TOWN
Of
PARADISE VALLEY

STAFF REPORT

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

FROM: **Andrew Ching, Town Manager**
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DATE: **November 13, 2025**

DEPARTMENT: Community Development – Engineering Division
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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