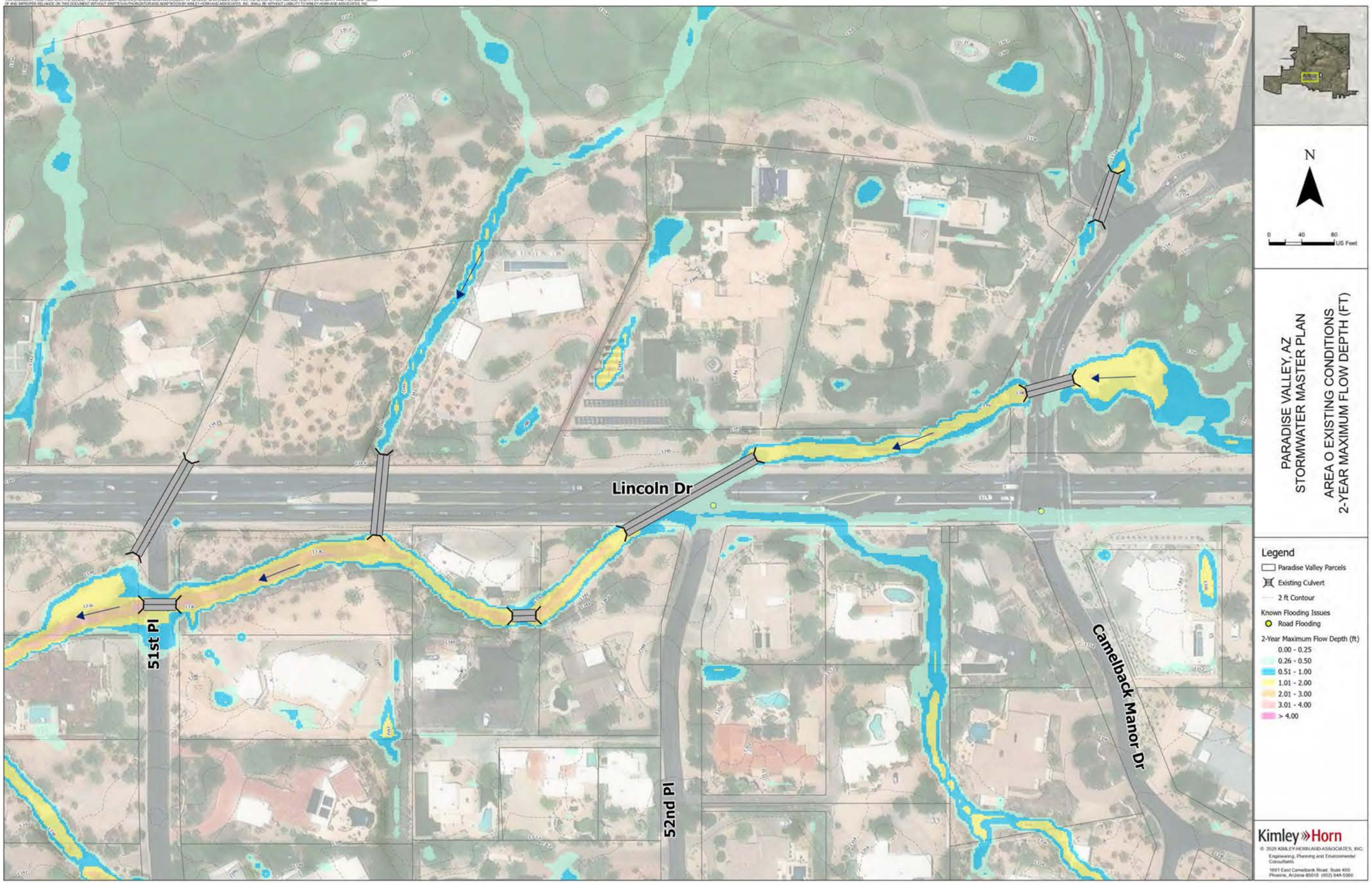

Via Del Cielo
Via Los Caballos
INDIAN BEND WASH
PROPOSED
2 - 10' x 4' RCBC
Caballo Ln
PROPOSED 2 - 10' x 4' RCBC
58th Pl
CHEROKEE WASH
Q10 = 341 CFS
Q100 = 426 CFS
59th Pl
PROPOSED
2 - 10' x 4' RCBC
Morning Glory Rd
PROPOSED
2 - 10' x 4' RCBC
61st Pl
Caballo Dr
N
0
75
150
US Feet
PARADISE VALLEY, AZ
STORMWATER MASTER PLAN
AREA N PROPOSED PROJECT
100-YEAR STORM RESULTS
Legend
Paradise Valley Parcels
Proposed Box Culvert
Known Flooding Issues
Road Flooding
Structural Flooding
100-Year Maximum Flow Depth (ft)
0.00 - 0.25
0.26 - 0.50
0.51 - 1.00
1.01 - 2.00
2.01 - 3.00
3.01 - 4.00
> 4.00
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Via Del Cielo
Via Los Caballos
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PROPOSED
2 - 10' x 4' RCBC
Caballo Ln
PROPOSED 2 - 10' x 4' RCBC
58th Pl
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61st Pl
Caballo Dr
N
0 75 150
US Feet
PARADISE VALLEY, AZ
STORMWATER MASTER PLAN
PROPOSED PROJECT 100-YEAR STORM
REDUCTION IN WATER SURFACE ELEVATION
Legend
Paradise Valley Parcels
Proposed Box Culvert
Known Flooding Issues
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Structural Flooding
Reduction in Water Surface Elevation (ft) (100-Year)
> 4 ft Reduction
3 - 4 ft Reduction
2 - 3 ft Reduction
1 -2 ft Reduction
0 - 1 ft Reduction
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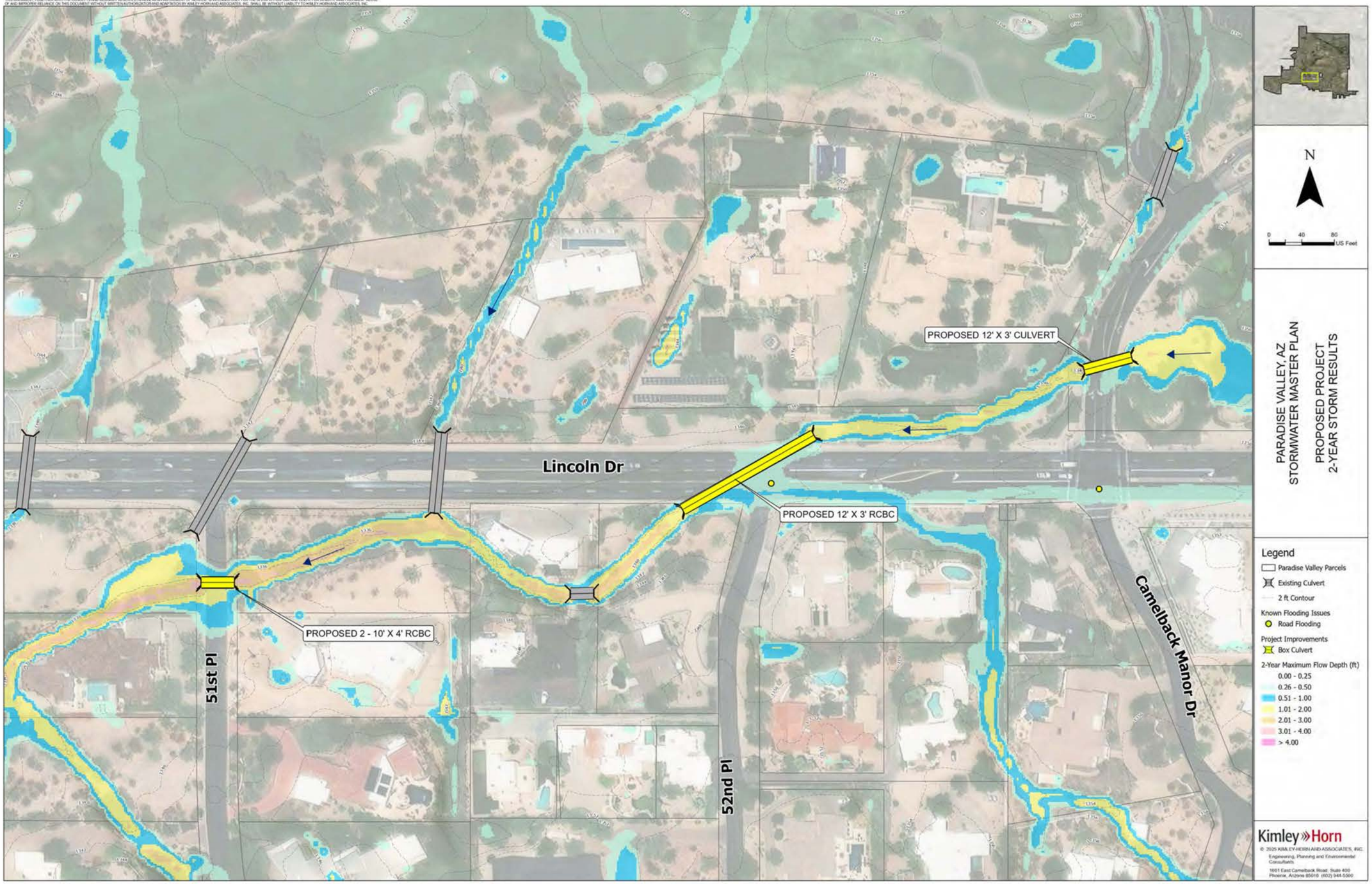
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FLOOD HAZARD AREA O

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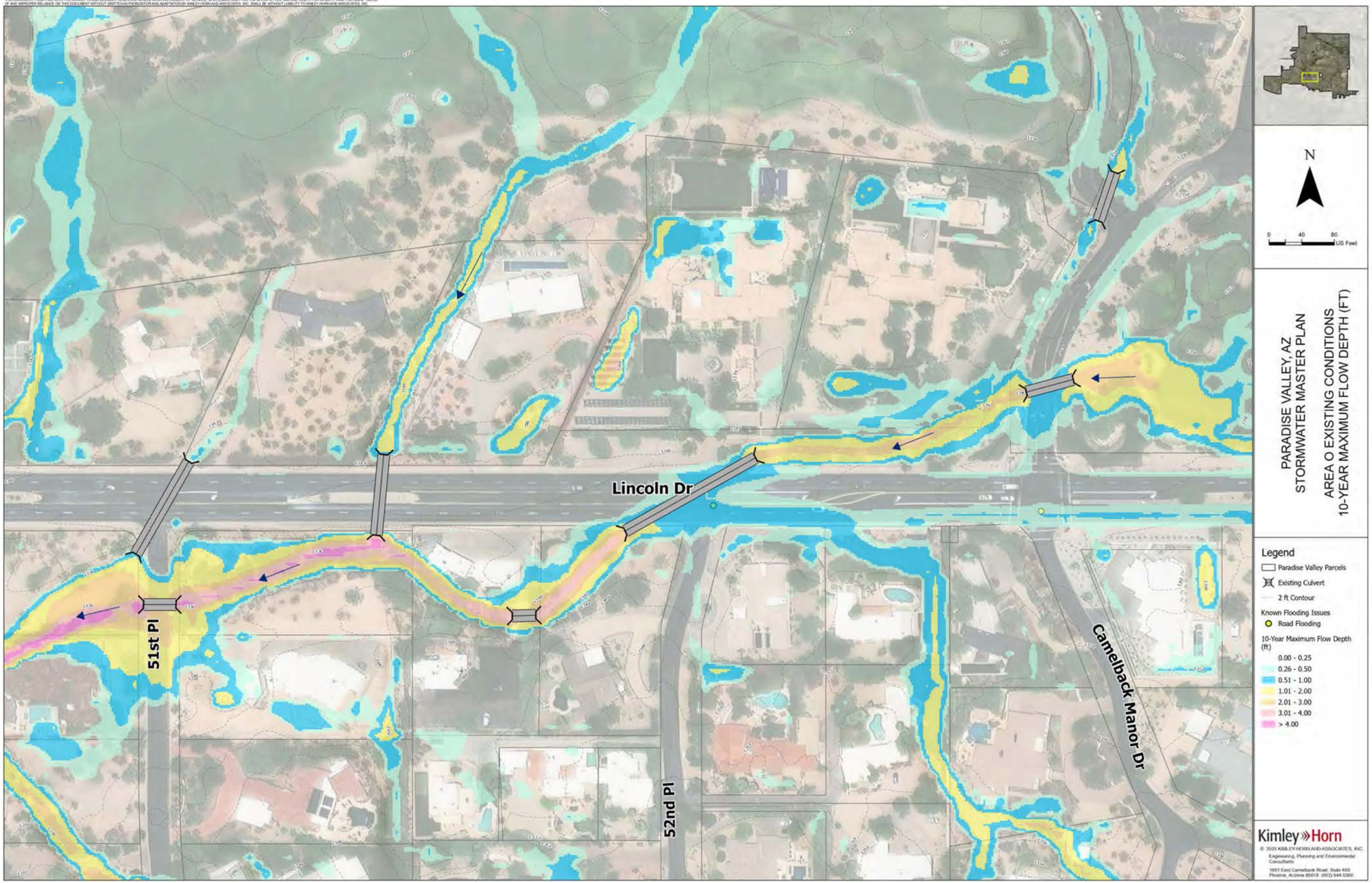


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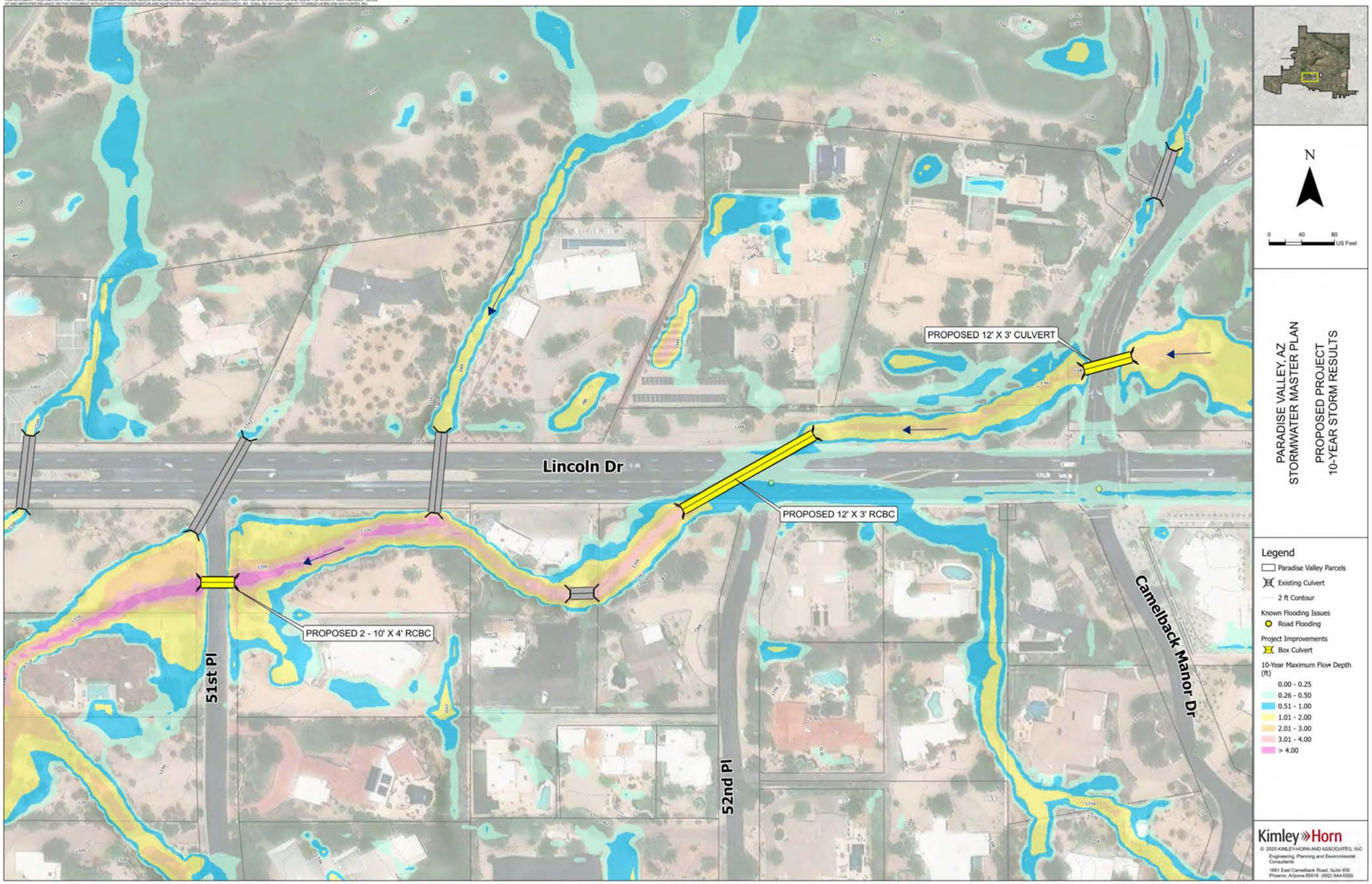



PROPOSED 12' X 3' CULVERT
Lincoln Dr
PROPOSED 12' X 3' RCBC
PROPOSED 2 - 10' X 4' RCBC
51st Pl
52nd Pl
Camelback Manor Dr
N
0 40 80 US Feet
PARADISE VALLEY, AZ
STORMWATER MASTER PLAN
PROPOSED PROJECT 2-YEAR STORM
REDUCTION IN WATER SURFACE ELEVATION
Legend
Paradise Valley Parcels
Existing Culvert
2 ft Contour
Known Flooding Issues
Road Flooding
Project Improvements
Box Culvert
Reduction in Water Surface Elevation (2-Year Storm)
1-2 ft
0-1 ft
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Phoenix, Arizona 85016 (602) 944-5500

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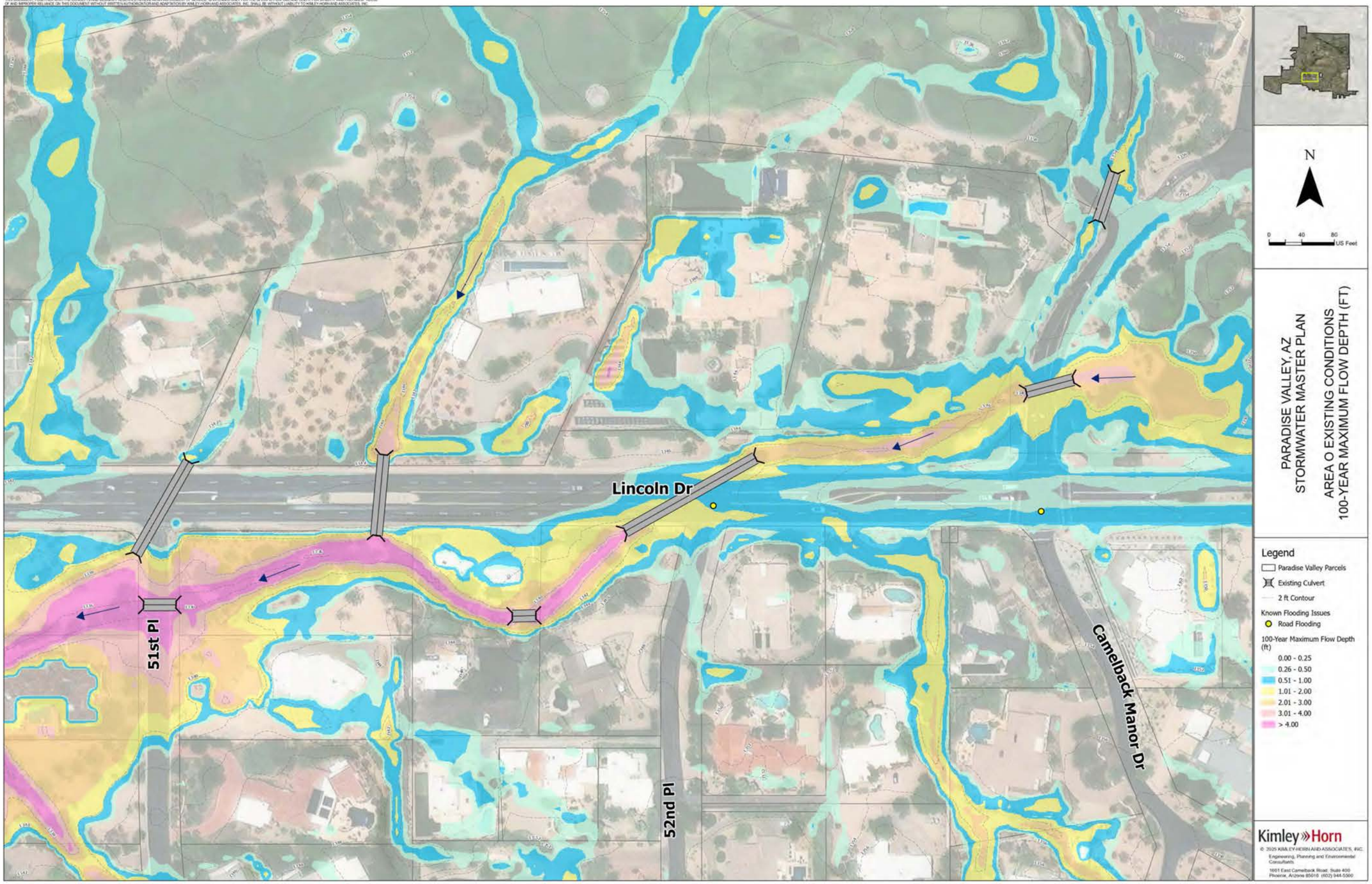
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Phoenix, Arizona 85016 (602) 944-5500


PROPOSED 12' X 3' CULVERT
Lincoln Dr
PROPOSED 12' X 3' RCBC
PROPOSED 2 - 10' X 4' RCBC
51st Pl
52nd Pl
Camelback Manor Dr
N
0 40 80
US Feet
PARADISE VALLEY, AZ
STORMWATER MASTER PLAN
PROPOSED PROJECT
10-YEAR STORM RESULTS
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10-Year Maximum Flow Depth (ft)
0.00 - 0.25
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0.51 - 1.00
1.01 - 2.00
2.01 - 3.00
3.01 - 4.00
> 4.00
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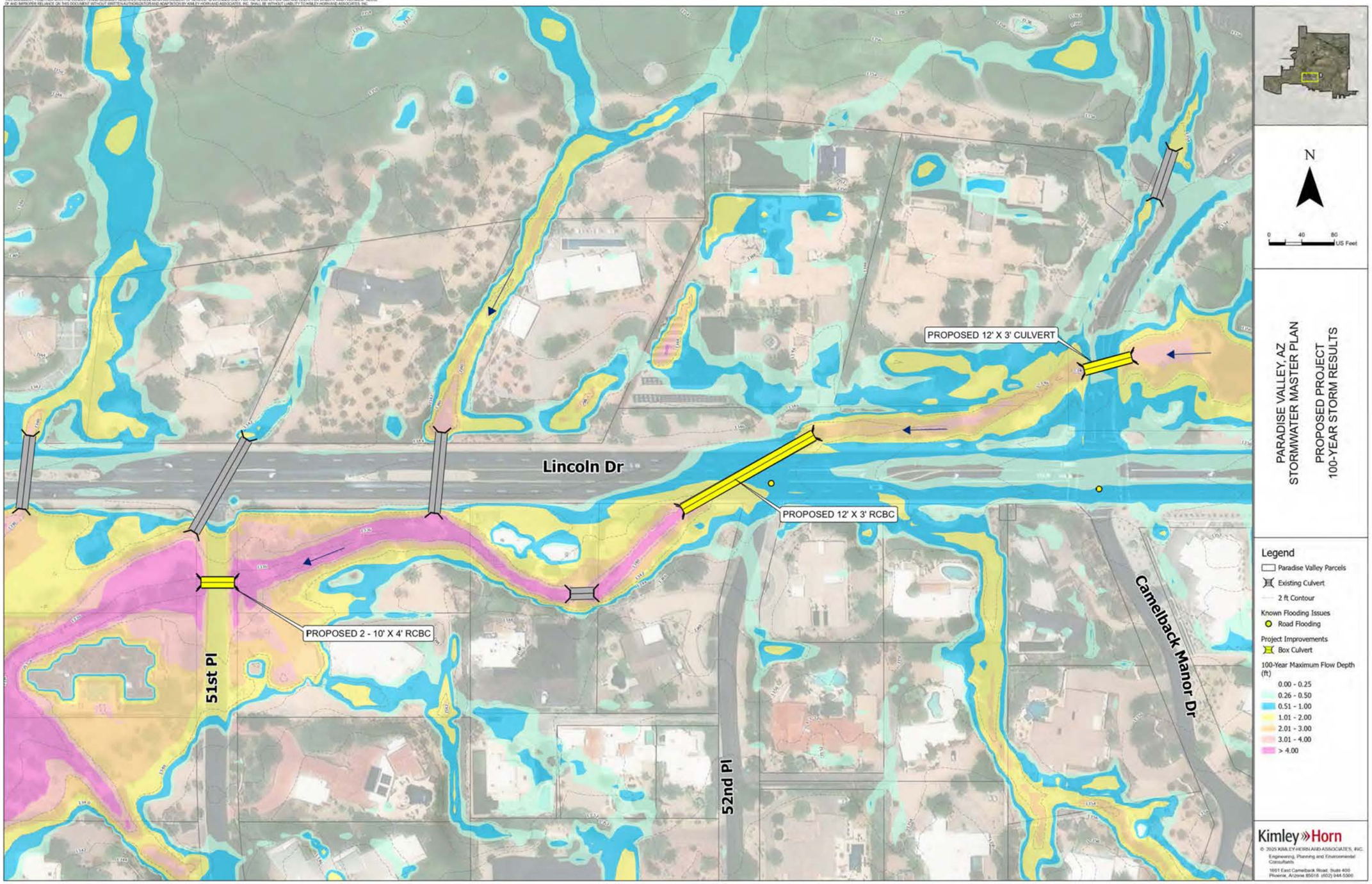
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XIX. APPENDIX G – HIGHEST PRIORITY PROJECTS COST ESTIMATES

Area A - Engineer's Opinion of Probable Cost

Item	Description	Unit	Quantity	Unit Price	Cost
	Construction Estimate				
1	12' x 3' RCBC	LF	900	$1,800	$1,620,000
2	2 - 30" RCP Storm Drain	LF	1,500	$750	$1,125,000
3	54" RCP Storm Drain	LF	1,200	$525	$630,000
4	42" RCP Storm Drain	LF	500	$415	$207,500
5	36" RCP Storm Drain	LF	450	$320	$144,000
6	Storm Drain Connection	EA	1	$3,500	$3,500
7	Catch Basin	EA	5	$25,000	$125,000
8	Manhole	EA	15	$12,000	$180,000
9	Pavement Removal	LF	4,210	$35	$147,350
10	Median Curb Replacement	LF	1,800	$55	$99,000
11	New Pavement/Regrading	SY	11,000	$85	$935,000
12	Concrete Curb and Gutter	LF	3,200	$55	$176,000
13	Clearing and Grubbing	LF	4,210	$50	$210,500
14	Inlet Structure	EA	3	$25,000	$75,000
15	Pavers to Match Existing Conditions	SF	4,210	$40	$168,400
16	Landscaping and Irrigation Restoration	SF	12,630	$60	$757,800
				Subtotal	6,604,050
	General Costs				
17	SWPPP (2%)	LS	1	$132,081	$132,081
18	Mobilization/Demobilization (10%)	LS	1	$660,405	$660,405
19	Design (15%)	LS	1	$990,608	$990,608
20	Construction Management (12%)	LS	1	$792,486	$792,486
21	Utilities (10%)	LS	1	$660,405	$660,405
22	Traffic Control (3%)	LS	1	$198,122	$198,122
				Subtotal	$10,038,156
				Contingency (15%)	$1,505,723
				Total Project Cost	$11,543,879

Area 1 - Engineer's Opinion of Probable Cost

Item	Description	Unit	Quantity	Unit Price	Cost
	Construction Estimate				
1	Storm Drain Outlet	EA	1	$2,500	$2,500
2	Storm Drain Pipe 24"	LF	110	$410	$45,100
3	Manhole	EA	1	$10,000	$10,000
4	Staff Gage	EA	1	$210	$210
5	Flood Warning Sign	EA	1	$275	$275
6	Protective Railing	LF	75	$180	$13,500
7	Removal of Curb and Gutter	LF	3	$250	$750
8	Curb & Gutter	LF	3	$100	$300
9	Concrete Sidewalk	SF	10	$35	$350
10	Storm Drain Pipe 36"	SF	15	$375	$5,625
11	Remove Bollards	EA	6	$260	$1,560
12	Removal of Pipe	LF	15	$75	$1,125
13	Riprap	CY	15	$120	$1,800
14	Channel Excavation	CY	1,200	$28	$33,600
15	Diversion Structure	LS	1	$55,000	$55,000
16	Basin Excavation	CY	2,600	$25	$65,000
17	Landscaping	LS	1	$15,000	$15,000
				Sub Total	$251,695
	General Costs				
18	SWPPP (10%)	LS	1	$25,170	$25,170
19	Mobilization/Demobilization (50%)	LS	1	$125,848	$125,848
20	Design (50%)	LS	1	$125,848	$125,848
21	Construction Management (45%)	LS	1	$113,263	$113,263
22	Utilities (20%)	LS	1	$50,339	$50,339
23	Traffic Control (20%)	LS	1	$50,339	$50,339
				Subtotal	$742,500
				Contingency (40%)	$297,000
				Total	$1,039,500

Area K - Engineer's Opinion of Probable Cost

Item	Description	Unit	Quantity	Unit Price	Cost
	Construction Estimate				
1	Basin Excavation	CY	61,307	$42	$2,574,894
2	Landscaping	SF	174,240	$5	$871,200
3	Clearing and Grubbing	SF	174,240	$2	$348,480
4	Weir Grading and Concrete	LS	1	$10,000	$10,000
5	Riprap	CY	630	$120	$75,600
				Subtotal	$3,880,174
	General Costs				
6	SWPPP (2%)	LS	1	$77,603	$77,603
7	Mobilization/Demobilization (12%)	LS	1	$465,621	$465,621
8	Design (10%)	LS	1	$388,017	$388,017
9	Construction Management (10%)	LS	1	$388,017	$388,017
10	Utilities (2%)	LS	1	$77,603	$77,603
11	Traffic Control (1%)	LS	1	$38,802	$38,802
				Subtotal	$5,315,838
				Contingency (15%)	$797,376
				Total	$6,113,214

Area L - Engineer's Opinion of Probable Costs

Item	Description	Unit	Quantity	Unit Price	Cost
	Construction Estimate				
1	2 - 10' x 4' RCBC	LF	125	$2,600	$325,000
2	3 - 10' x 4' RCBC	LF	45	$3,400	$153,000
3	Headwalls	EA	6	$15,000	$90,000
4	Grouted Riprap	CY	30	$470	$14,100
5	Safety Rail	LF	240	$150	$36,000
6	Earthwork/Sediment Basin	CY	780	$45	$35,100
7	Landscaping	LS	1	$20,000	$20,000
8	Pavement Replacement	TON	165	$475	$78,375
				Sub Total	$751,575
	General Costs				
9	SWPPP (5%)	LS	1	$37,579	$37,579
10	Mobilization/Demobilization (20%)	LS	1	$150,315	$150,315
11	Design (20%)	LS	1	$150,315	$150,315
12	Construction Management (15%)	LS	1	$112,736	$112,736
13	Utilities (8%)	LS	1	$60,126	$60,126
14	Traffic Control (5%)	LS	1	$37,579	$37,579
				Subtotal	$1,300,225
				Contingency (20%)	$260,045
				Total	$1,560,270

Area N - Engineer's Opinion of Probable Cost

Item	Description	Unit	Quantity	Unit Price	Cost
	Construction Estimate				
1	2 - 10' x 4' RCBC	LF	255	$2,600	$663,000
2	Headwall	EA	8	$15,000	$120,000
3	Grouted Riprap	CY	32	$480	$15,360
4	Pavement Removal and Replacement	LF	670	$150	$100,500
5	Landscaping	LS	1	$25,000	$25,000
6	Safety Rail	LF	200	$150	$30,000
7	Clearing and Grubbing	AC	1	$25,000	$25,000
8	Channel Grading and Excavation	LS	1	$20,000	$20,000
				Subtotal	$998,860
	General Costs				
9	SWPPP (3%)	LS	1	$29,966	$29,966
10	Mobilization/Demobilization (15%)	LS	1	$149,829	$149,829
11	Design (15%)	LS	1	$149,829	$149,829
12	Construction Management (15%)	LS	1	$149,829	$149,829
13	Utilities (10%)	LS	1	$99,886	$99,886
14	Traffic Control (8%)	LS	1	$79,909	$79,909
				Subtotal	$1,658,108
				Contingency (20%)	$331,622
				Total	$1,989,729

Area O - Engineer's Opinion of Probable Cost

Item	Description	Unit	Quantity	Unit Price	Cost
	Construction Estimate				
1	2 - 10' x 4' RCBC	LF	55	$2,400	$132,000
2	12' x 3' RCBC	LF	190	$1,800	$342,000
3	Drop Inlet	EA	1	$20,000	$20,000
4	Headwalls	EA	6	$12,000	$72,000
5	Grouted Riprap	CY	40	$470	$18,800
6	Excavation	CY	1,050	$65	$68,250
7	Channel Grading and Landscaping	LS	1	$50,000	$50,000
8	Remove and Replace Pavement	LF	315	$220	$69,300
				Subtotal	$772,350
	General Costs				
9	SWPPP (5%)	LS	1	$38,618	$38,618
10	Mobilization/Demobilization (20%)	LS	1	$154,470	$154,470
11	Design (20%)	LS	1	$154,470	$154,470
12	Construction Management (20%)	LS	1	$154,470	$154,470
13	Utilities (15%)	LS	1	$115,853	$115,853
14	Traffic Control (25%)	LS	1	$193,088	$193,088
				Subtotal	$1,583,318
				Contingency (25%)	$395,829
				Total	$1,979,147

XX. APPENDIX H – BENEFIT COST ANALYSIS DOCUMENTAION

FEMA Benefit-Cost Calculator

V.6.0 (Build 20250108.0114 | Release Notes)

Benefit-Cost Analysis

Project Name: Invergordon Storm Drain



Map Marker ▲	Mitigation Title	Property Type	Hazard	Discount Rate (%)	Benefits (B)	Costs (C)	BCR (B/C)
1	Floodwater Diversion and Storage @ 33.5770080; -111.9800110		DFA - Riverine Flood	3.1	$ 18,722,793	$ 6,072,476	3.08
2	Drainage Improvement @ 33.5584120; -111.9433950		DFA - Riverine Flood	3.1	$ 23,293,796	$ 11,616,355	2.01
TOTAL (SELECTED)					**$ 42,016,589**	**$ 17,688,831**	**2.38**
TOTAL					**$ 42,016,589**	**$ 17,688,831**	**2.38**

Property Configuration

Property Title:	Floodwater Diversion and Storage @ 33.5770080; -111.9800110
Property Location:	85028, Maricopa, Arizona
Property Coordinates:	33.577008, -111.980011
Is this a tribal project?:	No
Hazard Type:	Riverine Flood
Mitigation Action Type:	Floodwater Diversion and Storage
Property Type:	Residential Building
Analysis Method Type:	Professional Expected Damages

Cost Estimation

Floodwater Diversion and Storage @ 33.5770080; -111.9800110

Discount Rate (%):	3.1% Use Default:Yes
Project Useful Life (years):	75
Project Cost:	$6,000,000
Number of Maintenance Years:	75 Use Default:Yes
Annual Maintenance Cost:	$2,500

Damage Analysis Parameters - Damage Frequency Assessment

Floodwater Diversion and Storage @ 33.5770080; -111.9800110

Year of Analysis was Conducted:	2025
Year Property was Built:	0
Analysis Duration:	10 Use Default:Yes

Professional Expected Damages Before Mitigation

Floodwater Diversion and Storage @ 33.5770080; -111.9800110

	OTHER	OPTIONAL DAMAGES			VOLUNTEER COSTS		TOTAL
Recurrence Interval (years)	Damages ($)	Category 1 ($)	Category 2 ($)	Category 3 ($)	Number of Volunteers	Number of Days	Damages ($)
100	68,424,130	0	0	0	0	0	68,424,130
10	51,107,020	0	0	0	0	0	51,107,020

Annualized Damages Before Mitigation

Floodwater Diversion and Storage @ 33.5770080; -111.9800110

Annualized Recurrence Interval (years)	Damages and Losses ($)	Annualized Damages and Losses ($)
10	51,107,020	5,322,154
100	68,424,130	684,234
	Sum Damages and Losses ($)	Sum Annualized Damages and Losses ($)
	119,531,150	6,006,388

Professional Expected Damages After Mitigation

Floodwater Diversion and Storage @ 33.5770080; -111.9800110

	OTHER	OPTIONAL DAMAGES			VOLUNTEER COSTS		TOTAL
Recurrence Interval (years)	Damages ($)	Category 1 ($)	Category 2 ($)	Category 3 ($)	Number of Volunteers	Number of Days	Damages ($)
100	60,716,150	0	0	0	0	0	60,716,150
10	51,009,466	0	0	0	0	0	51,009,466

Annualized Damages After Mitigation

Floodwater Diversion and Storage @ 33.5770080; -111.9800110

Annualized Recurrence Interval (years)	Damages and Losses ($)	Annualized Damages and Losses ($)
10	51,009,466	5,008,642
100	60,716,150	607,155
	Sum Damages and Losses ($)	Sum Annualized Damages and Losses ($)
	111,725,616	5,615,797

Standard Benefits - Ecosystem Services

Floodwater Diversion and Storage @ 33.5770080; -111.9800110

Total Project Area (sq.ft):	174,240
Percentage of Urban Green Open Space:	100.00%
Percentage of Rural Green Open Space:	0.00%
Percentage of Riparian:	0.00%
Percentage of Coastal Wetlands:	0.00%
Percentage of Inland Wetlands:	0.00%
Percentage of Forests:	0.00%
Percentage of Coral Reefs:	0.00%
Percentage of Shellfish Reefs:	0.00%
Percentage of Beaches and Dunes:	0.00%
Expected Annual Ecosystem Services Benefits:	$62,164

Additional Benefits - Social

Floodwater Diversion and Storage @ 33.5770080; -111.9800110

Number of Workers:	410
Expected Annual Social Benefits:	$5,597,235

Benefits-Costs Summary

Floodwater Diversion and Storage @ 33.5770080; -111.9800110

Discount Rate (%):	3.1% Use Default:Yes
Total Standard Mitigation Benefits:	$13,125,558
Total Social Benefits:	$5,597,235
Total Mitigation Project Benefits:	$18,722,793
Total Mitigation Project Cost:	$6,072,476
Benefit Cost Ratio - Standard:	2.16
Benefit Cost Ratio - Standard + Social:	3.08

Property Configuration

Property Title:	Drainage Improvement @ 33.5584120; -111.9433950
Property Location:	85253, Maricopa, Arizona
Property Coordinates:	33.558412, -111.943395
Is this a tribal project?:	No
Hazard Type:	Riverine Flood
Mitigation Action Type:	Drainage Improvement
Property Type:	Residential Building
Analysis Method Type:	Professional Expected Damages

Cost Estimation

Drainage Improvement @ 33.5584120; -111.9433950

Discount Rate (%):	3.1% Use Default:Yes
Project Useful Life (years):	75
Project Cost:	$11,543,879
Number of Maintenance Years:	75 Use Default:Yes
Annual Maintenance Cost:	$2,500

Damage Analysis Parameters - Damage Frequency Assessment

Drainage Improvement @ 33.5584120; -111.9433950

Year of Analysis was Conducted:	2025
Year Property was Built:	0
Analysis Duration:	10 Use Default:Yes

Professional Expected Damages Before Mitigation

Drainage Improvement @ 33.5584120; -111.9433950

	OTHER	OPTIONAL DAMAGES			VOLUNTEER COSTS		TOTAL
Recurrence Interval (years)	Damages ($)	Category 1 ($)	Category 2 ($)	Category 3 ($)	Number of Volunteers	Number of Days	Damages ($)
100	74,057,157	0	0	0	0	0	74,057,157
10	34,557,678	0	0	0	0	0	34,557,678

Annualized Damages Before Mitigation

Drainage Improvement @ 33.5584120; -111.9433950

Annualized Recurrence Interval (years)	Damages and Losses ($)	Annualized Damages and Losses ($)
10	34,557,678	4,553,007
100	74,057,157	740,564
	Sum Damages and Losses ($)	Sum Annualized Damages and Losses ($)
	108,614,835	5,293,571

Professional Expected Damages After Mitigation

Drainage Improvement @ 33.5584120; -111.9433950

	OTHER	OPTIONAL DAMAGES			VOLUNTEER COSTS		TOTAL
Recurrence Interval (years)	Damages ($)	Category 1 ($)	Category 2 ($)	Category 3 ($)	Number of Volunteers	Number of Days	Damages ($)
100	69,521,281	0	0	0	0	0	69,521,281
10	32,335,631	0	0	0	0	0	32,335,631

Annualized Damages After Mitigation

Drainage Improvement @ 33.5584120; -111.9433950

Annualized Recurrence Interval (years)	Damages and Losses ($)	Annualized Damages and Losses ($)
10	32,335,631	4,267,191
100	69,521,281	695,206
	Sum Damages and Losses ($)	Sum Annualized Damages and Losses ($)
	101,856,912	4,962,397

Standard Benefits - Ecosystem Services

Drainage Improvement @ 33.5584120; -111.9433950

Total Project Area (acres):	26
Percentage of Urban Green Open Space:	100.00%
Percentage of Rural Green Open Space:	0.00%
Percentage of Riparian:	0.00%
Percentage of Coastal Wetlands:	0.00%
Percentage of Inland Wetlands:	0.00%
Percentage of Forests:	0.00%
Percentage of Coral Reefs:	0.00%
Percentage of Shellfish Reefs:	0.00%
Percentage of Beaches and Dunes:	0.00%
Expected Annual Ecosystem Services Benefits:	$404,066

Additional Benefits - Social

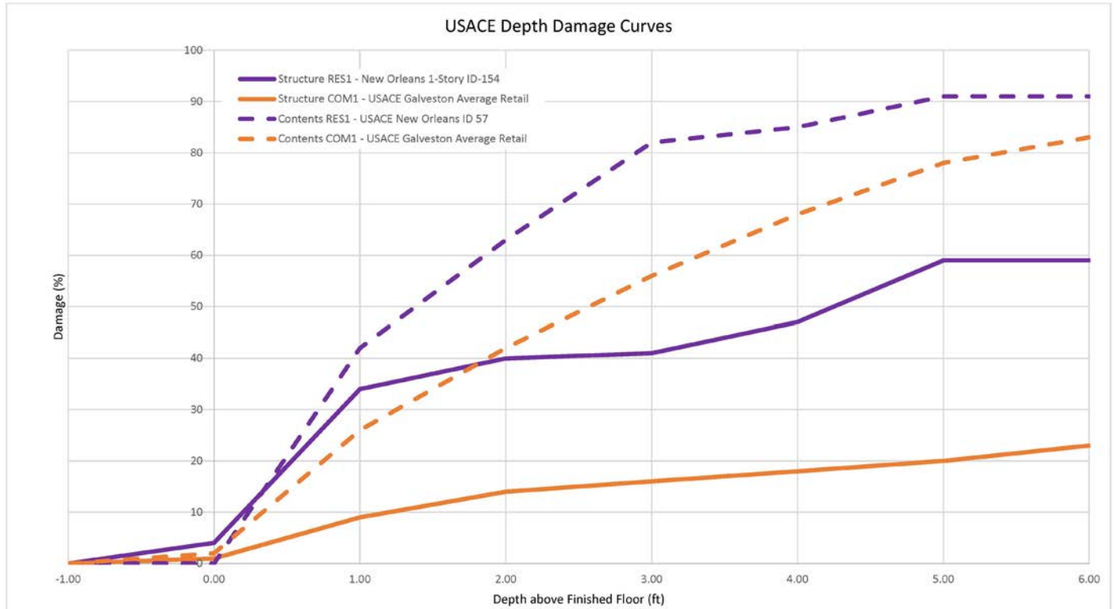
Drainage Improvement @ 33.5584120; -111.9433950

Number of Workers:	165
Expected Annual Social Benefits:	$1,978,900

Benefits-Costs Summary

Drainage Improvement @ 33.5584120; -111.9433950

Discount Rate (%):	3.1%	Use Default:Yes
Total Standard Mitigation Benefits:	$21,314,896	
Total Social Benefits:	$1,978,900	
Total Mitigation Project Benefits:	$23,293,796	
Total Mitigation Project Cost:	$11,616,355	
Benefit Cost Ratio - Standard:	1.83	
Benefit Cost Ratio - Standard + Social:	2.01	



10-Year and 100-Year Existing Building Damages in Area K

															Existing								
Building ID	HAG	Finished Floor Elevation (ft)	Land Use Type	Building Area (sf)	Replace Cost $ ($726/SF-Res)	Content Replacement Value ($) 1/2 of Replacement Cost	10yr Exist WSEL (ft)	10yr Exist Flow Depth (ft)	10yr Prop WSEL (ft)	10yr Prop Flow Depth (ft)	100yr Exist WSEL (ft)	100yr Exist Flow Depth (ft)	100yr Prop WSEL (ft)	100yr Prop Flow Depth (ft)	10yr Building Damage (%)	10yrBuilding Damage Cost ($)	10yr Content Damage (%)	10yr Content Damage Cost ($)	10yr Total Damage Cost ($)	100yr Building Damage (%)	100yrBuilding Damage Cost ($)	100yr Content Damage (%)	100yr Content Damage Cost ($)	100yr Total Damage Cost ($)
0	1372.7792	1373.029175	Residential	5062.750061	$ 3,675,557	$ 1,837,778	1372.830444	-0.20	1372.829956	-0.20	1372.834351	-0.19	1372.834229	-0.19	3.205076	$ 117,804	0	$ -	$ 117,804.38	3.220216	$ 118,361	0	$ -	$ 118,360.86
1	1371.6405	1371.890503	Residential	5114.190857	$ 3,712,903	$ 1,856,451	1371.667114	-0.22	1371.670532	-0.22	1371.717651	-0.17	1371.717651	-0.17	3.106444	$ 115,339	0	$ -	$ 115,339.24	3.308592	$ 122,845	0	$ -	$ 122,844.80
2	1367.0981	1367.348145	Residential	7006.825439	$ 5,086,955	$ 2,543,478	1367.262939	-0.09	1367.262573	-0.09	1367.392334	0.04	1367.224731	-0.12	3.659176	$ 186,141	0	$ -	$ 186,140.65	3.506344	$ 178,366	0	$ -	$ 178,366.15
3	1374.369	1374.619019	Residential	5893.124573	$ 4,278,408	$ 2,139,204	1374.525391	-0.09	1374.530029	-0.09	1374.701172	0.08	1374.527344	-0.09	3.63	$ 155,113	0.00	$ -	$ 155,113.18	3.63	$ 155,447	23.90	$ 511,310	$ 666,756.92
4	1380.3344	1380.584351	Residential	14318.15601	$ 10,394,981	$ 5,197,491	1380.388672	-0.20	1380.390015	-0.19	1380.391846	-0.19	1380.391846	-0.19	3.217284	$ 334,436	0	$ -	$ 334,436.07	3.22998	$ 335,756	0	$ -	$ 335,755.82
5	1381.6091	1381.859131	Residential	8338.503479	$ 6,053,754	$ 3,026,877	1381.669556	-0.19	1381.670044	-0.19	1381.842529	-0.02	1382.071655	0.21	3.24	$ 196,245	0.00	$ -	$ 196,244.53	10.38	$ 628,121	0.00	$ -	$ 628,120.52
6	1365.7844	1366.034424	Residential	5481.086914	$ 3,979,269	$ 1,989,635	1366.240723	0.21	1366.241211	0.21	1366.375732	0.34	1366.19458	0.16	10.19	$ 405,447	8.66	$ 172,393	$ 577,839.57	8.80	$ 350,362	11.48	$ 228,395	$ 578,757.00
7	1361.3544	1361.60437	Residential	6888.243347	$ 5,000,865	$ 2,500,432	1361.438843	-0.17	1361.439941	-0.16	1361.44165	-0.16	1361.441772	-0.16	3.34	$ 166,923	0.00	$ -	$ 166,923.46	3.35	$ 167,509	35.35	$ 883,911	$ 1,051,420.75
8	1373.5814	1373.831421	Residential	6063.259277	$ 4,401,926	$ 2,200,963	1373.639404	-0.19	1373.638428	-0.19	1373.656982	-0.17	1373.656982	-0.17	3.23	$ 142,267	0.00	$ -	$ 142,267.26	3.30	$ 145,362	35.21	$ 774,888	$ 920,250.74
9	1369.5145	1369.764526	Residential	4737.382507	$ 3,439,340	$ 1,719,670	1369.589478	-0.18	1369.589966	-0.17	1369.974854	0.21	1369.854858	0.09	3.30	$ 113,492	0.00	$ -	$ 113,491.61	6.71	$ 230,778	40.52	$ 696,869	$ 927,647.66
10	1375.5907	1375.840698	Residential	6107.704834	$ 4,434,194	$ 2,217,097	1375.984009	0.14	1375.97998	0.14	1375.985352	0.14	1375.985352	0.14	8.29933	$ 368,008	6.019062	$ 133,448	$ 501,456.80	8.33962	$ 369,795	0	$ -	$ 369,794.91
11	1359.4811	1359.731079	Residential	7633.545288	$ 5,541,954	$ 2,770,977	1359.544067	-0.19	1359.540039	-0.19	1359.545654	-0.19	1359.545654	-0.19	3.25	$ 180,222	0.00	$ -	$ 180,221.68	3.26	$ 180,573	0.00	$ -	$ 180,573.48
12	1349.402	1349.651978	Residential	12252.54138	$ 8,895,345	$ 4,447,673	1349.465942	-0.19	1349.469971	-0.18	1349.508179	-0.14	1349.468506	-0.18	3.26	$ 289,620	0.00	$ -	$ 289,619.63	3.27	$ 290,532	27.88	$ 1,240,028	$ 1,530,559.54
13	1361.3274	1361.577393	Residential	670.759644	$ 486,972	$ 243,486	1361.39917	-0.18	1361.403442	-0.17	1361.462036	-0.12	1361.462036	-0.12	3.287108	$ 16,007	0	$ -	$ 16,007.28	3.538572	$ 17,232	0	$ -	$ 17,231.84
14	1371.7996	1372.049561	Residential	6368.654053	$ 4,623,643	$ 2,311,821	1371.908325	-0.14	1371.910034	-0.14	1371.910645	-0.14	1371.910645	-0.14	3.435056	$ 158,825	0	$ -	$ 158,824.72	3.444336	$ 159,254	0	$ -	$ 159,253.79
15	1378.1814	1378.431396	Residential	5794.169983	$ 4,206,567	$ 2,103,284	1378.244873	-0.19	1378.24231	-0.19	1378.333862	-0.10	1378.259766	-0.17	3.253908	$ 136,878	0	$ -	$ 136,877.83	3.31348	$ 139,384	0	$ -	$ 139,383.77
16	1358.1885	1358.438477	Residential	7644.869263	$ 5,550,175	$ 2,775,088	1358.328003	-0.11	1358.329224	-0.11	1358.330688	-0.11	1358.330688	-0.11	3.558104	$ 197,481	0	$ -	$ 197,481.00	3.568844	$ 198,077	13.00707996	$ 360,958	$ 559,034.95
17	1365.3146	1365.564575	Residential	6809.630554	$ 4,943,792	$ 2,471,896	1365.397461	-0.17	1365.400024	-0.16	1365.399536	-0.17	1365.399658	-0.16	3.331544	$ 164,705	0	$ -	$ 164,704.60	3.340332	$ 165,139	0	$ -	$ 165,139.06
18	1379.1108	1379.36084	Residential	5093.971191	$ 3,698,223	$ 1,849,112	1379.271729	-0.09	1379.27478	-0.09	1379.274902	-0.09	1379.274902	-0.09	3.643556	$ 134,747	0	$ -	$ 134,746.83	3.656248	$ 135,216	0	$ -	$ 135,216.21
19	1378.9204	1379.17041	Residential	2066.832153	$ 1,500,520	$ 750,260	1378.949951	-0.22	1378.947754	-0.22	1378.994751	-0.18	1378.994751	-0.18	3.118164	$ 46,789	0	$ -	$ 46,788.68	3.297364	$ 49,478	0	$ -	$ 49,477.61
20	1363.8187	1364.068726	Residential	9950.357239	$ 7,223,959	$ 3,611,980	1363.894775	-0.17	1363.890015	-0.18	1363.896851	-0.17	1363.896851	-0.17	3.304196	$ 238,694	0	$ -	$ 238,693.78	3.3125	$ 239,294	0	$ -	$ 239,293.65
21	1359.7377	1359.987671	Residential	98.510803	$ 71,519	$ 35,759	1359.800293	-0.19	1359.802612	-0.19	1360.027832	0.04	1359.882813	-0.10	3.250488	$ 2,325	0	$ -	$ 2,324.71	3.580568	$ 2,561	0	$ -	$ 2,560.78
22	1353.2081	1353.45813	Residential	1837.229675	$ 1,333,829	$ 666,914	1353.245239	-0.21	1353.25	-0.21	1353.318115	-0.14	1353.247559	-0.21	3.148436	$ 41,995	0	$ -	$ 41,994.74	3.157716	$ 42,119	24.1428222	$ 161,012	$ 203,130.47
23	1353.9991	1354.249146	Residential	2561.5896	$ 1,859,714	$ 929,857	1354.064209	-0.18	1354.060059	-0.19	1354.065796	-0.18	1354.065918	-0.18	3.260252	$ 60,631	0	$ -	$ 60,631.36	3.267088	$ 60,758	0	$ -	$ 60,758.49
24	1376.0033	1376.253296	Residential	5004.554688	$ 3,633,307	$ 1,816,653	1376.087891	-0.17	1376.089478	-0.16	1376.089844	-0.16	1376.089844	-0.16	3.33838	$ 121,294	0	$ -	$ 121,293.58	3.346192	$ 121,577	0	$ -	$ 121,577.42
25	1366.6973	1366.947266	Residential	956.661987	$ 694,537	$ 347,268	1366.791504	-0.16	1366.790039	-0.16	1366.90979	-0.04	1366.796265	-0.15	3.38	$ 23,454	0.00	$ -	$ 23,454.17	3.40	$ 23,586	0.00	$ -	$ 23,586.44
26	1377.9141	1378.164063	Residential	272.638306	$ 197,935	$ 98,968	1377.926147	-0.24	1377.927246	-0.24	1377.952148	-0.21	1377.965576	-0.20	3.048336	$ 6,034	0	$ -	$ 6,033.74	3.206052	$ 6,346	0	$ -	$ 6,345.91
27	1359.7202	1359.970215	Residential	416.830383	$ 302,619	$ 151,309	1359.942627	-0.03	1359.942261	-0.03	1360.080933	0.11	1359.883057	-0.09	3.89	$ 11,771	0.00	$ -	$ 11,770.81	3.65	$ 11,050	0.00	$ -	$ 11,049.73
28	1373.551	1373.801025	Residential	6621.999878	$ 4,807,572	$ 2,403,786	1373.600098	-0.20	1373.599976	-0.20	1373.670898	-0.13	1373.695068	-0.11	3.20	$ 153,664	0.00	$ -	$ 153,664.04	3.58	$ 171,927	10.77	$ 258,929	$ 430,856.33
29	1376.4547	1376.704712	Residential	5605.584473	$ 4,069,654	$ 2,034,827	1376.563599	-0.14	1376.560181	-0.14	1376.62085	-0.08	1376.62085	-0.08	3.435548	$ 139,815	0	$ -	$ 139,814.93	3.664552	$ 149,135	0	$ -	$ 149,134.60
30	1350.1412	1350.391235	Residential	7004.17749	$ 5,085,033	$ 2,542,516	1350.164063	-0.23	1350.166504	-0.22	1350.671387	0.28	1350.452393	0.06	3.09	$ 157,194	0.00	$ -	$ 157,194.23	5.83	$ 296,698	8.25	$ 209,739	$ 506,437.43
31	1349.6879	1349.937866	Residential	1574.908997	$ 1,143,384	$ 571,692	1349.755249	-0.18	1349.76001	-0.18	1349.999878	0.06	1349.757446	-0.18	3.269532	$ 37,383	0	$ -	$ 37,383.30	3.27832	$ 37,484	12.57641574	$ 71,898	$ 109,382.14
32	1351.7725	1352.022461	Residential	7068.87146	$ 5,132,001	$ 2,566,000	1352.024414	0.00	1352.02002	0.00	1352.026245	0.00	1352.026245	0.00	4.06	$ 208,287	0.08	$ 2,105	$ 210,391.65	4.11	$ 211,106	0.00	$ -	$ 211,105.87
33	1361.1578	1361.407837	Residential	4317.881287	$ 3,134,782	$ 1,567,391	1361.28894	-0.12	1361.291138	-0.12	1361.293701	-0.11	1361.293701	-0.11	3.52	$ 110,483	0.00	$ -	$ 110,482.63	3.54	$ 111,080	0.00	$ -	$ 111,079.61
34	1380.4657	1380.715698	Residential	6718.879456	$ 4,877,906	$ 2,438,953	1380.545654	-0.17	1380.550049	-0.17	1380.547852	-0.17	1380.675903	-0.04	3.319824	$ 161,938	0	$ -	$ 161,937.91	3.84082	$ 187,352	0	$ -	$ 187,351.61
35	1352.3629	1352.612915	Residential	6026.699036	$ 4,375,384	$ 2,187,692	1352.395142	-0.22	1352.400024	-0.21	1352.397217	-0.22	1352.397339	-0.22	3.13	$ 136,902	0.00	$ -	$ 136,901.72	3.14	$ 137,286	0.00	$ -	$ 137,286.23
36	1364.9492	1365.199219	Residential	1969.893005	$ 1,430,142	$ 715,071	1365.000244	-0.20	1365	-0.20	1365.01001	-0.19	1365.003052	-0.20	3.2041	$ 45,823	0	$ -	$ 45,823.19	3.215332	$ 45,984	0	$ -	$ 45,983.82
37	1382.2072	1382.457153	Residential	12305.99646	$ 8,934,153	$ 4,467,077	1382.286987	-0.17	1382.290039	-0.17	1382.28894	-0.17	1382.289063	-0.17	3.319336	$ 296,555	0	$ -	$ 296,554.57	3.32764	$ 297,296	0	$ -	$ 297,296.46
38	1377.7423	1377.99231	Residential	5902.526306	$ 4,285,234	$ 2,142,617	1377.985107	-0.01	1377.98999	0.00	1377.98645	-0.01	1377.98645	-0.01	3.971188	$ 170,175	0	$ -	$ 170,174.70	3.97656	$ 170,405	0	$ -	$ 170,404.91
39	1368.6111	1368.861084	Residential	5975.38501	$ 4,338,130	$ 2,169,065	1368.935913	0.07	1368.930054	0.07	1369.276367	0.42	1369.043823	0.18	6.24487	$ 270,911	3.142818	$ 68,170	$ 339,080.31	9.48217	$ 411,349	0	$ -	$ 411,348.82
40	1358.2589	1358.508911	Residential	758.56012	$ 550,715	$ 275,357	1358.344971	-0.16	1358.339966	-0.17	1358.346558	-0.16	1358.346558	-0.16	3.34	$ 18,417	0.00	$ -	$ 18,417.22	3.35	$ 18,452	0.00	$ -	$ 18,452.18
41	1365.7938	1366.043823	Residential	5147.26416	$ 3,736,914	$ 1,868,457	1365.838989	-0.20	1365.839966	-0.20	1365.861206	-0.18	1365.849609	-0.19	3.18	$ 118,859	0.00	$ -	$ 118,858.67	3.22	$ 120,446	5.05	$ 94,358	$ 214,804.10
42	1362.7766	1363.026611	Residential	8623.175049	$ 6,260,425	$ 3,130,213	1362.801392	-0.23	1362.800049	-0.23	1362.804321	-0.22	1362.804443	-0.22	3.10	$ 194,018	0.00	$ -	$ 194,018.34	3.11	$ 194,782	0.00	$ -	$ 194,782.36
43	1362.8351	1363.085083	Residential	5379.317261	$ 3,905,384	$ 1,952,692	1362.961548	-0.12	1362.95874	-0.13	1363.098022	0.01	1362.971558	-0.11	3.50586	$ 136,917	0	$ -	$ 136,917.31	3.5459	$ 138,481	0	$ -	$ 138,481.02
44	1373.3346	1373.584595	Residential	437.73584	$ 317,796	$ 158,898	1373.473999	-0.11	1373.469971	-0.11	1373.475342	-0.11	1373.475342	-0.11	3.557616	$ 11,306	0	$ -	$ 11,305.97	3.562988	$ 11,323	3.54785172	$ 5,637	$ 16,960.51
45	1367.9971	1368.24707	Residential	7428.078186	$ 5,392,785	$ 2,696,392	1368.196655	-0.05	1368.199951	-0.05	1368.19873	-0.05	1368.19873	-0.05	3.80	$ 204,836	0.00	$ -	$ 204,836.30	3.81	$ 205,284	0.00	$ -	$ 205,283.90
46	1374.6667	1374.916748	Residential	4881.761841	$ 3,544,159	$ 1,772,080	1374.991455	0.07	1374.98999	0.07	1374.994629	0.08	1374.994507	0.08	6.24121	$ 221,198	3.137694	$ 55,602	$ 276,800.85	6.33277	$ 224,443	0	$ -	$ 224,443.44
47	1378.6304	1378.880371	Residential	5232.306396	$ 3,798,654	$ 1,899,327	1378.724121	-0.16	1378.725098	-0.16	1379.14209	0.26	1378.995605	0.12	3.38	$ 128,205	0.00	$ -	$ 128,204.59	7.46	$ 283,266	0.00	$ -	$ 283,266.42
48	1377.9553	1378.205322	Residential	6055.227417	$ 4,396,095	$ 2,198,048	1378.011475	-0.19	1378.012817	-0.19	1378.015869	-0.19	1378.015869	-0.19	3.224612	$ 141,757	0	$ -	$ 141,757.01	3.242188	$ 142,530	1.7021487	$ 37,414	$ 179,943.71
49	1376.8622	1377.112183	Residential	371.322083	$ 269,580	$ 134,790	1376.894043	-0.22	1376.893188	-0.22	1376.96582	-0.15	1376.980103	-0.13	3.12744	$ 8,431	0	$ -	$ 8,430.95	3.47168	$ 9,359	0	$ -	$ 9,358.95
50	1371.5935	1371.843506	Residential	3883.120056	$ 2,819,145	$ 1,409,573	1371.657227	-0.19	1371.65564	-0.19	1371.91626	0.07	1371.827026	-0.02	3.25	$ 91,760	0.00	$ -	$ 91,759.90	3.93	$ 110,907	32.30	$ 455,289	$ 566,196.62
51	1367.6451	1367.895142	Residential	8502.347534	$ 6,172,704	$ 3,086,352	1367.70874	-0.19	1367.709961	-0.19	1367.711426	-0.18	1367.711426	-0.18	3.25	$ 200,884	0.00	$ -	$ 200,884.00	3.27	$ 201,547	13.27	$ 409,673	$ 611,219.75
52	1360.0182	1360.268188	Residential	11716.17969	$ 8,505,946	$ 4,252,973	1360.080688	-0.19	1360.079956	-0.19	1360.084106	-0.18	1360.083984	-0.18	3.25	$ 276,443	0.00	$ -	$ 276,443.26	3.26	$ 277,565	0.00	$ -	$ 277,564.68
53	1376.1908	1376.440796	Residential	4086.243103	$ 2,966,612	$ 1,483,306	1376.506836	0.07	1376.51001	0.07	1376.508789	0.07	1376.508789	0.07	5.9812	$ 177,439	2.77368	$ 41,142	$ 218,581.20	6.03979	$ 179,177	0	$ -	$ 179,177.16
54	1386.9077	1387.157715	Residential	5026.592773	$ 3,649,306	$ 1,824,653	1387.001099	-0.16	1387.00061	-0.16	1387.004517	-0.15	1387.004517	-0.15	3.373536	$ 123,111	0	$ -	$ 123,110.66	3.387208	$ 123,610	0	$ -	$ 123,609.60
55	1376.2891	1376.539063	Residential	3620.247864	$ 2,628,300	$ 1,314,150	1376.426147	-0.11	1376.426758	-0.11	1376.470703	-0.07	1376.470703	-0.07	3.55	$ 93,261	0.00	$ -	$ 93,260.91	3.73	$ 97,945	0.00	$ -	$ 97,945.17
56	1377.2733	1377.523315	Residential	4993.57019	$ 3,625,332	$ 1,812,666	1377.564087	0.04	1377.560059	0.04	1377.56543	0.04	1377.56543	0.04	5.22	$ 189,357	1.71	$ 31,041	$ 220,397.42	5.26	$ 190,818	12.67	$ 229,641	$ 420,458.77
57	1351.041	1351.291016	Residential	10962.42029	$ 7,958,717	$ 3,979,359	1351.105469	-0.19	1351.109985	-0.18	1351.107666	-0.18	1351.107544	-0.18	3.26	$ 259,280	0.00	$ -	$ 259,280.04	3.27	$ 259,941	0.00	$ -	$ 259,940.62
58	1372.4613	1372.711304	Residential	5823.487061	$ 4,227,852	$ 2,113,926	1372.55835	-0.15	1372.560059	-0.15	1372.716797	0.01	1372.560547	-0.15	3.388184	$ 143,247	0	$ -	$ 143,247.39	3.396972	$ 143,619	0	$ -	$ 143,618.94
59	1377.0377	1377.28772	Residential	6052.135376	$ 4,393,850	$ 2,196,925	1377.146973	-0.14	1377.149902	-0.14	1377.14978	-0.14	1377.149902	-0.14	3.437012	$ 151,017	0	$ -	$ 151,017.16	3.448728	$ 151,532	0	$ -	$ 151,531.94
60	1368.8978	1369.147827	Residential	6837.879822	$ 4,964,301	$ 2,482,150	1368.899658	-0.25	1368.900024	-0.25	1368.906616	-0.24	1369.012573	-0.14	3.007324	$ 149,293	0	$ -	$ 149,292.61	3.458984	$ 171,714	0	$ -	$ 171,714.37
61	1365.9777	1366.227661	Residential	548.647339	$ 398,318	$ 199,159	1366.057861	-0.17	1366.061035	-0.17	1366.203369	-0.02	1366.046509	-0.18	3.3208	$ 13,227	0	$ -	$ 13,227.34	3.275392	$ 13,046	0	$ -	$ 13,046.47
62	1365.65	1365.900024	Residential	6442.914001	$ 4,677,556	$ 2,338,778	1365.738403	-0.16	1365.73999	-0.16	1366.14507	0.24	1365.892334	-0.01	3.35	$ 156,863	0.00	$ -	$ 156,862.57	3.97	$ 185,663	14.43	$ 337,421	$ 523,084.63
63	1348.2711	1348.521118	Residential	624.433289	$ 453,339	$ 226,669	1348.405151	-0.12	1348.409302	-0.11	1349.341187	0.82	1348.980347	0.46	3.536132	$ 16,031	0	$ -	$ 16,030.65	17.77687	$ 80,589	0	$ -	$ 80,589.41
64	1379.9254	1380.175415	Residential	335.501648	$ 243,574	$ 121,787	1379.99353	-0.18	1379.992065	-0.18	1380.040283	-0.14	1380.039917	-0.14	3.27	$ 7,971	0.00	$ -	$ 7,970.87	3.46	$ 8,423	0.00	$ -	$ 8,422.82
65	1380.058	1380.307983	Residential	344.429138	$ 250,056	$ 125,028	1380.170776	-0.14	1380.171509	-0.14	1380.185059	-0.12	1380.184814	-0.12	3.451172	$ 8,630	0.00	$ -	$ 8,629.85	3.507324	$ 8,770	0.00	$ -	$ 8,770.26
66	1357.8719	1358.121948	Residential	1980.532898	$ 1,437,867	$ 718,933	1358.057495	-0.06	1358.060059	-0.06	1358.059692	-0.06	1358.059692	-0.06	3.74	$ 53,808	0.00	$ -	$ 53,807.68	3.75	$ 53,934	0.00	$ -	$ 53,934.04
67	1361.5636	1361.813599	Residential	6199.695374	$ 4,500,979	$ 2,250,489	1361.722046	-0.09	1361.719971	-0.09	1361.726318	-0.09	1361.726196	-0.09	3.633788	$ 163,556	0	$ -	$ 163,556.03	3.650388	$ 164,303	0	$ -	$ 164,303.19
68	1373.7996	1374.049561	Residential	4352.848328	$ 3,160,168	$ 1,580,084	1373.888428	-0.16	1373.890015	-0.16	1373.941406	-0.11	1373.890869	-0.16	3.36	$ 106,038	0.00	$ -	$ 106,038.42	3.37	$ 106,347	0.27	$ 4,213	$ 110,559.51
69	1369.6515	1369.901489	Residential	7681.519775	$ 5,576,783	$ 2,788,392	1369.671997	-0.23	1369.670044	-0.23	1369.675293	-0.23	1369.675293	-0.23	3.082032	$ 171,878	0	$ -	$ 171,878.25	3.095216	$ 172,613	4.28100582	$ 119,371	$ 291,984.70
70	1352.7987	1353.048706	Residential	4176.407654	$ 3,032,072	$ 1,516,036	1352.82373	-0.22	1352.823853	-0.22	1352.83374	-0.21	1352.83374	-0.21	3.100096	$ 93,997	0	$ -	$ 93,997.14	3.140136	$ 95,211	0	$ -	$ 95,211.18
71	1354.4823	1354.7323	Residential	5939.919373	$ 4,312,381	$ 2,156,191	1354.613403	-0.12	1354.609985	-0.12	1355.001953	0.27	1354.824707	0.09	3.52	$ 151,986	0.00	$ -	$ 151,986.09	6.77	$ 292,044	0.00	$ -	$ 292,043.53
72	1358.7681	1359.018066	Residential	5464.610229	$ 3,967,307	$ 1,983,654	1358.818237	-0.20	1358.819946	-0.20	1358.820557	-0.20	1358.820557	-0.20	3.200684	$ 126,981	0	$ -	$ 126,980.96	3.209964	$ 127,349	0	$ -	$ 127,349.13
73	1370.2661	1370.516113	Residential	7295.893555	$ 5,296,819	$ 2,648,409	1370.522339	0.01	1370.521484	0.01	1370.69751	0.18	1370.449707	-0.07	4.19	$ 221,766	0.26	$ 6,925	$ 228,691.53	3.73	$ 197,803	0.00	$ -	$ 197,803.13
74	1380.3362	1380.586182	Residential	4872.422913	$ 3,537,379	$ 1,768,690	1380.464111	-0.12	1380.467407	-0.12	1380.876343	0.29	1380.724731	0.14	3.511716	$ 124,223	0.00	$ -	$ 124,222.71	8.15647	$ 288,525	0.00	$ -	$ 288,525.26
75	1368.1411	1368.391113	Residential	6527.1745	$ 4,738,729	$ 2,369,364	1368.207275	-0.18	1368.209961	-0.18	1368.209473	-0.18	1368.209351	-0.18	3.26	$ 154,703	0.00	$ -	$ 154,702.81	3.27	$ 155,096	16.67	$ 394,919	$ 550,015.43
76	1370.8282	1371.078247	Residential	7341.92395	$ 5,330,237	$ 2,665,118	1370.901245	-0.18	1370.900024	-0.18	1370.904663	-0.17	1370.904663	-0.17	3.291992	$ 175,471	0	$ -	$ 175,470.97	3.305664	$ 176,200	0	$ -	$ 176,199.72
77	1351.1089	1351.358887	Residential	7682.645386	$ 5,577,601	$ 2,788,800	1351.214355	-0.14	1351.209961	-0.15	1351.216187	-0.14	1351.216064	-0.14	3.421872	$ 190,858	0	$ -	$ 190,858.35	3.428708	$ 191,240	0	$ -	$ 191,239.64
78	1352.9404	1353.19043	Residential	359.594421	$ 261,066	$ 130,533	1353.207153	0.02	1353.199951	0.01	1353.580688	0.39	1353.317749	0.13	4.50169	$ 11,752	0.702366	$ 917	$ 12,669.18	7.81957	$ 20,414	6.88549806	$ 8,988	$ 29,402.04
79	1375.2893	1375.539307	Residential	5622.966309	$ 4,082,274	$ 2,041,137	1375.408813	-0.13	1375.410034	-0.13	1375.411865	-0.13	1375.411987	-0.13	3.478024	$ 141,982	0	$ -	$ 141,982.45	3.49072	$ 142,501	0	$ -	$ 142,500.74
80	1361.5787	1361.828735	Residential	4104.051453	$ 2,979,541	$ 1,489,771	1361.64856	-0.18	1361.650024	-0.18	1361.924194	0.10	1361.777954	-0.05	3.28	$ 97,708	0.00	$ -	$ 97,708.10	3.80	$ 113,129	0.00	$ -	$ 113,129.49
81	1372.7191	1372.969116	Residential	5524.363342	$ 4,010,688	$ 2,005,344	1372.777466	-0.19	1372.780029	-0.19	1372.78186	-0.19	1372.78186	-0.19	3.2334	$ 129,682	0	$ -	$ 129,681.58	3.250976	$ 130,386	0	$ -	$ 130,386.50
82	1378.332	1378.582031	Residential	328.372437	$ 238,398	$ 119,199	1378.797852	0.22	1378.800049	0.22	1379.000732	0.42	1379.000732	0.42	10.47	$ 24,971	9.06	$ 10,805	$ 35,776.14	16.56	$ 39,481	5.30	$ 6,319	$ 45,800.30
83	1374.9072	1375.157227	Residential	5100.398376	$ 3,702,889	$ 1,851,445	1375.089478	-0.07	1375.087524	-0.07	1375.173706	0.02	1375.173706	0.02	3.729004	$ 138,081	0	$ -	$ 138,080.89	4.49437	$ 166,422	0	$ -	$ 166,421.54
84	1362.9548	1363.204834	Residential	8479.753967	$ 6,156,301	$ 3,078,151	1363.019775	-0.19	1363.02002	-0.18	1363.022827	-0.18	1363.022827	-0.18	3.26	$ 200,681	0.00	$ -	$ 200,680.90	3.27	$ 201,432	0.00	$ -	$ 201,432.46
85	1366.3226	1366.572632	Residential	2076.678772	$ 1,507,669	$ 753,834	1366.432617	-0.14	1366.435669	-0.14	1366.70752	0.13	1366.435059	-0.14	3.43994	$ 51,863	0	$ -	$ 51,862.90	3.449708	$ 52,010	0	$ -	$ 52,010.17
86	1352.7321	1352.982056	Residential	5563.624268	$ 4,039,191	$ 2,019,596	1352.796631	-0.19	1352.800049	-0.18	1352.940308	-0.04	1352.799561	-0.18	3.2583	$ 131,609	0	$ -	$ 131,608.97	3.27002	$ 132,082	0	$ -	$ 132,082.36

10-Year and 100-Year Existing Building Damages in Area K

																Existing								
Building ID	HAG	Finished Floor Elevation (ft)	Land Use Type	Building Area (sf)	Replace Cost $ ($726/SF-Res)	Content Replacement Value ($) 1/2 of Replacement Cost	10yr Exist WSEL (ft)	10yr Exist Flow Depth (ft)	10yr Prop WSEL (ft)	10yr Prop Flow Depth (ft)	100yr Exist WSEL (ft)	100yr Exist Flow Depth (ft)	100yr Prop WSEL (ft)	100yr Prop Flow Depth (ft)	10yr Building Damage (%)	10yrBuilding Damage Cost ($)	10yr Content Damage (%)	10yr Content Damage Cost ($)	10yr Total Damage Cost ($)	100yr Building Damage (%)	100yrBuilding Damage Cost ($)	100yr Content Damage (%)	100yr Content Damage Cost ($)	100yr Total Damage Cost ($)
98	1364.3967	1364.646729	Residential	1845.062622	$ 1,339,515	$ 669,758	1364.488159	-0.16	1364.48999	-0.16	1364.490356	-0.16	1364.490356	-0.16	3.36572	$ 45,084	0	$ -	$ 45,084.34	3.374508	$ 45,202	4.1015625	$ 27,471	$ 72,672.59
99	1366.3516	1366.601563	Residential	4056.541199	$ 2,945,049	$ 1,472,524	1366.543823	-0.06	1366.536987	-0.06	1366.554199	-0.05	1366.554199	-0.05	3.77	$ 111,000	0.00	$ -	$ 111,000.07	3.81	$ 112,222	0.00	$ -	$ 112,222.38
100	1358.9648	1359.214844	Residential	5029.624146	$ 3,651,507	$ 1,825,754	1359.262451	0.05	1359.267212	0.05	1359.26416	0.05	1359.26416	0.05	5.43	$ 198,211	2.00	$ 36,506	$ 234,717.31	5.48	$ 200,084	20.04	$ 365,904	$ 565,987.62
101	1374.8926	1375.142578	Residential	9085.493774	$ 6,596,068	$ 3,298,034	1375.06897	-0.07	1375.073853	-0.07	1375.071899	-0.07	1375.071777	-0.07	3.705568	$ 244,422	0	$ -	$ 244,421.80	3.716796	$ 245,162	0	$ -	$ 245,162.41
102	1371.8109	1372.060913	Residential	4668.850098	$ 3,389,585	$ 1,694,793	1371.834229	-0.23	1371.838379	-0.22	1371.838257	-0.22	1371.838257	-0.22	3.093264	$ 104,849	0	$ -	$ 104,848.82	3.109376	$ 105,395	0	$ -	$ 105,394.95
103	1374.249	1374.499023	Residential	6966.036255	$ 5,057,342	$ 2,528,671	1374.279785	-0.22	1374.280029	-0.22	1374.282715	-0.22	1374.282715	-0.22	3.123048	$ 157,943	0	$ -	$ 157,943.23	3.134768	$ 158,536	0.68701164	$ 17,372	$ 175,908.21
104	1353.7365	1353.98645	Residential	6619.511108	$ 4,805,765	$ 2,402,883	1353.776123	-0.21	1353.780029	-0.21	1353.778442	-0.21	1353.778442	-0.21	3.16	$ 151,799	0.00	$ -	$ 151,799.32	3.17	$ 152,245	0.95	$ 22,914	$ 175,159.31
105	1363.4548	1363.704834	Residential	8842.429199	$ 6,419,604	$ 3,209,802	1364.171265	0.47	1364.170044	0.47	1364.463501	0.76	1364.036011	0.33	17.99293	$ 1,155,075	19.590102	$ 628,803	$ 1,783,878.23	13.93531	$ 894,592	0	$ -	$ 894,591.66
106	1363.5942	1363.844238	Residential	1209.473938	$ 878,078	$ 439,039	1363.675049	-0.17	1363.670044	-0.17	1363.677856	-0.17	1363.677856	-0.17	3.323244	$ 29,181	0.00	$ -	$ 29,180.68	3.334472	$ 29,279	0.00	$ -	$ 29,279.27
107	1364.436	1364.686035	Residential	4979.980835	$ 3,615,466	$ 1,807,733	1364.669312	-0.02	1364.665771	-0.02	1364.670898	-0.02	1364.670898	-0.02	3.93	$ 142,200	0.00	$ -	$ 142,200.19	3.94	$ 142,430	5.54	$ 100,096	$ 242,525.71
108	1352.4829	1352.73291	Residential	5092.605652	$ 3,697,232	$ 1,848,616	1352.545166	-0.19	1352.550049	-0.18	1352.547241	-0.19	1352.547241	-0.19	3.249024	$ 120,124	0.00	$ -	$ 120,123.95	3.257324	$ 120,431	0.00	$ -	$ 120,430.82
109	1349.7738	1350.023804	Residential	10592.73084	$ 7,690,323	$ 3,845,161	1349.815918	-0.21	1349.819946	-0.20	1349.818359	-0.21	1349.818359	-0.21	3.168456	$ 243,664	0	$ -	$ 243,664.49	3.17822	$ 244,415	0	$ -	$ 244,415.37
110	1356.3748	1356.624756	Residential	7430.694946	$ 5,394,685	$ 2,697,342	1356.497437	-0.13	1356.5	-0.12	1356.499512	-0.13	1356.499512	-0.13	3.49	$ 188,314	0.00	$ -	$ 188,313.55	3.50	$ 188,761	17.98	$ 484,988	$ 673,749.51
111	1349.6604	1349.9104	Residential	12568.94641	$ 9,125,055	$ 4,562,528	1349.750366	-0.16	1349.747437	-0.16	1349.757935	-0.15	1349.752686	-0.16	3.36	$ 306,589	0.00	$ -	$ 306,589.44	3.37	$ 307,436	1.35	$ 61,521	$ 368,956.85
112	1369.8452	1370.095215	Residential	474.788452	$ 344,696	$ 172,348	1369.938599	-0.16	1369.93689	-0.16	1369.944946	-0.15	1369.944946	-0.15	3.373536	$ 11,628	0	$ -	$ 11,628.46	3.398924	$ 11,716	0	$ -	$ 11,715.97
113	1380.3524	1380.602417	Residential	6280.325745	$ 4,559,516	$ 2,279,758	1380.448242	-0.15	1380.449951	-0.15	1380.450562	-0.15	1380.450562	-0.15	3.3833	$ 154,262	0	$ -	$ 154,262.12	3.39258	$ 154,685	0	$ -	$ 154,685.24
114	1377.1196	1377.369629	Residential	5297.63031	$ 3,846,080	$ 1,923,040	1377.239258	-0.13	1377.23999	-0.13	1377.242188	-0.13	1377.242188	-0.13	3.478516	$ 133,786	0	$ -	$ 133,786.49	3.490236	$ 134,237	0	$ -	$ 134,237.25
115	1366.8071	1367.057129	Residential	7888.129822	$ 5,726,782	$ 2,863,391	1366.859985	-0.20	1366.859985	-0.20	1366.862915	-0.19	1366.862915	-0.19	3.711424	$ 183,911	0	$ -	$ 183,911.26	3.723144	$ 184,582	0	$ -	$ 184,582.44
116	1360.8243	1361.074341	Residential	7805.948669	$ 5,667,119	$ 2,833,559	1360.955811	-0.12	1360.959961	-0.11	1361.056763	-0.02	1360.95874	-0.12	3.52588	$ 199,816	0	$ -	$ 199,815.81	3.537596	$ 200,480	0	$ -	$ 200,479.77
117	1364.4938	1364.743774	Residential	5855.000854	$ 4,250,731	$ 2,125,365	1364.699463	-0.04	1364.699951	-0.04	1364.702148	-0.04	1364.702148	-0.04	3.822756	$ 162,495	0	$ -	$ 162,495.06	3.833496	$ 162,952	0	$ -	$ 162,951.59
118	1360.4812	1360.731201	Residential	219.949097	$ 159,683	$ 79,842	1360.793945	0.06	1360.790039	0.06	1360.794067	0.06	1360.794189	0.06	5.88232	$ 9,393	2.635248	$ 2,104	$ 11,497.09	5.88964	$ 9,405	0	$ -	$ 9,404.76
119	1351.2076	1351.457642	Residential	5547.851379	$ 4,027,740	$ 2,013,870	1351.428955	-0.03	1351.425171	-0.03	1351.431519	-0.03	1351.431396	-0.03	3.89	$ 156,488	0.00	$ -	$ 156,487.85	3.90	$ 156,881	0.00	$ -	$ 156,881.12
120	1374.8663	1375.116333	Residential	6444.857483	$ 4,678,967	$ 2,339,483	1374.929321	-0.19	1374.930054	-0.19	1374.932129	-0.18	1374.932251	-0.18	3.25	$ 152,158	0.00	$ -	$ 152,157.75	3.26	$ 152,706	7.65	$ 178,957	$ 331,662.88
121	1363.498	1363.748047	Residential	212.195068	$ 154,054	$ 77,027	1363.517334	-0.23	1363.517944	-0.23	1363.666992	-0.08	1363.631226	-0.12	3.077148	$ 4,740	0	$ -	$ 4,740.46	3.532716	$ 5,442	0	$ -	$ 5,442.28
122	1368.4139	1368.66394	Residential	6069.277893	$ 4,406,296	$ 2,203,148	1368.446289	-0.22	1368.445923	-0.22	1368.67981	0.02	1368.450195	-0.21	3.13	$ 137,890	0.00	$ -	$ 137,890.44	3.15	$ 138,579	0.00	$ -	$ 138,578.88
123	1381.0881	1381.338135	Residential	6044.557678	$ 4,388,349	$ 2,194,174	1381.179443	-0.16	1381.180054	-0.16	1381.366333	0.03	1381.182739	-0.16	3.365232	$ 147,678	0	$ -	$ 147,678.12	3.378416	$ 148,257	0	$ -	$ 148,256.68
124	1379.9611	1380.21106	Residential	5559.381653	$ 4,036,111	$ 2,018,056	1380.097168	-0.11	1380.095825	-0.12	1380.099243	-0.11	1380.099243	-0.11	3.54	$ 143,057	0.00	$ -	$ 143,057.21	3.55	$ 143,392	0.00	$ -	$ 143,392.21
125	1361.5222	1361.772217	Residential	5136.399902	$ 3,729,026	$ 1,864,513	1361.562622	-0.21	1361.560059	-0.21	1361.609375	-0.16	1361.608765	-0.16	3.16	$ 117,898	0.00	$ -	$ 117,897.64	3.35	$ 124,780	0.00	$ -	$ 124,780.38
126	1349.9539	1350.203857	Residential	11645.22498	$ 8,454,433	$ 4,227,217	1350.02478	-0.18	1350.02002	-0.18	1350.026855	-0.18	1350.026855	-0.18	3.283692	$ 277,618	0	$ -	$ 277,617.55	3.291992	$ 278,319	0	$ -	$ 278,319.27
127	1357.042	1357.291992	Residential	3812.569763	$ 2,767,926	$ 1,383,963	1357.216553	-0.08	1357.219971	-0.07	1357.218506	-0.07	1357.218506	-0.07	3.70	$ 102,365	0.00	$ -	$ 102,364.64	3.71	$ 102,581	2.73	$ 37,819	$ 140,399.96
128	1363.7706	1364.02063	Residential	246.767029	$ 179,153	$ 89,576	1363.825928	-0.19	1363.829956	-0.19	1363.828491	-0.19	1363.828491	-0.19	3.22	$ 5,771	0.00	$ -	$ 5,770.86	3.23	$ 5,789	19.00	$ 17,015	$ 22,804.59
129	1377.3176	1377.567627	Residential	3762.542786	$ 2,731,606	$ 1,365,803	1377.35437	-0.21	1377.349976	-0.22	1377.857666	0.29	1377.634277	0.07	3.146972	$ 85,963	0	$ -	$ 85,962.88	5.9995	$ 163,883	18.79541034	$ 256,708	$ 420,590.99
130	1362.1476	1362.397583	Residential	5020.589172	$ 3,644,948	$ 1,822,474	1362.411865	0.01	1362.410034	0.01	1362.727783	0.33	1362.316406	-0.08	4.42846	$ 161,415	0.599844	$ 10,932	$ 172,347.05	3.675292	$ 133,962	3.70165992	$ 67,462	$ 201,424.26
131	1376.2094	1376.459351	Residential	5212.982361	$ 3,784,625	$ 1,892,313	1376.260254	-0.20	1376.260864	-0.20	1376.271851	-0.19	1376.271851	-0.19	3.20	$ 121,245	0.00	$ -	$ 121,244.71	3.25	$ 123,000	0.18	$ 3,493	$ 126,492.97
132	1379.1615	1379.411499	Residential	400.356567	$ 290,659	$ 145,329	1379.424072	0.01	1379.421387	0.01	1379.488525	0.08	1379.488281	0.08	4.37719	$ 12,723	0.528066	$ 767	$ 13,490.13	6.30346	$ 18,322	0	$ -	$ 18,321.57
133	1361.2078	1361.457764	Residential	4320.113953	$ 3,136,403	$ 1,568,201	1361.42041	-0.04	1361.420044	-0.04	1361.433716	-0.02	1361.42334	-0.03	3.850584	$ 120,770	0	$ -	$ 120,769.82	3.862304	$ 121,137	0	$ -	$ 121,137.41
134	1362.6445	1362.894531	Residential	3840.690247	$ 2,788,341	$ 1,394,171	1362.80603	-0.09	1362.805054	-0.09	1362.809204	-0.09	1362.809326	-0.09	3.645996	$ 101,663	0	$ -	$ 101,662.81	3.65918	$ 102,030	18.995361	$ 264,828	$ 366,858.15
135	1378.0864	1378.336426	Residential	326.96106	$ 237,374	$ 118,687	1378.312134	-0.02	1378.309937	-0.03	1378.371704	0.04	1378.371704	0.04	3.902832	$ 9,264	0	$ -	$ 9,264.30	5.05834	$ 12,007	0	$ -	$ 12,007.17
136	1364.1649	1364.414917	Residential	4181.148926	$ 3,035,514	$ 1,517,757	1364.769409	0.35	1364.77124	0.36	1364.967041	0.55	1364.687012	0.27	14.63476	$ 444,240	14.888664	$ 225,974	$ 670,213.96	12.16285	$ 369,205	0	$ -	$ 369,205.03
137	1360.8499	1361.099854	Residential	4583.988647	$ 3,327,976	$ 1,663,988	1360.899902	-0.20	1360.900024	-0.20	1361.072632	-0.03	1360.932739	-0.17	3.200192	$ 106,502	0	$ -	$ 106,501.61	3.33154	$ 110,873	0	$ -	$ 110,872.84
138	1368.3804	1368.630371	Residential	8776.445618	$ 6,371,700	$ 3,185,850	1368.661865	0.03	1368.660034	0.03	1368.665161	0.03	1368.665161	0.03	4.94482	$ 315,069	1.322748	$ 42,141	$ 357,209.84	5.0437	$ 321,369	0	$ -	$ 321,369.41
139	1353.156	1353.406006	Residential	323.715698	$ 235,018	$ 117,509	1353.186035	-0.22	1353.189941	-0.22	1353.190063	-0.22	1353.188965	-0.22	3.120116	$ 7,333	0.00	$ -	$ 7,332.82	3.131836	$ 7,360	0.00	$ -	$ 7,360.37
140	1378.5293	1378.779297	Residential	5263.701416	$ 3,821,447	$ 1,910,724	1378.623413	-0.16	1378.624146	-0.16	1378.66626	-0.11	1378.677856	-0.10	3.38	$ 129,030	0.00	$ -	$ 129,029.79	3.59	$ 137,352	9.07	$ 173,295	$ 310,646.44
141	1379.809	1380.05896	Residential	7932.297974	$ 5,758,848	$ 2,879,424	1380.026367	-0.03	1380.030029	-0.03	1380.028198	-0.03	1380.028198	-0.03	3.869628	$ 222,846	0	$ -	$ 222,846.01	3.876952	$ 223,268	0	$ -	$ 223,267.79
142	1371.869	1372.119019	Residential	4879.887024	$ 3,542,798	$ 1,771,399	1372.077759	-0.04	1372.077759	-0.04	1372.083496	-0.04	1372.081787	-0.04	3.83496	$ 135,865	0	$ -	$ 135,864.89	3.851072	$ 136,436	0	$ -	$ 136,435.70
143	1378.5239	1378.773926	Residential	188.311951	$ 136,714	$ 68,357	1378.562744	-0.21	1378.566528	-0.21	1378.578857	-0.20	1378.578735	-0.20	3.155272	$ 4,314	0	$ -	$ 4,313.71	3.219236	$ 4,401	0	$ -	$ 4,401.16
144	1375.1558	1375.405762	Residential	3412.608	$ 2,477,608	$ 1,706,304	1375.356201	-0.05	1375.359985	-0.05	1375.710083	0.30	1375.35791	-0.05	3.80	$ 129,739	0.00	$ -	$ 129,739.03	3.81	$ 129,972	0.00	$ -	$ 129,972.31
145	1364.0173	1364.267334	Residential	263.903442	$ 191,594	$ 95,797	1364.084961	-0.18	1364.079956	-0.19	1364.11499	-0.15	1364.086426	-0.18	3.270508	$ 6,266	0	$ -	$ 6,266.09	3.276368	$ 6,277	0	$ -	$ 6,277.32
146	1361.9521	1362.202148	Residential	5469.552246	$ 3,970,895	$ 1,985,447	1362.174438	-0.03	1362.178223	-0.02	1362.365112	0.16	1362.176025	-0.03	3.89	$ 154,434	0.00	$ -	$ 154,434.46	3.90	$ 154,687	0.00	$ -	$ 154,686.53
147	1361.5681	1361.818115	Residential	5371.711365	$ 3,899,862	$ 1,949,931	1361.999634	0.18	1361.995728	0.18	1362.157593	0.34	1361.909668	0.09	9.44557	$ 368,364	7.623798	$ 148,659	$ 517,023.06	6.74659	$ 263,108	23.625	$ 460,671	$ 723,778.98
148	1376.0001	1376.250122	Residential	4847.492981	$ 3,519,280	$ 1,759,640	1376.239746	-0.01	1376.24292	-0.01	1376.241943	-0.01	1376.241943	-0.01	3.958496	$ 139,311	0	$ -	$ 139,310.55	3.967284	$ 139,620	0	$ -	$ 139,619.83
149	1376.4144	1376.664429	Residential	5930.882202	$ 4,305,820	$ 2,152,910	1376.478149	-0.19	1376.47998	-0.18	1376.766724	0.10	1376.542114	-0.12	3.25	$ 140,149	0.00	$ -	$ 140,149.29	3.51	$ 151,166	0.00	$ -	$ 151,166.16
150	1372.437	1372.687012	Residential	5813.009705	$ 4,220,245	$ 2,110,123	1372.519775	-0.17	1372.52002	-0.17	1372.522461	-0.16	1372.522461	-0.16	3.331052	$ 140,579	0	$ -	$ 140,578.56	3.341796	$ 141,032	8.33129892	$ 175,801	$ 316,832.60
151	1387.2883	1387.53833	Residential	4486.418701	$ 3,257,140	$ 1,628,570	1387.536377	0.00	1387.540039	0.00	1387.53833	0.00	1387.53833	0.00	3.992188	$ 130,031	0	$ -	$ 130,031.15	4	$ 130,286	0	$ -	$ 130,285.60
152	1375.7926	1376.042603	Residential	4326.913086	$ 3,141,339	$ 1,570,669	1375.835449	-0.21	1375.839966	-0.20	1376.119263	0.08	1375.941162	-0.10	3.17	$ 99,624	0.00	$ -	$ 99,623.92	3.59	$ 112,907	0.00	$ -	$ 112,907.13
153	1367.1001	1367.350098	Residential	5923.343201	$ 4,300,347	$ 2,150,174	1367.170654	-0.18	1367.170044	-0.18	1367.174072	-0.18	1367.174072	-0.18	3.282224	$ 141,147	0	$ -	$ 141,147.03	3.295896	$ 141,735	15.82177758	$ 340,196	$ 481,930.65
154	1378.0719	1378.321899	Residential	5311.497314	$ 3,856,147	$ 1,928,074	1378.216553	-0.11	1378.219971	-0.10	1378.218384	-0.10	1378.218384	-0.10	3.578616	$ 137,997	0	$ -	$ 137,996.70	3.58594	$ 138,279	0	$ -	$ 138,279.12
155	1380.4923	1380.74231	Residential	2746.666016	$ 1,994,080	$ 997,040	1380.633667	-0.11	1380.62915	-0.11	1380.637695	-0.10	1380.638184	-0.10	3.57	$ 71,097	0.00	$ -	$ 71,097.47	3.58	$ 71,458	0.00	$ -	$ 71,457.76
156	1373.4617	1373.71167	Residential	6659.882751	$ 4,835,075	$ 2,417,537	1373.625244	-0.09	1373.630005	-0.08	1373.626709	-0.08	1373.626709	-0.08	3.65	$ 176,688	0.00	$ -	$ 176,687.95	3.66	$ 176,971	0.00	$ -	$ 176,971.28
157	1376.4575	1376.70752	Residential	4604.081482	$ 3,342,563	$ 1,671,282	1376.469116	-0.24	1376.470581	-0.24	1376.488281	-0.22	1376.477417	-0.23	3.046384	$ 101,827	0	$ -	$ 101,827.31	3.079588	$ 102,937	0.6818847	$ 11,396	$ 114,333.39
158	1374.9485	1375.198486	Residential	5014.781799	$ 3,640,732	$ 1,820,366	1374.963501	-0.23	1374.963257	-0.24	1374.966919	-0.23	1374.966919	-0.23	3.06006	$ 111,409	0	$ -	$ 111,408.57	3.073732	$ 111,906	0	$ -	$ 111,906.33
159	1368.0206	1368.27063	Residential	8032.684509	$ 5,831,729	$ 2,915,864	1368.052124	-0.22	1368.050049	-0.22	1368.055664	-0.21	1368.055664	-0.21	3.13	$ 182,298	0.00	$ -	$ 182,298.45	3.14	$ 183,124	0.00	$ -	$ 183,124.22
160	1364.0402	1364.290161	Residential	7812.84906	$ 5,672,128	$ 2,836,064	1364.276733	-0.01	1364.280029	-0.01	1364.278564	-0.01	1364.278564	-0.01	3.946288	$ 223,839	0	$ -	$ 223,838.52	3.954104	$ 224,282	5.8037112	$ 164,597	$ 388,878.83
161	1379.0062	1379.256226	Residential	4673.951538	$ 3,393,289	$ 1,696,644	1379.0354	-0.22	1379.033325	-0.22	1379.041504	-0.21	1379.041504	-0.21	3.116696	$ 105,758	0	$ -	$ 105,758.50	3.141112	$ 106,587	0	$ -	$ 106,587.00
162	1351.6937	1351.943726	Residential	7145.512817	$ 5,187,642	$ 2,593,821	1351.736572	-0.21	1351.73999	-0.20	1351.739258	-0.20	1351.739258	-0.20	3.171384	$ 164,520	0	$ -	$ 164,520.06	3.182128	$ 165,077	0	$ -	$ 165,077.42
163	1356.0435	1356.293457	Residential	8016.633606	$ 5,820,076	$ 2,910,038	1356.115234	-0.18	1356.119995	-0.17	1356.119141	-0.17	1356.119141	-0.17	3.29	$ 191,312	0.00	$ -	$ 191,312.18	3.30	$ 192,222	0.00	$ -	$ 192,221.75
164	1353.3625	1353.612549	Residential	5229.221985	$ 3,796,415	$ 1,898,208	1353.494629	-0.12	1353.48999	-0.12	1353.49646	-0.12	1353.496948	-0.12	3.52832	$ 133,950	0	$ -	$ 133,949.68	3.535644	$ 134,228	0	$ -	$ 134,227.72
165	1383.4026	1383.652588	Residential	5383.90863	$ 3,908,718	$ 1,954,359	1383.43689	-0.22	1383.439697	-0.21	1383.464355	-0.19	1383.744873	0.09	3.137208	$ 122,625	0	$ -	$ 122,624.60	6.76855	$ 264,564	24.9118653	$ 486,867	$ 751,430.75
166	1372.4465	1372.696533	Residential	5019.003479	$ 3,643,797	$ 1,821,898	1372.785156	0.09	1372.790039	0.09	1372.791992	0.10	1372.786621	0.09	6.65869	$ 242,629	3.722166	$ 67,814	$ 310,443.19	6.70264	$ 244,231	0	$ -	$ 244,230.56
167	1362.7709	1363.020874	Residential	89.848938	$ 65,230	$ 32,615	1362.811768	-0.21	1362.813477	-0.21	1362.815186	-0.21	1362.815186	-0.21	3.163576	$ 2,064	0	$ -	$ 2,063.61	3.177248	$ 2,073	8.65429698	$ 2,823	$ 4,895.14
168	1365.083	1365.333008	Residential	7013.951599	$ 5,091,129	$ 2,546,064	1365.13855	-0.19	1365.140015	-0.19	1365.140991	-0.19	1365.140991	-0.19	3.22	$ 164,077	0.00	$ -	$ 164,076.95	3.23	$ 164,574	0.00	$ -	$ 164,574.14
169	1362.7377	1362.987671	Residential	5120.312622	$ 3,717,347	$ 1,858,673	1362.824219	-0.16	1362.821777	-0.17	1362.997803	0.01	1362.758911	-0.23	3.346192	$ 124,390	0	$ -	$ 124,389.57	3.08496	$ 114,679	0	$ -	$ 114,678.67
170	1360.1978	1360.447754	Residential	793.997314	$ 576,442	$ 288,221	1360.297607	-0.15	1360.296753	-0.15	1360.363892	-0.08	1360.36377	-0.08	3.399412	$ 19,596	0	$ -	$ 19,595.64	3.664064	$ 21,121	0	$ -	$ 21,121.21
171	1376.9437	1377.193726	Residential	6148.210022	$ 4,463,600	$ 2,231,800	1377.074829	-0.12	1377.073853	-0.12	1377.077393	-0.12	1377.077393	-0.12	3.524412	$ 157,316	0	$ -	$ 157,315.67	3.534668	$ 157,773	0	$ -	$ 157,773.46
172	1382.8645	1383.114502	Residential	417.621704	$ 303,193	$ 151,597	1383.075317	-0.04	1383.074097	-0.04	1383.662109	0.55	1383.49707	0.38	3.84326	$ 11,653	0	$ -	$ 11,652.51	15.47704	$ 46,925	0	$ -	$ 46,925.36
173	1382.9543	1383.204346	Residential	7021.7854	$ 5,097,816	$ 2,548,908	1383.303101	0.10	1383.30249	0.10	1383.720337	0.52	1384.014648	0.81	6.96	$ 354,943	4.15	$ 105,721	$ 460,664.42	28.31	$ 1,443,144	0.00	$ -	$ 1,443,143.85
174	1360.3568	1360.606812	Residential	987.539978	$ 716,954	$ 358,477	1360.389648	-0.22	1360.390015	-0.22	1360.392334	-0.21	1360.392334	-0.21	3.131344	$ 22,450	0	$ -	$ 22,450.30	3.142088	$ 22,527	0	$ -	$ 22,527.33
175	1371.0583	1371.30835	Residential	4343.393616	$ 3,153,304	$ 1,576,652	1371.106812	-0.20	1371.103516	-0.20	1371.108887	-0.20	1371.108887	-0.20	3.193848	$ 100,712	0	$ -	$ 100,711.73	3.202148	$ 100,973	0	$ -	$ 100,973.45
176	1363.4857	1363.735718	Residential	1258.273743	$ 913,507	$ 456,753	1363.566162	-0.17	1363.56543	-0.17	1363.714722	-0.02	1363.61731	-0.12	3.321776	$ 30,345	0	$ -	$ 30,344.65	3.526368	$ 32,214	0	$ -	$ 32,213.61
177	1382.4683	1382.718262	Residential	5926.931763	$ 4,302,952	$ 2,151,476	1382.520874	-0.20	1382.522339	-0.20	1383.109375	0.39	1382.892212	0.17	3.210448	$ 138,144	0	$ -	$ 138,144.05	9.2185	$ 396,668	0	$ -	$ 396,667.67
178	1367.0305	1367.280518	Residential	7461.676697	$ 5,417,177	$ 2,708,589	1367.084473	-0.20	1367.079956	-0.20	1367.086426	-0.19	1367.086304	-0.19	3.21582	$ 174,207	0	$ -	$ 174,206.67	3.223144	$ 174,603	0	$ -	$ 174,603.42
179	1366.8289	1367.078857	Residential	8772.664185	$ 6,368,954	$ 3,184,477	1367.044067	-0.03	1367.04834	-0.03	1367.045654	-0.03	1367.045654	-0.03	3.860384	$ 245,895	0	$ -	$ 245,895.13	3.867188	$ 246,299	0	$ -	$ 246,299.43
180	1364.3354	1364.585449	Residential	1242.911804	$ 902,354	$ 451,177	1364.427124	-0.16	1364.428833	-0.16	1364.576904	-0.01	1364.416138	-0.17	3.3667	$ 30,380	0	$ -	$ 30,379.55	3.322756	$ 29,983	0	$ -	$ 29,983.02
181	1385.5297	1385.779663	Residential	4264.038574	$ 3,095,692	$ 1,547,846	1385.641846	-0.14	1385.642456	-0.14	1385.643799	-0.14	1385.643799	-0.14	3.448732	$ 106,762	0	$ -	$ 106,762.12	3.456544	$ 107,004	0	$ -	$ 107,003.96
182	1374.311	1374.561035	Residential	5276.539246	$ 3,830,767	$ 1,915,384	1374.384644	-0.18	1374.380005	-0.18	1374.387817	-0.17	1374.387817	-0.17	3.294436	$ 126,202	0	$ -	$ 126,202.18	3.307128	$ 126,688	0	$ -	$ 126,688.38
183	1358.566	1358.81604	Residential	7594.135925	$ 5,513,343	$ 2,756,671	1358.577881	-0.24	1358.579956	-0.24	1358.580444	-0.24	1358.580444	-0.24	3.05	$ 168,012	0.00	$ -	$ 168,011.62	3.06	$ 168,577	0.00	$ -	$ 168,576.85
184	1380.236	1380.485962	Residential	4827.576904	$ 3,504,821	$ 1,752,410	1380.30188	-0.18	1380.304321	-0.18	1380.490601	0.00	1380.304321	-0.18	3.263672	$ 114,386	0	$ -	$ 114,385.86	3.273436	$ 114,728	0	$ -	$

10-Year and 100-Year Existing Building Damages in Area K

																Existing							
Building ID	HAG	Finished Floor Elevation (ft)	Land Use Type	Building Area (sf)	Replace Cost $ ($726/SF-Res)	Content Replacement Value ($) 1/2 of Replacement Cost	10yr Exist WSEL (ft)	10yr Exist Flow Depth (ft)	10yr Prop WSEL (ft)	10yr Prop Flow Depth (ft)	100yr Exist WSEL (ft)	100yr Exist Flow Depth (ft)	100yr Prop WSEL (ft)	100yr Prop Flow Depth (ft)	10yr Building Damage (%)	10yrBuilding Damage Cost ($)	10yr Content Damage (%)	10yr Content Damage Cost ($)	10yr Total Damage Cost ($)	100yr Building Damage (%)	100yrBuilding Damage Cost ($)	100yr Content Damage (%)	100yr Content Damage Cost ($)	100yr Total Damage Cost ($)
195	1371.9503	1372.200317	Residential	5811.423157	$ 4,219,093	$ 2,109,547	1372.028442	-0.17	1372.030029	-0.17	1372.031372	-0.17	1372.031372	-0.17	3.3125	$ 139,757	0	$ -	$ 139,757.46	3.32422	$ 140,252	5.18334978	$ 109,345	$ 249,597.12
196	1375.9243	1376.174316	Residential	3570.859131	$ 2,592,444	$ 1,296,222	1375.952637	-0.22	1375.952393	-0.22	1375.955322	-0.22	1375.955444	-0.22	3.113284	$ 80,710	0	$ -	$ 80,710.14	3.124512	$ 81,001	0	$ -	$ 81,001.22
197	1382.3914	1382.641357	Residential	4534.560791	$ 3,292,091	$ 1,646,046	1382.78833	0.15	1382.78894	0.15	1382.793213	0.15	1382.793091	0.15	8.41	$ 276,838	6.17	$ 101,608	$ 378,446.39	8.55	$ 281,540	0.00	$ -	$ 281,540.29
198	1372.3955	1372.645508	Residential	3843.095703	$ 2,790,087	$ 1,395,044	1372.505371	-0.14	1372.508545	-0.14	1372.546753	-0.10	1372.546753	-0.10	3.439452	$ 95,964	0	$ -	$ 95,963.72	3.60498	$ 100,582	0	$ -	$ 100,582.10
199	1378.7993	1379.049316	Residential	5130.287109	$ 3,724,588	$ 1,862,294	1379.104492	0.06	1379.099976	0.05	1379.106445	0.06	1379.106323	0.06	5.66	$ 210,636	2.32	$ 43,157	$ 253,792.56	5.71	$ 212,682	0.00	$ -	$ 212,681.82
200	1369.2933	1369.543335	Residential	4194.780518	$ 3,045,411	$ 1,522,705	1369.405518	-0.14	1369.407227	-0.14	1369.692261	0.15	1369.369751	-0.17	3.448732	$ 105,028	0	$ -	$ 105,028.05	3.305664	$ 100,671	0	$ -	$ 100,671.04
201	1384.4399	1384.689941	Residential	4500.588989	$ 3,267,428	$ 1,633,714	1385.165039	0.48	1385.160034	0.47	1385.166504	0.48	1385.166626	0.48	18.25294	$ 596,402	19.954116	$ 325,993	$ 922,394.75	18.30055	$ 597,957	0	$ -	$ 597,957.22
202	1386.7983	1387.04834	Residential	4524.202332	$ 3,284,571	$ 1,642,285	1387.091187	0.04	1387.081299	0.03	1387.682007	0.63	1386.833618	-0.21	5.28541	$ 173,603	1.799574	$ 29,554	$ 203,157.18	3.141112	$ 103,172	0	$ -	$ 103,172.05
203	1372.1863	1372.436279	Residential	4600.928711	$ 3,340,274	$ 1,670,137	1372.266113	-0.17	1372.266479	-0.17	1372.269165	-0.17	1372.269287	-0.17	3.319336	$ 110,875	0	$ -	$ 110,874.93	3.332032	$ 111,299	0	$ -	$ 111,299.01
204	1351.7186	1351.968628	Residential	927.027771	$ 673,022	$ 336,511	1351.785278	-0.18	1351.790039	-0.18	1351.787354	-0.18	1351.787476	-0.18	3.2666	$ 21,985	0	$ -	$ 21,984.94	3.275392	$ 22,044	0	$ -	$ 22,044.11
205	1373.9084	1374.158447	Residential	6269.81665	$ 4,551,887	$ 2,275,943	1374.034424	-0.12	1374.030029	-0.13	1374.037842	-0.12	1374.037842	-0.12	3.503908	$ 159,494	0	$ -	$ 159,493.93	3.51758	$ 160,116	0	$ -	$ 160,116.26
206	1365.4144	1365.664429	Residential	6051.600159	$ 4,393,462	$ 2,196,731	1365.444336	-0.22	1365.444214	-0.22	1365.870117	0.21	1365.701416	0.04	3.119628	$ 137,060	0	$ -	$ 137,059.66	5.10961	$ 224,489	0	$ -	$ 224,488.76
207	1353.8657	1354.115723	Residential	755.925842	$ 548,802	$ 274,401	1353.93396	-0.18	1353.930054	-0.19	1353.936157	-0.18	1353.936157	-0.18	3.27	$ 17,962	0.00	$ -	$ 17,962.01	3.28	$ 18,010	0.00	$ -	$ 18,010.24
208	1369.4949	1369.694946	Residential	7994.761414	$ 5,804,197	$ 2,902,098	1369.686035	-0.01	1369.689941	-0.01	1369.687744	-0.01	1369.687744	-0.01	3.96	$ 230,099	0.00	$ -	$ 230,099.02	3.97	$ 230,496	19.49	$ 565,697	$ 796,192.43
209	1356.6626	1356.912598	Residential	6371.821533	$ 4,625,942	$ 2,312,971	1356.790527	-0.12	1356.794678	-0.12	1357.093018	0.18	1356.822266	-0.09	3.511716	$ 162,450	0	$ -	$ 162,449.96	3.638672	$ 168,323	0	$ -	$ 168,322.87
210	1378.3789	1378.628906	Residential	1189.775024	$ 863,777	$ 431,888	1378.425903	-0.20	1378.430054	-0.20	1378.454956	-0.17	1378.473999	-0.15	3.19	$ 27,537	0.00	$ -	$ 27,537.10	3.38	$ 29,199	0.00	$ -	$ 29,198.86
211	1372.8145	1373.064453	Residential	7189.552734	$ 5,219,615	$ 2,609,808	1372.927002	-0.14	1372.930054	-0.13	1372.929077	-0.14	1372.929199	-0.14	3.450196	$ 180,087	0	$ -	$ 180,086.96	3.458984	$ 180,546	0	$ -	$ 180,545.66
212	1384.6993	1384.949341	Residential	4849.682129	$ 3,520,869	$ 1,760,435	1384.800659	-0.15	1384.798706	-0.15	1384.845337	-0.10	1384.848267	-0.10	3.41	$ 119,895	0.00	$ -	$ 119,895.17	3.60	$ 126,600	16.95	$ 298,389	$ 424,988.54
213	1374.1124	1374.362427	Residential	5543.06311	$ 4,024,264	$ 2,012,132	1374.303589	-0.06	1374.300049	-0.06	1375.235962	0.87	1374.947021	0.58	3.76	$ 151,499	0.00	$ -	$ 151,499.37	21.54	$ 866,739	7.57	$ 152,266	$ 1,019,004.42
214	1351.9253	1352.175293	Residential	7474.652283	$ 5,426,598	$ 2,713,299	1352.022827	-0.15	1352.020386	-0.15	1352.025024	-0.15	1352.025146	-0.15	3.39	$ 183,969	0.00	$ -	$ 183,969.04	3.40	$ 184,472	0.00	$ -	$ 184,472.41
215	1372.7062	1372.956177	Residential	365.232666	$ 265,159	$ 132,579	1372.750366	-0.21	1372.75	-0.21	1372.754272	-0.20	1372.754272	-0.20	3.176756	$ 8,423	0	$ -	$ 8,423.45	3.19238	$ 8,465	0	$ -	$ 8,464.88
216	1383.9557	1384.205688	Residential	10282.73602	$ 7,465,266	$ 3,732,633	1384.018188	-0.19	1384.02002	-0.19	1384.431885	0.23	1384.276855	0.07	3.25	$ 242,621	0	$ -	$ 242,621.16	6.13501	$ 457,995	0	$ -	$ 457,994.84
217	1379.6527	1379.90271	Residential	5808.621948	$ 4,217,060	$ 2,108,530	1379.669067	-0.23	1379.665283	-0.24	1379.678833	-0.22	1379.678833	-0.22	3.065428	$ 129,271	0	$ -	$ 129,270.92	3.104492	$ 130,918	0	$ -	$ 130,918.28
218	1378.8989	1379.148926	Residential	5431.955078	$ 3,943,599	$ 1,971,800	1378.959473	-0.19	1378.959961	-0.19	1379.071411	-0.08	1379.14856	0.00	3.242188	$ 127,859	0	$ -	$ 127,858.91	3.998536	$ 157,686	15.55517586	$ 306,717	$ 464,403.15
219	1361.0637	1361.313721	Residential	697.469788	$ 506,363	$ 253,182	1361.248169	-0.07	1361.244873	-0.07	1361.327881	0.01	1361.283569	-0.03	3.737792	$ 18,927	0	$ -	$ 18,926.80	3.879392	$ 19,644	0	$ -	$ 19,643.81
220	1363.9265	1364.176514	Residential	5530.390808	$ 4,015,064	$ 2,007,532	1364.312012	0.14	1364.307861	0.13	1364.484375	0.31	1364.317505	0.14	8.06	$ 323,812	5.69	$ 114,247	$ 438,059.43	8.23	$ 330,429	3.97	$ 79,767	$ 410,195.95
221	1365.9146	1366.164551	Residential	7421.591003	$ 5,388,075	$ 2,694,038	1365.946289	-0.22	1365.947144	-0.22	1365.94812	-0.22	1365.94812	-0.22	3.126952	$ 168,483	0	$ -	$ 168,482.52	3.134276	$ 168,877	0	$ -	$ 168,877.14
222	1355.2457	1355.495728	Residential	6237.714416	$ 4,528,581	$ 2,264,290	1355.38916	-0.11	1355.387085	-0.11	1355.394287	-0.10	1355.394287	-0.10	3.573728	$ 161,839	0	$ -	$ 161,839.16	3.594236	$ 162,768	0	$ -	$ 162,767.88
223	1367.9564	1368.206421	Residential	6903.520142	$ 5,011,956	$ 2,505,978	1368.126953	-0.08	1368.130005	-0.08	1368.12915	-0.08	1368.12915	-0.08	3.682128	$ 184,547	0.00	$ -	$ 184,546.62	3.690916	$ 184,987	0.00	$ -	$ 184,987.07
224	1367.7229	1367.9729	Residential	7568.887512	$ 5,495,012	$ 2,747,506	1367.817627	-0.16	1367.819946	-0.15	1367.859985	-0.11	1367.819946	-0.15	3.378908	$ 185,671	0	$ -	$ 185,671.41	3.388184	$ 186,181	0	$ -	$ 186,181.13
225	1372.2632	1372.513184	Residential	6819.513489	$ 4,950,967	$ 2,475,483	1372.534302	0.02	1372.530029	0.02	1372.535645	0.02	1372.535645	0.02	4.63	$ 229,405	0.89	$ 21,956	$ 251,361.48	4.67	$ 231,400	0.00	$ -	$ 231,399.77
226	1382.7257	1382.975708	Residential	414.181458	$ 300,696	$ 150,348	1382.818604	-0.16	1382.819946	-0.16	1382.976807	0.00	1383.06543	0.09	3.371584	$ 10,138	0.00	$ -	$ 10,138.21	6.69166	$ 20,122	0.00	$ -	$ 20,121.54
227	1377.9037	1378.153687	Residential	6325.296997	$ 4,592,166	$ 2,296,083	1377.931274	-0.22	1377.93042	-0.22	1377.95105	-0.20	1377.956909	-0.20	3.11	$ 142,832	0.00	$ -	$ 142,832.33	3.21	$ 147,541	0.00	$ -	$ 147,541.14
228	1369.9781	1370.228149	Residential	7107.003967	$ 5,159,685	$ 2,579,842	1370.020264	-0.21	1370.02002	-0.21	1370.023315	-0.20	1370.023315	-0.20	3.17	$ 163,483	0.00	$ -	$ 163,482.55	3.18	$ 164,112	0.00	$ -	$ 164,112.24
229	1366.7046	1366.95459	Residential	6420.218262	$ 4,661,078	$ 2,330,539	1366.699341	-0.26	1366.699951	-0.25	1366.702881	-0.25	1366.702881	-0.25	2.98	$ 138,854	0.00	$ -	$ 138,853.71	2.99	$ 139,514	0.00	$ -	$ 139,513.72
230	1355.0955	1355.345459	Residential	7691.567017	$ 5,584,078	$ 2,792,039	1355.132324	-0.21	1355.130005	-0.22	1355.30835	-0.04	1355.136841	-0.21	3.14746	$ 175,757	0	$ -	$ 175,756.61	3.165528	$ 176,766	19.65673794	$ 548,824	$ 725,589.30
231	1372.5229	1372.772949	Residential	7904.628235	$ 5,738,760	$ 2,869,380	1372.625	-0.15	1372.622925	-0.15	1372.852051	0.08	1372.627319	-0.15	3.408204	$ 195,589	0	$ -	$ 195,588.65	3.41748	$ 196,121	0	$ -	$ 196,120.98
232	1373.4587	1373.70874	Residential	6641.056396	$ 4,821,407	$ 2,410,703	1373.506714	-0.20	1373.506592	-0.20	1373.51062	-0.20	1373.51062	-0.20	3.19	$ 153,894	0.00	$ -	$ 153,894.30	3.21	$ 154,648	0.00	$ -	$ 154,647.59
233	1368.4092	1368.65918	Residential	650.331116	$ 472,140	$ 236,070	1368.462769	-0.20	1368.466675	-0.19	1368.465942	-0.19	1368.465942	-0.19	3.214356	$ 15,176	0	$ -	$ 15,176.27	3.227048	$ 15,236	0	$ -	$ 15,236.20
234	1360.5137	1360.763672	Residential	6230.277466	$ 4,523,181	$ 2,261,591	1360.886719	0.12	1360.882568	0.12	1361.106689	0.34	1360.874512	0.11	7.69141	$ 347,896	5.167974	$ 116,878	$ 464,774.85	7.3252	$ 331,332	0	$ -	$ 331,332.09
235	1353.9615	1354.211548	Residential	6218.86676	$ 4,514,897	$ 2,257,449	1354.11731	-0.09	1354.119995	-0.09	1354.119385	-0.09	1354.119385	-0.09	3.62	$ 163,577	0.00	$ -	$ 163,576.90	3.63	$ 163,952	0.00	$ -	$ 163,951.63
236	1361.0813	1361.331299	Residential	552.338257	$ 400,998	$ 200,499	1361.399292	0.07	1361.398926	0.07	1361.947754	0.62	1361.722046	0.39	6.03979	$ 24,219	2.855706	$ 5,726	$ 29,945.07	15.72241	$ 63,046	8.90551746	$ 17,855	$ 80,901.94
237	1363.077	1363.327026	Residential	10609.44226	$ 7,702,455	$ 3,851,228	1363.127563	-0.20	1363.130005	-0.20	1363.129761	-0.20	1363.129761	-0.20	3.20	$ 246,644	0.00	$ -	$ 246,644.01	3.21	$ 247,321	0.00	$ -	$ 247,321.21
238	1349.4791	1349.729126	Residential	1499.625549	$ 1,088,728	$ 544,364	1349.505493	-0.22	1349.505371	-0.22	1349.608521	-0.12	1349.554077	-0.18	3.105468	$ 33,810	0	$ -	$ 33,810.10	3.299804	$ 35,926	0	$ -	$ 35,925.89
239	1368.2323	1368.4823	Residential	6792.286804	$ 4,931,200	$ 2,465,600	1368.323364	-0.16	1368.321777	-0.16	1368.325684	-0.16	1368.325684	-0.16	3.36	$ 165,898	0.00	$ -	$ 165,898.20	3.37	$ 166,356	9.72	$ 239,547	$ 405,903.07
240	1366.8684	1367.118408	Residential	6303.598511	$ 4,576,413	$ 2,288,206	1366.92749	-0.19	1366.926025	-0.19	1366.931519	-0.19	1366.931519	-0.19	3.236328	$ 148,108	0	$ -	$ 148,107.72	3.252444	$ 148,845	0	$ -	$ 148,845.25
241	1381.4254	1381.675415	Residential	8258.813843	$ 5,995,899	$ 2,997,949	1381.619629	-0.06	1381.620728	-0.05	1381.691772	0.02	1381.666382	-0.01	3.776856	$ 226,456	0	$ -	$ 226,456.47	3.963868	$ 237,670	0	$ -	$ 237,669.52
242	1374.0637	1374.313721	Residential	1514.909546	$ 1,099,824	$ 549,912	1374.154053	-0.16	1374.150024	-0.16	1374.155151	-0.16	1374.155273	-0.16	3.361328	$ 36,969	0	$ -	$ 36,968.70	3.366208	$ 37,022	0	$ -	$ 37,022.37
243	1361.5778	1361.827759	Residential	5731.376465	$ 4,160,979	$ 2,080,490	1361.610352	-0.22	1361.609985	-0.22	1361.613403	-0.21	1361.613403	-0.21	3.13	$ 130,254	0.00	$ -	$ 130,254.13	3.14	$ 130,762	5.05	$ 105,066	$ 235,827.68
244	1368.0669	1368.316895	Residential	820.711121	$ 595,836	$ 297,918	1368.264038	-0.05	1368.26001	-0.06	1368.454102	0.14	1368.264893	-0.05	3.788572	$ 22,574	0	$ -	$ 22,573.69	3.791992	$ 22,594	0	$ -	$ 22,594.06
245	1377.4694	1377.71936	Residential	9322.061707	$ 6,767,817	$ 3,383,908	1377.481201	-0.24	1377.478882	-0.24	1377.491089	-0.23	1377.491089	-0.23	3.05	$ 206,240	0.00	$ -	$ 206,240.01	3.09	$ 208,917	0.00	$ -	$ 208,916.82
246	1370.7789	1371.028931	Residential	4462.246643	$ 3,239,591	$ 1,619,796	1370.87854	-0.15	1370.880005	-0.15	1370.880981	-0.15	1370.880981	-0.15	3.398436	$ 110,095	0	$ -	$ 110,095.43	3.4082	$ 110,412	0	$ -	$ 110,411.74
247	1383.4347	1383.684692	Residential	5164.128662	$ 3,749,157	$ 1,874,579	1383.55481	-0.13	1383.557129	-0.13	1383.557861	-0.13	1383.557861	-0.13	3.48	$ 130,488	0.00	$ -	$ 130,488.37	3.49	$ 130,946	0.00	$ -	$ 130,945.92
248	1383.4193	1383.669312	Residential	5801.94397	$ 4,212,211	$ 2,106,106	1383.576904	-0.09	1383.579956	-0.09	1383.578613	-0.09	1383.578491	-0.09	3.630368	$ 152,919	0.00	$ -	$ 152,918.77	3.636716	$ 153,186	0.00	$ -	$ 153,186.16
249	1364.1787	1364.428711	Residential	4602.597412	$ 3,341,486	$ 1,670,743	1364.308594	-0.12	1364.310059	-0.12	1364.533447	0.10	1364.389771	-0.04	3.52	$ 117,605	0.00	$ -	$ 117,604.66	3.84	$ 128,455	0.00	$ -	$ 128,454.73
250	1378.4397	1378.689697	Residential	5496.526245	$ 3,990,478	$ 1,995,239	1378.47644	-0.21	1378.47998	-0.21	1378.478271	-0.21	1378.478271	-0.21	3.15	$ 125,579	0.00	$ -	$ 125,579.23	3.15	$ 125,871	6.32	$ 126,130	$ 252,001.18
251	1380.9373	1381.187256	Residential	5218.038513	$ 3,788,296	$ 1,894,148	1380.941772	-0.25	1380.939819	-0.25	1380.987305	-0.20	1381.089478	-0.10	3.02	$ 114,333	0.00	$ -	$ 114,333.20	3.61	$ 136,715	14.10	$ 267,058	$ 403,773.58
252	1384.512	1384.761963	Residential	4131.500061	$ 2,999,469	$ 1,499,735	1384.564697	-0.20	1384.560059	-0.20	1384.589355	-0.17	1384.589355	-0.17	3.210936	$ 96,311	0	$ -	$ 96,311.03	3.309568	$ 99,269	0	$ -	$ 99,269.47
253	1359.9803	1360.230347	Residential	2268.955322	$ 1,647,262	$ 823,631	1360.014893	-0.22	1360.013794	-0.22	1360.255005	0.02	1360.105713	-0.12	3.138184	$ 51,694	0	$ -	$ 51,694.10	3.501464	$ 57,678	3.1171875	$ 25,674	$ 83,352.39
254	1352.5721	1352.822144	Residential	5705.019409	$ 4,141,844	$ 2,070,922	1352.655762	-0.17	1352.660034	-0.16	1352.8479	0.03	1352.69519	-0.13	3.33	$ 138,109	0.00	$ -	$ 138,108.63	3.49	$ 144,641	0.28	$ 5,733	$ 150,374.28
255	1377.2522	1377.502197	Residential	6675.252869	$ 4,846,234	$ 2,423,117	1377.436279	-0.07	1377.435181	-0.07	1377.437622	-0.06	1377.437744	-0.06	3.74	$ 181,071	0.00	$ -	$ 181,071.18	3.74	$ 181,355	0.00	$ -	$ 181,355.17
256	1378.1875	1378.4375	Residential	1162.67511	$ 844,102	$ 422,051	1378.304199	-0.13	1378.302246	-0.14	1378.308716	-0.13	1378.308716	-0.13	3.466796	$ 29,263	0	$ -	$ 29,263.30	3.484864	$ 29,416	0	$ -	$ 29,415.81
257	1351.558	1351.807983	Residential	7151.573364	$ 5,192,042	$ 2,596,021	1351.605347	-0.20	1351.609985	-0.20	1351.660278	-0.15	1351.607544	-0.20	3.189456	$ 165,598	0	$ -	$ 165,597.90	3.198244	$ 166,054	0	$ -	$ 166,054.18
258	1352.8057	1353.055664	Residential	1599.585388	$ 1,161,299	$ 580,649	1352.888916	-0.17	1352.890991	-0.16	1353.143311	0.09	1352.966919	-0.09	3.333008	$ 38,706	0	$ -	$ 38,706.19	3.64502	$ 42,330	0	$ -	$ 42,329.58
259	1359.526	1359.776001	Residential	5013.345703	$ 3,639,689	$ 1,819,844	1359.563477	-0.21	1359.560059	-0.22	1359.815674	0.04	1359.676147	-0.10	3.15	$ 114,647	0.00	$ -	$ 114,646.71	3.60	$ 131,050	0.00	$ -	$ 131,050.06
260	1369.9309	1370.180908	Residential	1631.4505	$ 1,184,433	$ 592,217	1370.001343	-0.18	1370.003662	-0.18	1370.005859	-0.18	1370.005859	-0.18	3.28	$ 38,870	0.00	$ -	$ 38,870.01	3.30	$ 39,084	13.37	$ 79,186	$ 118,269.80
261	1364.5201	1364.770142	Residential	6330.97168	$ 4,596,285	$ 2,298,143	1364.756348	-0.01	1364.76001	-0.01	1364.758057	-0.01	1364.758057	-0.01	3.944824	$ 181,315	0	$ -	$ 181,315.37	3.95166	$ 181,630	0	$ -	$ 181,629.57
262	1379.0126	1379.262573	Residential	11915.48267	$ 8,650,640	$ 4,325,320	1379.315308	0.05	1379.310059	0.05	1379.430786	0.17	1379.430786	0.17	5.58	$ 482,883	2.21	$ 95,800	$ 578,683.29	9.05	$ 782,571	0.00	$ -	$ 782,570.67
263	1380.3851	1380.635132	Residential	839.351196	$ 609,369	$ 304,684	1380.475952	-0.16	1380.473145	-0.16	1380.871704	0.24	1380.726929	0.09	3.36	$ 20,495	0.00	$ -	$ 20,494.78	6.75	$ 41,156	0.00	$ -	$ 41,156.23
264	1350.6312	1350.881226	Residential	11002.85187	$ 7,988,070	$ 3,994,035	1350.748291	-0.13	1350.744751	-0.14	1350.750366	-0.13	1350.750366	-0.13	3.46826	$ 277,047	0	$ -	$ 277,047.05	3.47656	$ 277,710	0	$ -	$ 277,710.06
265	1362.2693	1362.519287	Residential	8576.057251	$ 6,226,218	$ 3,113,109	1362.358276	-0.16	1362.359985	-0.16	1362.360718	-0.16	1362.360718	-0.16	3.355956	$ 208,949	0	$ -	$ 208,949.12	3.365724	$ 209,557	0	$ -	$ 209,557.30
266	1379.4694	1379.71936	Residential	541.316711	$ 392,996	$ 196,498	1379.508667	-0.21	1379.511963	-0.21	1379.52002	-0.20	1379.52002	-0.20	3.157228	$ 12,408	0	$ -	$ 12,407.78	3.20264	$ 12,586	0	$ -	$ 12,586.24
267	1375.348	1375.598022	Residential	5572.635681	$ 4,045,734	$ 2,022,867	1375.486694	-0.11	1375.48999	-0.11	1375.488647	-0.11	1375.488647	-0.11	3.554688	$ 143,813	0	$ -	$ 143,813.20	3.5625	$ 144,129	0	$ -	$ 144,129.26
268	1369.1	1369.349976	Residential	4953.879761	$ 3,596,517	$ 1,798,258	1369.13855	-0.21	1369.140015	-0.21	1369.140991	-0.21	1369.140991	-0.21	3.154296	$ 113,445	0	$ -	$ 113,444.78	3.16406	$ 113,796	1.66113276	$ 29,871	$ 143,667.41
269	1375.8182	1376.068237	Residential	7317.905151	$ 5,312,799	$ 2,656,400	1375.90625	-0.16	1375.910034	-0.16	1375.908203	-0.16	1375.908203	-0.16	3.352052	$ 178,088	0	$ -	$ 178,087.79	3.359864	$ 178,503	0	$ -	$ 178,502.83
270	1372.4429	1372.692871	Residential	5703.677429	$ 4,140,870	$ 2,070,435	1372.499146	-0.19	1372.5	-0.19	1372.842041	0.15	1372.760498	0.07	3.2251	$ 133,547	0	$ -	$ 133,547.19	6.02881	$ 249,645	0	$ -	$ 249,645.17
271	1373.303	1373.552979	Residential	4983.422424	$ 3,617,965	$ 1,808,982	1373.359741	-0.19	1373.359985	-0.19	1373.362549	-0.19	1373.362549	-0.19	3.23	$ 116,753	0.00	$ -	$ 116,753.46	3.24	$ 117,160	0.00	$ -	$ 117,159.83
272	1374.13	1374.380005	Residential	1252.694458	$ 909,456	$ 454,728	1374.165894	-0.21	1374.165894	-0.21	1374.209473	-0.17	1374.31543	-0.06	3.14	$ 28,589	0.00	$ -	$ 28,589.26	3.74	$ 34,029	0.00	$ -	$ 34,029.12
273	1380.0908	1380.34082	Residential	6937.932373	$ 5,036,939	$ 2,518,469	1380.18396	-0.16	1380.179443	-0.16	1380.187744	-0.15	1380.187744	-0.15	3.37256	$ 169,874	0	$ -	$ 169,873.79	3.387696	$ 170,636	0	$ -	$ 170,636.18
274	1367.9772	1368.227173	Residential	913.789795	$ 663,411	$ 331,706	1368.055054	-0.17	1368.054565	-0.17	1368.118164	-0.11	1368.118652	-0.11	3.311574	$ 21,969	0	$ -	$ 21,969.03	3.565916	$ 23,657	4.58349612	$ 15,204	$ 38,860.41
275	1385.3944	1385.644409	Residential	5771.407349	$ 4,190,042	$ 2,095,021	1385.609619	-0.03	1385.606689	-0.04	1385.611938	-0.03	1385.611938	-0.03	3.86084	$ 161,771	0	$ -	$ 161,770.81	3.870116	$ 162,159	0	$ -	$ 162,159.48
276	1387.2709	1387.520874	Residential	5552.046021	$ 4,030,785	$ 2,015,393	1387.311035	-0.21	1387.310547	-0.21	1387.504761	-0.02	1387.318115	-0.20	3.16	$ 127,399	0.00	$ -	$ 127,398.78	3.19	$ 128,540	0.00	$ -	$ 128,540.30
277	1367.6104	1367.860352	Residential	7009.434998	$ 5,088,850	$ 2,544,425	1367.910522	0.05	1367.907593	0.05	1367.91394	0.05	1367.91394	0.05	5.51	$ 280,146	2.11	$ 53,615	$ 333,760.87	5.61	$ 285,364	0.00	$ -	$ 285,364.38
278	1363.4945	1363.744507	Residential	853.24762	$ 619,458	$ 309,729	1363.821899	0.08	1363.81604	0.07	1363.901367	0.16	1363.778931	0.03	6.32176	$ 39,161	3.250464	$ 10,068	$ 49,228.26	5.03272	$ 31,176	0	$ -	$ 31,175.58
279	1350.0875	1350.337524	Residential	10697.2514	$ 7,766,205	$ 3,883,102	1350.165649	-0.17	1350.170044	-0.17	1350.167847	-0.17	1350.167847	-0.17	3.3125	$ 257,256	0.00	$ -	$ 257,255.52	3.321292	$ 257,938	0.00	$ -	$ 257,938.33
280	1376.0103	1376.260254	Residential	5828.388794	$ 4,231,410	$ 2,115,705	1376.113281	-0.15	1376.110474	-0.15	1376.322021	0.06	1376.210327	-0.05	3.412108	$ 144,380	0	$ -	$ 144,380.29	3.800292	$ 160,806	0	$ -	$ 160,805.95
281	1363.2751	1363.525146	Residential	4981.87793	$ 3,616,843	$ 1,808,422	1363.585938	0.06	1363.589966	0.06	1363.587646	0.06	1363.587646	0.06	5.82	$ 210,636	2.55	$ 46,174	$ 256,810.06	5.88	$ 212,490	0.00	$ -	$ 212,489.55
282	1364.8573

10-Year and 100-Year Existing Building Damages in Area K

															Existing								
Building ID	HAG	Finished Floor Elevation (ft)	Land Use Type	Building Area (sf)	Replace Cost $ ($726/SF-Res)	Content Replacement Value ($) 1/2 of Replacement Cost	10yr Exist WSEL (ft)	10yr Exist Flow Depth (ft)	10yr Prop WSEL (ft)	10yr Prop Flow Depth (ft)	100yr Exist WSEL (ft)	100yr Exist Flow Depth (ft)	100yr Prop WSEL (ft)	100yr Prop Flow Depth (ft)	10yr Building Damage (%)	10yrBuilding Damage Cost ($)	10yr Content Damage (%)	10yr Content Damage Cost ($)	10yr Total Damage Cost ($)	100yr Building Damage (%)	100yrBuilding Damage Cost ($)	100yr Content Damage (%)	100yr Content Damage Cost ($)	100yr Total Damage Cost ($)
292	1350.9303	1351.180298	Residential	1578.312317	$ 1,145,855	$ 572,927	1350.985352	-0.19	1350.98999	-0.19	1350.987427	-0.19	1350.987305	-0.19	3.220216	$ 36,899	0	$ -	$ 36,899.00	3.228028	$ 36,989	0.00	$ -	$ 36,988.51
293	1367.7457	1367.995728	Residential	11956.06262	$ 8,680,101	$ 4,340,051	1367.846802	-0.15	1367.847534	-0.15	1368.100586	0.10	1368.070801	0.08	3.404296	$ 295,496	0	$ -	$ 295,496.35	6.25219	$ 542,696	0.00	$ -	$ 542,696.44
294	1352.0001	1352.250122	Residential	344.753784	$ 250,291	$ 125,146	1352.016235	-0.23	1352.016724	-0.23	1352.041626	-0.21	1352.020752	-0.23	3.064452	$ 7,670	0	$ -	$ 7,670.06	3.08252	$ 7,715	0.00	$ -	$ 7,715.28
295	1368.4915	1368.741455	Residential	7669.678345	$ 5,568,186	$ 2,784,093	1368.560059	-0.18	1368.560059	-0.18	1368.562866	-0.18	1368.562988	-0.18	3.274416	$ 182,326	0	$ -	$ 182,325.59	3.286132	$ 182,978	0.00	$ -	$ 182,977.96
296	1366.8972	1367.147217	Residential	9063.669006	$ 6,580,224	$ 3,290,112	1367.174805	0.03	1367.174316	0.03	1367.441162	0.29	1367.081421	-0.07	4.82764	$ 317,670	1.158696	$ 38,122	$ 355,791.91	3.736816	$ 245,891	0.00	$ -	$ 245,890.85
297	1367.4869	1367.736938	Residential	8579.124695	$ 6,228,445	$ 3,114,222	1367.578857	-0.16	1367.579956	-0.16	1367.581543	-0.16	1367.581543	-0.16	3.367676	$ 209,754	0	$ -	$ 209,753.83	3.37842	$ 210,423	0.00	$ -	$ 210,423.02
298	1355.2068	1355.456787	Residential	9155.569641	$ 6,646,944	$ 3,323,472	1355.265381	-0.19	1355.27002	-0.19	1355.2677	-0.19	1355.2677	-0.19	3.234376	$ 214,987	0	$ -	$ 214,987.15	3.243652	$ 215,604	0.00	$ -	$ 215,603.72
299	1364.124	1364.374023	Residential	4618.256714	$ 3,352,854	$ 1,676,427	1364.23877	-0.14	1364.23999	-0.13	1364.339722	-0.03	1364.241455	-0.13	3.458988	$ 115,975	0	$ -	$ 115,974.83	3.469728	$ 116,335	0.00	$ -	$ 116,334.93
300	1376.0048	1376.254761	Residential	4963.528931	$ 3,603,522	$ 1,801,761	1376.107666	-0.15	1376.109985	-0.14	1376.109985	-0.14	1376.109985	-0.14	3.41162	$ 122,938	0	$ -	$ 122,938.48	3.420896	$ 123,273	0.00	$ -	$ 123,272.74
301	1379.886	1380.135986	Residential	7881.984436	$ 5,722,321	$ 2,861,160	1380.047241	-0.09	1380.050049	-0.09	1380.049561	-0.09	1380.049561	-0.09	3.64502	$ 208,580	0	$ -	$ 208,579.73	3.6543	$ 209,111	0.00	$ -	$ 209,110.77
302	1368.6685	1368.918457	Residential	5292.979675	$ 3,842,703	$ 1,921,352	1368.994873	0.08	1368.991821	0.07	1369.317749	0.40	1368.893799	-0.02	6.29248	$ 241,801	3.209472	$ 61,665	$ 303,466.58	3.901368	$ 149,918	0.00	$ -	$ 149,917.99
303	1367.4	1367.650024	Residential	424.157715	$ 307,939	$ 153,969	1367.44519	-0.20	1367.449951	-0.20	1367.513428	-0.14	1367.51355	-0.14	3.180664	$ 9,794	0	$ -	$ 9,794.49	3.454104	$ 10,637	0.00	$ -	$ 10,636.52
304	1378.8812	1379.131226	Residential	5535.167419	$ 4,018,532	$ 2,009,266	1378.9552	-0.18	1378.953247	-0.18	1378.95813	-0.17	1378.95813	-0.17	3.295896	$ 132,447	0	$ -	$ 132,446.62	3.307616	$ 132,918	0.00	$ -	$ 132,917.59
305	1366.5336	1366.783569	Residential	3380.404663	$ 2,454,174	$ 1,227,087	1367.192749	0.41	1367.193726	0.41	1367.414429	0.63	1367.108154	0.32	16.2754	$ 399,427	17.18556	$ 210,882	$ 610,308.35	13.73755	$ 337,143	0.00	$ -	$ 337,143.35
306	1380.2086	1380.458618	Residential	15858.52405	$ 11,513,288	$ 5,756,644	1380.320923	-0.14	1380.319946	-0.14	1380.324341	-0.13	1380.324341	-0.13	3.44922	$ 397,119	0	$ -	$ 397,118.65	3.462892	$ 398,693	0.00	$ -	$ 398,692.74
307	1371.6975	1371.94751	Residential	5749.80481	$ 4,174,358	$ 2,087,179	1371.821777	-0.13	1371.821655	-0.13	1371.824951	-0.12	1371.824829	-0.12	3.497068	$ 145,980	0	$ -	$ 145,980.15	3.509276	$ 146,490	0.00	$ -	$ 146,489.75
308	1377.5427	1377.792725	Residential	13799.37878	$ 10,018,349	$ 5,009,174	1377.736206	-0.06	1377.73999	-0.05	1377.738037	-0.05	1377.738037	-0.05	3.773924	$ 378,085	0	$ -	$ 378,084.88	3.781248	$ 378,819	0.00	$ -	$ 378,818.62
309	1377.3077	1377.557739	Residential	1204.42157	$ 874,410	$ 437,205	1377.368042	-0.19	1377.364624	-0.19	1377.643188	0.09	1377.643188	0.09	3.241212	$ 28,341	0	$ -	$ 28,341.48	6.56347	$ 57,392	8.66	$ 37,882	$ 95,273.53
310	1370.2943	1370.544312	Residential	1040.882263	$ 755,681	$ 377,840	1370.353149	-0.19	1370.353394	-0.19	1370.484985	-0.06	1370.348022	-0.20	3.235348	$ 24,449	0	$ -	$ 24,448.89	3.21484	$ 24,294	0.00	$ -	$ 24,293.92
311	1365.8914	1366.141357	Residential	4740.45105	$ 3,441,567	$ 1,720,784	1366.033447	-0.11	1366.035645	-0.11	1366.249756	0.11	1365.988525	-0.15	3.56836	$ 122,808	0	$ -	$ 122,807.52	3.388672	$ 116,623	0.00	$ -	$ 116,623.43
312	1381.6313	1381.881348	Residential	5565.741516	$ 4,040,728	$ 2,020,364	1381.801147	-0.08	1381.799072	-0.08	1381.812256	-0.07	1381.812378	-0.07	3.679196	$ 148,666	0	$ -	$ 148,666.32	3.72412	$ 150,482	0.00	$ -	$ 150,481.57
313	1357.6017	1357.851685	Residential	4709.370728	$ 3,419,003	$ 1,709,502	1357.810669	-0.04	1357.810059	-0.04	1358.27124	0.42	1358.062866	0.21	3.835936	$ 131,151	0	$ -	$ 131,150.77	10.33543	$ 353,369	6.02	$ 102,896	$ 456,264.64
314	1381.8502	1382.10022	Residential	5632.723511	$ 4,089,357	$ 2,044,679	1381.916626	-0.18	1381.911987	-0.19	1381.931274	-0.17	1381.931152	-0.17	3.265624	$ 133,543	0	$ -	$ 133,543.03	3.323728	$ 135,919	0.00	$ -	$ 135,919.11
315	1384.3489	1384.598877	Residential	328.131775	$ 238,224	$ 119,112	1384.548584	-0.05	1384.546143	-0.05	1384.72168	0.12	1384.906738	0.31	3.798828	$ 9,050	0	$ -	$ 9,049.71	13.23583	$ 31,531	0.00	$ -	$ 31,530.88
316	1361.4711	1361.721069	Residential	8114.740051	$ 5,891,301	$ 2,945,651	1361.568604	-0.15	1361.569946	-0.15	1361.571045	-0.15	1361.571045	-0.15	3.39014	$ 199,723	0	$ -	$ 199,723.36	3.399904	$ 200,299	0.00	$ -	$ 200,298.59
317	1360.3242	1360.574219	Residential	3291.969604	$ 2,389,970	$ 1,194,985	1360.664551	0.09	1360.660034	0.09	1360.869141	0.29	1360.613525	0.04	6.70996	$ 160,366	3.793944	$ 45,337	$ 205,703.09	5.17918	$ 123,781	0.00	$ -	$ 123,780.84
318	1360.4828	1360.732788	Residential	7044.700256	$ 5,114,452	$ 2,557,226	1360.483276	-0.25	1360.4823	-0.25	1360.608276	-0.12	1360.561768	-0.17	3.001952	$ 153,533	0	$ -	$ 153,533.41	3.31592	$ 169,591	0.00	$ -	$ 169,591.15
319	1375.0812	1375.331177	Residential	7783.893127	$ 5,651,106	$ 2,825,553	1375.328735	0.00	1375.329956	0.00	1375.860107	0.53	1375.114136	-0.22	3.990232	$ 225,492	0	$ -	$ 225,492.26	3.131836	$ 176,983	0.00	$ -	$ 176,983.38
320	1353.952	1354.202026	Residential	5427.761719	$ 3,940,555	$ 1,970,278	1354.112427	-0.09	1354.115601	-0.09	1354.115967	-0.09	1354.114624	-0.09	3.641604	$ 143,499	0	$ -	$ 143,499.41	3.650392	$ 143,846	0.00	$ -	$ 143,845.70
321	1366.7892	1367.039185	Residential	5971.685242	$ 4,335,443	$ 2,167,722	1366.812988	-0.23	1366.810303	-0.23	1367.24707	0.21	1366.943237	-0.10	3.095212	$ 134,191	0	$ -	$ 134,191.17	3.616208	$ 156,779	0.00	$ -	$ 156,778.65
322	1378.1312	1378.381226	Residential	5963.877625	$ 4,329,775	$ 2,164,888	1378.215454	-0.17	1378.214478	-0.17	1378.220703	-0.16	1378.220703	-0.16	3.336912	$ 144,481	0	$ -	$ 144,480.79	3.357908	$ 145,390	0.00	$ -	$ 145,389.87
323	1370.1912	1370.441162	Residential	5864.994141	$ 4,257,986	$ 2,128,993	1370.313354	-0.13	1370.310059	-0.13	1370.500488	0.06	1370.292603	-0.15	3.488768	$ 148,551	0	$ -	$ 148,551.24	3.405764	$ 145,017	0.00	$ -	$ 145,016.95
324	1364.6116	1364.861572	Residential	8787.81427	$ 6,379,953	$ 3,189,977	1364.679688	-0.18	1364.684204	-0.18	1364.681763	-0.18	1364.681885	-0.18	3.272464	$ 208,782	0	$ -	$ 208,781.67	3.281252	$ 209,342	0.00	$ -	$ 209,342.34
325	1367.1274	1367.377441	Residential	862.57312	$ 626,228	$ 313,114	1367.134888	-0.24	1367.135864	-0.24	1367.141968	-0.24	1367.141968	-0.24	3.029788	$ 18,973	0	$ -	$ 18,973.38	3.058108	$ 19,151	0.00	$ -	$ 19,150.73
326	1360.1703	1360.420288	Residential	6272.609619	$ 4,553,915	$ 2,276,957	1360.312744	-0.11	1360.310059	-0.11	1360.492432	0.07	1360.253784	-0.17	3.569824	$ 162,567	0	$ -	$ 162,566.74	3.333984	$ 151,827	0.00	$ -	$ 151,826.78
327	1359.764	1360.014038	Residential	440.797302	$ 320,019	$ 160,009	1359.788696	-0.23	1359.787354		1359.799072	-0.21	1359.799072	-0.21					$ 51,107,020	-0.214966				$ 68,424,130.41

10-Year and 100-Year Proposed Building Damages in Area K

															Proposed								
Building ID	HAG	Finished Floor Elevation (ft)	Land Use Type	Building Area (sf)	Replace Cost $ ($726/SF-Res)	Content Replacement Value ($) 1/2 of Replacement Cost	10yr Exist WSEL (ft)	10yr Exist Flow Depth (ft)	10yr Prop WSEL (ft)	10yr Prop Flow Depth (ft)	100yr Exist WSEL (ft)	100yr Exist Flow Depth (ft)	100yr Prop WSEL (ft)	100yr Prop Flow Depth (ft)	10yr Building Damage (%)	10yrBuilding Damage Cost ($)	10yr Content Damage (%)	10yr Content Damage Cost ($)	10yr Total Damage Cost ($)	100yr Building Damage (%)	100yrBuilding Damage Cost ($)	100yr Content Damage (%)	100yr Content Damage Cost ($)	100yr Total Damage Cost ($)
0	1372.7792	1373.029175	Residential	5062.750061	$ 3,675,557	$ 1,837,778	1372.830444	-0.20	1372.829956	-0.20	1372.834351	-0.19	1372.834229	-0.19	3.203124	$ 117,733	0	$ -	$ 117,732.63	3.220216	$ 118,361	0	$ -	$ 118,360.86
1	1371.6405	1371.890503	Residential	5114.190857	$ 3,712,903	$ 1,856,451	1371.667114	-0.22	1371.670532	-0.22	1371.717651	-0.17	1371.717651	-0.17	3.120116	$ 115,847	0	$ -	$ 115,846.87	3.308592	$ 122,845	0	$ -	$ 122,844.80
2	1367.0981	1367.348145	Residential	7006.825439	$ 5,086,955	$ 2,543,478	1367.262939	-0.09	1367.262573	-0.09	1367.392334	0.04	1367.224731	-0.12	3.657712	$ 186,066	0	$ -	$ 186,066.17	3.506344	$ 178,366	0	$ -	$ 178,366.15
3	1374.369	1374.619019	Residential	5893.124573	$ 4,278,408	$ 2,139,204	1374.525391	-0.09	1374.530029	-0.09	1374.701172	0.08	1374.527344	-0.09	3.64	$ 155,907	0.00	$ -	$ 155,906.91	3.63	$ 155,447	0.00	$ -	$ 155,447.41
4	1380.3344	1380.584351	Residential	14318.15601	$ 10,394,981	$ 5,197,491	1380.388672	-0.20	1380.390015	-0.19	1380.391846	-0.19	1380.391846	-0.19	3.222656	$ 334,994	0	$ -	$ 334,994.49	3.22998	$ 335,756	0	$ -	$ 335,755.82
5	1381.6091	1381.859131	Residential	8338.503479	$ 6,053,754	$ 3,026,877	1381.669556	-0.19	1381.670044	-0.19	1381.842529	-0.02	1382.071655	0.21	3.24	$ 196,363	0.00	$ -	$ 196,362.70	10.38	$ 628,121	8.93	$ 270,179	$ 898,299.78
6	1365.7844	1366.034424	Residential	5481.086914	$ 3,979,269	$ 1,989,635	1366.240723	0.21	1366.241211	0.21	1366.375732	0.34	1366.19458	0.16	10.20	$ 406,029	8.69	$ 172,801	$ 578,829.93	8.80	$ 350,362	6.73	$ 133,834	$ 484,195.71
7	1361.3544	1361.60437	Residential	6888.243347	$ 5,000,865	$ 2,500,432	1361.438843	-0.17	1361.439941	-0.16	1361.44165	-0.16	1361.441772	-0.16	3.34	$ 167,143	0.00	$ -	$ 167,143.10	3.35	$ 167,509	0.00	$ -	$ 167,509.36
8	1373.5814	1373.831421	Residential	6063.259277	$ 4,401,926	$ 2,200,963	1373.639404	-0.19	1373.638428	-0.19	1373.656982	-0.17	1373.656982	-0.17	3.23	$ 142,095	0.00	$ -	$ 142,095.41	3.30	$ 145,362	0.00	$ -	$ 145,362.34
9	1369.5145	1369.764526	Residential	4737.382507	$ 3,439,340	$ 1,719,670	1369.589478	-0.18	1369.589966	-0.17	1369.974854	0.21	1369.854858	0.09	3.30	$ 113,559	0.00	$ -	$ 113,558.74	6.71	$ 230,778	3.79	$ 65,243	$ 296,021.63
10	1375.5907	1375.840698	Residential	6107.704834	$ 4,434,194	$ 2,217,097	1375.984009	0.14	1375.97998	0.14	1375.985352	0.14	1375.985352	0.14	8.17846	$ 362,649	5.849844	$ 129,697	$ 492,345.47	8.33962	$ 369,795	6.075468	$ 134,699	$ 504,493.92
11	1359.4811	1359.731079	Residential	7633.545288	$ 5,541,954	$ 2,770,977	1359.544067	-0.19	1359.540039	-0.19	1359.545654	-0.19	1359.545654	-0.19	3.24	$ 179,329	0.00	$ -	$ 179,328.76	3.26	$ 180,573	0.00	$ -	$ 180,573.48
12	1349.402	1349.651978	Residential	12252.54138	$ 8,895,345	$ 4,447,673	1349.465942	-0.19	1349.469971	-0.18	1349.508179	-0.14	1349.468506	-0.18	3.27	$ 291,053	0.00	$ -	$ 291,053.20	3.27	$ 290,532	0.00	$ -	$ 290,531.93
13	1361.3274	1361.577393	Residential	670.759644	$ 486,972	$ 243,486	1361.39917	-0.18	1361.403442	-0.17	1361.462036	-0.12	1361.462036	-0.12	3.304196	$ 16,090	0	$ -	$ 16,090.49	3.538572	$ 17,232	0	$ -	$ 17,231.84
14	1371.7996	1372.049561	Residential	6368.654053	$ 4,623,643	$ 2,311,821	1371.908325	-0.14	1371.910034	-0.14	1371.910645	-0.14	1371.910645	-0.14	3.441892	$ 159,141	0	$ -	$ 159,140.79	3.444336	$ 159,254	0	$ -	$ 159,253.79
15	1378.1814	1378.431396	Residential	5794.169983	$ 4,206,567	$ 2,103,284	1378.244873	-0.19	1378.24231	-0.19	1378.333862	-0.10	1378.259766	-0.17	3.243656	$ 136,447	0	$ -	$ 136,446.58	3.31348	$ 139,384	0	$ -	$ 139,383.77
16	1358.1885	1358.438477	Residential	7644.869263	$ 5,550,175	$ 2,775,088	1358.328003	-0.11	1358.329224	-0.11	1358.330688	-0.11	1358.330688	-0.11	3.562988	$ 197,752	0	$ -	$ 197,752.07	3.568844	$ 198,077	0	$ -	$ 198,077.09
17	1365.3146	1365.564575	Residential	6809.630554	$ 4,943,792	$ 2,471,896	1365.397461	-0.17	1365.400024	-0.16	1365.399536	-0.17	1365.399658	-0.16	3.341796	$ 165,211	0	$ -	$ 165,211.44	3.340332	$ 165,139	0	$ -	$ 165,139.06
18	1379.1108	1379.36084	Residential	5093.971191	$ 3,698,223	$ 1,849,112	1379.271729	-0.09	1379.27478	-0.09	1379.27478	-0.09	1379.274902	-0.09	3.65576	$ 135,198	0	$ -	$ 135,198.16	3.656248	$ 135,216	0	$ -	$ 135,216.21
19	1378.9204	1379.17041	Residential	2066.832153	$ 1,500,520	$ 750,260	1378.949951	-0.22	1378.947754	-0.22	1378.994751	-0.18	1378.994751	-0.18	3.109376	$ 46,657	0	$ -	$ 46,656.81	3.297364	$ 49,478	0	$ -	$ 49,477.61
20	1363.8187	1364.068726	Residential	9950.357239	$ 7,223,959	$ 3,611,980	1363.894775	-0.17	1363.890015	-0.18	1363.896851	-0.17	1363.896851	-0.17	3.285156	$ 237,318	0	$ -	$ 237,318.33	3.3125	$ 239,294	0	$ -	$ 239,293.65
21	1359.7377	1359.987671	Residential	98.510803	$ 71,519	$ 35,759	1359.800293	-0.19	1359.802612	-0.19	1360.027832	0.04	1359.882813	-0.10	3.259764	$ 2,331	0	$ -	$ 2,331.35	3.580568	$ 2,561	0	$ -	$ 2,560.78
22	1353.2081	1353.45813	Residential	1837.229675	$ 1,333,829	$ 666,914	1353.245239	-0.21	1353.25	-0.21	1353.318115	-0.14	1353.247559	-0.21	3.16748	$ 42,249	0	$ -	$ 42,248.76	3.157716	$ 42,119	0	$ -	$ 42,118.52
23	1353.9991	1354.249146	Residential	2561.5896	$ 1,859,714	$ 929,857	1354.064209	-0.18	1354.060059	-0.19	1354.065796	-0.18	1354.065918	-0.18	3.243652	$ 60,323	0	$ -	$ 60,322.65	3.267088	$ 60,758	0	$ -	$ 60,758.49
24	1376.0033	1376.253296	Residential	5004.554688	$ 3,633,307	$ 1,816,653	1376.087891	-0.17	1376.089478	-0.16	1376.089844	-0.16	1376.089844	-0.16	3.344728	$ 121,524	0	$ -	$ 121,524.23	3.346192	$ 121,577	0	$ -	$ 121,577.42
25	1366.6973	1366.947266	Residential	956.661987	$ 694,537	$ 347,268	1366.791504	-0.16	1366.790039	-0.16	1366.90979	-0.04	1366.796265	-0.15	3.37	$ 23,413	0.00	$ -	$ 23,413.47	3.40	$ 23,586	0.00	$ -	$ 23,586.44
26	1377.9141	1378.164063	Residential	272.638306	$ 197,935	$ 98,968	1377.926147	-0.24	1377.927246	-0.24	1377.952148	-0.21	1377.965576	-0.20	3.052732	$ 6,042	0	$ -	$ 6,042.44	3.206052	$ 6,346	0	$ -	$ 6,345.91
27	1359.7202	1359.970215	Residential	416.830383	$ 302,619	$ 151,309	1359.942627	-0.03	1359.942261	-0.03	1360.080933	0.11	1359.883057	-0.09	3.89	$ 11,766	0.00	$ -	$ 11,766.38	3.65	$ 11,050	0.00	$ -	$ 11,049.73
28	1373.551	1373.801025	Residential	6621.999878	$ 4,807,572	$ 2,403,786	1373.600098	-0.20	1373.599976	-0.20	1373.670898	-0.13	1373.695068	-0.11	3.20	$ 153,641	0.00	$ -	$ 153,640.58	3.58	$ 171,927	0.00	$ -	$ 171,927.04
29	1376.4547	1376.704712	Residential	5605.584473	$ 4,069,654	$ 2,034,827	1376.563599	-0.14	1376.560181	-0.14	1376.62085	-0.08	1376.62085	-0.08	3.421876	$ 139,259	0	$ -	$ 139,258.52	3.664552	$ 149,135	0	$ -	$ 149,134.60
30	1350.1412	1350.391235	Residential	7004.17749	$ 5,085,033	$ 2,542,516	1350.164063	-0.23	1350.166504	-0.22	1350.671387	0.28	1350.452393	0.06	3.10	$ 157,691	0.00	$ -	$ 157,690.73	5.83	$ 296,698	2.57	$ 65,308	$ 362,006.44
31	1349.6879	1349.937866	Residential	1574.908997	$ 1,143,384	$ 571,692	1349.755249	-0.18	1349.76001	-0.18	1349.999878	0.06	1349.757446	-0.18	3.288576	$ 37,601	0	$ -	$ 37,601.05	3.27832	$ 37,484	0	$ -	$ 37,483.78
32	1351.7725	1352.022461	Residential	7068.87146	$ 5,132,001	$ 2,566,000	1352.024414	0.00	1352.02002	0.00	1352.026245	0.00	1352.026245	0.00	3.99	$ 204,779	0.00	$ -	$ 204,778.94	4.11	$ 211,106	0.16	$ 4,078	$ 215,183.97
33	1361.1578	1361.407837	Residential	4317.881287	$ 3,134,782	$ 1,567,391	1361.28894	-0.12	1361.291138	-0.12	1361.297729	-0.11	1361.293701	-0.11	3.53	$ 110,758	0.00	$ -	$ 110,758.24	3.54	$ 111,080	0.00	$ -	$ 111,079.61
34	1380.4657	1380.715698	Residential	6718.879456	$ 4,877,906	$ 2,438,953	1380.545654	-0.17	1380.550049	-0.17	1380.547852	-0.17	1380.675903	-0.04	3.337404	$ 162,795	0	$ -	$ 162,795.45	3.84082	$ 187,352	0	$ -	$ 187,351.61
35	1352.3629	1352.612915	Residential	6026.699036	$ 4,375,384	$ 2,187,692	1352.395142	-0.22	1352.400024	-0.21	1352.397217	-0.22	1352.397339	-0.22	3.15	$ 137,756	0.00	$ -	$ 137,756.15	3.14	$ 137,286	0.00	$ -	$ 137,286.23
36	1364.9492	1365.199219	Residential	1969.893005	$ 1,430,142	$ 715,071	1365.000244	-0.20	1365	-0.20	1365.01001	-0.19	1365.003052	-0.20	3.203124	$ 45,809	0	$ -	$ 45,809.23	3.215332	$ 45,984	0	$ -	$ 45,983.82
37	1382.2072	1382.457153	Residential	12305.99646	$ 8,934,153	$ 4,467,077	1382.286987	-0.17	1382.290039	-0.17	1382.28894	-0.17	1382.289063	-0.17	3.331544	$ 297,645	0	$ -	$ 297,645.25	3.32764	$ 297,296	0	$ -	$ 297,296.46
38	1377.7423	1377.99231	Residential	5902.526306	$ 4,285,234	$ 2,142,617	1377.985107	-0.01	1377.98999	0.00	1377.98645	-0.01	1377.98645	-0.01	3.99072	$ 171,012	0	$ -	$ 171,011.69	3.97656	$ 170,405	0	$ -	$ 170,404.91
39	1368.6111	1368.861084	Residential	5975.38501	$ 4,338,130	$ 2,169,065	1368.935913	0.07	1368.930054	0.07	1369.276367	0.42	1369.043823	0.18	6.0691	$ 263,285	2.89674	$ 62,832	$ 326,117.59	9.48217	$ 411,349	7.675038	$ 166,477	$ 577,825.36
40	1358.2589	1358.508911	Residential	758.56012	$ 550,715	$ 275,357	1358.344971	-0.16	1358.339966	-0.17	1358.346558	-0.16	1358.346558	-0.16	3.32	$ 18,307	0.00	$ -	$ 18,306.97	3.35	$ 18,452	0.00	$ -	$ 18,452.18
41	1365.7938	1366.043823	Residential	5147.26416	$ 3,736,914	$ 1,868,457	1365.838989	-0.20	1365.839966	-0.20	1365.861206	-0.18	1365.849609	-0.19	3.18	$ 119,005	0.00	$ -	$ 119,004.71	3.22	$ 120,446	0.00	$ -	$ 120,446.11
42	1362.7766	1363.026611	Residential	8623.175049	$ 6,260,425	$ 3,130,213	1362.801392	-0.23	1362.800049	-0.23	1362.804321	-0.22	1362.804443	-0.22	3.09	$ 193,682	0.00	$ -	$ 193,682.03	3.11	$ 194,782	0.00	$ -	$ 194,782.36
43	1362.8351	1363.085083	Residential	5379.317261	$ 3,905,384	$ 1,952,692	1362.961548	-0.12	1362.95874	-0.13	1363.098022	0.01	1362.971558	-0.11	3.494628	$ 136,479	0	$ -	$ 136,478.65	3.5459	$ 138,481	0	$ -	$ 138,481.02
44	1373.3346	1373.584595	Residential	437.73584	$ 317,796	$ 158,898	1373.473999	-0.11	1373.469971	-0.11	1373.475342	-0.11	1373.475342	-0.11	3.541504	$ 11,255	0	$ -	$ 11,254.77	3.562988	$ 11,323	0	$ -	$ 11,323.04
45	1367.9971	1368.24707	Residential	7428.078186	$ 5,392,785	$ 2,696,392	1368.196655	-0.05	1368.199951	-0.05	1368.19873	-0.05	1368.19873	-0.05	3.81	$ 205,547	0.00	$ -	$ 205,547.29	3.81	$ 205,284	0.00	$ -	$ 205,283.90
46	1374.6667	1374.916748	Residential	4881.761841	$ 3,544,159	$ 1,772,080	1374.991455	0.07	1374.98999	0.07	1374.994629	0.08	1374.994507	0.08	6.19726	$ 219,641	3.076164	$ 54,512	$ 274,152.83	6.33277	$ 224,443	3.265878	$ 57,874	$ 282,317.40
47	1378.6304	1378.880371	Residential	5232.306396	$ 3,798,654	$ 1,899,327	1378.724121	-0.16	1378.725098	-0.16	1379.14209	0.26	1378.995605	0.12	3.38	$ 128,353	0.00	$ -	$ 128,353.04	7.46	$ 283,266	4.84	$ 91,924	$ 375,190.59
48	1377.9553	1378.205322	Residential	6055.227417	$ 4,396,095	$ 2,198,048	1378.011475	-0.19	1378.012817	-0.19	1378.015869	-0.19	1378.015869	-0.19	3.22998	$ 141,993	0	$ -	$ 141,992.99	3.242188	$ 142,530	0	$ -	$ 142,529.67
49	1376.8622	1377.112183	Residential	371.322083	$ 269,580	$ 134,790	1376.894043	-0.22	1376.893188	-0.22	1376.96582	-0.15	1376.980103	-0.13	3.12402	$ 8,422	0	$ -	$ 8,421.73	3.47168	$ 9,359	0	$ -	$ 9,358.95
50	1371.5935	1371.843506	Residential	3883.120056	$ 2,819,145	$ 1,409,573	1371.657227	-0.19	1371.65564	-0.19	1371.91626	0.07	1371.827026	-0.02	3.25	$ 91,581	0.00	$ -	$ 91,580.95	3.93	$ 110,907	0.00	$ -	$ 110,907.43
51	1367.6451	1367.895142	Residential	8502.347534	$ 6,172,704	$ 3,086,352	1367.70874	-0.19	1367.709961	-0.19	1367.711426	-0.18	1367.711426	-0.18	3.26	$ 201,185	0.00	$ -	$ 201,185.47	3.27	$ 201,547	0.00	$ -	$ 201,547.19
52	1360.0182	1360.268188	Residential	11716.17969	$ 8,505,946	$ 4,252,973	1360.080688	-0.19	1360.079956	-0.19	1360.084106	-0.18	1360.083984	-0.18	3.25	$ 276,194	0.00	$ -	$ 276,194.21	3.26	$ 277,565	0.00	$ -	$ 277,564.68
53	1376.1908	1376.440796	Residential	4086.243103	$ 2,966,612	$ 1,483,306	1376.506836	0.07	1376.51001	0.07	1376.508789	0.07	1376.508789	0.07	6.07642	$ 180,264	2.906988	$ 43,120	$ 223,383.37	6.03979	$ 179,177	2.855706	$ 42,359	$ 221,536.03
54	1386.9077	1387.157715	Residential	5026.592773	$ 3,649,306	$ 1,824,653	1387.001099	-0.16	1387.00061	-0.16	1387.004517	-0.15	1387.004517	-0.15	3.37158	$ 123,039	0	$ -	$ 123,039.28	3.387208	$ 123,610	0	$ -	$ 123,609.60
55	1376.2891	1376.539063	Residential	3620.247864	$ 2,628,300	$ 1,314,150	1376.426147	-0.11	1376.426758	-0.11	1376.470703	-0.07	1376.470703	-0.07	3.55	$ 93,325	0.00	$ -	$ 93,325.15	3.73	$ 97,945	0.00	$ -	$ 97,945.17
56	1377.2733	1377.523315	Residential	4993.57019	$ 3,625,332	$ 1,812,666	1377.564087	0.04	1377.560059	0.04	1377.56543	0.04	1377.56543	0.04	5.10	$ 184,976	1.54	$ 27,974	$ 212,949.97	5.26	$ 190,818	1.77	$ 32,063	$ 222,880.51
57	1351.041	1351.291016	Residential	10962.42029	$ 7,958,717	$ 3,979,359	1351.105469	-0.19	1351.109985	-0.18	1351.107666	-0.18	1351.107544	-0.18	3.28	$ 260,718	0.00	$ -	$ 260,717.70	3.27	$ 259,941	0.00	$ -	$ 259,940.62
58	1372.4613	1372.711304	Residential	5823.487061	$ 4,227,852	$ 2,113,926	1372.55835	-0.15	1372.560059	-0.15	1372.716797	0.01	1372.560547	-0.15	3.39502	$ 143,536	0	$ -	$ 143,536.41	3.396972	$ 143,619	0	$ -	$ 143,618.94
59	1377.0377	1377.28772	Residential	6052.135376	$ 4,393,850	$ 2,196,925	1377.146973	-0.14	1377.149902	-0.14	1377.14978	-0.14	1377.149902	-0.14	3.448728	$ 151,532	0	$ -	$ 151,531.94	3.448728	$ 151,532	0	$ -	$ 151,531.94
60	1368.8978	1369.147827	Residential	6837.879822	$ 4,964,301	$ 2,482,150	1368.899658	-0.25	1368.900024	-0.25	1368.906616	-0.24	1369.012573	-0.14	3.008788	$ 149,365	0	$ -	$ 149,365.29	3.458984	$ 171,714	0	$ -	$ 171,714.37
61	1365.9777	1366.227661	Residential	548.647339	$ 398,318	$ 199,159	1366.057861	-0.17	1366.061035	-0.17	1366.203369	-0.02	1366.046509	-0.18	3.333496	$ 13,278	0	$ -	$ 13,277.91	3.275392	$ 13,046	0	$ -	$ 13,046.47
62	1365.65	1365.900024	Residential	6442.914001	$ 4,677,556	$ 2,338,778	1365.738403	-0.16	1365.73999	-0.16	1366.14502	0.24	1365.892334	-0.01	3.36	$ 157,160	0.00	$ -	$ 157,159.51	3.97	$ 185,663	0.00	$ -	$ 185,663.41
63	1348.2711	1348.521118	Residential	624.433289	$ 453,339	$ 226,669	1348.405151	-0.12	1348.409302	-0.11	1349.341187	0.82	1348.980347	0.46	3.552736	$ 16,106	0	$ -	$ 16,105.92	17.77687	$ 80,589	19.287618	$ 43,719	$ 124,308.51
64	1379.9254	1380.175415	Residential	335.501648	$ 243,574	$ 121,787	1379.99353	-0.18	1379.992065	-0.18	1380.040283	-0.14	1380.039917	-0.14	3.27	$ 7,957	0.00	$ -	$ 7,956.59	3.46	$ 8,423	0.00	$ -	$ 8,422.82
65	1380.058	1380.307983	Residential	344.429138	$ 250,056	$ 125,028	1380.170776	-0.14	1380.171509	-0.14	1380.185059	-0.12	1380.184814	-0.12	3.454104	$ 8,637	0.00	$ -	$ 8,637.18	3.507324	$ 8,770	0.00	$ -	$ 8,770.26
66	1357.8719	1358.121948	Residential	1980.532898	$ 1,437,867	$ 718,933	1358.057495	-0.06	1358.060059	-0.06	1358.059692	-0.06	1358.059692	-0.06	3.75	$ 53,955	0.00	$ -	$ 53,955.15	3.75	$ 53,934	0.00	$ -	$ 53,934.04
67	1361.5636	1361.813599	Residential	6199.695374	$ 4,500,979	$ 2,250,489	1361.722046	-0.09	1361.719971	-0.09	1361.726318	-0.09	1361.726196	-0.09	3.625488	$ 163,182	0	$ -	$ 163,182.45	3.650388	$ 164,303	0	$ -	$ 164,303.19
68	1373.7996	1374.049561	Residential	4352.848328	$ 3,160,168	$ 1,580,084	1373.888428	-0.16	1373.890015	-0.16	1373.941406	-0.11	1373.890869	-0.16	3.36	$ 106,239	0.00	$ -	$ 106,239.03	3.37	$ 106,347	0.00	$ -	$ 106,346.98
69	1369.6515	1369.901489	Residential	7681.519775	$ 5,576,783	$ 2,788,392	1369.671997	-0.23	1369.670044	-0.23	1369.675293	-0.23	1369.675293	-0.23	3.07422	$ 171,443	0	$ -	$ 171,442.59	3.095216	$ 172,613	0	$ -	$ 172,613.49
70	1352.7987	1353.048706	Residential	4176.407654	$ 3,032,072	$ 1,516,036	1352.82373	-0.22	1352.823853	-0.22	1352.83374	-0.21	1352.83374	-0.21	3.100588	$ 94,012	0	$ -	$ 94,012.06	3.140136	$ 95,211	0	$ -	$ 95,211.18
71	1354.4823	1354.7323	Residential	5939.919373	$ 4,312,381	$ 2,156,191	1354.613403	-0.12	1354.609985	-0.12	1355.001953	0.27	1354.824707	0.09	3.51	$ 151,397	0.00	$ -	$ 151,396.50	6.77	$ 292,044	3.88	$ 83,684	$ 375,727.32
72	1358.7681	1359.018066	Residential	5464.610229	$ 3,967,307	$ 1,983,654	1358.818237	-0.20	1358.819946	-0.20	1358.820557	-0.20	1358.820557	-0.20	3.20752	$ 127,252	0	$ -	$ 127,252.17	3.209964	$ 127,349	0	$ -	$ 127,349.13
73	1370.2661	1370.516113	Residential	7295.893555	$ 5,296,819	$ 2,648,409	1370.522339	0.01	1370.521484	0.01	1370.69751	0.18	1370.449707	-0.07	4.16	$ 220,408	0.23	$ 5,974	$ 226,381.85	3.73	$ 197,803	0.00	$ -	$ 197,803.13
74	1380.3362	1380.586182	Residential	4872.422913	$ 3,537,379	$ 1,768,690	1380.464111	-0.12	1380.467407	-0.12	1380.876343	0.29	1380.724731	0.14	3.5249	$ 124,689	0.00	$ -	$ 124,689.07	8.15647	$ 288,525	5.82	$ 102,921	$ 391,446.33
75	1368.1411	1368.391113	Residential	6527.1745	$ 4,738,729	$ 2,369,364	1368.207275	-0.18	1368.209961	-0.18	1368.209473	-0.18	1368.209351	-0.18	3.28	$ 155,212	0.00	$ -	$ 155,211.94	3.27	$ 155,096	0.00	$ -	$ 155,096.32
76	1370.8282	1371.078247	Residential	7341.92395	$ 5,330,237	$ 2,665,118	1370.901245	-0.18	1370.900024	-0.18	1370.904541	-0.17	1370.904663	-0.17	3.287108	$ 175,211	0	$ -	$ 175,210.64	3.305664	$ 176,200	0	$ -	$ 176,199.72
77	1351.1089	1351.358887	Residential	7682.645386	$ 5,577,601	$ 2,788,800	1351.214355	-0.14	1351.209961	-0.15	1351.216187	-0.14	1351.216064	-0.14	3.404296	$ 189,878	0	$ -	$ 189,878.03	3.428708	$ 191,240	0	$ -	$ 191,239.64
78	1352.9404	1353.19043	Residential	359.594421	$ 261,066	$ 130,533	1353.207153	0.02	1353.199951	0.01	1353.580688	0.39	1353.317749	0.13	4.28563	$ 11,188	0.399882	$ 522	$ 11,710.28	7.81957	$ 20,414	5.347398	$ 6,980	$ 27,394.31
79	1375.2893	1375.539307	Residential	5622.966309	$ 4,082,274	$ 2,041,137	1375.408813	-0.13	1375.410034	-0.13	1375.411865	-0.13	1375.411987	-0.13	3.482908	$ 142,182	0	$ -	$ 142,181.83	3.49072	$ 142,501	0	$ -	$ 142,500.74

10-Year and 100-Year Proposed Building Damages in Area K

															Proposed									
Building ID	HAG	Finished Floor Elevation (ft)	Land Use Type	Building Area (sf)	Replace Cost $ ($726/SF-Res)	Content Replacement Value ($) 1/2 of Replacement Cost	10yr Exist WSEL (ft)	10yr Exist Flow Depth (ft)	10yr Prop WSEL (ft)	10yr Prop Flow Depth (ft)	100yr Exist WSEL (ft)	100yr Exist Flow Depth (ft)	100yr Prop WSEL (ft)	100yr Prop Flow Depth (ft)	10yr Building Damage (%)	10yrBuilding Damage Cost ($)	10yr Content Damage (%)	10yr Content Damage Cost ($)	10yr Total Damage Cost ($)	100yr Building Damage (%)	100yrBuilding Damage Cost ($)	100yr Content Damage (%)	100yr Content Damage Cost ($)	100yr Total Damage Cost ($)
80	1361.5787	1361.828735	Residential	4104.051453	$ 2,979,541	$ 1,489,771	1361.64856	-0.18	1361.650024	-0.18	1361.924194	0.10	1361.777954	-0.05	3.29	$ 97,883	0.00	$ -	$ 97,882.58	3.80	$ 113,129	0.00	$ -	$ 113,129.49
81	1372.7191	1372.969116	Residential	5524.363342	$ 4,010,688	$ 2,005,344	1372.777466	-0.19	1372.780029	-0.19	1372.78186	-0.19	1372.78186	-0.19	3.243652	$ 130,093	0	$ -	$ 130,092.75	3.250976	$ 130,386	0	$ -	$ 130,386.50
82	1378.332	1378.582031	Residential	328.372437	$ 238,398	$ 119,199	1378.797852	0.22	1378.800049	0.22	1379.000732	0.42	1379.000732	0.42	10.54	$ 25,128	9.16	$ 10,915	$ 36,043.26	16.56	$ 39,481	17.59	$ 20,962	$ 60,442.93
83	1374.9072	1375.157227	Residential	5100.398376	$ 3,702,889	$ 1,851,445	1375.089478	-0.07	1375.087524	-0.07	1375.173706	0.02	1375.173706	0.02	3.721188	$ 137,791	0	$ -	$ 137,791.47	4.49437	$ 166,422	0.692118	$ 12,814	$ 179,235.72
84	1362.9548	1363.204834	Residential	8479.753967	$ 6,156,301	$ 3,078,151	1363.019775	-0.19	1363.02002	-0.18	1363.022827	-0.18	1363.022827	-0.18	3.26	$ 200,741	0.00	$ -	$ 200,741.23	3.27	$ 201,432	0.00	$ -	$ 201,432.46
85	1366.3226	1366.572632	Residential	2076.678772	$ 1,507,669	$ 753,834	1366.432617	-0.14	1366.435669	-0.14	1366.70752	0.13	1366.435059	-0.14	3.452148	$ 52,047	0	$ -	$ 52,046.96	3.449708	$ 52,010	0	$ -	$ 52,010.17
86	1352.7321	1352.982056	Residential	5563.624268	$ 4,039,191	$ 2,019,596	1352.796631	-0.19	1352.800049	-0.18	1352.940308	-0.04	1352.799561	-0.18	3.271972	$ 132,161	0	$ -	$ 132,161.21	3.27002	$ 132,082	0	$ -	$ 132,082.36
87	1367.7133	1367.963257	Residential	4968.399292	$ 3,607,058	$ 1,803,529	1367.959106	0.00	1367.960571	0.00	1368.091064	0.13	1367.916382	-0.05	3.99	$ 143,895	0.00	$ -	$ 143,894.77	3.81	$ 137,519	0.00	$ -	$ 137,519.08
88	1361.6323	1361.882324	Residential	797.473267	$ 578,966	$ 289,483	1361.7677	-0.11	1361.77002	-0.11	1361.769897	-0.11	1361.769897	-0.11	3.550784	$ 20,558	0	$ -	$ 20,557.82	3.550292	$ 20,555	0	$ -	$ 20,554.97
89	1363.135	1363.38501	Residential	8303.006226	$ 6,027,983	$ 3,013,991	1363.190308	-0.19	1363.189941	-0.20	1363.193359	-0.19	1363.193359	-0.19	3.22	$ 194,084	0.00	$ -	$ 194,084.40	3.23	$ 194,909	0.00	$ -	$ 194,908.55
90	1366.2108	1366.460815	Residential	4910.555115	$ 3,565,063	$ 1,782,532	1366.218384	-0.24	1366.220825	-0.24	1366.294312	-0.17	1366.241577	-0.22	3.04004	$ 108,379	0	$ -	$ 108,379.34	3.123048	$ 111,339	0	$ -	$ 111,338.63
91	1368.8278	1369.077759	Residential	6629.62793	$ 4,813,110	$ 2,406,555	1368.94104	-0.14	1368.939941	-0.14	1368.944092	-0.13	1368.944214	-0.13	3.448728	$ 165,991	0	$ -	$ 165,991.07	3.46582	$ 166,814	0	$ -	$ 166,813.72
92	1374.304	1374.553955	Residential	5484.503662	$ 3,981,750	$ 1,990,875	1374.360107	-0.19	1374.359985	-0.19	1374.363159	-0.19	1374.363037	-0.19	3.22	$ 128,376	0.00	$ -	$ 128,376.39	3.24	$ 128,862	0.00	$ -	$ 128,862.48
93	1354.0405	1354.290527	Residential	7800.228271	$ 5,662,966	$ 2,831,483	1354.07605	-0.21	1354.079956	-0.21	1354.078491	-0.21	1354.078369	-0.21	3.157716	$ 178,820	0	$ -	$ 178,820.37	3.151368	$ 178,461	0	$ -	$ 178,460.89
94	1364.1387	1364.388672	Residential	9319.309509	$ 6,765,819	$ 3,382,909	1364.178955	-0.21	1364.180054	-0.21	1364.295898	-0.09	1364.261353	-0.13	3.17	$ 214,174	0.00	$ -	$ 214,173.89	3.49	$ 236,176	0.00	$ -	$ 236,176.06
95	1362.6045	1362.854492	Residential	143.450073	$ 104,145	$ 52,072	1362.984863	0.13	1362.980347	0.13	1362.987305	0.13	1362.987427	0.13	7.78	$ 8,098	5.29	$ 2,752	$ 10,850.43	7.99	$ 8,319	5.58	$ 2,907	$ 11,226.48
96	1361.0277	1361.27771	Residential	5807.243103	$ 4,216,058	$ 2,108,029	1361.062378	-0.22	1361.060059	-0.22	1361.230591	-0.05	1361.197632	-0.08	3.13	$ 131,937	0.00	$ -	$ 131,937.17	3.68	$ 155,138	0.00	$ -	$ 155,137.80
97	1379.2681	1379.518066	Residential	5512.254822	$ 4,001,897	$ 2,000,949	1379.418945	-0.10	1379.419434	-0.10	1379.574341	0.06	1379.704102	0.19	3.605472	$ 144,287	0.00	$ -	$ 144,287.28	9.58108	$ 383,425	7.81	$ 156,344	$ 539,769.30
98	1364.3967	1364.646729	Residential	1845.062622	$ 1,339,515	$ 669,758	1364.488159	-0.16	1364.48999	-0.16	1364.490356	-0.16	1364.490356	-0.16	3.373044	$ 45,182	0	$ -	$ 45,182.45	3.374508	$ 45,202	0	$ -	$ 45,202.06
99	1366.3516	1366.601563	Residential	4056.541199	$ 2,945,049	$ 1,472,524	1366.543823	-0.06	1366.536987	-0.06	1366.554199	-0.05	1366.554199	-0.05	3.74	$ 110,195	0.00	$ -	$ 110,194.78	3.81	$ 112,222	0.00	$ -	$ 112,222.38
100	1358.9648	1359.214844	Residential	5029.624146	$ 3,651,507	$ 1,825,754	1359.262451	0.05	1359.267212	0.05	1359.26416	0.05	1359.26416	0.05	5.57	$ 203,427	2.20	$ 40,157	$ 243,583.57	5.48	$ 200,084	2.07	$ 37,816	$ 237,899.93
101	1374.8926	1375.142578	Residential	9085.493774	$ 6,596,068	$ 3,298,034	1375.06897	-0.07	1375.073853	-0.07	1375.071899	-0.07	1375.071777	-0.07	3.7251	$ 245,710	0	$ -	$ 245,710.15	3.716796	$ 245,162	0	$ -	$ 245,162.41
102	1371.8109	1372.060913	Residential	4668.850098	$ 3,389,585	$ 1,694,793	1371.834229	-0.23	1371.838379	-0.22	1371.838257	-0.22	1371.838257	-0.22	3.109864	$ 105,411	0	$ -	$ 105,411.49	3.109376	$ 105,395	0	$ -	$ 105,394.95
103	1374.249	1374.499023	Residential	6966.036255	$ 5,057,342	$ 2,528,671	1374.279785	-0.22	1374.280029	-0.22	1374.282715	-0.22	1374.282715	-0.22	3.124024	$ 157,993	0	$ -	$ 157,992.59	3.134768	$ 158,536	0	$ -	$ 158,535.95
104	1353.7365	1353.98645	Residential	6619.511108	$ 4,805,765	$ 2,402,883	1353.776123	-0.21	1353.780029	-0.21	1353.778442	-0.21	1353.778442	-0.21	3.17	$ 152,550	0.00	$ -	$ 152,550.17	3.17	$ 152,245	0.00	$ -	$ 152,245.10
105	1363.4548	1363.704834	Residential	8842.429199	$ 6,419,604	$ 3,209,802	1364.171265	0.47	1364.170044	0.47	1364.463501	0.76	1364.036011	0.33	17.9563	$ 1,152,723	19.53882	$ 627,157	$ 1,779,880.68	13.93531	$ 894,592	13.909434	$ 446,465	$ 1,341,056.93
106	1363.5942	1363.844238	Residential	1209.473938	$ 878,078	$ 439,039	1363.675049	-0.17	1363.670044	-0.17	1363.677856	-0.17	1363.677856	-0.17	3.303224	$ 29,005	0.00	$ -	$ 29,004.89	3.334472	$ 29,279	0.00	$ -	$ 29,279.27
107	1364.436	1364.686035	Residential	4979.980835	$ 3,615,466	$ 1,807,733	1364.669312	-0.02	1364.665771	-0.02	1364.670898	-0.02	1364.670898	-0.02	3.92	$ 141,688	0.00	$ -	$ 141,688.09	3.94	$ 142,430	0.00	$ -	$ 142,429.55
108	1352.4829	1352.73291	Residential	5092.605652	$ 3,697,232	$ 1,848,616	1352.545166	-0.19	1352.550049	-0.18	1352.547241	-0.19	1352.547241	-0.19	3.268556	$ 120,846	0.00	$ -	$ 120,846.09	3.257324	$ 120,431	0.00	$ -	$ 120,430.82
109	1349.7738	1350.023804	Residential	10592.73084	$ 7,690,323	$ 3,845,161	1349.815918	-0.21	1349.819946	-0.20	1349.818359	-0.21	1349.818359	-0.21	3.184568	$ 244,904	0	$ -	$ 244,903.55	3.17822	$ 244,415	0	$ -	$ 244,415.37
110	1356.3748	1356.624756	Residential	7430.694946	$ 5,394,685	$ 2,697,342	1356.497437	-0.13	1356.5	-0.12	1356.499512	-0.13	1356.499512	-0.13	3.50	$ 188,867	0.00	$ -	$ 188,866.61	3.50	$ 188,761	0.00	$ -	$ 188,761.31
111	1349.6604	1349.9104	Residential	12568.94641	$ 9,125,055	$ 4,562,528	1349.750366	-0.16	1349.747437	-0.16	1349.757935	-0.15	1349.752686	-0.16	3.35	$ 305,520	0.00	$ -	$ 305,520.35	3.37	$ 307,436	0.00	$ -	$ 307,436.25
112	1369.8452	1370.095215	Residential	474.788452	$ 344,696	$ 172,348	1369.938599	-0.16	1369.93689	-0.16	1369.944946	-0.15	1369.944946	-0.15	3.3667	$ 11,605	0	$ -	$ 11,604.89	3.398924	$ 11,716	0	$ -	$ 11,715.97
113	1380.3524	1380.602417	Residential	6280.325745	$ 4,559,516	$ 2,279,758	1380.448242	-0.15	1380.449951	-0.15	1380.450562	-0.15	1380.450562	-0.15	3.390136	$ 154,574	0	$ -	$ 154,573.81	3.39258	$ 154,685	0	$ -	$ 154,685.24
114	1377.1196	1377.369629	Residential	5297.63031	$ 3,846,080	$ 1,923,040	1377.239258	-0.13	1377.23999	-0.13	1377.242188	-0.13	1377.242188	-0.13	3.481444	$ 133,899	0	$ -	$ 133,899.11	3.490236	$ 134,237	0	$ -	$ 134,237.25
115	1366.8071	1367.057129	Residential	7888.129822	$ 5,726,782	$ 2,863,391	1366.859985	-0.20	1366.859985	-0.20	1366.862915	-0.19	1366.862915	-0.19	3.211424	$ 183,911	0	$ -	$ 183,911.26	3.223144	$ 184,582	0	$ -	$ 184,582.44
116	1360.8243	1361.074341	Residential	7805.948669	$ 5,667,119	$ 2,833,559	1360.955811	-0.12	1360.959961	-0.11	1361.056763	-0.02	1360.95874	-0.12	3.54248	$ 200,757	0	$ -	$ 200,756.55	3.537596	$ 200,480	0	$ -	$ 200,479.77
117	1364.4938	1364.743774	Residential	5855.000854	$ 4,250,731	$ 2,125,365	1364.699463	-0.04	1364.699951	-0.04	1364.702148	-0.04	1364.702148	-0.04	3.824708	$ 162,578	0	$ -	$ 162,578.03	3.833496	$ 162,952	0	$ -	$ 162,951.59
118	1360.4812	1360.731201	Residential	219.949097	$ 159,683	$ 79,842	1360.793945	0.06	1360.790039	0.06	1360.794067	0.06	1360.794189	0.06	5.76514	$ 9,206	2.471196	$ 1,973	$ 11,178.99	5.88964	$ 9,405	2.645496	$ 2,112	$ 11,516.96
119	1351.2076	1351.457642	Residential	5547.851379	$ 4,027,740	$ 2,013,870	1351.428955	-0.03	1351.425171	-0.03	1351.431519	-0.03	1351.431396	-0.03	3.87	$ 155,878	0.00	$ -	$ 155,878.21	3.90	$ 156,881	0.00	$ -	$ 156,881.12
120	1374.8663	1375.116333	Residential	6444.857483	$ 4,678,967	$ 2,339,483	1374.929321	-0.19	1374.930054	-0.19	1374.932129	-0.18	1374.932251	-0.18	3.25	$ 152,295	0.00	$ -	$ 152,294.93	3.26	$ 152,706	0.00	$ -	$ 152,706.12
121	1363.498	1363.748047	Residential	212.195068	$ 154,054	$ 77,027	1363.517334	-0.23	1363.517944	-0.23	1363.666992	-0.08	1363.631226	-0.12	3.079588	$ 4,744	0	$ -	$ 4,744.22	3.532716	$ 5,442	0	$ -	$ 5,442.28
122	1368.4139	1368.66394	Residential	6069.277893	$ 4,406,296	$ 2,203,148	1368.446289	-0.22	1368.445923	-0.22	1368.67981	0.02	1368.450195	-0.21	3.13	$ 137,826	0.00	$ -	$ 137,825.93	3.15	$ 138,579	0.00	$ -	$ 138,578.88
123	1381.0881	1381.338135	Residential	6044.557678	$ 4,388,349	$ 2,194,174	1381.179443	-0.16	1381.180054	-0.16	1381.366333	0.03	1381.182739	-0.16	3.367676	$ 147,785	0	$ -	$ 147,785.37	3.378416	$ 148,257	0	$ -	$ 148,256.68
124	1379.9611	1380.21106	Residential	5559.381653	$ 4,036,111	$ 2,018,056	1380.097168	-0.11	1380.095825	-0.12	1380.099243	-0.11	1380.099243	-0.11	3.54	$ 142,840	0.00	$ -	$ 142,840.39	3.55	$ 143,392	0.00	$ -	$ 143,392.21
125	1361.5222	1361.772217	Residential	5136.399902	$ 3,729,026	$ 1,864,513	1361.562622	-0.21	1361.560059	-0.21	1361.609375	-0.16	1361.608765	-0.16	3.15	$ 117,515	0.00	$ -	$ 117,515.34	3.35	$ 124,780	0.00	$ -	$ 124,780.38
126	1349.9539	1350.203857	Residential	11645.22498	$ 8,454,433	$ 4,227,217	1350.02478	-0.18	1350.02002	-0.18	1350.026855	-0.18	1350.026855	-0.18	3.264652	$ 276,008	0	$ -	$ 276,007.83	3.291992	$ 278,319	0	$ -	$ 278,319.27
127	1357.042	1357.291992	Residential	3812.569763	$ 2,767,926	$ 1,383,963	1357.216553	-0.08	1357.219971	-0.07	1357.218506	-0.07	1357.218506	-0.07	3.71	$ 102,743	0.00	$ -	$ 102,743.07	3.71	$ 102,581	0.00	$ -	$ 102,580.87
128	1363.7706	1364.02063	Residential	246.767029	$ 179,153	$ 89,576	1363.825928	-0.19	1363.829956	-0.19	1363.828491	-0.19	1363.828491	-0.19	3.24	$ 5,800	0.00	$ -	$ 5,799.72	3.23	$ 5,789	0.00	$ -	$ 5,789.22
129	1377.3176	1377.567627	Residential	3762.542786	$ 2,731,606	$ 1,365,803	1377.35437	-0.21	1377.349976	-0.22	1377.857666	0.29	1377.634277	0.07	3.129396	$ 85,483	0	$ -	$ 85,482.77	5.9995	$ 163,883	2.7993	$ 38,233	$ 202,115.63
130	1362.1476	1362.397583	Residential	5020.589172	$ 3,644,948	$ 1,822,474	1362.411865	0.01	1362.410034	0.01	1362.727783	0.33	1362.316406	-0.08	4.37353	$ 159,413	0.522942	$ 9,530	$ 168,943.36	3.675292	$ 133,962	0	$ -	$ 133,962.47
131	1376.2094	1376.459351	Residential	5212.982361	$ 3,784,625	$ 1,892,313	1376.260254	-0.20	1376.260864	-0.20	1376.271851	-0.19	1376.271851	-0.19	3.21	$ 121,337	0.00	$ -	$ 121,337.05	3.25	$ 123,000	0.00	$ -	$ 123,000.32
132	1379.1615	1379.411499	Residential	400.356567	$ 290,659	$ 145,329	1379.424072	0.01	1379.421387	0.01	1379.488525	0.08	1379.488281	0.08	4.29664	$ 12,489	0.415296	$ 604	$ 13,092.11	6.30346	$ 18,322	3.224844	$ 4,687	$ 23,008.21
133	1361.2078	1361.457764	Residential	4320.113953	$ 3,136,403	$ 1,568,201	1361.42041	-0.04	1361.420044	-0.04	1361.433716	-0.02	1361.42334	-0.03	3.84912	$ 120,724	0	$ -	$ 120,723.90	3.862304	$ 121,137	0	$ -	$ 121,137.41
134	1362.6445	1362.894531	Residential	3840.690247	$ 2,788,341	$ 1,394,171	1362.80603	-0.09	1362.805054	-0.09	1362.809204	-0.09	1362.809326	-0.09	3.642092	$ 101,554	0	$ -	$ 101,553.95	3.65918	$ 102,030	0	$ -	$ 102,030.42
135	1378.0864	1378.336426	Residential	326.96106	$ 237,374	$ 118,687	1378.312134	-0.02	1378.309937	-0.03	1378.373901	0.04	1378.371704	0.04	3.894044	$ 9,243	0	$ -	$ 9,243.44	5.05834	$ 12,007	1.481676	$ 1,759	$ 13,765.73
136	1364.1649	1364.414917	Residential	4181.148926	$ 3,035,514	$ 1,517,757	1364.769409	0.35	1364.77124	0.36	1364.967041	0.55	1364.687012	0.27	14.68969	$ 445,908	14.965566	$ 227,141	$ 673,048.55	12.16285	$ 369,205	11.42799	$ 173,449	$ 542,654.15
137	1360.8499	1361.099854	Residential	4583.988647	$ 3,327,976	$ 1,663,988	1360.899902	-0.20	1360.900024	-0.20	1361.072632	-0.03	1360.932739	-0.17	3.20068	$ 106,518	0	$ -	$ 106,517.85	3.33154	$ 110,873	0	$ -	$ 110,872.84
138	1368.3804	1368.630371	Residential	8776.445618	$ 6,371,700	$ 3,185,850	1368.661865	0.03	1368.660034	0.03	1368.665161	0.03	1368.665161	0.03	4.88989	$ 311,569	1.245846	$ 39,691	$ 351,259.88	5.0437	$ 321,369	1.46118	$ 46,551	$ 367,920.41
139	1353.156	1353.406006	Residential	323.715698	$ 235,018	$ 117,509	1353.186035	-0.22	1353.189941	-0.22	1353.190063	-0.22	1353.188965	-0.22	3.13574	$ 7,370	0.00	$ -	$ 7,369.54	3.131836	$ 7,360	0.00	$ -	$ 7,360.37
140	1378.5293	1378.779297	Residential	5263.701416	$ 3,821,447	$ 1,910,724	1378.623413	-0.16	1378.624146	-0.16	1378.66626	-0.11	1378.677856	-0.10	3.38	$ 129,142	0.00	$ -	$ 129,141.83	3.59	$ 137,352	0.00	$ -	$ 137,351.83
141	1379.809	1380.05896	Residential	7932.297974	$ 5,758,848	$ 2,879,424	1380.026367	-0.03	1380.030029	-0.03	1380.028198	-0.03	1380.028198	-0.03	3.884276	$ 223,690	0	$ -	$ 223,689.56	3.876952	$ 223,268	0	$ -	$ 223,267.79
142	1371.869	1372.119019	Residential	4879.887024	$ 3,542,798	$ 1,771,399	1372.077759	-0.04	1372.077759	-0.04	1372.083496	-0.04	1372.081787	-0.04	3.83496	$ 135,865	0	$ -	$ 135,864.89	3.851072	$ 136,436	0	$ -	$ 136,435.70
143	1378.5239	1378.773926	Residential	188.311951	$ 136,714	$ 68,357	1378.562744	-0.21	1378.566528	-0.21	1378.578857	-0.20	1378.578735	-0.20	3.170408	$ 4,334	0	$ -	$ 4,334.41	3.219236	$ 4,401	0	$ -	$ 4,401.16
144	1375.1558	1375.405762	Residential	4700.561829	$ 3,412,608	$ 1,706,304	1375.356201	-0.05	1375.359985	-0.05	1375.710083	0.30	1375.35791	-0.05	3.82	$ 130,256	0.00	$ -	$ 130,255.56	3.81	$ 129,972	0.00	$ -	$ 129,972.31
145	1364.0173	1364.267334	Residential	263.903442	$ 191,594	$ 95,797	1364.084961	-0.18	1364.079956	-0.19	1364.11499	-0.15	1364.086426	-0.18	3.250488	$ 6,228	0	$ -	$ 6,227.74	3.276368	$ 6,277	0	$ -	$ 6,277.32
146	1361.9521	1362.202148	Residential	5469.552246	$ 3,970,895	$ 1,985,447	1362.174438	-0.03	1362.178223	-0.02	1362.365112	0.16	1362.176025	-0.03	3.90	$ 155,036	0.00	$ -	$ 155,035.65	3.90	$ 154,687	0.00	$ -	$ 154,686.53
147	1361.5681	1361.818115	Residential	5371.711365	$ 3,899,862	$ 1,949,931	1361.999634	0.18	1361.995728	0.18	1362.157593	0.34	1361.909668	0.09	9.32839	$ 363,794	7.459746	$ 145,460	$ 509,254.30	6.74659	$ 263,108	3.845226	$ 74,979	$ 338,086.99
148	1376.0001	1376.250122	Residential	4847.492981	$ 3,519,280	$ 1,759,640	1376.239746	-0.01	1376.24292	-0.01	1376.241943	-0.01	1376.241943	-0.01	3.971192	$ 139,757	0	$ -	$ 139,757.36	3.967284	$ 139,620	0	$ -	$ 139,619.83
149	1376.4144	1376.664429	Residential	5930.882202	$ 4,305,820	$ 2,152,910	1376.478149	-0.19	1376.47998	-0.18	1376.766724	0.10	1376.542114	-0.12	3.26	$ 140,465	0.00	$ -	$ 140,464.65	3.51	$ 151,166	0.00	$ -	$ 151,166.16
150	1372.437	1372.687012	Residential	5813.009705	$ 4,220,245	$ 2,110,123	1372.519775	-0.17	1372.52002	-0.17	1372.522461	-0.16	1372.522461	-0.16	3.332032	$ 140,620	0	$ -	$ 140,619.92	3.341796	$ 141,032	0	$ -	$ 141,031.98
151	1387.2883	1387.53833	Residential	4486.418701	$ 3,257,140	$ 1,628,570	1387.536377	0.00	1387.540039	0.00	1387.53833	0.00	1387.53833	0.00	4.05127	$ 131,956	0.071778	$ 1,169	$ 133,124.49	4	$ 130,286	0	$ -	$ 130,285.60
152	1375.7926	1376.042603	Residential	4326.913086	$ 3,141,339	$ 1,570,669	1375.835449	-0.21	1375.839966	-0.20	1376.119263	0.08	1375.941162	-0.10	3.19	$ 100,191	0.00	$ -	$ 100,191.50	3.59	$ 112,907	0.00	$ -	$ 112,907.13
153	1367.1001	1367.350098	Residential	5923.343201	$ 4,300,347	$ 2,150,174	1367.170654	-0.18	1367.170044	-0.18	1367.174072	-0.18	1367.174072	-0.18	3.279784	$ 141,042	0	$ -	$ 141,042.10	3.295896	$ 141,735	0	$ -	$ 141,734.97
154	1378.0719	1378.321899	Residential	5311.497314	$ 3,856,147	$ 1,928,074	1378.216553	-0.11	1378.219971	-0.10	1378.218384	-0.10	1378.218384	-0.10	3.592288	$ 138,524	0	$ -	$ 138,523.91	3.58594	$ 138,279	0	$ -	$ 138,279.12
155	1380.4923	1380.74231	Residential	2746.666016	$ 1,994,080	$ 997,040	1380.633667	-0.11	1380.62915	-0.11	1380.637695	-0.10	1380.638184	-0.10	3.55	$ 70,737	0.00	$ -	$ 70,737.18	3.58	$ 71,458	0.00	$ -	$ 71,457.76
156	1373.4617	1373.71167	Residential	6659.882751	$ 4,835,075	$ 2,417,537	1373.625244	-0.09	1373.630005	-0.08	1373.626709	-0.08	1373.626709	-0.08	3.67	$ 177,609	0.00	$ -	$ 177,608.74	3.66	$ 176,971	0.00	$ -	$ 176,971.28
157	1376.4575	1376.70752	Residential	4604.081482	$ 3,342,563	$ 1,671,282	1376.469116	-0.24	1376.470581	-0.24	1376.488281	-0.22	1376.477417	-0.23	3.052244	$ 102,023	0	$ -	$ 102,023.18	3.079588	$ 102,937	0	$ -	$ 102,937.17
158	1374.9485	1375.198486	Residential	5014.781799	$ 3,640,732	$ 1,820,366	1374.963501	-0.23	1374.963257	-0.24	1374.966919	-0.23	1374.966919	-0.23	3.059084	$ 111,373	0	$ -	$ 111,373.04	3.073732	$ 111,906	0	$ -	$ 111,906.33

10-Year and 100-Year Proposed Building Damages in Area K

															Proposed								
Building ID	HAG	Finished Floor Elevation (ft)	Land Use Type	Building Area (sf)	Replace Cost $ ($726/SF-Res)	Content Replacement Value ($) 1/2 of Replacement Cost	10yr Exist WSEL (ft)	10yr Exist Flow Depth (ft)	10yr Prop WSEL (ft)	10yr Prop Flow Depth (ft)	100yr Exist WSEL (ft)	100yr Exist Flow Depth (ft)	100yr Prop WSEL (ft)	100yr Prop Flow Depth (ft)	10yr Building Damage (%)	10yrBuilding Damage Cost ($)	10yr Content Damage (%)	10yr Content Damage Cost ($)	10yr Total Damage Cost ($)	100yr Building Damage (%)	100yrBuilding Damage Cost ($)	100yr Content Damage (%)	100yr Content Damage Cost ($)	100yr Total Damage Cost ($)
159	1368.0206	1368.27063	Residential	8032.684509	$ 5,831,729	$ 2,915,864	1368.052124	-0.22	1368.050049	-0.22	1368.055664	-0.21	1368.055664	-0.21	3.12	$ 181,814	0.00	$ -	$ 181,814.41	3.14	$ 183,124	0.00	$ -	$ 183,124.22
160	1364.0402	1364.290161	Residential	7812.84906	$ 5,672,128	$ 2,836,064	1364.276733	-0.01	1364.280029	-0.01	1364.278564	-0.01	1364.278687	-0.01	3.959472	$ 224,586	0	$ -	$ 224,586.34	3.954104	$ 224,282	0	$ -	$ 224,281.86
161	1379.0062	1379.256226	Residential	4673.951538	$ 3,393,289	$ 1,696,644	1379.0354	-0.22	1379.033325	-0.22	1379.041504	-0.21	1379.041504	-0.21	3.108396	$ 105,477	0	$ -	$ 105,476.85	3.141112	$ 106,587	0	$ -	$ 106,587.00
162	1351.6937	1351.943726	Residential	7145.512817	$ 5,187,642	$ 2,593,821	1351.736572	-0.21	1351.73999	-0.20	1351.739258	-0.20	1351.739258	-0.20	3.185056	$ 165,229	0	$ -	$ 165,229.31	3.182128	$ 165,077	0	$ -	$ 165,077.42
163	1356.0435	1356.293457	Residential	8016.633606	$ 5,820,076	$ 2,910,038	1356.115234	-0.18	1356.119995	-0.17	1356.119141	-0.17	1356.119141	-0.17	3.31	$ 192,421	0.00	$ -	$ 192,420.56	3.30	$ 192,222	0.00	$ -	$ 192,221.75
164	1353.3625	1353.612549	Residential	5229.221985	$ 3,796,415	$ 1,898,208	1353.494629	-0.12	1353.48999	-0.12	1353.49646	-0.12	1353.49646	-0.12	3.509764	$ 133,245	0	$ -	$ 133,245.21	3.535644	$ 134,228	0	$ -	$ 134,227.72
165	1383.4026	1383.652588	Residential	5383.90863	$ 3,908,718	$ 1,954,359	1383.43689	-0.22	1383.439697	-0.21	1383.464355	-0.19	1383.744873	0.09	3.148436	$ 123,063	0	$ -	$ 123,063.47	6.76855	$ 264,564	3.87597	$ 75,750	$ 340,313.87
166	1372.4465	1372.696533	Residential	5019.003479	$ 3,643,797	$ 1,821,898	1372.785156	0.09	1372.790039	0.09	1372.791992	0.10	1372.786621	0.09	6.80518	$ 247,967	3.927252	$ 71,551	$ 319,517.45	6.70264	$ 244,231	3.783696	$ 68,935	$ 313,165.66
167	1362.7709	1363.020874	Residential	89.848938	$ 65,230	$ 32,615	1362.811768	-0.21	1362.813477	-0.21	1362.815186	-0.21	1362.815186	-0.21	3.170412	$ 2,068	0	$ -	$ 2,068.07	3.177248	$ 2,073	0	$ -	$ 2,072.53
168	1365.083	1365.333008	Residential	7013.951599	$ 5,092,129	$ 2,546,064	1365.13855	-0.19	1365.140015	-0.19	1365.140991	-0.19	1365.140991	-0.19	3.23	$ 164,375	0.00	$ -	$ 164,375.35	3.23	$ 164,574	0.00	$ -	$ 164,574.14
169	1362.7377	1362.987671	Residential	5120.312622	$ 3,717,347	$ 1,858,673	1362.824219	-0.16	1362.821777	-0.17	1362.997803	0.01	1362.758911	-0.23	3.336424	$ 124,026	0	$ -	$ 124,026.46	3.08496	$ 114,679	0	$ -	$ 114,678.67
170	1360.1978	1360.447754	Residential	793.997314	$ 576,442	$ 288,221	1360.297607	-0.15	1360.296753	-0.15	1360.363892	-0.08	1360.36377	-0.08	3.395996	$ 19,576	0	$ -	$ 19,575.95	3.664064	$ 21,121	0	$ -	$ 21,121.21
171	1376.9437	1377.193726	Residential	6148.210022	$ 4,463,600	$ 2,231,800	1377.074829	-0.12	1377.073853	-0.12	1377.077393	-0.12	1377.077393	-0.12	3.520508	$ 157,141	0	$ -	$ 157,141.41	3.534668	$ 157,773	0	$ -	$ 157,773.46
172	1382.8645	1383.114502	Residential	417.621704	$ 303,193	$ 151,597	1383.075317	-0.04	1383.074097	-0.04	1383.662109	0.55	1383.49707	0.38	3.83838	$ 11,638	0	$ -	$ 11,637.71	15.47704	$ 46,925	16.067856	$ 24,358	$ 71,283.69
173	1382.9543	1383.204346	Residential	7021.7854	$ 5,097,816	$ 2,548,908	1383.303101	0.10	1383.30249	0.10	1383.720337	0.52	1384.014648	0.81	6.94	$ 354,009	4.12	$ 105,067	$ 459,075.89	28.31	$ 1,443,144	34.03	$ 867,462	$ 2,310,605.69
174	1360.3568	1360.606812	Residential	987.539978	$ 716,954	$ 358,477	1360.389648	-0.22	1360.390015	-0.22	1360.392334	-0.21	1360.392334	-0.21	3.132812	$ 22,461	0	$ -	$ 22,460.82	3.142088	$ 22,527	0	$ -	$ 22,527.33
175	1371.0583	1371.30835	Residential	4343.393616	$ 3,153,304	$ 1,576,652	1371.106812	-0.20	1371.103516	-0.20	1371.108887	-0.20	1371.108887	-0.20	3.180664	$ 100,296	0	$ -	$ 100,296.00	3.202148	$ 100,973	0	$ -	$ 100,973.45
176	1363.4857	1363.735718	Residential	1258.273743	$ 913,507	$ 456,753	1363.566162	-0.17	1363.56543	-0.17	1363.714722	-0.02	1363.61731	-0.12	3.318848	$ 30,318	0	$ -	$ 30,317.90	3.526368	$ 32,214	0	$ -	$ 32,213.61
177	1382.4683	1382.718262	Residential	5926.931763	$ 4,302,952	$ 2,151,476	1382.520874	-0.20	1382.522339	-0.20	1383.109375	0.39	1382.892212	0.17	3.216308	$ 138,396	0	$ -	$ 138,396.20	9.2185	$ 396,668	7.3059	$ 157,185	$ 553,852.37
178	1367.0305	1367.280518	Residential	7461.676697	$ 5,417,177	$ 2,708,589	1367.084473	-0.20	1367.079956	-0.20	1367.086426	-0.19	1367.086304	-0.19	3.197752	$ 173,228	0	$ -	$ 173,227.89	3.223144	$ 174,603	0	$ -	$ 174,603.42
179	1366.8289	1367.078857	Residential	8772.664185	$ 6,368,954	$ 3,184,477	1367.044067	-0.03	1367.04834	-0.03	1367.045654	-0.03	1367.045654	-0.03	3.877932	$ 246,984	0	$ -	$ 246,983.71	3.867188	$ 246,299	0	$ -	$ 246,299.43
180	1364.3354	1364.585449	Residential	1242.911804	$ 902,354	$ 451,177	1364.427124	-0.16	1364.428833	-0.16	1364.576904	-0.01	1364.416138	-0.17	3.373536	$ 30,441	0	$ -	$ 30,441.24	3.322756	$ 29,983	0	$ -	$ 29,983.02
181	1385.5297	1385.779663	Residential	4264.038574	$ 3,095,692	$ 1,547,846	1385.641846	-0.14	1385.642456	-0.14	1385.643677	-0.14	1385.643799	-0.14	3.451172	$ 106,838	0	$ -	$ 106,837.66	3.456544	$ 107,004	0	$ -	$ 107,003.96
182	1374.311	1374.561035	Residential	5276.539246	$ 3,830,767	$ 1,915,384	1374.384644	-0.18	1374.380005	-0.18	1374.387817	-0.17	1374.387817	-0.17	3.27588	$ 125,491	0	$ -	$ 125,491.35	3.307128	$ 126,688	0	$ -	$ 126,688.38
183	1358.566	1358.81604	Residential	7594.135925	$ 5,513,343	$ 2,756,671	1358.577881	-0.24	1358.579956	-0.24	1358.580444	-0.24	1358.580444	-0.24	3.06	$ 168,469	0.00	$ -	$ 168,469.23	3.06	$ 168,577	0.00	$ -	$ 168,576.85
184	1380.236	1380.485962	Residential	4827.576904	$ 3,504,821	$ 1,752,410	1380.30188	-0.18	1380.304321	-0.18	1380.490601	0.00	1380.304321	-0.18	3.273436	$ 114,728	0	$ -	$ 114,728.07	3.273436	$ 114,728	0	$ -	$ 114,728.07
185	1363.7234	1363.973389	Residential	10285.24762	$ 7,467,090	$ 3,733,545	1363.945801	-0.03	1363.949951	-0.02	1363.94751	-0.03	1363.947388	-0.03	3.906248	$ 291,683	0	$ -	$ 291,683.04	3.895996	$ 290,918	0	$ -	$ 290,917.52
186	1364.5854	1364.835449	Residential	6041.695801	$ 4,386,271	$ 2,193,136	1364.953857	0.12	1364.951416	0.12	1365.078857	0.24	1364.9823	0.15	7.48	$ 328,050	4.87	$ 106,819	$ 434,868.83	8.41	$ 368,689	6.17	$ 135,267	$ 503,956.28
187	1358.5145	1358.764526	Residential	4361.768433	$ 3,166,644	$ 1,583,322	1358.786499	0.02	1358.790039	0.03	1358.788574	0.02	1358.788574	0.02	4.76539	$ 150,903	1.071546	$ 16,966	$ 167,868.95	4.72144	$ 149,511	1.010016	$ 15,992	$ 165,503.00
188	1364.4982	1364.748169	Residential	2346.480347	$ 1,703,545	$ 851,772	1364.658569	-0.09	1364.660034	-0.09	1364.901978	0.15	1364.857544	0.11	3.65	$ 62,136	0.00	$ -	$ 62,136.11	7.28	$ 124,039	4.59	$ 39,128	$ 163,167.64
189	1349.9558	1350.205811	Residential	2159.600586	$ 1,567,870	$ 783,935	1349.965942	-0.24	1349.969971	-0.24	1349.987671	-0.22	1349.968506	-0.24	3.06	$ 47,924	0.00	$ -	$ 47,924.14	3.05	$ 47,832	0.00	$ -	$ 47,832.27
190	1378.7681	1379.018066	Residential	11906.15375	$ 8,643,868	$ 4,321,934	1378.897461	-0.12	1378.895508	-0.12	1378.978882	-0.04	1378.978882	-0.04	3.51	$ 303,380	0.00	$ -	$ 303,379.70	3.84	$ 332,207	0.00	$ -	$ 332,206.65
191	1368.9064	1369.156372	Residential	8501.921448	$ 6,172,395	$ 3,086,197	1368.998169	-0.16	1369	-0.16	1369.000854	-0.16	1369.000854	-0.16	3.37	$ 208,288	0.00	$ -	$ 208,288.21	3.38	$ 208,499	0.00	$ -	$ 208,499.06
192	1386.421	1386.671021	Residential	7075.245361	$ 5,136,628	$ 2,568,314	1386.675415	0.00	1386.675537	0.00	1387.56189	0.89	1387.329956	0.66	4.14	$ 212,424	0.19	$ 4,871	$ 217,295.60	23.77	$ 1,220,876	27.68	$ 710,788	$ 1,931,664.19
193	1362.7275	1362.977539	Residential	9759.761292	$ 7,085,587	$ 3,542,793	1362.987305	0.01	1362.98999	0.01	1362.989624	0.01	1362.989624	0.01	4.37	$ 309,890	0.52	$ 18,527	$ 328,417.01	4.36	$ 309,112	0.51	$ 17,982	$ 327,094.42
194	1359.8994	1360.149414	Residential	5130.461975	$ 3,724,715	$ 1,862,358	1360.129272	-0.02	1360.109985	-0.04	1360.291382	0.14	1360.05542	-0.09	3.842284	$ 143,114	0	$ -	$ 143,114.14	3.624024	$ 134,985	0	$ -	$ 134,984.58
195	1371.9503	1372.200317	Residential	5811.423157	$ 4,219,093	$ 2,109,547	1372.028442	-0.17	1372.030029	-0.17	1372.031372	-0.17	1372.031372	-0.17	3.318848	$ 140,025	0	$ -	$ 140,025.29	3.32422	$ 140,252	0	$ -	$ 140,251.94
196	1375.9243	1376.174316	Residential	3570.859131	$ 2,592,444	$ 1,296,222	1375.952637	-0.22	1375.952393	-0.22	1375.955322	-0.22	1375.955444	-0.22	3.112308	$ 80,685	0	$ -	$ 80,684.83	3.124512	$ 81,001	0	$ -	$ 81,001.22
197	1382.3914	1382.641357	Residential	4534.560791	$ 3,292,091	$ 1,646,046	1382.78833	0.15	1382.78894	0.15	1382.793213	0.15	1382.793091	0.15	8.43	$ 277,441	6.20	$ 102,030	$ 379,470.56	8.55	$ 281,540	6.37	$ 104,900	$ 386,439.95
198	1372.3955	1372.645508	Residential	3843.095703	$ 2,790,087	$ 1,395,044	1372.505371	-0.14	1372.508545	-0.14	1372.546753	-0.10	1372.546753	-0.10	3.452148	$ 96,318	0	$ -	$ 96,317.95	3.60498	$ 100,582	0	$ -	$ 100,582.10
199	1378.7993	1379.049316	Residential	5130.287109	$ 3,724,588	$ 1,862,294	1379.104492	0.06	1379.099976	0.05	1379.106445	0.06	1379.106323	0.06	5.52	$ 205,590	2.13	$ 39,624	$ 245,214.24	5.71	$ 212,682	2.39	$ 44,589	$ 257,270.62
200	1369.2933	1369.543335	Residential	4194.780518	$ 3,045,411	$ 1,522,705	1369.405518	-0.14	1369.407227	-0.14	1369.692261	0.15	1369.369751	-0.17	3.455568	$ 105,236	0	$ -	$ 105,236.24	3.305664	$ 100,671	0	$ -	$ 100,671.04
201	1384.4399	1384.689941	Residential	4500.588989	$ 3,267,428	$ 1,633,714	1385.165039	0.48	1385.160034	0.47	1385.166504	0.48	1385.166626	0.48	18.10279	$ 591,496	19.743906	$ 322,559	$ 914,054.48	18.30055	$ 597,957	20.02077	$ 327,082	$ 925,039.31
202	1386.7983	1387.04834	Residential	4524.202332	$ 3,284,571	$ 1,642,285	1387.091187	0.04	1387.081299	0.03	1387.682007	0.63	1386.833618	-0.21	4.98877	$ 163,860	1.384278	$ 22,734	$ 186,593.48	3.141112	$ 103,172	0	$ -	$ 103,172.05
203	1372.1863	1372.436279	Residential	4600.928711	$ 3,340,274	$ 1,670,137	1372.266113	-0.17	1372.266479	-0.17	1372.269165	-0.17	1372.269287	-0.17	3.3208	$ 110,924	0	$ -	$ 110,923.83	3.332032	$ 111,299	0	$ -	$ 111,299.01
204	1351.7186	1351.968628	Residential	927.027771	$ 673,022	$ 336,511	1351.785278	-0.18	1351.790039	-0.18	1351.787354	-0.18	1351.787476	-0.18	3.285644	$ 22,113	0	$ -	$ 22,113.11	3.275392	$ 22,044	0	$ -	$ 22,044.11
205	1373.9084	1374.158447	Residential	6269.81665	$ 4,551,887	$ 2,275,943	1374.034424	-0.12	1374.030029	-0.13	1374.037842	-0.12	1374.037842	-0.12	3.486328	$ 158,694	0	$ -	$ 158,693.71	3.51758	$ 160,116	0	$ -	$ 160,116.26
206	1365.4144	1365.664429	Residential	6051.600159	$ 4,393,462	$ 2,196,731	1365.444336	-0.22	1365.444214	-0.22	1365.870117	0.21	1365.701416	0.04	3.11914	$ 137,038	0	$ -	$ 137,038.22	5.10961	$ 224,489	1.553454	$ 34,125	$ 258,613.96
207	1353.8657	1354.115723	Residential	755.925842	$ 548,802	$ 274,401	1353.93396	-0.18	1353.930054	-0.19	1353.936157	-0.18	1353.936157	-0.18	3.26	$ 17,876	0.00	$ -	$ 17,876.26	3.28	$ 18,010	0.00	$ -	$ 18,010.24
208	1369.4449	1369.694946	Residential	7994.761414	$ 5,804,197	$ 2,902,098	1369.686035	-0.01	1369.689941	-0.01	1369.687744	-0.01	1369.687744	-0.01	3.98	$ 231,006	0.00	$ -	$ 231,005.87	3.97	$ 230,496	0.00	$ -	$ 230,495.80
209	1356.6626	1356.912598	Residential	6371.821533	$ 4,625,942	$ 2,312,971	1356.790527	-0.12	1356.794678	-0.12	1357.093018	0.18	1356.822266	-0.09	3.52832	$ 163,218	0	$ -	$ 163,218.05	3.638672	$ 168,323	0	$ -	$ 168,322.87
210	1378.3789	1378.628906	Residential	1189.775024	$ 863,777	$ 431,888	1378.425903	-0.20	1378.430054	-0.20	1378.454956	-0.17	1378.473999	-0.15	3.20	$ 27,681	0.00	$ -	$ 27,680.52	3.38	$ 29,199	0.00	$ -	$ 29,198.86
211	1372.8145	1373.064453	Residential	7189.552734	$ 5,219,615	$ 2,609,808	1372.927002	-0.14	1372.930054	-0.13	1372.929077	-0.14	1372.929199	-0.14	3.462404	$ 180,724	0	$ -	$ 180,724.17	3.458984	$ 180,546	0	$ -	$ 180,545.66
212	1384.6993	1384.949341	Residential	4849.682129	$ 3,520,869	$ 1,760,435	1384.800659	-0.15	1384.798706	-0.15	1384.845337	-0.10	1384.848267	-0.10	3.40	$ 119,620	0.00	$ -	$ 119,620.12	3.60	$ 126,600	0.00	$ -	$ 126,600.04
213	1374.1124	1374.362427	Residential	5543.06311	$ 4,024,264	$ 2,012,132	1374.303589	-0.06	1374.300049	-0.06	1375.235962	0.87	1374.947021	0.58	3.75	$ 150,930	0.00	$ -	$ 150,929.53	21.54	$ 866,739	24.55	$ 494,038	$ 1,360,776.40
214	1351.9253	1352.175293	Residential	7474.652283	$ 5,426,598	$ 2,713,299	1352.022827	-0.15	1352.020386	-0.15	1352.025024	-0.15	1352.025146	-0.15	3.38	$ 183,439	0.00	$ -	$ 183,439.18	3.40	$ 184,472	0.00	$ -	$ 184,472.41
215	1372.7062	1372.956177	Residential	365.232666	$ 265,159	$ 132,579	1372.750366	-0.21	1372.75	-0.21	1372.754272	-0.20	1372.754272	-0.20	3.175292	$ 8,420	0	$ -	$ 8,419.57	3.19238	$ 8,465	0	$ -	$ 8,464.88
216	1383.9557	1384.205688	Residential	10282.73602	$ 7,465,266	$ 3,732,633	1384.018188	-0.19	1384.02002	-0.19	1384.431885	0.23	1384.276855	0.07	3.257328	$ 243,168	0	$ -	$ 243,168.21	6.13501	$ 457,995	2.989014	$ 111,569	$ 569,563.77
217	1379.6527	1379.90271	Residential	5808.621948	$ 4,217,060	$ 2,108,530	1379.669067	-0.23	1379.665283	-0.24	1379.678833	-0.22	1379.678833	-0.22	3.050292	$ 128,633	0	$ -	$ 128,632.63	3.104492	$ 130,918	0	$ -	$ 130,918.28
218	1378.8989	1379.148926	Residential	5431.955078	$ 3,943,599	$ 1,971,800	1378.959473	-0.19	1378.959961	-0.19	1379.071411	-0.08	1379.14856	0.00	3.24414	$ 127,936	0	$ -	$ 127,935.89	3.998536	$ 157,686	0	$ -	$ 157,686.24
219	1361.0637	1361.313721	Residential	697.469788	$ 506,363	$ 253,182	1361.248169	-0.07	1361.244873	-0.07	1361.327881	0.01	1361.283569	-0.03	3.724608	$ 18,860	0	$ -	$ 18,860.04	3.879392	$ 19,644	0	$ -	$ 19,643.81
220	1363.9265	1364.176514	Residential	5530.390808	$ 4,015,064	$ 2,007,532	1364.312012	0.14	1364.307861	0.13	1364.484375	0.31	1364.317505	0.14	7.94	$ 318,813	5.52	$ 110,747	$ 429,559.50	8.23	$ 330,429	5.92	$ 118,878	$ 449,307.35
221	1365.9146	1366.164551	Residential	7421.591003	$ 5,388,075	$ 2,694,038	1365.946289	-0.22	1365.947144	-0.22	1365.94812	-0.22	1365.94812	-0.22	3.130372	$ 168,667	0	$ -	$ 168,666.79	3.134276	$ 168,877	0	$ -	$ 168,877.14
222	1355.2457	1355.495728	Residential	6237.714416	$ 4,528,581	$ 2,264,290	1355.38916	-0.11	1355.387085	-0.11	1355.394287	-0.10	1355.394287	-0.10	3.565428	$ 161,463	0	$ -	$ 161,463.28	3.594236	$ 162,768	0	$ -	$ 162,767.88
223	1367.9564	1368.206421	Residential	6903.520142	$ 5,011,956	$ 2,505,978	1368.126953	-0.08	1368.130005	-0.08	1368.12915	-0.08	1368.12915	-0.08	3.694336	$ 185,158	0.00	$ -	$ 185,158.48	3.690916	$ 184,987	0.00	$ -	$ 184,987.07
224	1367.7229	1367.9729	Residential	7568.887512	$ 5,495,012	$ 2,747,506	1367.817627	-0.16	1367.819946	-0.15	1367.859985	-0.11	1367.819946	-0.15	3.388184	$ 186,181	0	$ -	$ 186,181.13	3.388184	$ 186,181	0	$ -	$ 186,181.13
225	1372.2632	1372.513184	Residential	6819.513489	$ 4,950,967	$ 2,475,483	1372.534302	0.02	1372.530029	0.02	1372.535645	0.02	1372.535645	0.02	4.51	$ 223,058	0.71	$ 17,514	$ 240,572.18	4.67	$ 231,400	0.94	$ 23,353	$ 254,752.54
226	1382.7257	1382.975708	Residential	414.181458	$ 300,696	$ 150,348	1382.818604	-0.16	1382.819946	-0.16	1382.976807	0.00	1383.06543	0.09	3.376952	$ 10,154	0.00	$ -	$ 10,154.35	6.69166	$ 20,122	3.77	$ 5,666	$ 25,787.13
227	1377.9037	1378.153687	Residential	6325.296997	$ 4,592,166	$ 2,296,083	1377.931274	-0.22	1377.93042	-0.22	1377.95105	-0.20	1377.956909	-0.20	3.11	$ 142,675	0.00	$ -	$ 142,675.46	3.21	$ 147,541	0.00	$ -	$ 147,541.14
228	1369.9781	1370.228149	Residential	7107.003967	$ 5,159,685	$ 2,579,842	1370.020264	-0.21	1370.02002	-0.21	1370.023315	-0.20	1370.023315	-0.20	3.17	$ 163,432	0.00	$ -	$ 163,432.19	3.18	$ 164,112	0.00	$ -	$ 164,112.24
229	1366.7046	1366.95459	Residential	6420.218262	$ 4,661,078	$ 2,330,539	1366.699341	-0.26	1366.699951	-0.25	1366.702881	-0.25	1366.702881	-0.25	2.98	$ 138,967	0.00	$ -	$ 138,967.44	2.99	$ 139,514	0.00	$ -	$ 139,513.72
230	1355.0955	1355.345459	Residential	7691.567017	$ 5,584,078	$ 2,792,039	1355.132324	-0.21	1355.130005	-0.22	1355.30835	-0.04	1355.136841	-0.21	3.138184	$ 175,239	0	$ -	$ 175,238.63	3.165528	$ 176,766	0	$ -	$ 176,765.54
231	1372.5229	1372.772949	Residential	7904.628235	$ 5,738,760	$ 2,869,380	1372.625	-0.15	1372.622925	-0.15	1372.852051	0.08	1372.627319	-0.15	3.399904	$ 195,112	0	$ -	$ 195,112.33	3.41748	$ 196,121	0	$ -	$ 196,120.98
232	1373.4587	1373.70874	Residential	6641.056396	$ 4,821,407	$ 2,410,703	1373.506714	-0.20	1373.506592	-0.20	1373.51062	-0.20	1373.51062	-0.20	3.19	$ 153,871	0.00	$ -	$ 153,870.77	3.21	$ 154,648	0.00	$ -	$ 154,647.59
233	1368.4092	1368.65918	Residential	650.331116	$ 472,140	$ 236,070	1368.462769	-0.20	1368.466675	-0.19	1368.465942	-0.19	1368.465942	-0.19	3.22998	$ 15,250	0	$ -	$ 15,250.04	3.227048	$ 15,236	0	$ -	$ 15,236.20
234	1360.5137	1360.763672	Residential	6230.277466	$ 4,523,181	$ 2,261,591	1360.886719	0.12	1360.882568	0.12	1361.106689	0.34	1360.874512	0.11	7.56688	$ 342,264	4.993632	$ 112,936	$ 455,199.23	7.3252	$ 331,332	4.65528	$ 105,283	$ 436,615.47
235	1353.9615	1354.211548	Residential	6218.86676	$ 4,514,897	$ 2,257,449	1354.11731	-0.09	1354.119995	-0.09	1354.119385	-0.09	1354.119385	-0.09	3.63	$ 164,062	0.00	$ -	$ 164,061.80	3.63	$ 163,952	0.00	$ -	$ 163,951.63
236	1361.0813	1361.331299	Residential	552.338257	$ 400,998	$ 200,499	1361.399292	0.07	1361.398926	0.07	1361.947754	0.62	1361.722046	0.39	6.02881	$ 24,175	2.840334	$ 5,695	$ 29,870.22	15.72241	$ 63,046	16.411374	$ 32,905	$ 95,951.09

10-Year and 100-Year Proposed Building Damages in Area K

															Proposed								
Building ID	HAG	Finished Floor Elevation (ft)	Land Use Type	Building Area (sf)	Replace Cost $ ($726/SF-Res)	Content Replacement Value ($) 1/2 of Replacement Cost	10yr Exist WSEL (ft)	10yr Exist Flow Depth (ft)	10yr Prop WSEL (ft)	10yr Prop Flow Depth (ft)	100yr Exist WSEL (ft)	100yr Exist Flow Depth (ft)	100yr Prop WSEL (ft)	100yr Prop Flow Depth (ft)	10yr Building Damage (%)	10yrBuilding Damage Cost ($)	10yr Content Damage (%)	10yr Content Damage Cost ($)	10yr Total Damage Cost ($)	100yr Building Damage (%)	100yrBuilding Damage Cost ($)	100yr Content Damage (%)	100yr Content Damage Cost ($)	100yr Total Damage Cost ($)
237	1363.077	1363.327026	Residential	10609.44226	$ 7,702,455	$ 3,851,228	1363.127563	-0.20	1363.130005	-0.20	1363.129761	-0.20	1363.129761	-0.20	3.21	$ 247,396	0.00	$ -	$ 247,396.39	3.21	$ 247,321	0.00	$ -	$ 247,321.21
238	1349.4791	1349.729126	Residential	1499.625549	$ 1,088,728	$ 544,364	1349.505493	-0.22	1349.505371	-0.22	1349.608521	-0.12	1349.554077	-0.18	3.10498	$ 33,805	0	$ -	$ 33,804.79	3.299804	$ 35,926	0	$ -	$ 35,925.89
239	1368.2323	1368.4823	Residential	6792.286804	$ 4,931,200	$ 2,465,600	1368.323364	-0.16	1368.321777	-0.16	1368.325684	-0.16	1368.325684	-0.16	3.36	$ 165,585	0.00	$ -	$ 165,585.17	3.37	$ 166,356	0.00	$ -	$ 166,355.81
240	1366.8684	1367.118408	Residential	6303.598511	$ 4,576,413	$ 2,288,206	1366.92749	-0.19	1366.926025	-0.19	1366.931519	-0.19	1366.931519	-0.19	3.230468	$ 147,840	0	$ -	$ 147,839.54	3.252444	$ 148,845	0	$ -	$ 148,845.25
241	1381.4254	1381.675415	Residential	8258.813843	$ 5,995,899	$ 2,997,949	1381.619629	-0.06	1381.620728	-0.05	1381.691772	0.02	1381.666382	-0.01	3.781252	$ 226,720	0	$ -	$ 226,720.05	3.963868	$ 237,670	0	$ -	$ 237,669.52
242	1374.0637	1374.313721	Residential	1514.909546	$ 1,099,824	$ 549,912	1374.154053	-0.16	1374.150024	-0.16	1374.155151	-0.16	1374.155273	-0.16	3.345212	$ 36,791	0	$ -	$ 36,791.46	3.366208	$ 37,022	0	$ -	$ 37,022.37
243	1361.5778	1361.827759	Residential	5731.376465	$ 4,160,979	$ 2,080,490	1361.610352	-0.22	1361.609985	-0.22	1361.613403	-0.21	1361.613403	-0.21	3.13	$ 130,193	0.00	$ -	$ 130,193.05	3.14	$ 130,762	0.00	$ -	$ 130,761.94
244	1368.0669	1368.316895	Residential	820.711121	$ 595,836	$ 297,918	1368.264038	-0.05	1368.26001	-0.06	1368.454102	0.14	1368.264893	-0.05	3.77246	$ 22,478	0	$ -	$ 22,477.69	3.791992	$ 22,594	0	$ -	$ 22,594.06
245	1377.4694	1377.71936	Residential	9322.061707	$ 6,767,817	$ 3,383,908	1377.481201	-0.24	1377.478882	-0.24	1377.491089	-0.23	1377.491089	-0.23	3.04	$ 205,612	0.00	$ -	$ 205,612.23	3.09	$ 208,917	0.00	$ -	$ 208,916.82
246	1370.7789	1371.028931	Residential	4462.246643	$ 3,239,591	$ 1,619,796	1370.87854	-0.15	1370.880005	-0.15	1370.880981	-0.15	1370.880981	-0.15	3.404296	$ 110,285	0	$ -	$ 110,285.27	3.4082	$ 110,412	0	$ -	$ 110,411.74
247	1383.4347	1383.684692	Residential	5164.128662	$ 3,749,157	$ 1,874,579	1383.55481	-0.13	1383.557129	-0.13	1383.557861	-0.13	1383.557861	-0.13	3.49	$ 130,836	0.00	$ -	$ 130,836.15	3.49	$ 130,946	0.00	$ -	$ 130,945.92
248	1383.4193	1383.669312	Residential	5801.94397	$ 4,212,211	$ 2,106,106	1383.576904	-0.09	1383.579956	-0.09	1383.578613	-0.09	1383.578491	-0.09	3.642576	$ 153,433	0.00	$ -	$ 153,433.00	3.636716	$ 153,186	0.00	$ -	$ 153,186.16
249	1364.1787	1364.428711	Residential	4602.597412	$ 3,341,486	$ 1,670,743	1364.308594	-0.12	1364.310059	-0.12	1364.533447	0.10	1364.389771	-0.04	3.53	$ 117,800	0.00	$ -	$ 117,800.47	3.84	$ 128,455	0.00	$ -	$ 128,454.73
250	1378.4397	1378.689697	Residential	5496.526245	$ 3,990,478	$ 1,995,239	1378.47644	-0.21	1378.47998	-0.21	1378.478271	-0.21	1378.478271	-0.21	3.16	$ 126,144	0.00	$ -	$ 126,144.28	3.15	$ 125,871	0.00	$ -	$ 125,871.49
251	1380.9373	1381.187256	Residential	5218.038513	$ 3,788,296	$ 1,894,148	1380.941772	-0.25	1380.939819	-0.25	1380.987305	-0.20	1381.089478	-0.10	3.01	$ 114,037	0.00	$ -	$ 114,037.25	3.61	$ 136,715	0.00	$ -	$ 136,715.36
252	1384.512	1384.761963	Residential	4131.500061	$ 2,999,469	$ 1,499,735	1384.564697	-0.20	1384.560059	-0.20	1384.589355	-0.17	1384.589355	-0.17	3.192384	$ 95,755	0	$ -	$ 95,754.57	3.309568	$ 99,269	0	$ -	$ 99,269.47
253	1359.9803	1360.230347	Residential	2268.955322	$ 1,647,262	$ 823,631	1360.014893	-0.22	1360.013794	-0.22	1360.255005	0.02	1360.105713	-0.12	3.133788	$ 51,622	0	$ -	$ 51,621.69	3.501464	$ 57,678	0	$ -	$ 57,678.27
254	1352.5721	1352.822144	Residential	5705.019409	$ 4,141,844	$ 2,070,922	1352.655762	-0.17	1352.660034	-0.16	1352.8479	0.03	1352.69519	-0.13	3.35	$ 138,816	0.00	$ -	$ 138,816.39	3.49	$ 144,641	0.00	$ -	$ 144,640.82
255	1377.2522	1377.502197	Residential	6675.252869	$ 4,846,234	$ 2,423,117	1377.436279	-0.07	1377.435181	-0.07	1377.437622	-0.06	1377.437744	-0.06	3.73	$ 180,858	0.00	$ -	$ 180,858.34	3.74	$ 181,355	0.00	$ -	$ 181,355.17
256	1378.1875	1378.4375	Residential	1162.67511	$ 844,102	$ 422,051	1378.304199	-0.13	1378.302246	-0.14	1378.308716	-0.13	1378.308716	-0.13	3.458984	$ 29,197	0	$ -	$ 29,197.36	3.484864	$ 29,416	0	$ -	$ 29,415.81
257	1351.558	1351.807983	Residential	7151.573364	$ 5,192,042	$ 2,596,021	1351.605347	-0.20	1351.609985	-0.20	1351.660278	-0.15	1351.607544	-0.20	3.208008	$ 166,561	0	$ -	$ 166,561.13	3.198244	$ 166,054	0	$ -	$ 166,054.18
258	1352.8057	1353.055664	Residential	1599.585388	$ 1,161,299	$ 580,649	1352.888916	-0.17	1352.890991	-0.16	1353.143311	0.09	1352.966919	-0.09	3.341308	$ 38,803	0	$ -	$ 38,802.58	3.64502	$ 42,330	0	$ -	$ 42,329.58
259	1359.526	1359.776001	Residential	5013.345703	$ 3,639,689	$ 1,819,844	1359.563477	-0.21	1359.560059	-0.22	1359.815674	0.04	1359.676147	-0.10	3.14	$ 114,149	0.00	$ -	$ 114,149.09	3.60	$ 131,050	0.00	$ -	$ 131,050.06
260	1369.9309	1370.180908	Residential	1631.4505	$ 1,184,433	$ 592,217	1370.001343	-0.18	1370.003662	-0.18	1370.005859	-0.18	1370.005859	-0.18	3.29	$ 38,980	0.00	$ -	$ 38,979.88	3.30	$ 39,084	0.00	$ -	$ 39,083.97
261	1364.5201	1364.770142	Residential	6330.97168	$ 4,596,285	$ 2,298,143	1364.756348	-0.01	1364.76001	-0.01	1364.758057	-0.01	1364.758057	-0.01	3.959472	$ 181,989	0	$ -	$ 181,988.64	3.95166	$ 181,630	0	$ -	$ 181,629.57
262	1379.0126	1379.262573	Residential	11915.48267	$ 8,650,640	$ 4,325,320	1379.315308	0.05	1379.310059	0.05	1379.430786	0.17	1379.430786	0.17	5.42	$ 469,261	1.99	$ 86,265	$ 555,525.62	9.05	$ 782,571	7.06	$ 305,582	$ 1,088,152.21
263	1380.3851	1380.635132	Residential	839.351196	$ 609,369	$ 304,684	1380.475952	-0.16	1380.473145	-0.16	1380.871704	0.24	1380.726929	0.09	3.35	$ 20,426	0.00	$ -	$ 20,426.36	6.75	$ 41,156	3.86	$ 11,747	$ 52,903.26
264	1350.6312	1350.881226	Residential	11002.85187	$ 7,988,070	$ 3,994,035	1350.748291	-0.13	1350.744751	-0.14	1350.750366	-0.13	1350.750366	-0.13	3.4541	$ 275,916	0	$ -	$ 275,915.94	3.47656	$ 277,710	0	$ -	$ 277,710.06
265	1362.2693	1362.519287	Residential	8576.057251	$ 6,226,218	$ 3,113,109	1362.358276	-0.16	1362.359985	-0.16	1362.360718	-0.16	1362.360718	-0.16	3.362792	$ 209,375	0	$ -	$ 209,374.75	3.365724	$ 209,557	0	$ -	$ 209,557.30
266	1379.4694	1379.71936	Residential	541.316711	$ 392,996	$ 196,498	1379.508667	-0.21	1379.511963	-0.21	1379.52002	-0.20	1379.52002	-0.20	3.170412	$ 12,460	0	$ -	$ 12,459.59	3.20264	$ 12,586	0	$ -	$ 12,586.24
267	1375.348	1375.598022	Residential	5572.635681	$ 4,045,734	$ 2,022,867	1375.486694	-0.11	1375.48999	-0.11	1375.488647	-0.11	1375.488647	-0.11	3.567872	$ 144,347	0	$ -	$ 144,346.59	3.5625	$ 144,129	0	$ -	$ 144,129.26
268	1369.1	1369.349976	Residential	4953.879761	$ 3,596,517	$ 1,798,258	1369.13855	-0.21	1369.140015	-0.21	1369.140991	-0.21	1369.140991	-0.21	3.160156	$ 113,656	0	$ -	$ 113,655.54	3.16406	$ 113,796	0	$ -	$ 113,795.95
269	1375.8182	1376.068237	Residential	7317.905151	$ 5,312,799	$ 2,656,400	1375.90625	-0.16	1375.910034	-0.16	1375.908203	-0.16	1375.908203	-0.16	3.367188	$ 178,892	0	$ -	$ 178,891.94	3.359864	$ 178,503	0	$ -	$ 178,502.83
270	1372.4429	1372.692871	Residential	5703.677429	$ 4,140,870	$ 2,070,435	1372.499146	-0.19	1372.5	-0.19	1372.842041	0.15	1372.760498	0.07	3.228516	$ 133,689	0	$ -	$ 133,688.64	6.02881	$ 249,645	2.840334	$ 58,807	$ 308,452.44
271	1373.303	1373.552979	Residential	4983.422424	$ 3,617,965	$ 1,808,982	1373.359741	-0.19	1373.359985	-0.19	1373.362549	-0.19	1373.362549	-0.19	3.23	$ 116,789	0.00	$ -	$ 116,788.77	3.24	$ 117,160	0.00	$ -	$ 117,159.83
272	1374.13	1374.380005	Residential	1252.694458	$ 909,456	$ 454,728	1374.165894	-0.21	1374.165894	-0.21	1374.209473	-0.17	1374.31543	-0.06	3.14	$ 28,589	0.00	$ -	$ 28,589.26	3.74	$ 34,029	0.00	$ -	$ 34,029.12
273	1380.0908	1380.34082	Residential	6937.932373	$ 5,036,939	$ 2,518,469	1380.18396	-0.16	1380.179443	-0.16	1380.187744	-0.15	1380.187744	-0.15	3.354492	$ 168,964	0	$ -	$ 168,963.71	3.387696	$ 170,636	0	$ -	$ 170,636.18
274	1367.9772	1368.227173	Residential	913.789795	$ 663,411	$ 331,706	1368.055054	-0.17	1368.054565	-0.17	1368.118164	-0.11	1368.118652	-0.11	3.309568	$ 21,956	0	$ -	$ 21,956.05	3.565916	$ 23,657	0	$ -	$ 23,656.69
275	1385.3944	1385.644409	Residential	5771.407349	$ 4,190,042	$ 2,095,021	1385.609619	-0.03	1385.606689	-0.04	1385.611938	-0.03	1385.611938	-0.03	3.84912	$ 161,280	0	$ -	$ 161,279.73	3.870116	$ 162,159	0	$ -	$ 162,159.48
276	1387.2709	1387.520874	Residential	5552.046021	$ 4,030,785	$ 2,015,393	1387.311035	-0.21	1387.310547	-0.21	1387.504761	-0.02	1387.318115	-0.20	3.16	$ 127,320	0.00	$ -	$ 127,320.10	3.19	$ 128,540	0.00	$ -	$ 128,540.30
277	1367.6104	1367.860352	Residential	7009.434998	$ 5,088,850	$ 2,544,425	1367.910522	0.05	1367.907593	0.05	1367.91394	0.05	1367.91394	0.05	5.42	$ 275,675	1.98	$ 50,484	$ 326,159.19	5.61	$ 285,364	2.25	$ 57,267	$ 342,631.65
278	1363.4945	1363.744507	Residential	853.24762	$ 619,458	$ 309,729	1363.821899	0.08	1363.81604	0.07	1363.901367	0.16	1363.778931	0.03	6.14599	$ 38,072	3.004386	$ 9,305	$ 47,377.26	5.03272	$ 31,176	1.445808	$ 4,478	$ 35,653.66
279	1350.0875	1350.337524	Residential	10697.2514	$ 7,766,205	$ 3,883,102	1350.165649	-0.17	1350.170044	-0.17	1350.167847	-0.17	1350.167847	-0.17	3.33008	$ 258,621	0.00	$ -	$ 258,620.82	3.321292	$ 257,938	0.00	$ -	$ 257,938.33
280	1376.0103	1376.260254	Residential	5828.388794	$ 4,231,410	$ 2,115,705	1376.113281	-0.15	1376.110474	-0.15	1376.322021	0.06	1376.210327	-0.05	3.40088	$ 143,905	0	$ -	$ 143,905.19	3.800292	$ 160,806	0	$ -	$ 160,805.95
281	1363.2751	1363.525146	Residential	4981.87793	$ 3,616,843	$ 1,808,422	1363.585938	0.06	1363.589966	0.06	1363.587646	0.06	1363.587646	0.06	5.94	$ 215,007	2.72	$ 49,233	$ 264,240.07	5.88	$ 212,490	2.63	$ 47,471	$ 259,960.62
282	1364.8573	1365.1073	Residential	5441.521606	$ 3,950,545	$ 1,975,272	1364.873047	-0.23	1364.869995	-0.24	1365.18335	0.08	1365.019409	-0.09	3.05	$ 120,522	0.00	$ -	$ 120,522.43	3.65	$ 144,133	0.00	$ -	$ 144,133.09
283	1354.2184	1354.468384	Residential	8289.320374	$ 6,018,047	$ 3,009,023	1354.248779	-0.22	1354.25	-0.22	1354.251343	-0.22	1354.251343	-0.22	3.126464	$ 188,152	0	$ -	$ 188,152.06	3.131836	$ 188,475	0	$ -	$ 188,475.35
284	1372.8903	1373.140259	Residential	8222.430359	$ 5,969,484	$ 2,984,742	1373.056763	-0.08	1373.060059	-0.08	1373.05896	-0.08	1373.05896	-0.08	3.6792	$ 219,629	0.00	$ -	$ 219,629.27	3.674804	$ 219,367	0.00	$ -	$ 219,366.85
285	1378.4001	1378.650146	Residential	676.52594	$ 491,158	$ 245,579	1378.46167	-0.19	1378.463745	-0.19	1378.816895	0.17	1378.637695	-0.01	3.254396	$ 15,984	0.00	$ -	$ 15,984.22	3.950196	$ 19,402	0.00	$ -	$ 19,401.70
286	1368.6187	1368.868652	Residential	5465.292114	$ 3,967,802	$ 1,983,901	1368.747925	-0.12	1368.75	-0.12	1368.750244	-0.12	1368.750244	-0.12	3.525392	$ 139,881	0.00	$ -	$ 139,880.58	3.526368	$ 139,919	0.00	$ -	$ 139,919.30
287	1367.5726	1367.822632	Residential	1352.527161	$ 981,935	$ 490,967	1367.605469	-0.22	1367.606201	-0.22	1367.737671	-0.08	1367.611938	-0.21	3.134276	$ 30,777	0.00	$ -	$ 30,776.54	3.157224	$ 31,002	0.00	$ -	$ 31,001.88
288	1374.5093	1374.759277	Residential	7223.822937	$ 5,244,495	$ 2,622,248	1374.658447	-0.10	1374.660034	-0.10	1374.661987	-0.10	1374.661987	-0.10	3.603028	$ 188,961	0.00	$ -	$ 188,960.64	3.61084	$ 189,370	0.00	$ -	$ 189,370.34
289	1374.952	1375.202026	Residential	5736.555786	$ 4,164,740	$ 2,082,370	1375.108032	-0.09	1375.109985	-0.09	1375.367554	0.17	1375.110474	-0.09	3.631836	$ 151,257	0.00	$ -	$ 151,256.51	3.633792	$ 151,338	0.00	$ -	$ 151,337.97
290	1384.7537	1385.003662	Residential	5160.67395	$ 3,746,649	$ 1,873,325	1384.845093	-0.16	1384.845825	-0.16	1384.84729	-0.16	1384.84729	-0.16	3.368652	$ 126,212	0.00	$ -	$ 126,211.58	3.374512	$ 126,431	0.00	$ -	$ 126,431.13
291	1384.5807	1384.830688	Residential	5555.55072	$ 4,033,330	$ 2,016,665	1384.603516	-0.23	1384.602539	-0.23	1384.821777	-0.01	1384.624878	-0.21	3.087404	$ 124,525	0.00	$ -	$ 124,525.19	3.17676	$ 128,129	0.00	$ -	$ 128,129.21
292	1350.9303	1351.180298	Residential	1578.312317	$ 1,145,855	$ 572,927	1350.985352	-0.19	1350.98999	-0.19	1350.987427	-0.19	1350.987305	-0.19	3.238768	$ 37,112	0	$ -	$ 37,111.58	3.228028	$ 36,989	0	$ -	$ 36,988.51
293	1367.7457	1367.995728	Residential	11956.06262	$ 8,680,101	$ 4,340,051	1367.846802	-0.15	1367.847534	-0.15	1368.100586	0.10	1368.070801	0.08	3.407224	$ 295,751	0	$ -	$ 295,750.50	6.25219	$ 542,696	3.153066	$ 136,845	$ 679,541.10
294	1352.0001	1352.250122	Residential	344.753784	$ 250,291	$ 125,146	1352.016235	-0.23	1352.016724	-0.23	1352.041626	-0.21	1352.020752	-0.23	3.066408	$ 7,675	0	$ -	$ 7,674.95	3.08252	$ 7,715	0	$ -	$ 7,715.28
295	1368.4915	1368.741455	Residential	7669.678345	$ 5,568,186	$ 2,784,093	1368.560059	-0.18	1368.560059	-0.18	1368.562866	-0.18	1368.562988	-0.18	3.274416	$ 182,326	0	$ -	$ 182,325.59	3.286132	$ 182,978	0	$ -	$ 182,977.96
296	1366.8972	1367.147217	Residential	9063.669006	$ 6,580,224	$ 3,290,112	1367.174805	0.03	1367.174316	0.03	1367.441162	0.29	1367.081421	-0.07	4.81297	$ 316,704	1.138158	$ 37,447	$ 354,150.86	3.736816	$ 245,891	0	$ -	$ 245,890.85
297	1367.4869	1367.736938	Residential	8579.124695	$ 6,228,445	$ 3,114,222	1367.578857	-0.16	1367.579956	-0.16	1367.581543	-0.16	1367.581543	-0.16	3.372072	$ 210,028	0	$ -	$ 210,027.63	3.37842	$ 210,423	0	$ -	$ 210,423.02
298	1355.2068	1355.456787	Residential	9155.569641	$ 6,646,944	$ 3,323,472	1355.265381	-0.19	1355.27002	-0.19	1355.2677	-0.19	1355.2677	-0.19	3.252932	$ 216,221	0	$ -	$ 216,220.55	3.243652	$ 215,604	0	$ -	$ 215,603.72
299	1364.124	1364.374023	Residential	4618.256714	$ 3,352,854	$ 1,676,427	1364.23877	-0.14	1364.23999	-0.13	1364.339722	-0.03	1364.241455	-0.13	3.463868	$ 116,138	0	$ -	$ 116,138.45	3.469728	$ 116,335	0	$ -	$ 116,334.93
300	1376.0048	1376.254761	Residential	4963.528931	$ 3,603,522	$ 1,801,761	1376.107666	-0.15	1376.109985	-0.14	1376.109985	-0.14	1376.109985	-0.14	3.420896	$ 123,273	0	$ -	$ 123,272.74	3.420896	$ 123,273	0	$ -	$ 123,272.74
301	1379.886	1380.135986	Residential	7881.984436	$ 5,722,321	$ 2,861,160	1380.047241	-0.09	1380.050049	-0.09	1380.049561	-0.09	1380.049561	-0.09	3.656252	$ 209,222	0	$ -	$ 209,222.47	3.6543	$ 209,111	0	$ -	$ 209,110.77
302	1368.6685	1368.918457	Residential	5292.979675	$ 3,842,703	$ 1,921,352	1368.994873	0.08	1368.991821	0.07	1369.317749	0.40	1368.893799	-0.02	6.20092	$ 238,283	3.081288	$ 59,202	$ 297,485.33	3.901368	$ 149,918	0	$ -	$ 149,917.99
303	1367.4	1367.650024	Residential	424.157715	$ 307,939	$ 153,969	1367.44519	-0.20	1367.449951	-0.20	1367.513428	-0.14	1367.51355	-0.14	3.199708	$ 9,853	0	$ -	$ 9,853.13	3.454104	$ 10,637	0	$ -	$ 10,636.52
304	1378.8812	1379.131226	Residential	5535.167419	$ 4,018,532	$ 2,009,266	1378.9552	-0.18	1378.953247	-0.18	1378.95813	-0.17	1378.95813	-0.17	3.288084	$ 132,133	0	$ -	$ 132,132.69	3.307616	$ 132,918	0	$ -	$ 132,917.59
305	1366.5336	1366.783569	Residential	3380.404663	$ 2,454,174	$ 1,227,087	1367.192749	0.41	1367.193726	0.41	1367.414429	0.63	1367.108154	0.32	16.30471	$ 400,146	17.226594	$ 211,385	$ 611,531.20	13.73755	$ 337,143	13.63257	$ 167,283	$ 504,426.83
306	1380.2086	1380.458618	Residential	15858.52405	$ 11,513,288	$ 5,756,644	1380.320923	-0.14	1380.319946	-0.14	1380.324341	-0.13	1380.324341	-0.13	3.445312	$ 396,669	0	$ -	$ 396,668.71	3.462892	$ 398,693	0	$ -	$ 398,692.74
307	1371.6975	1371.94751	Residential	5749.80481	$ 4,174,358	$ 2,087,179	1371.821777	-0.13	1371.821655	-0.13	1371.824829	-0.12	1371.824829	-0.12	3.49658	$ 145,960	0	$ -	$ 145,959.78	3.509276	$ 146,490	0	$ -	$ 146,489.75
308	1377.5427	1377.792725	Residential	13799.37878	$ 10,018,349	$ 5,009,174	1377.736206	-0.06	1377.73999	-0.05	1377.738037	-0.05	1377.738037	-0.05	3.78906	$ 379,601	0	$ -	$ 379,601.25	3.781248	$ 378,819	0	$ -	$ 378,818.62
309	1377.3077	1377.557739	Residential	1204.42157	$ 874,410	$ 437,205	1377.368042	-0.19	1377.364624	-0.19	1377.489746	-0.07	1377.643188	0.09	3.22754	$ 28,222	0	$ -	$ 28,221.93	6.56347	$ 57,392	3.588858	$ 15,691	$ 73,082.31
310	1370.2943	1370.544312	Residential	1040.882263	$ 755,681	$ 377,840	1370.353149	-0.19	1370.353394	-0.19	1370.484985	-0.06	1370.348022	-0.20	3.236328	$ 24,456	0	$ -	$ 24,456.30	3.21484	$ 24,294	0	$ -	$ 24,293.92
311	1365.8914	1366.141357	Residential	4740.45105	$ 3,441,567	$ 1,720,784	1366.033447	-0.11	1366.035645	-0.11	1366.249756	0.11	1365.988525	-0.15	3.577152	$ 123,110	0	$ -	$ 123,110.10	3.388672	$ 116,623	0	$ -	$ 116,623.43
312	1381.6313	1381.881348	Residential	5565.741516	$ 4,040,728	$ 2,020,364	1381.801147	-0.08	1381.799072	-0.08	1381.812256	-0.07	1381.812378	-0.07	3.670896	$ 148,331	0	$ -	$ 148,330.94	3.72412	$ 150,482	0	$ -	$ 150,481.57
313	1357.6017	1357.851685	Residential	4709.370728	$ 3,419,003	$ 1,709,502	1357.810669	-0.04	1357.810059	-0.04	1358.27124	0.42	1358.062866	0.21	3.833496	$ 131,067	0	$ -	$ 131,067.35	10.33543	$ 353,369	8.869602	$ 151,626	$ 504,994.66
314	1381.8502	1382.10022	Residential	5632.723511	$ 4,089,357	$ 2,044,679	1381.916626	-0.18	1381.911987	-0.19	1381.931274	-0.17	1381.931152	-0.17	3.247068	$ 132,784	0	$ -	$ 132,784.21	3.323728	$ 135,919	0	$ -	$ 135,919.11
315	1384.3489	1384.598877	Residential	328.131775	$ 238,224	$ 119,112	1384.548584	-0.05	1384.546143	-0.05	1384.72168	0.12	1384.906738	0.31	3.789064	$ 9,026	0	$ -	$ 9,026.45	13.23583	$ 31,531	12.930162	$ 15,401	$ 46,932.23

10-Year and 100-Year Proposed Building Damages in Area K

															Proposed									
Building ID	HAG	Finished Floor Elevation (ft)	Land Use Type	Building Area (sf)	Replace Cost $ ($726/SF-Res)	Content Replacement Value ($) 1/2 of Replacement Cost	10yr Exist WSEL (ft)	10yr Exist Flow Depth (ft)	10yr Prop WSEL (ft)	10yr Prop Flow Depth (ft)	100yr Exist WSEL (ft)	100yr Exist Flow Depth (ft)	100yr Prop WSEL (ft)	100yr Prop Flow Depth (ft)	10yr Building Damage (%)	10yrBuilding Damage Cost ($)	10yr Content Damage (%)	10yr Content Damage Cost ($)	10yr Total Damage Cost ($)	100yr Building Damage (%)	100yrBuilding Damage Cost ($)	100yr Content Damage (%)	100yr Content Damage Cost ($)	100yr Total Damage Cost ($)
316	1361.4711	1361.721069	Residential	8114.740051	$ 5,891,301	$ 2,945,651	1361.568604	-0.15	1361.569946	-0.15	1361.571045	-0.15	1361.571045	-0.15	3.395508	$ 200,040	0	$ -	$ 200,039.61	3.399904	$ 200,299	0	$ -	$ 200,298.59
317	1360.3242	1360.574219	Residential	3291.969604	$ 2,389,970	$ 1,194,985	1360.664551	0.09	1360.660034	0.09	1360.869141	0.29	1360.613525	0.04	6.57445	$ 157,127	3.60423	$ 43,070	$ 200,197.38	5.17918	$ 123,781	1.650852	$ 19,727	$ 143,508.28
318	1360.4828	1360.732788	Residential	7044.700256	$ 5,114,452	$ 2,557,226	1360.483276	-0.25	1360.4823	-0.25	1360.608276	-0.12	1360.561768	-0.17	2.998048	$ 153,334	0	$ -	$ 153,333.74	3.31592	$ 169,591	0	$ -	$ 169,591.15
319	1375.0812	1375.331177	Residential	7783.893127	$ 5,651,106	$ 2,825,553	1375.328735	0.00	1375.329956	0.00	1375.860107	0.53	1375.114136	-0.22	3.995116	$ 225,768	0	$ -	$ 225,768.26	3.131836	$ 176,983	0	$ -	$ 176,983.38
320	1353.952	1354.202026	Residential	5427.761719	$ 3,940,555	$ 1,970,278	1354.112427	-0.09	1354.115601	-0.09	1354.115967	-0.09	1354.114624	-0.09	3.6543	$ 144,000	0	$ -	$ 143,999.70	3.650392	$ 143,846	0	$ -	$ 143,845.70
321	1366.7892	1367.039185	Residential	5971.685242	$ 4,335,443	$ 2,167,722	1366.812988	-0.23	1366.810303	-0.23	1367.24707	0.21	1366.943237	-0.10	3.084472	$ 133,726	0	$ -	$ 133,725.54	3.616208	$ 156,779	0	$ -	$ 156,778.65
322	1378.1312	1378.381226	Residential	5963.877625	$ 4,329,775	$ 2,164,888	1378.215454	-0.17	1378.214478	-0.17	1378.220703	-0.16	1378.220703	-0.16	3.333008	$ 144,312	0	$ -	$ 144,311.75	3.357908	$ 145,390	0	$ -	$ 145,389.87
323	1370.1912	1370.441162	Residential	5864.994141	$ 4,257,986	$ 2,128,993	1370.313354	-0.13	1370.310059	-0.13	1370.500488	0.06	1370.292603	-0.15	3.475588	$ 147,990	0	$ -	$ 147,990.04	3.405764	$ 145,017	0	$ -	$ 145,016.95
324	1364.6116	1364.861572	Residential	8787.81427	$ 6,379,953	$ 3,189,977	1364.679688	-0.18	1364.684204	-0.18	1364.681763	-0.18	1364.681885	-0.18	3.290528	$ 209,934	0	$ -	$ 209,934.15	3.281252	$ 209,342	0	$ -	$ 209,342.34
325	1367.1274	1367.377441	Residential	862.57312	$ 626,228	$ 313,114	1367.134888	-0.24	1367.135864	-0.24	1367.141968	-0.24	1367.141968	-0.24	3.033692	$ 18,998	0	$ -	$ 18,997.83	3.058108	$ 19,151	0	$ -	$ 19,150.73
326	1360.1703	1360.420288	Residential	6272.609619	$ 4,553,915	$ 2,276,957	1360.312744	-0.11	1360.310059	-0.11	1360.492432	0.07	1360.253784	-0.17	3.559084	$ 162,078	0	$ -	$ 162,077.65	3.333984	$ 151,827	0	$ -	$ 151,826.78
327	1359.764	1360.014038	Residential	440.797302	$ 320,019	$ 160,009	1359.788696	-0.23	1359.787354		1359.799072	-0.21	1359.799072	-0.21					$ 51,009,466.04					$ 60,716,150.04

10-Year and 100-Year Existing Building Damages in Area A

															Existing							
Building ID	HAG	Finished Floor Elevation (ft)	Land Use Type	Building Area (sf)	Replace Cost $ ($726/SF-Res)	Content Replacement Value ($) 1/2 of Replacement Cost	10yr Exist WSEL (ft)	10yr Exist Flow Depth (ft)	10yr Prop WSEL (ft)	10yr Prop Flow Depth (ft)	100yr Exist WSEL (ft)	100yr Exist Flow Depth (ft)	100yr Prop WSEL (ft)	100yr Prop Flow Depth (ft)	10yr Building Damage (%)	10yrBuilding Damage Cost ($)	10yr Content Damage (%)	10yr Content Damage Cost ($)	10yr Total Damage Cost ($)	100yr Building Damage (%)	100yrBuilding Damage Cost ($)	100yr Content Damage (%)	100yr Content Damage Cost ($)	100yr Total Damage Cost ($)
198	1331.10	1331.35	Residential	7479.12	$ 5,429,839	$ 2,714,920	1331.08	-0.27	1331.08	-0.27	1331.18	-0.17	1331.18	-0.17	2.92724608	$ 158,945	0	$ -	$ 158,944.76	3.31542968	$ 180,023	0	$ -	$ 180,022.50
528	1335.72	1335.97	Residential	10191.57	$ 7,399,081	$ 3,699,541	1335.76	-0.21	1335.76	-0.21	1335.81	-0.16	1335.81	-0.16	3.16845704	$ 234,437	0	$ -	$ 234,436.70	3.36865236	$ 249,249	0	$ -	$ 249,249.32
121	1525.48	1525.73	Residential	406.99	$ 295,472	$ 147,736	0.00	-1.00	0.00	-1.00	1166.47	-1.00	1166.47	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
538	1327.24	1327.49	Residential	2669.28	$ 1,937,899	$ 968,950	1327.36	-0.14	1327.19	-0.30	1328.06	0.57	1327.66	0.16	3.45	$ 66,842	0.00	$ -	$ 66,842.38	21.07	$ 408,369	23.90	$ 231,597	$ 639,965.63
470	1333.16	1333.41	Residential	1558.25	$ 1,131,291	$ 565,645	974.14	-1.00	974.13	-1.00	1333.04	-0.37	1333.04	-0.37	0	$ -	0	$ -	$ -	2.50341796	$ 28,321	0	$ -	$ 28,320.94
262	1340.41	1340.66	Residential	8866.52	$ 6,437,090	$ 3,218,545	1340.38	-0.28	1340.38	-0.28	1340.47	-0.19	1340.46	-0.20	2.88	$ 185,255	0.00	$ -	$ 185,254.93	3.24	$ 208,703	0.00	$ -	$ 208,702.53
61	1333.57	1333.82	Residential	2138.95	$ 1,552,880	$ 776,440	1279.33	-1.00	1279.30	-1.00	1334.09	0.27	1334.06	0.24	0.00	$ -	0.00	$ -	$ -	12.20	$ 189,443	11.48	$ 89,129	$ 278,572.45
51	1341.97	1342.22	Residential	8818.57	$ 6,402,284	$ 3,201,142	1342.64	0.42	1342.58	0.36	1343.07	0.84	1343.04	0.82	16.58	$ 1,061,691	17.62	$ 563,920	$ 1,625,611.33	29.25	$ 1,872,684	35.35	$ 1,131,615	$ 3,004,298.58
59	1343.56	1343.81	Residential	1029.42	$ 747,360	$ 373,680	1344.22	0.41	1344.05	0.24	1344.65	0.84	1344.54	0.73	16.35	$ 122,211	17.29	$ 64,621	$ 186,831.80	29.15	$ 217,838	35.21	$ 131,561	$ 349,399.02
274	1339.51	1339.76	Residential	2963.81	$ 2,151,726	$ 1,075,863	1340.25	0.49	1340.19	0.43	1340.72	0.96	1340.68	0.92	18.73	$ 403,076	20.63	$ 221,905	$ 624,980.34	32.95	$ 708,893	40.52	$ 435,977	$ 1,144,869.66
195	1331.08	1331.33	Residential	5775.30	$ 4,192,867	$ 2,096,433	1048.47	-1.00	1048.48	-1.00	1331.17	-0.16	1331.19	-0.16	0	$ -	0	$ -	$ -	3.35888672	$ 140,834	0	$ -	$ 140,833.64
537	1317.88	1318.13	Residential	11429.48	$ 8,297,801	$ 4,148,901	871.71	-1.00	871.70	-1.00	1317.76	-0.37	1317.74	-0.39	0.00	$ -	0.00	$ -	$ -	2.51	$ 207,931	0.00	$ -	$ 207,931.23
360	1323.97	1324.22	Residential	1063.36	$ 772,000	$ 386,000	1324.61	0.38	1324.58	0.36	1324.89	0.66	1324.88	0.66	15.55	$ 120,020	16.17	$ 62,398	$ 182,417.93	23.91	$ 184,620	27.88	$ 107,618	$ 292,238.49
338	1320.98	1321.23	Residential	3049.31	$ 2,213,799	$ 1,106,900	787.52	-1.00	787.51	-1.00	787.54	-1.00	787.53	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
60	1333.08	1333.33	Residential	7401.44	$ 5,373,442	$ 2,686,721	289.24	-1.00	289.23	-1.00	289.27	-1.00	289.26	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
413	1455.19	1455.44	Residential	9053.91	$ 6,573,135	$ 3,286,568	0.00	-1.00	0.00	-1.00	736.98	-1.00	0.00	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
158	1332.06	1332.31	Residential	13840.34	$ 10,048,089	$ 5,024,045	1332.44	0.13	1332.44	0.13	1332.62	0.31	1332.63	0.31	7.8122557	$ 784,982	5.33715798	$ 268,141	$ 1,053,123.61	13.2907714	$ 1,335,469	13.00707996	$ 653,481	$ 1,988,950.04
238	1335.27	1335.52	Residential	6338.22	$ 4,601,549	$ 2,300,774	100.03	-1.00	100.03	-1.00	1335.16	-0.36	1335.16	-0.36	0	$ -	0	$ -	$ -	2.5493164	$ 117,308	0	$ -	$ 117,308.03
349	1324.98	1325.23	Residential	7393.78	$ 5,367,884	$ 2,683,942	673.55	-1.00	673.54	-1.00	783.59	-1.00	783.57	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
27	1316.52	1316.77	Residential	7472.12	$ 5,424,758	$ 2,712,379	0.00	-1.00	0.00	-1.00	0.00	-1.00	0.00	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
405	1326.51	1326.76	Residential	1009.50	$ 732,896	$ 366,448	355.52	-1.00	355.52	-1.00	355.55	-1.00	355.55	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
141	1342.43	1342.68	Residential	7243.14	$ 5,258,522	$ 2,629,261	874.65	-1.00	874.65	-1.00	874.66	-1.00	874.67	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
146	1338.37	1338.62	Residential	15504.94	$ 11,256,588	$ 5,628,294	1338.87	0.25	1338.88	0.25	1339.19	0.57	1339.21	0.57	11.573242	$ 1,302,752	10.6025388	$ 596,742	$ 1,899,494.18	21.244873	$ 2,391,448	24.1428222	$ 1,358,829	$ 3,750,276.74
72	1351.63	1351.88	Residential	11007.51	$ 7,991,454	$ 3,995,727	1351.32	-0.57	1351.32	-0.57	1351.37	-0.51	1351.37	-0.51	1.73632812	$ 138,758	0	$ -	$ 138,757.86	1.953125	$ 156,083	0	$ -	$ 156,083.08
254	1345.68	1345.93	Residential	1895.39	$ 1,376,051	$ 688,025	0.00	-1.00	0.00	-1.00	753.45	-1.00	753.45	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
565	1332.50	1332.75	Residential	6624.03	$ 4,809,043	$ 2,404,522	1332.28	-0.47	1332.28	-0.47	1332.63	-0.13	1332.33	-0.43	2.11	$ 101,511	0.00	$ -	$ 101,511.20	3.49	$ 167,847	0.00	$ -	$ 167,846.88
169	1332.68	1332.93	Residential	10483.42	$ 7,610,964	$ 3,805,482	518.50	-1.00	518.50	-1.00	1332.76	-0.17	1332.76	-0.17	0	$ -	0	$ -	$ -	3.3017578	$ 251,296	0	$ -	$ 251,295.59
286	1349.36	1349.61	Residential	7943.75	$ 5,767,160	$ 2,883,580	1349.40	-0.20	1349.40	-0.20	1349.42	-0.18	1349.42	-0.18	3.19	$ 184,194	0.00	$ -	$ 184,194.30	3.26	$ 188,277	0.00	$ -	$ 188,277.49
373	1322.46	1322.71	Residential	7149.90	$ 5,190,828	$ 2,595,414	1322.63	-0.08	1322.58	-0.13	1322.97	0.26	1322.96	0.25	3.66	$ 190,018	0.00	$ -	$ 190,017.78	11.69	$ 607,020	10.77	$ 279,571	$ 886,591.20
400	1328.18	1328.43	Residential	9066.93	$ 6,582,588	$ 3,291,294	568.20	-1.00	568.20	-1.00	568.33	-1.00	568.33	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
280	1330.76	1331.01	Residential	4647.57	$ 3,374,137	$ 1,687,068	1330.98	-0.03	1330.95	-0.06	1331.20	0.20	1331.19	0.18	3.90	$ 131,489	0.00	$ -	$ 131,489.18	9.89	$ 333,781	8.25	$ 139,171	$ 472,951.63
144	1336.17	1336.42	Residential	7180.50	$ 5,213,041	$ 2,606,520	1336.51	0.08	1336.51	0.08	1336.72	0.30	1336.73	0.30	6.4060057	$ 333,948	3.36840798	$ 87,798	$ 421,745.92	12.9831541	$ 676,817	12.57641574	$ 327,807	$ 1,004,623.93
525	1326.25	1326.50	Residential	19943.97	$ 14,479,323	$ 7,239,662	1165.30	-1.00	1165.29	-1.00	1326.23	-0.27	1326.02	-0.48	0.00	$ -	0.00	$ -	$ -	2.94	$ 425,472	0.00	$ -	$ 425,471.51
404	1322.82	1323.07	Residential	5577.85	$ 4,049,522	$ 2,024,761	1322.62	-0.45	1322.60	-0.47	1322.96	-0.11	1322.95	-0.11	2.21	$ 89,493	0.00	$ -	$ 89,492.85	3.57	$ 144,442	0.00	$ -	$ 144,442.18
89	1369.74	1369.99	Residential	10864.86	$ 7,887,890	$ 3,943,945	736.76	-1.00	736.75	-1.00	736.78	-1.00	736.77	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
555	1330.05	1330.30	Residential	6177.14	$ 4,484,601	$ 2,242,300	690.87	-1.00	690.63	-1.00	1329.38	-0.92	690.95	-1.00	0.00	$ -	0.00	$ -	$ -	0.34	$ 15,197	0.00	$ -	$ 15,196.84
328	1382.11	1382.36	Residential	5083.66	$ 3,690,738	$ 1,845,369	0.00	-1.00	0.00	-1.00	1062.62	-1.00	1062.61	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
544	1317.89	1318.14	Residential	1064.51	$ 772,835	$ 386,417	0.00	-1.00	0.00	-1.00	863.13	-1.00	0.00	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
269	1343.78	1344.03	Residential	1292.67	$ 938,479	$ 469,239	766.99	-1.00	0.00	-1.00	767.16	-1.00	767.11	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
163	1341.77	1342.02	Residential	767.27	$ 557,041	$ 278,521	0.00	-1.00	0.00	-1.00	900.61	-1.00	900.61	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
551	1327.07	1327.32	Residential	11720.01	$ 8,508,728	$ 4,254,364	1326.26	-1.00	915.96	-1.00	1326.52	-0.80	1326.34	-0.98	0.00	$ -	0.00	$ -	$ -	0.79	$ 67,139	0.00	$ -	$ 67,139.18
271	1331.69	1331.94	Residential	3774.99	$ 2,740,645	$ 1,370,322	1331.91	-0.04	1331.90	-0.04	1332.06	0.12	1332.04	0.10	3.86	$ 105,718	0.00	$ -	$ 105,718.24	7.61	$ 208,486	5.05	$ 69,202	$ 277,687.68
385	1323.06	1323.31	Residential	6452.90	$ 4,684,808	$ 2,342,404	1322.62	-0.69	1322.57	-0.74	1322.96	-0.35	1322.95	-0.36	1.24	$ 58,080	0.00	$ -	$ 58,079.72	2.59	$ 121,306	0.00	$ -	$ 121,306.32
460	1321.03	1321.28	Residential	1265.95	$ 919,080	$ 459,540	0.00	-1.00	0.00	-1.00	1321.13	-0.15	1321.13	-0.15	0	$ -	0	$ -	$ -	0.3857422	$ 31,118	0	$ -	$ 31,117.69
524	1332.22	1332.47	Residential	10676.48	$ 7,751,124	$ 3,875,562	1332.37	-0.10	1332.37	-0.10	1332.55	0.08	1332.56	0.08	3.58349612	$ 277,761	0	$ -	$ 277,761.24	6.5341798	$ 506,472	3.54785172	$ 137,499	$ 643,971.60
307	1348.84	1349.09	Residential	7855.95	$ 5,703,422	$ 2,851,711	1348.80	-0.29	1348.80	-0.29	1348.82	-0.27	1348.82	-0.27	2.85	$ 162,581	0.00	$ -	$ 162,580.95	2.91	$ 166,146	0.00	$ -	$ 166,145.59
346	1321.84	1322.09	Residential	2195.05	$ 1,593,607	$ 796,803	1273.33	-1.00	1273.33	-1.00	1273.38	-1.00	1273.38	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
120	1384.09	1384.34	Residential	13591.52	$ 9,867,443	$ 4,933,721	1382.97	-1.00	1383.03	-1.00	1383.41	-0.93	1383.38	-0.97	0.00	$ -	0.00	$ -	$ -	0.28	$ 27,319	0.00	$ -	$ 27,318.55
500	1317.50	1317.75	Residential	1672.89	$ 1,214,517	$ 607,259	1317.67	-0.09	1317.67	-0.09	1317.79	0.04	1317.80	0.04	3.64599608	$ 44,281	0	$ -	$ 44,281.25	5.2158205	$ 63,347	1.7021487	$ 10,336	$ 73,683.48
282	1341.63	1341.88	Residential	8841.63	$ 6,419,026	$ 3,209,513	0.00	-1.00	0.00	-1.00	770.21	-1.00	770.20	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
563	1331.78	1332.03	Residential	6237.47	$ 4,528,402	$ 2,264,201	1332.30	0.27	1331.80	-0.23	1332.80	0.77	1332.35	0.32	12.18	$ 551,777	11.46	$ 259,449	$ 811,226.33	27.07	$ 1,225,897	32.30	$ 731,333	$ 1,957,229.39
18	1309.78	1310.03	Residential	700.48	$ 508,551	$ 254,276	1310.13	0.10	1310.08	0.05	1310.35	0.32	1310.31	0.28	7.05	$ 35,837	4.27	$ 10,846	$ 46,683.42	13.48	$ 68,559	13.27	$ 33,752	$ 102,310.57
53	1338.91	1339.16	Residential	9128.88	$ 6,627,566	$ 3,313,783	1339.02	-0.14	1339.02	-0.14	1339.06	-0.10	1339.06	-0.11	3.45	$ 228,437	0.00	$ -	$ 228,437.43	3.58	$ 237,272	0.00	$ -	$ 237,272.03
191	1331.67	1331.92	Residential	8250.07	$ 5,989,549	$ 2,994,774	1331.09	-0.83	1331.09	-0.83	1331.20	-0.72	1331.22	-0.72	0.69970704	$ 41,909	0	$ -	$ 41,909.29	1.12890628	$ 67,616	0	$ -	$ 67,616.39
164	1344.25	1344.50	Residential	7496.39	$ 5,442,379	$ 2,721,189	0.00	-1.00	0.00	-1.00	755.26	-1.00	755.27	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
258	1331.78	1332.03	Residential	8405.13	$ 6,102,124	$ 3,051,062	1331.51	-0.52	1331.51	-0.52	1331.88	-0.15	1331.80	-0.23	1.92	$ 116,888	0.00	$ -	$ 116,887.86	3.39	$ 206,960	0.00	$ -	$ 206,959.74
482	1324.13	1324.38	Residential	4767.85	$ 3,461,462	$ 1,730,731	1324.29	-0.09	1324.21	-0.17	1324.68	0.30	1324.66	0.28	3.65	$ 126,374	0.00	$ -	$ 126,373.80	13.05	$ 451,689	12.67	$ 219,261	$ 670,949.87
112	1371.29	1371.54	Residential	6684.88	$ 4,853,225	$ 2,426,612	1370.55	-0.99	1370.55	-0.99	1370.82	-0.72	1370.82	-0.72	0.04	$ 2,109	0.00	$ -	$ 2,109.07	1.14	$ 55,096	0.00	$ -	$ 55,096.42
540	1319.37	1319.62	Residential	12604.81	$ 9,151,093	$ 4,575,547	0.00	-1.00	0.00	-1.00	637.48	-1.00	637.40	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
375	1325.37	1325.62	Residential	7943.12	$ 5,766,706	$ 2,883,353	414.68	-1.00	414.68	-1.00	414.73	-1.00	414.73	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
526	1326.54	1326.79	Residential	723.15	$ 525,003	$ 262,502	0.00	-1.00	0.00	-1.00	773.77	-1.00	113.99	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
170	1342.44	1342.69	Residential	676.25	$ 490,958	$ 245,479	978.28	-1.00	978.29	-1.00	1341.92	-0.76	1341.94	-0.76	0	$ -	0	$ -	$ -	0.9448242	$ 4,639	0	$ -	$ 4,638.69
167	1346.13	1346.38	Residential	8580.62	$ 6,229,533	$ 3,114,767	1346.37	-0.01	1346.37	-0.01	1346.72	0.34	1346.72	0.34	3.96	$ 246,444	0.00	$ -	$ 246,443.74	14.31	$ 891,146	14.43	$ 449,375	$ 1,340,520.69
534	1329.33	1329.58	Residential	639.16	$ 464,030	$ 232,015	0.00	-1.00	0.00	-1.00	32.18	-1.00	32.18	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
3	1317.03	1317.28	Residential	12624.49	$ 9,165,380	$ 4,582,690	1316.84	-0.43	1316.84	-0.43	1316.87	-0.41	1316.87	-0.41	2.26	$ 207,340	0.00	$ -	$ 207,339.88	2.36	$ 216,156	0.00	$ -	$ 216,156.18
129	1494.88	1495.13	Residential	8054.19	$ 5,847,340	$ 2,923,670	0.00	-1.00	0.00	-1.00	0.00	-1.00	0.00	-1.00	0	$ -	0.00	$ -	$ -	0	$ -	0.00	$ -	$ -
487	1329.29	1329.54	Residential	7301.80	$ 5,301,110	$ 2,650,555	1328.95	-0.58	1328.95	-0.58	1328.98	-0.56	1328.98	-0.56	1.66	$ 88,084	0.00	$ -	$ 88,084.36	1.75	$ 93,028	0.00	$ -	$ 93,028.27
505	1334.49	1334.74	Residential	1851.91	$ 1,344,488	$ 672,244	801.65	-1.00	801.65	-1.00	801.67	-1.00	801.66	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
299	1334.10	1334.35	Residential	12457.47	$ 9,044,127	$ 4,522,063	1334.08	-0.27	1334.08	-0.27	1334.36	0.01	1334.33	-0.02	2.92	$ 263,684	0.00	$ -	$ 263,683.99	4.19	$ 378,988	0.27	$ 12,056	$ 391,043.68
206	1330.94	1331.19	Residential	6811.92	$ 4,945,451	$ 2,472,726	1331.01	-0.18	1331.01	-0.18	1331.29	0.10	1331.30	0.10	3.28271484	$ 162,345	0	$ -	$ 162,345.06	7.0578613	$ 349,043	4.28100582	$ 105,858	$ 454,900.63
443	1325.91	1326.16	Residential	6111.80	$ 4,437,165	$ 2,218,582	1324.48	-1.00	1324.47	-1.00	1324.59	-1.00	1324.59	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
39	1317.80	1318.05	Residential	5414.14	$ 3,930,662	$ 1,965,331	1317.89	-0.16	1317.89	-0.16	1317.93	-0.13	1317.93	-0.13	3.37	$ 132,276	0.00	$ -	$ 132,276.00	3.49	$ 137,304	0.00	$ -	$ 137,304.48
502	1319.37	1319.62	Residential	2781.41	$ 2,019,305	$ 1,009,652	0.00	-1.00	0.00	-1.00	0.00	-1.00	0.00	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
111	1379.55	1379.80	Residential	7498.79	$ 5,444,124	$ 2,722,062	1379.10	-0.70	1379.09	-0.71	1379.30	-0.50	1379.30	-0.50	1.18	$ 64,250	0.00	$ -	$ 64,250.23	2.01	$ 109,680	0.00	$ -	$ 109,679.95
438	1340.20	1340.45	Residential	6215.27	$ 4,512,285	$ 2,256,142	0.00	-1.00	0.00	-1.00	0.00	-1.00	1340.16	-1.00	0	$ -	0.00	$ -	$ -	0	$ -	0.00	$ -	$ -
333	1324.71	1324.96	Residential	1601.10	$ 1,162,399	$ 581,200	1324.96	0.00	1324.89	-0.07	1325.36	0.40	1325.32	0.36	3.98	$ 46,286	0.00	$ -	$ 46,285.96	15.91	$ 184,886	16.67	$ 96,873	$ 281,758.34
173	1336.89	1337.14	Residential	10216.91	$ 7,417,477	$ 3,708,738	0.00	-1.00	0.00	-1.00	1335.14	-1.00	1335.14	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
580	1433.33	1433.58	Residential	2372.25	$ 1,722,254	$ 861,127	1431.31	-1.00	1431.31	-1.00	1431.40	-1.00	1431.39	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
193	1330.91	1331.16	Residential	388.64	$ 282,149	$ 141,075	1331.13	-0.03	1331.13	-0.03	1331.32	0.16	1331.34	0.16	3.86767576	$ 10,913	0	$ -	$ 10,912.61	8.9182129	$ 25,163	6.88549806	$ 9,714	$ 34,876.33
313	1344.58	1344.83	Residential	4545.76	$ 3,300,219	$ 1,650,110	0.00	-1.00	0.00	-1.00	1344.11	-0.72	1344.25	-0.72	0	$ -	0	$ -	$ -	1.12353516	$ 37,079	0	$ -	$ 37,079.12
30	1319.25	1319.50	Residential	8650.86	$ 6,280,523	$ 3,140,262	1319.31	-0.19	1319.31	-0.19	1319.34	-0.16	1319.34	-0.16	3.25	$ 204,270	0.00	$ -	$ 204,270.33	3.36	$ 210,802	0.00	$ -	$ 210,802.32
265	1336.62	1336.87	Residential	9275.89	$ 6,734,294	$ 3,367,147	453.05	-1.00	453.06	-1.00	453.06	-1.00	453.07	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
278	1329.33	1329.58	Residential	9887.56	$ 7,178,367	$ 3,589,183	1329.54	-0.04	1329.52	-0.06	1329.70	0.13	1329.69	0.11	3.86	$ 276,830	0.00	$ -	$ 276,829.78	7.79	$ 558,952	5.30	$ 190,272	$ 749,224.48
8	1314.25	1314.50	Residential	4845.72	$ 3,517,990	$ 1,758,995	0.00	-1.00	0.00	-1.00	0.00	-1.00	0.00	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
288	1341.77	1342.02	Residential	7520.30	$ 5,459,739	$ 2,729,869	1341.76	-0.26	1341.76	-0.26	1341.78	-0.24	1341.78	-0.24	2.95	$ 160,886	0.00	$ -	$ 160,886.34	3.06	$ 166,965	0.00	$ -	$ 166,964.56
415	1359.67	1359.92	Residential	361.17	$ 262,212	$ 131,106	0.00	-1.00	0.00	-1.00	378.48	-1.00	378.49	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
35	1317.85	1318.10	Residential	7080.65	$ 5,140,551	$ 2,570,275	803.86	-1.00	803.87	-1.00	1317.85	-0.25	1317.85	-0.25	0	$ -	0	$ -	$ -	2.99023436	$ 153,715	0	$ -	$ 153,714.52
279	1336.73	1336.98	Residential	7751.73	$ 5,627,755	$ 2,813,877	1336.39	-0.59	1336.32	-0.66	1336.98	0.00	1336.96	-0.02	1.65	$ 92,578	0.00	$ -	$ 92,577.67	4.00	$ 225,000	0.00	$ -	$ 225,000.28
399	1329.62	1329.87	Residential	9065.18	$ 6,581,319	$ 3,290,660	766.63	-1.00	766.63	-1.00	766.71	-1.00	766.72	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
42	1323.17	1323.42	Residential	7002.87	$ 5,084,085	$ 2,542,043	1323.12	-0.30	1323.12	-0.30	1323.18	-0.24	1323.18	-0.24	2.80	$ 142,344	0.00	$ -	$ 142,344.46	3.05	$ 155,179	0.00	$ -	$ 155,178.79
57	1341.09	1341.34	Residential	7023.87	$ 5,099,331	$ 2,549,666	743.98	-1.00	743.97	-1.00	759.64	-1.00	759.62	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
397	1327.07	1327.32	Residential	9177.64	$ 6,662,967	$ 3,331,483	1326.82	-0.50	1326.82	-0.50	1327.09	-0.23	1327.09	-0.23	1.9819336	$ 132,056	0	$ -	$ 132,055.58	3.06347656	$ 204,118	0	$ -	$ 204,118.43
374	1324.33	1324.58	Residential	7554.42	$ 5,484,508	$ 2,742,254	1324.35	-0.23	1324.35	-0.23	1324.42	-0.17	1324.40	-0.19	3.07	$ 168,204	0.00	$ -	$ 168,204.07	3.33	$ 182,371	0.00	$ -	$ 182,370.60
216	1336.13	1336.38	Residential	5675.45	$ 4,120,379	$ 2,060,189	0.00	-1.00	0.00	-1.00	0.00	-1.00	0.00	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
283	1339.27	1339.52	Residential	13817.96	$ 10,031,838	$ 5,015,919	1339.17	-0.35	1338.87	-0.65	1339.53	0.01	1339.50	-0.02	2.59	$ 259,907	0.00	$ -	$ 259,906.89	4.32	$ 433,603	0.45	$ 72,630	$ 456,233.10
334	1324.83	1325.08	Residential	10462.71	$ 7,595,925	$ 3,797,963	1324.97	-0.11	1324.90	-0.18	1325.54	0.46	1325.48	0.39	3.57	$ 271,050	0.00	$ -	$ 271,049.91	17.85	$ 1,355,880	19.39	$ 736,430	$ 2,092,310.17
26	1311.97	1312.22	Residential	13261.74	$ 9,628,026	$ 4,814,013	1311.93	-0.29	1311.93	-0.29	1311.98	-0.25	1311.97	-0.25	2.83	$ 272,152	0.00	$ -	$ 272,151.56	3.01	$ 290,063	0.00	$ -	$ 290,063.08
301	1346.57	1346.82	Residential	11175.62	$ 8,113,498	$ 4

10-Year and 100-Year Existing Building Damages in Area A

																Existing								
Building ID	HAG	Finished Floor Elevation (ft)	Land Use Type	Building Area (sf)	Replace Cost $ ($726/SF-Res)	Content Replacement Value ($) 1/2 of Replacement Cost	10yr Exist WSEL (ft)	10yr Exist Flow Depth (ft)	10yr Prop WSEL (ft)	10yr Prop Flow Depth (ft)	100yr Exist WSEL (ft)	100yr Exist Flow Depth (ft)	100yr Prop WSEL (ft)	100yr Prop Flow Depth (ft)	10yr Building Damage (%)	10yrBuilding Damage Cost ($)	10yr Content Damage (%)	10yr Content Damage Cost ($)	10yr Total Damage Cost ($)	100yr Building Damage (%)	100yrBuilding Damage Cost ($)	100yr Content Damage (%)	100yr Content Damage Cost ($)	100yr Total Damage Cost ($)
308	1334.93	1335.18	Residential	6969.43	$ 5,059,808	$ 2,529,904	1334.88	-0.29	1334.88	-0.29	1335.28	0.10	1335.29	0.10	2.82128904	$ 142,752	0	$ -	$ 142,751.81	6.9296875	$ 350,629	4.1015625	$ 103,766	$ 454,394.47
196	1332.19	1332.44	Residential	8166.56	$ 5,928,926	$ 2,964,463	0.00	-1.00	0.00	-1.00	1332.16	-0.28	1332.16	-0.28	0.00	$ -	0.00	$ -	$ -	2.86	$ 169,791	0.00	$ -	$ 169,790.77
496	1323.96	1324.21	Residential	5063.01	$ 3,675,743	$ 1,837,872	1324.30	0.09	1324.22	0.01	1324.69	0.48	1324.67	0.46	6.76	$ 248,660	3.87	$ 71,141	$ 319,801.33	18.32	$ 673,219	20.04	$ 368,333	$ 1,041,551.79
573	1331.74	1331.99	Residential	7754.41	$ 5,629,702	$ 2,814,851	1331.39	-0.60	1331.39	-0.60	1331.42	-0.57	1331.42	-0.57	1.60742188	$ 90,493	0	$ -	$ 90,493.06	1.72070312	$ 96,870	0	$ -	$ 96,870.46
108	1379.24	1379.49	Residential	1156.59	$ 839,681	$ 419,840	0.00	-1.00	0.00	-1.00	1378.04	-1.00	1378.04	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
188	1333.66	1333.91	Residential	10182.29	$ 7,392,344	$ 3,696,172	1333.86	-0.05	1333.86	-0.05	1333.93	0.02	1333.94	0.02	3.78222656	$ 279,595	0	$ -	$ 279,595.18	4.4907226	$ 331,970	0.68701164	$ 25,393	$ 357,362.77
351	1324.71	1324.96	Residential	4981.85	$ 3,616,823	$ 1,808,412	1324.58	-0.39	1324.56	-0.41	1324.99	0.02	1324.98	0.01	2.46	$ 88,919	0.00	$ -	$ 88,919.46	4.68	$ 169,309	0.95	$ 17,245	$ 186,554.28
467	1340.84	1341.09	Residential	4065.37	$ 2,951,456	$ 1,475,728	0.00	-1.00	0.00	-1.00	1079.51	-1.00	1079.52	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
132	1490.09	1490.34	Residential	1336.38	$ 970,214	$ 485,107	0.00	-1.00	0.00	-1.00	0.00	-1.00	0.00	-1.00	0	$ -	0.00	$ -	$ -	0	$ -	0.00	$ -	$ -
408	1322.66	1322.91	Residential	6487.88	$ 4,710,200	$ 2,355,100	1322.62	-0.29	1322.57	-0.34	1323.04	0.13	1323.04	0.13	2.84	$ 133,624	0.00	$ -	$ 133,624.33	7.96	$ 374,700	5.54	$ 130,404	$ 505,104.57
119	1390.29	1390.54	Residential	315.89	$ 229,336	$ 114,668	0.00	-1.00	0.00	-1.00	0.00	-1.00	0.00	-1.00	0	$ -	0.00	$ -	$ -	0	$ -	0.00	$ -	$ -
584	1353.35	1353.60	Residential	0.00	$ -	$ -	175.39	-1.00	175.39	-1.00	415.79	-1.00	415.78	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
511	1321.86	1322.11	Residential	646.27	$ 469,192	$ 234,596	1322.07	-0.03	1322.00	-0.10	1322.53	0.43	1322.24	0.14	3.87	$ 18,170	0.00	$ -	$ 18,169.74	16.84	$ 79,026	17.98	$ 42,181	$ 121,207.04
54	1336.82	1337.07	Residential	9657.93	$ 7,011,655	$ 3,505,828	1336.97	-0.10	1336.94	-0.13	1337.10	0.03	1337.08	0.01	3.59	$ 251,913	0.00	$ -	$ 251,912.89	4.96	$ 347,998	1.35	$ 47,272	$ 395,270.08
289	1315.29	1315.54	Residential	732.08	$ 531,493	$ 265,747	568.06	-1.00	568.05	-1.00	707.89	-1.00	707.90	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
425	1440.09	1440.34	Residential	3730.58	$ 2,708,404	$ 1,354,202	1436.06	-1.00	1436.06	-1.00	1436.14	-1.00	1436.13	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
325	1403.93	1404.18	Residential	4455.81	$ 3,234,917	$ 1,617,458	1401.98	-1.00	1401.98	-1.00	1402.03	-1.00	1402.03	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
45	1313.71	1313.96	Residential	5863.55	$ 4,256,937	$ 2,128,469	1313.00	-0.96	1313.00	-0.96	1313.58	-0.38	1313.58	-0.38	0.15527344	$ 6,610	0	$ -	$ 6,609.89	2.47509764	$ 105,363	0	$ -	$ 105,363.35
147	1333.51	1333.76	Residential	1860.79	$ 1,350,934	$ 675,467	800.72	-1.00	800.73	-1.00	1333.04	-0.72	1333.06	-0.72	0	$ -	0	$ -	$ -	1.10644528	$ 14,947	0	$ -	$ 14,947.35
355	1320.50	1320.75	Residential	7271.22	$ 5,278,904	$ 2,639,452	1320.51	-0.24	1320.51	-0.24	1320.53	-0.22	1320.62	-0.22	3.04150392	$ 160,558	0	$ -	$ 160,558.08	3.13427736	$ 165,455	0	$ -	$ 165,455.50
55	1333.97	1334.22	Residential	8885.46	$ 6,450,843	$ 3,225,422	1256.97	-1.00	1256.97	-1.00	1257.07	-1.00	1257.06	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
383	1323.11	1323.36	Residential	6532.58	$ 4,742,656	$ 2,371,328	1322.62	-0.74	1322.57	-0.78	1322.97	-0.39	1322.96	-0.39	1.06	$ 50,090	0.00	$ -	$ 50,089.67	2.44	$ 115,857	0.00	$ -	$ 115,856.96
377	1324.05	1324.30	Residential	6948.25	$ 5,044,428	$ 2,522,214	1324.25	-0.05	1324.22	-0.08	1324.48	0.18	1324.47	0.17	3.79	$ 191,186	0.00	$ -	$ 191,185.79	9.46	$ 477,398	7.65	$ 192,935	$ 670,332.53
501	1320.89	1321.14	Residential	14670.16	$ 10,650,533	$ 5,325,266	0.00	-1.00	0.00	-1.00	0.00	-1.00	0.00	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
114	1377.43	1377.68	Residential	1961.87	$ 1,424,316	$ 712,158	1377.38	-0.30	1377.38	-0.30	1377.48	-0.20	1377.48	-0.20	2.79	$ 39,697	0.00	$ -	$ 39,697.25	3.20	$ 45,609	0.00	$ -	$ 45,608.72
92	1384.83	1385.08	Residential	23180.32	$ 16,828,912	$ 8,414,456	1383.02	-1.00	1383.02	-1.00	1383.70	-1.00	1383.69	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
194	1337.21	1337.46	Residential	9523.28	$ 6,913,901	$ 3,456,951	1337.21	-0.25	1337.21	-0.25	1337.29	-0.17	1337.29	-0.17	3.01	$ 208,193	0.00	$ -	$ 208,193.50	3.32	$ 229,799	0.00	$ -	$ 229,799.44
560	1318.46	1318.71	Residential	5850.33	$ 4,247,338	$ 2,123,669	1318.50	-0.21	1318.50	-0.21	1318.55	-0.16	1318.55	-0.16	3.16	$ 134,202	0.00	$ -	$ 134,201.77	3.37	$ 143,182	0.00	$ -	$ 143,181.74
300	1339.66	1339.91	Residential	13233.48	$ 9,607,509	$ 4,803,755	341.83	-1.00	341.83	-1.00	1339.10	-0.81	1339.11	-0.81	0	$ -	0	$ -	$ -	0.0573242	$ 72,760	0	$ -	$ 72,759.99
478	1321.22	1321.47	Residential	7719.33	$ 5,604,232	$ 2,802,116	1320.76	-0.71	1320.74	-0.73	1321.53	0.07	1321.51	0.04	1.18	$ 66,030	0.00	$ -	$ 66,030.33	5.95	$ 333,559	2.73	$ 76,572	$ 410,131.01
272	1339.97	1340.22	Residential	5299.00	$ 3,847,076	$ 1,923,538	1340.21	0.00	1340.15	-0.06	1340.67	0.45	1340.62	0.40	3.98	$ 153,132	0.00	$ -	$ 153,131.67	17.57	$ 675,859	19.00	$ 365,383	$ 1,041,241.81
152	1345.74	1345.99	Residential	6940.51	$ 5,038,809	$ 2,519,405	1346.19	0.20	1346.19	0.20	1346.44	0.45	1346.44	0.45	10.0864258	$ 508,236	8.52099612	$ 214,678	$ 722,914.14	17.4252931	$ 878,027	18.79541034	$ 473,532	$ 1,351,559.75
507	1326.03	1326.28	Residential	10797.12	$ 7,838,706	$ 3,919,353	1326.10	-0.18	1326.10	-0.18	1326.37	0.09	1326.37	0.09	3.27197264	$ 256,480	0	$ -	$ 256,480.31	6.6440428	$ 520,807	3.70165992	$ 145,081	$ 665,888.08
259	1335.19	1335.44	Residential	10032.44	$ 7,283,551	$ 3,641,776	1334.66	-0.78	1334.63	-0.81	1335.44	0.00	1335.39	-0.05	0.88	$ 64,122	0.00	$ -	$ 64,122.28	4.13	$ 300,944	0.18	$ 6,722	$ 307,666.03
568	1332.40	1332.65	Residential	5264.32	$ 3,821,899	$ 1,910,950	0.00	-1.00	0.00	-1.00	0.00	-1.00	0.00	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
67	1358.85	1359.10	Residential	3832.96	$ 2,782,731	$ 1,391,366	1358.66	-0.43	1358.66	-0.43	1358.77	-0.33	1358.77	-0.33	2.26025392	$ 62,897	0	$ -	$ 62,896.80	2.69384768	$ 74,963	0	$ -	$ 74,962.55
157	1334.69	1334.94	Residential	11620.03	$ 8,436,143	$ 4,218,071	1335.22	0.28	1335.22	0.28	1335.39	0.45	1335.40	0.45	12.3935545	$ 1,045,538	11.7509763	$ 495,665	$ 1,541,202.53	17.568115	$ 1,482,071	18.995361	$ 801,238	$ 2,283,309.17
161	1338.81	1339.06	Residential	12200.44	$ 8,857,520	$ 4,428,760	1338.67	-0.39	1338.67	-0.39	1338.88	-0.18	1338.88	-0.18	2.44677736	$ 216,724	0	$ -	$ 216,723.79	3.26708984	$ 289,383	0	$ -	$ 289,383.13
178	1338.71	1338.96	Residential	2191.33	$ 1,590,906	$ 795,453	0.00	-1.00	0.00	-1.00	1338.85	-0.10	1338.86	-0.10	0	$ -	0	$ -	$ -	3.59326172	$ 57,165	0	$ -	$ 57,165.43
394	1326.19	1326.44	Residential	863.93	$ 627,213	$ 313,607	0.00	-1.00	0.00	-1.00	263.80	-1.00	263.81	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
199	1333.72	1333.97	Residential	8444.06	$ 6,130,386	$ 3,065,193	0.00	-1.00	0.00	-1.00	331.65	-1.00	331.65	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
84	1378.04	1378.29	Residential	2416.84	$ 1,754,627	$ 877,314	0.00	-1.00	0.00	-1.00	0.00	-1.00	0.00	-1.00	0	$ -	0.00	$ -	$ -	0	$ -	0.00	$ -	$ -
17	1314.46	1314.71	Residential	6917.41	$ 5,022,043	$ 2,511,021	1314.60	-0.11	1314.49	-0.22	1314.93	0.22	1314.87	0.16	3.57	$ 179,401	0.00	$ -	$ 179,400.71	10.48	$ 526,223	9.07	$ 227,739	$ 753,962.37
472	1336.64	1336.89	Residential	11331.29	$ 8,226,515	$ 4,113,257	0.00	-1.00	0.00	-1.00	0.00	-1.00	0.00	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
582	1462.74	1462.99	Residential	16759.96	$ 12,167,729	$ 6,083,864	1460.73	-1.00	1460.73	-1.00	1460.80	-1.00	1460.80	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
464	1329.31	1329.56	Residential	5295.97	$ 3,844,872	$ 1,922,436	1329.39	-0.17	1329.39	-0.17	1329.44	-0.12	1329.44	-0.12	3.30322264	$ 127,005	0	$ -	$ 127,004.69	3.5073242	$ 134,852	0	$ -	$ 134,852.14
419	1390.04	1390.29	Residential	4825.64	$ 3,503,412	$ 1,751,706	1389.19	-1.00	1389.19	-1.00	1389.89	-0.40	1389.89	-0.40	0.00	$ -	0.00	$ -	$ -	2.39	$ 83,890	0.00	$ -	$ 83,890.31
439	1343.45	1343.70	Residential	6849.88	$ 4,973,013	$ 2,486,507	0.00	-1.00	0.00	-1.00	130.35	-1.00	1061.14	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
303	1333.92	1334.17	Residential	7565.22	$ 5,492,353	$ 2,746,176	0.00	-1.00	0.00	-1.00	1333.50	-0.67	1333.50	-0.67	0.00	$ -	0.00	$ -	$ -	1.32	$ 72,758	0.00	$ -	$ 72,757.58
155	1347.15	1347.40	Residential	3848.09	$ 2,793,714	$ 1,396,857	1347.66	0.26	1347.66	0.26	1347.97	0.56	1347.97	0.56	11.6757814	$ 326,188	10.74609396	$ 150,108	$ 476,295.45	20.875	$ 583,188	23.625	$ 330,007	$ 913,195.15
82	1358.10	1358.35	Residential	651.46	$ 472,962	$ 236,481	0.00	-1.00	0.00	-1.00	30.58	-1.00	30.58	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
409	1331.58	1331.83	Residential	7662.12	$ 5,562,697	$ 2,781,348	1331.57	-0.26	1331.57	-0.26	1331.60	-0.23	1331.59	-0.24	2.97	$ 165,414	0.00	$ -	$ 165,414.18	3.06	$ 170,303	0.00	$ -	$ 170,303.26
230	1337.64	1337.89	Residential	4073.31	$ 2,957,220	$ 1,478,610	1337.76	-0.13	1337.76	-0.13	1338.09	0.20	1338.10	0.20	3.46728516	$ 102,535	0	$ -	$ 102,535.26	9.9509278	$ 294,271	8.33129892	$ 123,187	$ 417,458.30
499	1321.37	1321.62	Residential	6734.36	$ 4,889,149	$ 2,444,574	1024.72	-1.00	528.49	-1.00	1278.41	-1.00	1078.87	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
207	1345.29	1345.54	Residential	62629.14	$ 45,468,757	$ 22,734,378	1345.04	-0.50	1345.04	-0.50	1345.19	-0.35	1345.19	-0.35	2.00	$ 908,487	0.00	$ -	$ 908,487.08	2.61	$ 1,185,784	0.00	$ -	$ 1,185,784.33
63	1334.63	1334.88	Residential	5989.61	$ 4,348,454	$ 2,174,227	1335.05	0.17	1335.05	0.17	1335.26	0.38	1335.26	0.38	9.1599121	$ 398,315	7.22387694	$ 157,063	$ 555,378.08	15.3012697	$ 665,369	15.82177758	$ 344,001	$ 1,009,370.10
412	1375.69	1375.94	Residential	3662.89	$ 2,659,255	$ 1,329,627	1375.59	-0.35	1375.59	-0.35	1375.64	-0.30	1375.64	-0.30	2.60400392	$ 69,247	0	$ -	$ 69,247.10	2.7836914	$ 74,025	0	$ -	$ 74,025.45
0	1317.98	1318.23	Residential	2031.12	$ 1,474,595	$ 737,297	637.78	-1.00	637.78	-1.00	1317.82	-0.41	1317.82	-0.41	0.00	$ -	0.00	$ -	$ -	2.36	$ 34,827	0.00	$ -	$ 34,827.23
531	1324.51	1324.76	Residential	18433.22	$ 13,382,516	$ 6,691,258	1323.32	-1.00	1322.88	-1.00	1323.85	-0.90	1323.41	-1.00	0.00	$ -	0.00	$ -	$ -	0.39	$ 51,687	0.00	$ -	$ 51,687.36
174	1346.24	1346.49	Residential	1124.42	$ 816,330	$ 408,165	303.67	-1.00	303.67	-1.00	1346.51	0.02	1346.51	0.02	0	$ -	0	$ -	$ -	4.4870605	$ 36,629	0.6818847	$ 2,783	$ 39,412.44
341	1322.03	1322.28	Residential	18894.74	$ 13,717,579	$ 6,858,789	0.00	-1.00	0.00	-1.00	0.00	-1.00	0.00	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
24	1314.06	1314.31	Residential	5845.51	$ 4,243,839	$ 2,121,919	1313.88	-0.43	1313.88	-0.43	1314.07	-0.24	1314.01	-0.30	2.29	$ 97,310	0.00	$ -	$ 97,309.90	3.03	$ 128,434	0.00	$ -	$ 128,434.15
246	1335.49	1335.74	Residential	8095.61	$ 5,877,416	$ 2,938,708	1335.25	-0.49	1335.25	-0.49	1335.88	0.14	1335.88	0.14	2.02490236	$ 119,012	0	$ -	$ 119,011.94	8.145508	$ 478,745	5.8037112	$ 170,554	$ 649,299.53
403	1330.29	1330.54	Residential	11988.20	$ 8,703,431	$ 4,351,715	1329.02	-1.00	1329.02	-1.00	1329.06	-1.00	1329.06	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
76	1386.63	1386.88	Residential	12287.31	$ 8,916,955	$ 4,458,478	1381.01	-1.00	1381.01	-1.00	1383.36	-1.00	1383.36	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
2	1318.40	1318.65	Residential	9772.67	$ 7,094,958	$ 3,547,479	1318.08	-0.57	1318.08	-0.57	1318.11	-0.54	1318.11	-0.54	1.72	$ 121,702	0.00	$ -	$ 121,702.10	1.83	$ 129,635	0.00	$ -	$ 129,635.42
557	1319.81	1320.06	Residential	4983.35	$ 3,617,912	$ 1,808,956	1319.67	-0.39	1319.67	-0.39	1319.76	-0.30	1319.76	-0.30	2.45800784	$ 88,929	0	$ -	$ 88,928.57	2.80419924	$ 101,453	0	$ -	$ 101,453.47
363	1327.28	1327.53	Residential	13619.36	$ 9,887,654	$ 4,943,827	1327.80	0.27	1327.79	0.26	1328.12	0.59	1328.13	0.59	12.0859375	$ 1,195,016	11.3203125	$ 559,657	$ 1,754,672.31	21.7941895	$ 2,154,934	24.9118653	$ 1,231,599	$ 3,386,533.49
348	1322.03	1322.28	Residential	12779.27	$ 9,277,748	$ 4,638,874	716.09	-1.00	716.10	-1.00	716.26	-1.00	716.27	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
222	1335.24	1335.49	Residential	10175.58	$ 7,387,470	$ 3,693,735	1335.36	-0.13	1335.36	-0.13	1335.70	0.21	1335.71	0.21	3.46728516	$ 256,145	0	$ -	$ 256,144.64	10.1816407	$ 752,166	8.65429698	$ 319,667	$ 1,071,832.42
353	1324.46	1324.71	Residential	8593.13	$ 6,238,612	$ 3,119,306	1324.36	-0.35	1324.36	-0.35	1324.38	-0.33	1324.38	-0.33	2.60	$ 162,088	0.00	$ -	$ 162,088.16	2.69	$ 168,028	0.00	$ -	$ 168,028.25
219	1337.56	1337.81	Residential	1562.94	$ 1,134,694	$ 567,347	1337.55	-0.26	1337.55	-0.26	1337.76	-0.05	1337.77	-0.05	2.9736328	$ 33,742	0	$ -	$ 33,741.62	3.81347656	$ 43,271	0	$ -	$ 43,271.27
441	1327.97	1328.22	Residential	6274.07	$ 4,554,976	$ 2,277,488	427.21	-1.00	427.20	-1.00	950.84	-1.00	950.84	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
124	1438.10	1438.35	Residential	14426.98	$ 10,473,990	$ 5,236,995	1431.87	-1.00	1431.86	-1.00	1432.70	-1.00	1432.70	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
4	1313.10	1313.35	Residential	553.49	$ 401,831	$ 200,915	1313.18	-0.17	1313.17	-0.17	0.00	-1.00	1314.42	-1.00	3.3183594	$ 13,334	0	$ -	$ 13,334.19	0	$ -	0	$ -	$ -
533	1317.14	1317.39	Residential	10692.01	$ 7,762,402	$ 3,881,201	1317.04	-0.35	1317.04	-0.35	1317.08	-0.31	1317.08	-0.32	2.61	$ 202,740	0.00	$ -	$ 202,739.68	2.74	$ 212,935	0.00	$ -	$ 212,935.41
442	1295.07	1295.32	Residential	1280.72	$ 929,801	$ 464,900	0.00	-1.00	0.00	-1.00	0.00	-1.00	730.69	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
127	1440.11	1440.36	Residential	1667.16	$ 1,210,360	$ 605,180	1432.41	-1.00	1432.41	-1.00	1432.48	-1.00	1432.48	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
213	1344.82	1345.07	Residential	18886.60	$ 13,711,674	$ 6,855,837	1344.77	-0.29	1344.77	-0.29	1344.89	-0.17	1344.90	-0.17	2.82275388	$ 387,047	0	$ -	$ 387,046.81	3.30224608	$ 452,793	0	$ -	$ 452,793.22
339	1321.66	1321.91	Residential	4252.24	$ 3,087,125	$ 1,543,562	156.52	-1.00	156.52	-1.00	1320.88	-1.00	1320.88	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
550	1321.54	1321.79	Residential	9066.992	$ 6,584,997	$ 4,533,496	1319.73	-1.00	1319.73	-1.00	1319.76	-1.00	1319.76	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
547	1321.82	1322.07	Residential	303.30	$ 220,193	$ 110,097	0.00	-1.00	0.00	-1.00	786.73	-1.00	0.00	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
7	1315.20	1315.45	Residential	8695.64	$ 6,313,034	$ 3,156,517	0.00	-1.00	0.00	-1.00	0.00	-1.00	0.00	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
166	1334.79	1335.04	Residential	4656.42	$ 3,380,564	$ 1,690,282	238.50	-1.00	238.50	-1.00	1334.60	-0.44	1334.61	-0.44	0	$ -	0	$ -	$ -	2.24804688	$ 75,997	0	$ -	$ 75,996.66
356	1323.12	1323.37	Residential	20490.88	$ 14,876,379	$ 7,438,189	473.06	-1.00	473.06	-1.00	1322.08	-1.00	1322.08	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
366	1322.45	1322.70	Residential	7079.13	$ 5,139,449	$ 2,569,724	1321.50	-1.00	1321.50	-1.00	1322.30	-0.39	1322.30	-0.39	0.00	$ -	0.00	$ -	$ -	2.43	$ 125,048	0.00	$ -	$ 125,048.21
212	1335.76	1336.01	Residential	1686.91	$ 1,224,694	$ 612,347	0.00	-1.00	0.00	-1.00	0.00	-1.00	0.00	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
81	1362.73	1362.98	Residential	13883.69	$ 10,079,557	$ 5,039,778	1362.85	-0.12	1362.85	-0.12	1362.93	-0.04	1362.93	-0.04	3.50097656	$ 352,883	0	$ -	$ 352,882.92	3.82421876	$ 385,464	0	$ -	$ 385,464.30
252	1342.94	1343.19	Residential	11528.90	$ 8,369,982	$ 4,184,991	1342.22	-0.97	1342.22	-0.97	1343.01	-0.18	1342.25	-0.94	0.12	$ 10,054	0.00	$ -	$ 10,053.79	3.28	$ 274,722	0.00	$ -	$ 274,721.78
451	1330.63	1330.88	Residential	4329.91	$ 3,143,516	$ 1,571,758	1329.82	-1.00	1329.82	-1.00	1329.86	-1.00	1329.86	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
290	1334.83	1335.08	Residential	11536.70	$ 8,375,645	$ 4,187,822	1333.35	-1.00	1333.32	-1.00	1334.64	-0.44	1334.63	-0.45	0.00	$ -	0.00	$ -	$ -	2.24	$ 187,920	0.00	$ -	$ 187,920.35
19	1316.38	1316.63	Residential	6993.30	$ 5,077,134	$ 2,538,567	1315.78	-0.85	1315.78	-0.85	1315.97	-0.66	1315.93	-0.70	0.61	$ 30,765	0.00	$ -	$ 30,765.25	1.34	$ 68,050	0.00	$ -	$ 68,050.45
388	1322.89	1323.14	Residential	10092.64	$ 7,327,254	$ 3,663,627	1322.62	-0.52	1322.57	-0.57	1323.24	0.10	1323.22	0.08	1.92	$ 140,892	0.00	$ -	$ 140,892.22	6.87	$ 503,462	4.02	$ 147,261	$ 650,723.13
43	1320.11	1320.36	Residential	6209.68	$ 4,508,230	$ 2,254,115	1319.63	-0.74	1319.63	-0.74	1319.65	-0.71	1319.65	-0.71	1.05	$ 47,240	0.00	$ -	$ 47,239.56	1.16	$ 52,325	0.00	$ -	$ 52,324.53
347	1326.78	1327.03	Residential	9360.23	$ 6,795,524	$ 3,397,762	821.46	-1.00	23.19	-1.00	1326.56	-0.47	1326.54	-0.49	0.00	$ -	0.00	$ -	$ -	2.10	$ 143,044	0.00	$ -	$ 143,044.44
558	1329.23	1329.48	Residential	5699.37	$ 4,137,742	$ 2,068,871	0.00	-1.00	0.00	-1.00	1329.38	-0.10	0.00	-1.00	0.00	$ -	0.00	$ -	$ -	3.61	$ 149,488	0.00	$ -	$ 149,488.05
411	1371.41	1371.66	Residential	3701.56	$ 2,687,336	$ 1,343,668	1369.90	-1.00	1369.90	-1.00	1369.95	-1.00	1369.95	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -

10-Year and 100-Year Existing Building Damages in Area A

															Existing								
Building ID	HAG	Finished Floor Elevation (ft)	Land Use Type	Building Area (sf)	Replace Cost $ ($726/SF-Res)	Content Replacement Value ($) 1/2 of Replacement Cost	10yr Exist WSEL (ft)	10yr Exist Flow Depth (ft)	10yr Prop WSEL (ft)	10yr Prop Flow Depth (ft)	100yr Exist WSEL (ft)	100yr Exist Flow Depth (ft)	100yr Prop WSEL (ft)	100yr Prop Flow Depth (ft)	10yr Building Damage (%)	10yrBuilding Damage Cost ($)	10yr Content Damage (%)	10yr Content Damage Cost ($)	10yr Total Damage Cost ($)	100yr Building Damage (%)	100yrBuilding Damage Cost ($)	100yr Content Damage (%)	100yr Content Damage Cost ($)	100yr Total Damage Cost ($)
314	1330.36	1330.61	Residential	4196.13	$ 3,046,391	$ 1,523,196	1330.19	-0.42	1330.19	-0.42	1330.73	0.12	1330.74	0.12	2.30957032	$ 70,359	0	$ -	$ 70,358.55	7.7023927	$ 234,645	5.18334978	$ 78,953	$ 313,597.60
79	1368.26	1368.51	Residential	1459.23	$ 1,059,402	$ 529,701	819.50	-1.00	819.51	-1.00	1341.09	-1.00	1341.09	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
117	1391.60	1391.85	Residential	3751.96	$ 2,723,924	$ 1,361,962	0.00	-1.00	0.00	-1.00	1391.33	-0.52	1391.33	-0.53	0.00	$ -	0.00	$ -	$ -	1.90	$ 51,805	0.00	$ -	$ 51,805.10
422	1360.68	1360.93	Residential	19148.04	$ 13,901,477	$ 6,950,738	1359.30	-1.00	1359.30	-1.00	1359.43	-1.00	1359.43	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
398	1326.86	1327.11	Residential	13652.47	$ 9,911,695	$ 4,955,847	1326.93	-0.18	1326.93	-0.18	1326.96	-0.15	1326.96	-0.15	3.28	$ 324,695	0.00	$ -	$ 324,695.12	3.40	$ 337,085	0.00	$ -	$ 337,084.74
160	1330.28	1330.53	Residential	16486.30	$ 11,969,051	$ 5,984,525	1329.35	-1.00	1329.35	-1.00	1329.39	-1.00	1329.39	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
448	1350.42	1350.67	Residential	9775.28	$ 7,096,851	$ 3,548,425	1350.44	-0.23	1350.44	-0.23	1350.50	-0.18	1350.50	-0.18	3.07958984	$ 218,554	0	$ -	$ 218,553.90	3.28515624	$ 233,143	0	$ -	$ 233,142.64
241	1340.47	1340.72	Residential	4769.11	$ 3,462,376	$ 1,731,188	0.00	-1.00	0.00	-1.00	618.40	-1.00	618.40	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
65	1360.27	1360.52	Residential	2558.86	$ 1,857,730	$ 928,865	1358.39	-1.00	1358.39	-1.00	1358.61	-1.00	1358.62	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
221	1332.89	1333.14	Residential	6409.64	$ 4,653,397	$ 2,326,698	1130.18	-1.00	1130.18	-1.00	1332.84	-0.30	1332.86	-0.30	0	$ -	0	$ -	$ -	2.81298828	$ 130,899	0	$ -	$ 130,899.50
107	1408.31	1408.56	Residential	9558.60	$ 6,939,545	$ 3,469,773	1407.44	-1.00	1407.44	-1.00	1407.53	-1.00	1407.53	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
159	1337.05	1337.30	Residential	7081.33	$ 5,141,047	$ 2,570,523	0.00	-1.00	0.00	-1.00	1336.93	-0.37	1336.93	-0.37	0	$ -	0	$ -	$ -	2.52636716	$ 129,882	0	$ -	$ 129,881.71
354	1324.37	1324.62	Residential	6151.11	$ 4,465,703	$ 2,232,851	1264.84	-1.00	1264.85	-1.00	1324.36	-0.26	1324.35	-0.27	0.00	$ -	0.00	$ -	$ -	2.98	$ 132,903	0.00	$ -	$ 132,902.62
11	1310.91	1311.16	Residential	8959.69	$ 6,504,734	$ 3,252,367	1311.35	0.19	1311.26	0.10	1311.62	0.46	1311.58	0.42	9.58	$ 622,984	7.81	$ 253,956	$ 876,940.07	17.92	$ 1,165,866	19.49	$ 633,973	$ 1,799,838.86
480	1320.99	1321.24	Residential	21154.48	$ 15,358,155	$ 7,679,077	0.00	-1.00	0.00	-1.00	67.45	-1.00	0.00	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
535	1318.96	1319.21	Residential	15038.36	$ 10,917,848	$ 5,458,924	1319.07	-0.14	1319.07	-0.14	1319.10	-0.11	1319.09	-0.12	3.43	$ 374,608	0.00	$ -	$ 374,608.00	3.54	$ 386,549	0.00	$ -	$ 386,549.40
324	1416.21	1416.46	Residential	23457.64	$ 17,030,244	$ 8,515,122	1413.95	-1.00	1413.95	-1.00	1414.07	-1.00	1414.07	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
15	1310.89	1311.14	Residential	6635.11	$ 4,817,087	$ 2,408,543	1311.22	0.08	1311.13	-0.01	1311.54	0.40	1311.49	0.35	6.52	$ 314,051	3.53	$ 84,958	$ 399,009.09	16.11	$ 775,885	16.95	$ 408,241	$ 1,184,126.01
83	1371.94	1372.19	Residential	2134.99	$ 1,550,000	$ 775,000	1372.24	0.05	1372.24	0.05	1372.37	0.18	1372.36	0.17	5.53	$ 85,670	2.14	$ 16,569	$ 102,239.11	9.41	$ 145,782	7.57	$ 58,647	$ 204,429.02
396	1328.64	1328.89	Residential	16191.87	$ 11,755,297	$ 5,877,649	965.23	-1.00	965.23	-1.00	1328.35	-0.53	1328.35	-0.54	0.00	$ -	0.00	$ -	$ -	1.86	$ 219,034	0.00	$ -	$ 219,034.25
583	1330.49	1330.74	Residential	0.00	$ -	$ -	1329.79	-0.95	1329.79	-0.95	1329.82	-0.93	1329.82	-0.93	0.19970704	$ -	0	$ -	$ -	0.29003908	$ -	0	$ -	$ -
516	1322.12	1322.37	Residential	766.64	$ 556,581	$ 278,291	76.91	-1.00	76.90	-1.00	291.24	-1.00	128.43	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
342	1321.31	1321.56	Residential	440.90	$ 320,096	$ 160,048	0.00	-1.00	0.00	-1.00	0.00	-1.00	0.00	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
150	1341.28	1341.53	Residential	4258.47	$ 3,091,652	$ 1,545,826	1341.73	0.20	1341.73	0.20	1341.90	0.37	1341.91	0.37	9.9216307	$ 306,742	8.29028298	$ 128,153	$ 434,895.66	15.1108399	$ 467,175	15.55517586	$ 240,456	$ 707,630.56
143	1329.96	1330.21	Residential	3734.03	$ 2,710,903	$ 1,355,452	0.00	-1.00	0.00	-1.00	0.00	-1.00	0.00	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
344	1324.82	1325.07	Residential	7011.00	$ 5,089,986	$ 2,544,993	1324.73	-0.34	1324.62	-0.45	1325.17	0.09	1325.15	0.08	2.64	$ 134,507	0.00	$ -	$ 134,506.85	6.84	$ 348,060	3.97	$ 101,122	$ 449,182.53
571	1327.57	1327.82	Residential	8562.45	$ 6,216,338	$ 3,108,169	1327.58	-0.23	1327.59	-0.23	1327.62	-0.20	1327.62	-0.20	3.07421876	$ 191,104	0	$ -	$ 191,103.84	3.21142576	$ 199,633	0	$ -	$ 199,633.09
88	1379.61	1379.86	Residential	11455.28	$ 8,316,533	$ 4,158,267	1378.41	-1.00	1378.41	-1.00	1378.46	-1.00	1378.46	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
49	1377.00	1377.25	Residential	728.13	$ 528,623	$ 264,311	0.00	-1.00	0.00	-1.00	0.00	-1.00	0.00	-1.00	0	$ -	0.00	$ -	$ -	0	$ -	0.00	$ -	$ -
445	1348.57	1348.82	Residential	8000.24	$ 5,808,173	$ 2,904,086	1348.40	-0.42	1348.39	-0.43	1348.43	-0.39	1348.43	-0.39	2.30029296	$ 133,605	0	$ -	$ 133,604.99	2.4267578	$ 140,950	0	$ -	$ 140,950.29
376	1323.14	1323.39	Residential	7118.19	$ 5,167,807	$ 2,583,904	1322.66	-0.73	1322.57	-0.82	1323.33	-0.06	1323.33	-0.06	1.08	$ 55,640	0.00	$ -	$ 55,639.72	3.77	$ 194,979	0.00	$ -	$ 194,978.75
86	1377.55	1377.80	Residential	2949.41	$ 2,141,271	$ 1,070,635	0.00	-1.00	0.00	-1.00	0.00	-1.00	0.00	-1.00	0	$ -	0.00	$ -	$ -	0	$ -	0.00	$ -	$ -
520	1322.62	1322.87	Residential	15567.65	$ 11,302,117	$ 5,651,058	1322.30	-0.57	1322.30	-0.57	1322.78	-0.09	1322.35	-0.52	1.71	$ 192,765	0.00	$ -	$ 192,765.11	3.65	$ 412,295	0.00	$ -	$ 412,295.48
224	1342.44	1342.69	Residential	5688.11	$ 4,129,571	$ 2,064,785	1342.46	-0.24	1342.46	-0.24	1342.48	-0.21	1342.48	-0.21	3.05	$ 125,762	0.00	$ -	$ 125,762.36	3.16	$ 130,340	0.00	$ -	$ 130,339.57
16	1311.95	1312.20	Residential	5118.95	$ 3,716,356	$ 1,858,178	0.00	-1.00	0.00	-1.00	1311.91	-0.29	1311.88	-0.32	0.00	$ -	0.00	$ -	$ -	2.82	$ 104,958	0.00	$ -	$ 104,958.01
71	1355.29	1355.54	Residential	15605.34	$ 11,329,477	$ 5,664,738	1355.85	0.31	1355.86	0.31	1356.01	0.47	1356.03	0.47	13.1735839	$ 1,492,498	12.84301746	$ 727,523	$ 2,220,021.51	18.0405271	$ 2,043,897	19.65673794	$ 1,113,503	$ 3,157,400.16
493	1320.68	1320.93	Residential	1623.50	$ 1,178,660	$ 589,330	0.00	-1.00	0.00	-1.00	0.00	-1.00	0.00	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
380	1324.56	1324.81	Residential	7115.36	$ 5,165,750	$ 2,582,875	1324.17	-0.64	1262.30	-1.00	1324.34	-0.47	1324.33	-0.48	1.42	$ 73,451	0.00	$ -	$ 73,450.51	2.10	$ 108,662	0.00	$ -	$ 108,662.37
291	1343.71	1343.96	Residential	10971.13	$ 7,965,040	$ 3,982,520	0.00	-1.00	0.00	-1.00	1194.25	-1.00	1194.26	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
548	1331.38	1331.63	Residential	2067.78	$ 1,501,207	$ 750,604	1330.21	-1.00	1330.21	-1.00	1330.49	-1.00	1330.48	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
326	1390.61	1390.86	Residential	6518.30	$ 4,732,285	$ 2,366,143	1390.62	-0.24	1390.62	-0.24	1390.64	-0.22	1390.64	-0.22	3.05	$ 144,464	0.00	$ -	$ 144,464.11	3.14	$ 148,577	0.00	$ -	$ 148,577.13
530	1331.84	1332.09	Residential	10819.21	$ 7,854,744	$ 3,927,372	1332.11	0.02	1332.11	0.02	1332.30	0.21	1332.31	0.21	4.4760742	$ 351,584	0.66650388	$ 26,176	$ 377,760.28	10.3610839	$ 813,837	8.90551746	$ 349,753	$ 1,163,589.48
323	1425.01	1425.26	Residential	9843.82	$ 7,146,612	$ 3,573,306	1424.74	-0.52	1424.74	-0.52	1424.79	-0.47	1424.79	-0.48	1.91	$ 136,302	0.00	$ -	$ 136,302.09	2.10	$ 150,121	0.00	$ -	$ 150,120.73
497	1320.51	1320.76	Residential	2723.39	$ 1,977,179	$ 988,590	0.00	-1.00	0.00	-1.00	147.26	-1.00	147.25	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
391	1323.62	1323.87	Residential	9604.68	$ 6,972,994	$ 3,486,497	1323.72	-0.15	1323.65	-0.22	1324.10	0.23	1324.10	0.23	3.42	$ 238,335	0.00	$ -	$ 238,334.77	10.94	$ 762,824	9.72	$ 338,733	$ 1,101,557.78
319	1347.74	1347.99	Residential	5079.32	$ 3,687,584	$ 1,843,792	1347.48	-0.52	1347.48	-0.52	1347.77	-0.23	1347.77	-0.23	1.9399414	$ 71,537	0	$ -	$ 71,536.97	3.0961914	$ 114,175	0	$ -	$ 114,174.66
492	1321.53	1321.78	Residential	1339.91	$ 972,774	$ 486,387	1320.63	-1.00	1320.63	-1.00	1320.71	-1.00	1320.70	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
321	1334.36	1334.61	Residential	10459.22	$ 7,593,394	$ 3,796,697	961.07	-1.00	961.06	-1.00	1333.64	-0.97	1333.64	-0.97	0	$ -	0	$ -	$ -	0.125	$ 9,492	0	$ -	$ 9,491.74
90	1393.57	1393.82	Residential	10984.74	$ 7,974,925	$ 3,987,462	1393.79	-0.03	1393.79	-0.03	1393.94	0.12	1393.93	0.12	3.88	$ 309,807	0.00	$ -	$ 309,807.13	7.61	$ 606,667	5.05	$ 201,369	$ 808,035.48
474	1319.47	1319.72	Residential	1083.36	$ 786,522	$ 393,261	485.09	-1.00	485.10	-1.00	485.20	-1.00	485.17	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
484	1326.28	1326.53	Residential	17723.79	$ 12,867,474	$ 6,433,737	1326.15	-0.38	1326.14	-0.39	1326.45	-0.08	1326.44	-0.09	2.50	$ 321,310	0.00	$ -	$ 321,309.88	3.69	$ 474,425	0.00	$ -	$ 474,425.28
138	1340.89	1341.14	Residential	8006.64	$ 5,812,823	$ 2,906,411	1340.56	-0.58	1340.56	-0.58	1340.78	-0.36	1340.79	-0.36	1.67041016	$ 97,098	0	$ -	$ 97,097.98	2.56445312	$ 149,067	0	$ -	$ 149,067.12
29	1317.70	1317.95	Residential	511.14	$ 371,090	$ 185,545	1197.86	-1.00	1197.85	-1.00	1317.42	-0.53	1317.42	-0.53	0.00	$ -	0.00	$ -	$ -	1.87	$ 6,951	0.00	$ -	$ 6,950.69
231	1341.90	1342.15	Residential	5392.15	$ 3,914,704	$ 1,957,352	0.00	-1.00	0.00	-1.00	0.00	-1.00	0.00	-1.00	0	$ -	0.00	$ -	$ -	0	$ -	0.00	$ -	$ -
32	1318.65	1318.90	Residential	4524.83	$ 3,285,027	$ 1,642,514	1318.50	-0.40	1318.50	-0.40	1318.52	-0.39	1318.51	-0.39	2.39	$ 78,436	0.00	$ -	$ 78,436.44	2.45	$ 80,377	0.00	$ -	$ 80,377.30
257	1333.35	1333.60	Residential	9422.90	$ 6,841,023	$ 3,420,512	1333.63	0.02	1333.63	0.02	1333.75	0.15	1333.70	0.10	4.70	$ 321,491	0.98	$ 33,495	$ 354,986.64	8.52	$ 582,539	6.32	$ 216,229	$ 798,767.93
491	1324.09	1324.34	Residential	6194.34	$ 4,497,094	$ 2,248,547	1324.30	-0.05	1324.22	-0.13	1324.68	0.34	1324.67	0.32	3.81	$ 171,342	0.00	$ -	$ 171,341.93	14.07	$ 632,777	14.10	$ 317,025	$ 949,802.56
223	1340.02	1340.27	Residential	4310.09	$ 3,129,127	$ 1,564,564	23.32	-1.00	23.32	-1.00	188.13	-1.00	188.13	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
317	1346.67	1346.92	Residential	5732.43	$ 4,161,744	$ 2,080,872	1346.85	-0.06	1346.85	-0.06	1346.99	0.07	1346.99	0.07	3.74707028	$ 155,943	0	$ -	$ 155,943.49	6.2265625	$ 259,134	3.1171875	$ 64,865	$ 323,998.30
350	1325.39	1325.64	Residential	9207.28	$ 6,684,486	$ 3,342,243	1325.32	-0.32	1325.28	-0.36	1325.65	0.01	1325.64	0.00	2.71	$ 180,853	0.00	$ -	$ 180,853.20	4.20	$ 280,598	0.28	$ 9,253	$ 289,851.45
36	1310.52	1310.77	Residential	5860.59	$ 4,254,790	$ 2,127,395	1310.41	-0.37	1310.41	-0.36	1310.51	-0.26	1310.51	-0.27	2.54	$ 108,032	0.00	$ -	$ 108,031.79	2.97	$ 126,293	0.00	$ -	$ 126,293.31
205	1344.40	1344.65	Residential	10715.30	$ 7,779,310	$ 3,889,655	1344.06	-0.59	1344.06	-0.59	1344.11	-0.54	1344.11	-0.54	1.6464844	$ 128,085	0	$ -	$ 128,085.13	1.85107424	$ 144,001	0	$ -	$ 144,000.81
105	1423.56	1423.81	Residential	7121.88	$ 5,170,483	$ 2,585,241	1423.11	-0.70	1423.11	-0.70	1423.19	-0.62	1423.19	-0.62	1.21679688	$ 62,914	0	$ -	$ 62,914.27	1.52490236	$ 78,845	0	$ -	$ 78,844.81
236	1335.02	1335.27	Residential	7463.86	$ 5,418,764	$ 2,709,382	772.25	-1.00	772.24	-1.00	1334.27	-1.00	1334.29	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
485	1320.88	1321.13	Residential	7138.89	$ 5,182,831	$ 2,591,415	1320.54	-0.59	1320.54	-0.59	1320.74	-0.39	1320.68	-0.45	1.66	$ 85,942	0.00	$ -	$ 85,941.86	2.44	$ 126,585	0.00	$ -	$ 126,584.57
276	1333.43	1333.68	Residential	582.30	$ 422,748	$ 211,374	1333.80	0.12	1333.76	0.09	1334.00	0.32	1333.98	0.31	7.51	$ 31,757	4.92	$ 10,393	$ 42,149.40	13.55	$ 57,286	13.37	$ 28,263	$ 85,548.67
232	1334.12	1334.37	Residential	6944.69	$ 5,041,848	$ 2,520,924	742.32	-1.00	742.32	-1.00	1334.19	-0.18	1334.21	-0.18	0	$ -	0	$ -	$ -	3.27734372	$ 165,239	0	$ -	$ 165,238.69
503	1335.00	1335.25	Residential	13617.09	$ 9,886,006	$ 4,943,003	1334.06	-1.00	1334.06	-1.00	1334.27	-0.98	1334.27	-0.98	0.00	$ -	0.00	$ -	$ -	0.08	$ 8,351	0.00	$ -	$ 8,350.97
64	1335.75	1336.00	Residential	8714.23	$ 6,326,533	$ 3,163,267	1335.57	-0.44	1335.57	-0.44	1335.61	-0.39	1335.61	-0.39	2.25	$ 142,440	0.00	$ -	$ 142,439.67	2.44	$ 154,086	0.00	$ -	$ 154,085.68
182	1332.38	1332.63	Residential	11920.23	$ 8,654,087	$ 4,327,044	228.28	-1.00	228.27	-1.00	888.27	-1.00	982.05	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
430	1362.52	1362.77	Residential	9532.75	$ 6,920,775	$ 3,460,388	1360.53	-1.00	1360.54	-1.00	1360.63	-1.00	1360.63	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
184	1331.65	1331.90	Residential	7792.51	$ 5,657,361	$ 2,828,681	1331.47	-0.43	1331.47	-0.43	1331.63	-0.27	1331.64	-0.27	2.29785156	$ 129,998	0	$ -	$ 129,997.76	2.9350586	$ 166,047	0	$ -	$ 166,046.86
204	1341.13	1341.38	Residential	1620.13	$ 1,176,216	$ 588,108	1341.03	-0.36	1341.03	-0.36	1341.13	-0.25	1341.14	-0.25	2.5791016	$ 30,336	0	$ -	$ 30,335.79	2.99560548	$ 35,235	0	$ -	$ 35,234.78
315	1338.98	1339.23	Residential	8432.94	$ 6,122,312	$ 3,061,156	1339.05	-0.18	1339.05	-0.18	1339.27	0.04	1339.28	0.04	3.2993164	$ 201,994	0	$ -	$ 201,994.44	5.1865234	$ 317,535	1.66113276	$ 50,850	$ 368,385.00
449	1326.30	1326.55	Residential	512.23	$ 371,880	$ 185,940	0.00	-1.00	0.00	-1.00	0.00	-1.00	0.00	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
125	1431.44	1431.69	Residential	10791.68	$ 7,834,763	$ 3,917,382	1430.37	-1.00	1430.37	-1.00	1430.49	-1.00	1430.49	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
261	1344.98	1345.23	Residential	31570.81	$ 22,920,407	$ 11,460,203	1344.21	-1.00	913.11	-1.00	1344.65	-0.58	1344.54	-0.69	0.00	$ -	0.00	$ -	$ -	1.68	$ 384,655	0.00	$ -	$ 384,655.46
386	1324.50	1324.75	Residential	4437.01	$ 3,221,266	$ 1,610,633	228.38	-1.00	228.38	-1.00	1324.11	-0.64	1324.10	-0.65	0.00	$ -	0.00	$ -	$ -	1.43	$ 46,023	0.00	$ -	$ 46,022.58
414	1397.75	1398.00	Residential	6393.90	$ 4,641,974	$ 2,320,987	1395.84	-1.00	1395.84	-1.00	1396.06	-1.00	1396.06	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
229	1338.56	1338.81	Residential	4433.88	$ 3,218,996	$ 1,609,498	1338.74	-0.07	1338.74	-0.07	1338.92	0.11	1338.92	0.11	3.7319336	$ 120,131	0	$ -	$ 120,130.81	7.2739258	$ 234,147	4.58349612	$ 73,771	$ 307,918.69
431	1356.48	1356.73	Residential	3025.96	$ 2,196,849	$ 1,098,424	123.92	-1.00	123.92	-1.00	631.20	-1.00	631.20	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
509	1325.09	1325.34	Residential	15430.55	$ 11,202,578	$ 5,601,289	1324.71	-0.63	1324.71	-0.63	1324.78	-0.56	1324.78	-0.56	1.49	$ 166,398	0.00	$ -	$ 166,397.67	1.75	$ 196,483	0.00	$ -	$ 196,482.72
440	1326.41	1326.66	Residential	5519.16	$ 4,006,909	$ 2,003,455	0.00	-1.00	0.00	-1.00	1326.24	-0.42	1326.24	-0.42	0.00	$ -	0.00	$ -	$ -	2.32	$ 93,012	0.00	$ -	$ 93,011.95
402	1327.14	1327.39	Residential	1014.49	$ 736,520	$ 368,260	481.85	-1.00	481.85	-1.00	1326.17	-1.00	1326.17	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
542	1337.79	1338.04	Residential	1862.82	$ 1,352,407	$ 676,203	0.00	-1.00	0.00	-1.00	0.00	-1.00	0.00	-1.00	0	$ -	0.00	$ -	$ -	0	$ -	0.00	$ -	$ -
416	1398.89	1399.14	Residential	5128.78	$ 3,723,492	$ 1,861,746	1389.92	-1.00	1389.92	-1.00	1390.58	-1.00	1390.58	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
569	1321.58	1321.83	Residential	6215.34	$ 4,512,337	$ 2,256,168	1321.17	-0.67	1321.17	-0.67	1321.20	-0.64	1321.20	-0.64	1.32	$ 59,687	0.00	$ -	$ 59,687.11	1.45	$ 65,283	0.00	$ -	$ 65,283.46
384	1326.34	1326.59	Residential	13713.92	$ 9,956,308	$ 4,978,154	1326.19	-0.40	1326.19	-0.40	1326.23	-0.36	1326.23	-0.36	2.42	$ 240,497	0.00	$ -	$ 240,497.35	2.56	$ 255,179	0.00	$ -	$ 255,179.01
66	1341.15	1341.40	Residential	7401.01	$ 5,373,131	$ 2,686,565	1341.20	-0.20	1341.20	-0.20	1341.30	-0.10	1341.30	-0.10	3.20166016	$ 172,029	0	$ -	$ 172,029.39	3.61328128	$ 194,146	0	$ -	$ 194,146.33
134	1653.63	1653.88	Residential	8993.07	$ 6,528,966	$ 3,264,483	0.00	-1.00	0.00	-1.00	0.00	-1.00	0.00	-1.00	0	$ -	0.00	$ -	$ -	0	$ -	0.00	$ -	$ -
94	1414.71	1414.96	Residential	1163.57	$ 844,755	$ 422,378	0.00	-1.00	0.00	-1.00	0.00	-1.00	0.00	-1.00	0	$ -	0.00	$ -	$ -	0	$ -	0.00	$ -	$ -
87	1398.25	1398.50	Residential	724.88	$ 526,260	$ 263,130	0.00	-1.00	0.00	-1.00	0.00	-1.00	0.00	-1.00	0	$ -	0.00	$ -	$ -	0	$ -	0.00	$ -	$ -
420	1364.99	1365.24	Residential	4334.78	$ 3,147,053	$ 1,573,527	0.00	-1.00	0.00	-1.00	0.00	-1.00	0.00	-1.00	0	$ -	0.00	$ -	$ -	0	$ -	0.00	$ -	$ -
85	1347.99	1348.24	Residential	4822.15	$ 3,500,880	$ 1,750,440	0.00	-1.00	0.00	-1.00	0.00	-1.00	0.00	-1.00	0	$ -	0.00	$ -	$ -	0	$ -	0.00	$ -	$ -
294	1346.60	1346.85	Residential	349.86	$ 253,997	$ 126,998	0.00	-1.00	0.00	-1.00	0.00	-1.00	0.00	-1.00	0	$ -	0.00	$ -	$ -	0	$ -	0.00	$ -	$ -
243	1342.10	1342.35	Residential	3590.12	$ 2,606,425	$ 1,303,213	0.00	-1.00	0.00	-1.00	0.00	-1.00	0.00	-1.00	0	$ -	0.00	$ -	$ -	0	$ -	0.00	$ -	$ -
471	1339.29	1339.54	Residential	3984.20	$ 2,892,527	$ 1,446,264	0.00	-1.00	0.00	-1.00	0.00	-1.00	0.00	-1.00	0	$ -	0.00	$ -	$ -	0	$ -	0.00	$ -	$ -

10-Year and 100-Year Existing Building Damages in Area A

															Existing									
Building ID	HAG	Finished Floor Elevation (ft)	Land Use Type	Building Area (sf)	Replace Cost $ ($726/SF-Res)	Content Replacement Value ($) 1/2 of Replacement Cost	10yr Exist WSEL (ft)	10yr Exist Flow Depth (ft)	10yr Prop WSEL (ft)	10yr Prop Flow Depth (ft)	100yr Exist WSEL (ft)	100yr Exist Flow Depth (ft)	100yr Prop WSEL (ft)	100yr Prop Flow Depth (ft)	10yr Building Damage (%)	10yrBuilding Damage Cost ($)	10yr Content Damage (%)	10yr Content Damage Cost ($)	10yr Total Damage Cost ($)	100yr Building Damage (%)	100yrBuilding Damage Cost ($)	100yr Content Damage (%)	100yr Content Damage Cost ($)	100yr Total Damage Cost ($)
473	1337.74	1337.99	Residential	5738.70	$ 4,166,293	$ 2,083,146	0.00	-1.00	0.00	-1.00	0.00	-1.00	0.00	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
70	1337.13	1337.38	Residential	428.49	$ 311,081	$ 155,540	0.00	-1.00	0.00	-1.00	0.00	-1.00	0.00	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
466	1333.18	1333.43	Residential	4856.25	$ 3,525,640	$ 1,762,820	0.00	-1.00	0.00	-1.00	0.00	-1.00	0.00	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
247	1330.67	1330.92	Residential	324.60	$ 235,659	$ 117,830	1329.61	-1.00	1329.61	-1.00	0.00	-1.00	1331.19	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
486	1328.38	1328.63	Residential	10080.08	$ 7,318,139	$ 3,659,070	0.00	-1.00	0.00	-1.00	0.00	-1.00	0.00	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
418	1326.27	1326.52	Residential	642.45	$ 466,418	$ 233,209	0.00	-1.00	0.00	-1.00	0.00	-1.00	0.00	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
577	1325.04	1325.29	Residential	6459.08	$ 4,689,290	$ 2,344,645	0.00	-1.00	0.00	-1.00	0.00	-1.00	0.00	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
273	1343.59	1343.84	Residential	2568.08	$ 1,864,428	$ 932,214	64.58	-1.00	64.58	-1.00	86.11	-1.00	86.12	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
562	1318.27	1318.52	Residential	6529.13	$ 4,740,151	$ 2,370,076	0.00	-1.00	0.00	-1.00	68.31	-1.00	0.00	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
201	1336.36	1336.61	Residential	10297.53	$ 7,476,003	$ 3,738,002	153.83	-1.00	153.83	-1.00	153.83	-1.00	153.84	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
245	1340.43	1340.68	Residential	941.45	$ 683,496	$ 341,748	0.00	-1.00	0.00	-1.00	213.48	-1.00	213.49	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
305	1341.91	1342.16	Residential	6338.38	$ 4,601,667	$ 2,300,833	216.16	-1.00	216.16	-1.00	216.17	-1.00	216.17	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
372	1326.69	1326.94	Residential	1276.52	$ 926,755	$ 463,378	0.00	-1.00	0.00	-1.00	206.81	-1.00	206.82	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
226	1098.42	1098.67	Residential	691.10	$ 501,735	$ 250,868	0.00	-1.00	0.00	-1.00	0.00	-1.00	0.00	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
6	1318.58	1318.83	Residential	8429.50	$ 6,119,817	$ 3,059,909	220.78	-1.00	220.78	-1.00	220.79	-1.00	220.79	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
513	1335.01	1335.26	Residential	526.95	$ 382,565	$ 191,282	0.00	-1.00	0.00	-1.00	252.12	-1.00	252.12	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
47	1318.51	1318.76	Residential	5281.01	$ 3,834,015	$ 1,917,007	349.96	-1.00	349.96	-1.00	349.97	-1.00	349.97	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
31	1318.31	1318.56	Residential	924.64	$ 671,292	$ 335,646	175.74	-1.00	175.73	-1.00	392.23	-1.00	392.23	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
175	1346.66	1346.91	Residential	1148.33	$ 833,687	$ 416,843	0.00	-1.00	0.00	-1.00	444.16	-1.00	444.16	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
248	1340.61	1340.86	Residential	2664.64	$ 1,934,529	$ 967,265	0.00	-1.00	0.00	-1.00	442.03	-1.00	442.04	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
250	1341.47	1341.72	Residential	7701.93	$ 5,591,604	$ 2,795,802	0.00	-1.00	0.00	-1.00	460.08	-1.00	460.08	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
576	1331.62	1331.87	Residential	617.80	$ 448,524	$ 224,262	505.16	-1.00	505.17	-1.00	505.22	-1.00	505.23	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
570	1320.14	1320.39	Residential	11790.86	$ 8,560,166	$ 4,280,083	506.07	-1.00	505.97	-1.00	506.25	-1.00	506.20	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
523	1326.63	1326.88	Residential	7607.83	$ 5,523,283	$ 2,761,642	524.98	-1.00	524.98	-1.00	525.04	-1.00	525.05	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
202	1275.49	1275.74	Residential	2124.08	$ 1,542,082	$ 771,041	0.00	-1.00	0.00	-1.00	477.18	-1.00	477.19	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
9	763.59	763.84	Residential	417.29	$ 302,950	$ 151,475	0.00	-1.00	0.00	-1.00	0.00	-1.00	0.00	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
52	1346.47	1346.72	Residential	7442.51	$ 5,403,259	$ 2,701,630	149.36	-1.00	149.36	-1.00	599.70	-1.00	599.70	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
136	1341.26	1341.51	Residential	8006.87	$ 5,812,987	$ 2,906,493	266.48	-1.00	266.48	-1.00	623.67	-1.00	623.66	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
357	1322.47	1322.72	Residential	4760.72	$ 3,456,285	$ 1,728,142	0.00	-1.00	0.00	-1.00	618.21	-1.00	618.20	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
23	1316.47	1316.72	Residential	5702.06	$ 4,139,693	$ 2,069,847	619.59	-1.00	619.59	-1.00	619.65	-1.00	619.64	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
137	1343.10	1343.35	Residential	12613.34	$ 9,157,283	$ 4,578,641	692.83	-1.00	692.83	-1.00	692.84	-1.00	692.84	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
475	1322.99	1323.24	Residential	4541.68	$ 3,297,259	$ 1,648,629	83.56	-1.00	83.56	-1.00	688.76	-1.00	688.75	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
249	1339.78	1340.03	Residential	5162.03	$ 3,747,637	$ 1,873,818	758.09	-1.00	758.09	-1.00	758.09	-1.00	758.09	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
1	1317.42	1317.67	Residential	1455.68	$ 1,056,823	$ 528,411	747.59	-1.00	747.60	-1.00	747.62	-1.00	747.63	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
494	1321.28	1321.53	Residential	1256.14	$ 911,959	$ 455,980	754.22	-1.00	754.23	-1.00	754.23	-1.00	754.24	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -

10-Year and 100-Year Proposed Building Damages in Area A

															Proposed									
Building ID	HAG	Finished Floor Elevation (ft)	Land Use Type	Building Area (sf)	Replace Cost $ ($726/SF-Res)	Content Replacement Value ($) 1/2 of Replacement Cost	10yr Exist WSEL (ft)	10yr Exist Flow Depth (ft)	10yr Prop WSEL (ft)	10yr Prop Flow Depth (ft)	100yr Exist WSEL (ft)	100yr Exist Flow Depth (ft)	100yr Prop WSEL (ft)	100yr Prop Flow Depth (ft)	10yr Building Damage (%)	10yrBuilding Damage Cost ($)	10yr Content Damage (%)	10yr Content Damage Cost ($)	10yr Total Damage Cost ($)	100yr Building Damage (%)	100yrBuilding Damage Cost ($)	100yr Content Damage (%)	100yr Content Damage Cost ($)	100yr Total Damage Cost ($)
198	1331.10	1331.35	Residential	7479.12	$ 5,429,839	$ 2,714,920	1331.08	-0.27	1331.08	-0.27	1331.18	-0.17	1331.18	-0.17	2.92724608	$ 158,945	0	$ -	$ 158,944.76	3.31542968	$ 180,023	0	$ -	$ 180,022.50
528	1335.72	1335.97	Residential	10191.57	$ 7,399,081	$ 3,699,541	1335.76	-0.21	1335.76	-0.21	1335.81	-0.16	1335.81	-0.16	3.16796876	$ 234,401	0	$ -	$ 234,400.58	3.37207032	$ 249,502	0	$ -	$ 249,502.22
121	1525.48	1525.73	Residential	406.99	$ 295,472	$ 147,736	0.00	-1.00	0.00	-1.00	1166.47	-1.00	1166.47	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
538	1327.24	1327.49	Residential	2669.28	$ 1,937,899	$ 968,950	1327.36	-0.14	1327.19	-0.30	1328.06	0.57	1327.66	0.16	2.78	$ 53,955	0.00	$ -	$ 53,954.59	8.85	$ 171,478	6.79	$ 65,773	$ 237,250.71
470	1333.16	1333.41	Residential	1558.25	$ 1,131,291	$ 565,645	974.14	-1.00	974.13	-1.00	1333.04	-0.37	1333.04	-0.37	0	$ -	0	$ -	$ -	2.50341796	$ 28,321	0	$ -	$ 28,320.94
262	1340.41	1340.66	Residential	8866.52	$ 6,437,090	$ 3,218,545	1340.38	-0.28	1340.38	-0.28	1340.47	-0.19	1340.46	-0.20	2.88	$ 185,255	0.00	$ -	$ 185,254.93	3.21	$ 206,502	0.00	$ -	$ 206,502.35
61	1333.57	1333.82	Residential	2138.95	$ 1,552,880	$ 776,440	1279.33	-1.00	1279.30	-1.00	1334.09	0.27	1334.06	0.24	0.00	$ -	0.00	$ -	$ -	11.31	$ 175,681	10.24	$ 79,496	$ 255,176.89
51	1341.97	1342.22	Residential	8818.57	$ 6,402,284	$ 3,201,142	1342.64	0.42	1342.58	0.36	1343.07	0.84	1343.04	0.82	14.83	$ 949,151	15.16	$ 485,142	$ 1,434,293.06	28.47	$ 1,822,744	34.26	$ 1,096,657	$ 2,919,401.09
59	1343.56	1343.81	Residential	1029.42	$ 747,360	$ 373,680	1344.22	0.41	1344.05	0.24	1344.65	0.84	1344.54	0.73	11.11	$ 83,018	9.95	$ 37,186	$ 120,204.36	25.87	$ 193,343	30.62	$ 114,414	$ 307,756.88
274	1339.51	1339.76	Residential	2963.81	$ 2,151,726	$ 1,075,863	1340.25	0.49	1340.19	0.43	1340.72	0.96	1340.68	0.92	16.89	$ 363,361	18.04	$ 194,105	$ 557,465.73	31.56	$ 679,028	38.58	$ 415,071	$ 1,094,099.74
195	1331.08	1331.33	Residential	5775.30	$ 4,192,867	$ 2,096,433	1048.47	-1.00	1048.48	-1.00	1331.17	-0.16	1331.19	-0.16	0	$ -	0	$ -	$ -	3.35888672	$ 140,834	0	$ -	$ 140,833.64
537	1317.88	1318.13	Residential	11429.48	$ 8,297,801	$ 4,148,901	871.71	-1.00	871.70	-1.00	1317.76	-0.37	1317.74	-0.39	0.00	$ -	0.00	$ -	$ -	2.43	$ 202,016	0.00	$ -	$ 202,015.80
360	1323.97	1324.22	Residential	1063.36	$ 772,000	$ 386,000	1324.61	0.38	1324.58	0.36	1324.89	0.66	1324.88	0.66	14.77	$ 114,055	15.08	$ 58,222	$ 172,276.96	23.81	$ 183,800	27.73	$ 107,044	$ 290,844.71
338	1320.98	1321.23	Residential	3049.31	$ 2,213,799	$ 1,106,900	787.52	-1.00	787.51	-1.00	787.54	-1.00	787.53	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
60	1333.08	1333.33	Residential	7401.44	$ 5,373,442	$ 2,686,721	289.24	-1.00	289.23	-1.00	289.27	-1.00	289.26	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
413	1455.19	1455.44	Residential	9053.91	$ 6,573,135	$ 3,286,568	0.00	-1.00	0.00	-1.00	736.98	-1.00	0.00	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
158	1332.06	1332.31	Residential	13840.34	$ 10,048,089	$ 5,024,045	1332.44	0.13	1332.44	0.13	1332.62	0.31	1332.63	0.31	7.8232423	$ 786,086	5.35253922	$ 268,914	$ 1,055,000.31	13.2907714	$ 1,335,469	13.00707996	$ 653,481	$ 1,988,950.04
238	1335.27	1335.52	Residential	6338.22	$ 4,601,549	$ 2,300,774	100.03	-1.00	100.03	-1.00	1335.16	-0.36	1335.16	-0.36	0	$ -	0	$ -	$ -	2.5493164	$ 117,308	0	$ -	$ 117,308.03
349	1324.98	1325.23	Residential	7393.78	$ 5,367,884	$ 2,683,942	673.55	-1.00	673.54	-1.00	783.59	-1.00	783.57	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
27	1316.52	1316.77	Residential	7472.12	$ 5,424,758	$ 2,712,379	0.00	-1.00	0.00	-1.00	0.00	-1.00	0.00	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
405	1326.51	1326.76	Residential	1009.50	$ 732,896	$ 366,448	355.52	-1.00	355.52	-1.00	355.55	-1.00	355.55	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
141	1342.43	1342.68	Residential	7243.14	$ 5,258,522	$ 2,629,261	874.65	-1.00	874.65	-1.00	874.66	-1.00	874.67	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
146	1338.37	1338.62	Residential	15504.94	$ 11,256,588	$ 5,628,294	1338.87	0.25	1338.88	0.25	1339.19	0.57	1339.21	0.57	11.5	$ 1,294,508	10.5	$ 590,971	$ 1,885,478.44	21.244873	$ 2,391,448	24.1428222	$ 1,358,829	$ 3,750,276.74
72	1351.63	1351.88	Residential	11007.51	$ 7,991,454	$ 3,995,727	1351.32	-0.57	1351.32	-0.57	1351.37	-0.51	1351.37	-0.51	1.73583984	$ 138,719	0	$ -	$ 138,718.84	1.95458984	$ 156,200	0	$ -	$ 156,200.14
254	1345.68	1345.93	Residential	1895.39	$ 1,376,051	$ 688,025	0.00	-1.00	0.00	-1.00	753.45	-1.00	753.45	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
565	1332.50	1332.75	Residential	6624.03	$ 4,809,043	$ 2,404,522	1332.28	-0.47	1332.28	-0.47	1332.63	-0.13	1332.33	-0.43	2.11	$ 101,535	0.00	$ -	$ 101,534.68	2.29	$ 110,105	0.00	$ -	$ 110,105.49
169	1332.68	1332.93	Residential	10483.42	$ 7,610,964	$ 3,805,482	518.50	-1.00	518.50	-1.00	1332.76	-0.17	1332.76	-0.17	0	$ -	0	$ -	$ -	3.3017578	$ 251,296	0	$ -	$ 251,295.59
286	1349.36	1349.61	Residential	7943.75	$ 5,767,160	$ 2,883,580	1349.40	-0.20	1349.40	-0.20	1349.42	-0.18	1349.42	-0.18	3.19	$ 184,251	0.00	$ -	$ 184,250.62	3.26	$ 188,137	0.00	$ -	$ 188,136.69
373	1322.46	1322.71	Residential	7149.90	$ 5,190,828	$ 2,595,414	1322.63	-0.08	1322.58	-0.13	1322.97	0.26	1322.96	0.25	3.47	$ 180,133	0.00	$ -	$ 180,132.90	11.50	$ 596,755	10.49	$ 272,385	$ 869,140.61
400	1328.18	1328.43	Residential	9066.93	$ 6,582,588	$ 3,291,294	568.20	-1.00	568.20	-1.00	568.33	-1.00	568.33	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
280	1330.76	1331.01	Residential	4647.57	$ 3,374,137	$ 1,687,068	1330.98	-0.03	1330.95	-0.06	1331.20	0.20	1331.19	0.18	3.77	$ 127,074	0.00	$ -	$ 127,073.80	9.48	$ 319,818	7.67	$ 129,397	$ 449,214.88
144	1336.17	1336.42	Residential	7180.50	$ 5,213,041	$ 2,606,520	1336.51	0.08	1336.51	0.08	1336.72	0.30	1336.73	0.30	6.4023436	$ 333,757	3.36328104	$ 87,665	$ 421,421.38	12.9831541	$ 676,817	12.57641574	$ 327,807	$ 1,004,623.93
525	1326.25	1326.50	Residential	19943.97	$ 14,479,323	$ 7,239,662	1165.30	-1.00	1165.29	-1.00	1326.23	-0.27	1326.02	-0.48	0.00	$ -	0.00	$ -	$ -	2.06	$ 298,848	0.00	$ -	$ 298,848.14
404	1322.82	1323.07	Residential	5577.85	$ 4,049,522	$ 2,024,761	1322.62	-0.45	1322.60	-0.47	1322.96	-0.11	1322.95	-0.11	2.14	$ 86,586	0.00	$ -	$ 86,586.21	3.55	$ 143,612	0.00	$ -	$ 143,611.71
89	1369.74	1369.99	Residential	10864.86	$ 7,887,890	$ 3,943,945	736.76	-1.00	736.75	-1.00	736.78	-1.00	736.77	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
555	1330.05	1330.30	Residential	6177.14	$ 4,484,601	$ 2,242,300	690.87	-1.00	690.63	-1.00	1329.38	-0.92	690.95	-1.00	0.00	$ -	0.00	$ -	$ -	0.00	$ -	0.00	$ -	$ -
328	1382.11	1382.36	Residential	5083.66	$ 3,690,738	$ 1,845,369	0.00	-1.00	0.00	-1.00	1062.62	-1.00	1062.61	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
544	1317.89	1318.14	Residential	1064.51	$ 772,835	$ 386,417	0.00	-1.00	0.00	-1.00	863.13	-1.00	0.00	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
269	1343.78	1344.03	Residential	1292.67	$ 938,479	$ 469,239	766.99	-1.00	0.00	-1.00	767.16	-1.00	767.11	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
163	1341.77	1342.02	Residential	767.27	$ 557,041	$ 278,521	0.00	-1.00	0.00	-1.00	900.61	-1.00	900.61	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
551	1327.07	1327.32	Residential	11720.01	$ 8,508,728	$ 4,254,364	1326.26	-1.00	915.96	-1.00	1326.52	-0.80	1326.34	-0.98	0.00	$ -	0.00	$ -	$ -	0.08	$ 7,188	0.00	$ -	$ 7,187.55
271	1331.69	1331.94	Residential	3774.99	$ 2,740,645	$ 1,370,322	1331.91	-0.04	1331.90	-0.04	1332.06	0.12	1332.04	0.10	3.85	$ 105,531	0.00	$ -	$ 105,530.89	7.02	$ 192,327	4.22	$ 57,891	$ 250,217.67
385	1323.06	1323.31	Residential	6452.90	$ 4,684,808	$ 2,342,404	1322.62	-0.69	1322.57	-0.74	1322.96	-0.35	1322.95	-0.36	1.04	$ 48,953	0.00	$ -	$ 48,952.58	2.57	$ 120,368	0.00	$ -	$ 120,368.45
460	1321.03	1321.28	Residential	1265.95	$ 919,080	$ 459,540	0.00	-1.00	0.00	-1.00	1321.13	-0.15	1321.13	-0.15	0	$ -	0	$ -	$ -	3.38769532	$ 31,136	0	$ -	$ 31,135.64
524	1332.22	1332.47	Residential	10676.48	$ 7,751,124	$ 3,875,562	1332.37	-0.10	1332.37	-0.10	1332.55	0.08	1332.56	0.08	3.58593752	$ 277,950	0	$ -	$ 277,950.48	6.5341798	$ 506,472	3.54785172	$ 137,499	$ 643,971.60
307	1348.84	1349.09	Residential	7855.95	$ 5,703,422	$ 2,851,711	1348.80	-0.29	1348.80	-0.29	1348.82	-0.27	1348.82	-0.27	2.85	$ 162,609	0.00	$ -	$ 162,608.80	2.91	$ 166,062	0.00	$ -	$ 166,062.04
346	1321.84	1322.09	Residential	2195.05	$ 1,593,607	$ 796,803	1273.33	-1.00	1273.33	-1.00	1273.38	-1.00	1273.38	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
120	1384.09	1384.34	Residential	13591.52	$ 9,867,443	$ 4,933,721	1382.97	-1.00	1383.03	-1.00	1383.41	-0.93	1383.38	-0.97	0.00	$ -	0.00	$ -	$ -	0.14	$ 13,683	0.00	$ -	$ 13,683.37
500	1317.50	1317.75	Residential	1672.89	$ 1,214,517	$ 607,259	1317.67	-0.09	1317.67	-0.09	1317.79	0.04	1317.80	0.04	3.64355468	$ 44,252	0	$ -	$ 44,251.60	5.2194826	$ 63,392	1.70727564	$ 10,368	$ 73,759.09
282	1341.63	1341.88	Residential	8841.63	$ 6,419,026	$ 3,209,513	0.00	-1.00	0.00	-1.00	770.21	-1.00	770.20	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
563	1331.78	1332.03	Residential	6237.47	$ 4,528,402	$ 2,264,201	1332.30	0.27	1331.80	-0.23	1332.80	0.77	1332.35	0.32	3.07	$ 139,191	0.00	$ -	$ 139,190.88	13.74	$ 622,091	13.63	$ 308,669	$ 930,760.23
18	1309.78	1310.03	Residential	700.48	$ 508,551	$ 254,276	1310.13	0.10	1310.08	0.05	1310.35	0.32	1310.31	0.28	5.45	$ 27,698	2.03	$ 5,149	$ 32,847.87	12.35	$ 62,823	11.69	$ 29,736	$ 92,559.20
53	1338.91	1339.16	Residential	9128.88	$ 6,627,566	$ 3,313,783	1339.02	-0.14	1339.02	-0.14	1339.06	-0.10	1339.06	-0.11	3.45	$ 228,437	0.00	$ -	$ 228,437.43	3.58	$ 236,981	0.00	$ -	$ 236,980.78
191	1331.67	1331.92	Residential	8250.07	$ 5,989,549	$ 2,994,774	1331.09	-0.83	1331.09	-0.83	1331.20	-0.72	1331.22	-0.72	0.69970704	$ 41,909	0	$ -	$ 41,909.29	1.12890628	$ 67,616	0	$ -	$ 67,616.39
164	1344.25	1344.50	Residential	7496.39	$ 5,442,379	$ 2,721,189	0.00	-1.00	0.00	-1.00	755.26	-1.00	755.27	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
258	1331.78	1332.03	Residential	8405.13	$ 6,102,124	$ 3,051,062	1331.51	-0.52	1331.51	-0.52	1331.88	-0.15	1331.80	-0.23	1.92	$ 116,858	0.00	$ -	$ 116,858.06	3.07	$ 187,354	0.00	$ -	$ 187,354.28
482	1324.13	1324.38	Residential	4767.85	$ 3,461,462	$ 1,730,731	1324.29	-0.09	1324.21	-0.17	1324.68	0.30	1324.66	0.28	3.34	$ 115,574	0.00	$ -	$ 115,573.63	12.48	$ 431,914	11.87	$ 205,419	$ 637,332.46
112	1371.29	1371.54	Residential	6684.88	$ 4,853,225	$ 2,426,612	1370.55	-0.99	1370.55	-0.99	1370.82	-0.72	1370.82	-0.72	0.04	$ 1,896	0.00	$ -	$ 1,895.79	1.11	$ 53,698	0.00	$ -	$ 53,698.28
540	1319.37	1319.62	Residential	12604.81	$ 9,151,093	$ 4,575,547	0.00	-1.00	0.00	-1.00	637.48	-1.00	637.40	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
375	1325.37	1325.62	Residential	7943.12	$ 5,766,706	$ 2,883,353	414.68	-1.00	414.68	-1.00	414.73	-1.00	414.73	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
526	1326.54	1326.79	Residential	723.15	$ 525,003	$ 262,502	0.00	-1.00	0.00	-1.00	773.77	-1.00	113.99	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
170	1342.44	1342.69	Residential	676.25	$ 490,958	$ 245,479	978.28	-1.00	978.29	-1.00	1341.92	-0.76	1341.94	-0.76	0	$ -	0	$ -	$ -	0.9448242	$ 4,639	0	$ -	$ 4,638.69
167	1346.13	1346.38	Residential	8580.62	$ 6,229,533	$ 3,114,767	1346.37	-0.01	1346.37	-0.01	1346.72	0.34	1346.72	0.34	3.96	$ 246,626	0.00	$ -	$ 246,626.24	14.25	$ 887,952	14.36	$ 447,139	$ 1,335,091.16
534	1329.33	1329.58	Residential	639.16	$ 464,030	$ 232,015	0.00	-1.00	0.00	-1.00	32.18	-1.00	32.18	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
3	1317.03	1317.28	Residential	12624.49	$ 9,165,380	$ 4,582,690	1316.84	-0.43	1316.84	-0.43	1316.87	-0.41	1316.87	-0.41	2.26	$ 207,385	0.00	$ -	$ 207,384.63	2.35	$ 215,843	0.00	$ -	$ 215,842.91
129	1494.88	1495.13	Residential	8054.19	$ 5,847,340	$ 2,923,670	0.00	-1.00	0.00	-1.00	0.00	-1.00	0.00	-1.00	0	$ -	0.00	$ -	$ -	0	$ -	0.00	$ -	$ -
487	1329.29	1329.54	Residential	7301.80	$ 5,301,110	$ 2,650,555	1328.95	-0.58	1328.95	-0.58	1328.98	-0.56	1328.98	-0.56	1.66	$ 88,058	0.00	$ -	$ 88,058.48	1.75	$ 92,873	0.00	$ -	$ 92,872.96
505	1334.49	1334.74	Residential	1851.91	$ 1,344,488	$ 672,244	801.65	-1.00	801.65	-1.00	801.67	-1.00	801.66	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
299	1334.10	1334.35	Residential	12457.47	$ 9,044,127	$ 4,522,063	1334.08	-0.27	1334.08	-0.27	1334.36	0.01	1334.33	-0.02	2.92	$ 263,684	0.00	$ -	$ 263,683.99	3.92	$ 354,655	0.00	$ -	$ 354,655.18
206	1330.94	1331.19	Residential	6811.92	$ 4,945,451	$ 2,472,726	1331.01	-0.18	1331.01	-0.18	1331.29	0.10	1331.30	0.10	3.28271484	$ 162,345	0	$ -	$ 162,345.06	7.0578613	$ 349,043	4.28100582	$ 105,858	$ 454,900.63
443	1325.91	1326.16	Residential	6111.80	$ 4,437,165	$ 2,218,582	1324.48	-1.00	1324.47	-1.00	1324.59	-1.00	1324.59	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
39	1317.80	1318.05	Residential	5414.14	$ 3,930,662	$ 1,965,331	1317.89	-0.16	1317.89	-0.16	1317.93	-0.13	1317.93	-0.13	3.37	$ 132,276	0.00	$ -	$ 132,276.00	3.49	$ 137,132	0.00	$ -	$ 137,131.75
502	1319.37	1319.62	Residential	2781.41	$ 2,019,305	$ 1,009,652	0.00	-1.00	0.00	-1.00	0.00	-1.00	0.00	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
111	1379.55	1379.80	Residential	7498.79	$ 5,444,124	$ 2,722,062	1379.10	-0.70	1379.09	-0.71	1379.30	-0.50	1379.30	-0.50	1.18	$ 64,197	0.00	$ -	$ 64,197.06	1.99	$ 108,457	0.00	$ -	$ 108,457.15
438	1340.20	1340.45	Residential	6215.27	$ 4,512,285	$ 2,256,142	0.00	-1.00	0.00	-1.00	0.00	-1.00	1340.16	-1.00	0	$ -	0.00	$ -	$ -	0	$ -	0.00	$ -	$ -
333	1324.71	1324.96	Residential	1601.10	$ 1,162,399	$ 581,200	1324.96	0.00	1324.89	-0.07	1325.36	0.40	1325.32	0.36	3.72	$ 43,244	0.00	$ -	$ 43,243.75	14.80	$ 171,987	15.11	$ 87,844	$ 259,831.40
173	1336.89	1337.14	Residential	10216.91	$ 7,417,477	$ 3,708,738	0.00	-1.00	0.00	-1.00	1335.14	-1.00	1335.14	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
580	1433.33	1433.58	Residential	2372.25	$ 1,722,254	$ 861,127	1431.31	-1.00	1431.31	-1.00	1431.40	-1.00	1431.39	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
193	1330.91	1331.16	Residential	388.64	$ 282,149	$ 141,075	1331.13	-0.03	1331.13	-0.03	1331.32	0.16	1331.34	0.16	3.8666992	$ 10,910	0	$ -	$ 10,909.85	8.9182129	$ 25,163	6.88549806	$ 9,714	$ 34,876.33
313	1344.58	1344.83	Residential	4545.76	$ 3,300,219	$ 1,650,110	0.00	-1.00	0.00	-1.00	1344.11	-0.72	1344.25	-0.72	0	$ -	0	$ -	$ -	1.12353516	$ 37,079	0	$ -	$ 37,079.12

10-Year and 100-Year Proposed Building Damages in Area A

															Proposed								
Building ID	HAG	Finished Floor Elevation (ft)	Land Use Type	Building Area (sf)	Replace Cost $ ($726/SF-Res)	Content Replacement Value ($) 1/2 of Replacement Cost	10yr Exist WSEL (ft)	10yr Exist Flow Depth (ft)	10yr Prop WSEL (ft)	10yr Prop Flow Depth (ft)	100yr Exist WSEL (ft)	100yr Exist Flow Depth (ft)	100yr Prop WSEL (ft)	100yr Prop Flow Depth (ft)	10yr Building Damage (%)	10yrBuilding Damage Cost ($)	10yr Content Damage (%)	10yr Content Damage Cost ($)	10yr Total Damage Cost ($)	100yr Building Damage (%)	100yrBuilding Damage Cost ($)	100yr Content Damage (%)	100yr Content Damage Cost ($)	100yr Total Damage Cost ($)
30	1319.25	1319.50	Residential	8650.86	$ 6,280,523	$ 3,140,262	1319.31	-0.19	1319.31	-0.19	1319.34	-0.16	1319.34	-0.16	3.25	$ 204,240	0.00	$ -	$ 204,239.66	3.35	$ 210,557	0.00	$ -	$ 210,556.99
265	1336.62	1336.87	Residential	9275.89	$ 6,734,294	$ 3,367,147	453.05	-1.00	453.06	-1.00	453.06	-1.00	453.07	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
278	1329.33	1329.58	Residential	9887.56	$ 7,178,367	$ 3,589,183	1329.54	-0.04	1329.52	-0.06	1329.70	0.13	1329.69	0.11	3.77	$ 270,836	0.00	$ -	$ 270,836.13	7.42	$ 532,664	4.79	$ 171,871	$ 704,534.95
8	1314.25	1314.50	Residential	4845.72	$ 3,517,990	$ 1,758,995	0.00	-1.00	0.00	-1.00	0.00	-1.00	0.00	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
288	1341.77	1342.02	Residential	7520.30	$ 5,459,739	$ 2,729,869	1341.76	-0.26	1341.76	-0.26	1341.78	-0.24	1341.78	-0.24	2.95	$ 160,886	0.00	$ -	$ 160,886.34	3.06	$ 166,858	0.00	$ -	$ 166,857.93
415	1359.67	1359.92	Residential	361.17	$ 262,212	$ 131,106	0.00	-1.00	0.00	-1.00	378.48	-1.00	378.49	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
35	1317.85	1318.10	Residential	7080.65	$ 5,140,551	$ 2,570,275	803.86	-1.00	803.87	-1.00	1317.85	-0.25	1317.85	-0.25	0	$ -	0	$ -	$ -	2.99365232	$ 153,890	0	$ -	$ 153,890.22
279	1336.73	1336.98	Residential	7751.73	$ 5,627,755	$ 2,813,877	1336.39	-0.59	1336.32	-0.66	1336.98	0.00	1336.96	-0.02	1.36	$ 76,695	0.00	$ -	$ 76,694.65	3.90	$ 219,642	0.00	$ -	$ 219,641.82
399	1329.62	1329.87	Residential	9065.18	$ 6,581,319	$ 3,290,660	766.63	-1.00	766.63	-1.00	766.71	-1.00	766.72	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
42	1323.17	1323.42	Residential	7002.87	$ 5,084,085	$ 2,542,043	1323.12	-0.30	1323.12	-0.30	1323.18	-0.24	1323.18	-0.24	2.80	$ 142,295	0.00	$ -	$ 142,294.81	3.04	$ 154,434	0.00	$ -	$ 154,434.06
57	1341.09	1341.34	Residential	7023.87	$ 5,099,331	$ 2,549,666	743.98	-1.00	743.97	-1.00	759.64	-1.00	759.62	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
397	1327.07	1327.32	Residential	9177.64	$ 6,662,967	$ 3,331,483	1326.82	-0.50	1326.82	-0.50	1327.09	-0.23	1327.09	-0.23	1.98095704	$ 131,991	0	$ -	$ 131,990.51	3.06347656	$ 204,118	0	$ -	$ 204,118.43
374	1324.33	1324.58	Residential	7554.42	$ 5,484,508	$ 2,742,254	1324.35	-0.23	1324.35	-0.23	1324.42	-0.17	1324.40	-0.19	3.07	$ 168,204	0.00	$ -	$ 168,204.07	3.26	$ 178,755	0.00	$ -	$ 178,755.32
216	1336.13	1336.38	Residential	5675.45	$ 4,120,379	$ 2,060,189	0.00	-1.00	0.00	-1.00	0.00	-1.00	0.00	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
283	1339.27	1339.52	Residential	13817.96	$ 10,031,838	$ 5,015,919	1339.17	-0.35	1338.87	-0.65	1339.53	0.01	1339.50	-0.02	1.38	$ 138,868	0.00	$ -	$ 138,868.46	3.93	$ 394,514	0.00	$ -	$ 394,513.77
334	1324.83	1325.08	Residential	10462.71	$ 7,595,925	$ 3,797,963	1324.97	-0.11	1324.90	-0.18	1325.54	0.46	1325.48	0.39	3.27	$ 248,611	0.00	$ -	$ 248,610.77	15.79	$ 1,199,270	16.50	$ 626,803	$ 1,826,072.65
26	1311.97	1312.22	Residential	13261.74	$ 9,628,026	$ 4,814,013	1311.93	-0.29	1311.93	-0.29	1311.98	-0.25	1311.97	-0.25	2.83	$ 272,152	0.00	$ -	$ 272,151.56	3.00	$ 288,982	0.00	$ -	$ 288,981.81
301	1346.57	1346.82	Residential	11175.62	$ 8,113,498	$ 4,056,749	0.00	-1.00	0.00	-1.00	0.00	-1.00	0.00	-1.00	0	$ -	0.00	$ -	$ -	0	$ -	0.00	$ -	$ -
308	1334.93	1335.18	Residential	6969.43	$ 5,059,808	$ 2,529,904	1334.88	-0.29	1334.88	-0.29	1335.28	0.10	1335.29	0.10	2.82177732	$ 142,777	0	$ -	$ 142,776.51	6.9296875	$ 350,629	4.1015625	$ 103,766	$ 454,394.47
196	1332.19	1332.44	Residential	8166.56	$ 5,928,926	$ 2,964,463	0.00	-1.00	0.00	-1.00	1332.16	-0.28	1332.16	-0.28	0.00	$ -	0.00	$ -	$ -	2.86	$ 169,588	0.00	$ -	$ 169,588.13
496	1323.96	1324.21	Residential	5063.01	$ 3,675,743	$ 1,837,872	1324.30	0.09	1324.22	0.01	1324.69	0.48	1324.67	0.46	4.33	$ 159,145	0.46	$ 8,480	$ 167,625.02	17.84	$ 655,585	19.37	$ 355,989	$ 1,011,574.20
573	1331.74	1331.99	Residential	7754.41	$ 5,629,702	$ 2,814,851	1331.39	-0.60	1331.39	-0.60	1331.42	-0.57	1331.42	-0.57	1.60791016	$ 90,521	0	$ -	$ 90,520.55	1.72070312	$ 96,870	0	$ -	$ 96,870.46
108	1379.24	1379.49	Residential	1156.59	$ 839,681	$ 419,840	0.00	-1.00	0.00	-1.00	1378.04	-1.00	1378.04	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
188	1333.66	1333.91	Residential	10182.29	$ 7,392,344	$ 3,696,172	1333.86	-0.05	1333.86	-0.05	1333.93	0.02	1333.94	0.02	3.78271484	$ 279,631	0	$ -	$ 279,631.28	4.4907226	$ 331,970	0.68701164	$ 25,393	$ 357,362.77
351	1324.71	1324.96	Residential	4981.85	$ 3,616,823	$ 1,808,412	1324.58	-0.39	1324.56	-0.41	1324.99	0.02	1324.98	0.01	2.36	$ 85,529	0.00	$ -	$ 85,528.69	4.31	$ 155,799	0.43	$ 7,788	$ 163,587.10
467	1340.84	1341.09	Residential	4065.37	$ 2,951,456	$ 1,475,728	0.00	-1.00	0.00	-1.00	1079.51	-1.00	1079.52	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
132	1490.09	1490.34	Residential	1336.38	$ 970,214	$ 485,107	0.00	-1.00	0.00	-1.00	0.00	-1.00	0.00	-1.00	0	$ -	0.00	$ -	$ -	0	$ -	0.00	$ -	$ -
408	1322.66	1322.91	Residential	6487.88	$ 4,710,200	$ 2,355,100	1322.62	-0.29	1322.57	-0.34	1323.04	0.13	1323.04	0.13	2.65	$ 124,586	0.00	$ -	$ 124,585.71	7.81	$ 367,973	5.34	$ 125,695	$ 493,668.31
119	1390.29	1390.54	Residential	315.89	$ 229,336	$ 114,668	0.00	-1.00	0.00	-1.00	0.00	-1.00	0.00	-1.00	0	$ -	0.00	$ -	$ -	0	$ -	0.00	$ -	$ -
584	1353.35	1353.60	Residential	0.00	$ -	$ -	175.39	-1.00	175.39	-1.00	415.79	-1.00	415.78	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
511	1321.86	1322.11	Residential	646.27	$ 469,192	$ 234,596	1322.07	-0.03	1322.00	-0.10	1322.53	0.43	1322.24	0.14	3.58	$ 16,797	0.00	$ -	$ 16,797.45	8.15	$ 38,218	5.80	$ 13,615	$ 51,833.37
54	1336.82	1337.07	Residential	9657.93	$ 7,011,655	$ 3,505,828	1336.97	-0.10	1336.94	-0.13	1337.10	0.03	1337.08	0.01	3.48	$ 244,278	0.00	$ -	$ 244,278.13	4.37	$ 306,144	0.51	$ 17,974	$ 324,117.87
289	1315.29	1315.54	Residential	732.08	$ 531,493	$ 265,747	568.06	-1.00	568.05	-1.00	707.89	-1.00	707.90	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
425	1440.09	1440.34	Residential	3730.58	$ 2,708,404	$ 1,354,202	1436.06	-1.00	1436.06	-1.00	1436.14	-1.00	1436.13	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
325	1403.93	1404.18	Residential	4455.81	$ 3,234,917	$ 1,617,458	1401.98	-1.00	1401.98	-1.00	1402.03	-1.00	1402.03	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
45	1313.71	1313.96	Residential	5863.55	$ 4,256,937	$ 2,128,469	1313.00	-0.96	1313.00	-0.96	1313.58	-0.38	1313.58	-0.38	0.15478516	$ 6,589	0	$ -	$ 6,589.11	2.47509764	$ 105,363	0	$ -	$ 105,363.35
147	1333.51	1333.76	Residential	1860.79	$ 1,350,934	$ 675,467	800.72	-1.00	800.73	-1.00	1333.04	-0.72	1333.06	-0.72	0	$ -	0	$ -	$ -	1.10644528	$ 14,947	0	$ -	$ 14,947.35
355	1320.50	1320.75	Residential	7271.22	$ 5,278,904	$ 2,639,452	1320.51	-0.24	1320.51	-0.24	1320.53	-0.22	1320.62	-0.22	3.04101564	$ 160,532	0	$ -	$ 160,532.30	3.13427736	$ 165,455	0	$ -	$ 165,455.50
55	1333.97	1334.22	Residential	8885.46	$ 6,450,843	$ 3,225,422	1256.97	-1.00	1256.97	-1.00	1257.07	-1.00	1257.06	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
383	1323.11	1323.36	Residential	6532.58	$ 4,742,656	$ 2,371,328	1322.62	-0.74	1322.57	-0.78	1322.97	-0.39	1322.96	-0.39	0.86	$ 40,850	0.00	$ -	$ 40,849.83	2.42	$ 114,838	0.00	$ -	$ 114,838.03
377	1324.05	1324.30	Residential	6948.25	$ 5,044,428	$ 2,522,214	1324.25	-0.05	1324.22	-0.08	1324.48	0.18	1324.47	0.17	3.69	$ 185,964	0.00	$ -	$ 185,964.02	9.21	$ 464,467	7.29	$ 183,883	$ 648,349.37
501	1320.89	1321.14	Residential	14670.16	$ 10,650,533	$ 5,325,266	0.00	-1.00	0.00	-1.00	0.00	-1.00	0.00	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
114	1377.43	1377.68	Residential	1961.87	$ 1,424,316	$ 712,158	1377.38	-0.30	1377.38	-0.30	1377.48	-0.20	1377.48	-0.20	2.80	$ 39,881	0.00	$ -	$ 39,880.85	3.19	$ 45,386	0.00	$ -	$ 45,386.17
92	1384.83	1385.08	Residential	23180.32	$ 16,828,912	$ 8,414,456	1383.02	-1.00	1383.02	-1.00	1383.70	-1.00	1383.69	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
194	1337.21	1337.46	Residential	9523.28	$ 6,913,901	$ 3,456,951	1337.21	-0.25	1337.21	-0.25	1337.29	-0.17	1337.29	-0.17	3.01	$ 208,160	0.00	$ -	$ 208,159.74	3.31	$ 228,652	0.00	$ -	$ 228,651.62
560	1318.46	1318.71	Residential	5850.33	$ 4,247,338	$ 2,123,669	1318.50	-0.21	1318.50	-0.21	1318.55	-0.16	1318.55	-0.16	3.16	$ 134,223	0.00	$ -	$ 134,222.51	3.36	$ 142,912	0.00	$ -	$ 142,912.13
300	1339.66	1339.91	Residential	13233.48	$ 9,607,509	$ 4,803,755	341.83	-1.00	341.83	-1.00	1339.10	-0.81	1339.11	-0.81	0	$ -	0	$ -	$ -	0.7573242	$ 72,760	0	$ -	$ 72,759.99
478	1321.22	1321.47	Residential	7719.33	$ 5,604,232	$ 2,802,116	1320.76	-0.71	1320.74	-0.73	1321.53	0.07	1321.51	0.04	1.08	$ 60,585	0.00	$ -	$ 60,584.81	5.24	$ 293,743	1.74	$ 48,702	$ 342,445.13
272	1339.97	1340.22	Residential	5299.00	$ 3,847,076	$ 1,923,538	1340.21	0.00	1340.15	-0.06	1340.67	0.45	1340.62	0.40	3.75	$ 144,171	0.00	$ -	$ 144,171.44	16.15	$ 621,196	17.01	$ 327,119	$ 948,314.61
152	1345.74	1345.99	Residential	6940.51	$ 5,038,809	$ 2,519,405	1346.19	0.20	1346.19	0.20	1346.44	0.45	1346.44	0.45	10.0827637	$ 508,051	8.51586918	$ 214,549	$ 722,600.45	17.4472657	$ 879,134	18.82617198	$ 474,307	$ 1,353,441.91
507	1326.03	1326.28	Residential	10797.12	$ 7,838,706	$ 3,919,353	1326.10	-0.18	1326.10	-0.18	1326.37	0.09	1326.37	0.09	3.27197264	$ 256,480	0	$ -	$ 256,480.31	6.6440428	$ 520,807	3.70165992	$ 145,081	$ 665,888.08
259	1335.19	1335.44	Residential	10032.44	$ 7,283,551	$ 3,641,776	1334.66	-0.78	1334.63	-0.81	1335.44	0.00	1335.39	-0.05	0.77	$ 55,836	0.00	$ -	$ 55,835.82	3.81	$ 277,152	0.00	$ -	$ 277,151.93
568	1332.40	1332.65	Residential	5264.32	$ 3,821,899	$ 1,910,950	0.00	-1.00	0.00	-1.00	0.00	-1.00	0.00	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
67	1358.85	1359.10	Residential	3832.96	$ 2,782,731	$ 1,391,366	1358.66	-0.43	1358.66	-0.43	1358.77	-0.33	1358.77	-0.33	2.26025392	$ 62,897	0	$ -	$ 62,896.80	2.69531252	$ 75,003	0	$ -	$ 75,003.31
157	1334.69	1334.94	Residential	11620.03	$ 8,436,143	$ 4,218,071	1335.22	0.28	1335.22	0.28	1335.39	0.45	1335.40	0.45	12.3935545	$ 1,045,538	11.7509763	$ 495,665	$ 1,541,202.53	17.568115	$ 1,482,071	18.995361	$ 801,238	$ 2,283,309.17
161	1338.81	1339.06	Residential	12200.44	$ 8,857,520	$ 4,428,760	1338.67	-0.39	1338.67	-0.39	1338.88	-0.18	1338.88	-0.18	2.44287112	$ 216,378	0	$ -	$ 216,377.79	3.26708984	$ 289,383	0	$ -	$ 289,383.13
178	1338.71	1338.96	Residential	2191.33	$ 1,590,906	$ 795,453	0.00	-1.00	0.00	-1.00	1338.85	-0.10	1338.86	-0.10	0	$ -	0	$ -	$ -	3.59326172	$ 57,165	0	$ -	$ 57,165.43
394	1326.19	1326.44	Residential	863.93	$ 627,213	$ 313,607	0.00	-1.00	0.00	-1.00	263.80	-1.00	263.81	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
199	1333.72	1333.97	Residential	8444.06	$ 6,130,386	$ 3,065,193	0.00	-1.00	0.00	-1.00	331.65	-1.00	331.65	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
84	1378.04	1378.29	Residential	2416.84	$ 1,754,627	$ 877,314	0.00	-1.00	0.00	-1.00	0.00	-1.00	0.00	-1.00	0	$ -	0.00	$ -	$ -	0	$ -	0.00	$ -	$ -
17	1314.46	1314.71	Residential	6917.41	$ 5,022,043	$ 2,511,021	1314.60	-0.11	1314.49	-0.22	1314.93	0.22	1314.87	0.16	3.12	$ 156,890	0.00	$ -	$ 156,889.79	8.71	$ 437,577	6.60	$ 165,687	$ 603,264.30
472	1336.64	1336.89	Residential	11331.29	$ 8,226,515	$ 4,113,257	0.00	-1.00	0.00	-1.00	0.00	-1.00	0.00	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
582	1462.74	1462.99	Residential	16759.96	$ 12,167,729	$ 6,083,864	1460.73	-1.00	1460.73	-1.00	1460.80	-1.00	1460.80	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
464	1329.31	1329.56	Residential	5295.97	$ 3,844,872	$ 1,922,436	1329.39	-0.17	1329.39	-0.17	1329.44	-0.12	1329.44	-0.12	3.30078124	$ 126,911	0	$ -	$ 126,910.83	3.5073242	$ 134,852	0	$ -	$ 134,852.14
419	1390.04	1390.29	Residential	4825.64	$ 3,503,412	$ 1,751,706	1389.19	-1.00	1389.19	-1.00	1389.89	-0.40	1389.89	-0.40	0.00	$ -	0.00	$ -	$ -	2.39	$ 83,599	0.00	$ -	$ 83,599.50
439	1343.45	1343.70	Residential	6849.88	$ 4,973,013	$ 2,486,507	0.00	-1.00	0.00	-1.00	130.35	-1.00	1061.14	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
303	1333.92	1334.17	Residential	7565.22	$ 5,492,353	$ 2,746,176	0.00	-1.00	0.00	-1.00	1333.50	-0.67	1333.50	-0.67	0.00	$ -	0.00	$ -	$ -	1.32	$ 72,543	0.00	$ -	$ 72,543.04
155	1347.15	1347.40	Residential	3848.09	$ 2,793,714	$ 1,396,857	1347.66	0.26	1347.66	0.26	1347.97	0.56	1347.97	0.56	11.6831056	$ 326,393	10.75634784	$ 150,251	$ 476,643.30	20.8896484	$ 583,597	23.64550776	$ 330,294	$ 913,890.85
82	1358.10	1358.35	Residential	651.46	$ 472,962	$ 236,481	0.00	-1.00	0.00	-1.00	30.58	-1.00	30.58	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
409	1331.58	1331.83	Residential	7662.12	$ 5,562,697	$ 2,781,348	1331.57	-0.26	1331.57	-0.26	1331.60	-0.23	1331.59	-0.24	2.97	$ 165,414	0.00	$ -	$ 165,414.18	3.06	$ 170,140	0.00	$ -	$ 170,140.29
230	1337.64	1337.89	Residential	4073.31	$ 2,957,220	$ 1,478,610	1337.76	-0.13	1337.76	-0.13	1338.09	0.20	1338.10	0.20	3.46923828	$ 102,593	0	$ -	$ 102,593.02	9.9509278	$ 294,271	8.33129892	$ 123,187	$ 417,458.30
499	1321.37	1321.62	Residential	6734.36	$ 4,889,149	$ 2,444,574	1024.72	-1.00	528.49	-1.00	1278.41	-1.00	1078.87	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
207	1345.29	1345.54	Residential	62629.14	$ 45,468,757	$ 22,734,378	1345.04	-0.50	1345.04	-0.50	1345.19	-0.35	1345.19	-0.35	2.00	$ 909,153	0.00	$ -	$ 909,153.12	2.60	$ 1,183,342	0.00	$ -	$ 1,183,342.15
63	1334.63	1334.88	Residential	5989.61	$ 4,348,454	$ 2,174,227	1335.05	0.17	1335.05	0.17	1335.26	0.38	1335.26	0.38	9.1708984	$ 398,792	7.23925776	$ 157,398	$ 556,190.23	15.3012697	$ 665,369	15.82177758	$ 344,001	$ 1,009,370.10
412	1375.69	1375.94	Residential	3662.89	$ 2,659,255	$ 1,329,627	1375.59	-0.35	1375.59	-0.35	1375.64	-0.30	1375.64	-0.30	2.60400392	$ 69,247	0	$ -	$ 69,247.10	2.78564452	$ 74,077	0	$ -	$ 74,077.39
0	1317.98	1318.23	Residential	2031.12	$ 1,474,595	$ 737,297	637.78	-1.00	637.78	-1.00	1317.82	-0.41	1317.82	-0.41	0.00	$ -	0.00	$ -	$ -	2.35	$ 34,712	0.00	$ -	$ 34,712.02
531	1324.51	1324.76	Residential	18433.22	$ 13,382,516	$ 6,691,258	1323.32	-1.00	1322.88	-1.00	1323.85	-0.90	1323.41	-1.00	0.00	$ -	0.00	$ -	$ -	0.00	$ -	0.00	$ -	$ -
174	1346.24	1346.49	Residential	1124.42	$ 816,330	$ 408,165	303.67	-1.00	303.67	-1.00	1346.51	0.02	1346.51	0.02	0	$ -	0	$ -	$ -	4.4870605	$ 36,629	0.6818847	$ 2,783	$ 39,412.44
341	1322.03	1322.28	Residential	18894.74	$ 13,717,579	$ 6,858,789	0.00	-1.00	0.00	-1.00	0.00	-1.00	0.00	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -

10-Year and 100-Year Proposed Building Damages in Area A

															Proposed									
Building ID	HAG	Finished Floor Elevation (ft)	Land Use Type	Building Area (sf)	Replace Cost $ ($726/SF-Res)	Content Replacement Value ($) 1/2 of Replacement Cost	10yr Exist WSEL (ft)	10yr Exist Flow Depth (ft)	10yr Prop WSEL (ft)	10yr Prop Flow Depth (ft)	100yr Exist WSEL (ft)	100yr Exist Flow Depth (ft)	100yr Prop WSEL (ft)	100yr Prop Flow Depth (ft)	10yr Building Damage (%)	10yrBuilding Damage Cost ($)	10yr Content Damage (%)	10yr Content Damage Cost ($)	10yr Total Damage Cost ($)	100yr Building Damage (%)	100yrBuilding Damage Cost ($)	100yr Content Damage (%)	100yr Content Damage Cost ($)	100yr Total Damage Cost ($)
24	1314.06	1314.31	Residential	5845.51	$ 4,243,839	$ 2,121,919	1313.88	-0.43	1313.88	-0.43	1314.07	-0.24	1314.01	-0.30	2.29	$ 97,289	0.00	$ -	$ 97,289.18	2.80	$ 118,819	0.00	$ -	$ 118,819.20
246	1335.49	1335.74	Residential	8095.61	$ 5,877,416	$ 2,938,708	1335.25	-0.49	1335.25	-0.49	1335.88	0.14	1335.88	0.14	2.02539064	$ 119,041	0	$ -	$ 119,040.64	8.145508	$ 478,745	5.8037112	$ 170,554	$ 649,299.53
403	1330.29	1330.54	Residential	11988.20	$ 8,703,431	$ 4,351,715	1329.02	-1.00	1329.02	-1.00	1329.06	-1.00	1329.06	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
76	1386.63	1386.88	Residential	12282.31	$ 8,916,955	$ 4,458,478	1381.01	-1.00	1381.01	-1.00	1383.36	-1.00	1383.36	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
2	1318.40	1318.65	Residential	9772.67	$ 7,094,958	$ 3,547,479	1318.08	-0.57	1318.08	-0.57	1318.11	-0.54	1318.11	-0.54	1.71	$ 121,667	0.00	$ -	$ 121,667.45	1.82	$ 129,393	0.00	$ -	$ 129,392.92
557	1319.81	1320.06	Residential	4983.35	$ 3,617,912	$ 1,808,956	1319.67	-0.39	1319.67	-0.39	1319.76	-0.30	1319.76	-0.30	2.45800784	$ 88,929	0	$ -	$ 88,928.57	2.80615236	$ 101,524	0	$ -	$ 101,524.14
363	1327.28	1327.53	Residential	13619.36	$ 9,887,654	$ 4,943,827	1327.80	0.27	1327.79	0.26	1328.12	0.59	1328.13	0.59	11.7014158	$ 1,156,995	10.78198212	$ 533,043	$ 1,690,038.01	21.7941895	$ 2,154,934	24.9118653	$ 1,231,599	$ 3,386,533.49
348	1322.03	1322.28	Residential	12779.27	$ 9,277,748	$ 4,638,874	716.09	-1.00	716.10	-1.00	716.26	-1.00	716.27	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
222	1335.24	1335.49	Residential	10175.58	$ 7,387,470	$ 3,693,735	1335.36	-0.13	1335.36	-0.13	1335.70	0.21	1335.71	0.21	3.4663086	$ 256,073	0	$ -	$ 256,072.50	10.1816407	$ 752,166	8.65429698	$ 319,667	$ 1,071,832.42
353	1324.46	1324.71	Residential	8593.13	$ 6,238,612	$ 3,119,306	1324.36	-0.35	1324.36	-0.35	1324.38	-0.33	1324.38	-0.33	2.60	$ 162,119	0.00	$ -	$ 162,118.62	2.69	$ 167,906	0.00	$ -	$ 167,906.40
219	1337.56	1337.81	Residential	1562.94	$ 1,134,694	$ 567,347	1337.55	-0.26	1337.55	-0.26	1337.76	-0.05	1337.77	-0.05	2.9736328	$ 33,742	0	$ -	$ 33,741.62	3.81347656	$ 43,271	0	$ -	$ 43,271.27
441	1327.97	1328.22	Residential	6274.07	$ 4,554,976	$ 2,277,488	427.21	-1.00	427.20	-1.00	950.84	-1.00	950.84	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
124	1438.10	1438.35	Residential	14426.98	$ 10,473,990	$ 5,236,995	1431.87	-1.00	1431.86	-1.00	1432.70	-1.00	1432.70	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
4	1313.10	1313.35	Residential	553.49	$ 401,831	$ 200,915	1313.18	-0.17	1313.17	-0.17	0.00	-1.00	1314.42	-1.00	3.30371096	$ 13,275	0	$ -	$ 13,275.33	0	$ -	0	$ -	$ -
533	1317.14	1317.39	Residential	10692.01	$ 7,762,402	$ 3,881,201	1317.04	-0.35	1317.04	-0.35	1317.08	-0.31	1317.08	-0.32	2.61	$ 202,778	0.00	$ -	$ 202,777.58	2.74	$ 212,670	0.00	$ -	$ 212,670.09
442	1295.07	1295.32	Residential	1280.72	$ 929,801	$ 464,900	0.00	-1.00	0.00	-1.00	0.00	-1.00	730.69	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
127	1440.11	1440.36	Residential	1667.16	$ 1,210,360	$ 605,180	1432.41	-1.00	1432.41	-1.00	1432.48	-1.00	1432.48	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
213	1344.82	1345.07	Residential	18886.60	$ 13,711,674	$ 6,855,837	1344.77	-0.29	1344.77	-0.29	1344.89	-0.17	1344.90	-0.17	2.82324216	$ 387,114	0	$ -	$ 387,113.77	3.30224608	$ 452,793	0	$ -	$ 452,793.22
339	1321.66	1321.91	Residential	4252.24	$ 3,087,125	$ 1,543,562	156.52	-1.00	156.52	-1.00	1320.88	-1.00	1320.88	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
550	1321.54	1321.79	Residential	12488.97	$ 9,066,992	$ 4,533,496	1319.73	-1.00	1319.73	-1.00	1319.76	-1.00	1319.76	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
547	1321.82	1322.07	Residential	303.30	$ 220,193	$ 110,097	0.00	-1.00	0.00	-1.00	786.73	-1.00	0.00	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
7	1315.20	1315.45	Residential	8695.64	$ 6,313,034	$ 3,156,517	0.00	-1.00	0.00	-1.00	0.00	-1.00	0.00	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
166	1334.79	1335.04	Residential	4656.42	$ 3,380,564	$ 1,690,282	238.50	-1.00	238.50	-1.00	1334.60	-0.44	1334.61	-0.44	0	$ -	0	$ -	$ -	2.24804688	$ 75,997	0	$ -	$ 75,996.66
356	1323.12	1323.37	Residential	20490.88	$ 14,876,379	$ 7,438,189	473.06	-1.00	473.06	-1.00	1322.08	-1.00	1322.08	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
366	1322.45	1322.70	Residential	7079.13	$ 5,139,449	$ 2,569,724	1321.50	-1.00	1321.50	-1.00	1322.30	-0.39	1322.30	-0.39	0.00	$ -	0.00	$ -	$ -	2.43	$ 124,822	0.00	$ -	$ 124,822.36
212	1335.76	1336.01	Residential	1686.91	$ 1,224,694	$ 612,347	0.00	-1.00	0.00	-1.00	0.00	-1.00	0.00	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
81	1362.73	1362.98	Residential	13883.69	$ 10,079,557	$ 5,039,778	1362.85	-0.12	1362.85	-0.12	1362.93	-0.04	1362.93	-0.04	3.50097656	$ 352,883	0	$ -	$ 352,882.92	3.82519532	$ 385,563	0	$ -	$ 385,562.74
252	1342.94	1343.19	Residential	11528.90	$ 8,369,982	$ 4,184,991	1342.22	-0.97	1342.22	-0.97	1343.01	-0.18	1342.25	-0.94	0.12	$ 10,095	0.00	$ -	$ 10,094.65	0.23	$ 19,617	0.00	$ -	$ 19,617.15
451	1330.63	1330.88	Residential	4329.91	$ 3,143,516	$ 1,571,758	1329.82	-1.00	1329.82	-1.00	1329.86	-1.00	1329.86	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
290	1334.83	1335.08	Residential	11536.70	$ 8,375,645	$ 4,187,822	1333.35	-1.00	1333.32	-1.00	1334.64	-0.44	1334.63	-0.45	0.00	$ -	0.00	$ -	$ -	2.19	$ 183,135	0.00	$ -	$ 183,135.43
19	1316.38	1316.63	Residential	6993.30	$ 5,077,134	$ 2,538,567	1315.78	-0.85	1315.78	-0.85	1315.97	-0.66	1315.93	-0.70	0.58	$ 29,575	0.00	$ -	$ 29,575.30	1.18	$ 60,043	0.00	$ -	$ 60,043.06
388	1322.89	1323.14	Residential	10092.64	$ 7,327,254	$ 3,663,627	1322.62	-0.52	1322.57	-0.57	1323.24	0.10	1323.22	0.08	1.73	$ 126,545	0.00	$ -	$ 126,545.40	6.46	$ 473,409	3.45	$ 126,223	$ 599,632.72
43	1320.11	1320.36	Residential	6209.68	$ 4,508,230	$ 2,254,115	1319.63	-0.74	1319.63	-0.74	1319.65	-0.71	1319.65	-0.71	1.05	$ 47,240	0.00	$ -	$ 47,239.56	1.16	$ 52,126	0.00	$ -	$ 52,126.41
347	1326.78	1327.03	Residential	9360.23	$ 6,795,524	$ 3,397,762	821.46	-1.00	23.19	-1.00	1326.56	-0.47	1326.54	-0.49	0.00	$ -	0.00	$ -	$ -	2.05	$ 139,030	0.00	$ -	$ 139,029.51
558	1329.23	1329.48	Residential	5699.37	$ 4,137,742	$ 2,068,871	0.00	-1.00	0.00	-1.00	1329.38	-0.10	0.00	-1.00	0.00	$ -	0.00	$ -	$ -	0.00	$ -	0.00	$ -	$ -
411	1371.41	1371.66	Residential	3701.56	$ 2,687,336	$ 1,343,668	1369.90	-1.00	1369.90	-1.00	1369.95	-1.00	1369.95	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
314	1330.36	1330.61	Residential	4196.13	$ 3,046,391	$ 1,523,196	1330.19	-0.42	1330.19	-0.42	1330.73	0.12	1330.74	0.12	2.30664064	$ 70,269	0	$ -	$ 70,269.30	7.7023927	$ 234,645	5.18334978	$ 78,953	$ 313,597.60
79	1368.26	1368.51	Residential	1459.23	$ 1,059,402	$ 529,701	819.50	-1.00	819.51	-1.00	1341.09	-1.00	1341.09	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
117	1391.60	1391.85	Residential	3751.96	$ 2,723,924	$ 1,361,962	0.00	-1.00	0.00	-1.00	1391.33	-0.52	1391.33	-0.53	0.00	$ -	0.00	$ -	$ -	1.90	$ 51,685	0.00	$ -	$ 51,685.40
422	1360.68	1360.93	Residential	19148.04	$ 13,901,477	$ 6,950,738	1359.30	-1.00	1359.30	-1.00	1359.43	-1.00	1359.43	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
398	1326.86	1327.11	Residential	13652.47	$ 9,911,695	$ 4,955,847	1326.93	-0.18	1326.93	-0.18	1326.96	-0.15	1326.96	-0.15	3.28	$ 324,695	0.00	$ -	$ 324,695.12	3.40	$ 336,552	0.00	$ -	$ 336,552.37
160	1330.28	1330.53	Residential	16486.30	$ 11,969,051	$ 5,984,525	1329.35	-1.00	1329.35	-1.00	1329.39	-1.00	1329.39	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
448	1350.42	1350.67	Residential	9775.28	$ 7,096,851	$ 3,548,425	1350.44	-0.23	1350.44	-0.23	1350.50	-0.18	1350.50	-0.18	3.07958984	$ 218,554	0	$ -	$ 218,553.90	3.28515624	$ 233,143	0	$ -	$ 233,142.64
241	1340.47	1340.72	Residential	4769.11	$ 3,462,376	$ 1,731,188	0.00	-1.00	0.00	-1.00	618.40	-1.00	618.40	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
65	1360.27	1360.52	Residential	2558.86	$ 1,857,730	$ 928,865	1358.39	-1.00	1358.39	-1.00	1358.61	-1.00	1358.62	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
221	1332.89	1333.14	Residential	6409.64	$ 4,653,397	$ 2,326,698	1130.18	-1.00	1130.18	-1.00	1332.84	-0.30	1332.86	-0.30	0	$ -	0	$ -	$ -	2.81298828	$ 130,899	0	$ -	$ 130,899.50
107	1408.31	1408.56	Residential	9558.60	$ 6,939,545	$ 3,469,773	1407.44	-1.00	1407.44	-1.00	1407.53	-1.00	1407.53	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
159	1337.05	1337.30	Residential	7081.33	$ 5,141,047	$ 2,570,523	0.00	-1.00	0.00	-1.00	1336.93	-0.37	1336.93	-0.37	0	$ -	0	$ -	$ -	2.52636716	$ 129,882	0	$ -	$ 129,881.71
354	1324.37	1324.62	Residential	6151.11	$ 4,465,703	$ 2,232,851	1264.84	-1.00	1264.85	-1.00	1324.36	-0.26	1324.35	-0.27	0.00	$ -	0.00	$ -	$ -	2.91	$ 130,003	0.00	$ -	$ 130,002.53
11	1310.91	1311.16	Residential	8959.69	$ 6,504,734	$ 3,252,367	1311.35	0.19	1311.26	0.10	1311.62	0.46	1311.58	0.42	6.85	$ 445,755	3.99	$ 129,896	$ 575,651.45	16.59	$ 1,078,919	17.62	$ 573,111	$ 1,652,029.25
480	1320.99	1321.24	Residential	21154.48	$ 15,358,155	$ 7,679,077	0.00	-1.00	0.00	-1.00	67.45	-1.00	0.00	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
535	1318.96	1319.21	Residential	15038.36	$ 10,917,848	$ 5,458,924	1319.07	-0.14	1319.07	-0.14	1319.10	-0.11	1319.09	-0.12	3.43	$ 374,608	0.00	$ -	$ 374,608.00	3.54	$ 386,123	0.00	$ -	$ 386,122.92
324	1416.21	1416.46	Residential	23457.64	$ 17,030,244	$ 8,515,122	1413.95	-1.00	1413.95	-1.00	1414.07	-1.00	1414.07	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
15	1310.89	1311.14	Residential	6635.11	$ 4,817,087	$ 2,408,543	1311.22	0.08	1311.13	-0.01	1311.54	0.40	1311.49	0.35	3.98	$ 191,484	0.00	$ -	$ 191,483.90	14.45	$ 695,973	14.63	$ 352,302	$ 1,048,274.99
83	1371.94	1372.19	Residential	2134.99	$ 1,550,000	$ 775,000	1372.24	0.05	1372.24	0.05	1372.37	0.18	1372.36	0.17	5.52	$ 85,557	2.13	$ 16,490	$ 102,046.11	9.20	$ 142,546	7.28	$ 56,382	$ 198,928.71
396	1328.64	1328.89	Residential	16191.87	$ 11,755,297	$ 5,877,649	965.23	-1.00	965.23	-1.00	1328.35	-0.53	1328.35	-0.54	0.00	$ -	0.00	$ -	$ -	1.86	$ 218,575	0.00	$ -	$ 218,575.05
583	1330.49	1330.74	Residential	0.00	$ -	$ -	1329.79	-0.95	1329.79	-0.95	1329.82	-0.93	1329.82	-0.93	0.19970704	$ -	0	$ -	$ -	0.28759768	$ -	0	$ -	$ -
516	1322.12	1322.37	Residential	766.64	$ 556,581	$ 278,291	76.91	-1.00	76.90	-1.00	291.24	-1.00	128.43	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
342	1321.31	1321.56	Residential	440.90	$ 320,096	$ 160,048	0.00	-1.00	0.00	-1.00	0.00	-1.00	0.00	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
150	1341.28	1341.53	Residential	4258.47	$ 3,091,652	$ 1,545,826	1341.73	0.20	1341.73	0.20	1341.90	0.37	1341.91	0.37	9.9216307	$ 306,742	8.29028298	$ 128,153	$ 434,895.66	15.1108399	$ 467,175	15.55517586	$ 240,456	$ 707,630.56
143	1329.96	1330.21	Residential	3734.03	$ 2,710,903	$ 1,355,452	0.00	-1.00	0.00	-1.00	0.00	-1.00	0.00	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
344	1324.82	1325.07	Residential	7011.00	$ 5,089,986	$ 2,544,993	1324.73	-0.34	1324.62	-0.45	1325.17	0.09	1325.15	0.08	2.21	$ 112,561	0.00	$ -	$ 112,561.26	6.29	$ 320,286	3.21	$ 81,681	$ 401,967.21
571	1327.57	1327.82	Residential	8562.45	$ 6,216,338	$ 3,108,169	1327.58	-0.23	1327.59	-0.23	1327.62	-0.20	1327.62	-0.20	3.07714844	$ 191,286	0	$ -	$ 191,285.96	3.21142576	$ 199,633	0	$ -	$ 199,633.09
88	1379.61	1379.86	Residential	11455.28	$ 8,316,533	$ 4,158,267	1378.41	-1.00	1378.41	-1.00	1378.46	-1.00	1378.46	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
49	1377.00	1377.25	Residential	728.13	$ 528,623	$ 264,311	0.00	-1.00	0.00	-1.00	0.00	-1.00	0.00	-1.00	0	$ -	0.00	$ -	$ -	0	$ -	0.00	$ -	$ -
445	1348.57	1348.82	Residential	8000.24	$ 5,808,173	$ 2,904,086	1348.40	-0.42	1348.39	-0.43	1348.43	-0.39	1348.43	-0.39	2.296875	$ 133,406	0	$ -	$ 133,406.47	2.42822264	$ 141,035	0	$ -	$ 141,035.37
376	1323.14	1323.39	Residential	7118.19	$ 5,167,807	$ 2,583,904	1322.66	-0.73	1322.57	-0.82	1323.33	-0.06	1323.33	-0.06	0.73	$ 37,875	0.00	$ -	$ 37,875.39	3.77	$ 194,878	0.00	$ -	$ 194,877.81
86	1377.55	1377.80	Residential	2949.41	$ 2,141,271	$ 1,070,635	0.00	-1.00	0.00	-1.00	0.00	-1.00	0.00	-1.00	0	$ -	0.00	$ -	$ -	0	$ -	0.00	$ -	$ -
520	1322.62	1322.87	Residential	15567.65	$ 11,302,117	$ 5,651,058	1322.30	-0.57	1322.30	-0.57	1322.78	-0.09	1322.35	-0.52	1.71	$ 192,765	0.00	$ -	$ 192,765.11	1.90	$ 215,115	0.00	$ -	$ 215,115.49
224	1342.44	1342.69	Residential	5688.11	$ 4,129,571	$ 2,064,785	1342.46	-0.24	1342.46	-0.24	1342.48	-0.21	1342.48	-0.21	3.05	$ 125,762	0.00	$ -	$ 125,762.36	3.15	$ 130,279	0.00	$ -	$ 130,279.08
16	1311.95	1312.20	Residential	5118.95	$ 3,716,356	$ 1,858,178	0.00	-1.00	0.00	-1.00	1311.91	-0.29	1311.88	-0.32	0.00	$ -	0.00	$ -	$ -	2.72	$ 101,238	0.00	$ -	$ 101,238.03
71	1355.29	1355.54	Residential	15605.34	$ 11,329,477	$ 5,664,738	1355.85	0.31	1355.86	0.31	1356.01	0.47	1356.03	0.47	13.3	$ 1,506,820	13.02	$ 737,549	$ 2,244,369.39	18.0405271	$ 2,043,897	19.65673794	$ 1,113,503	$ 3,157,400.16
493	1320.68	1320.93	Residential	1623.50	$ 1,178,660	$ 589,330	0.00	-1.00	0.00	-1.00	0.00	-1.00	0.00	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
380	1324.56	1324.81	Residential	7115.36	$ 5,165,750	$ 2,582,875	1324.17	-0.64	1262.30	-1.00	1324.34	-0.47	1324.33	-0.48	0.00	$ -	0.00	$ -	$ -	2.09	$ 107,830	0.00	$ -	$ 107,830.00
291	1343.71	1343.96	Residential	10971.13	$ 7,965,040	$ 3,982,520	0.00	-1.00	0.00	-1.00	1194.25	-1.00	1194.26	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
548	1331.38	1331.63	Residential	2067.78	$ 1,501,207	$ 750,604	1330.21	-1.00	1330.21	-1.00	1330.49	-1.00	1330.48	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
326	1390.61	1390.86	Residential	6518.30	$ 4,732,285	$ 2,366,143	1390.62	-0.24	1390.62	-0.24	1390.64	-0.22	1390.64	-0.22	3.05	$ 144,464	0.00	$ -	$ 144,464.11	3.14	$ 148,415	0.00	$ -	$ 148,415.38
530	1331.84	1332.09	Residential	10819.21	$ 7,854,744	$ 3,927,372	1332.11	0.02	1332.11	0.02	1332.30	0.21	1332.31	0.21	4.4724121	$ 351,297	0.66137694	$ 25,975	$ 377,271.27	10.3610839	$ 813,837	8.90551746	$ 349,753	$ 1,163,589.48
323	1425.01	1425.26	Residential	9843.82	$ 7,146,612	$ 3,573,306	1424.74	-0.52	1424.74	-0.52	1424.79	-0.47	1424.79	-0.48	1.91	$ 136,302	0.00	$ -	$ 136,302.09	2.10	$ 149,737	0.00	$ -	$ 149,736.88
497	1320.51	1320.76	Residential	2723.39	$ 1,977,179	$ 988,590	0.00	-1.00	0.00	-1.00	147.26	-1.00	147.25	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -

10-Year and 100-Year Proposed Building Damages in Area A

															Proposed								
Building ID	HAG	Finished Floor Elevation (ft)	Land Use Type	Building Area (sf)	Replace Cost $ ($726/SF-Res)	Content Replacement Value ($) 1/2 of Replacement Cost	10yr Exist WSEL (ft)	10yr Exist Flow Depth (ft)	10yr Prop WSEL (ft)	10yr Prop Flow Depth (ft)	100yr Exist WSEL (ft)	100yr Exist Flow Depth (ft)	100yr Prop WSEL (ft)	100yr Prop Flow Depth (ft)	10yr Building Damage (%)	10yrBuilding Damage Cost ($)	10yr Content Damage (%)	10yr Content Damage Cost ($)	10yr Total Damage Cost ($)	100yr Building Damage (%)	100yrBuilding Damage Cost ($)	100yr Content Damage (%)	100yr Content Damage Cost ($)	100yr Total Damage Cost ($)
391	1323.62	1323.87	Residential	9604.68	$ 6,972,994	$ 3,486,497	1323.72	-0.15	1323.65	-0.22	1324.10	0.23	1324.10	0.23	3.14	$ 218,757	0.00	$ -	$ 218,757.27	10.79	$ 752,099	9.50	$ 331,226	$ 1,083,325.18
319	1347.74	1347.99	Residential	5079.32	$ 3,687,584	$ 1,843,792	1347.48	-0.52	1347.48	-0.52	1347.77	-0.23	1347.77	-0.23	1.9375	$ 71,447	0	$ -	$ 71,446.94	3.0961914	$ 114,175	0	$ -	$ 114,174.66
492	1321.53	1321.78	Residential	1339.91	$ 972,774	$ 486,387	1320.63	-1.00	1320.63	-1.00	1320.71	-1.00	1320.70	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
321	1334.36	1334.61	Residential	10459.22	$ 7,593,394	$ 3,796,697	961.07	-1.00	961.06	-1.00	1333.64	-0.97	1333.64	-0.97	0	$ -	0	$ -	$ -	0.125	$ 9,492	0	$ -	$ 9,491.74
90	1393.57	1393.82	Residential	10984.74	$ 7,974,925	$ 3,987,462	1393.79	-0.03	1393.79	-0.03	1393.94	0.12	1393.93	0.12	3.88	$ 309,768	0.00	$ -	$ 309,768.19	7.49	$ 597,613	4.89	$ 195,031	$ 792,644.42
474	1319.47	1319.72	Residential	1083.36	$ 786,522	$ 393,261	485.09	-1.00	485.10	-1.00	485.20	-1.00	485.17	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
484	1326.28	1326.53	Residential	17723.79	$ 12,867,474	$ 6,433,737	1326.15	-0.38	1326.14	-0.39	1326.45	-0.08	1326.44	-0.09	2.44	$ 313,393	0.00	$ -	$ 313,393.36	3.65	$ 469,336	0.00	$ -	$ 469,336.09
138	1340.89	1341.14	Residential	8006.64	$ 5,812,823	$ 2,906,411	1340.56	-0.58	1340.56	-0.58	1340.78	-0.36	1340.79	-0.36	1.67041016	$ 97,098	0	$ -	$ 97,097.98	2.56445312	$ 149,067	0	$ -	$ 149,067.12
29	1317.70	1317.95	Residential	511.14	$ 371,090	$ 185,545	1197.86	-1.00	1197.85	-1.00	1317.42	-0.53	1317.42	-0.53	0.00	$ -	0.00	$ -	$ -	1.86	$ 6,918	0.00	$ -	$ 6,918.07
231	1341.90	1342.15	Residential	5392.15	$ 3,914,704	$ 1,957,352	0.00	-1.00	0.00	-1.00	0.00	-1.00	0.00	-1.00	0	$ -	0.00	$ -	$ -	0	$ -	0.00	$ -	$ -
32	1318.65	1318.90	Residential	4524.83	$ 3,285,027	$ 1,642,514	1318.50	-0.40	1318.50	-0.40	1318.52	-0.39	1318.51	-0.39	2.39	$ 78,436	0.00	$ -	$ 78,436.44	2.44	$ 80,313	0.00	$ -	$ 80,313.14
257	1333.35	1333.60	Residential	9422.90	$ 6,841,023	$ 3,420,512	1333.63	0.02	1333.63	0.02	1333.75	0.15	1333.70	0.10	4.70	$ 321,491	0.98	$ 33,495	$ 354,986.64	7.01	$ 479,573	4.21	$ 144,153	$ 623,725.58
491	1324.09	1324.34	Residential	6194.34	$ 4,497,094	$ 2,248,547	1324.30	-0.05	1324.22	-0.13	1324.68	0.34	1324.67	0.32	3.49	$ 156,871	0.00	$ -	$ 156,871.29	13.62	$ 612,685	13.47	$ 302,961	$ 915,646.15
223	1340.02	1340.27	Residential	4310.09	$ 3,129,127	$ 1,564,564	23.32	-1.00	23.32	-1.00	188.13	-1.00	188.13	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
317	1346.67	1346.92	Residential	5732.43	$ 4,161,744	$ 2,080,872	1346.85	-0.06	1346.85	-0.06	1346.99	0.07	1346.99	0.07	3.74707028	$ 155,943	0	$ -	$ 155,943.49	6.2265625	$ 259,134	3.1171875	$ 64,865	$ 323,998.30
350	1325.39	1325.64	Residential	9207.28	$ 6,684,486	$ 3,342,243	1325.32	-0.32	1325.28	-0.36	1325.65	0.01	1325.64	0.00	2.55	$ 170,507	0.00	$ -	$ 170,506.61	3.99	$ 266,661	0.00	$ -	$ 266,661.37
36	1310.52	1310.77	Residential	5860.59	$ 4,254,790	$ 2,127,395	1310.41	-0.37	1310.41	-0.36	1310.51	-0.26	1310.51	-0.27	2.54	$ 108,073	0.00	$ -	$ 108,073.34	2.94	$ 125,026	0.00	$ -	$ 125,026.02
205	1344.40	1344.65	Residential	10715.30	$ 7,779,310	$ 3,889,655	1344.06	-0.59	1344.06	-0.59	1344.11	-0.54	1344.11	-0.54	1.6464844	$ 128,085	0	$ -	$ 128,085.13	1.85107424	$ 144,001	0	$ -	$ 144,000.81
105	1423.56	1423.81	Residential	7121.88	$ 5,170,483	$ 2,585,241	1423.11	-0.70	1423.11	-0.70	1423.19	-0.62	1423.19	-0.62	1.21679688	$ 62,914	0	$ -	$ 62,914.27	1.52734376	$ 78,971	0	$ -	$ 78,971.04
236	1335.02	1335.27	Residential	7463.86	$ 5,418,764	$ 2,709,382	772.25	-1.00	772.24	-1.00	1334.27	-1.00	1334.29	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
485	1320.88	1321.13	Residential	7138.89	$ 5,182,831	$ 2,591,415	1320.54	-0.59	1320.54	-0.59	1320.74	-0.39	1320.68	-0.45	1.66	$ 85,917	0.00	$ -	$ 85,916.56	2.20	$ 113,805	0.00	$ -	$ 113,804.64
276	1333.43	1333.68	Residential	582.30	$ 422,748	$ 211,374	1333.80	0.12	1333.76	0.09	1334.00	0.32	1333.98	0.31	6.59	$ 27,855	3.62	$ 7,662	$ 35,517.13	13.18	$ 55,707	12.85	$ 27,158	$ 82,864.18
232	1334.12	1334.37	Residential	6944.69	$ 5,041,848	$ 2,520,924	742.32	-1.00	742.32	-1.00	1334.19	-0.18	1334.21	-0.18	0	$ -	0	$ -	$ -	3.27734372	$ 165,239	0	$ -	$ 165,238.69
503	1335.00	1335.25	Residential	13617.09	$ 9,886,006	$ 4,943,003	1334.06	-1.00	1334.06	-1.00	1334.27	-0.98	1334.27	-0.98	0.00	$ -	0.00	$ -	$ -	0.08	$ 7,820	0.00	$ -	$ 7,819.99
64	1335.75	1336.00	Residential	8714.23	$ 6,326,533	$ 3,163,267	1335.57	-0.44	1335.57	-0.44	1335.61	-0.39	1335.61	-0.39	2.25	$ 142,440	0.00	$ -	$ 142,439.67	2.43	$ 153,993	0.00	$ -	$ 153,993.00
182	1332.38	1332.63	Residential	11920.23	$ 8,654,087	$ 4,327,044	228.28	-1.00	228.27	-1.00	888.27	-1.00	982.05	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
430	1362.52	1362.77	Residential	9532.75	$ 6,920,775	$ 3,460,388	1360.53	-1.00	1360.54	-1.00	1360.63	-1.00	1360.63	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
184	1331.65	1331.90	Residential	7792.51	$ 5,657,361	$ 2,828,681	1331.47	-0.43	1331.47	-0.43	1331.63	-0.27	1331.64	-0.27	2.29785156	$ 129,998	0	$ -	$ 129,997.76	2.9350586	$ 166,047	0	$ -	$ 166,046.86
204	1341.13	1341.38	Residential	1620.13	$ 1,176,216	$ 588,108	1341.03	-0.36	1341.03	-0.36	1341.13	-0.25	1341.14	-0.25	2.5791016	$ 30,336	0	$ -	$ 30,335.79	2.99560548	$ 35,235	0	$ -	$ 35,234.78
315	1338.98	1339.23	Residential	8432.94	$ 6,122,312	$ 3,061,156	1339.05	-0.18	1339.05	-0.18	1339.27	0.04	1339.28	0.04	3.29980468	$ 202,024	0	$ -	$ 202,024.33	5.1865234	$ 317,535	1.66113276	$ 50,850	$ 368,385.00
449	1326.30	1326.55	Residential	512.23	$ 371,880	$ 185,940	0.00	-1.00	0.00	-1.00	0.00	-1.00	0.00	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
125	1431.44	1431.69	Residential	10791.68	$ 7,834,763	$ 3,917,382	1430.37	-1.00	1430.37	-1.00	1430.49	-1.00	1430.49	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
261	1344.98	1345.23	Residential	31570.81	$ 22,920,407	$ 11,460,203	1344.21	-1.00	913.11	-1.00	1344.65	-0.58	1344.54	-0.69	0.00	$ -	0.00	$ -	$ -	1.25	$ 285,498	0.00	$ -	$ 285,497.84
386	1324.50	1324.75	Residential	4437.01	$ 3,221,266	$ 1,610,633	228.38	-1.00	228.38	-1.00	1324.11	-0.64	1324.10	-0.65	0.00	$ -	0.00	$ -	$ -	1.40	$ 45,095	0.00	$ -	$ 45,094.58
414	1397.75	1398.00	Residential	6393.90	$ 4,641,974	$ 2,320,987	1395.84	-1.00	1395.84	-1.00	1396.06	-1.00	1396.06	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
229	1338.56	1338.81	Residential	4433.88	$ 3,218,996	$ 1,609,498	1338.74	-0.07	1338.74	-0.07	1338.92	0.11	1338.92	0.11	3.7319336	$ 120,131	0	$ -	$ 120,130.81	7.28125	$ 234,383	4.59375	$ 73,936	$ 308,319.50
431	1356.48	1356.73	Residential	3025.96	$ 2,196,849	$ 1,098,424	123.92	-1.00	123.92	-1.00	631.20	-1.00	631.20	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
509	1325.09	1325.34	Residential	15430.55	$ 11,202,578	$ 5,601,289	1324.71	-0.63	1324.71	-0.63	1324.78	-0.56	1324.78	-0.56	1.49	$ 166,398	0.00	$ -	$ 166,397.67	1.75	$ 196,100	0.00	$ -	$ 196,099.82
440	1326.41	1326.66	Residential	5519.16	$ 4,006,909	$ 2,003,455	0.00	-1.00	0.00	-1.00	1326.24	-0.42	1326.24	-0.42	0.00	$ -	0.00	$ -	$ -	2.31	$ 92,718	0.00	$ -	$ 92,718.47
402	1327.14	1327.39	Residential	1014.49	$ 736,520	$ 368,260	481.85	-1.00	481.85	-1.00	1326.17	-1.00	1326.17	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
542	1337.79	1338.04	Residential	1862.82	$ 1,352,407	$ 676,203	0.00	-1.00	0.00	-1.00	0.00	-1.00	0.00	-1.00	0	$ -	0.00	$ -	$ -	0	$ -	0.00	$ -	$ -
416	1398.89	1399.14	Residential	5128.78	$ 3,723,492	$ 1,861,746	1389.92	-1.00	1389.92	-1.00	1390.58	-1.00	1390.58	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
569	1321.58	1321.83	Residential	6215.34	$ 4,512,337	$ 2,256,168	1321.17	-0.67	1321.17	-0.67	1321.20	-0.64	1321.20	-0.64	1.32	$ 59,709	0.00	$ -	$ 59,709.14	1.45	$ 65,239	0.00	$ -	$ 65,239.40
384	1326.34	1326.59	Residential	13713.92	$ 9,956,308	$ 4,978,154	1326.19	-0.40	1326.19	-0.40	1326.23	-0.36	1326.23	-0.36	2.42	$ 240,497	0.00	$ -	$ 240,497.35	2.56	$ 254,741	0.00	$ -	$ 254,741.48
66	1341.15	1341.40	Residential	7401.01	$ 5,373,131	$ 2,686,565	1341.20	-0.20	1341.20	-0.20	1341.30	-0.10	1341.30	-0.10	3.20263672	$ 172,082	0	$ -	$ 172,081.86	3.61328128	$ 194,146	0	$ -	$ 194,146.33
134	1653.63	1653.88	Residential	8993.07	$ 6,528,966	$ 3,264,483	0.00	-1.00	0.00	-1.00	0.00	-1.00	0.00	-1.00	0	$ -	0.00	$ -	$ -	0	$ -	0.00	$ -	$ -
94	1414.71	1414.96	Residential	1163.57	$ 844,755	$ 422,378	0.00	-1.00	0.00	-1.00	0.00	-1.00	0.00	-1.00	0	$ -	0.00	$ -	$ -	0	$ -	0.00	$ -	$ -
87	1398.25	1398.50	Residential	724.88	$ 526,260	$ 263,130	0.00	-1.00	0.00	-1.00	0.00	-1.00	0.00	-1.00	0	$ -	0.00	$ -	$ -	0	$ -	0.00	$ -	$ -
420	1364.99	1365.24	Residential	4334.78	$ 3,147,053	$ 1,573,527	0.00	-1.00	0.00	-1.00	0.00	-1.00	0.00	-1.00	0	$ -	0.00	$ -	$ -	0	$ -	0.00	$ -	$ -
85	1347.99	1348.24	Residential	4822.15	$ 3,500,880	$ 1,750,440	0.00	-1.00	0.00	-1.00	0.00	-1.00	0.00	-1.00	0	$ -	0.00	$ -	$ -	0	$ -	0.00	$ -	$ -
294	1346.60	1346.85	Residential	349.86	$ 253,997	$ 126,998	0.00	-1.00	0.00	-1.00	0.00	-1.00	0.00	-1.00	0	$ -	0.00	$ -	$ -	0	$ -	0.00	$ -	$ -
243	1342.10	1342.35	Residential	3590.12	$ 2,606,425	$ 1,303,213	0.00	-1.00	0.00	-1.00	0.00	-1.00	0.00	-1.00	0	$ -	0.00	$ -	$ -	0	$ -	0.00	$ -	$ -
471	1339.29	1339.54	Residential	3984.20	$ 2,892,527	$ 1,446,264	0.00	-1.00	0.00	-1.00	0.00	-1.00	0.00	-1.00	0	$ -	0.00	$ -	$ -	0	$ -	0.00	$ -	$ -
473	1337.74	1337.99	Residential	5738.70	$ 4,166,293	$ 2,083,146	0.00	-1.00	0.00	-1.00	0.00	-1.00	0.00	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
70	1337.13	1337.38	Residential	428.49	$ 311,081	$ 155,540	0.00	-1.00	0.00	-1.00	0.00	-1.00	0.00	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
466	1333.18	1333.43	Residential	4856.25	$ 3,525,640	$ 1,762,820	0.00	-1.00	0.00	-1.00	0.00	-1.00	0.00	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
247	1330.67	1330.92	Residential	324.60	$ 235,659	$ 117,830	1329.61	-1.00	1329.61	-1.00	0.00	-1.00	1331.19	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
486	1328.38	1328.63	Residential	10080.08	$ 7,318,139	$ 3,659,070	0.00	-1.00	0.00	-1.00	0.00	-1.00	0.00	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
418	1326.27	1326.52	Residential	642.45	$ 466,418	$ 233,209	0.00	-1.00	0.00	-1.00	0.00	-1.00	0.00	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
577	1325.04	1325.29	Residential	6459.08	$ 4,689,290	$ 2,344,645	0.00	-1.00	0.00	-1.00	0.00	-1.00	0.00	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
273	1343.59	1343.84	Residential	2568.08	$ 1,864,428	$ 932,214	64.58	-1.00	64.58	-1.00	86.11	-1.00	86.12	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
562	1318.27	1318.52	Residential	6529.13	$ 4,740,151	$ 2,370,076	0.00	-1.00	0.00	-1.00	68.31	-1.00	0.00	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
201	1336.36	1336.61	Residential	10297.53	$ 7,476,003	$ 3,738,002	153.83	-1.00	153.83	-1.00	153.83	-1.00	153.84	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
245	1340.43	1340.68	Residential	941.45	$ 683,496	$ 341,748	0.00	-1.00	0.00	-1.00	213.48	-1.00	213.49	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
305	1341.91	1342.16	Residential	6338.38	$ 4,601,667	$ 2,300,833	216.16	-1.00	216.16	-1.00	216.17	-1.00	216.17	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
372	1326.69	1326.94	Residential	1276.52	$ 926,755	$ 463,378	0.00	-1.00	0.00	-1.00	206.81	-1.00	206.82	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
226	1098.42	1098.67	Residential	691.10	$ 501,735	$ 250,868	0.00	-1.00	0.00	-1.00	0.00	-1.00	0.00	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
6	1318.58	1318.83	Residential	8429.50	$ 6,119,817	$ 3,059,909	220.78	-1.00	220.78	-1.00	220.79	-1.00	220.79	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
513	1335.01	1335.26	Residential	526.95	$ 382,565	$ 191,282	0.00	-1.00	0.00	-1.00	252.12	-1.00	252.12	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
47	1318.51	1318.76	Residential	5281.01	$ 3,834,015	$ 1,917,007	349.96	-1.00	349.96	-1.00	349.97	-1.00	349.97	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
31	1318.31	1318.56	Residential	924.64	$ 671,292	$ 335,646	175.74	-1.00	175.73	-1.00	392.23	-1.00	392.23	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
175	1346.66	1346.91	Residential	1148.33	$ 833,687	$ 416,843	0.00	-1.00	0.00	-1.00	444.16	-1.00	444.16	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
248	1340.61	1340.86	Residential	2664.64	$ 1,934,529	$ 967,265	0.00	-1.00	0.00	-1.00	442.03	-1.00	442.04	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
250	1341.47	1341.72	Residential	7701.93	$ 5,591,604	$ 2,795,802	0.00	-1.00	0.00	-1.00	460.08	-1.00	460.08	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
576	1331.62	1331.87	Residential	617.80	$ 448,524	$ 224,262	505.16	-1.00	505.17	-1.00	505.22	-1.00	505.23	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
570	1320.14	1320.39	Residential	11790.86	$ 8,560,166	$ 4,280,083	506.07	-1.00	505.97	-1.00	506.25	-1.00	506.20	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
523	1326.63	1326.88	Residential	7607.83	$ 5,523,283	$ 2,761,642	524.98	-1.00	524.98	-1.00	525.04	-1.00	525.05	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
202	1275.49	1275.74	Residential	2124.08	$ 1,542,082	$ 771,041	0.00	-1.00	0.00	-1.00	477.18	-1.00	477.19	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
9	763.59	763.84	Residential	417.29	$ 302,950	$ 151,475	0.00	-1.00	0.00	-1.00	0.00	-1.00	0.00	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -

10-Year and 100-Year Proposed Building Damages in Area A

															Proposed									
Building ID	HAG	Finished Floor Elevation (ft)	Land Use Type	Building Area (sf)	Replace Cost $ ($726/SF-Res)	Content Replacement Value ($) 1/2 of Replacement Cost	10yr Exist WSEL (ft)	10yr Exist Flow Depth (ft)	10yr Prop WSEL (ft)	10yr Prop Flow Depth (ft)	100yr Exist WSEL (ft)	100yr Exist Flow Depth (ft)	100yr Prop WSEL (ft)	100yr Prop Flow Depth (ft)	10yr Building Damage (%)	10yrBuilding Damage Cost ($)	10yr Content Damage (%)	10yr Content Damage Cost ($)	10yr Total Damage Cost ($)	100yr Building Damage (%)	100yrBuilding Damage Cost ($)	100yr Content Damage (%)	100yr Content Damage Cost ($)	100yr Total Damage Cost ($)
52	1346.47	1346.72	Residential	7442.51	$ 5,403,259	$ 2,701,630	149.36	-1.00	149.36	-1.00	599.70	-1.00	599.70	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
136	1341.26	1341.51	Residential	8006.87	$ 5,812,987	$ 2,906,493	266.48	-1.00	266.48	-1.00	623.67	-1.00	623.66	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
357	1322.47	1322.72	Residential	4760.72	$ 3,456,285	$ 1,728,142	0.00	-1.00	0.00	-1.00	618.21	-1.00	618.20	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
23	1316.47	1316.72	Residential	5702.06	$ 4,139,693	$ 2,069,847	619.59	-1.00	619.59	-1.00	619.65	-1.00	619.64	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
137	1343.10	1343.35	Residential	12613.34	$ 9,157,283	$ 4,578,641	692.83	-1.00	692.83	-1.00	692.84	-1.00	692.84	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
475	1322.99	1323.24	Residential	4541.68	$ 3,297,259	$ 1,648,629	83.56	-1.00	83.56	-1.00	688.76	-1.00	688.75	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
249	1339.78	1340.03	Residential	5162.03	$ 3,747,637	$ 1,873,818	758.09	-1.00	758.09	-1.00	758.09	-1.00	758.09	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
1	1317.42	1317.67	Residential	1455.68	$ 1,056,823	$ 528,411	747.59	-1.00	747.60	-1.00	747.62	-1.00	747.63	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -
494	1321.28	1321.53	Residential	1256.14	$ 911,959	$ 455,980	754.22	-1.00	754.23	-1.00	754.23	-1.00	754.24	-1.00	0	$ -	0	$ -	$ -	0	$ -	0	$ -	$ -

XXI. APPENDIX I – GRANT FUNDING INFORMATION

TOWN OF PARADISE VALLEY FUNDING OPPORTUNITY MATRIX
MAY 20, 2025

Kimley

#	Grant Name	Agency	Funding Max	Required Match	Date Open	Date Due	Priorities	Types of Projects	Link to Site
1	**Pre-Disaster Mitigation Grant Program**	Federal Emergency Management Agency - FEMA	In FY24 NOFO, up to $10 Million awarded.	Yes. 75%/25% 25% cash, donated or third-party in-kind services, materials, or any combination. Cost share for the PDM program is adjusted to 90% federal and 10% nonfederal for the following communities: • Local governments meeting the definition of small impoverished community • Federally recognized tribes meeting the definition of small impoverished community	For FY2024 application opening date was May 22, 2024. Has happened annually but has not opened yet (most likely due to the changes at the federal level regarding FEMA).	For FY2024, the application closing date was June 28, 2024	The Pre-Disaster Mitigation (PDM) Grant Program makes federal funds available to state, local, tribal, and territorial governments to plan for and implement sustainable cost-effective measures designed to reduce the risk to individuals and property from future natural hazards, while also reducing reliance on federal funding from future disasters.	• Capability and Capacity-Building activities – activities that enhance the knowledge, skills, and expertise of the current workforce to expand or improve the administration of mitigation assistance. This includes activities in the following sub-categories: project scoping, hazard mitigation planning and planning-related activities, and other activities; • Hazard Mitigation Projects – cost-effective projects designed to increase resilience and public safety; reduce injuries and loss of life; and reduce damage and destruction to property, critical services, facilities, and infrastructure (including natural systems) from a multitude of natural hazards, including drought, wildfire, earthquakes, extreme heat, and the effects of climate change; • Management Costs – financial assistance to reimburse the recipient and subrecipient for eligible and reasonable indirect costs, direct administrative costs, and other administrative expenses associated with a specific mitigation measure or project.	https://www.fema.gov/grants/mitigation/learn/pre-disaster
2	**Hazard Mitigation Grant Program (HMGP)**	Federal Emergency Management Agency (FEMA)	Varies	Yes. 75% Grant 25% Match Required	Funding is historically available following a Presidentially-declared disaster	Varies	FEMA's Hazard Mitigation Grant Program provides funding to state, local, tribal and territorial governments so they can develop hazard mitigation plans and rebuild in a way that reduces, or mitigates, future disaster losses in their communities. This grant funding is available after a presidentially declared disaster. In this program, homeowners and businesses cannot apply for a grant. However, a local community may apply for funding on their behalf. All state, local, tribal and territorial governments must develop and adopt hazard mitigation plans to receive funding for hazard mitigation project application.	Projects that involve: 1. Protection or purchasing public or private property that experienced, or is in danger of experiencing, repetitive damage, 2. Purchasing and removing a flood-prone property from an individual, 3. Developing and adopting hazard mitigation plans, which are required for state, local, tribal and territorial governments to receive funding for their hazard mitigation projects, or 4. Using aquifer storage and recovery, floodplain and street restoration, flood diversion and storage, or green infrastructure methods that may reduce the impacts of flood and drought. Projects that include long-term efforts to reduce the impacts of future disasters. Examples include flood mitigation projects.	https://www.fema.gov/grants/mitigation/learn/hazard-mitigation
3	Safeguarding Tomorrow Revolving Loan Fund Program (RLF) - Congressional spending	Federal Emergency Management Agency (FEMA)	25%	Capitalization grant recipients must deposit an amount that is at least 10% of the amount of the grant into the loan fund, as a condition of receiving funding.	5/1/2025	6/1/2025	The Safeguarding Tomorrow Revolving Loan Fund (RLF) program is authorized under Section 205 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act to provide capitalization grants to states, eligible federally recognized tribes, territories and the District of Columbia to establish revolving loan funds that provide hazard mitigation assistance for local governments to reduce risks from natural hazards and disasters. These low-interest loans will allow jurisdictions to reduce vulnerability to natural disasters, foster greater community resilience and reduce disaster suffering. Eligible entities are: - States - Puerto Rico, the U.S. Virgin Islands, Guam, American Samoa, the Commonwealth of the Northern Mariana Islands, and the District of Columbia - Federally recognized tribes that received a direct major disaster declaration are eligible to apply for funding as an entity in this new program. Tribal entities may provide a loan to any authorized tribal organization, including a sub-component within their respective governmental structures. Additionally, Indian tribes located within a participating entity (such as a state or territory) may also apply for a loan under a participating entity's revolving loan fund. The priorities of the Safeguarding Tomorrow RLF program are to: Empower Entities. FEMA will collaborate with eligible entities to help them increase their capacity and capability, through focused engagement activities leading up to the application period and providing increased technical assistance during the Year 1 application period. Create innovative funding solutions. Applicants can leverage loans for non-federal cost share with other FEMA Hazard Mitigation Assistance programs, helping underserved communities access additional funding resources. Deliver equitable investments and increased access. A goal of the Safeguarding Tomorrow RLF program is that 40% of the overall benefits generated by the entity loan funds flow to underserved communities. Reduce grant application complexity. The goal of launching this effort is to reduce program complexity by breaking down barriers and increasing access to mitigation funding.	The Safeguarding Tomorrow RLF program complements and supplements FEMA's Hazard Mitigation Assistance grant portfolio to support mitigation projects at the local government level and increase the nation's resilience to natural hazards.	https://www.fema.gov/grants/mitigation/learn/storm-rlf
4	Flood Mitigation Assistance (FMA) Program	Federal Emergency Management Agency (FEMA)	$30 million for Community Flood Mitigation Projects Individual Project $300,000 Community Project $900,000	25% non-federal funds required as local match	Application Opening for FY2023 was October 16, 2023. Has happened annually but has not opened yet (most likely due to the changes at the federal level regarding FEMA).	Application deadline for FY2023 was February 29,2024 on FEMA GO Portal	The Flood Mitigation Assistance grant program is a competitive program that provides funding to state, territory and local governments and, federally recognized Tribal Nations. Since the National Flood Insurance Reform Act of 1994 was signed into law, funds are used for projects to reduce or eliminate the risk of repetitive flood damage to buildings insured by the National Flood Insurance Program.	Flood Mitigation Assistance funds may be used for projects such as Project Scoping; Technical Assistance; Community Flood Mitigation Projects; Individual Structure/Property-Level Flood Mitigation Projects; and Management Costs. Types of Projects/ Activities: Localized flood control, floodwater storage and diversion, floodplain and stream restoration, stormwater management, wetland restoration / creation.	https://www.fema.gov/grants/mitigation/learn/flood-mitigation-assistance/after-you-apply/previous-fiscal-year-subapplication-statuses/fy22-status

TOWN OF PARADISE VALLEY FUNDING OPPORTUNITY MATRIX
MAY 20, 2025

Kimley

#	Grant Name	Agency	Funding Max	Required Match	Date Open	Date Due	Priorities	Types of Projects	Link to Site
5	**Community Development Block Grant Program (CDBG Annual Competition) (HUD Funds)**	U.S. Department of Housing and Urban Development (HUD)	Competitive Fund. Up to $450,000 Community Enhancement Fund. Up to $250,000. Planning Fund. Unlisted. Economic Development Fund. Up to $250,000	Generally no required match for entitlement communities; however, states may need to provide a dollar-for-dollar match if they exceed $100,000 in administrative costs, up to a maximum of 3% of their total CDBG allocation.	*FY2024 applications opened September 2, 2025*	*FY2024 applications close on October 31, 2025*	All projects must meet one of the three national objectives: Benefit at least 51% of low and moderate-income persons. Aid in the prevention or clearance of slum and blight (meet an urgent need). Eligible grantees are as follows: Principal cities of Metropolitan Statistical Areas (MSAs) Other metropolitan cities with populations of at least 50,000 Qualified Urban Counties with populations of at least 200,000 (excluding the population of entitled cities) States and insular areas Eligibility for participation as an entitlement community is based on population data provided by the U.S. Census Bureau and metropolitan area delineations published by the Office of Management and Budget. HUD determines the amount of each entitlement grantee's annual funding allocation by a statutory dual formula which uses several objective measures of community needs, including the extent of poverty, population, housing overcrowding, age of housing and population growth lag in relationship to other metropolitan areas. Eligibility for participation as a state - 49 States and Puerto Rico participate in the State CDBG Program. HUD continues to administer the program for the non-entitled counties in the State of Hawaii because the State has permanently elected not to participate in the State CDBG Program. HUD distributes funds to each State based on a statutory formula which takes into account population, poverty, incidence of overcrowded housing, and age of housing. States participating in the CDBG Program award grants only to non-entitlement Units of General Local Government (UGLG).	CDBG funds may be used for activities which include, but are not limited to: - Acquisition of real property - Relocation and demolition - Rehabilitation of residential and non-residential structures - Construction of public facilities and improvements, such as water and sewer facilities, streets, neighborhood centers, and the conversion of school buildings for eligible purposes - Public services, within certain limits - Activities relating to energy conservation and renewable energy resources - Provision of assistance to profit-motivated businesses to carry out economic development and job creation/retention activities Each activity must meet one of the following national objectives for the program: benefit low- and moderate-income persons, prevention or elimination of slums or blight, or address community development needs having a particular urgency because existing conditions pose a serious and immediate threat to the health or welfare of the community for which other funding is not available. Generally, the following types of activities are ineligible: - Acquisition, construction, or reconstruction of buildings for the general conduct of government - Political activities - Certain income payments - Construction of new housing (with some exceptions)	https://www.hud.gov/hud-partners/community-cdbg#eg
6	**Water Infrastructure Finance and Innovation Act Program (WIFIA)**	U.S. Environmental Protection Agency (EPA)	Varies	Loan	Rolling	Continuous review cycle. No fixed deadline.	Like a bank, the WIFIA program has funding available on an ongoing basis. This allows prospective borrowers to request financing on their schedule. A rolling selection process allows EPA to provide year-round access to WIFIA funding and quicker selection decisions to prospective borrowers. In addition, under this iterative, rolling selection process, the WIFIA program can provide technical assistance to prospective borrowers that need support to complete their Letter of Interest (LOI) package. In the most recent Notices of Funding Availability, the WIFIA Program announced availability of an estimated $7.5 billion—$6.5 billion for WIFIA and $1 billion for SWIFIA—in financing to support approximately $15 billion in water infrastructure projects.	Since 2018, the WIFIA program has provided billions of dollars in loans to communities across the country and has an active pipeline of future projects. These projects will help mitigate the impacts of drought, replace lead service lines, manage stormwater, address PFAS and other emerging contaminants, and modernize aging infrastructure.	https://www.epa.gov/wifia/wifia-available-funding
7	**Corps Water Infrastructure Financing Program (CWIFP)***	U.S Army Corps of Engineers	CWIFP can provide credit assistance of up to 49% of the total project costs and up to 80% of project costs in some cases.	Loan	Open	Once a completed application is received, USACE will work with the applicant to expeditiously as possible move towards issuance of a loan.	The Corps Water Infrastructure Financing Program (CWIFP) is the U.S. Army Corps of Engineers' (Corps) new credit assistance program, also authorized by WIFIA, for non-federal dam safety projects. To be eligible for CWIFP credit assistance, a prospective borrower must be either a Local, State or Tribal Government, a Private Corporation, or a State Revolving Fund Program. Additionally multiple entities may apply for a single project under a joint application.	*Long-term, low cost credit assistance for water resource infrastructure projects **(currently limited to dam safety projects that are non-federally owned, operated, and maintained)** Funding of up to 49% of project costs (can fund up to 80% of project costs in some cases) Big impact to infrastructure with low cost and risk to taxpayers Available to individual projects or a group of projects with eligible costs in excess of $20 million Accelerates construction Local control and ownership of the project are maintained. Note: This opportunity is typically available for other water infrastructure projects. Has now been limited to just DAM projects, possibly because of budget restructuring. Keep in mind for future potential applicants. Eligible Costs: - Development-phase activities - Construction, reconstruction, rehab, and replacement activities. - Acquisition of property used to mitigate environmental impacts of eligible projects. - Capitalized interest, reserve funds, issuance costs, and other project carrying costs during construction. CWIFP is available for credit assistance to dam safety projects that support: - Flood damage reduction, hurricane, and storm damage reduction - Environmental restoration - Coastal or inland harbor navigation improvement, or inland and intracoastal waterways navigation improvement. CWIFP focuses on projects that are not federally authorized. Non-federal projects that have received federal appropriations may be eligible under certain circumstances.	https://www.usace.army.mil/Missions/Civil-Works/Infrastructure/revolutionize/CWIFP/

TOWN OF PARADISE VALLEY FUNDING OPPORTUNITY MATRIX
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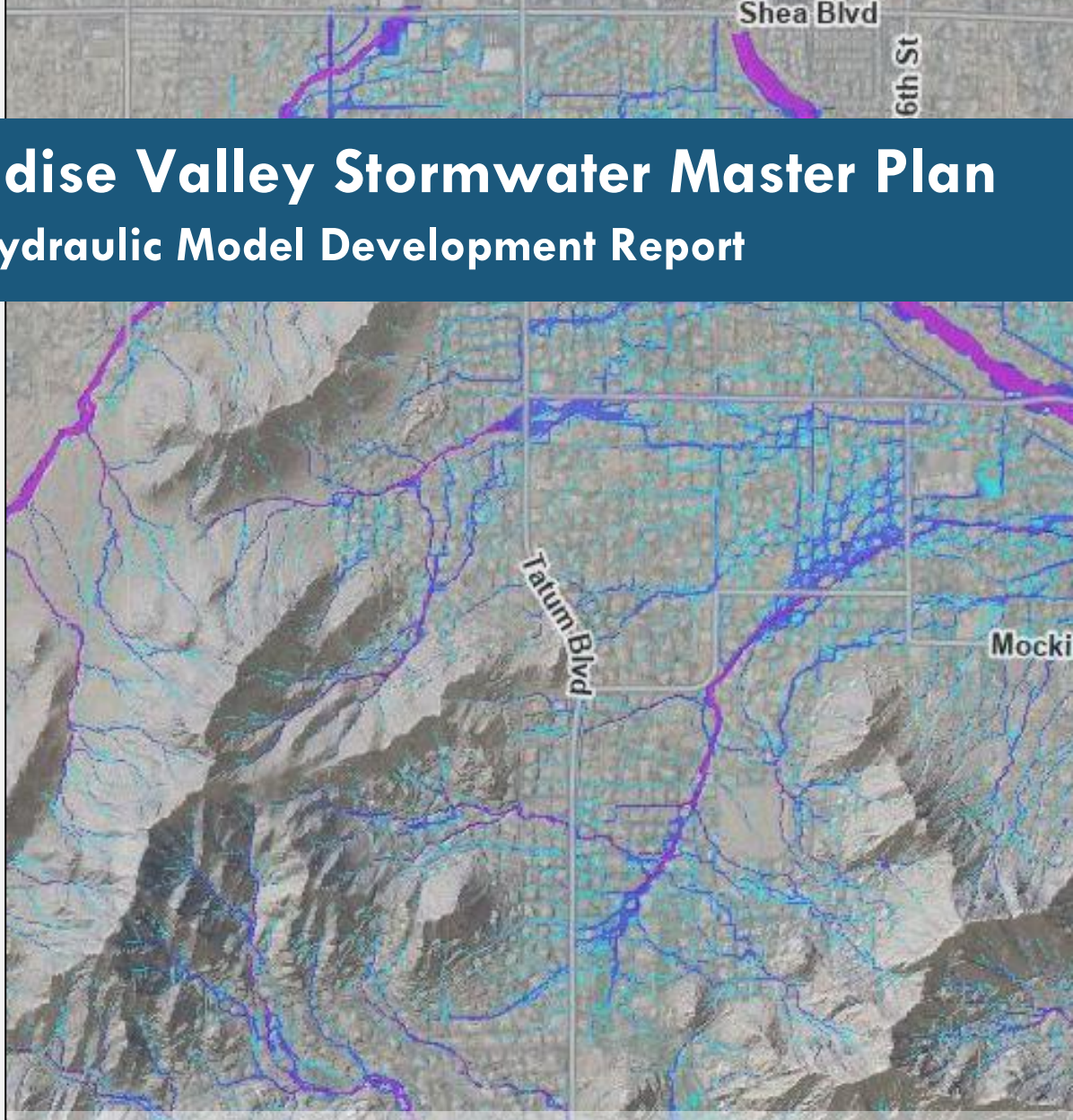
Kimley

#	Grant Name	Agency	Funding Max	Required Match	Date Open	Date Due	Priorities	Types of Projects	Link to Site
8	**Fiscal Year 2023 Public Works and Economic Adjustment Assistance (PWEAA) Application Submission and Program**	U.S Economic Development Administration (EDA)	Generally funds 50% but may fund up to 80%. In the past, the average size of a Public Works investment has been approximately $1.4 million. In FY2024, EDA expects investments ranging from $600,000 to $5 million. The average size of an EAA investment has been approximately $650,000, and EDA expects to make investments ranging from $150,000 to $2.5 million in FY2024. ACC, NCC, and BCC awards generally have ranged from $500,000 to $3 million for implementation projects and from $100,000 to $350,000 for planning activities. EDA anticipates making similar sized awards, subject to the availability of funding.	20% to 50%	Opened in 2023	There are no application submission deadlines. Applications will be accepted on an ongoing basis until the publication of a new PWEAA NOFO, cancellation of this PWEAA NOFO, or all available funds have been expended.	The Economic Development Administration's (EDA's) mission is to lead the Federal economic development agenda by promoting innovation and competitiveness, preparing American regions for economic growth and success in the worldwide economy. EDA fulfills this mission through strategic investments and partnerships that create the regional economic ecosystems required to foster globally competitive regions throughout the United States. EDA supports development in economically distressed areas of the United States by fostering job creation and attracting private investment. Under this NOFO, EDA solicits applications from applicants in order to provide investments that support construction, non construction, planning, technical assistance, and revolving loan fund projects under EDA's Public Works program and EAA program (which includes Assistance to Coal Communities, Nuclear Closure Communities, and Biomass Closure Communities). Grants and cooperative agreements made under these programs are designed to leverage existing regional assets and support the implementation of economic development strategies that advance new ideas and creative approaches to advance economic prosperity in distressed communities, including those negatively impacted by changes to the coal economy and nuclear power plant closures.	Water and sewer improvement projects included in this. Agency will fund a wide range of projects excluding the following: Some projects are generally ineligible under this NOFO, including projects that are primarily residential in nature (e.g., housing), projects to create community amenities (e.g., swimming pools, zoos, recreational centers), projects that support casinos or gaming, projects that support general governmental or public safety functions (e.g., buildings to house municipal government, firehouses, public safety equipment), and requests for funding to supplement operating budgets or replace lost revenue (including lost tax revenue). Applicants who are unsure whether their proposed project is eligible under this NOFO should consult the appropriate EDA Regional Office Point of Contact (POC) listed in section G.	https://www.eda.gov/funding/funding-opportunities/fiscal-year-2023-public-works-and-economic-adjustment-assistance
9	**Sewer Overflow and Stormwater Reuse Municipal Grants Program**	U.S Environmental Protection Agency	11/01/41	The federal share for awards shall be 80% of the total award. The state grant recipients are required to provide a non-federal cost share/match for the remaining 20% of the total award, unless reduced by EPA after verifying that the sub-award will support rural (population of 10,000 of less) and/or financially distressed communities as defined by the state.	05/09/24	States are under a Region and are allocated a certain amount of funding. For Arizona (Region 9), an allocation of $344,000 has been applied.	Funding for the planning, design and construction of critical stormwater infrastructure projects in communities including combined sewer overflows (CSO) and sanitary sewer overflows (SSO). Managing runoff remains a complex environmental challenge for local communities across the country, especially due to the rise in extreme weather events. The program can help facilitate the development of infrastructure capable of coping with the changing climate's impacts, such as increased precipitation events. **EPA allocates grant funding to states, the District of Columbia, and territories, which then provide sub-awards to eligible entities for projects that address infrastructure needs for CSOs, SSOs and stormwater management.** Projects under the program have many of the same program requirements as the CWSRF and, to the extent that eligible projects are available, at least 20% of a state's allocation must be used for green infrastructure, water conservation improvements, energy efficiency improvements or environmentally innovative activities that advance climate resilience and adaptation.	Eligible projects generally fall under three main categories: - Correcting CSOs. - Correcting SSOs. - Addressing stormwater and subsurface drainage needs. Examples of climate adaptation and resilience projects supported by this program include: Planning and design activities that increase the resilience of treatment works to manmade or natural disasters, such as extreme weather events and sea-level rise, including assessing future risks and vulnerabilities. Stormwater or subsurface drainage projects that develop or implement watershed pilot projects related to watershed-wide management, stormwater best practices, integrated water resource planning and forming watershed partnerships. Rainwater harvesting collection, storage, management and distribution systems. Green infrastructure solutions such as green roofs, green streets, bioretention/bioswales (e.g., rain gardens, tree boxes), permeable pavement and the replacement of gray infrastructure. Creating, protecting and restoring wetlands, shoreline and riparian areas. Nature-based solutions, such as the establishment or restoration of urban tree canopy. Watershed management activities related to integrated planning, partnership formation, wet weather discharge and stormwater best management practices.	https://www.epa.gov/resilient-investments/sewer-overflow-and-stormwater-reuse-municipal-grants-program
10	**Defense Community Infrastructure Program**	Department of Defense	No award can exceed $20 million or be less than $250,000	Grant recipients must agree to contribute not less than thirty percent (30%) of the total funding required for the community infrastructure project as a local cost share. For example, if the total project cost is $10 million, the required local cost share is $3 million for a $7 million Defense Community Infrastructure Program award. A proposal that does not commit to this required cost sharing, and is not subject to an exception below, will be deemed ineligible and removed from further consideration.	05/01/25	5pm PDT on June 23, 2025	Executive Summary: This Notice of Funding Opportunity Forecast (Forecast) forecasts potential funding from the Office of Local Defense Community Cooperation under the Defense Community Infrastructure Program to assist state and local governments, and not-for-profit, member-owned utilities, in addressing deficiencies in community infrastructure supportive of a military installation. For purposes of the Defense Community Infrastructure Program, "Community Infrastructure" includes projects related to transportation; schools; hospitals; police, fire, or emergency response, or other community support facilities; and utility projects (e.g., water, wastewater, telecommunications, electric and natural gas facilities). The facility or project itself must be owned by a state or local government, or a not-for-profit, member-owned utility. The facility addressed in the application must not be located on a military installation unless it is on property under the jurisdiction of a military department that is also subject to a real estate agreement (including a lease or an easement) held by an eligible community.	Eligible community infrastructure projects are any complete and usable transportation project; community support facility (e.g., school, hospital, police, fire, emergency response, or other community support facility); and utility infrastructure project (e.g., water, wastewater, telecommunications, electric, gas, or other utility infrastructure (with necessary cyber safeguards)) that: • are on land located off of a military installation or on property under the jurisdiction of a Secretary of a military department that is subject to a real estate agreement allowing the project or facility to be located on military property (including a lease or easement); • support a military installation; • are owned by a state, local government, or a not-for-profit, member-owned utility service; • are supported by the installation commander representing the installation benefitting from the proposed project; • are where ground-disturbing work has not yet commenced; and, • are construction-ready so that the project can be completed within five (5) years of grant award.	https://www.grants.gov/search-results-detail/358802

Town of Paradise Valley Stormwater Master Plan

Hydrologic and Hydraulic Model Development Report

April 2025



Prepared for
Town of Paradise Valley
6401 E Lincoln Drive
Paradise Valley, AZ 85253

Prepared by
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In association with
Kimley-Horn and Associates, Inc.
1661 East Camelback Road, Suite 400
Phoenix, AZ 85016

Town of Paradise Valley Stormwater Master Plan

Hydrologic and Hydraulic Model Development Report

April 2025

Prepared for:

Town of Paradise Valley
Contact: Shar Johnson, MBA, PE
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Appendix A Digital Submittal



Expires 3/31/2026

Abbreviations

ACDC	Arizona Canal Diversion Channel
ac-ft	acre-feet
ADMP	Area Drainage Master Plan
ADMS	Area Drainage Master Study
ADMS/P	Area Drainage Master Study & Plan
ALERT	Automated Local Evaluation in Real Time
FCDMC	Flood Control District of Maricopa County
HEC-RAS	Hydrologic Engineering Center River Analysis System
H&H	Hydrologic and Hydraulic
IBW	Indian Bend Wash
MIBW	Middle Indian Bend Wash
NOAA	National Oceanic and Atmospheric Administration
PRISM	Parameter-elevation Regressions on Independent Slopes Model
PVSWMP	Paradise Valley Stormwater Master Plan
SFC	Surface Feature Characterization
USGS	United States Geological Survey

1 INTRODUCTION

This document outlines the development of the hydrologic and hydraulic (H&H) components of the Town of Paradise Valley (Town) Storm Water Master Plan (SWMP). These components comprise the entirety of the existing condition H&H model development.

1.1 Study Purpose

The purpose of this study is to develop a Town-wide H&H model using the completed Flood Control District of Maricopa County (FCDMC) FLO-2D models as the starting point. The goal was to develop an integrated model that depicts the entirety of the Town of Paradise Valley (Town) limits. This model will then be leveraged to evaluate existing condition drainage issues throughout the Town, and it will further be used to evaluate the effectiveness of various conceptual flood mitigation strategies.

1.2 Study Location

The study area fully encompasses the 15.4 mi^2 boundary of the Town of Paradise Valley, Arizona. **Figure 1-1** depicts the location of the Town as it relates to the Phoenix Metropolitan area.

The study area is generally bounded by Shea Boulevard to the north and Scottsdale Road to the East. The western and southern boundaries are generally are bounded by the Piestewa Peak mountainous area and Camelback Mountain, respectively. Several notable peaks reside within the Town boundary itself, one example being Mummy Mountain.

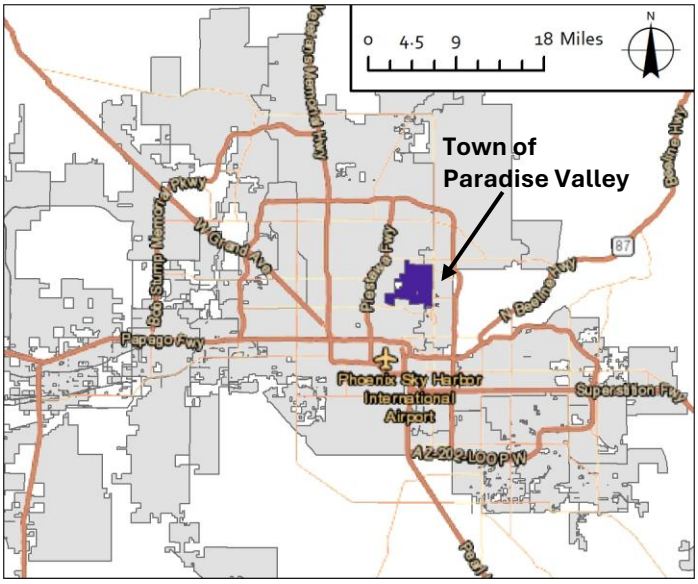


Figure 1-1. Study Location.

1.3 Consultant Team

The consultant team performing the overall SWMP study is led by Kimley Horn and Associates, Inc. (KHA) under Contract # CON-24-015-ENG. As part of the overall study, JE Fuller Hydrology & Geomorphology, Inc. (JE Fuller) performed the H&H model development tasks. Contact information for the consultant team is shown below in **Table 1-1**.

Table 1-1. Contact Information.

Consultant	Name	Role	Email	Phone
KHA	Geoff Brownell, PE	Project Manager	geoffrey.brownell@kimley-horn.com	602.944.5500
JE Fuller	Peter Acton, PE	Project Manager	peter@jefuller.com	480.222.5701

2 DATA COLLECTION AND MAPPING

This section outlines the data collection performed for this study.

2.1 Digital Data Collection

The location of the Town boundaries resides within the intersection of five Area Drainage Master Studies/Plans (ADMS/P) performed by the FCDMC. All five studies were performed using the FLO-2D modeling software. While the summation of the boundaries of the five models completely covers the Town boundaries, no singular study comprised more than half of the Town. Therefore, new model boundaries were developed, and input data for this new modeling relied heavily on the datasets used in the five ADMS studies. Data pertaining to each study was requested from the District by JE Fuller and the received data included both the entirety of the FLO-2D model input and output files as well as relevant geospatial data. The five studies are listed below in **Table 2-1**.

Table 2-1. ADMS/Ps Referenced in this Study.

Study Name	Abbreviation	Dates			Prime Consultant	Cell Size
		Topographic Data Capture	Model Development	Completed		[ft]
East Shea Corridor (Wilson, 2023)	E Shea	2007 - 2016	2016	2024	HELM-Wilson & Co., Inc.	15
Phoenix Metro (Wood Patel, 2021)	Metro	2018	2020	On-going	Wood Patel, Inc.	20
Cudia City Wash (Michael Baker, 2020)	Cudia	2015	2019	2020	Michael Baker International	15
Middle Indian Bend Wash (Kimley-Horn, 2019)	MIBW	2014	2015	2019	KHA	20
Lower Indian Bend Wash (Gavin & Barker, 2017)	LIBW	2007	2013	2017	Gavin & Barker, Inc.	20

Data leveraged from these five ADMS/Ps include inflow hydrographs, surface feature characterization (SFC) shapefiles (including building footprints), storm drain infrastructure, one-dimensional channels, and hydraulic structure (i.e., culverts).

A comprehensive soil coverage dataset was downloaded from the District website in March 2024, and precipitation datasets were also obtained from the District. This soil dataset represents the implementation of new Green and Ampt (GA) parameters that were developed by the FCDMC in late 2023. None of the five ADMS/Ps used this newer dataset.

2.2 Topographic Mapping

While much of the input data obtained from the previous ADMS modeling efforts were included in the present study, newer and more refined topography spanning the entirety of the new modeling domain was available. This dataset, obtained through the United States Geological Survey (USGS) 3D Elevation Program (3DEP) (Sanborn, 2021). The effective date of this data source is November 11th, 2020. This topographic dataset was used for the entirety of the current modeling effort.

2.3 Survey Data Collection

Survey data was provided by KHA to verify and obtain hydraulic structure properties.

2.4 Digital Projection Information

Geographical Information System (GIS) files were developed using the following projection information:

- Vertical Datum: The North American Vertical Datum of 1988 (NAVD88)
- Horizontal Datum: NAD 1983 HARN State Plane Arizona Central (WKID 2868)
- Units: International Feet

3 MODEL DEVELOPMENT

Hydrologic and hydraulic modeling for this study has been completed with the use of the FLO-2D PRO modeling software. This is a volume-conserving, two-dimensional (2D) flood routing model. The model routes flow (rainfall runoff and inflow hydrographs) over a grid comprised of square elements based upon topography (defined by the elevation of each grid element) and roughness parameters. This 2D modeling approach is highly suited for simulating the complex and distributary flow prevalent within the watersheds of this study. The FLO-2D model also incorporates significant storm drains, culverts, walls, and channels within the modeling area.

The choice of this modeling software for this study was also influenced by the existing regional modeling in the area (**Table 2-1**) that had all utilized FLO-2D, thereby simplifying the development of the present model.

The FLO-2D PRO version used in this study is build number 23.10.25 with an executable date of November 9th, 2023. The QGIS plugin version used to develop some model input files was released on August 17th, 2021, and is version 0.10.32.

3.1 Method Overview

The analysis was completed using FCDMC guidance and recommendations for model parameter estimation and development (FCDMC, 2016; FCDMC, 2020; FCDMC, 2021[a]; FCDMC, 2021[b]) as well as two-dimensional modeling techniques appropriate for the area. The QGIS plugin for developing FLO-2D model inputs was used to create spatially-varied input files for topography, infiltration, precipitation, and Manning's *n*. Other input datasets were developed using in-house custom scripting.

This study included developing datasets for the 2-Year, 10-Year, and 100-Year recurrence intervals. Both the 6-Hour and 24-Hour durations were modeled (for the 100-Year event), and the controlling duration was selected based on an evaluation of the results. The 2-Year and 10-Year events were then modeled with the controlling duration only.

3.2 Model Domain and Sub-Models

The goal of this modeling effort was to develop a Town-Wide FLO-2D model (also termed PV model in this document) that will be used to develop and assess various flood reduction measures throughout the Town. That said, the entirety of the Town boundary needed to be incorporated into the model domain. Further, a cell size of 10 feet was desired, as this finer resolution (as compared to previous FLO-2D studies listed in **Table 2-1**) as it provides a more resolved and realistic depiction of flow paths and depths. While FLO-2D can be used to model extremely large areas with very fine detail, there is an upper limit to the number of cells in a model before model runtimes become exponentially long. This issue can be easily circumvented by delineating the study area into sub-models that run independently of each other.

The model area was delineated into two separate sub-models, termed "NORTH" and "SOUTH". These delineations are simply model constructs that make it easier and facilitate running larger models. In this paradigm, sub-models that are upstream must be executed first, and the outflow from the upstream model becomes inflow into the downstream model. For the PV model, the SOUTH model is upstream of the NORTH model. Statistics for each sub-model is shown in

Table 3-1, and **Figure 3-1** below depicts the two sub-model boundaries that comprise the overall PV model.

Table 3-1. Sub-model Statistics.

Sub-Model	Cell Size (ft)	# of Cells	Area (mi^2)
NORTH	10	3,143,855	11.28
SOUTH	10	2,943,125	10.56
Total		6,086,980	21.83

Model boundaries were drawn to include as much drainage area as possible within the current modeling area, as this minimizes the need for inflow hydrographs developed using other modeling methods (e.g., earlier version of the GA parameters) keeping in line with the study goal of developing a Town-wide comprehensive model. The result is that the PV modeling area is larger than the Town boundary itself, as it includes a significant amount of upstream tributary area. The boundary was also drawn to facilitate the inclusion of existing storm drain networks and channels and to allow for accurate headwater and tailwater calculations for culverts. Multiple iterations of delineations and review of results were performed to fine tune the model boundaries.

The Tatum Wash drainage area was included in the NORTH sub-model domain for several reasons. First, initial modeling indicates distributary flow as the wash transitions from undeveloped desert into more urbanized settings, with some fraction of the distributary flow crossing into the Town along the northwestern boundary of the Town. Secondly, model calibration (not included in this submittal) leverages both precipitation datasets and stage data collected at the Tatum basin. Including this area in the NORTH sub-model simplified the calibration effort and it provided more accurate inflow hydrographs.

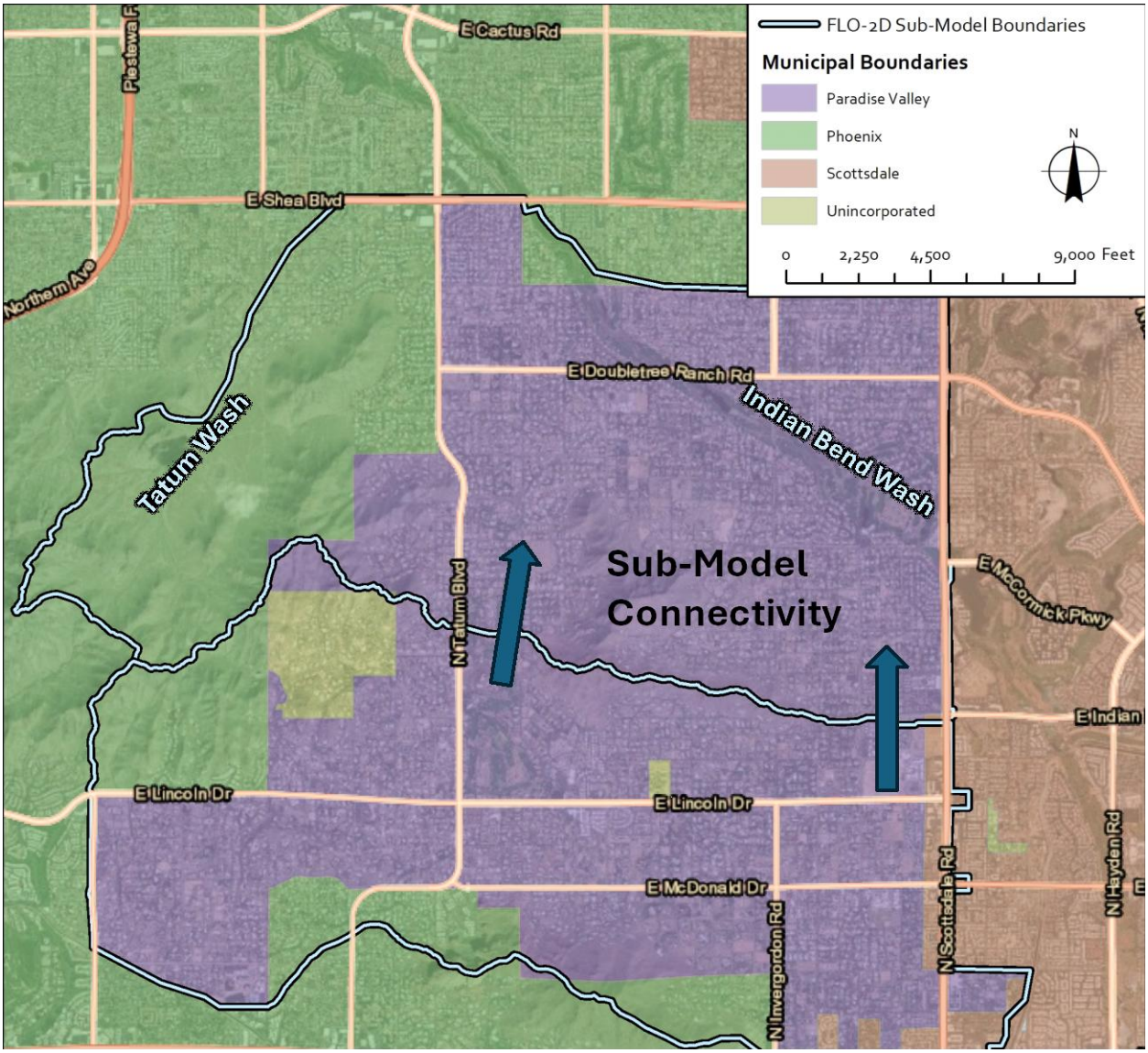


Figure 3-1. Sub-Model Boundaries and Connectivity.

3.3 Off-Site Model Inflows

The previous models were leveraged to account for inflows into the PV model. While the need for inflows from other models was minimized, the northern boundary of the PV model required offsite inflow to be included. The off-site models used to parameterize this inflow included both the MIBW and East Shea models. **Figure 3-2** below shows the spatial extents of where the offsite inflows are included in the context of the PV model boundary as well as the boundaries of the five off-site models. Several storm drain inflows from contributing studies were also identified and included.

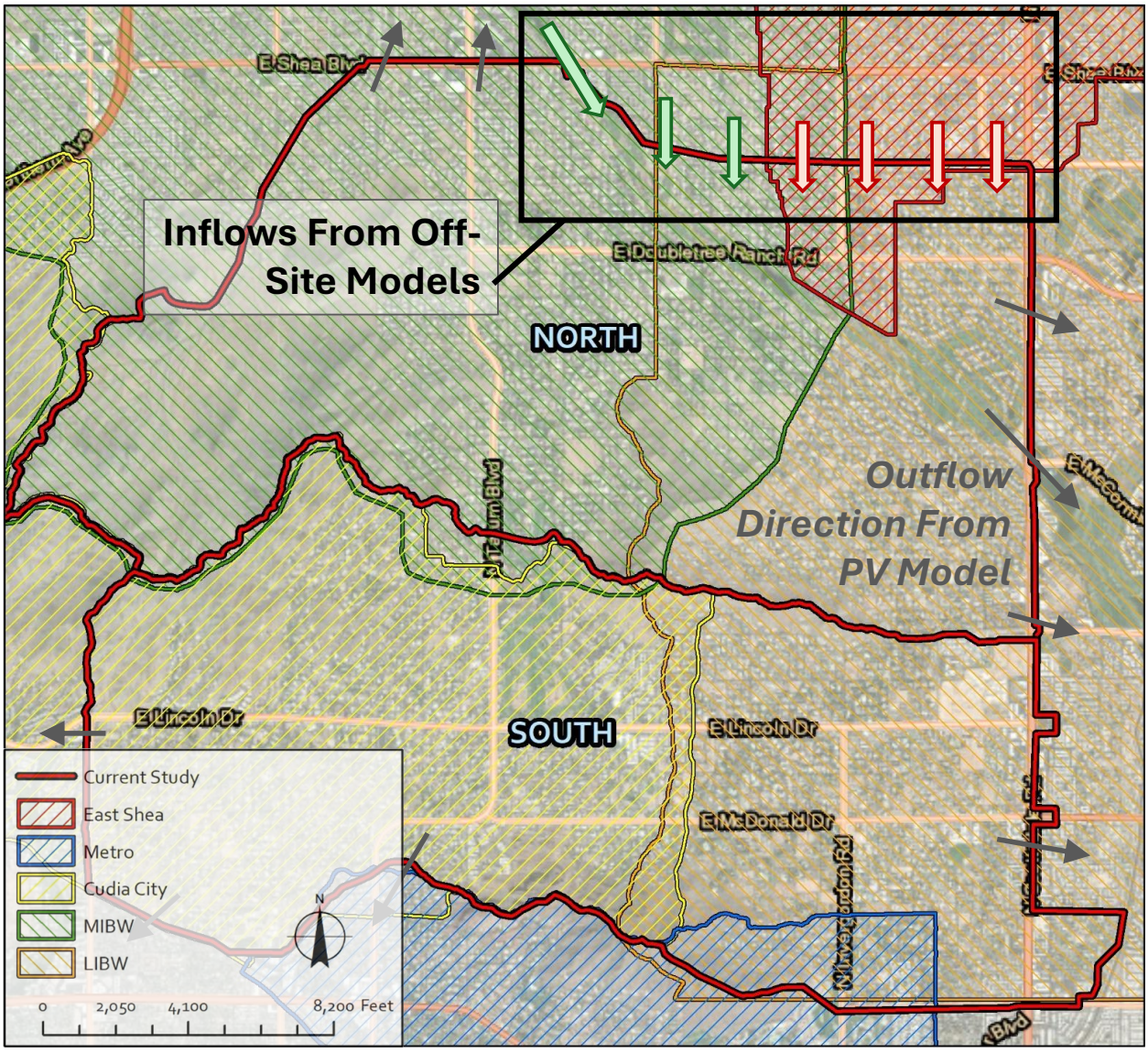


Figure 3-2. Offsite Model Boundaries and Inflows to Current Study.

The inflow hydrographs from the off-site models were obtained by using the original model files from each study (obtained from the FCDMC) and re-parameterizing the RAIN.DAT input files to develop models representing the 2-, 10-, and 100-year recurrence intervals for both the 6-hour and 24-hour durations. No other changes were made to the off-site model inflow files. For the MIBW model this required running two off-site models (MIBW-North and MIBW-South), while the East Shea Model only required one sub-model to be re-parameterized, as it is hydrologically detached from the other three sub-models. Since both studies overlap far into the PV model, new outflow nodes were placed in each off-site model domain directly on top of the upstream PV boundary to obtain hydrographs for each cell. Cells from the off-site models mapped to PV inflow cells to translate the outflow hydrographs from the offsite models into inflow hydrographs for the PV model. **Figure 3-3** depicts an example of how mapping was performed between an off-site model (with a larger grid size) and the PV model.

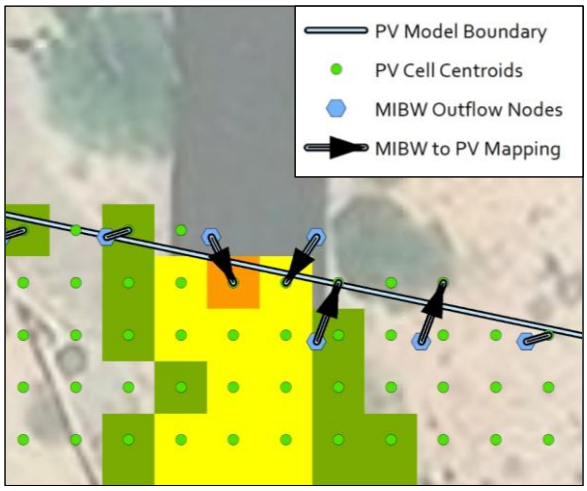


Figure 3-3. Off-site Model Mapping.

3.4 Surface Feature Characterization

The surface feature characterization (SFC) dataset defines the spatial land use for the model area. This polygon shapefile defines the extent of each land use category, and this dataset is used to develop FLO-2D input files pertaining to infiltration, blocked obstructions, and roughness parameters.

SFC datasets were generated as part of each study listed in **Table 2-1**, and these five datasets were all provided by the FCDMC. Each dataset was then merged to create one comprehensive, Town-wide SFC dataset. For areas overlapping SFC coverages the newest dataset was used. Given the varying dates of the development of each contributing SFC dataset, a close examination of the Town-wide SFC shapefile was performed against aerial datasets (dated 2024) to look for changes in land use since the underlying SFC development. Manual changes were made as necessary to update the SFC based on this newer aerial dataset.

The resulting, updated SFC dataset is shown below on **Figure 3-4**.

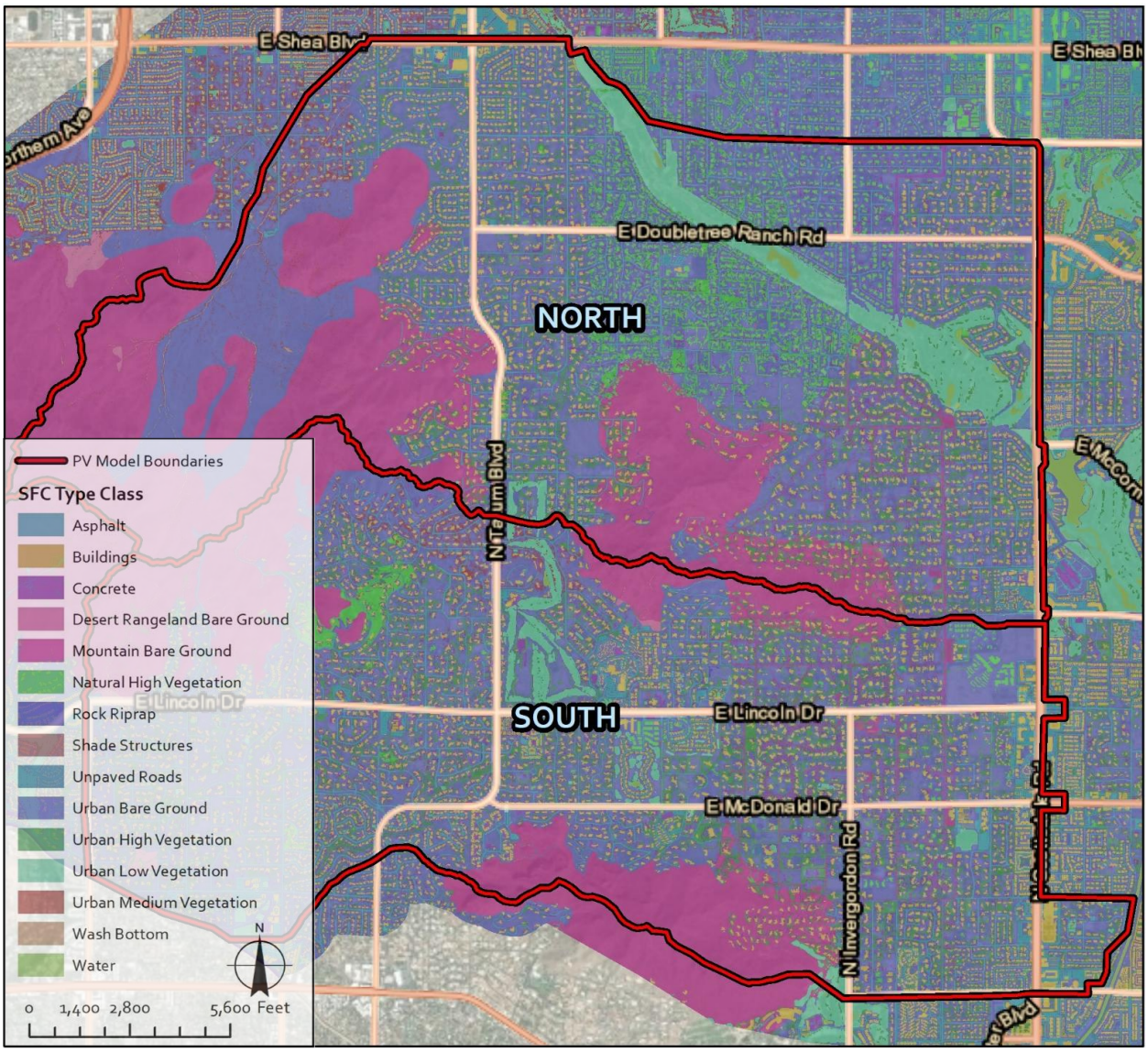


Figure 3-4. Merged and Updated SFC Dataset.

3.5 Development of Model Input Files

This section highlights the processes used to develop the FLO-2D input files.

3.5.1 Topography

3.5.1.1 Base Grid Elevation Assignment

The underlying topography for the model was developed by sampling the 10-foot model grid against the more resolved, 1-foot bare earth raster. Processes outlined in FCDMC (2021[b]) were used along with the QGIS plugin, as required by the District. A hill shade view of the topography in the study area is shown on **Figure 3-5** below.

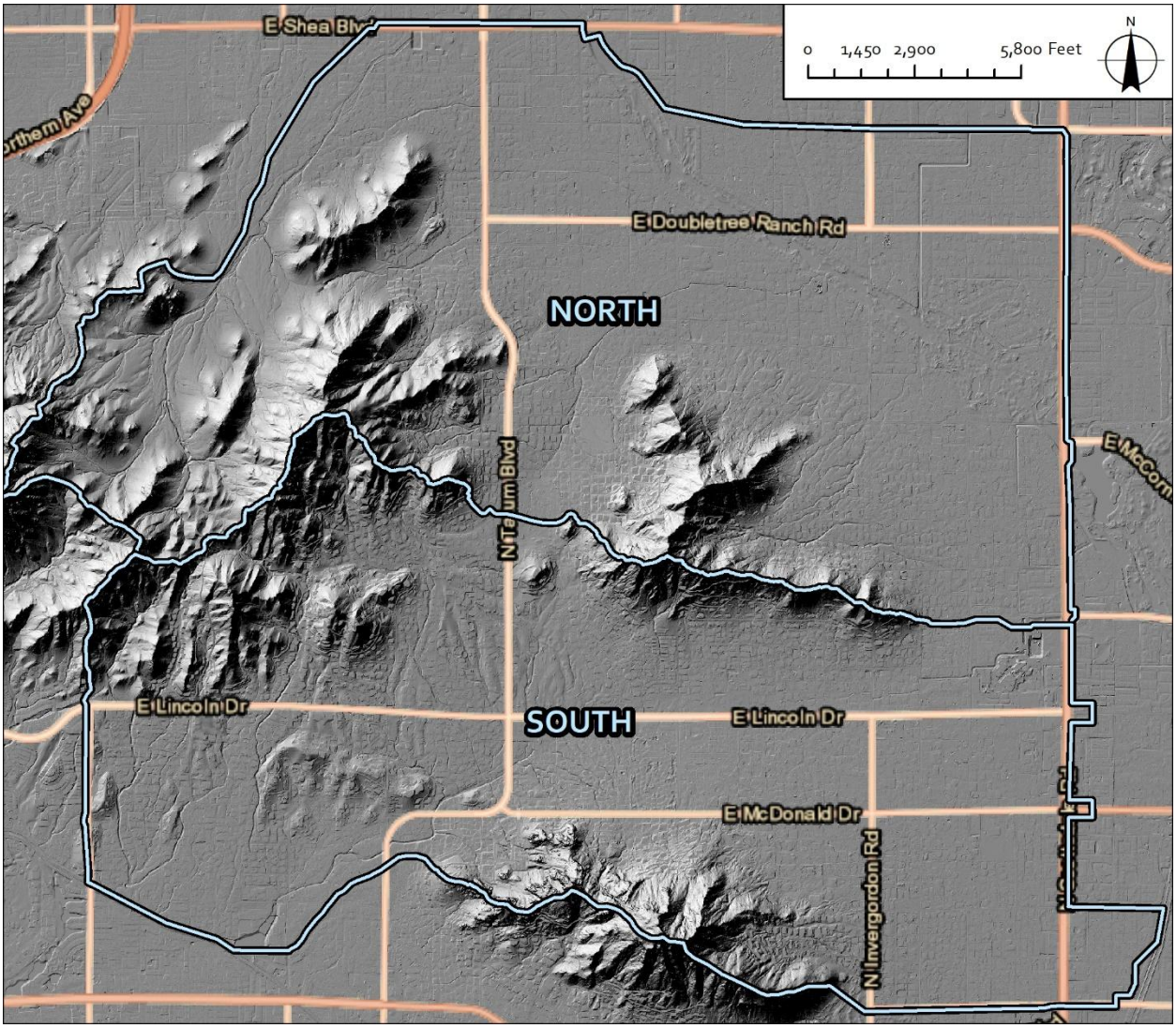


Figure 3-5. Hill Shade View of Study Area.

3.5.1.2 Elevation Adjustments

Elevation adjustments were made using a polygon shapefile to override elevations assigned in the rasterization of the source topography. This included establishing elevations for culvert and storm drain inverts along with changes to improve model stability. This shapefile is included in the digital deliverable.

3.5.2 Roughness

Roughness values in the model, represented by Manning's n values, were based on the SFC dataset discussed earlier in this report. Two spatially-varied input files were used in this model representing a depth-varying approach to assigning roughness. Both an n-value (MANNINGS_N.DAT) and an n-value corresponding to a shallow depth (SHALLOWN_SPATIAL.DAT) were used in this study. This differentiation allows FLO-2D to compute a time and depth-varied roughness value based upon the depth of water. In general, the n-value parameter corresponds to the roughness at a depth of three feet, and the shallow n-value applies to a depth of 0.5 feet. A logarithmic function is then used to compute roughness values in between these depths. The FLO-2D Data Input Manual can be referred to for more detailed information on this interpolation process.

Roughness value assignments by SFC category are listed below in **Table 3-2**.

Table 3-2. Roughness Values by SFC Category.

Class ID	Type Class	n	Shallow n
0	Natural High Vegetation	0.065	0.20
3	Urban High Vegetation	0.065	0.20
4	Urban Medium Vegetation	0.055	0.15
5	Urban Low Vegetation	0.045	0.12
6	Mountain Bare Ground	0.050	0.40
8	Desert Rangeland Bare Ground	0.040	0.25
9	Urban Bare Ground	0.035	0.13
12	Wash Bottom	0.035	0.15
13	Concrete	0.016	0.10
14	Asphalt	0.020	0.10
15	Buildings	0.024	0.12
16	Shade Structures	0.035	0.10
17	Water	0.040	0.10
21	Unpaved Roads	0.026	0.10
23	Rock Riprap	0.065	0.25

Increases in n-values in cases of deep ponding is applied in the development of FLO-2D modeling to improve model stability. Adjustments to n-values in ponded locations were made using criteria shown in **Table 3-3** below.

Table 3-3. Manning's n-value Adjustment for Ponded Depth.

Ponded Depth (ft)	Manning's n-value
5 - 8	0.08
8 - 10	0.1
10 - 15	0.2
Greater than 16	0.3

3.5.3 Precipitation

The RAIN.DAT input file defines the rainfall temporal and spatial distribution for the FLO-2D model. Two RAIN.DAT files were created to represent two design storms. Given the large scale of the modeling area, the 24-hour event may control in larger washes and channels, and the 6-hour event may control for smaller tributary watersheds throughout the modeling area. Both the 6-hour and 24-hour storm durations were run for the 100-year storm at the preliminary modeling phase, and a single duration was selected for use to perform the detailed modeling.

The rainfall depths were taken from the NOAA Atlas 14, Precipitation-Frequency Atlas of the United States, Volume 1: Semiarid Southwest (Arizona, Southeast California, Nevada, New Mexico, Utah) as provided on the FCDMC website for public download, and the temporal distributions were taken from the FCDMC Hydrology Manual. The SCS Type II pattern was used for the 24-hour duration, and the Maricopa County Pattern No. 1 was used for the 6-hour duration. The maximum and minimum rainfall depths for the study area are shown below in **Table 3-4**. The 24-hour and 6-hour distributions are also shown below on **Figure 3-6.**

Table 3-4. Precipitation Depths.

Event	Maximum	Minimum
	[in]	[in]
2-Year 6-Hour	1.176	1.121
10-Year 6-Hour	1.766	1.689
100-Year 6-Hour	2.691	2.581
100-Year 24-Hour	3.766	3.526

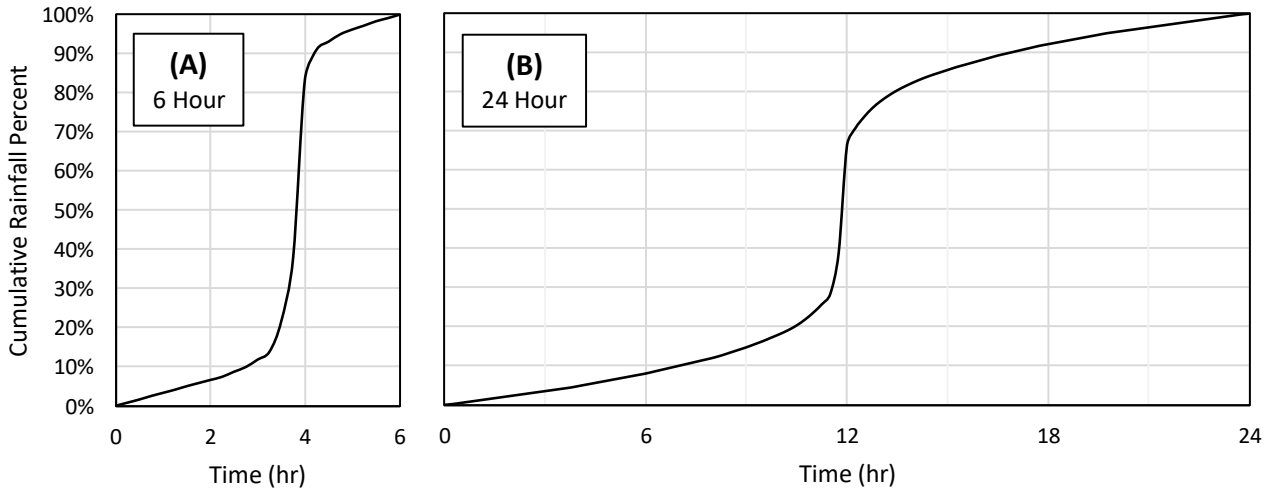


Figure 3-6. (A) Maricopa County 6-Hour Local Storm Temporal Distribution (Pattern No. 1) and (B) SCS Type II 24-Hour Temporal Distribution.

The RAIN.DAT model input files were developed using the QGIS plugin and the rasterized precipitation datasets obtained from the FCDMC. **Figure 3-7** below depicts the spatial distribution of the NOAA Atlas 14 precipitation statistics for the four modeled events. **Section 4.3** below highlights the selection of the controlling duration.

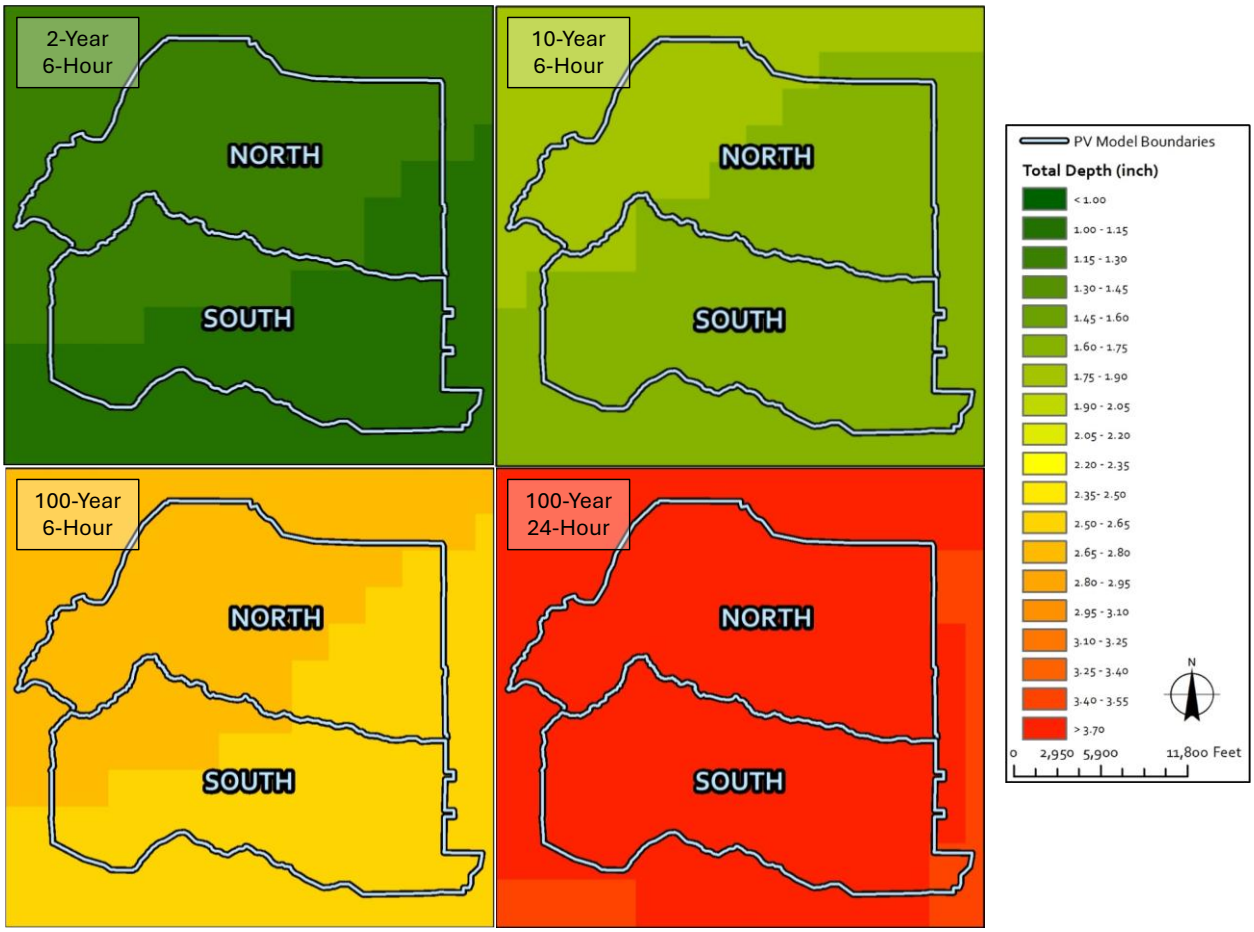


Figure 3-7. NOAA Atlas 14 Precipitation Datasets.

3.5.4 Infiltration

The INFIL.DAT file contains the infiltration parameters used in FLO-2D to calculate rainfall losses. The Green and Ampt method was used for this study as recommended by the District's Hydrology Manual. This method requires a number of inputs to be estimated from the land use and soil types within the study area.

Recent revisions to the District Hydrology Manual have simplified the approach to parameterizing the Green and Ampt infiltration model. Soils datasets provided by the District contain pre-computed Green-Ampt parameters, thereby eliminating the need to compute this dataset. Soil properties provided in this dataset used in the INFIL.DAT parameterization include hydraulic conductivity (XKSAT), rock outcrop (ROCKOUT), moisture deficit (DTHETA) for dry, normal, and saturated conditions, as well as capillary suction head (PSIF). Values by soil unit are shown below on in **Table 3-5**, and this coverage is shown on **Figure 3-8** below. The limiting depth variable was globally set at 4 inches for this submittal based upon District guidance (FCDMC, 2021[b]), and this value may be adjusted based upon a future model calibration phase. The second dataset used in developing INFIL.DAT is the SFC delineations. Properties of each land use used in the INFIL.DAT parameterization include initial abstraction (IA), percent impervious (RTIMP), development type (Type) and initial saturation condition (InitSat). Values by SFC category are shown below in **Table 3-6**.

The QGIS plugin directly computes the INFIL.DAT file for each sub-model simply by pointing the software to the two FCDMC shapefiles (SFC and soils).

Table 3-5. Soil Unit Infiltration Values.

Soil ID	Description	Rock Outcrop	XKSAT (2006)	PSIF (2006)	DTheta, Dry	DTheta, Normal	Limiting Depth
		[%]	[in / hr]	[in]			[ft]
AZ645109	Schenco-Rock outcrop complex 25 to 60 percent slopes	25	0.069	16.539	0.266	0.135	0.333
AZ64550	Estrella loams	0	0.254	14.129	0.298	0.167	0.333
AZ645113	Tremant gravelly loams	0	0.196	14.727	0.299	0.171	0.333
AZ64568	Gunsight-Cipriano complex 1 to 7 percent slopes	0	0.14	9.438	0.279	0.174	0.333
AZ64555	Gilman loams	0	0.121	16.899	0.263	0.132	0.333
AZ64598	Pinamt-Tremant complex 1 to 10 percent slopes	0	0.12	11.336	0.269	0.158	0.333
AZ655Es	Estrella loam	0	0.156	14.967	0.277	0.147	0.333
AZ655PvC	Pinamt very gravelly loam 3 to 5 percent slopes	0	0.072	16.7	0.267	0.137	0.333
AZ655Ro	Rock land	70	0.01	18.18	0.195	0.063	0.333
AZ655Va	Valencia sandy loam	0	0.65	4.603	0.315	0.235	0.333
AZ655LaA	Laveen loam 0 to 1 percent slopes	0	0.137	16.7	0.267	0.137	0.333
AZ655Ru	Rough broken land	70	0.01	18.18	0.195	0.063	0.333
AZ655CeC	Cavelt gravelly loam 1 to 5 percent slopes	0	0.125	15.714	0.276	0.149	0.333
AZ655Mv	Mohall loam MLRA 40	0	0.152	15.372	0.274	0.142	0.333
AZ655AoB	Antho gravelly sandy loam 1 to 3 percent slopes	0	0.577	4.631	0.331	0.248	0.333
AZ655LaB	Laveen loam 1 to 3 percent slopes	0	0.137	16.7	0.267	0.137	0.333
AZ655TrB	Tremant gravelly loam 1 to 3 percent slopes	0	0.087	10.015	0.234	0.133	0.333
AZ655Gm	Gilman loam	0	0.121	16.899	0.263	0.132	0.333
AZ655RiB	Rillito gravelly loam 1 to 3 percent slopes	0	0.219	14.461	0.303	0.176	0.333

Table 3-6. Infiltration Properties by SFC Category.

Class ID	Type Class	IA	RTIMP	Type	InitSat
		[in]	[%]		
0	Natural High Vegetation	0.10	0	Natural	Dry
3	Urban High Vegetation	0.10	0	Urban	Normal
4	Urban Medium Vegetation	0.10	0	Urban	Normal
5	Urban Low Vegetation	0.10	0	Urban	Normal
6	Mountain Bare Ground	0.25	0	Natural	Dry
8	Desert Rangeland Bare Ground	0.35	0	Natural	Dry
9	Urban Bare Ground	0.20	0	Urban	Dry
12	Wash Bottom	0.10	0	Natural	Dry
13	Concrete	0.05	98	Urban	Normal

Class ID	Type Class	IA	RTIMP	Type	InitSat
		[in]	[%]		
14	Asphalt	0.05	95	Urban	Normal
15	Buildings	0.05	95	Urban	Normal
16	Shade Structures	0.05	98	Urban	Normal
17	Water	0.00	100	Urban	Saturated
21	Unpaved Roads	0.10	50	Urban	Dry
23	Rock Riprap	0.25	95	Natural	Dry

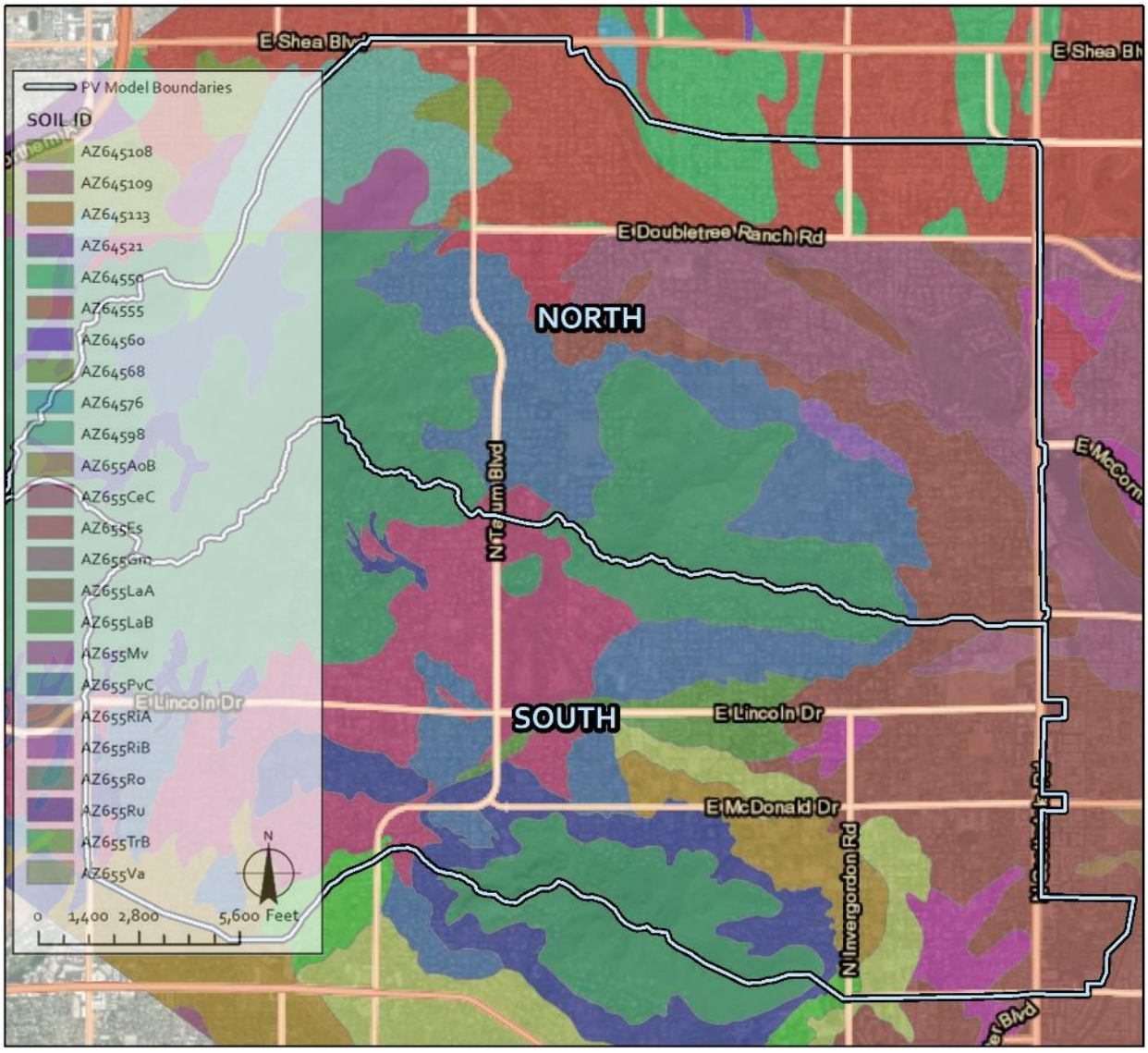


Figure 3-8. Soil Survey in Study Area.

3.5.5 Inflow and Outflow

Inflow hydrographs were used to transfer flow from an upstream sub-model to a downstream sub-model (namely, from the SOUTH sub-model to the NORTH sub-model). The inflow hydrographs are automatically written by FLO-2D during model execution of the upstream sub-models. The OUTCHAR field of the upstream OUTFLOW.DAT file was altered in order to capture flow moving out of the upstream model as well as organize the outflows into INFLOW.DAT files for the downstream sub-model. FLO-2D allows for a single sub-model to branch into up to nine separate sub-models, and there is no limit on how many sub-models can be collected into a single downstream sub-model.

3.5.6 Floodplain Cross-Sections

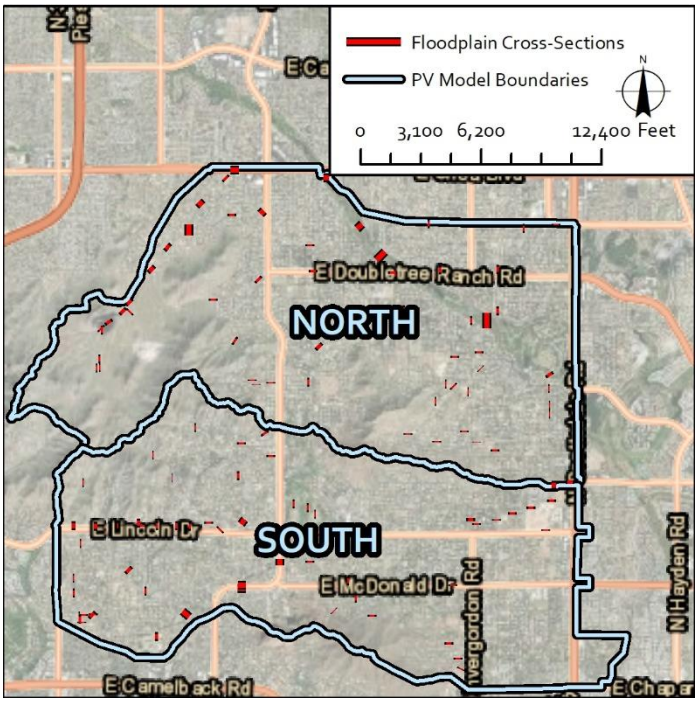


Figure 3-9. Floodplain Cross-Section Locations.

Floodplain cross-sections were developed and included in the FPXSEC.DAT file to query flow hydrographs and peak discharges from the FLO-2D model at key locations within the study area. A total of 121 floodplain cross-sections have been placed throughout the two model domains, and **Figure 3-9** visualizes the locations and density. Cross-sections were placed at locations of major flow concentration, flow transfer location between sub-models, areas of interest to the Town, and areas to assist in identifying model stability. Shapefiles containing information found in HYCROSS.OUT are provide for each sub-model including the peak discharge, volume, and id for each floodplain cross-section.

3.5.7 Blocked Obstructions

Blocked obstructions were included in the model to simulate the hydraulic effects of buildings on routing using the areal reduction factor (ARF) routine in FLO-2D. Building footprints were extracted from the general surface feature characterization shapefile from which a global area-weighted 10-foot blocked obstruction raster was created. This raster was then used to compute the percentage of area obstructed by buildings and assigned to area reduction factors (ARF) for each grid in both sub-models. Width Reduction Factors (WRFs) were not incorporated in the model development.

Further, the FLO-2D model will provide a revised ARF.DAT file (termed 'ARF.BAC') that rounds up ARF values to 1.0 when the prescribed value for a given cell is greater than 0.85. This is done automatically by the model to improve model stability. The revised .BAC file was then used in subsequent model runs. Also, where model boundaries cross ARF cells (i.e., buildings), outflow cells were removed to prevent conflicts between ARF, OUTFLOW, and INFLOW cells. However, if the ARF value for a given cell was less than 0.15, the ARF cell was removed, and the OUTFLOW cell was retained.

3.5.8 Property Walls

Walls and wall openings were not defined in this modeling effort, and the LEVEE.DAT input file was not included.

3.5.9 Culverts

Culverts were modeled using the HYSTRUC.DAT input file. A single shapefile (provided in the appendix) provides locations and attributes for all hydraulic structures in both sub models. Data from this shapefile was then directly used to automatically generate the HYSTRUC.DAT shapefiles for both sub models. This file is particularly useful when reviewing and modifying the hydraulic structures. A total of 241 culverts were included in this model with 280 separate hydraulic structure objects (**Figure 3-10**). This results where multiple objects may be used to simulate a single physical culvert, particularly when the culvert is wider than one FLO-2D model cell.

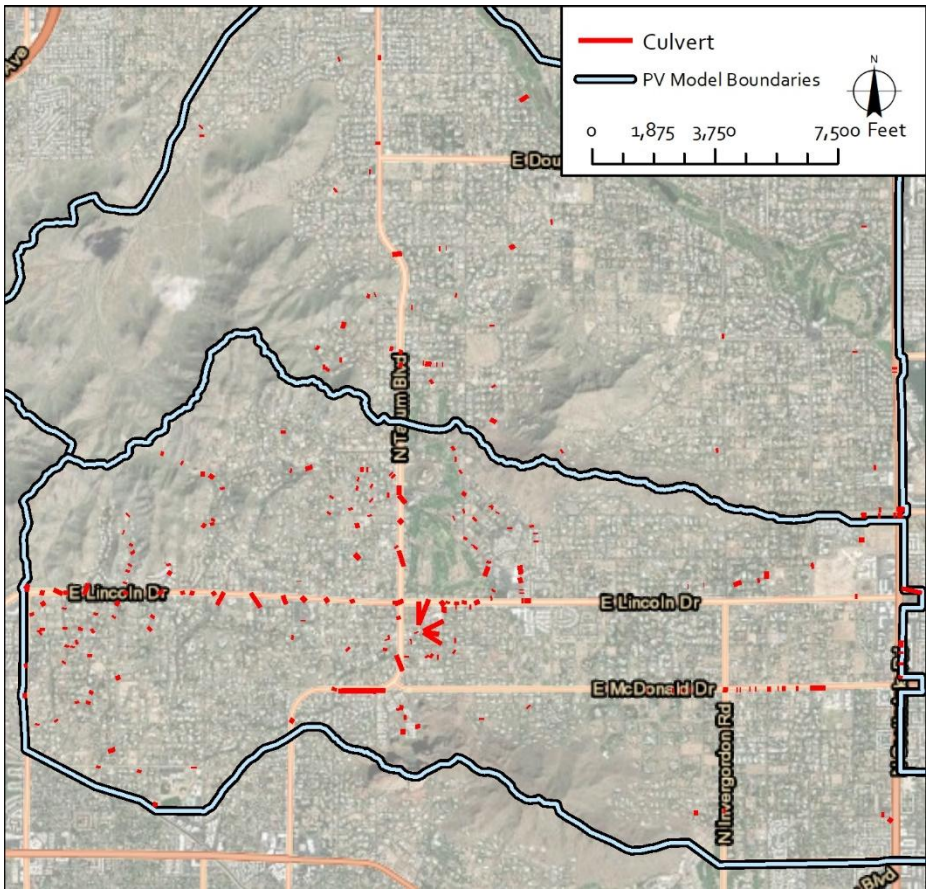


Figure 3-10. Hydraulic Structure Locations.

Hydraulic structures were included in each of the five contributing studies, and a proprietary process was developed to bring this data into the current study. In general, hydraulic structures from each study were mapped from local coordinates (i.e., cell centroids) to global coordinates (i.e., northing and easting) and then re-mapped to local coordinates of the current study. Most culverts imported this way were parameterized using rating tables, however some leveraged the generalized culvert equations. No modifications to imported culverts were made in this study with the exception of several structures where additional hydraulic structure objects were added to wider culverts to address the smaller cell size of this study. A significant portion of the total culvert count was developed in this study, and in all cases, new structures added to the model utilized the generalized culvert equations. Sources of data included the Town GIS database, aerial imagery, and field survey. Elevations for inlets and outlets were adjusted as necessary to reflect the elevations found in the high-resolution topographic dataset.

3.5.10 Storm Drains

3.5.10.1 Input Data Development

Storm drain model components were developed based on the storm drain systems modeled in previous studies (see **Table 2-1**), with additional storm drain systems along Indian Bend Road incorporated in this study due to their hydraulic significance. The storm drain systems were incorporated into the FLO-2D model through its SWMM module. The SWMM model input parameters for nodes (e.g., inlet type, inlet size, inlet maximum depth) and conduits (e.g., Manning's n-values, lengths, shape) were adopted directly from the previous studies for any storm drain systems modeled in those studies. The SWMM model input is documented in the SWMM.INP, SWMMFLORT.DAT, and SWMMOUTF.DAT files.

Since the previous studies were completed at different times and the SWMM module has undergone significant revisions over time, some minor modifications were made to the SWMM components in each ADMS before they could be combined into the final model. For example, the conduit offset input parameter in the MIBW model used an actual elevation rather than the offset from the node invert that was used in the other ADMSs. This was adjusted to use the offset to be consistent with other systems. Another example is that the original LIBW storm drains used sub catchments to denote inlets that were connected to the FLO-2D grid surface. Sub catchments became unnecessary in later versions of the SWMM module, so these were removed from the LIBW systems that were imported to the full PV SWMP model.

Additional systems along Indian Bend Road and Lincoln Drive that were not included in the previous ADMSs was developed based on data provided by KHA.

As a result, a total of 372 inlets and approximately 15 miles of storm drain conduits were modeled using SWMM and are shown in **Figure 3-11**. Detailed information on SWMM components (number of inlets, manholes, and outfalls and total length of pipes) by sub-models are summarized in **Table 3-7**.

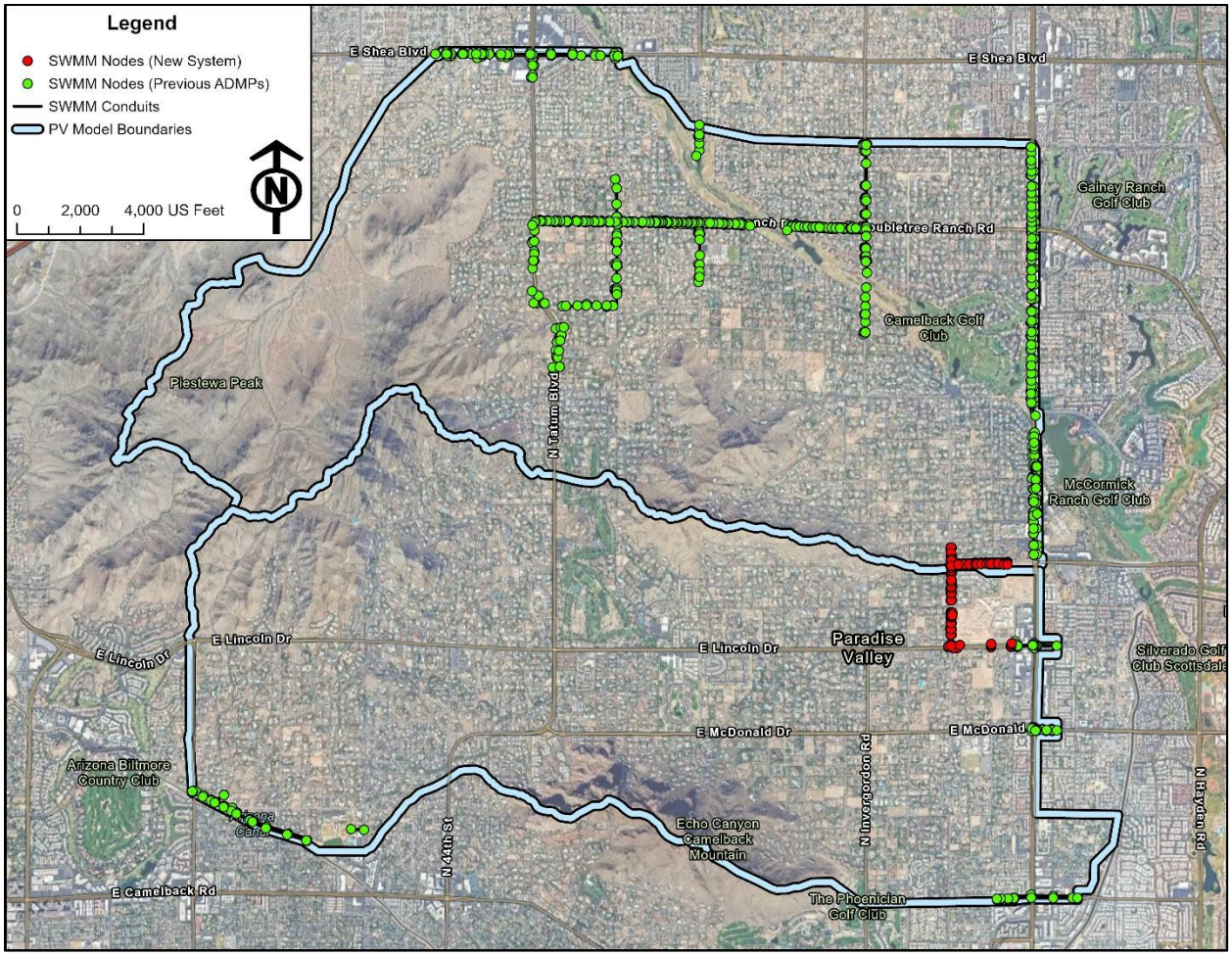


Figure 3-11. A Map of SWMM Components

Table 3-7. SWMM Component by FLO-2D Sub-Models

Sub-Model	Number of Inlets	Number of Manholes	Number of Outfalls	Total Length of Pipes (Mile)
North	296	6	14	11.6
South	76	20	11	2.9

3.5.10.2 Inlets

The curb opening inlets were modeled as Type 2 inlets (Curb Opening Inlet with Sag) with an 8-inch curb height, the minimum curb height described in Uniform Standard Details for Public Construction by Maricopa Association of Governments (2023) and a 0.5-ft of sag width. The sizes of inlets were obtained from the as-built drawings. If no information on inlet sizes is available in the as-built drawings, measurements were taken using Google street view and ArcMap. For the curb-opening inlets, the weir coefficient of 2.3 was used as suggested in the FLO-2D Storm Drain Manual (FLO-2D Software, Inc., 2021).

Grate inlets are modeled as Type 3 inlets, which are defined as grate (gutter) inlets. For the FLO-2D model inputs, the perimeter and area for the grates are based on as-built drawings. It should be noted that since these grates are not against a curb and are typically within depressed swales, all four sides of the grate

configuration were included in the grate perimeter. The weir coefficient of 3.0 was used as recommended in the FLO-2D Storm Drain Manual for the grate inlets.

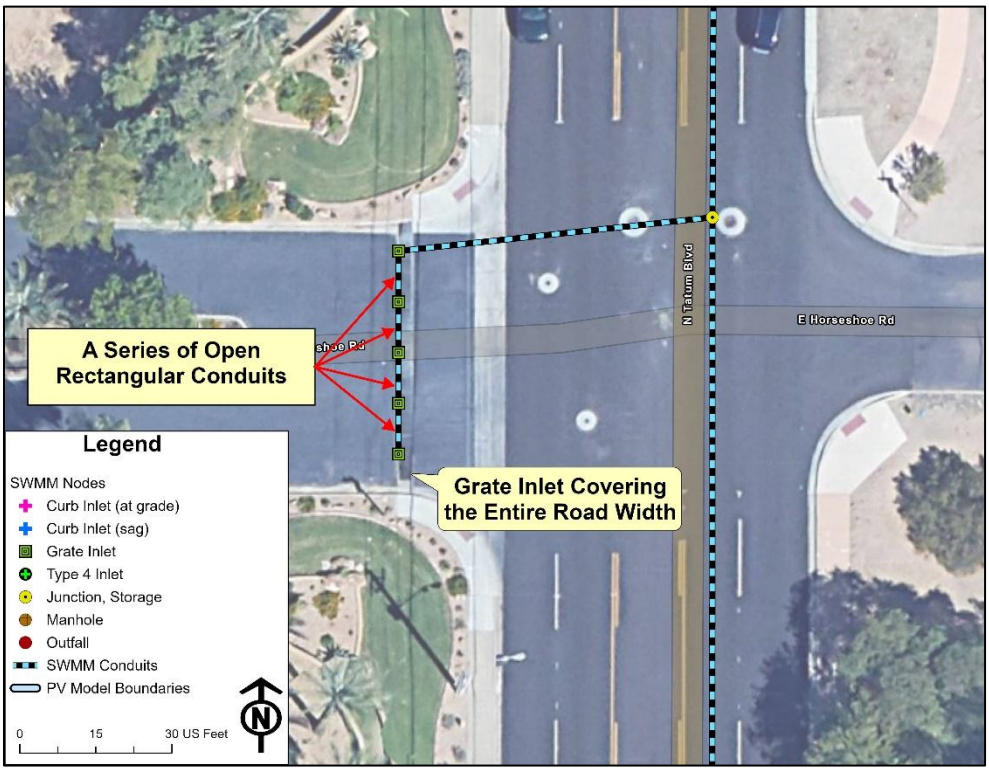


Figure 3-12. Grate Inlet Modelled with a Series of Open Rectangular Conduits at East Horseshoe Road and North Tatum boulevard

Several grate inlets could not be accurately modeled using the 10-ft FLO-2D grid because their lengths were much greater than the grid size, as shown in **Figure 3-12**. To address this, the length of the grate inlet was divided by the number of grid cells it intersected, and this adjusted length was assigned to each grid cell. The grate inlets were then represented as a series of open rectangular conduits, with depths matching the maximum depth of the grate inlets and lengths equal to the grid size of 10 ft.

Manholes can act as inlets in FLO-2D once the manhole lid is popped. While most manholes are called out as having a solid lid in the plans, several manholes are called out as having grated lids. These grated lids have a surcharge depth set to 0.01-ft so that flow can enter/exit with minimal surcharge. The remaining manholes with solid lids have a surcharge depth of 0.69-ft which is based on a manhole lid weight of 210-lbs per MAG detail 423-2, manhole diameter of 2.5-ft, and the surcharge depth equation per the FLO-2D Storm Drain Reference Manual.

Junctions were modeled in FLO-2D SWMM where lateral pipes connect directly to the storm drain main. These locations are simply junctions and do not receive or deliver flow to the FLO-2D surface grid.

Vertical opening inlets with a culvert entrance can be modeled using an inflow discharge defined by a rating table and are modeled as Type 4 inlets, which are characterized as inlets with variable geometry. A rating curve for each inlet must be supplied for Type 4 inlets. The rating tables for these inlets were created using the inlet control equation described in Hydraulic Design of Highway Culverts report by U.S. Department of Transportation Federal Highway Administration (Schall, Thompson, Zerges, Kilgore, & Morris, 2012).

Combination inlets usually consist of a curb opening inlet with a grate inlet, although other combinations are possible. Within the study area, multiple combination inlets were observed and modeled as Type 4 rating table in the FLO-2D model. The rating tables for the combination grate/curb inlets were based on calculations with the weir and orifice equations similar to how a typical curb (or grate) inlet is calculated in the FLO-2D SWMM component. The maximum weir depth for when the weir equation is calculated based on the geometry of the inlet. Similarly, the minimum depth for when the orifice equation controls is calculated based on the inlet geometry, and the discharges between these two depths are calculated based on linear interpolation. The grate and curb discharges are calculated separately, and the two sets of discharges are combined into one rating table which is applied to the combination inlet as a Type 4 inlet in the FLO-2D SWMM model.

3.5.10.3 Conduits

Information on the storm drain conduits (e.g., diameter, shape, length, material, and invert elevations) was obtained from the previous studies and incorporated into the existing FLO-2D SWMM.INP input file. Per the recommendations in the FLO-2D Storm Drain Manual, it is advised to have a minimum pipe length equal to or greater than the size of the FLO-2D grid element side. This precaution helps prevent excessive volume conservation errors. Consequently, a minimum pipe length of 10 ft was implemented for this purpose in this study.

The additional storm drain system along Indian Bend Road primarily consists of rubber-gasketed reinforced concrete pipes (RGRCP), with a few corrugated metal squash pipes. For these conduits, a Manning's n value of 0.012 was used.

3.5.10.4 Outfalls

Outfall in the FLO-2D SWMM component refers to a point where main storm drain flow is discharged from the stormwater network back to the FLO-2D grid surface. Outfalls are located in natural/manmade channels, reservoirs, basins, or underground storage. In the study area, several underground outfalls that have a connection to drywells and the ground surface through a grate were identified. The FLO-2D cell elevation was adjusted to match the invert elevation of the storm drain outfall. Therefore, the storm drain discharged to the adjusted cell, the water ponded in that cell and overflowed into surrounding cells once the ponded depth reached a sufficient level.

3.5.11 One Dimensional Channels

The one-dimensional (1D) Channel option was applied to locations deemed hydraulically significant or where channel capacity could not be adequately captured by the FLO-2D grid cell size and elevation interpolation. The modeled segments include 3,600 feet in the North model, 2,700 feet in the South model, with a total of approximately 6,000 feet in length.

The 1D channel geometry incorporates natural cross-sections sampled from topographic data (**Section 2.2**). These channels were modeled as 1D channels in earlier studies, and the Manning's n values for the channel segments were derived from those studies. The north channel segment is an engineered, concrete-lined channel with Manning's n values ranging from 0.016 to 0.03. In contrast, the south channel segment is a natural channel, where Manning's n values range from 0.02 to 0.076. The 1D channels are shown in **Figure 3-13**.

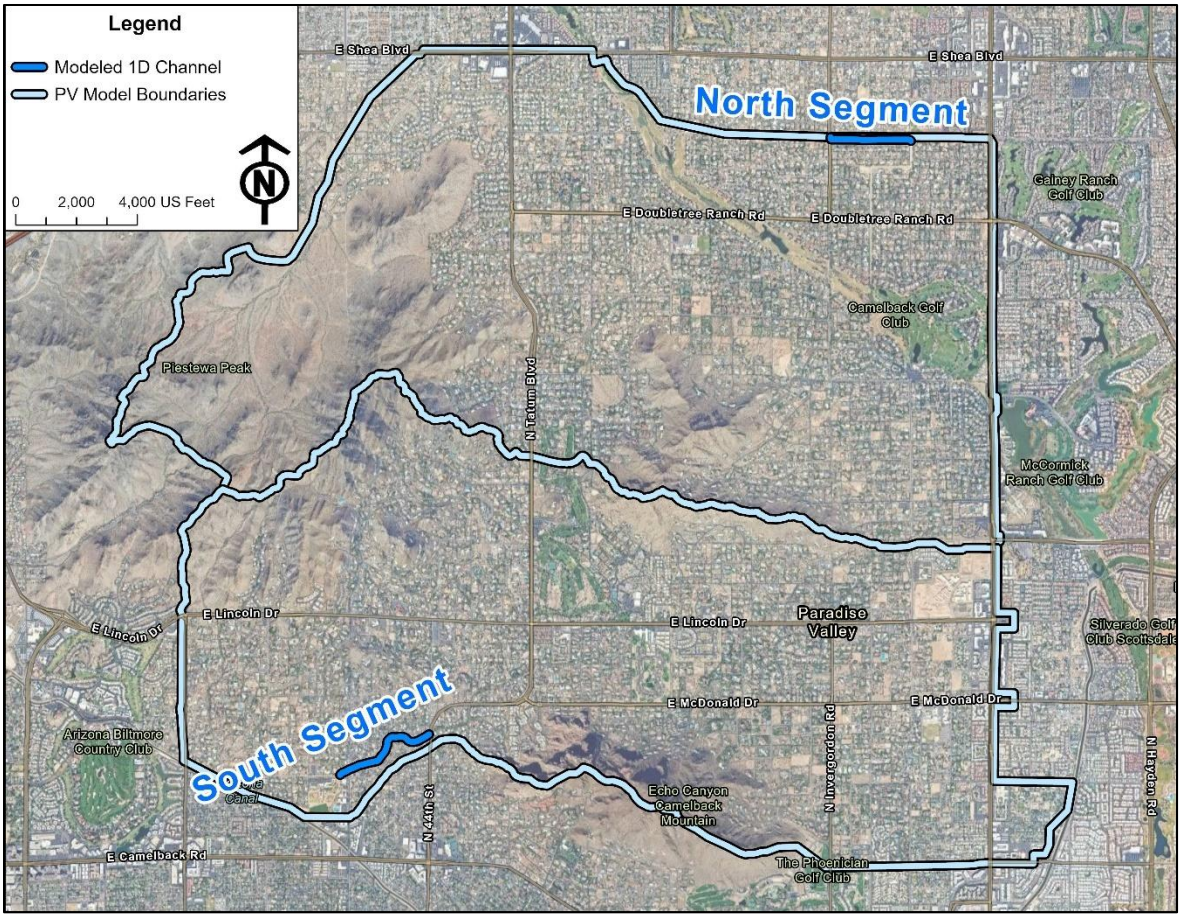


Figure 3-13. 1D Channels

3.5.12 Model Control Files

A model runtime of 12 and 18 hours was used for the 6-hour and 24-hour durations, respectively. This allowed for adequate time to capture the peak of the hydrograph as observed in HYCROSS.OUT. Further iterations and refinement of this modeling may require a longer simulation time. A global limiting Froude number (FROUDL) of 0.95 was set in CONT.DAT. A TOLGLOBAL value of 0.004 feet was used per District guidelines, and this value was subtracted from the initial abstraction value in INFIL.DAT. The floodplain Courant number was set to 0.60, and the TIMEACCEL parameter was set to 0.1. Both DEPTOL and WAVEMAX were set to 0.0.

3.5.13 Special Modeling Considerations and Solutions

There are no special modeling considerations in the model at this stage of model development.

3.6 Model Warnings and Error Messages

The following warnings and error messages are reported in the FLO-2D output file ERROR.CHK. Some messages are repeated multiple times if the applicable situation occurs multiple times during a simulation. For example, the warning message appears quite often that the downstream water surface is higher than the upstream water surface for a hydraulic structure. Each warning is only discussed once in the list below. The warnings that were reported for both final sub-model runs include the following:

- WARNING: THE IMPERVIOUS AREA REPRESENTED BY THE RTIMP PERCENTAGE IS LESS THAN THE ARF VALUE FOR AT LEAST ONE GRID ELEMENT. THE IMPERVIOUS AREA ASSIGNED BY THE RTIMP VARIABLE MUST INCLUDE THE BUILDING AREA, STREET AND ALL OTHER IMPERVIOUS AREAS WITHIN THE GRID ELEMENT. IF THE RTIMP PARAMETER IS LESS THAN THE BUILDING ARF VALUE, YOU MAY HAVE GLOBALLY UNDERESTIMATED THE RTIMP PARAMETER. FOR THIS SIMULATION THE RTIMP IS RESET TO THE ARF VALUE, HOWEVER, YOU SHOULD REVIEW ALL THE RTIMP ASSIGNMENTS.
    - This message occurs because the maximum RTIMP assigned to grid elements in the INFIL.DAT file is 98 percent for impervious surfaces (e.g. roof tops, concrete). However, FLO-2D assigns an RTIMP of 100 percent to grid elements that have an ARF value of 1.0 (completely blocked) at runtime and there is currently no control for this. Therefore, a slight increase in rainfall runoff will occur on roofs for example. This error is considered conservative but will likely be imperceptible in the model results.
- *** THERE ARE DRY OUTFLOW NODES FOR THE FOLLOWING DOWNSTREAM GRID SYSTEM: 1*** GRID CELL: XXXXXX ***
    - This warning is due to the placement of outflow nodes along long portions of the model boundaries. These nodes are located along peaks and ridges that receive no contributing runoff
- WARNING: THE HYDRAULIC STRUCTURE OUTFLOW NODE: XXXXXXX IS REPEATED MORE THAN ONCE WITHOUT ASSIGNING A D-LINE CONVEYANCE CAPACITY LIMITATION. EITHER REVISE THE OUTFLOW NODES OR ADD A D-LINE
    - This is a valid assumption, as in these cases there are adjacent outlets.
- NOTE: THE HYDRAULIC STRUCTURE LOCATED AT THE END OF THE CHANNEL SEGMENT ELIMINATES THE CHANNEL ELEMENT: 2219312 FROM HAVING OUTFLOW TO THE FLOODPLAIN AT END OF THE CHANNEL SEGMENT. ALL THE CHANNEL FLOW WILL ENTER THE CULVERT
    - This is understood to be a limitation of the model, and it was assumed that the structure was appropriately sized for the channel. This approach mimics how the previous study parameterized this location.
- REVIEW THE EVACUATEDCHAN.OUT FILE FOR COMPLETE EVACUATION OF VOLUME IN THE LISTED CHANNEL ELEMENTS - IMPROVE ROUTING STABILITY BY REDUCING THE OUTFLOW FROM THE CHANNEL ELEMENT
    - The EVACUATEDCHAN.OUT file only lists one node, and no obvious channel instabilities were detected.
- NOTE: THE FOLLOWING INTERIOR CHANNEL ELEMENT ELEVATIONS WERE RESET TO THE CHANNEL BED ELEVATION FOR THE UPSTREAM OR DOWNSTREAM END OF THE CHANNEL SEGMENT TO EXCHANGE FLOW BETWEEN THE FLOODPLAIN AND CHANNEL TERMINUS. THE FLOODPLAIN GRID ELEMENT ELEVATIONS UPSTREAM OR DOWNSTREAM OF THE END OF THE CHANNEL SHOULD ALSO BE ADJUSTED TO ALLOW FLOW INTO THE CHANNEL OR FROM THE CHANNEL BASED ON THE CHANNEL BED ELEVATION (SEE PROFILES PROGRAM FOR BED ELEVATION):
    - Checks were made to ensure a smooth transition between the floodplain the channel.
- WARNING: THE FOLLOWING HYDRAULIC STRUCTURES HAVE ARF VALUES IN EITHER THE INLET OR OUTLET ELEMENTS: (THIS WOULD ONLY BE A PROBLEM IF THE REMAINING SURFACE AREA WAS RELATIVELY SMALL (< 50%).)
    - This error was printed in the CHK file, but no nodes were identified.

4 MODEL RESULTS

4.1 Overview

Runoff in the study area generally flows to the northeast in the NORTH model, except for the northeastern corner on the north side of IBW, where runoff flows to the south into IBW. The western half of the SOUTH sub-model flows to the southwest towards the Arizona Canal Diversion Channel (ACDC), while the eastern half flows toward IBW. The valley floor is marked by extensive amounts of shallow, distributary flow.

4.2 Hydrologic and Hydraulic Results

The digital deliverable includes rasterized datasets for model inputs and outputs, and a brief overview of the general flow paths can be seen in the 100-year 6-hour results on **Figure 4-1** below.

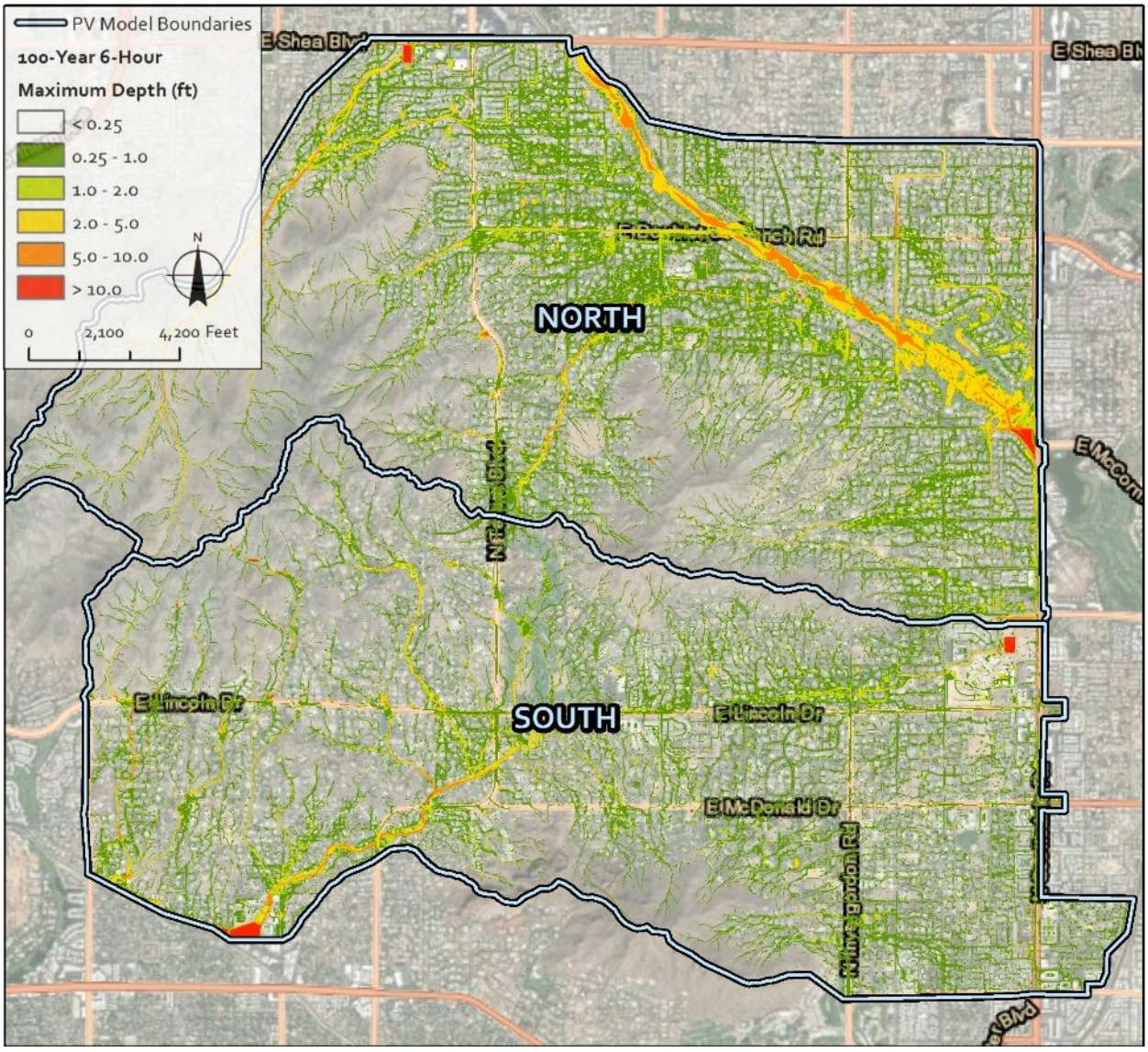


Figure 4-1. Preliminary Maximum Depth Results for the 100-Year 6-Hour Event.

4.3 Controlling Duration

An analysis was performed to determine the controlling duration to use for the remainder of this study. Both the 6-hour and 24-hour durations were simulated at the 100-Year recurrence interval, and a comparison of some results for peak discharge from these simulations was performed to determine which duration generally controls. It should be noted that this comparison was made early in the study, prior to the development of more detailed modeling features (e.g., culverts, storm drains, etc.). The comparisons of discharges were generally made upstream of significant hydraulic features.

Peak discharges from identical locations and from both durations were plotted against each other on **Figure 4-2** below. Values that fall below the 1:1 indicate points where the 6-hour duration yields a higher flow rate, and values that fall above the line represent points where the 24-hour result is greater. The comparison points span a wide range of small to large watersheds in the study area, and it also includes several points along Indian Bend Wash. Nearly all comparison points indicate the 6-hour event yields a higher peak flow rate. The comparison on larger, axial watercourses (namely Indian Bend Wash) suggests a 24-hour controlling duration, and this is expected given that the watershed size is much larger than the other comparison points. Given that the purpose of the overall SWMP study is to identify drainage solutions throughout the Town (i.e., focusing on smaller drainage areas and less on IBW), the 6-hour duration was selected as the controlling duration. The 2-year and 10-year recurrence intervals were then analyzed solely with this duration.

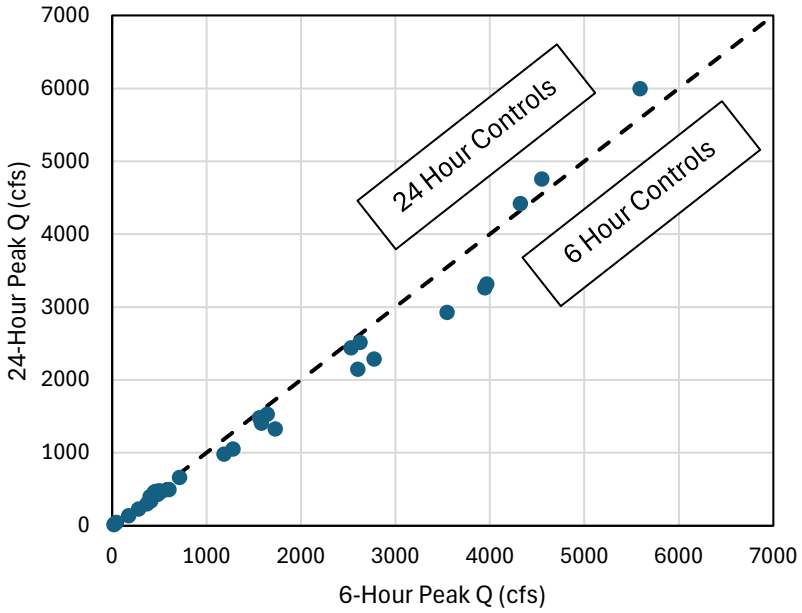


Figure 4-2. 6-Hour vs. 24-Hour Peak Discharge Comparison.

4.4 Infiltration Loss Summary

The loss due to infiltration of the rainfall volume is summarized in **Table 4-1**. As expected, the loss percentage due to infiltration is higher for lower-magnitude events. The loss rates seen below are considered reasonable based upon experience in similar watersheds.

Table 4-1. Infiltration Loss Summary.

Duration	Recurrence Interval	Sub-Model	Maximum Point Precipitation [in]	Precipitation Volume [ac-ft]	Inflow Volume [ac-ft]	Infiltration and Interception Volume [ac-ft]	Loss Percentage (of Precipitation Only)
6-Hour	100-Year	SOUTH	2.691	1,483	0	332	22.4%
		NORTH	2.691	1,598	1,809	409	25.6%
	10-Year	SOUTH	1.766	972	0	327	33.6%
		NORTH	1.766	1,049	811	400	38.1%
	2-Year	SOUTH	1.176	647	0	308	47.6%
		NORTH	1.176	698	437	370	53.0%

5 MODEL CALIBRATION AND VERIFICATION

This section documents the calibration efforts that were performed. Thereafter the final results are placed in the context of other studies and hydrologic approaches.

5.1 Calibration

The model calibration effort focused on gage data that was collected by the District at the Tatum Basin Inflow (ID # 58007) flood warning stream gage. This gaging station is located just upstream of the Tatum Basin within Tatum Wash, and it was installed in 1994 and has been continuously active and maintained since. This station consists of a pressure transducer sensor mounted to the vertical concrete channel wall, and the station uses the ALERT2 telemetry protocol for real-time data reporting. The contributing drainage area at this location is 2.17 mi^2. This gaging location is shown in **Figure 5-1**.



Figure 5-1. Tatum Basin Inflow Gage. Source: FCDMC ALERT Website.

The location of the gage in relation to the contributing drainage area and the study model boundaries is shown below on **Figure 5-4**.

5.1.1 Historical Flow Events

As of December 2024, a total of thirty-six flow events have been recorded by this gaging station ranging in peak discharges between 8 cfs and 1,688 cfs. Three of these events were chosen to include in the calibration effort for this study:

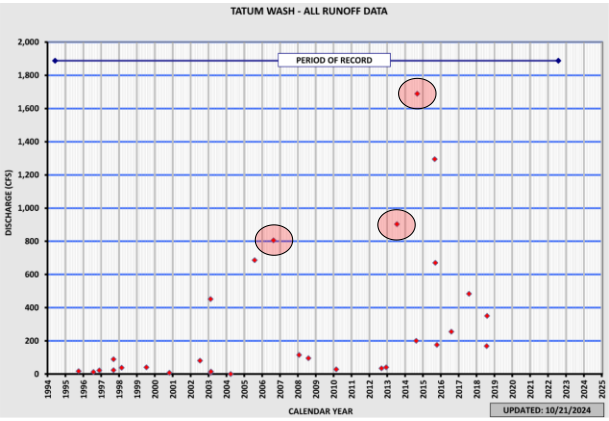


Figure 5-2. Runoff Event History. Source: FCDMC ALERT Website.

- August 24, 2006 808 cfs
- July 21, 2013 903 cfs
- September 8, 2014 1,688 cfs

Figure 5-2 to the left shows the magnitude of peak flow rates of thirty-six events, and the three used in this study are circled. The 2014 event was a notable flooding event in the Paradise Valley area, with extreme runoff resulting in significant Town-wide flooding issues. The other two events were selected as they represent lower-magnitude runoff events that may better depict hydrologic conditions used in the sizing of stormwater infrastructure. The precipitation recurrence interval for each of the three events was determined using NOAA Atlas 14 precipitation data for the calibration watershed (statistics obtained with coordinates of 33.5547°, -112.0052°). Spatially-distributed precipitation datasets on a five-minute interval for each event were provided by the District. Four locations were selected within the calibration watershed that generally span the extent of the basin to extract precipitation hyetographs. This data was then plotted for each event, averaged across the four locations, and the approximate precipitation duration was determined (**Figure 5-3**). Using the average depth and duration, a precipitation recurrence interval was then calculated for the three events (**Table 5-1**).

Both the 2006 and 2013 events were similar in magnitude and duration and were less than a 10-year event. The 2014 event exhibited significantly higher precipitation and subsequently was calculated as a 750-year precipitation event for this basin. Lastly, it should be noted that precipitation recurrence interval is not necessarily tied to runoff recurrence interval, as carrying hydrologic methods (e.g., loss methods, routing options, software, etc.) can yield significantly different flow rates.

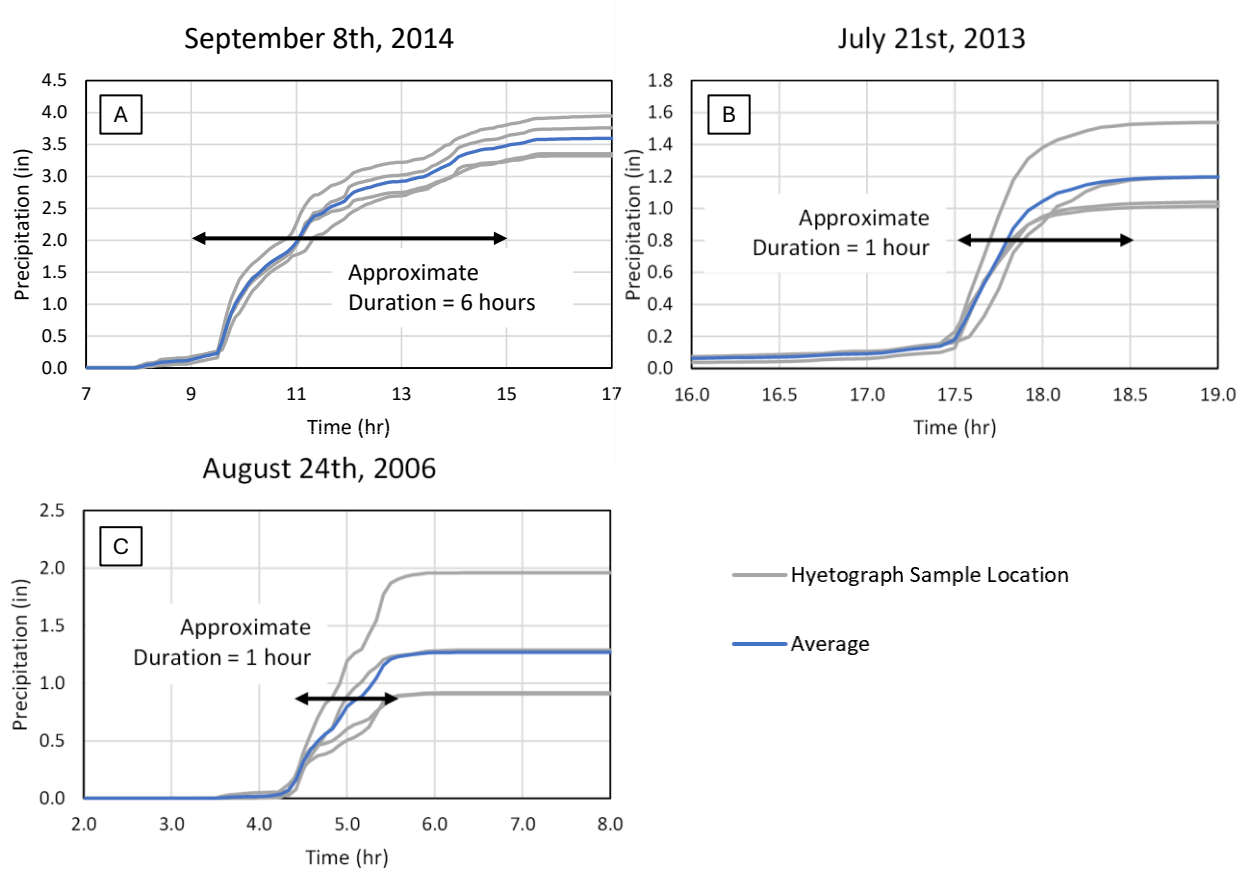


Figure 5-3. Event Hyetographs for (A) September 8th, 2014, (B) July 21st, 2013, and (C) August 24th, 2006.

Table 5-1. Precipitation Recurrence Interval of Calibration Events.

Event	Average Total Depth (in)[a]	Approximate Duration (hour)	Precipitation Recurrence Interval (year)	Maximum Measured Flow Rate (cfs)
August 24th, 2006	1.149	1	6.6	808
July 21st, 2013	1.127	1	6.1	903
September 8th, 2014	3.540	6	750	1,688
[a]Averaged across Tatum Wash watershed				

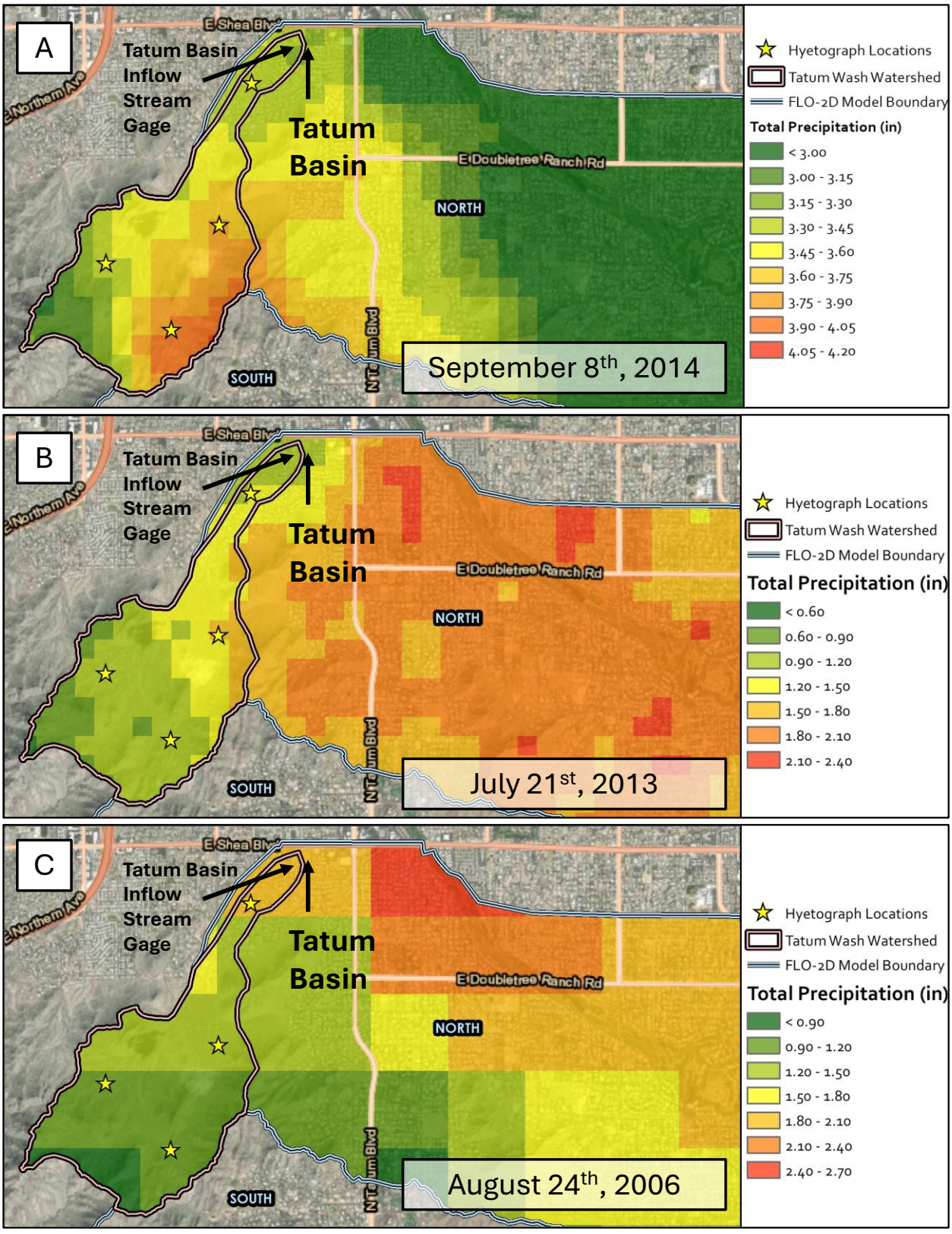


Figure 5-4. Calibration Precipitation Events. (A) September 8th, 2014, (B) July 21st, 2023, and (C) August 24th, 2006.

5.1.2 Calibration Process

The input data provided by the District was processed into RAINCELL.DAT FLO-2D input files using the QGIS pre-processor application. This input file describes precipitation input in both spatially (cell by cell) and temporal dimensions. During the development and testing of this input file it was noted that the District-approved FLO-2D executable (Build 23.10.25, Compiled on 11/9/2023) was not correctly reading the RAINCELL.DAT or RAINCELL.HDF file. JE Fuller coordinated with the District to receive guidance on how to proceed. An interim executable described as a re-compiled version of the same source code (Compiled on 11/5/2024) as the approved version was provided to JE Fuller, however the District noted that this executable exhibited other instabilities un-related to this specific application. A comparison between the 2023 and 2024 executables yielded the same peak discharge and timing at Tatum Basin. Given this, the following work plan was developed between JE Fuller and the District for this study:

1. Compare base results for the 2023 and 2024 executable.
2. Utilize the 2024 executable for calibration runs, including adjusting input parameters.
3. Using the input parameterization from the final, selected calibration scenario, re-run the design storm models (i.e., 2-, 10, and 100-year events) with the approved 2023 version.

Hydrographs at the gaging location just upstream of the inlet to Tatum Basin were compared between the actual, gage data and the base model results. The three events are compared below on **Figure 5-5**. A similar trend is seen in all three scenarios, where the modeled peak flow rate is less than the gage data and the flood wave arrival time is longer than the gage data as well. Further, the modeled volume for the 2014 event appeared to be larger as well.

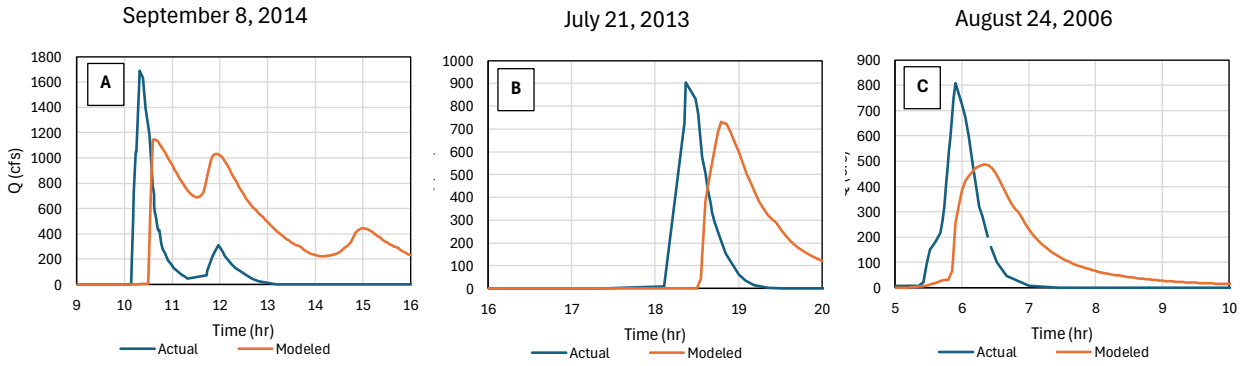


Figure 5-5. Initial Hydrograph Comparisons for the (A) September 8, 2014, (B) July 21, 2013, and (C) August 24, 2006 events.

5.1.2.1 Scenarios

A range of scenarios were developed to understand the sensitivity of various input parameters to the modeled peak discharge, timing, and volume (**Table 5-2**) and reflect ranges of adjustments that are typically made for hydrologic studies. This exercise was performed with the 2006 event only, as it (along with the 2013 event) are closer in magnitude to what it is typically used to size drainage infrastructure as compared to the 2014 event.

In general, adjustments to infiltration (hydraulic conductivity, initial abstraction, and limiting depth) and roughness (base Manning's n and shallow Manning's n) were made. The first scenario involved simply adjusting the global porosity setting to 0.4, however it was concluded afterwards that this value should be 0.0 when using spatially varied parameterization of INFIL.DAT, and when used in this manner it simply increases the DTHETA value.

The scenarios shown below were applied to all cells in the NORTH model. Global modifications were made as this initial step in the calibration process is simply much more effeicient than modifying based upon soil type and land use classification. The purpose of this initial step was to identify which parameters can be adjusted to match the gage data and to provide a more general view of the response of the model to various adjustments. Detailed calibration adjustments then follow this preliminary step. The storm drain component was turned off for all calibration-related simulations, as the purpose of this was limited to the Tatum Wash sub-basin only, and no storm drains are hydraulically upstream from the comparison point.

Table 5-2. Calibration Scenarios for 2006 Event.

Run	Description
S1	Set global porosity to 0.40
S2	50% of base for XKSAT, liming depth = 8"
S3	50% of base for XKSAT, liming depth = 16"
S4	75% of base for XKSAT, liming depth = 16"
S5	50% of IA
S6	50% of IA, 50% for XKSAT, and limiting depth = 8"
S7	50% of Shallow n
S8	50% of Manning N
S9	50% of Shallow n and Manning N
S10	Turn off Shallow n
S11	200% of XKSAT, limiting depth = 16", 50% of IA, 33% of Manning N, turn off Shallow n
S12	67% Shallow n, 1.25 IA, 60% Manning n, limiting depth = 16"
S13	60% of Shallow n, 75% of base n values, 80% of XKSAT, and 110% of IA, limiting depth = 16"

5.1.2.2 Hydrograph Comparisons

The resulting hydrograph at the Tatum Basin inlet for all scenarios is shown below on **Figure 5-6**. The gage data is also displayed along with the 'base', or un-calibrated result. One of the closer matches is from the S1 scenario, as it matched the arrival time well and provided a notable improvement in peak discharge (in terms of matching the gage data), however as noted above this is not a realistic parameterization. It does, however, suggest that an increase in DTHETA could yield closer results. DTHETA was not adjusted in this calibration exercise. The results from the remaining scenarios demonstrate that the arrival time both the arrival time and peak discharge from the model can match the gage data, however not in a simultaneous parameterization. Further, the S11 scenario, which was the only simulation where the peak was close to the modeled peak, represents an extreme parameterization and it required very large adjustments to several variables and is far more of an adjustment that what is typically used in calibration exercises.

In all but S11, the scenario results tend to exhibit lower peak discharge and higher volume. No reasonable combination of variable adjustments yielded agreement with the gage data in terms of timing, peak discharge, and volume comparisons.

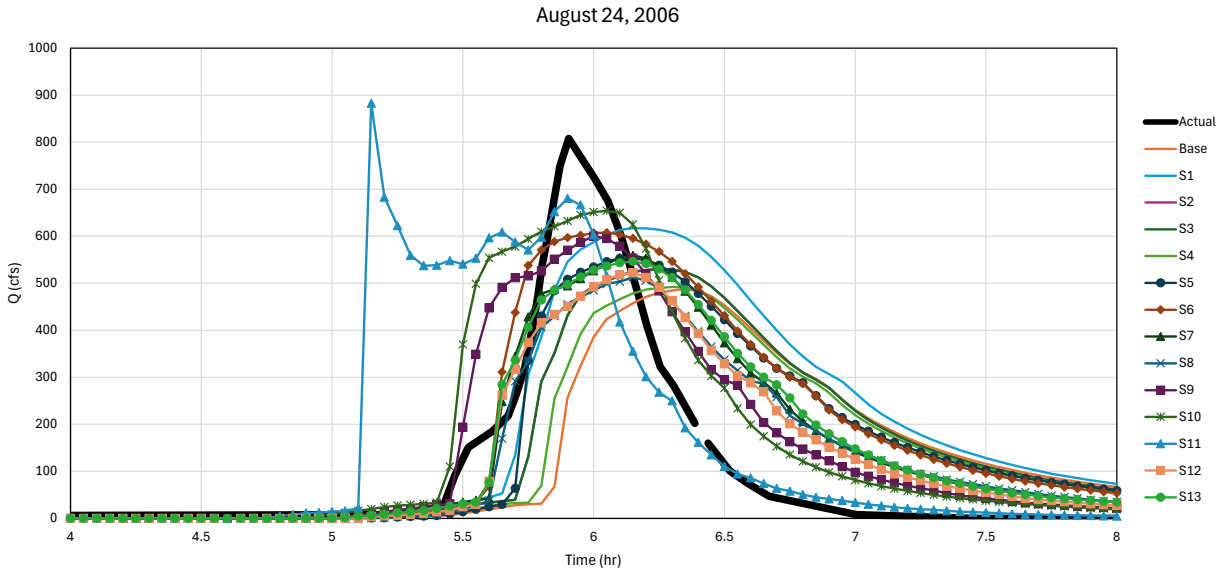


Figure 5-6. Calibration Iterations for 2006 event.

5.1.3 USGS Regression Analysis

Flow rate estimates using the USGS Regional Regression approach (USGS, 2014) were computed for the Tatum Basin. A basin area of 2.17 mi^2, mean basin elevation of 1,705 feet, and mean annual precipitation of 9.17 inches was used. Precipitation was determined using the PRISM dataset (PRISM, 2025). Regression equations for various recurrence intervals were developed in the USGS (2014) study, and results for the 2-, 10-, and 100-year recurrence intervals are presented in **Table 5-3**.

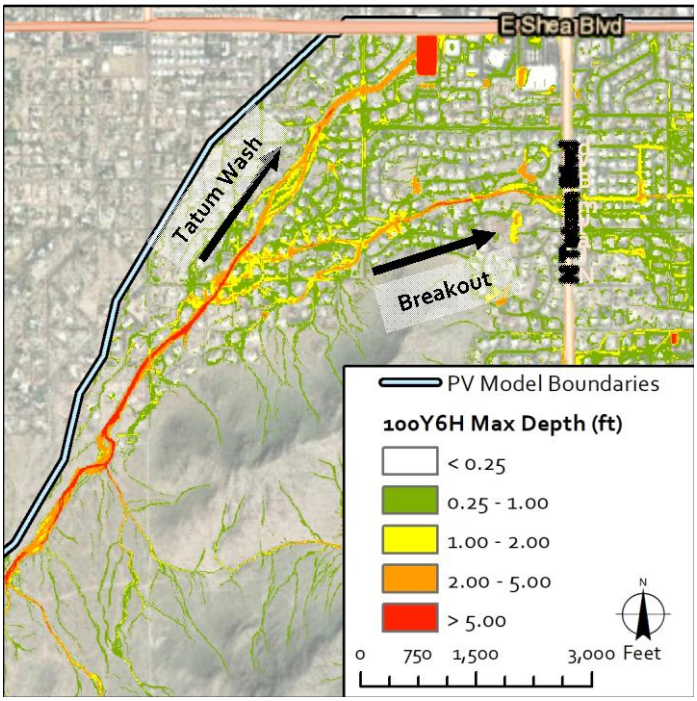


Figure 5-7. Tatum Wash Breakout.

It was observed in the preliminary (i.e., base) model results that a significant breakout to the east occurs just upstream of 44th Street (**Figure 5-7**), and the presence of this breakout in flow was corroborated by Town staff. The model results suggest that flow begins to break out between the 2-year and 10-year events. Therefore, comparisons between model and regression equation results need to include the breakout hydrograph for the modeled results.

Model results presented in **Table 5-3** include both the Tatum Basin inlet as well as the peak of the sum of the inlet and breakout hydrographs. This provides a more one-to-one comparison to the regression results. Inversely to the gage data comparison, the model results are significantly higher than the regression equations with the 100-year modeled results being nearly double of the regression equation results.

Table 5-3. USGS Regression Results.

Recurrence Interval (year)	USGS Region 3 Regression Results (cfs)	6 Hour Model Results (cfs)	
		Tatum Basin	Tatum Basin + Breakout
2	140	887	888
10	569	1,299	1,789
100	1,649	1,641	3,124

5.1.4 Field Verification

A number of field verification points were included in the MIBW ADMS/P H&H Report (Kimley-Horn, 2019). These are locations within the MIBW study where field photographs from the 2014 event were compared with model results from that study. Given that much of the MIBW study extends north of Shea Boulevard, only one comparison point from that study fell within the present study modeling domain.

Figure 5-8 below depicts the conditions and MIBW results from this event at the intersection of Tatum Wash and 44th Street as well as the base results from the present study. The flotsam line from the wash is generally visible. The WSEL profile includes flow from the south along 44th Street, and it is inferred that the transition from a horizontal water surface elevation to varying elevation denotes where the inundation from Tatum Wash intersected the roadway and thereby deposited the flotsam. A simple GIS exercise demonstrates that this location is generally in the vicinity seen in the field photograph taken shortly after the 2014 event.

While this is a qualitative comparison, it does suggest that the base FLO-2D parameterization produces reasonable results.

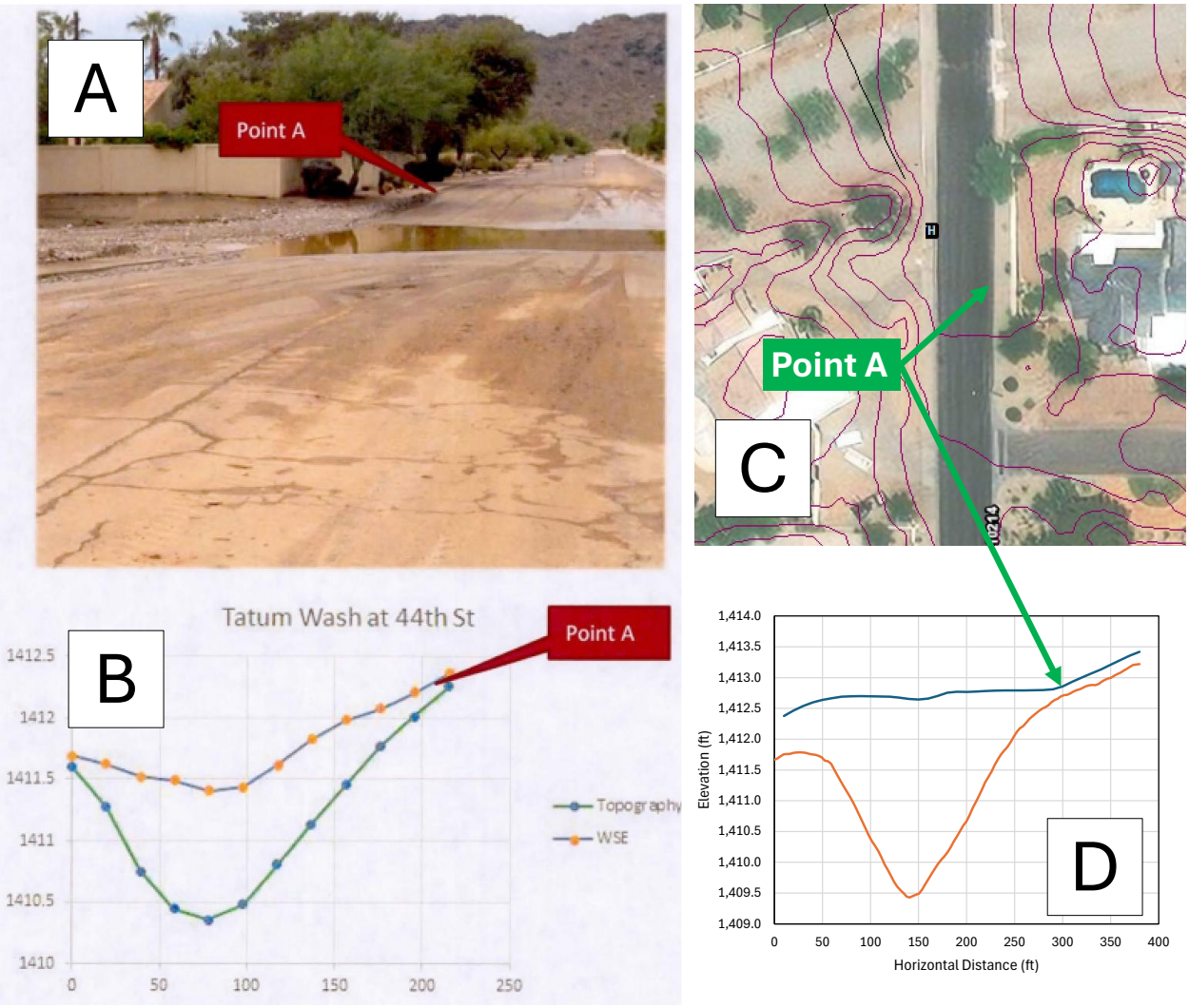


Figure 5-8. 44th Street and Tatum Wash Verification. (A) Field photograph from MIBW report, (B) WSEL profile from MIBW Report, (C) WSEL contours from current study, and (D) WSEL profile from current study.

5.1.5 Further Investigation

Given the disagreements between the gage comparison and regional regression comparisons, further investigation into these differences was performed.

5.1.5.1 FLO-2D Cell Size

To assess the effects of cell size on model results, a 5-ft grid FLO-2D model was developed. This model uses the same input values as the 10-ft grid PVSWMP FLO-2D model, and a comparison of the results is shown below on **Figure 5-10**. Even with the same input shapefiles, the 5-ft model produces a thinner, higher peak hydrograph relative to the 10-ft cell model. This result correlates well with the observed hydrographs at the Tatum Basin Inflow stream gage, where the observed hydrograph arrives faster and has a higher peak than what is obtained from the 10-ft cell with multiple variations of input parameters. This suggests that it may be difficult to fully calibrate the 10-ft model to observed events in this watershed because resolution is lost in the rasterization process relative to actual conditions in the physical world. An example of lost resolution in the Manning's n values is shown in **Figure 5-9**.

More notably, however, is that above a certain flow rate, Tatum Wash breaks out to the east. This breakout occurs over a long length along Tatum Wash (approximately 1,000 feet), and the elevation divide separating the wash from the breakout acts like a lateral weir. Slight differences (e.g., < 0.10 feet) in weir elevations can have very large impacts when considering the long length. The rasterization of the topography at smaller cell sizes closer represents the actual ground surface, and perhaps closer represents the hydraulic properties at the breakout.

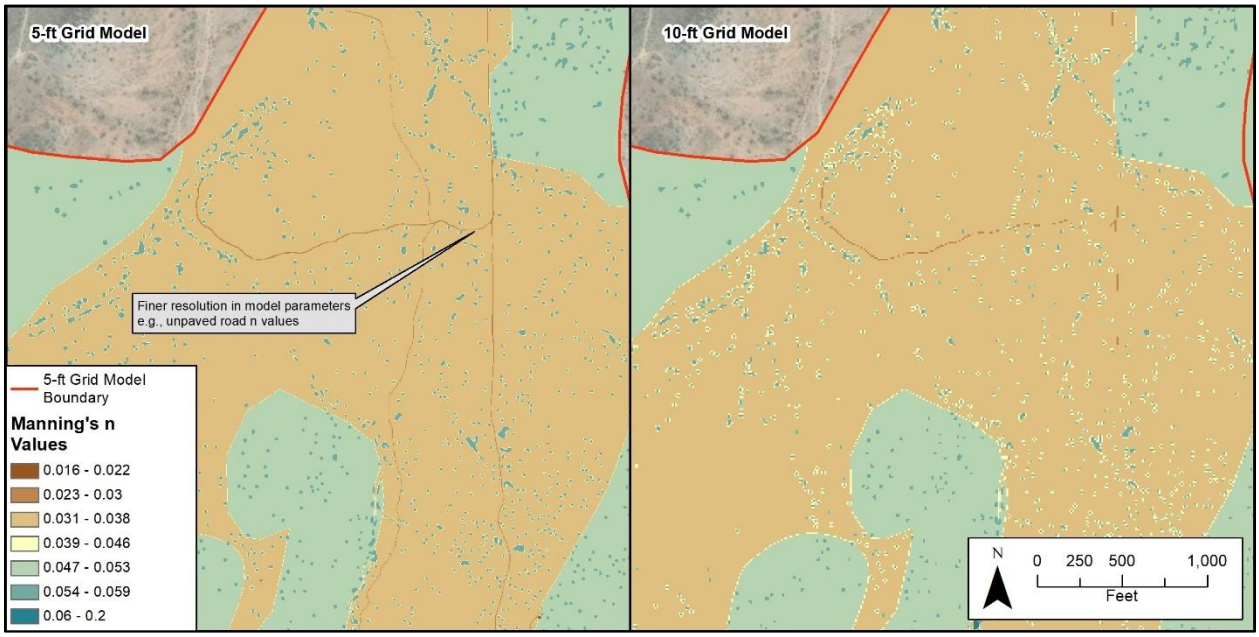


Figure 5-9. Comparison of Manning's n Values between the 5-ft Grid and 10-ft Grid FLO-2D Models.

5.1.5.2 HEC-RAS 2D

To further test model sensitivity, a HEC-RAS 2D (RAS2D) model was developed. Since the infiltration input parameters for this model differ from the FLO-2D model (e.g., initial abstraction is not an explicit parameter and transmission losses cannot be simulated) and RAS2D does not currently implement a shallow Manning's n-value, the results do not provide an exact comparison to FLO-2D. However, the

results do give insight into how each of the models compute runoff. The results from the RAS2D model are compared with the FLO-2D results on **Figure 5-10**. This comparison shows that RAS2D produces a significantly higher peak, and the arrival time is shorter relative to both FLO-2D hydrographs – similar to the differences seen between modeled and measured events for the three calibration storm events. This would indicate that infiltration parameters and Manning's n values may need to be adjusted to produce results equivalent to FLO-2D.

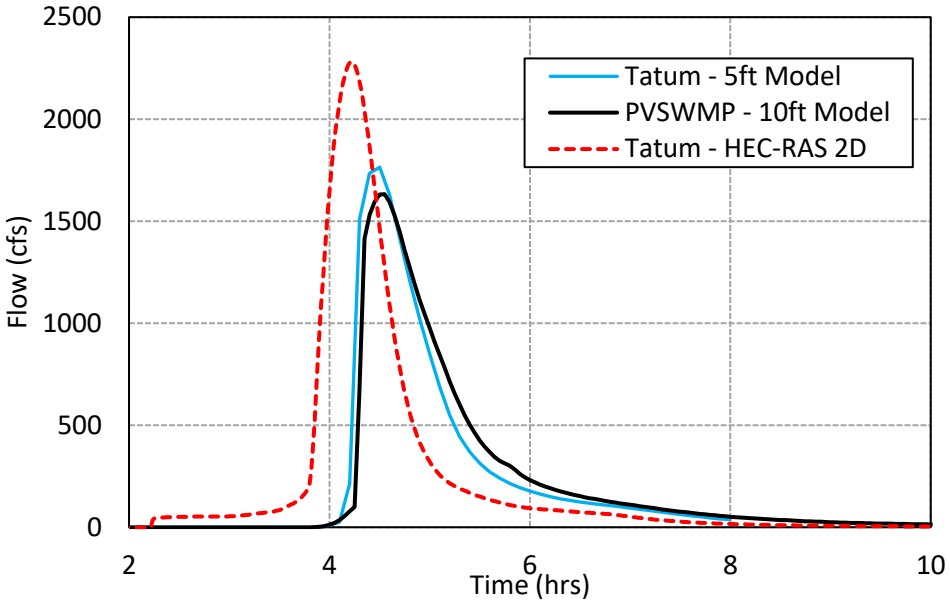


Figure 5-10. Comparison of 100-year Hydrographs at the Tatum Basin Inflow Channel.

Lastly, comparisons between these test models, the base FLO-2D model results, and the gage data were compared for the 2006 and 2014 calibration events (**Figure 5-11** and **Figure 5-12)**. Note that both test models did not use gridded rainfall data (i.e., the RAINCELL.DAT for FLO-2D) for the real event simulations, rather the rainfall input was estimated based on the data in **Figure 5-3**, the storm events where there was less variation across the watershed may be more accurate than those with more variation.

Simply reducing the cell size from 10 to 5 feet yielded a better improvement in matching the gage data than any scenario listed above (**Table 5-2**). The 5-ft hydrograph exhibits an improved arrival time, peak discharge, and the shape better matches the measured hydrograph (in terms of width). It can be easily assumed that calibration of the 5-ft model to the 2006 event would be possible and a very close match could be achieved. The arrival time of the RAS2D hydrograph is much less than the gage data, as is the peak discharge, volume, and hydrograph shape. It should, however, be noted again that there are significant differences in the parameterization of RAS2D as compared to FLO2D. Perhaps the two largest drivers of these differences are the inability to provide increased roughness for shallower depths and no mechanism to simulate transmission losses, where FLO-2D inherently computes these losses when using the Green-Ampt infiltration routine.

A similar trend was seen in comparing the 5-ft and 10-ft model to the 2014 event. The results for the 5-ft model showed slightly elevated peak flow rates and an arrival time much closer to the gage data. Both modeled scenarios, however, over-predicted volume by a significant margin.

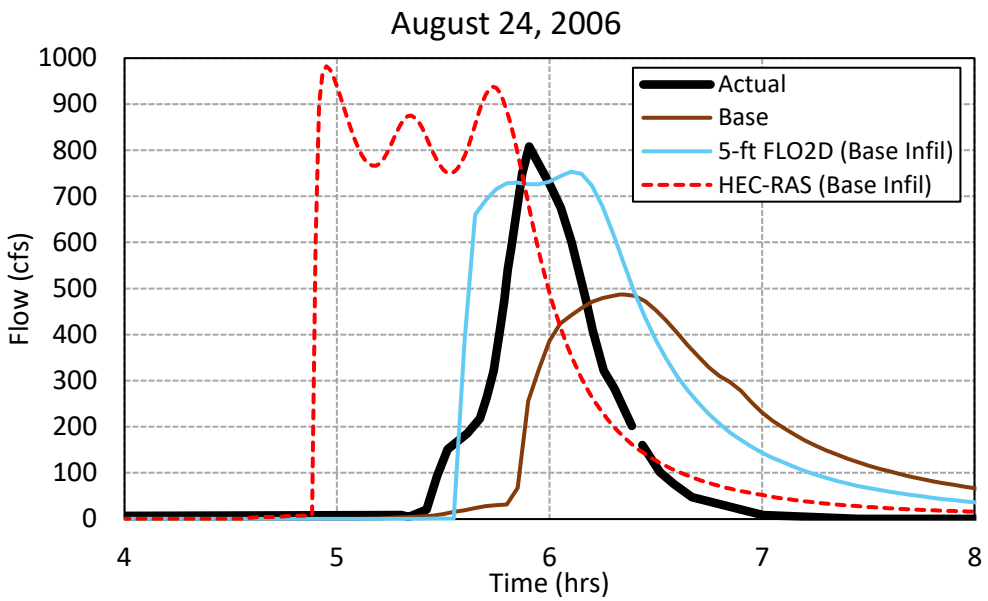


Figure 5-11. Comparison of Hydrographs at the Tatum Basin Inflow Channel for the Event of 8/24/2006.

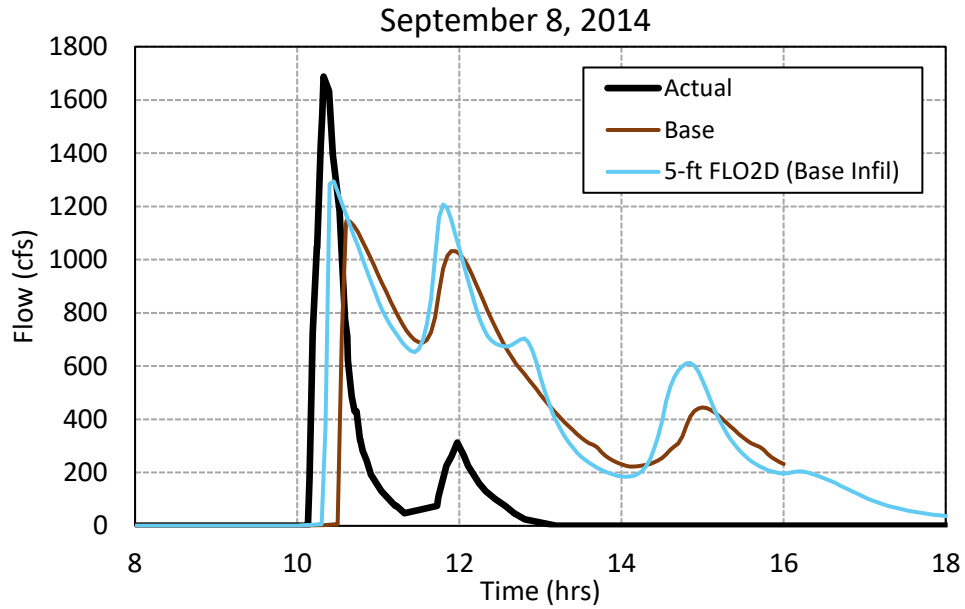


Figure 5-12. Comparison of Hydrographs at the Tatum Basin Inflow Channel for the Event of 9/8/2014.

5.2 Comparison to Previous Studies

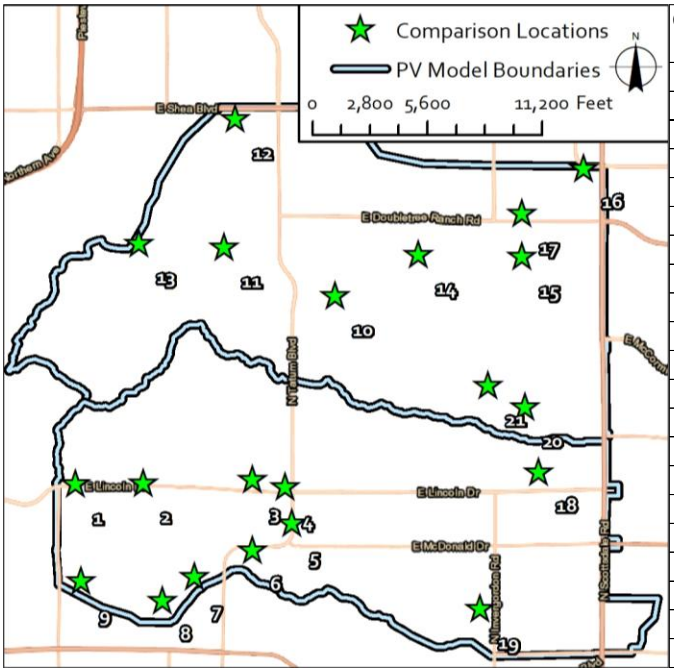
Several exercises were performed to assess the results of this study in the context of previous studies.

5.2.1 Agreement with Existing Studies

The base (i.e., un-calibrated) results of this study were also compared to the results of the contributing study to assess differences and to ensure that the results generated in this study are reasonably close to previous, and in some cases recent results.

The 100-year 6-hour results were compared to the overlapping contributing studies listed in **Table 2-1** with the exception of LIBW, where only the 24-hour event was simulated. Further, this model was not re-computed as there are no inflows into the current model from LIBW. Note that while most of the input data used in developing the PVSWMP model was taken from the Cudia City ADMS, the peak flow rates used in this comparison are from the final Echo Canyon Wash Letter of Map Revision (LOMR) (JE Fuller, 2024) FLO-2D model since this modeling was recently approved by FEMA for a floodplain revision in Echo Canyon Wash (also referred to as Cudia City Wash). The Echo Canyon Wash LOMR modeling exercise resulted in minor changes to the Cudia City Wash ADMS model throughout the LOMR process.

A total of twenty-one comparison points were made throughout the study area (**Figure 5-13**). In general, there was a very close agreement between the current study and the contributing studies. The largest discrepancies were noted when comparing to the East Shea ADMS/P results, where the current study exhibited higher peak discharges. While the average percent difference across the twenty-one comparison points is 8.9%, when weighting the difference based upon the magnitude of the flow rate this difference drops to 0.42% indicating that the base results closely align with the overlapping studies.



Comparison Point	Peak Q (cfs)		Difference		Source
	Current Study	Comparison	cfs	%	
1	595	547	48	8.4%	Cudia
2	124	110	14	12.0%	Cudia
3	1,257	1,190	67	5.5%	Cudia
4	205	202	3	1.5%	Cudia
5	1,510	1,346	164	11.5%	Cudia
6	3,201	2,894	307	10.1%	Cudia
7	2,790	2,784	6	0.2%	Cudia
8	3,295	3,109	186	5.8%	Cudia
9	882	973	-91	9.8%	Cudia
10	1,451	1,483	-32	2.2%	MIBW
11	368	359	9	2.5%	MIBW
12	1,643	1,403	240	15.8%	MIBW
13	3,432	3,269	163	4.9%	MIBW
14	426	426	0	0.0%	MIBW
15	978	617	361	45.3%	E Shea
16	479	546	-67	13.1%	E Shea
17	981	579	402	51.5%	E Shea
18	372	347	25	7.0%	LIBW
19	284	237	47	18.0%	LIBW
20	204	221	-17	8.0%	LIBW
21	616	508	108	19.2%	LIBW

Figure 5-13. Comparison to Previous Study Results.

5.2.2 Off-Site Inflows

The off-site models (i.e., MIBW and E Shea) were re-computed using a variety of recurrence interval and duration combinations. Given that these models were previously calibrated, inflow from these models were examined within the PV model to ensure agreement of peak flow rate values between the off-site model results and what is shown in the PV model results. This is especially important, as the off-site models were re-processed using a much newer FLO-2D executable version.

The primary comparison point is on Indian Bend Wash and Shea Boulevard, at the northern boundary of the PV model. The original study reported a 100-year 6-hour peak discharge of 4,254 cfs, and the equivalent peak discharge at a nearby floodplain cross-section in the PV model was 4,420 cfs. This confirms that the inflow from the MIBW model was accurately translated into the PV model.

5.3 Conclusion

The calibration scenarios were not applied to the design storm events, and the base model parameterization was determined to best reflect hydrologic and hydraulic conditions in the study area. This determination was based on the following factors and conclusions:

- Attempts to calibrate the model to the 2006 storm event could not replicate the gage data, and the modeled discharges were less than the measured discharges. The inverse relationship was found when comparing to the USGS regression equation results, where the modeled results were significantly higher than the regression estimates. Therefore, any attempts to push the model to match one dataset would pull it further from the other, and both datasets (i.e., gage data and regression equation results) are valid and suitable for calibration.
- Further investigations suggest that observed discrepancies may result from basal factors, including model cell size and even model software.
- There is close agreement with the base parameterization results with the final contributing study results. This is particularly important, as it provides a seamless transition to adjacent studies. Further, regulatory flow rates have already been established within the Town limits using the contributing studies, and it is important that this Town-wide model yield similar results.

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Action Report

File #: 25-252

AGENDA TITLE:
Consideration of Requests for Future Agenda Items

RECOMMENDATION:
Review the current list of pending agenda topics.

TOWN COUNCIL AGENDA SCHEDULE 2025

MEETING DATE	12/11
Executive Session	ROW Abandonment
Study Session	Zoning Code Update Check In
	Mockingbird Lane Update
	Community Services Funding Program
	Short-Term Rental Check In
Presentations	PV Vintage Car Show Distribution to Veterans Charities
	Historic Recognition of 6122 E Quartz Mountain Rd
	Historic Recognition of 5312 E Royal Palm Rd
	Street Sweeper Naming
Consent Agenda	Employee Handbook Update
	Purchase Air Conditioning Units
Public Hearings	
Action Items	Accepting the FY2024/25 ACFR
	Adopt Subdivision Code Amendments (HB2447)

FUTURE AGENDA SCHEDULE 2026

MEETING DATE	1/8	1/22	2/12	2/26	3/12	3/26
Executive Session						
Study Session	Personnel Appeals Board Rules	Investment Update		Committee Applicant Interviews		
Presentations	Historic Property Recognition 5404 E Palo Verde Dr					
Consent Agenda						
Public Hearings						
Action Items	Approval of Contract - McDonald Drive Curb Replacement: 40th St to 44th St, and 45th St, McDonald to Valley Vista Ln.	Mockingbird Lane Construction Contract	Doubletree Ranch Rd Entryway Construction Contract		Approval of Contract - Sewer System and Manhole Repair	
	Approval of Contract - Las Brisas and Cheney Intersection				Committee Appointments & Reappointments	

This is a tentative calendar and subject to change

Items to be scheduled - Numbering does not reflect priority or order in which items will be scheduled

1 Expenditure Limitation Adjustment and Bond Financing Follow Up
2 Long-Term Capital Project Funding Strategy
3 McCormick-Stillman Railroad Park Presentation