SefDesign, LLC
Steven E. Frome, aia
317 East Le Marche Ave, Phoenix, Arizona, 85022
c:602.705.5558 f:602.441.3134 sefdesign@cox.net

July 15, 2025

Brandon McMahon, Planner II
Community Development Department
Town of Paradise Valley
6401 East Lincoln Drive
Paradise Valley, AZ 85253
bmcmahon@paradisevalleyaz.gov

Re: Pre-Application (PA-25-21) Variance
Westbrook Residence – New Retaining Wall - Variance Narrative
6341 North 34th Place, Paradise Valley, AZ 85253
APN- 164-05-023

Brandon,
We offer the following responses to the Community Development Department Narrative and Variance Criteria.

Introduction
The Phillip Westbrook residence at 6341 north 34th place was originally constructed in 1977 south of Lincoln drive. There is an existing drainage wash along the north end of the property, paralleling Lincoln drive. Over the years the drainage flows in the wash have eroded the south bank and continue to cause erosion towards the residence. The current erosion is currently very close to residence and is causing concern for failure of the existing foundations. The owner is proposing to provide a new retaining wall and redefine the existing drainage easement to provide protection from further erosion and protect the residence foundations.

Requested variance
The structural design of the wall requires it to be placed into the wash area and rise to a visible height of 9ft facing the wash at the lowest point of the wash grade. This is higher than the paradise valley suggested limits.

"That there are special circumstances applicable to the property, which may include circumstances related to the property's size, shape, topography, location, or surroundings; and" (Town Code Section 2-5-3(C)4).

The home was built in 1977 on the highest portion of the site, centered in the parcel, to take advantage of the city views and to provide amenity space to the south. The northern quarter portion of the site is a drainage wash running along the south side of Lincoln drive.

To prevent current and future erosion leading to the failure of the existing residence, special circumstances relative to the flows and topography of the existing wash are the reason for the variance request. Due to the existing soil conditions and the structural design criteria, the new retaining wall is required to be placed within the existing wash area and slightly exceed the Town code requirements for allowable wall height.

2. *"That the special circumstances applicable to the property were not self-imposed or created by the property owner; and"* (Town Code Section 2-5-3(C)4).

At the time of construction, the wash appears to be sufficient in depth for required drainage.

The erosion and scouring in the existing wash is natural and has been happening over the years on the residence property.

Due to special circumstances of the substantial flows encountered in the existing wash, the erosion continues to move towards the residence. The owner in an attempt to mediate further erosion towards the foundations, installed a short retaining wall at the south bank of the wash where one of the building columns is the closest but the erosion is starting to undermine this wall and the south bank of the wash.

Over the years the substantial flows have eroded the supporting wash banks, areas around the retaining wall and into the slope adjacent to the home's foundations. Further erosion is expected if provisions are not made to mediate the erosion and prevent the foundations and residence from failure.

"*That the strict application of the Zoning Ordinance will deprive the property of privileges enjoyed by other property of the same classification in the same zoning district"* (Town Code Section 2-5-3(C)4).

Unless mediation to remedy current erosion and scouring within the existing wash is completed, the strict application of the zoning ordinance will deprive the property privileges because the existing flows within the wash will continue to erode the south bank and cause damage to the residence foundations and ultimately failure of the residence.

A new retaining wall is proposed to be placed at a sufficient distance from the residence foundation bearing and north of the existing retaining wall to avoid any disruption to the bearing of the home's foundation. Due to the existing soil conditions and the new structural wall design criteria, the new retaining wall is required to be placed into the wash area. The new retaining wall location slightly exceeds the Town code requirements for allowable wall height and will require the existing drainage easement for the wash to be redefined.

Per previous direction from the Town of Paradise Valley, the new wall is intended to be a single poured concrete retaining wall, have a decorative board formed finish with a brown additive color that blends into the landscape color palette. Per the Geotechnical report, the footing design of the of the new retaining wall is designed to be set into the rock sub-base of the wash to avoid any future erosion along the southern bank of the wash. The top elevation of the concrete wall will vary to match the adjacent grade at the residence elevations, thus blending into the landscape view from Lincoln Drive. The intent is to maintain the oleander plantings along the bank for privacy to the home and to soften the view and reduce the noise level from the Lincoln Drive.

We have met with the Paradise Valley planning team and have received direction to apply for a variance to provide a safe and design acceptable solution to protect this residence from future wash erosion problems.

Supporting documents have been provided for review by Civil and Structural engineers, Geotechnical investigations and Architectural documents.

Please review the information for the processing of the variance. Let me know if there is any additional information required.

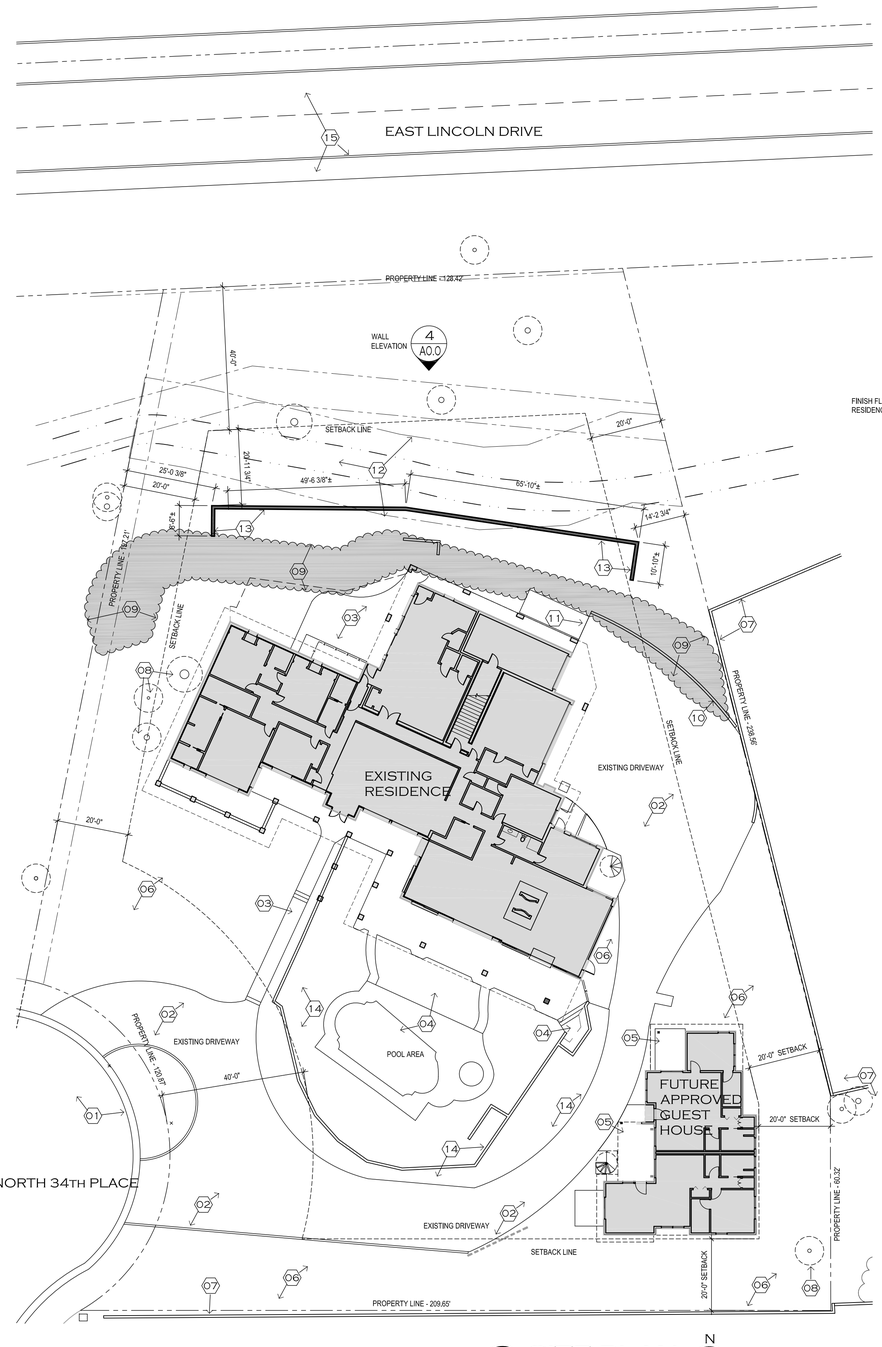
Steven E. Frome, aia

Pvgh-071525-variance narrative2

NEW SITE RETAINING WALL AT THE RESIDENCE OF

PHILLIP WESTBROOKS

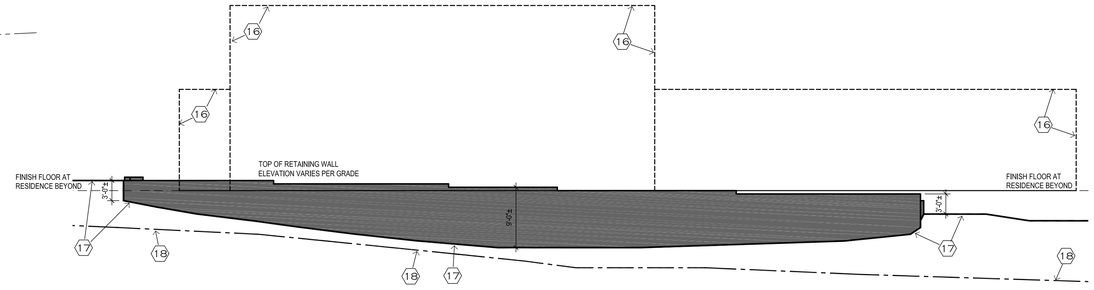
6341 NORTH 34TH PLACE
PARADISE VALLEY, AZ 85253



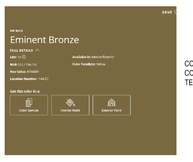
3 SITE PLAN
SCALE: 1"=20'-0"

N

REFER TO CIVIL ENGINEERING DRAWING FOR ALL SITE CONDITIONS



4 RETAINING WALL ELEVATION
SCALE: 3/32"=1'-0"



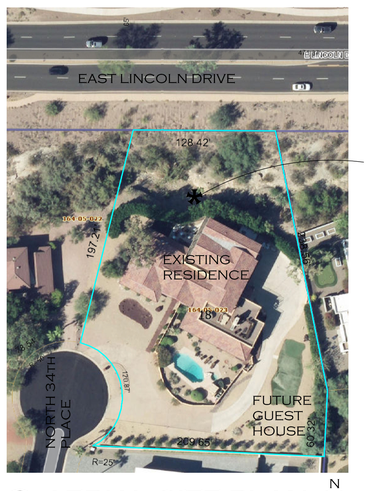
CONCRETE RETAINING WALL COLOR ADDITIVE. BOARD FORM TEXTURED FINISH

RETAINING WALL FINISH COLOR SAMPLE 5
NO SCALE

PLAN NOTES:

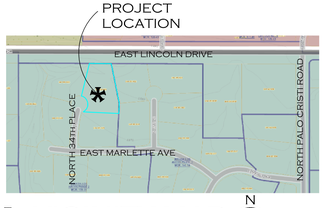
A- THE GENERAL CONTRACTOR TO VISIT THE SITE AND VERIFY ALL EXISTING CONDITIONS PRIOR TO COMMENCING ANY WORK. REVIEW ALL EXISTING CONDITIONS.
B- REFER TO STRUCTURAL AND CIVIL DOCUMENTS FOR ADDITIONAL INFORMATION AND DETAILS.

01- EXISTING STREET PAVING AND CURB.
02- EXISTING PAVED DRIVEWAY AND CURBING.
03- EXISTING CONCRETE PAVING WALKWAYS.
04- EXISTING POOL AREA, PAVING AND EQUIPMENT.
05- NEW CONCRETE PAVING.
06- EXISTING GRAVEL LANDSCAPING.
07- EXISTING 6FT SITE WALL AT ADJACENT PROPERTIES.
08- EXISTING TREES.
09- EXISTING OLEANDER BUSHES.
10- EXISTING LOW RETAINING WALL AT OLEANDERS.
11- EXISTING RETAINING WALL IN WASH AREA.
12- EXISTING DRAINAGE WASH REGRADED. REFER TO CIVIL DWGS.
13- PROPOSED NEW CONCRETE RETAINING WALL. ALL EXPOSED SURFACES TO BE BOARD FORMED TEXTURED EXPOSED FINISH. COLOR ADDITIVE TO CONCRETE REFER TO DETAIL 5 THIS DWG FOR REFERENCE. TOP OF WALL ELEVATION VARIES PER ADJACENT GRADE. REFER TO STRUCTURAL AND CIVIL DWGS.
14- EXISTING LOW SITE WALLS AT POOL AREA,
15- LINCOLN DRIVE PAVING, CURB AND SIDEWALK.
16- APPROXIMATE OUTLINE OF RESIDENCE STRUCTURE BEYOND.
17- APPROXIMATE NEW GRADE AT WASH AND ADJACENT AREA. REFER TO CIVIL DWGS.
18- APPROXIMATE ELEVATION AT CENTER OF WASH IN FOREGROUND.



2 AERIAL SITE PLAN
NO SCALE

N



1 VICINITY MAP
NO SCALE

N

PROJECT DATA:

PROJECT DESCRIPTION: NEW SITE RETAINING WALL AT EXISTING RESIDENCE.

OWNER- PHILLIP WESTBROOKS
6341 NORTH 34TH PLACE, PARADISE VALLEY, AZ 85253
CONTACT- PHILLLIP WESTBROOKS, C- 480-206-3999, EMAIL- PHILL@SPECTRUMSOLINC.COM

PROJECT LOCATION- 6341 NORTH 34TH PLACE, PARADISE VALLEY, AZ 85253

APN- 164-05-023
MCR- 15935
DESCRIPTION- MIRADA LOS ARCOS PHASE 2
LOT SIZE- 51,462 SF
ZONING- R-43
LOT- 18
SECTION TOWNSHIP RANGE- 12-2N-3E
MARKET AREA/ NEIGHBORHOOD- 14/001
SUBDIVISION (18 PARCELS)- MIRADA LOS ARCOS PHASE 2
PU DESCRIPTION- SINGLE FAMILY RESIDENCE
PROPERTY USE CODE- 0151
CONSTRUCTION YEAR- 1977

LEGAL DESCRIPTION- LOT 18, MIRADA LOS ARCOS, PHASE 2, ACCORDING TO BOOK 159 OF MAPS, PAGE 35, RECORDS OF MARICOPA COUNTY, ARIZONA.

GOVERNING CODES:

ALL CONSTRUCTION TO COMPLY WITH THE LATEST CODE AND CITY ADMENDMENTS ENFORCED BY THE TOWN OF PARADISE VALLEY. CODES MAY INCLUDE THE FOLLOWING:
2015 INTERNATIONAL RESIDENTIAL CODE
2015 INTERNATIONAL MECHANICAL CODE
2015 INTERNATIONAL FUEL GAS CODE
2015 INTERNATIONAL PROPERTY MAINTENANCE CODE
2015 INTERNATIONAL ENERGY CONSERVATION CODE
2015 INTERNATIONAL BUILDING CODE
2015 INTERNATIONAL PLUMBING CODE
2015 INTERNATIONAL FIRE CODE
2014 NATIONAL ELECTRICAL CODE

GENERAL NOTES:

01- FIELD VERIFY ALL SETBACK CLEARANCES.
02- CONTRACTOR SHALL VERIFY THE LOCATION OF ALL UTILITIES PRIOR TO CONSTRUCTION. MAINTAIN EXISTING UTILITIES TO REMAIN. KEEP IN SERVICE AND PROTECT AGAINST DAMAGE DURING DEMOLITION OPERATIONS.
03- IF THE CONTRACTOR OR SUBCONTRACTOR SHOULD FIND ANY DISCREPANCIES IN AND OR OMISSIONS FROM THESE DRAWINGS, OR IF HE SHOULD BE IN QUESTION AS TO THEIR MEANING OR INTENT, HE SHOULD CONTACT THE ARCHITECT AT ONCE FOR INTERPRETATION OR CLARIFICATION.
04- ALL LABOR AND MATERIAL USED SHALL BE EQUAL TO OR EXCEED ALL APPLICABLE STATE OR LOCAL CODES AND REQUIREMENTS.
05- COORDINATE WITH THE OWNER FOR ALL STAGING AND DEMOLITION OPERATIONS.
06- CONTRACTOR SHALL REMOVE PROMPTLY AND LEGALLY ALL ACCUMULATED DEBRIS.
07- CONTRACTOR IS TO PROVIDE FOR VERIFICATION BY THE TOWN OF PARADISE VALLEY ALL ITEMS TO COMPLY WITH MATERIAL STANDARDS OF THE APPLICABLE SECTION OF THE IBC CODE.
09- INFORMATION FOR ALL TRADES ARE PROVIDED ON ALL DRAWING SHEETS AND ARE LIMITED TO A PLAN FOR AN INDIVIDUAL TRADE. GENERAL CONTRACTOR TO COORDINATE ALL TRADES AND PROVIDE ALL ITEMS INCLUDED IN THESE DOCUMENTS.
10- CONTRACTOR TO FIELD VERIFY ALL DIMENSIONS, ELEVATIONS, GRADE CONDITIONS. ACTUAL EXISTING CONDITIONS MAY VERY FROM WHAT IS DEPICTED ON THESE DRAWINGS,
11- CONTRACTOR TO VERIFY ALL INTENDED FINAL EXTERIOR GRADES TO DETERMINE HEIGHT AND EXTENT OF FOUNDATION WALLS AND FOOTING LOCATIONS. PROVIDE STEP FOOTINGS AS REQUIRED FOR BEARING BELOW EXISTING NATURAL GRADE ELEVATION.

CONTACT INFO:

OWNER:
PHILLIP WESTBROOKS
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CONTACT- PHILLIP WESTBROOKS, C- 480-206-3999, EMAIL- PHILL@SPECTRUMSOLINC.COM

ARCHITECT:
SeFDesign, LLC
317 EAST LE MARCHE AVE., PHOENIX, AZ 85022
CONTACT- STEVE FROME, C- 602-705-5558, EMAIL- SEFDESIGN@COX.NET

CIVIL ENGINEER:
KBELL ENGINEERING, LLC
1355 NORTH 86th PLACE, MESA, AZ 85207
CONTACT- KELLY BELL, C- 602-980-8246, EMAIL- KBELL@KBELLENG.COM

SOILS INVESTIGATION:
VANN ENGINEERING INC.
3013 N 24TH AVE # 7, PHOENIX, AZ 85021
CONTACT- JEREMY MINNICK, PE T- 602-675-0520
EMAIL- JMINNICK@VANNENGINEERINGINC.COM

STRUCTURAL EGINNEER:
SCHAEFER, INC
2800 NORTH CENTRAL AVENUE, SUITE 125, PHOENIX, AZ 85004
CONTACT- JOHN HECK, PE C- 480-241-4870 EMAIL- JOHN.HECK@SCHAEFER-INC.COM

GENERAL CONTRACTOR:
TO BE DETERMINED

DRAWING INDEX:

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NEW SITE RETAINING WALL
AT THE RESIDENCE OF

PHILLIP WESTBROOKS

6341 NORTH 34TH PLACE
PARADISE VALLEY, AZ 85253

REGISTERED ARCHITECT
CERTIFICATE NO.
44158
STEVEN E. FROME
07/15/25
Registered Architect
ARIZONA U.S.A.
EXPIRES

REVISIONS:
PROJECT NO: 25-RE-017
DRAWN BY SEF
DATE: 07/15/25
CAD SAVED FILE PHGH
PV VARIANCE DOCUMENT
SHEET NUMBER

PROJECT INFORMATION+ SITE PLANS

A0.0

05- PHOTO VIEW FROM LINCOLN DRIVE SIDEWALK

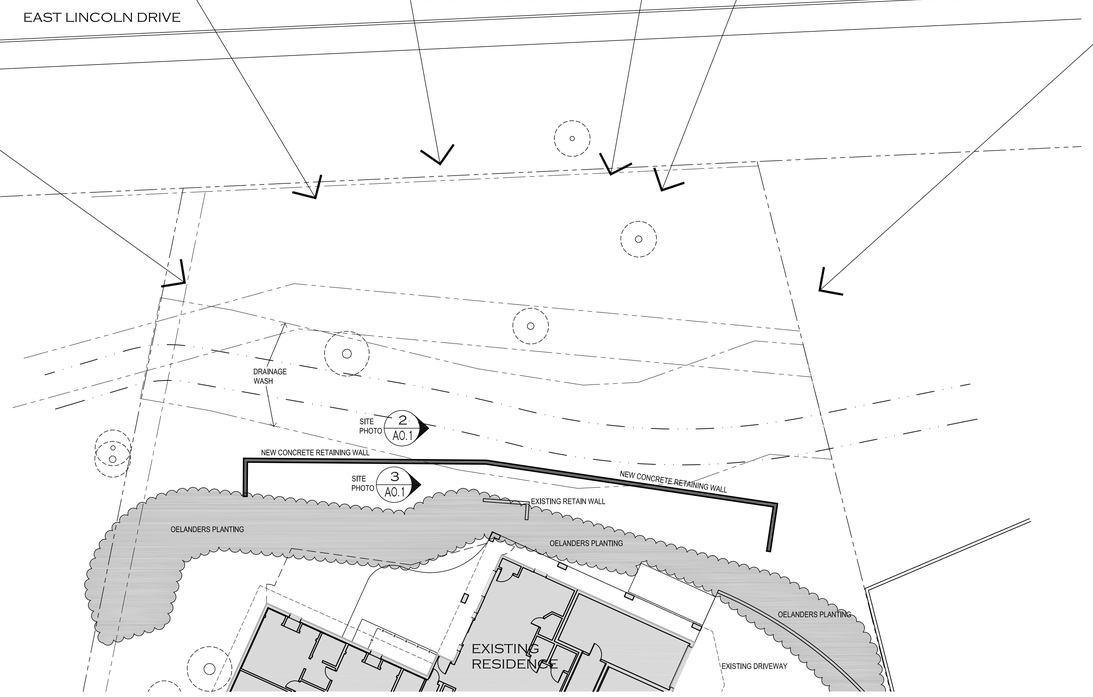
03- PHOTO VIEW FROM LINCOLN DRIVE SIDEWALK

02- PHOTO VIEW FROM LINCOLN DRIVE SIDEWALK

06- PHOTO VIEW FROM LINCOLN DRIVE SIDEWALK

04- PHOTO VIEW FROM LINCOLN DRIVE SIDEWALK

01- PHOTO VIEW FROM LINCOLN DRIVE SIDEWALK



1 SITE PHOTOS
SCALE: 1/16"=1'-0"

REFER TO CIVIL ENGINEERING DRAWING FOR ALL SITE CONDITIONS

03- PHOTO TO EXISTING RETAINING WALL

3 SITE PHOTOS
NO SCALE

02 - PHOTO INTO EXISTING WASH BASIN

2 SITE PHOTOS
NO SCALE

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PV VARIANCE DOCUMENT
SHEET NUMBER

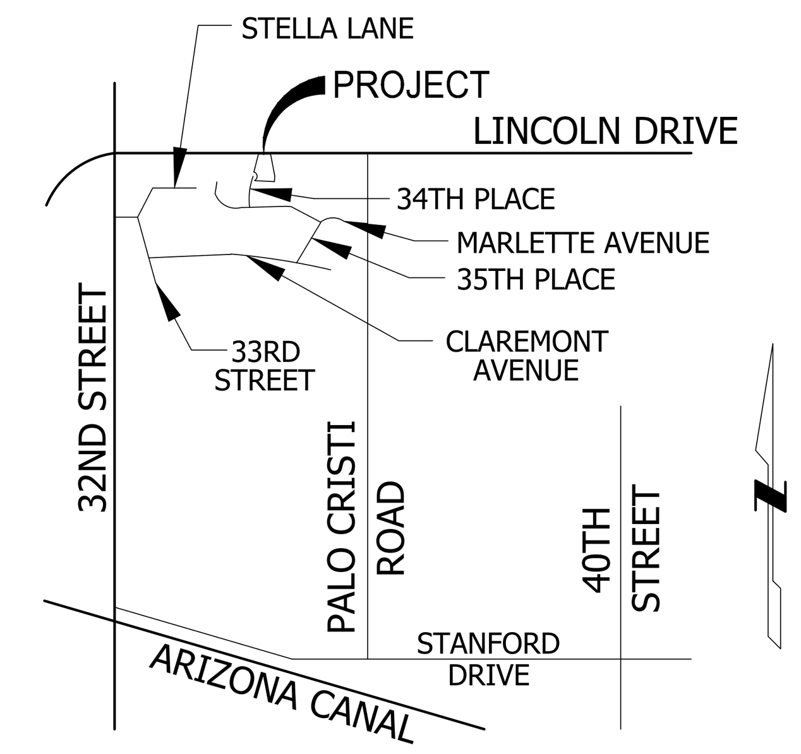
SITE PHOTOS

A0.1

GRADING AND DRAINAGE PLAN
FOR
WESTBROOKS RESIDENCE NEW RETAINING WALL
PARADISE VALLEY, ARIZONA

TOWN OF PARADISE VALLEY GRADING AND DRAINAGE GENERAL NOTES

1. PRIOR TO THE FIRST INSPECTION OF STRUCTURES WITHIN 3 FEET OF A SETBACK LINE, THE PROPERTY PINS SHALL BE PLACED BY A REGISTERED CIVIL ENGINEER OR LAND SURVEYOR OF THE STATE OF ARIZONA, AND THE PROPERTY LINE(S) IDENTIFIED.
2. WHERE EXCAVATION IS TO OCCUR THE TOP 4" OF EXCAVATED NATIVE SOIL SHALL REMAIN ON THE SITE AND SHALL BE REUSED IN A MANNER THAT TAKES ADVANTAGE OF THE NATURAL SOIL SEED BANK IT CONTAINS.
3. ALL WORK REQUIRED TO COMPLETE THE CONSTRUCTION COVERED BY THIS PLAN SHALL BE IN ACCORDANCE WITH THE MARICOPA ASSOCIATION OF GOVERNMENTS (M.A.G.) STANDARD SPECIFICATIONS AND DETAILS AND CURRENT SUPPLEMENTS THEREOF PER THE LOCAL MUNICIPALITY UNLESS SPECIFIED OTHERWISE IN THESE PLANS OR ELSEWHERE IN THE CONTRACT DOCUMENTS.
4. THE CONTRACTOR IS TO COMPLY WITH ALL LOCAL STATE, AND FEDERAL LAWS AND REGULATIONS APPLICABLE TO THE CONSTRUCTION COVERED BY THIS PLAN.
5. THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING AND COMPLYING WITH ALL PERMITS REQUIRED TO COMPLETE ALL WORK COVERED BY THIS PLAN.
6. ALL EXTERIOR SITE LIGHTING SHALL COMPLY WITH THE APPLICABLE REQUIREMENTS FOR TYPE, LOCATION, HEIGHT, WATTAGE, AND LUMEN BASED UPON THE FIXTURES INSTALLED PURSUANT TO SECTION 1023 OF THE TOWN OF PARADISE VALLEY ZONING ORDINANCE FOR NON-HILLSIDE PROPERTIES, SECTION 2208 OF THE TOWN OF PARADISE VALLEY ZONING ORDINANCE FOR HILLSIDE PROPERTIES, OR AS SPECIFIED IN THE SPECIAL USE PERMIT FOR SPECIAL USE PERMIT PROPERTIES.
7. A DUST CONTROL PLAN AND PERMIT MEETING THE REQUIREMENTS OF RULE 310 OF THE MARICOPA COUNTY AIR POLLUTION CONTROL REGULATIONS, AS AMENDED, IS REQUIRED.
8. A SEPARATE RIGHT-OF-WAY PERMIT IS NECESSARY FOR ANY OFF-SITE CONSTRUCTION.
9. AN APPROVED GRADING AND DRAINAGE PLAN SHALL BE ON THE JOB SITE AT ALL TIMES. DEVIATIONS FROM THE PLAN MUST BE PRECEDED BY AN APPROVED PLAN REVISION.
10. EAVE PROJECTIONS INTO REQUIRED SETBACKS ARE LIMITED TO A MAXIMUM OF 24" PURSUANT TO SECTION 1008 OF THE TOWN OF PARADISE VALLEY ZONING ORDINANCES.
11. ALL STRUCTURES AND LANDSCAPING WITHIN THE SIGHT VISIBILITY TRIANGLE SHALL HAVE A 2 FOOT MAXIMUM HEIGHT.
12. ALL NEW AND EXISTING ELECTRICAL SERVICE LINES SHALL BE BURIED PER THE TOWN OF PARADISE VALLEY REQUIREMENTS.
13. IT SHALL BE THE RESPONSIBILITY OF THE PERMITTEE TO ARRANGE FOR THE RELOCATION AND RELOCATION COSTS OF ALL UTILITIES, AND TO SUBMIT A UTILITY RELOCATION SCHEDULE PRIOR TO THE ISSUANCE OF AN ENGINEERING CONSTRUCTION PERMIT.
14. EXISTING AND/OR NEW UTILITY CABINETS AND PEDESTALS SHALL BE LOCATED A MINIMUM OF 4' BEHIND ULTIMATE BACK OF CURB LOCATION.
15. POOL, SPA, BARBECUE AND ANY PROPOSED STRUCTURES OVER 8" ABOVE GRADE REQUIRE SEPARATE PERMIT APPLICATIONS.
16. POOLS SHALL BE CONSTRUCTED BY SEPARATE PERMIT AND SECURED FROM UNWANTED ACCESS PER TOWN CODE, ARTICLE 5-2.
17. ALL FILL MATERIAL UNDER SLABS AND WALKS SHALL BE COMPACTED TO NOT LESS THAN 95%.
18. SETBACK CERTIFICATION IS REQUIRED AND SHALL BE PROVIDED TO TOWN INSPECTOR PRIOR TO STEM WALL INSPECTION.
19. FOR BUILDING PADS THAT HAVE 1' OR MORE OF FILL MATERIAL, SOILS COMPACTION TEST RESULTS ARE REQUIRED AND SHALL BE PROVIDED TO TOWN INSPECTOR PRIOR TO PRE-SLAB INSPECTION.
20. FINISHED FLOOR ELEVATION CERTIFICATION IS REQUIRED AND SHALL BE PROVIDED TO TOWN INSPECTOR PRIOR TO STRAP AND SHEAR INSPECTION.
21. MAIL BOXES SHALL COMPLY WITH THE TOWN OF PARADISE VALLEY STANDARDS FOR MAIL BOXES IN THE RIGHTOF-WAY FOR HEIGHT, WIDTH AND BREAK AWAY FEATURES.
22. ALL PATIOS, WALKS, AND DRIVES TO SLOPE AWAY FROM BUILDING AND GARAGES AT A MINIMUM SLOPE OF 1/4" PER FOOT UNLESS SPECIFIED OTHERWISE.
23. TRENCH BEDDING AND SHADING SHALL BE FREE OF ROCKS AND DEBRIS.
24. THE TOWN ONLY APPROVES THE SCOPE OF WORK AND NOT THE ENGINEERING DESIGN. ANY CONSTRUCTION QUANTITIES SHOWN ARE NOT VERIFIED BY THE TOWN.
25. THE APPROVAL OF THE PLANS IS VALID FOR 180 DAYS. IF A PERMIT FOR CONSTRUCTION HAS NOT BEEN ISSUED WITHIN 180 DAYS, THE PERMIT MUST BE RENEWED.
26. A TOWN INSPECTOR WILL INSPECT ALL WORK WITHIN THE TOWN'S RIGHTS-OF-WAY. NOTIFY TOWN INSPECTION SERVICES TO SCHEDULE A PRECONSTRUCTION MEETING PRIOR TO STARTING CONSTRUCTION.
27. WHENEVER EXCAVATION IS NECESSARY, CALL ARIZONA811 BY DIALING 811 or 602-263-1100, TWO (2) WORKING DAYS BEFORE EXCAVATION BEGINS.
28. EXCAVATIONS SHALL COMPLY WITH REQUIREMENTS OF OSHA EXCAVATION STANDARDS (29 CFR, PART 1926, SUBPART P). UNDER NO CIRCUMSTANCES WILL THE CONTRACTORS BE ALLOWED TO WORK IN A TRENCH LOCATED WITHIN THE TOWN'S RIGHT-OF-WAY WITHOUT PROPER SHORING OR EXCAVATION METHODS.
29. PERMIT HOLDER SHALL POST A 6 SQUARE FOOT (2'X3') IDENTIFICATION SIGN, MADE OF DURABLE MATERIAL, IN THE FRONT YARD OF SUBJECT PROPERTY AND NOT IN THE TOWN'S RIGHT-OF-WAY. THE SIGN MAY NOT EXCEED A MAXIMUM OF 6 FEET IN HEIGHT FROM GRADE TO TOP OF THE SIGN. THE SIGN MUST INCLUDE THE PERMITTEE OR COMPANY NAME, PHONE NUMBER. TYPE OF WORK, ADDRESS OF PROJECT AND TOWN CONTACT NUMBER, 480-348-3556.
30. WHEN DEEMED NECESSARY, A 6-FOOT HIGH CHAIN LINK FENCE MUST BE INSTALLED AROUND THE CONSTRUCTION AREA TO PREVENT ANY POTENTIAL SAFETY HAZARD FOR THE PUBLIC. THE FENCE SHALL BE SETBACK AT LEAST 10 FEET FROM ALL RIGHTS-OF-WAY AND HAVE A 50-FOOT STREET CORNER SITE TRIANGLE WHERE APPLICABLE.
31. CLEAR ACCESS FOR NEIGHBORING PROPERTIES AND EMERGENCY VEHICLES MUST BE MAINTAINED AT ALL TIMES. CONSTRUCTION RELATED VEHICLES MUST BE LEGALLY PARKED ONLY ON ONE SIDE OF THE STREET OR JOB SITE PROPERTY.
32. ALL CONSTRUCTION DEBRIS AND EQUIPMENT MUST BE CONTAINED ON SITE AT ALL TIMES. CONTRACTOR AND PROPERTY OWNER MUST MAINTAIN THE JOB SITE FREE OF LITTER AND UNSIGHTLY MATERIALS AT ALL TIMES. CONSTRUCTION MATERIALS ARE PROHIBITED IN THE TOWN'S RIGHT-OF-WAY.
33. CONSTRUCTION ACTIVITIES ARE PERMITTED BETWEEN THE HOURS OF 7 AM AND 5 PM MONDAY THROUGH FRIDAY. CONSTRUCTION ACTIVITIES MAY START ONE (1) HOUR EARLIER DURING THE SUMMER (MAY 1ST THROUGH SEPTEMBER 30TH).
34. THE USE AND OPERATION OF FUEL-FIRED GENERATORS IS PROHIBITED UNLESS DUE TO A HARDSHIP. TOWN APPROVAL SHALL BE REQUIRED.
35. THE CONTRACTOR AND PROPERTY OWNER SHALL BE LIABLE FOR ANY DAMAGE DONE TO ANY PUBLIC PROPERTY AS A RESULT OF ANY CONSTRUCTION OR CONSTRUCTION RELATED ACTIVITIES. NO CERTIFICATE OF OCCUPANCY WILL BE ISSUED UNTIL ALL AFFECTED RIGHTS-OF-WAY ARE CLEANED AND/OR REPAIRED TO THEIR ORIGINAL CONDITION AND UNTIL ANY AND ALL DAMAGES TO AFFECTED PROPERTIES ARE RESTORED TO ORIGINAL CONDITION.
36. A KEYED SWITCH SHALL BE REQUIRED ON ALL NEW AND EXISTING ELECTRIC ENTRY GATES. THE KEYED SWITCH SHALL BE INSTALLED IN A LOCATION THAT IS READILY VISIBLE AND ACCESSIBLE. KNOX BOX ORDER FORMS ARE AVAILABLE AT THE TOWN'S BUILDING SAFETY DEPARTMENT.
37. PROPERTY OWNER, BUILDER, OR GENERAL CONTRACTOR WILL BE RESPONSIBLE FOR CONTROLLING DUST FROM THE SITE AT ALL TIMES. ALL MEANS NECESSARY SHALL BE USED BY THE BUILDER OR GENERAL CONTRACTOR TO CONTROL THE EXISTENCE OF DUST CAUSED BY ANY EARTHWORK, SPRAY APPLICATION OF MATERIALS, OR OTHER DUST-CAUSING PRACTICES REQUIRED BY THE CONSTRUCTION PROCESS.
38. APPROVAL OF THESE PLANS ARE FOR PERMIT PURPOSES ONLY AND SHALL NOT PREVENT THE TOWN FROM REQUIRING CORRECTION OF ERRORS IN THE PLANS WHERE SUCH ERRORS ARE SUBSEQUENTLY FOUND TO BE IN VIOLATION OF ANY LAW, ORDINANCE, HEALTH, SAFETY, OR OTHER DESIGN ISSUES.
39. ALL DRAINAGE PROTECTIVE DEVICES SUCH AS SWALES, INTERCEPTION DITCHES, PIPES PROTECTIVE BERMS, CONCRETE CHANNELS OR OTHER MEASURES DESIGNED TO PROTECT PROPOSED AND EXISTING IMPROVEMENTS FROM RUNOFF OR DAMAGE FROM STORM WATER, MUST BE CONSTRUCTED PRIOR TO THE CONSTRUCTION OF ANY IMPROVEMENTS.



VICINITY MAP
NOT TO SCALE

OWNER / APPLICANT
PHILLIP WESTBROOKS
6341 N. 34TH PLACE
PARADISE VALLEY, ARIZONA
PH: 480.206.3999
CONTACT: PHILLIP WESTBROOKS
EMAIL: PHILL@SPECTURM-SOLINC.COM

ARCHITECT
SEFDESIGN, LLC
317 EAST LE MARCHE AVE
PHOENIX, AZ 85022
PH: 602.705.5558
CONTACT: STEVEN FROME, AIA
EMAIL: SEFDESIGN@COX.NET

ENGINEER/ CONTACT
KBELL ENGINEERING LLC
1355 N 86TH PLACE
MESA, AZ 85207
PH: 602.980.8246
CONTACT: KELLY BELL, P.E.
EMAIL: KBELL@KBELLENG.COM

ENGINEER'S NOTES
1. DIMENSIONS TO BE VERIFIED BY ARCHITECT AND LANDSCAPE ARCHITECT. INFORMATION PROVIDED FOR REFERENCE ONLY ON THIS PLAN.
2. EXISTING GRADE INFORMATION IS PROVIDED BASED ON TOPOGRAPHIC SURVEY COMPLETED BY SUPERIOUR SURVEYING SERVICES, INC. DATED JUNE 17, 2024.

LEGAL DESCRIPTION
LOT 18, MIRADA LOS ARCOS, PHASE 2, ACCORDING TO BOOK 159 OF MAPS PAGE 35, IN THE OFFICE OF THE COUNTY RECORDER OF MARICOPA COUNTY, AZ.

BENCHMARK
MARICOPA COUNTY DEPARTMENT OF TRANSPORTATION POINT ID 3185, BEING A 3" MARICOPA COUNTY HIGHWAY DEPARTMENT BRASS CAP IN HANDHOLE WITH A DEPTH OF 0.55 FEET, LOCATED AT THE INTERSECTION OF LINCOLN DRIVE AND 32ND STREET, MARKING THE WEST QUARTER CORNER OF SECTION 12, HAVING AN ELEVATION OF 1387.346, NAVD88

UTILITY PROVIDERS

WATER	EPCOR USA
SANITARY SEWER	CITY OF PHOENIX
ELECTRIC	ARIZONA PUBLIC SERVICE CO.
TELEPHONE	CENTURYLINK
NATURAL GAS	SOUTHWEST GAS
CABLE TV	COX COMMUNICATIONS

PROPERTY INFORMATION

PROPERTY:	APN 164-05-023
USE:	RESIDENTIAL
PROJECT ADDRESS:	6341 N. 34TH PLACE PARADISE VALLEY, AZ 85253
ZONING:	R-43
SUBDIVISION/ LEGAL DESCRIPTION:	LOT 13 PARADISE HILLS SUBDIVISION
LOT SIZE:	51,462 SF (1.18 AC)
CONSTRUCTION YEAR:	1993

CUT AND FILL QUANTITIES

CUT: 122 CY
FILL: 205 CY
NET: 83 CY FILL

QUANTITIES ARE IN PLACE ESTIMATES. NO SHRINK OR SWELL IS ASSUMED. NO GROUND LOSS IS INCLUDED.

NATIVE PLANTS STATEMENT
ALL NATIVE PLANTS IMPACTED BY CONSTRUCTION SHALL BE RELOCATED ON SITE.

PROJECT DESCRIPTION
THE INTENT OF THIS PROJECT IS TO CONSTRUCT A NEW RETAINING WALL ALONG THE NORTH SIDE OF THE PROPERTY TO PROTECT THE EXISTING HOUSE FROM THE CURRENT SCOURING HAPPENING WITHIN THE WASH.

SITE NOTES
THE LOWEST FINISHED FLOOR ELEVATION IS 1377.60 (NEW HOUSE) IS SAFE FROM INUNDATION DURING A 100-YEAR PEAK RUN-OFF EVENT IF CONSTRUCTED IN ACCORDANCE WITH THE APPROVED PLANS.

THE PROPOSED DEVELOPMENT DOES NOT IMPACT DRAINAGE CONDITIONS OF ADJOINING LOTS. OFFSITE FLOWS ARE CONTAINED WITHIN THE DRAINAGE EASEMENT.

FLOOD INSURANCE RATE MAP (FIRM) DATA:
THE SITE IS LOCATED IN FEMA FLOOD ZONE "X" AS SHOWN IN FEMA FIRM MAP NO.04013C1745L EFFECTIVE 10/16/2013, REVISED 4/7/2017.

ENGINEER CERTIFICATION
ENGINEER CERTIFIES BY SEALING THIS PLAN THAT THE RESIDENCE FINISH FLOOR ELEVATION SHOWN ON THE PLAN OF 1378.60 AND THE NEW GUEST HOUSE FINISHED FLOOR ELEVATION OF 1377.60 (NAVD 88) IS A MINIMUM OF 12" ABOVE THE 100-YEAR STORM ELEVATION OF 1376.50 FT.

SHEET INDEX:

AS-BUILT CERTIFICATION I HEREBY CERTIFY THAT THE "RECORD DRAWING" MEASUREMENTS AS SHOWN HEREON WERE MADE UNDER MY SUPERVISION OR AS NOTED AND ARE CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF.

REGISTERED ENGINEER/ LAND SURVEYOR DATE

REGISTRATION NUMBER

THIS SET OF PLANS HAS BEEN REVIEWED FOR COMPLIANCE WITH TOWN OF PARADISE VALLEY REQUIREMENTS PRIOR TO ISSUANCE OF PERMIT. THE TOWN NEITHER ACCEPTS NOR ASSUMES ANY LIABILITY FOR ERRORS OR OMISSIONS. THIS COMPLIANCE APPROVAL SHALL NOT PREVENT THE TOWN ENGINEER FROM REQUIRING CORRECTIONS OF ERRORS OR OMISSIONS IN THE PLANS TO BE FOUND IN VIOLATION OF LAWS AND ORDINANCES.

TOWN OF PARADISE VALLEY APPROVAL SIGNATURE DATE

LEGEND

PROP SURFACE FLOW DIRECTION	LIGHT POLE
EX SURFACE FLOW DIRECTION	STREET SIGN
BOUNDARY LINE	WATER METER
CENTER LINE	FL FLOW LINE
EXISTING CONTOURS	FFE FINISHED FLOOR ELEVATION
PROPOSED CONTOURS	FS FLAGSTONE
S SEWER MANHOLE	NG NATURAL GROUND
● CO SEWER CLEANOUT	TC TOP OF CURB
E ELECTRIC BOX	FG FINISHED GRADE
FIRE HYDRANT	C CONCRETE
	EX EXISTING

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IN MARICOPA COUNTY: (602) 263-1100

THE LOCATION OF EXISTING UNDERGROUND UTILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK. HE AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE OCCASIONED BY HIS FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UNDERGROUND UTILITIES.

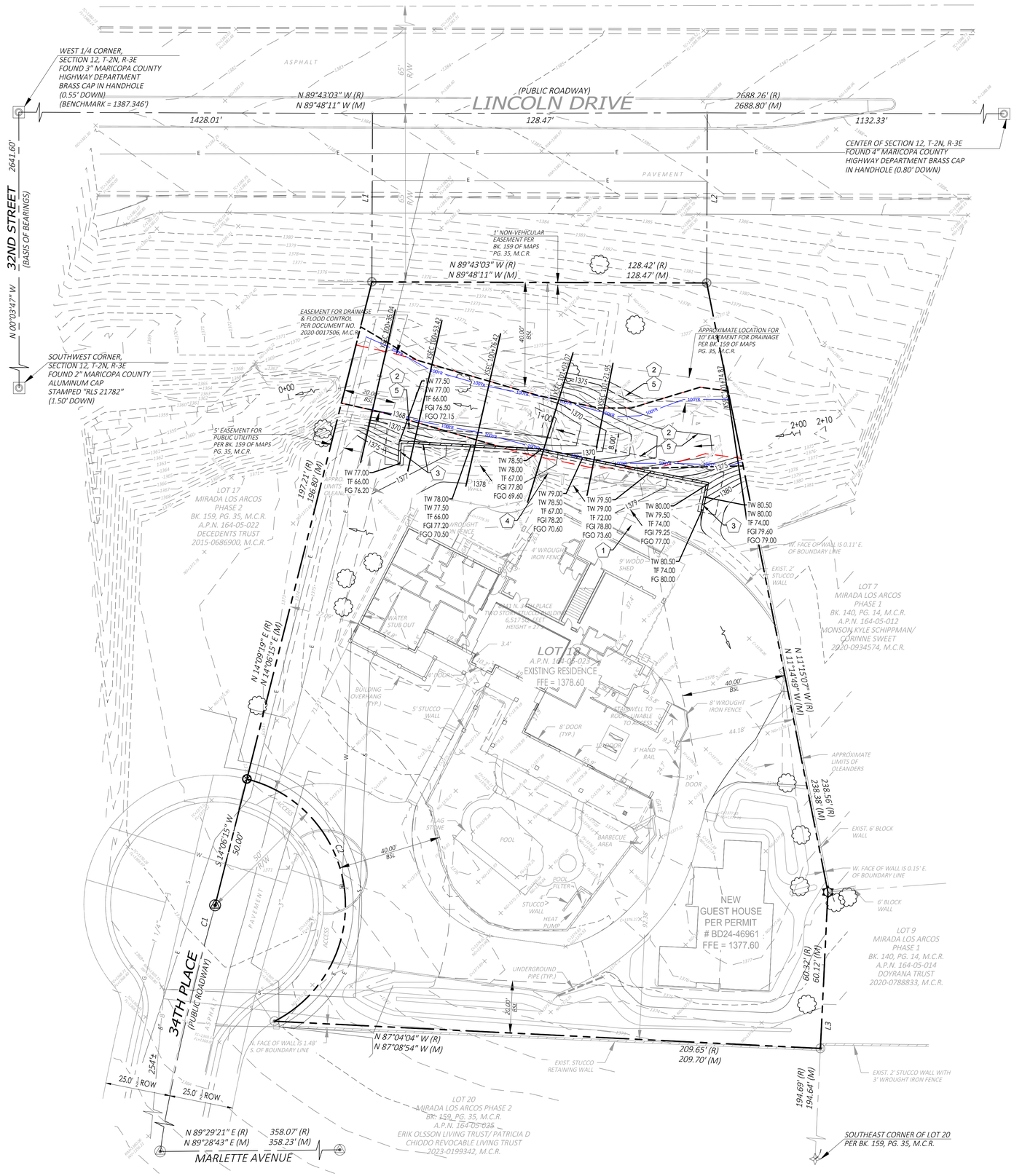
KBELL
ENGINEERING
1355 N 86TH PLACE MESA, ARIZONA 85207
PH: 602.980.8246 Copyright © 2025

57116
KELLY J. BELL
07-14-2025

CLIENT:
WESTBROOKS RESIDENCE
PROJECT NAME/ ADDRESS:
WESTBROOKS RESIDENCE NEW RETAINING WALL
6341 N. 34TH PLACE, PARADISE VALLEY, ARIZONA
COVER SHEET

PROJECT NO.: 1039-02
DESIGNED BY: KJB/GGM
DRAWN BY: KJB/GGM

SHEET
C-1



GENERAL NOTES

1. GRADE SITE TO PROPOSED GRADES AS SHOWN ON THIS PLAN MEETING THE REQUIREMENTS OF THE GEOTECHNICAL REPORT. GRADES SHOWN REFLECT FINISH GRADE FOR THE SITE.
2. INFORMATION SHOWN ON THIS PLAN IS FOR REFERENCE ONLY. SEE GEOTECHNICAL REPORT FOR SLAB ON GRADE REQUIREMENTS.
3. GEOTECHNICAL REPORT REFERENCE:
   PREPARED FOR PHILL RESIDENCE ADDITIONS, BY VANN ENGINEERING INC. "PROJECT NUMBER 25878 - GEOTECHNICAL ENGINEERIIG REPORT, DATED 08.01.2024.
4. FOR WASH SECTIONS SEE SHEET C-3.

GRADING AND STORM DRAIN KEYNOTES

1. REMOVE EXISTING WOOD SHED TO BE COORDINATED WITH OWNER.
2. REMOVE VEGETATION AS NECESSARY TO INSTALL NEW CONSTRUCTION.
3. INSTALL NEW CONCRETE RETAINING WALL PER PLAN AND STRUCTURAL DTLS.
4. PROTECT EXISTING RETAINING WALL IN PLACE. TO BE BURIED OVER WITH NEW GRADING.
5. INSTALL NEW DRAINAGE CHANNEL PER PLAN GRADING ON PLAN. 3:1 SIDE SLOPES TYPICAL EXCEPT AT EDGES MATCHING INTO EXISTING.

GRADING LEGEND

— 100YR —	100YR FLOODPLAIN LINES
— — —	EX. WASH DRAINAGE ESMT. LINES
— — —	PROPOSED WASH DRAINAGE ESMT. LINES
C	CONCRETE
EX	EXISTING
NG	NATURAL GRADE
FG	FINISHED GRADE
FGI	FINISHED GRADE INSIDE
FGO	FINISHED GRADE OUTSIDE
TW	TOP OF WALL
TF	TOP OF FOOTING
FFE	FINISHED FLOOR ELV.
FS	FLAG STONE

5 15
0 10 20 40
SCALE: 1"=20'

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Registered Professional Engineer (Civil)
CERTIFICATE NO.
57116
KELLY J.
BELL
Date Signed 07-14-2025
ARIZONA U.S.A.

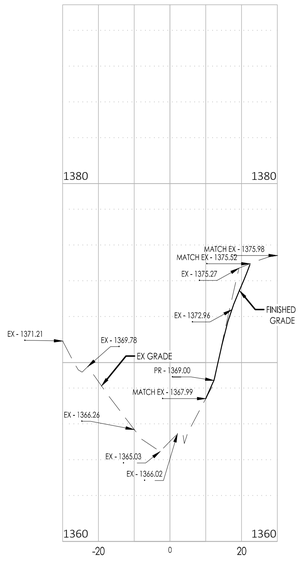
CLIENT:
WESTBROOKS RESIDENCE
PROJECT NAME & ADDRESS:
WESTBROOKS RESIDENCE NEW RETAINING WALL
6341 N. 34TH PLACE, PARADISE VALLEY, ARIZONA
GRADING AND DRAINAGE PLAN

PROJECT NO.: 1039-02
DESIGNED BY: KJB/GGM
DRAWN BY: KJB/GGM

SHEET
C-2

103904 GnD Plans.dwg modified by gmiller on Jul 14, 25 3:22 PM

100+35



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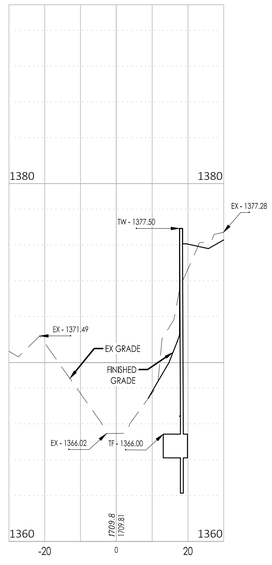

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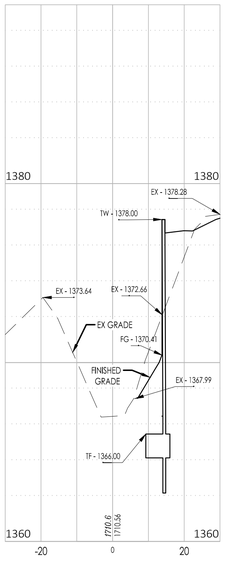

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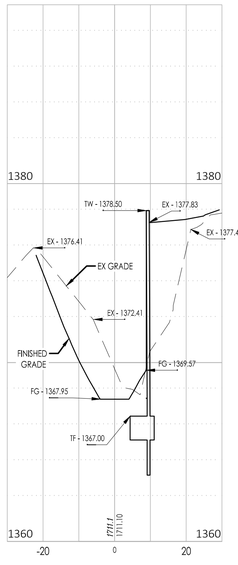

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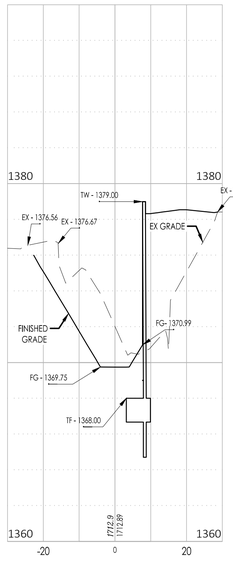

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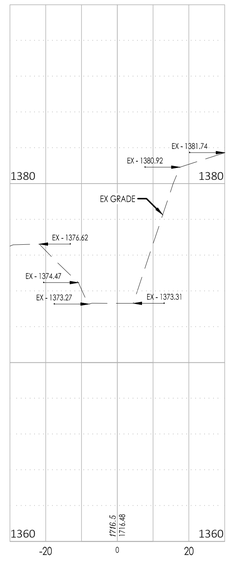

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KELLY J. BELL
07-24-2025

5 15
0 10 20 40
HZ SCALE: 1"=20'
VT SCALE: 1"=4'

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CLIENT: WESTBROOKS RESIDENCE
PROJECT NAME & ADDRESS: WESTBROOKS RESIDENCE NEW RETAINING WALL
6341 N. 34TH PLACE, PARADISE VALLEY, ARIZONA
WASH SECTIONS

PROJECT NO.: 1039-02
DESIGNED BY: KJB/GGM
DRAWN BY: KJB/GGM

SHEET
C-3

STRUCTURAL NOTES

COPIES OF PUBLICATIONS REFERENCED IN THESE GENERAL STRUCTURAL NOTES ARE AVAILABLE FOR REVIEW AT SCHAEFER. CONTRACTORS UNFAMILIAR WITH THESE PUBLICATIONS MUST REVIEW THEM PRIOR TO CONSTRUCTION.

GOVERNING CODE

2015 INTERNATIONAL BUILDING CODE

DESIGN LOADS

1. WIND LOAD (PER ASCE 7):
   - A. BASIC DESIGN WIND SPEED, V= 115 MPH
   - B. ALLOWABLE STRESS DESIGN WIND SPEED, V_{ASD} = 89 MPH
   - C. RISK CATEGORY = II
   - D. WIND EXPOSURE = C (ALL WIND DIRECTIONS)
   - E. INTERNAL PRESSURE COEFFICIENT, GCpi = +0.18, -0.18
2. SEISMIC LOAD
   - A. SEISMIC RISK CATEGORY = II
   - B. SEISMIC IMPORTANCE FACTOR, I_e = 1.0
   - C. MAPPED SPECTRAL RESPONSE ACCELERATION FACTOR AT SHORT PERIOD, S_S = 0.181
   - D. MAPPED SPECTRAL RESPONSE ACCELERATION FACTOR AT 1 SECOND, S_1 = 0.059
   - E. SITE CLASS = C
   - F. DESIGN SPECTRAL RESPONSE ACCELERATION FACTOR AT SHORT PERIOD, S_{DS} = 0.145
   - G. DESIGN SPECTRAL RESPONSE ACCELERATION FACTOR AT 1 SECOND PERIOD, S_{D1} = 0.067
   - H. SEISMIC DESIGN CATEGORY = A

CONSTRUCTION AND SAFETY

1. ENGINEER SHALL NOT BE RESPONSIBLE FOR THE MEANS, METHODS, TECHNIQUES, SEQUENCES OR PROCEDURES OF CONSTRUCTION SELECTED BY CONTRACTOR.
2. THE CONTRACTOR WILL BE SOLELY AND COMPLETELY RESPONSIBLE FOR CONDITIONS OF THE JOB SITE INCLUDING SAFETY OF ALL PERSONS AND PROPERTY DURING PERFORMANCE OF THE WORK. THIS REQUIREMENT WILL APPLY CONTINUOUSLY AND IS NOT LIMITED TO NORMAL WORKING HOURS. WHEN ON SITE, THE ENGINEER IS RESPONSIBLE FOR HIS/HER OWN SAFETY BUT HAS NO RESPONSIBILITY FOR THE SAFETY OF OTHER PERSONNEL OR SAFETY CONDITIONS AT THE SITE.
3. FOUNDATION DOWELS SHALL NOT BE REPAIRED, REPLACED OR FIELD-MODIFIED WITHOUT THE WRITTEN APPROVAL OF THE STRUCTURAL ENGINEER OF RECORD.
4. CONTRACTOR SHALL VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS. SHOULD ANY DISCREPANCY BE FOUND, CONTRACTOR SHALL NOTIFY ARCHITECT/ENGINEER IMMEDIATELY OF THE CONDITION.
5. CONTRACTOR SHALL BRACE ENTIRE STRUCTURE AS REQUIRED DURING DEMOLITION AND CONSTRUCTION TO MAINTAIN STABILITY UNTIL THE STRUCTURE IS COMPLETE AND FUNCTIONING AS THE DESIGNED UNIT.

FOUNDATIONS

1. FOUNDATION DESIGN IS BASED UPON RECOMMENDATIONS DESCRIBED IN THE GEOTECHNICAL ENGINEER'S REPORT BY VANN ENGINEERING PROJECT NO 25878, DATED 08/01/2024. THE GEOTECHNICAL ENGINEER'S REPORT IS AVAILABLE UPON REQUEST.
   - A. ALL FOOTINGS SHALL BE SOCKETED 1'-0" MIN INTO HIGHLY WEATHERED AND FRACTURED FANGOMERATE ROCK. FOUNDATIONS HAVE BEEN DESIGNED FOR A MAXIMUM ALLOWABLE SOIL BEARING PRESSURE OF **3500 PSF** BELOW STRIP FOOTINGS.
2. CONTRACTOR SHALL CONTACT UTILITY COMPANIES FOR LOCATING UNDERGROUND SERVICES AND IS RESPONSIBLE FOR THEIR PROTECTION AND SUPPORT.
3. FILL MATERIALS: ALL FILL MATERIALS SHALL BE APPROVED BY A GEOTECHNICAL ENGINEER, INCLUDING THE SUITABILITY OF ALL EXCAVATED ON-SITE SOILS FOR RE-USE. MATERIAL SHALL NOT BE PLACED ON FROZEN GROUND.
4. FOUNDATIONS MAY BE PLACED WITHOUT SIDE FORMS IF EXCAVATED WALLS STAND APPROXIMATELY VERTICAL
5. LATERAL SOIL PRESSURES: LATERAL EARTH PRESSURES INDICATED BELOW DO NOT INCLUDE HYDROSTATIC OR COMPACTION PRESSURES DURING BACKFILL OPERATIONS. WALLS SHALL HAVE ADEQUATE DRAINAGE TO PREVENT HYDROSTATIC PRESSURES. COMPACT USING HAND-OPERATED TAMPERS ONLY.
   - A. CANTILEVERED RETAINING WALLS (ACTIVE PRESSURE): 38 PCF EQUIVALENT FLUID PRESSURE, TRIANGULAR DISTRIBUTION + 60 PSF SURCHARGE, RECTANGULAR DISTRIBUTION.
6. BACKFILL AGAINST WALLS:
   - A. RETAINED SIDE OF CANTILEVERED RETAINING WALLS:
     - i. MINIMUM 3 FT WIDE ZONE OF FREE DRAINING GRANULAR FILL (COMPACTED TO 95% STANDARD PROCTOR MAXIMUM DRY DENSITY AND WITHIN +/- 2% OPTIMUM MOISTURE CONTENT) UP TO FINISHED GRADE ABOVE SLURRY FILL INDICATED BELOW. AT THE BOTTOM OF THE GRANULAR MATERIAL, PLACE A 4" DIAMETER PERFORATED FOUNDATION DRAIN PIPE WITH POSITIVE DRAINAGE TO SUMP OR TO DAYLIGHT.
     - ii. THE LOWER PORTIONS OF THE RETAINED SIDE OF THE WALL TO BE FILLED WITH 2 SACK SLURRY TO ENSURE THAT ALL THE UNDERCUT CAVITIES ARE COMPLETE FILLED. SEE GEOTECH REPORT FOR A DIAGRAM OF THE PROPOSED RETAINING WALL AND SURROUNDING FEATURES.
7. FINISHED GRADE SHALL SLOPE AWAY FROM THE PERIMETER FOUNDATION
8. EXCAVATIONS:
   - A. EXCAVATIONS IN THE VICINITY OF EXISTING FOUNDATIONS WITH THE BOTTOM NEAR EDGE OF THE EXCAVATION BELOW A LINE WITH SLOPE OF 2 HORIZONTAL TO 1 VERTICAL EXTENDING OUTWARD AND DOWNWARD FROM THE NEAREST BOTTOM CORNER OF THE EXISTING FOUNDATION SHALL BE MADE ONLY WITH THE APPROVAL OF THE STRUCTURAL ENGINEER AND THE PROJECT GEOTECHNICAL ENGINEER. SUCH EXCAVATIONS MAY REQUIRE SPECIAL TEMPORARY EXCAVATION BRACING OR UNDERPINNING OF EXISTING FOUNDATIONS, WHICH IS THE RESPONSIBILITY OF THE CONTRACTOR AS PART OF ITS SELECTED MEANS, METHODS, TECHNIQUES, SEQUENCES, OR PROCEDURES. CONTRACTOR SHALL SUBMIT TEMPORARY EXCAVATION BRACING AND UNDERPINNING DETAILS PRIOR TO EXCAVATION. CONTRACTOR SHALL PERFORM THESE EXCAVATIONS WITH CAUTION SO AS NOT TO UNDERMINE ANY EXISTING STRUCTURE FOUNDATIONS, AND EXCAVATIONS SHALL BE MADE IN ACCORDANCE WITH THE PROJECT GEOTECHNICAL ENGINEER'S RECOMMENDATIONS.
9. ELEVATION AND BEARING STRATA SHALL BE APPROVED BY A GEOTECHNICAL ENGINEER PRIOR TO PLACING CONCRETE.

CAST-IN-PLACE CONCRETE (03-30-00)

1. CONCRETE MIXTURES: REFER TO CONCRETE MIXTURE REQUIREMENTS TABLE FOR CONCRETE MIX INFORMATION.
2. CONCRETE MATERIALS:
   - A. CEMENTITIOUS MATERIALS
     - i. PORTLAND CEMENT: ASTM C150, TYPE II.
     - ii. BLENDED HYDRAULIC CEMENT: ASTM C595, TYPE IL, PORTLAND LIMESTONE CEMENT
     - iii. FLY ASH: ASTM C618, CLASS F OR C. FLY ASH SHALL NOT EXCEED 25% OF TOTAL CEMENTITIOUS CONTENT BY MASS.
     - iv. GROUND GRANULATED BLAST FURNACE SLAG: ASTM C989, GRADE 100 OR 120. COMBINATION SLAG AND FLY ASH SHALL NOT EXCEED 50% OF TOTAL CEMENTITIOUS CONTENT BY MASS.
   - B. AGGREGATES:
     - i. NORMAL WEIGHT AGGREGATES: ASTM C33, COARSE GRADED.
   - C. ADMIXTURES: ADMIXTURES CONTAINING CHLORIDE ARE NOT PERMITTED IN REINFORCED CONCRETE OR CONCRETE CONTAINING METALS.
     - i. WATER REDUCING ADMIXTURE: ASTM C494.
     - ii. PLASTICIZING ADMIXTURE: ASTM C1017.
     - iii. AIR ENTRAINING ADMIXTURE: ASTM C260.
   - D. WATER: ASTM C94 AND POTABLE
   - E. COLOR PIGMENT: ASTM C979/C979M, SYNTHETIC MINERAL-OXIDE PIGMENTS OR COLORED WATER-REDUCING ADMIXTURES; COLOR STABLE, NONFADING, AND RESISTANT TO LIME AND OTHER ALKALIS.
     - i. COLOR: MATCH ARCHITECT'S SAMPLE.
3. FORM-FACING PANELS:
   - A. FINISHES: BOARD FORMED CONCRETE FINISH.
4. DETAILING REQUIREMENTS
   - A. PROVIDE 3/4" CHAMFER AT CORNERS OF EXPOSED CONCRETE.
   - B. PROVIDE CONTRACTION/CONSTRUCTION JOINTS IN CONCRETE WALLS AT A MAXIMUM SPACING OF TWICE THE HEIGHT OF THE WALL ABOVE THE TOP OF FOOTING. MAXIMUM JOINT SPACING SHALL NOT EXCEED 24 FT. CONTRACTION JOINTS SHALL HAVE A 1-1/2" DEEP BY 3/4" WIDE TAPERED REVEAL EACH SIDE OF THE WALL. AT CONTRACTION JOINTS, EVERY OTHER HORIZONTAL BAR SHALL BE CUT BACK 1-1/2" FROM THE CONTRACTION JOINT. CONSTRUCTION JOINTS SHALL BE FORMED SIMILAR TO CONTRACTION JOINTS. AT CONSTRUCTION JOINTS, ALL HORIZONTAL STEEL SHALL BE DISCONTINUOUS AND A DOWEL BAR OF SIZE AND SPACING TO MATCH THE HORIZONTAL REINFORCING SHALL BE EMBEDDED A MINIMUM OF 40 BAR DIAMETERS EACH SIDE OF THE CONSTRUCTION JOINT. SEE ARCHITECTURAL DRAWINGS FOR ARCHITECTURAL JOINT TREATMENT.
   - C. CONDUITS AND PIPES OF ALUMINUM SHALL NOT BE EMBEDDED IN STRUCTURAL CONCRETE UNLESS EFFECTIVELY COATED TO PREVENT ALUMINUM-CONCRETE REACTION OR ELECTROLYTIC ACTION BETWEEN ALUMINUM AND STEEL.
5. CONCRETE PLACEMENT
   - A. DO NOT BACKFILL AGAINST RETAINING WALLS UNTIL CONCRETE STRENGTH HAS REACHED 0.75 f'c AND A MINIMUM OF 7 DAYS.
6. PERFORMANCE
   - A. CONCRETE WORK IN COLD WEATHER SHALL CONFORM TO ALL REQUIREMENTS OF ACI 306.1-90 "STANDARD SPECIFICATION FOR COLD WEATHER CONCRETING" AND ACI 306R-16 "GUIDE TO COLD WEATHER CONCRETING".
   - B. CONCRETE WORK IN HOT WEATHER SHALL CONFORM TO ALL REQUIREMENTS OF ACI 305.1-14 "SPECIFICATION FOR HOT WEATHER CONCRETING" AND ACI 305R-10 "GUIDE TO HOT WEATHER CONCRETING". THE AIR TEMPERATURE, RELATIVE HUMIDITY, CONCRETE TEMPERATURE, AND WIND SPEED SHALL BE ENTERED INTO NOMOGRAPH FIGURE 4.2 IN ACI 305R-10 TO DETERMINE IF PRECAUTIONS AGAINST PLASTIC SHRINKAGE ARE REQUIRED.
   - C. TOLERANCES: CONFORM TO ACI 117-2010
   - D. IF CONCRETE ARRIVES AT THE POINT OF DELIVERY WITH A SLUMP BELOW THAT WHICH WILL RESULT IN THE SPECIFIED SLUMP AT THE POINT OF PLACEMENT AND IS UNSUITABLE FOR PLACING AT THAT SLUMP, THE SLUMP MAY BE ADJUSTED ONCE ONLY TO THE REQUIRED VALUE BY ADDING WATER UP TO THE AMOUNT ALLOWED IN THE ACCEPTED MIXTURE PROPORTIONS. ADDITION OF WATER SHALL BE IN ACCORDANCE WITH ASTM C94. DO NOT EXCEED THE SPECIFIED WATER-CEMENTITIOUS MATERIAL RATIO OR SLUMP IN THE APPROVED MIX DESIGN. DO NOT ADD WATER TO CONCRETE DELIVERED IN EQUIPMENT NOT ACCEPTABLE FOR MIXING. AFTER PLASTICIZING OR WATER REDUCING ADMIXTURES ARE ADDED TO THE CONCRETE AT THE SITE TO ACHIEVE FLOWABLE CONCRETE, DO NOT ADD WATER TO THE CONCRETE. MEASURE SLUMP (AND AIR CONTENT OF AIR ENTRAINED CONCRETE), AFTER SLUMP ADJUSTMENT, TO VERIFY COMPLIANCE WITH SPECIFIED REQUIREMENTS.
   - E. SLUMP SHALL BE MEASURED PRIOR TO THE ADDITION OF ADMIXTURES AND AFTER THE ADDITION OF ADMIXTURES.
7. SUBMITTALS:
   - A. CONCRETE MIX DESIGNS: CONCRETE MIX DESIGNS INCLUDING PRODUCT DATA FOR ALL CONSTITUENTS AND ADMIXTURES SHALL BE SUBMITTED FOR EACH TYPE OF CONCRETE TO THE STRUCTURAL ENGINEER FOR APPROVAL IN ACCORDANCE WITH ACI 301-16 FIELD TEST DATA OR TRIAL MIXTURES. SUBMITTAL DATA MUST INCLUDE FIELD TEST DATA FROM AT LEAST 10 TESTS OR A THREE POINT CURVE GENERATED USING TRIAL MIXTURES.
   - B. PRODUCT DATA FOR CURING MATERIALS
   - C. PROPOSED CONSTRUCTION + CONTRACTION JOINT LOCATIONS
8. QUALITY ASSURANCE
   - A. CONCRETE WORK AND TESTING, AS PERFORMED BY "QUALIFIED FIELD TESTING TECHNICIANS" AND "QUALIFIED LABORATORY TECHNICIANS", SHALL CONFORM TO ALL REQUIREMENTS OF ACI 301-16, "SPECIFICATIONS FOR STRUCTURAL CONCRETE FOR BUILDINGS", EXCEPT AS MODIFIED BY THE SUPPLEMENTAL REQUIREMENTS ABOVE. REPORTS FROM TESTS REQUIRED BY SECTION 1.6 OF ACI 301-16 SHALL BE SUBMITTED TO STRUCTURAL ENGINEER, ARCHITECT, OWNER, CONTRACTOR, CONCRETE SUPPLIER, AND BUILDING OFFICIAL.

CONCRETE REINFORCING (03-20-00)

1. MATERIALS
   - A. DEFORMED BARS: ASTM A615, GRADE 60.
2. REINFORCING DEVELOPMENT AND LAP SPLICES (UNLESS OTHERWISE NOTED)
   - A. SEE REINFORCING BAR DEVELOPMENT TABLES FOR REQUIRED DEVELOPMENT AND LAP SPLICE LENGTHS.
3. DETAILING REQUIREMENTS
   - A. PROVIDE 3/4" CHAMFER AT CORNERS OF EXPOSED CONCRETE.
   - B. PROVIDE CONTRACTION/CONSTRUCTION JOINTS IN CONCRETE WALLS AT A MAXIMUM SPACING OF TWICE THE HEIGHT OF THE WALL ABOVE THE TOP OF FOOTING. MAXIMUM JOINT SPACING SHALL NOT DIMENSIONS NOTED ON DRAWINGS. CONTRACTION JOINTS SHALL HAVE A 1-1/2" DEEP BY 3/4" WIDE TAPERED REVEAL EACH SIDE OF THE WALL. AT CONTRACTION JOINTS, EVERY OTHER HORIZONTAL BAR SHALL BE CUT BACK 1-1/2" FROM THE CONTRACTION JOINT. CONSTRUCTION JOINTS SHALL BE FORMED SIMILAR TO CONTRACTION JOINTS. AT CONSTRUCTION JOINTS, ALL HORIZONTAL STEEL SHALL BE DISCONTINUOUS AND A DOWEL BAR OF SIZE AND SPACING TO MATCH THE HORIZONTAL REINFORCING SHALL BE EMBEDDED A MINIMUM OF 40 BAR DIAMETERS EACH SIDE OF THE CONSTRUCTION JOINT. SEE ARCHITECTURAL DRAWINGS FOR ARCHITECTURAL JOINT TREATMENT.
   - C. CONDUITS AND PIPES OF ALUMINUM SHALL NOT BE EMBEDDED IN STRUCTURAL CONCRETE UNLESS EFFECTIVELY COATED TO PREVENT ALUMINUM-CONCRETE REACTION OR ELECTROLYTIC ACTION BETWEEN ALUMINUM AND STEEL.
4. PERFORMANCE
   - A. COMPLY WITH CRSI'S "MANUAL OF STANDARD PRACTICE" FOR PLACING AND SUPPORTING REINFORCEMENT.
   - B. REINFORCING BARS SHALL HAVE CLEAR COVER AS INDICATED ON THE DRAWINGS. WHERE NOT INDICATED, PROVIDE MINIMUM CLEAR COVER PER ACI-318.
   - C. REINFORCING BARS SHALL BE FREE OF DIRT AND FORM RELEASE AGENTS.
5. SUBMITTALS
   - A. SHOP DRAWINGS FOR REINFORCING STEEL (COMPLY WITH ACI SP-066):

SPECIAL INSPECTIONS

1. SPECIAL INSPECTIONS ARE REQUIRED BY SECTION 1704 OF THE REFERENCED BUILDING CODE. THE INTENT OF SPECIAL INSPECTIONS IS TO VERIFY THE COMPLIANCE OF MATERIALS, INSTALLATION, FABRICATION, ERECTION AND/OR PLACEMENT OF COMPONENTS WITH THE COMPLETED SET OF CONSTRUCTION DOCUMENTS AND REFERENCED STANDARDS. IT IS THE RESPONSIBILITY OF ALL PARTIES INVOLVED TO BECOME FAMILIAR WITH THE SPECIAL INSPECTION REQUIREMENTS SET FORTH IN CHAPTER 17 OF THE REFERENCED BUILDING CODE. SPECIAL INSPECTIONS SHALL BE PROVIDED BY THE OWNER OR THE OWNER'S AGENT AND SHALL NOT BE CONSIDERED IN THE SCOPE OF WORK OF THE CONTRACTOR.
   - A. THE FOLLOWING SCHEDULE OF SPECIAL INSPECTIONS FOR STRUCTURAL WORK HAS BEEN PREPARED IN ACCORDANCE WITH SECTIONS 106.1 AND 1704 OF THE REFERENCED BUILDING CODE. SEE OTHERS FOR SPECIAL INSPECTION REQUIREMENTS FOR NON-STRUCTURAL WORK. THE SPECIAL INSPECTOR(S) SHALL COORDINATE WITH THE OWNER, CONTRACTORS, AND DESIGN PROFESSIONALS AND SCHEDULE ALL INSPECTIONS ACCORDINGLY.

SCHEDULE OF SPECIAL INSPECTION SERVICES - 1705.6 SOILS

Item	Sub Item / Scope	Extent			Agency Qualifications	Comments
		Cont.	Periodic	N/A		
1. Bearing Materials	Verify materials below shallow foundations are adequate to achieve the design bearing capacity.		X		Testing Agency Under supervision of Licensed Geotechnical Engineer	
2. Excavations	Verify excavations are extended to proper depth and have reached proper material		X		Testing Agency Under supervision of Licensed Geotechnical Engineer	
3. Fill Classification	Perform classification and testing of compacted fill materials		X		Testing Agency Under supervision of Licensed Geotechnical Engineer	
4. Placement and Fill Compaction	Verify use of proper materials, densities, and lift thicknesses during placement and compaction of compacted fill	X			Testing Agency Under supervision of Licensed Geotechnical Engineer	
5. Subgrade	Prior to placement of compacted fill, inspect subgrade and verify that the site has been prepared properly		X		Testing Agency Under supervision of Licensed Geotechnical Engineer	

SCHEDULE OF SPECIAL INSPECTION SERVICES - 1705.3 CONCRETE CONSTRUCTION

Item	Sub Item / Scope	Extent			Agency Qualifications	Comments
		Cont.	Periodic	N/A		
In-Plant Special Inspections (Precast Concrete)	**Fabrication and implementation procedures:** In addition to special inspections provided on site, provide special inspections indicated below on the premises of fabricator's shop. Verify that the fabricator maintains detailed fabrication and quality control procedures.			X	As Noted Below	Special inspections on the premises of the fabricator's shop are not required provided the fabricator is an *Approved Fabricator* in accordance with section 1704.2.5.1. Fabricator is required to submit documentation/certification that they are an *Approved Fabricator*.
1. Reinforcing steel	a. **Mild Reinforcing Steel:** Inspect size, spacing, cover, positioning and grade of reinforcing steel: Verify that reinforcing bars are free of form oil or other deleterious materials. Inspect bar laps and mechanical splices. Verify that bars are adequately tied and supported on chairs or bolsters. Verify welded wire fabric is supported per construction documents. Reference ACI 318: 20, 25.2, 25.3, 26.6-1-26.6-3, and IBC 1908.4.		X		Testing Agency	
	b. **Prestress Steel:** Inspect size, spacing, cover, and position of prestressing tendons:			X	Testing Agency	
2. Welding of Reinforcing Steel	a. Verify weldability of reinforcing bars other than ASTM A706. Reference ACI 318: 26.6.4 and AWS D1.4			X	Testing Agency	
	b. Inspect single pass fillet welds, maximum 5/16"			X	Testing Agency AWS - Certified Welding Inspector	
	c. Inspect all other welds			X	Testing Agency AWS - Certified Welding Inspector	
3. Cast in Place Anchor Rods	Inspect size, position and embedment of cast in place bolts and anchor rods. Inspect concrete placement and consolidation around anchors. Reference ACI 318: 17.8.2			X	Testing Agency	
4. Post Installed Anchors (Anchors installed in Hardened Concrete)	a. Adhesive anchors installed in horizontally or upwardly inclined orientations to resist sustained tension loads. Inspect type and size of anchor, concrete type and compressive strength, hole cleaning procedures, anchor embedment, anchor spacing and edge distances, and tightening torque (where applicable). Reference ACI 318: 17.8.2.4			X	Testing Agency	Reference evaluation report (identified in project general notes) for additional inspection scope required by manufacturer.
	b. Mechanical anchors and adhesive anchors not defined in 4.a. Inspect type and size of anchor, concrete type and compressive strength, hole cleaning procedures, anchor embedment, anchor spacing and edge distances, and tightening torque (where applicable). Reference ACI 318: 17.8.2			X	Testing Agency	
5. Mix Design	Prior to concrete placement, fabricate specimens for strength tests, perform slump and air content tests, and determine the temperature of the concrete.		X		Testing Agency	
6. Sampling and Testing of Concrete	At the time fresh concrete is sampled to fabricate specimens for strength tests, perform slump and air content tests as required by construction documents, and determine the temperature of concrete. Reference ASTM C 172, ASTM C31, ACI 318 19, 26.4.3, 26.4.4, and IBC 1904.1, 1904.2, 1908.2, 1908.3	X			Testing Agency	
7. Concrete and Shotcrete Placement	Inspect concrete and shotcrete placement for proper application techniques. Reference ACI 318: 26.5 and IBC 1908.6, 1908.7, and 1908.8. Verify that concrete conveyance and depositing avoids segregation or contamination. Verify that concrete is properly consolidated.	X			Testing Agency	
8. Curing and Protection	Inspect for maintenance of specified curing temperature and techniques. Inspect cold weather and hot weather protection procedures as applicable. Reference ACI 318: 26.5.3-26.5.5 and IBC 1908.9.		X		Testing Agency	
9. Prestressed (Post-tensioned) Concrete	a. **Application of Prestressing Forces:** Inspect placement, stressing, grouting and protection of post-tensioning tendons. Verify that tendons are correctly positioned, supported, tied and wrapped. Record tendon elongations. Reference ACI 318: 26.10.2			X	Testing Agency	
	b. **Grouting of Bonded Prestressing Tendons in the Seismic-Force Resisting System:** Reference ACI 318: 26.10.1			X	Testing Agency	
10. Precast Concrete Erection	Inspect erection of precast concrete including member configuration, connections, welding and grouting. Reference ACI 318: Ch 26.9			X	Testing Agency	
11. Verification of In-Situ Concrete Strength	Verify concrete strength prior to the removal of shores and forms from beams and structural slabs and prior to the stressing of tendons in post-tensioned concrete. Reference ACI 318: 26.10.2 & 26.11.11.2		X		Testing Agency	
12. Formwork Geometry	Inspect formwork for shape, location and dimensions of the concrete member being formed. Reference ACI 318: 26.11		X		Testing Agency	

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STAMP:

Registered Professional Engineer (Civil)
CERTIFICATE NO. 66205
JOHN W. HECK
Date Signed 07/09/2025
ARIZONA, U.S.A.
Expires 3/31/27

Site Improvments at the Residence of Phillip Westbrooks

6341 North 34th Place
Paradise Valley, AZ 85253

ENGINEER: Designer
MODELER: Author
CHECKED BY: Checker

ISSUE/REVISION/SUBMISSION

NO	DATE	DESCRIPTION

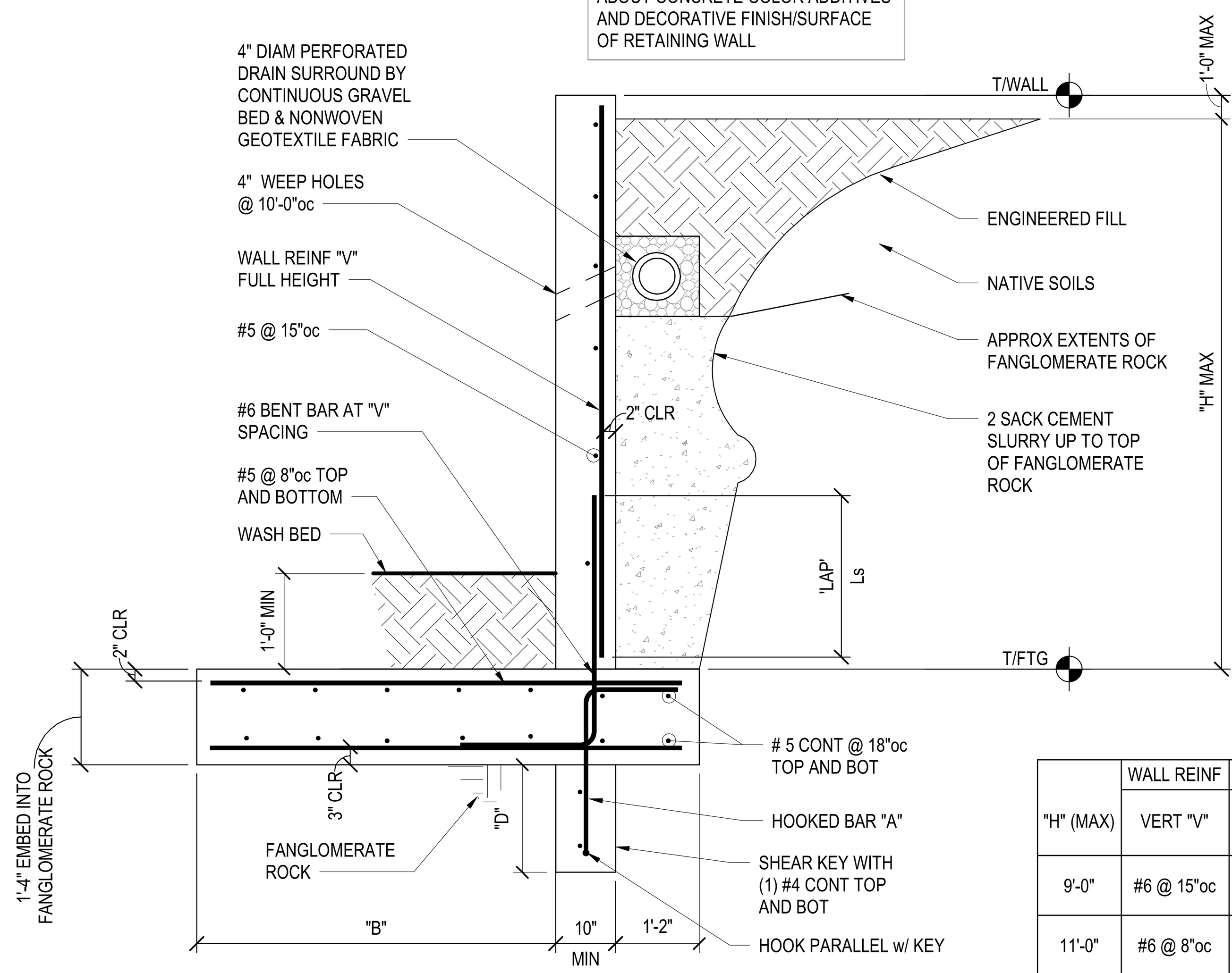
PROJECT NUMBER: **2420.70**

SHEET NAME: **GENERAL NOTES**

DATE: **07/07/2025**

SHEET: **S001**

SEE ARCH FOR MORE INFORMATION ABOUT CONCRETE COLOR ADDITIVES AND DECORATIVE FINISH/SURFACE OF RETAINING WALL



CONTROL JOINTS @ 18'-0"oc (MAX)

NOTE: STEPS IN RETAINING WALL FOOTING HAVE BEEN COORDINATED WITH SITE CIVIL. SEE GRADING AND DRAINAGE PLAN FROM KBELL ENGINEERING, LLC.

"H" (MAX)	WALL REINF	FOOTING SIZE & REINF			
	VERT "V"	"D" DEPTH @ SHEAR KEY	"B" WIDTH	LONGITUDINAL REINF	HOOKED BAR "A"
9'-0"	#6 @ 15"oc	1'-0"	4'-0"	SEE SECTION	#6 @ 18"oc CENTERED IN KEY
11'-0"	#6 @ 8"oc	1'-8"	5'-0"	SEE SECTION	#6 @ 18"oc CENTERED IN KEY
13'-0"	#6 @ 5"oc	2'-4"	7'-0"	SEE SECTION	#6 @ 6"oc CENTERED IN KEY

RETAINING WALL HAS NOT BEEN DESIGNED FOR FUTURE STRUCTURE OR SURCHARGE LOAD (SUCH AS HOUSE ADDITION OR POOL)

SECTION 1/S201
1/2" = 1'-0"

SCHEDULE OF TENSION DEVELOPMENT AND LAP SPLICE LENGTHS

EXTERIOR RETAINING WALLS & FOOTINGS (f'c = 4500PSI)

BAR SIZE	Ld		Ls		Ldh
	OTHER BARS	TOP BARS	OTHER BARS	TOP BARS	
	(in)	(in)	(in)	(in)	(in)
#3	14	18	18	23	7
#4	18	24	24	31	9
#5	23	30	30	38	12
#6	27	35	35	46	14
#7	40	51	51	67	16
#8	45	59	59	76	18
#9	51	66	66	86	21
#10	57	74	74	96	23
#11	64	82	82	107	26
#14	76	99	99	128	31

LAP AND DEVELOPMENT TABLE CRITERIA:

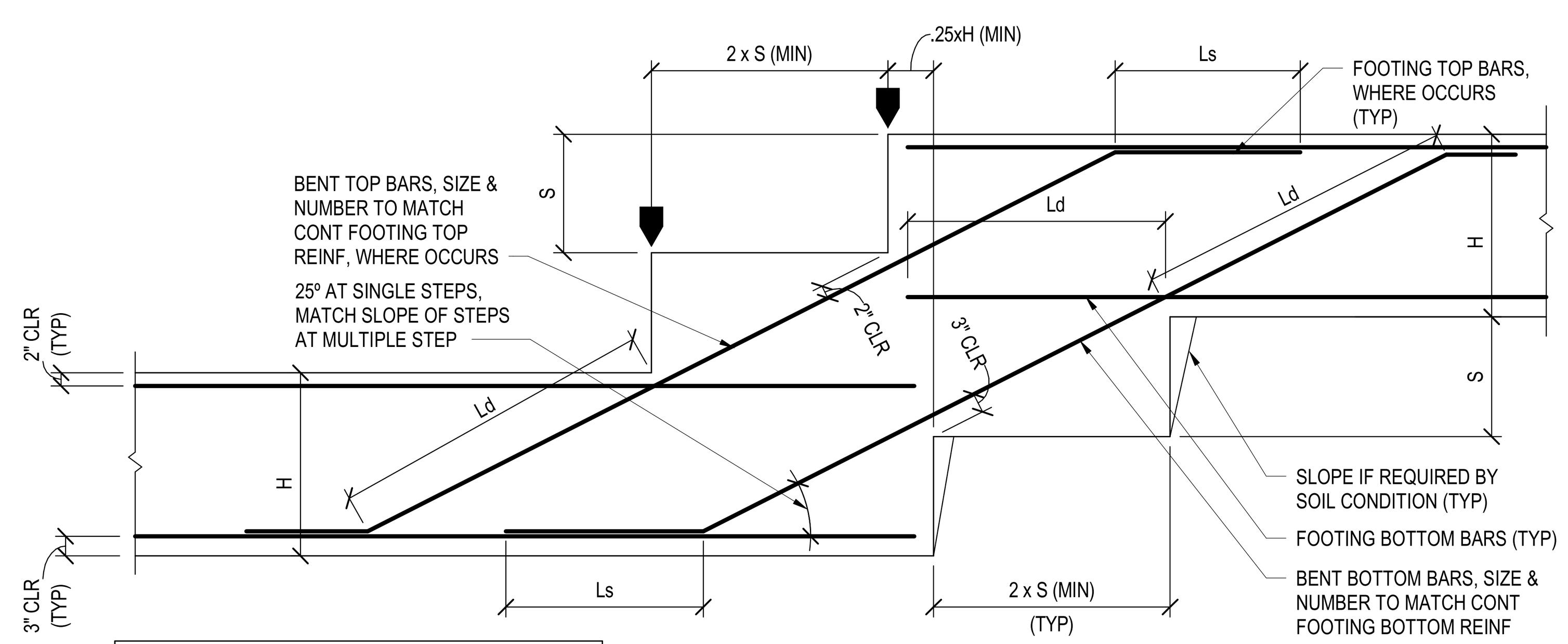
A. GRADE 60 UNCOATED REINFORCING STEEL
  i. FOR EPOXY COATED: MULTIPLY Ld, Ls BY 1.5; Ldh BY 1.2
B. NORMAL WEIGHT CONCRETE
  i. FOR LIGHTWEIGHT CONCRETE: MULTIPLY Ld, Ls, Ldh BY 1.33
C. CLEAR COVER GREATER THAN db
D. MIN 2*db CLEAR SPACING BETWEEN BARS

FOR BARS THAT DO NOT MEET THE CLEAR COVER OR CLEAR SPACING INDICATED:

#6 AND SMALLER: Ld = 54 BAR DIAMETERS; Ls = 70 BAR DIAMETERS
#7 AND LARGER: Ld = 68 BAR DIAMETERS; Ls = 88 BAR DIAMETERS
FOR TOP BARS MULTIPLY BY 1.3
MINIMUM Ld AND Ls = 12"

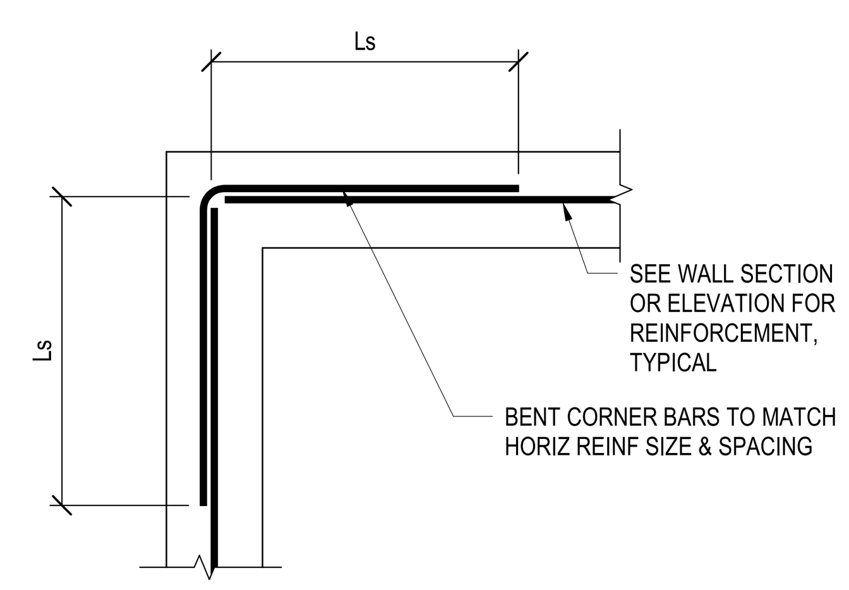
LAP AND DEVELOPMENT TABLE NOTES & DEFINITIONS:

A. TOP BARS = HORIZ BARS WITH MORE THAN 12" OF CONCRETE CAST BELOW THE BARS
B. db = BAR DIAMETER
C. s = CENTER-TO-CENTER BAR SPACING
D. Ath = TOTAL AREA OF TIES OR STIRRUPS CONFINING HOOKED BARS
E. Ahs = TOTAL AREA OF HOOKED BARS BEING DEVELOPED
F. WHERE BARS OF DIFFERENT SIZES ARE SPLICED, Ls FOR THE LARGER BAR SHALL BE USED
G. ALL TENSION SPLICES SHALL BE CLASS B, UNLESS NOTED OTHERWISE
H. Ldh VALUES FOR #11 BARS AND SMALLER MAY BE REDUCED AS FOLLOWS (PER ACI 318-14)
  i. MULTIPLY BY 0.70 FOR (1) OR (2)
    (1) SIDE COVER ≥ 2 1/2"
    (2) 90° HOOKS WITH COVER ON BAR EXTENSION BEYOND HOOK ≥ 2"
  ii. MULTIPLY BY 0.80 FOR (3), (4), or (5)
    (3) 90° HOOKS ENCLOSED ALONG Ldh WITHIN TIES OR STIRRUPS AT s ≤ 3db
    (4) 90° HOOKS ENCLOSED ALONG THE BAR EXTENSION WITHIN TIES OR STIRRUPS AT s ≤ 3db
    (5) 180° HOOKS ENCLOSED ALONG Ldh WITHIN TIES OR STIRRUPS AT s ≤ 3db
  iii. Ldh SHALL NOT BE LESS THAN THE LARGER OF 8db OR 6" WITH REDUCTIONS APPLIED



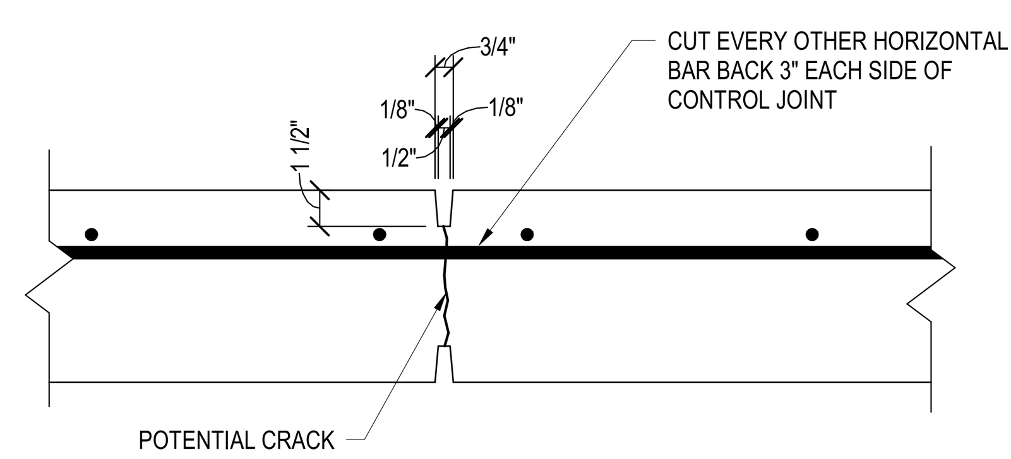
NOTES:
1. SEE 1/S201 FOR FTG SIZE & REINF
2. S = STEP IN FOOTING (TOP & BOTTOM), 2'-0" MAX
   H = DEPTH OF FOOTING

TYPICAL STEP IN FOOTING
NTS



NOTES:
1. VERTICAL REINFORCEMENT BARS NOT SHOWN FOR CLARITY.

TYPICAL CONCRETE WALL CORNER REINFORCEMENT DETAIL AT SINGLE CURTAIN OF STEEL
NTS



CONCRETE WALL TYPICAL VERTICAL CONTROL JOINT
NTS

CONCRETE MIXTURE REQUIREMENTS										
CONCRETE CLASS	DESCRIPTION	EXPOSURE CLASS				MINIMUM f'c AT 28 DAYS (PSI)	MAXIMUM w/c RATIO	AIR CONTENT	MINIMUM CEMENTITIOUS MATERIAL (LB/CY)	REMARKS
		F	S	W	C					
J	EXTERIOR RETAINING WALLS & FOOTINGS	F1	S0	W1	C1	4500	0.50	6% ±1.5%	--	--

CONCRETE MIXTURE NOTES:
A. PROVIDE MIX DESIGNS IN ACCORDANCE WITH **ACI 301-16** FOR SPECIFIED EXPOSURE CLASS AND AGGREGATE.
B. NOMINAL MAX AGGREGATE SIZE = **3/4"** UNLESS OTHERWISE NOTED
C. ALL CONCRETE SHALL BE NORMAL WEIGHT UNLESS OTHERWISE NOTED

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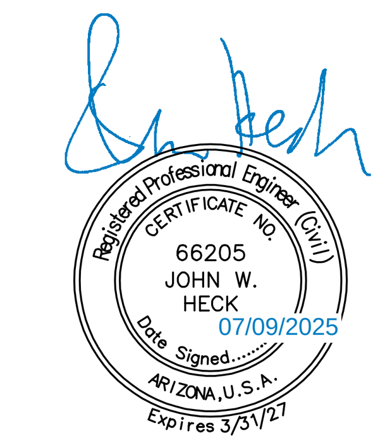
STAMP:



Site Improvments at the Residence of Phillip Westbrooks

6341 North 34th Place
Paradise Valley, AZ 85253

ENGINEER: JWH
MODELER: DAP
CHECKED BY: JWH

ISSUE/REVISION/SUBMISSION

NO	DATE	DESCRIPTION

PROJECT NUMBER:
2420.70

SHEET NAME:
TYPICAL FOUNDATION DETAILS & SECTIONS

DATE:
07/07/2025

SHEET:
S201

G:\24\SelDesign, LLC - Pho - 10136141\24-2070\60-Drawings\schaefer\current\PV RETAINING WALL_R22.rte
7/9/2025 12:07:19 PM
Owner 2420.70

June 30, 2025

schaefer CONNECT

Prepared For
Phillip Westbrooks
Home Owner
6341 North 34th Place
Paradise Valley, AZ 85253

Re: Retaining wall
Schaefer Project Number: 2420.70

The attached drawings and calculations have been prepared for Phillip Westbrooks and pertain to the defined scope of the work performed by Schaefer. The structure(s) have been reviewed according to the 2015 IBC. The engineering seal on this cover letter shall apply to the attached calculations and drawings.

Do not hesitate to contact Schaefer should you have any questions regarding this submittal package or require further information.

Prepared By:
John Heck, PE, SE
Project Manager

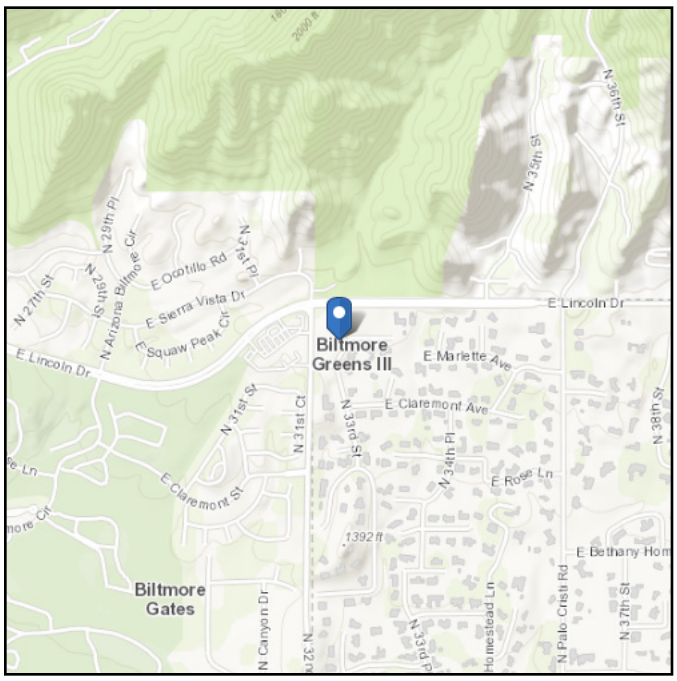
Enclosure

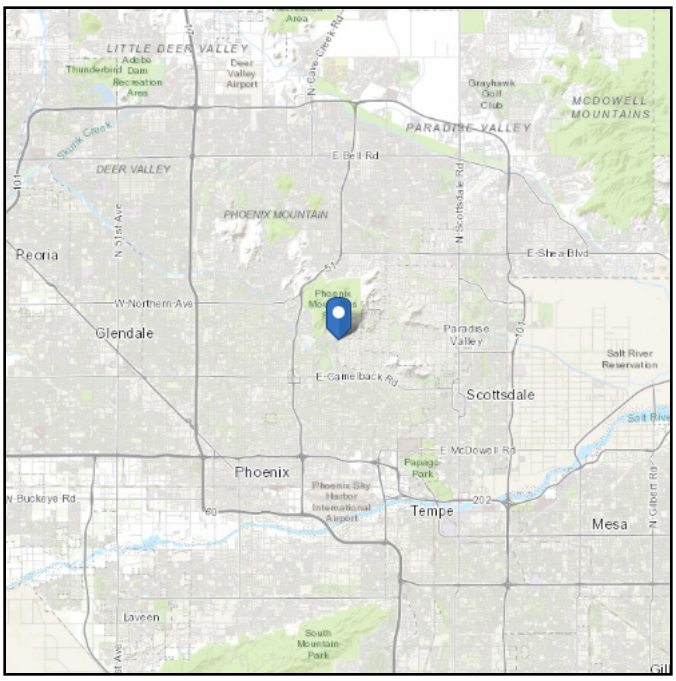
schaefer-inc.com
2800 North Central Avenue, Suite 1250
Phoenix, Arizona 85004
800.542.3302

ASCE Hazards Report

Address:
No Address at This Location

Standard:	ASCE/SEI 7-10	**Latitude:**	33.530759
Risk Category:	II	**Longitude:**	-112.011976
Soil Class:	C - Very Dense Soil and Soft Rock	**Elevation:**	1375.9774675909887 ft (NAVD 88)





Wind

Results:

Wind Speed	115 Vmph
10-year MRI	76 Vmph
25-year MRI	84 Vmph
50-year MRI	90 Vmph
100-year MRI	96 Vmph

Data Source: ASCE/SEI 7-10, Fig. 26.5-1A and Figs. CC-1–CC-4, and Section 26.5.2, incorporating errata of March 12, 2014

Date Accessed: Mon Jun 30 2025

Value provided is 3-second gust wind speeds at 33 ft above ground for Exposure C Category, based on linear interpolation between contours. Wind speeds are interpolated in accordance with the 7-10 Standard. Wind speeds correspond to approximately a 7% probability of exceedance in 50 years (annual exceedance probability = 0.00143, MRI = 700 years).

Site is not in a hurricane-prone region as defined in ASCE/SEI 7-10 Section 26.2.

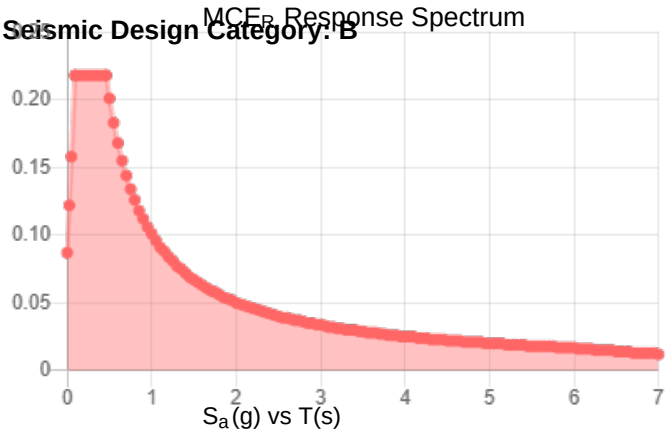
Seismic

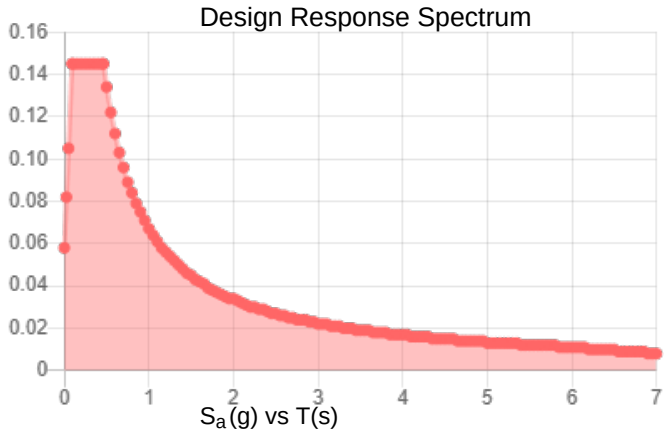
Site Soil Class: C - Very Dense Soil and Soft Rock

Results:

S_S :	0.181	S_{D1} :	0.067
S_1 :	0.059	T_L :	6
F_a :	1.2	PGA :	0.074
F_v :	1.7	PGA_M :	0.089
S_{MS} :	0.218	F_{PGA} :	1.2
S_{M1} :	0.101	I_e :	1
S_{DS} :	0.145		

Seismic Design Category: B





Data Accessed: Mon Jun 30 2025

Date Source:

USGS Seismic Design Maps based on ASCE/SEI 7-10, incorporating Supplement 1 and errata of March 31, 2013, and ASCE/SEI 7-10 Table 1.5-2. Additional data for site-specific ground motion procedures in accordance with ASCE/SEI 7-10 Ch. 21 are available from USGS.

Rain

Results:

15-minute Precipitation Intensity: 4.87 in./h

60-minute Precipitation Intensity: 2.03 in./h

Data Source: NOAA National Weather Service, Precipitation Frequency Data Server, Atlas 14 (https://www.nws.noaa.gov/oh/hdsc/)

Date Accessed: Mon Jun 30 2025

Project Title:
Engineer:
Project ID:
Project Descr:

Cantilevered Retaining Wall

Project File: 2420.70 PV Retaining Wall.ec6

LIC# : KW-06011769, Build:20.25.05.28 Schaefer (c) ENERCALC, LLC 1982-2025

DESCRIPTION: site retaining wall 13ft max

Code Reference

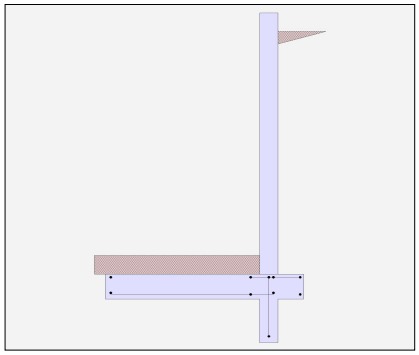
Calculations per IBC 2021, ACI 318-19, TMS 402-16

Criteria

Retained Height	=	13.00 ft
Wall height above soil	=	1.00 ft
Slope Behind Wall	=	0.00
Height of Soil over Toe	=	12.00 in
Water table above bottom of footing	=	0.0 ft

Soil Data

Allow Soil Bearing	=	3,500.0 psf
Equivalent Fluid Pressure Method		
Active Heel Pressure	=	38.0 psf/ft
	=	
Passive Pressure	=	366.0 psf/ft
Soil Density, Heel	=	110.00 pcf
Soil Density, Toe	=	110.00 pcf
Footing||Soil Friction	=	0.520
Soil height to ignore for passive pressure	=	12.00 in



Surcharge Loads

Surcharge Over Heel	=	60.0 psf
NOT Used To Resist Sliding & Overturning		
Surcharge Over Toe	=	0.0
NOT Used for Sliding & Overturning		

Axial Load Applied to Stem

Axial Dead Load	=	0.0 lbs
Axial Live Load	=	0.0 lbs
Axial Load Eccentricity	=	0.0 in

Lateral Load Applied to Stem

Lateral Load	=	25.0 #/ft
...Height to Top	=	13.00 ft
...Height to Bottom	=	1.00 ft
Load Type	=	Wind (W) (Strength Level)
Wind on Exposed Stem (Strength Level)	=	25.0 psf

Adjacent Footing Load

Adjacent Footing Load	=	500.0 lbs
Footing Width	=	2.00 ft
Eccentricity	=	0.00 in
Wall to Ftg CL Dist	=	7.00 ft
Footing Type		Line Load
Base Above/Below Soil at Back of Wall	=	-2.0 ft
Poisson's Ratio	=	0.300

Project Title:
Engineer:
Project ID:
Project Descr:

Cantilevered Retaining Wall

Project File: 2420.70 PV Retaining Wall.ec6

DESCRIPTION: site retaining wall 13ft max

Design Summary

Wall Stability Ratios

Overturning	=	1.74	OK
Sliding	=	1.57	OK
Global Stability	=	1.05	

Total Bearing Load	=	7,934	lbs
...resultant ecc.	=	21.59	in

Eccentricity outside middle third

Soil Pressure @ Toe	=	1,554 psf	OK
Soil Pressure @ Heel	=	0 psf	OK
Allowable	=	3,500 psf	

Soil Pressure Less Than Allowable

ACI Factored @ Toe	=	2,200 psf	
ACI Factored @ Heel	=	0 psf	
Footing Shear @ Toe	=	38.7 psi	OK
Footing Shear @ Heel	=	14.7 psi	OK
Allowable	=	100.6 psi	

Sliding Calcs

Lateral Sliding Force	=	4,499.9 lbs

Vertical component of active lateral soil pressure IS NOT considered in the calculation of soil bearing pressures.

Load Factors

Building Code	
Dead Load	1.200
Live Load	1.600
Earth, H	1.600
Wind, W	1.000
Seismic, E	1.000

Stem Construction

		Bottom		
		Stem OK		
Design Height Above Ftg	ft =	0.00		
Wall Material Above "Ht"	=	Concrete		
Design Method	=	SD	SD	SD
Thickness	=	10.00		
Rebar Size	=	# 6		
Rebar Spacing	=	5.00		
Rebar Placed at	=	7.5 in		

Design Data

fb/FB + fa/Fa	=	**0.931**
Total Force @ Section		
Service Level	lbs =	
Strength Level	lbs =	6,048.3
Moment....Actual		
Service Level	ft-# =	
Strength Level	ft-# =	30,131.2
Moment.....Allowable	=	32,350.3
Shear.....Actual		
Service Level	psi =	
Strength Level	psi =	67.2
Shear.....Allowable	psi =	91.5
Anet (Masonry)	in2 =	
Wall Weight	psf =	125.0
Rebar Depth 'd'	in =	7.50

Masonry Data

f'm	psi =	
Fs	psi =	
Solid Grouting	=	
Modular Ratio 'n'	=	
Equiv. Solid Thick.	=	
Masonry Block Type	=	Medium Weight
Masonry Design Method	=	ASD

Concrete Data

f'c	psi =	4,500.0
Fy	psi =	60,000.0

Summary of Sliding Forces

	FS = 1.0	FS = 1.5
Lateral Force @ Base of Footing	4,499.87 lbs	6,749.80 lbs
less 100% Passive Force	- 3,802.33 lbs	- 3,802.33 lbs
less 100% Friction Force	- 3,274.27 lbs	- 3,274.27 lbs
Added Resisting Force Required	0.0 lbs	
Added Resisting Force Required for 1.5 Factor of Safety		0.00 lbs

Sliding Factor of Safety = 1.573: 1.00

Project Title:
Engineer:
Project ID:
Project Descr:

Cantilevered Retaining Wall

Project File: 2420.70 PV Retaining Wall.ec6

DESCRIPTION: site retaining wall 13ft max

Concrete Stem Rebar Area Details

Bottom Stem	Vertical Reinforcing	Horizontal Reinforcing	
As (based on applied moment) :	0.9312 in2/ft		
0.0018bh : 0.0018(12)(10) :	0.216 in2/ft	Horizontal Reinforcing Options :	
	==========	One layer of :	Two layers of :
Required Area :	0.9312 in2/ft	#4@ 11.11 in	#4@ 22.22 in
Provided Area :	1.056 in2/ft	#5@ 17.22 in	#5@ 34.44 in
Maximum Area :	1.775 in2/ft	#6@ 24.44 in	#6@ 48.89 in

Footing Data

Toe Width	=	7.00 ft
Heel Width	=	2.00
Total Footing Width	=	9.00
Footing Thickness	=	16.00 in
Key Width	=	10.00 in
Key Depth	=	28.00 in
Key Distance from Toe	=	7.00 ft

f'c = 4,500 psi Fy = 60,000 psi
Footing Concrete Density = 150.00 pcf
Min. As % = 0.0018
Cover @ Top 2.00 @ Btm.= 3.00 in

Footing Design Results

		Toe	Heel	Key	
Factored Pressure	=	2,200	0		psf
Mu' : Upward	=	38,383	1		ft-#
Mu' : Downward	=	9,114	1,397		ft-#
Mu: Design	=	29,269	1,396	6,711	ft-#
φ Mn	=	56,714	28,005	13,569	ft-#
Actual 1-Way Shear	=	38.74	14.72	87.79	psi
Allow 1-Way Shear	=	76.88	56.94	89.51	psi

Toe Reinforcing = # 6 @ 5.00 in
Heel Reinforcing = # 5 @ 8.00 in
Key Reinforcing = # 6 @ 8.00 in
Footing Torsion, Tu = 0.00 ft-lbs
Footing Allow. Torsion, φ Tn = 0.00 ft-lbs

If torsion exceeds allowable, provide supplemental design for footing torsion.

Other Acceptable Sizes & Spacings

Toe: #4@ 4.49 in, #5@ 6.97 in, #6@ 9.89 in, #7@ 13.49 in, #8@ 17.76 in, #9@ 18 in, #10@ 18 in

Heel: #4@ 6.94 in, #5@ 10.76 in, #6@ 15.27 in, #7@ 18 in, #8@ 18 in, #9@ 18 in, #10@ 18 in

Key: #4@ 7.54 in, #5@ 11.69 in, #6@ 16.6 in, #7@ 18 in, #8@ 18 in, #9@ 18 in, #10@ 18 in

Min footing T&S reinf Area 3.11 in2
Min footing T&S reinf Area per foot 0.35 in2 /ft

If one layer of horizontal bars:	If two layers of horizontal bars:
#4@ 6.94 in	#4@ 13.89 in
#5@ 10.76 in	#5@ 21.53 in
#6@ 15.28 in	#6@ 30.56 in

Project Title:
Engineer:
Project ID:
Project Descr:

Cantilevered Retaining Wall

Project File: 2420.70 PV Retaining Wall.ec6

DESCRIPTION: site retaining wall 13ft max

Summary of Overturning & Resisting Forces & Moments

Item		.....OVERTURNING..... Force lbs	Distance ft	Moment ft-#		.....RESISTING..... Force lbs	Distance ft	Moment ft-#
HL Act Pres (ab water tbl)		3,903.4	4.78	18,649.8	Soil Over HL (ab. water tbl)	1,668.3	8.42	14,041.8
HL Act Pres (be water tbl)					Soil Over HL (bel. water tbl)		8.42	14,041.8
Hydrostatic Force					Water Table			
Buoyant Force	=				Sloped Soil Over Heel	=		
Surcharge over Heel	=	297.1	7.17	2,129.2	Surcharge Over Heel	=		
Surcharge Over Toe	=				Adjacent Footing Load	= 16.7	8.67	144.4
Adjacent Footing Load	=	104.3	5.92	617.9	Axial Dead Load on Stem	=		
Added Lateral Load	=	180.0	8.33	1,500.0	* Axial Live Load on Stem	=		
Load @ Stem Above Soil	=	15.0	14.83	222.5	Soil Over Toe	= 770.0	3.50	2,695.0
	=				Surcharge Over Toe	=		
					Stem Weight(s)	= 1,750.0	7.42	12,979.2
					Earth @ Stem Transitions	=		
					Footing Weight	= 1,800.0	4.50	8,100.0
					Key Weight	= 291.7	7.42	2,163.2
					Vert. Component	=		
Total	=	4,499.9	**O.T.M.** =	23,119.4	**Total =**	6,296.7 lbs	**R.M.=**	40,123.6

Resisting/Overturning Ratio = **1.74**

Vertical Loads used for Soil Pressure = 7,933.6 lbs

* Axial live load NOT included in total displayed, or used for overturning resistance, but is included for soil pressure calculation.

Vertical component of active lateral soil pressure IS NOT considered in the calculation of Sliding Resistance.

Vertical component of active lateral soil pressure IS NOT considered in the calculation of Overturning Resistance.

Tilt

Horizontal Deflection at Top of Wall due to settlement of soil

(Deflection due to wall bending not considered)

Soil Spring Reaction Modulus	250.0	pci
Horizontal Defl @ Top of Wall (approximate only)	0.067	in

The above calculation is not valid if the heel soil bearing pressure exceeds that of the toe, because the wall would then tend to rotate into the retained soil.

Cantilevered Retaining Wall

DESCRIPTION: site retaining wall 13ft max

Rebar Lap & Embedment Lengths Information

Stem Design Segment: Bottom
Stem Design Height: 0.00 ft above top of footing

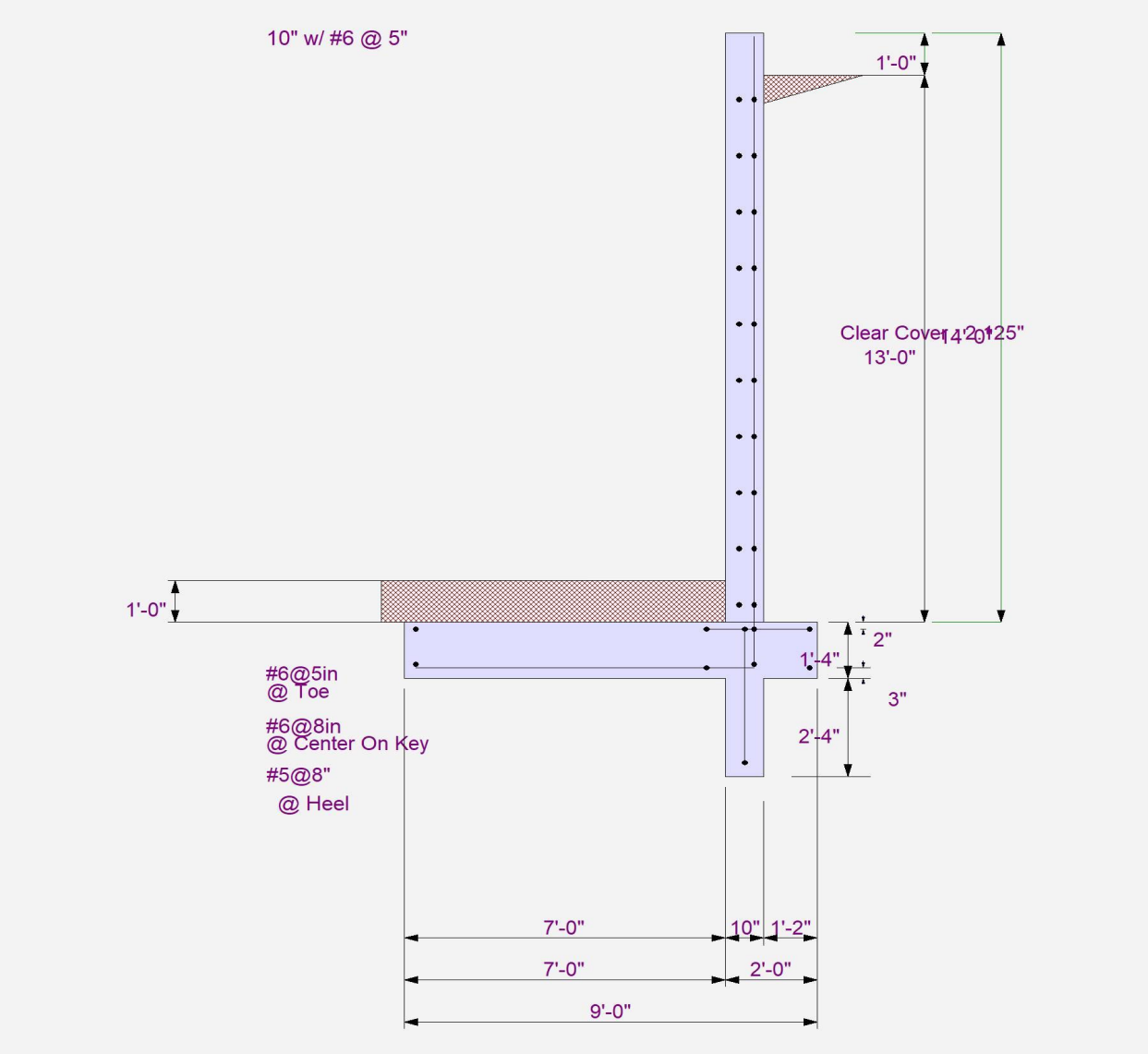
Lap Splice length for #6 bar specified in this stem design segment (25.4.2.4a) =	20.93 in
Development length for #6 bar specified in this stem design segment =	16.10 in
Hooked embedment length into footing for #6 bar specified in this stem design segment =	9.51 in
As Provided =	1.0560 in2/ft
As Required =	0.9312 in2/ft

Project Title:
Engineer:
Project ID:
Project Descr:

Cantilevered Retaining Wall

Project File: 2420.70 PV Retaining Wall.ec6

DESCRIPTION: site retaining wall 13ft max

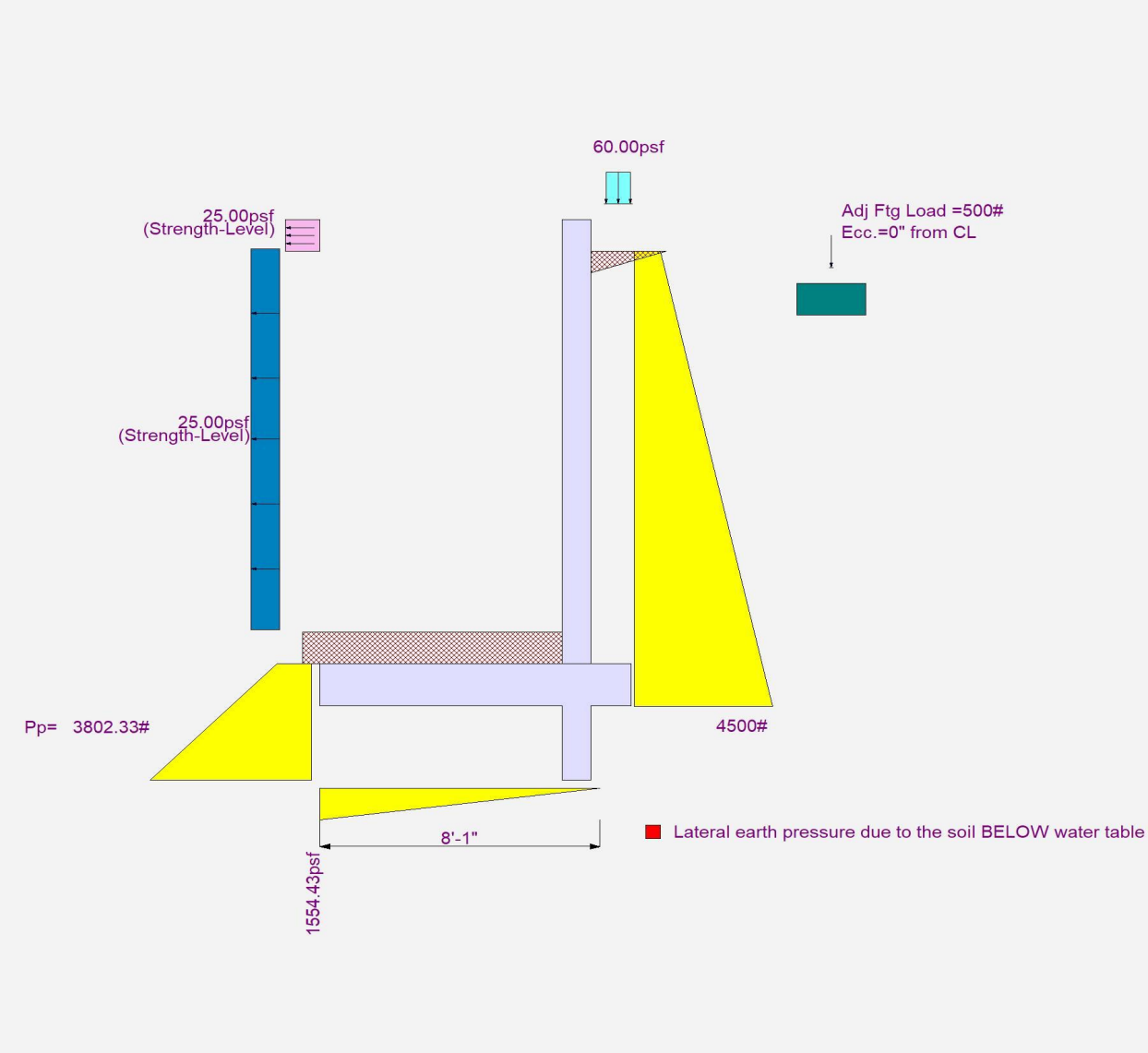


Project Title:
Engineer:
Project ID:
Project Descr:

Cantilevered Retaining Wall

Project File: 2420.70 PV Retaining Wall.ec6

DESCRIPTION: site retaining wall 13ft max



Project Title:
Engineer:
Project ID:
Project Descr:

Cantilevered Retaining Wall

Project File: 2420.70 PV Retaining Wall.ec6

DESCRIPTION: site retaining wall 11ft max

Code Reference

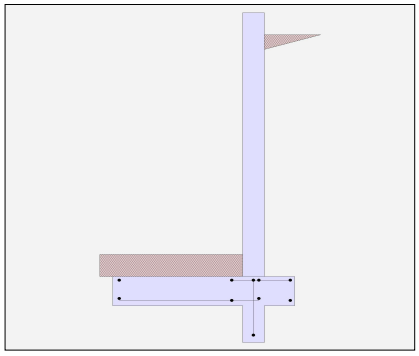
Calculations per IBC 2021, ACI 318-19, TMS 402-16

Criteria

Retained Height	=	11.00 ft
Wall height above soil	=	1.00 ft
Slope Behind Wall	=	0.00
Height of Soil over Toe	=	12.00 in
Water table above bottom of footing	=	0.0 ft

Soil Data

Allow Soil Bearing	=	3,500.0 psf
Equivalent Fluid Pressure Method		
Active Heel Pressure	=	38.0 psf/ft
	=	
Passive Pressure	=	366.0 psf/ft
Soil Density, Heel	=	110.00 pcf
Soil Density, Toe	=	110.00 pcf
Footing||Soil Friction	=	0.520
Soil height to ignore for passive pressure	=	12.00 in



Surcharge Loads

Surcharge Over Heel	=	60.0 psf
NOT Used To Resist Sliding & Overturning		
Surcharge Over Toe	=	0.0
NOT Used for Sliding & Overturning		

Axial Load Applied to Stem

Axial Dead Load	=	0.0 lbs
Axial Live Load	=	0.0 lbs
Axial Load Eccentricity	=	0.0 in

Lateral Load Applied to Stem

Lateral Load	=	25.0 #/ft
...Height to Top	=	13.00 ft
...Height to Bottom	=	1.00 ft
Load Type	=	Wind (W) (Strength Level)
Wind on Exposed Stem (Strength Level)	=	25.0 psf

Adjacent Footing Load

Adjacent Footing Load	=	500.0 lbs
Footing Width	=	2.00 ft
Eccentricity	=	0.00 in
Wall to Ftg CL Dist	=	7.00 ft
Footing Type		Line Load
Base Above/Below Soil at Back of Wall	=	-2.0 ft
Poisson's Ratio	=	0.300

Project Title:
Engineer:
Project ID:
Project Descr:

Cantilevered Retaining Wall

Project File: 2420.70 PV Retaining Wall.ec6

DESCRIPTION: site retaining wall 11ft max

Design Summary

Wall Stability Ratios

Overturning	=	1.58	OK
Sliding	=	1.57	OK
Global Stability	=	1.24	

Total Bearing Load	=	6,282	lbs
...resultant ecc.	=	20.66	in

Eccentricity outside middle third

Soil Pressure @ Toe	=	1,901 psf	OK
Soil Pressure @ Heel	=	0 psf	OK
Allowable	=	3,500 psf	

Soil Pressure Less Than Allowable

ACI Factored @ Toe	=	2,698 psf	
ACI Factored @ Heel	=	0 psf	
Footing Shear @ Toe	=	33.8 psi	OK
Footing Shear @ Heel	=	12.9 psi	OK
Allowable	=	100.6 psi	

Sliding Calcs

Lateral Sliding Force	=	3,432.9 lbs

Vertical component of active lateral soil pressure IS NOT considered in the calculation of soil bearing pressures.

Load Factors

Building Code	
Dead Load	1.200
Live Load	1.600
Earth, H	1.600
Wind, W	1.000
Seismic, E	1.000

Stem Construction

		Bottom		
		Stem OK		
Design Height Above Ftg	ft =	0.00		
Wall Material Above "Ht"	=	Concrete		
Design Method	=	SD	SD	SD
Thickness	=	10.00		
Rebar Size	=	# 6		
Rebar Spacing	=	8.00		
Rebar Placed at	=	7.5 in		
Design Data				
fb/FB + fa/Fa	=	**0.941**		
Total Force @ Section				
Service Level	lbs =			
Strength Level	lbs =	4,499.2		
Moment....Actual				
Service Level	ft-# =			
Strength Level	ft-# =	19,753.0		
Moment.....Allowable	=	20,990.0		
Shear.....Actual				
Service Level	psi =			
Strength Level	psi =	50.0		
Shear.....Allowable	psi =	78.2		
Anet (Masonry)	in2 =			
Wall Weight	psf =	125.0		
Rebar Depth 'd'	in =	7.50		

Masonry Data

f'm	psi =	
Fs	psi =	
Solid Grouting	=	
Modular Ratio 'n'	=	
Equiv. Solid Thick.	=	
Masonry Block Type	=	Medium Weight
Masonry Design Method	=	ASD

Concrete Data

f'c	psi =	4,500.0
Fy	psi =	60,000.0

Summary of Sliding Forces

	FS = 1.0	FS = 1.5
Lateral Force @ Base of Footing	3,432.92 lbs	5,149.38 lbs
less 100% Passive Force	- 2,745.0 lbs	- 2,745.0 lbs
less 100% Friction Force	- 2,636.40 lbs	- 2,636.40 lbs
Added Resisting Force Required	0.0 lbs	
Added Resisting Force Required for 1.5 Factor of Safety		0.00 lbs

Sliding Factor of Safety = 1.568: 1.00

Project Title:
Engineer:
Project ID:
Project Descr:

Cantilevered Retaining Wall

Project File: 2420.70 PV Retaining Wall.ec6

DESCRIPTION: site retaining wall 11ft max

Concrete Stem Rebar Area Details

Bottom Stem	Vertical Reinforcing	Horizontal Reinforcing	
As (based on applied moment) :	0.6105 in2/ft		
0.0018bh : 0.0018(12)(10) :	0.216 in2/ft	Horizontal Reinforcing Options :	
	==========	One layer of :	Two layers of :
Required Area :	0.6105 in2/ft	#4@ 11.11 in	#4@ 22.22 in
Provided Area :	0.66 in2/ft	#5@ 17.22 in	#5@ 34.44 in
Maximum Area :	1.775 in2/ft	#6@ 24.44 in	#6@ 48.89 in

Footing Data

Toe Width	=	5.00 ft
Heel Width	=	2.00
Total Footing Width	=	7.00
Footing Thickness	=	16.00 in
Key Width	=	10.00 in
Key Depth	=	20.00 in
Key Distance from Toe	=	5.00 ft

f'c = 4,500 psi Fy = 60,000 psi
Footing Concrete Density = 150.00 pcf
Min. As % = 0.0018
Cover @ Top 2.00 @ Btm.= 3.00 in

Footing Design Results

		Toe	Heel	Key	
Factored Pressure	=	2,698	0		psf
Mu' : Upward	=	23,186	0		ft-#
Mu' : Downward	=	4,650	1,217		ft-#
Mu: Design	=	18,536	1,217	3,413	ft-#
φ Mn	=	25,913	28,005	6,346	ft-#
Actual 1-Way Shear	=	33.80	12.88	59.88	psi
Allow 1-Way Shear	=	58.40	56.94	68.31	psi

Toe Reinforcing = # 5 @ 8.00 in
Heel Reinforcing = # 5 @ 8.00 in
Key Reinforcing = # 6 @ 18.00 in
Footing Torsion, Tu = 0.00 ft-lbs
Footing Allow. Torsion, φ Tn = 0.00 ft-lbs

If torsion exceeds allowable, provide supplemental design for footing torsion.

Other Acceptable Sizes & Spacings

Toe: #4@ 5.32 in, #5@ 8.25 in, #6@ 11.71 in, #7@ 15.98 in, #8@ 18 in, #9@ 18 in, #10@ 18 in

Heel: #4@ 6.94 in, #5@ 10.76 in, #6@ 15.27 in, #7@ 18 in, #8@ 18 in, #9@ 18 in, #10@ 18 in

Key: #4@ 11.92 in, #5@ 18 in, #6@ 18 in, #7@ 18 in, #8@ 18 in, #9@ 18 in, #10@ 18 in

Min footing T&S reinf Area 2.42 in2
Min footing T&S reinf Area per foot 0.35 in2 /ft

If one layer of horizontal bars:	If two layers of horizontal bars:
#4@ 6.94 in	#4@ 13.89 in
#5@ 10.76 in	#5@ 21.53 in
#6@ 15.28 in	#6@ 30.56 in

Project Title:
Engineer:
Project ID:
Project Descr:

Cantilevered Retaining Wall

Project File: 2420.70 PV Retaining Wall.ec6

DESCRIPTION: site retaining wall 11ft max

Summary of Overturning & Resisting Forces & Moments

Item		.....OVERTURNING..... Force lbs	Distance ft	Moment ft-#		.....RESISTING..... Force lbs	Distance ft	Moment ft-#
HL Act Pres (ab water tbl)		2,890.1	4.11	11,881.6	Soil Over HL (ab. water tbl)	1,411.7	6.42	9,058.2
HL Act Pres (be water tbl)					Soil Over HL (bel. water tbl)		6.42	9,058.2
Hydrostatic Force					Water Table			
Buoyant Force	=				Sloped Soil Over Heel	=		
Surcharge over Heel	=	255.6	6.17	1,576.4	Surcharge Over Heel	=		
Surcharge Over Toe	=				Adjacent Footing Load	=		
Adjacent Footing Load	=	92.2	4.56	419.9	Axial Dead Load on Stem	=		
Added Lateral Load	=	180.0	8.33	1,500.0	* Axial Live Load on Stem	=		
Load @ Stem Above Soil	=	15.0	12.83	192.5	Soil Over Toe	=	550.0	2.50	1,375.0
	=				Surcharge Over Toe	=		
					Stem Weight(s)	=	1,500.0	5.42	8,125.0
					Earth @ Stem Transitions	=		
					Footing Weight	=	1,400.0	3.50	4,900.0
					Key Weight	=	208.3	5.42	1,128.5
					Vert. Component	=			
Total	=	3,432.9	**O.T.M.** =	15,570.4	**Total =**	5,070.0 lbs	**R.M.=**	24,586.7

Resisting/Overturning Ratio = **1.58**

Vertical Loads used for Soil Pressure = 6,282.0 lbs

* Axial live load NOT included in total displayed, or used for overturning resistance, but is included for soil pressure calculation.

Vertical component of active lateral soil pressure IS NOT considered in the calculation of Sliding Resistance.

Vertical component of active lateral soil pressure IS NOT considered in the calculation of Overturning Resistance.

Tilt

Horizontal Deflection at Top of Wall due to settlement of soil

(Deflection due to wall bending not considered)

Soil Spring Reaction Modulus	250.0	pci
Horizontal Defl @ Top of Wall (approximate only)	0.091	in

The above calculation is not valid if the heel soil bearing pressure exceeds that of the toe, because the wall would then tend to rotate into the retained soil.

Cantilevered Retaining Wall

DESCRIPTION: site retaining wall 11ft max

Rebar Lap & Embedment Lengths Information

Stem Design Segment: Bottom
Stem Design Height: 0.00 ft above top of footing

Lap Splice length for #6 bar specified in this stem design segment (25.4.2.4a) =	20.93 in
Development length for #6 bar specified in this stem design segment =	16.10 in
Hooked embedment length into footing for #6 bar specified in this stem design segment =	9.51 in
As Provided =	0.6600 in2/ft
As Required =	0.6105 in2/ft

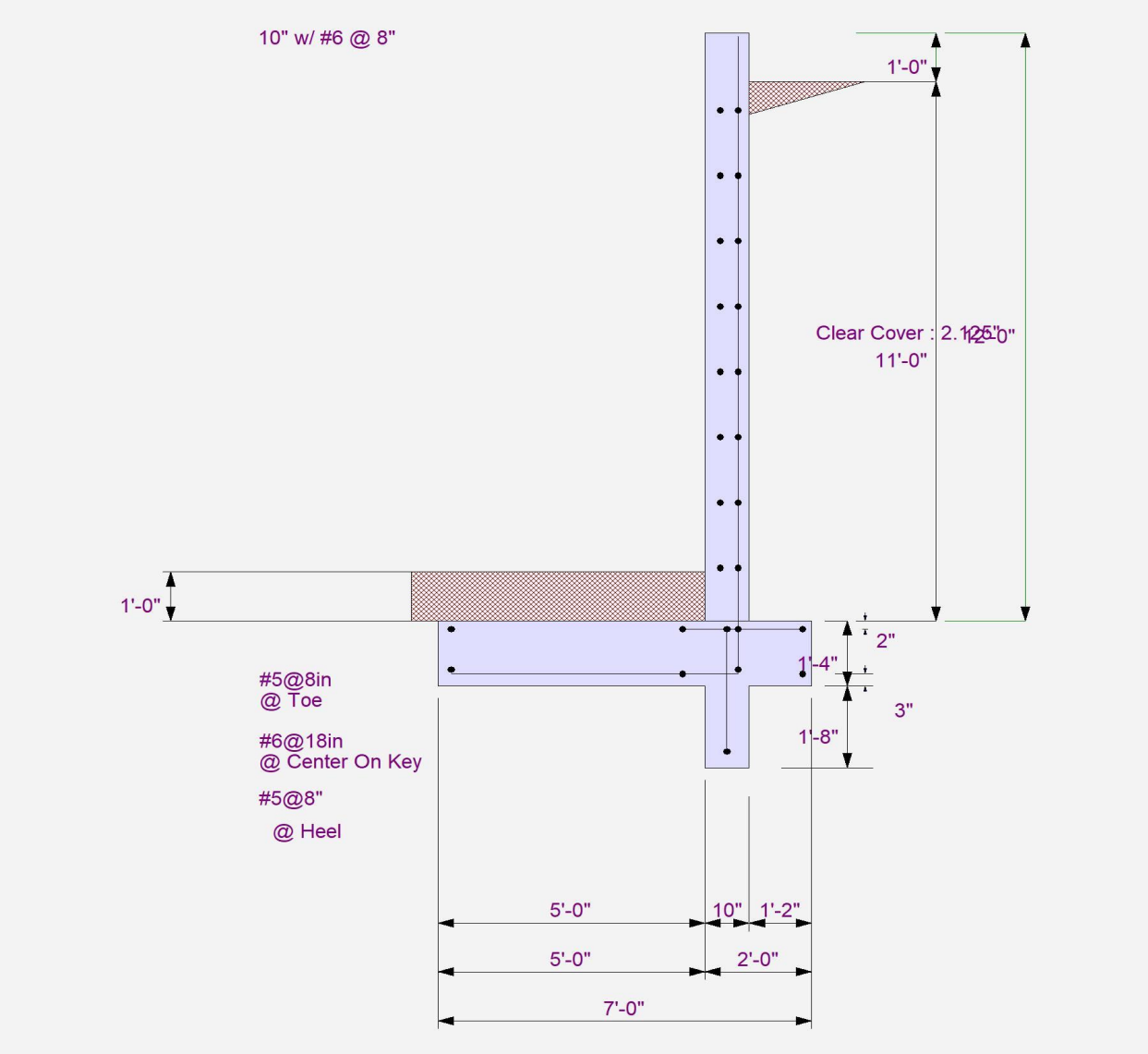
Project Title:
Engineer:
Project ID:
Project Descr:

Cantilevered Retaining Wall

Project File: 2420.70 PV Retaining Wall.ec6

LIC# : KW-06011769, Build:20.25.05.28 Schaefer (c) ENERCALC, LLC 1982-2025

DESCRIPTION: site retaining wall 11ft max



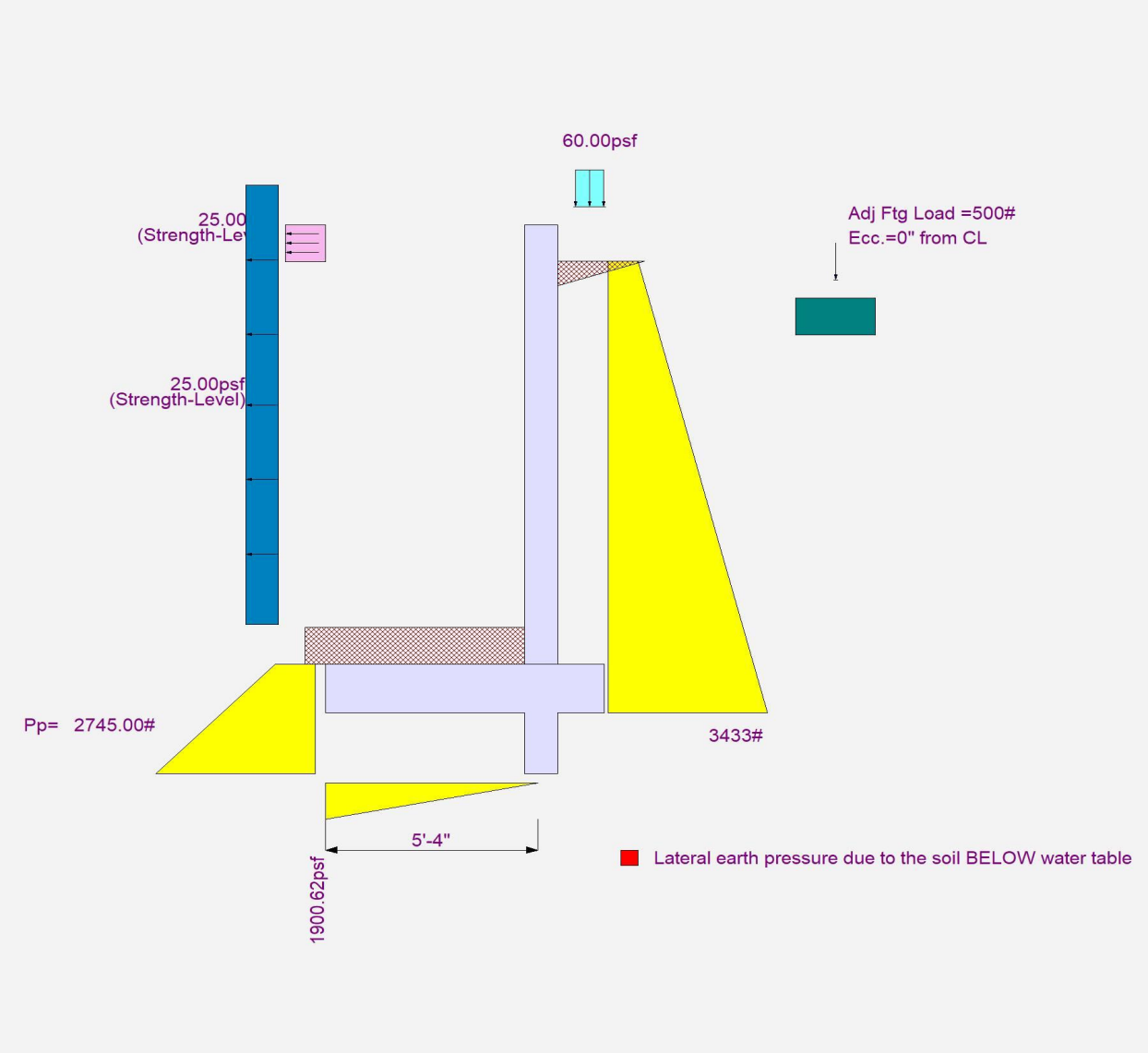
Project Title:
Engineer:
Project ID:
Project Descr:

Cantilevered Retaining Wall

Project File: 2420.70 PV Retaining Wall.ec6

Schaefer

DESCRIPTION: site retaining wall 11ft max



Project Title:
Engineer:
Project ID:
Project Descr:

Cantilevered Retaining Wall

Project File: 2420.70 PV Retaining Wall.ec6

DESCRIPTION: site retaining wall 9ft max

Code Reference

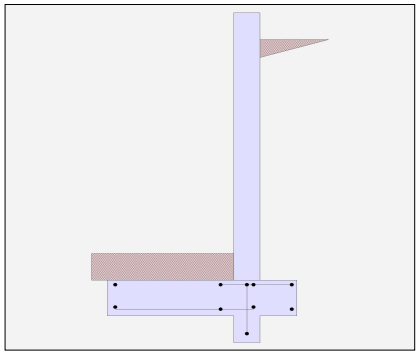
Calculations per IBC 2021, ACI 318-19, TMS 402-16

Criteria

Retained Height	=	9.00 ft
Wall height above soil	=	1.00 ft
Slope Behind Wall	=	0.00
Height of Soil over Toe	=	12.00 in
Water table above bottom of footing	=	0.0 ft

Soil Data

Allow Soil Bearing	=	3,500.0 psf
Equivalent Fluid Pressure Method		
Active Heel Pressure	=	38.0 psf/ft
	=	
Passive Pressure	=	366.0 psf/ft
Soil Density, Heel	=	110.00 pcf
Soil Density, Toe	=	110.00 pcf
Footing||Soil Friction	=	0.520
Soil height to ignore for passive pressure	=	12.00 in



Surcharge Loads

Surcharge Over Heel	=	60.0 psf
NOT Used To Resist Sliding & Overturning		
Surcharge Over Toe	=	0.0
NOT Used for Sliding & Overturning		

Axial Load Applied to Stem

Axial Dead Load	=	0.0 lbs
Axial Live Load	=	0.0 lbs
Axial Load Eccentricity	=	0.0 in

Lateral Load Applied to Stem

Lateral Load	=	25.0 #/ft
...Height to Top	=	9.00 ft
...Height to Bottom	=	1.00 ft
Load Type	=	Wind (W) (Strength Level)
Wind on Exposed Stem (Strength Level)	=	25.0 psf

Adjacent Footing Load

Adjacent Footing Load	=	500.0 lbs
Footing Width	=	2.00 ft
Eccentricity	=	0.00 in
Wall to Ftg CL Dist	=	7.00 ft
Footing Type		Line Load
Base Above/Below Soil at Back of Wall	=	-2.0 ft
Poisson's Ratio	=	0.300

Project Title:
Engineer:
Project ID:
Project Descr:

Cantilevered Retaining Wall

Project File: 2420.70 PV Retaining Wall.ec6

DESCRIPTION: site retaining wall 9ft max

Design Summary

Wall Stability Ratios

Overturning	=	1.81	OK
Sliding	=	1.64	OK
Global Stability	=	1.51	

Total Bearing Load	=	5,021	lbs
...resultant ecc.	=	14.30	in

Eccentricity outside middle third

Soil Pressure @ Toe	=	1,537 psf	OK
Soil Pressure @ Heel	=	0 psf	OK
Allowable	=	3,500 psf	

Soil Pressure Less Than Allowable

ACI Factored @ Toe	=	2,188 psf	
ACI Factored @ Heel	=	0 psf	
Footing Shear @ Toe	=	23.2 psi	OK
Footing Shear @ Heel	=	10.5 psi	OK
Allowable	=	100.6 psi	

Sliding Calcs

Lateral Sliding Force	=	2,453.9 lbs

Vertical component of active lateral soil pressure IS NOT considered in the calculation of soil bearing pressures.

Load Factors

Building Code	
Dead Load	1.200
Live Load	1.600
Earth, H	1.600
Wind, W	1.000
Seismic, E	1.000

Stem Construction

		Bottom		
		Stem OK		
Design Height Above Ftg	ft =	0.00		
Wall Material Above "Ht"	=	Concrete		
Design Method	=	SD	SD	SD
Thickness	=	10.00		
Rebar Size	=	# 6		
Rebar Spacing	=	15.00		
Rebar Placed at	=	7.5 in		

Design Data

fb/FB + fa/Fa	=	**0.964**
Total Force @ Section		
Service Level	lbs =	
Strength Level	lbs =	3,085.4
Moment....Actual		
Service Level	ft-# =	
Strength Level	ft-# =	11,106.0
Moment.....Allowable	=	11,514.5
Shear.....Actual		
Service Level	psi =	
Strength Level	psi =	34.3
Shear.....Allowable	psi =	63.4
Anet (Masonry)	in2 =	
Wall Weight	psf =	125.0
Rebar Depth 'd'	in =	7.50

Masonry Data

f'm	psi =	
Fs	psi =	
Solid Grouting	=	
Modular Ratio 'n'	=	
Equiv. Solid Thick.	=	
Masonry Block Type	=	Medium Weight
Masonry Design Method	=	ASD

Concrete Data

f'c	psi =	4,500.0
Fy	psi =	60,000.0

Summary of Sliding Forces

	FS = 1.0	FS = 1.5
Lateral Force @ Base of Footing	2,453.86 lbs	3,680.80 lbs
less 100% Passive Force	- 1,850.33 lbs	- 1,850.33 lbs
less 100% Friction Force	- 2,168.40 lbs	- 2,168.40 lbs
Added Resisting Force Required	0.0 lbs	
Added Resisting Force Required for 1.5 Factor of Safety		0.00 lbs

Sliding Factor of Safety = 1.638: 1.00

Project Title:
Engineer:
Project ID:
Project Descr:

Cantilevered Retaining Wall

Project File: 2420.70 PV Retaining Wall.ec6

DESCRIPTION: site retaining wall 9ft max

Concrete Stem Rebar Area Details

Bottom Stem	Vertical Reinforcing	Horizontal Reinforcing	
As (based on applied moment) :	0.3432 in2/ft		
0.0018bh : 0.0018(12)(10) :	0.216 in2/ft	Horizontal Reinforcing Options :	
	==========	One layer of :	Two layers of :
Required Area :	0.3432 in2/ft	#4@ 11.11 in	#4@ 22.22 in
Provided Area :	0.352 in2/ft	#5@ 17.22 in	#5@ 34.44 in
Maximum Area :	1.775 in2/ft	#6@ 24.44 in	#6@ 48.89 in

Footing Data

Toe Width	=	4.00 ft
Heel Width	=	2.00
Total Footing Width	=	6.00
Footing Thickness	=	16.00 in
Key Width	=	10.00 in
Key Depth	=	12.00 in
Key Distance from Toe	=	4.00 ft

f'c = 4,500 psi Fy = 60,000 psi
Footing Concrete Density = 150.00 pcf
Min. As % = 0.0018
Cover @ Top 2.00 @ Btm.= 3.00 in

Footing Design Results

		Toe	Heel	Key	
Factored Pressure	=	2,188	0		psf
Mu' : Upward	=	13,204	14		ft-#
Mu' : Downward	=	2,976	1,037		ft-#
Mu: Design	=	10,228	1,023	1,311	ft-#
φ Mn	=	19,634	28,005	6,346	ft-#
Actual 1-Way Shear	=	23.19	10.54	35.68	psi
Allow 1-Way Shear	=	53.31	56.94	68.31	psi

Toe Reinforcing = # 6 @ 15.00 in
Heel Reinforcing = # 5 @ 8.00 in
Key Reinforcing = # 6 @ 18.00 in
Footing Torsion, Tu = 0.00 ft-lbs
Footing Allow. Torsion, φ Tn = 0.00 ft-lbs

If torsion exceeds allowable, provide supplemental design for footing torsion.

Other Acceptable Sizes & Spacings

Toe: #4@ 6.94 in, #5@ 10.76 in, #6@ 15.27 in, #7@ 18 in, #8@ 18 in, #9@ 18 in, #10@ 18 in

Heel: #4@ 6.94 in, #5@ 10.76 in, #6@ 15.27 in, #7@ 18 in, #8@ 18 in, #9@ 18 in, #10@ 18 in

Key: #4@ 11.11 in, #5@ 17.22 in, #6@ 18 in, #7@ 18 in, #8@ 18 in, #9@ 18 in, #10@ 18 in

Min footing T&S reinf Area 2.07 in2
Min footing T&S reinf Area per foot 0.35 in2 /ft

If one layer of horizontal bars:	If two layers of horizontal bars:
#4@ 6.94 in	#4@ 13.89 in
#5@ 10.76 in	#5@ 21.53 in
#6@ 15.28 in	#6@ 30.56 in

Project Title:
Engineer:
Project ID:
Project Descr:

Cantilevered Retaining Wall

Project File: 2420.70 PV Retaining Wall.ec6

DESCRIPTION: site retaining wall 9ft max

Summary of Overturning & Resisting Forces & Moments

Item		.....OVERTURNING..... Force lbs	Distance ft	Moment ft-#		.....RESISTING..... Force lbs	Distance ft	Moment ft-#
HL Act Pres (ab water tbl)		2,028.8	3.44	6,988.0	Soil Over HL (ab. water tbl)	1,155.0	5.42	6,256.3
HL Act Pres (be water tbl)					Soil Over HL (bel. water tbl)		5.42	6,256.3
Hydrostatic Force					Water Table			
Buoyant Force	=				Sloped Soil Over Heel	=		
Surcharge over Heel	=	214.2	5.17	1,106.6	Surcharge Over Heel	=		
Surcharge Over Toe	=				Adjacent Footing Load	=		
Adjacent Footing Load	=	75.9	3.31	251.4	Axial Dead Load on Stem	=		
Added Lateral Load	=	120.0	6.33	760.0	* Axial Live Load on Stem	=		
Load @ Stem Above Soil	=	15.0	10.83	162.5	Soil Over Toe	=	440.0	2.00	880.0
	=				Surcharge Over Toe	=		
					Stem Weight(s)	=	1,250.0	4.42	5,520.8
					Earth @ Stem Transitions	=		
					Footing Weight	=	1,200.0	3.00	3,600.0
					Key Weight	=	125.0	4.42	552.1
					Vert. Component	=			
Total	=	2,453.9	**O.T.M.** =	9,268.5	**Total =**		4,170.0 lbs	**R.M.=**	16,809.2

Resisting/Overturning Ratio = **1.81**

Vertical Loads used for Soil Pressure = 5,020.8 lbs

* Axial live load NOT included in total displayed, or used for overturning resistance, but is included for soil pressure calculation.

Vertical component of active lateral soil pressure IS NOT considered in the calculation of Sliding Resistance.

Vertical component of active lateral soil pressure IS NOT considered in the calculation of Overturning Resistance.

Tilt

Horizontal Deflection at Top of Wall due to settlement of soil

(Deflection due to wall bending not considered)

Soil Spring Reaction Modulus	250.0	pci
Horizontal Defl @ Top of Wall (approximate only)	0.071	in

The above calculation is not valid if the heel soil bearing pressure exceeds that of the toe, because the wall would then tend to rotate into the retained soil.

Cantilevered Retaining Wall

DESCRIPTION: site retaining wall 9ft max

Rebar Lap & Embedment Lengths Information

Stem Design Segment: Bottom
Stem Design Height: 0.00 ft above top of footing

Lap Splice length for #6 bar specified in this stem design segment (25.4.2.4a) =	20.93 in
Development length for #6 bar specified in this stem design segment =	16.10 in
Hooked embedment length into footing for #6 bar specified in this stem design segment =	9.51 in
As Provided =	0.3520 in2/ft
As Required =	0.3432 in2/ft

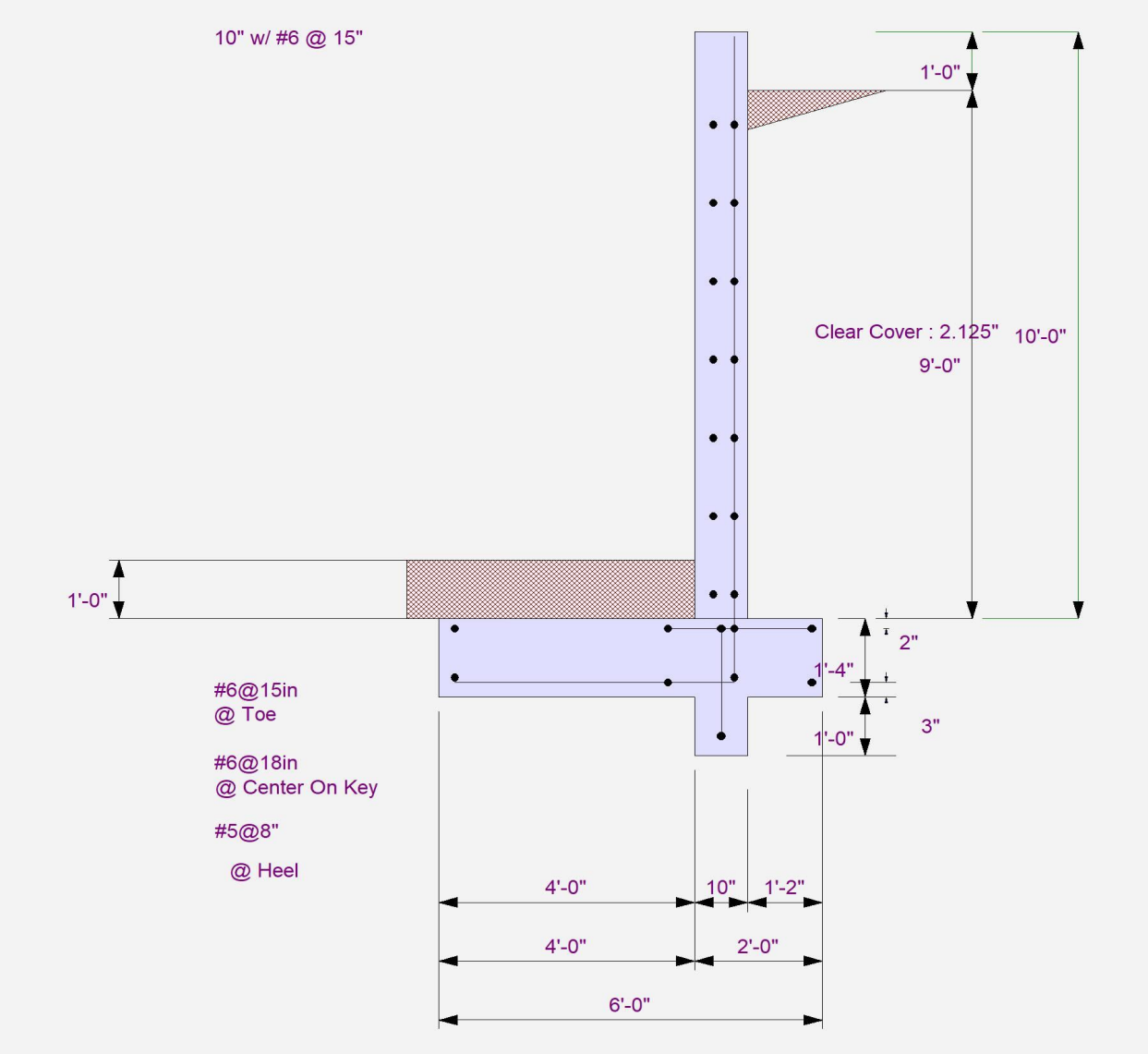
Project Title:
Engineer:
Project ID:
Project Descr:

Cantilevered Retaining Wall

Project File: 2420.70 PV Retaining Wall.ec6

LIC# : KW-06011769, Build:20.25.05.28 Schaefer (c) ENERCALC, LLC 1982-2025

DESCRIPTION: site retaining wall 9ft max

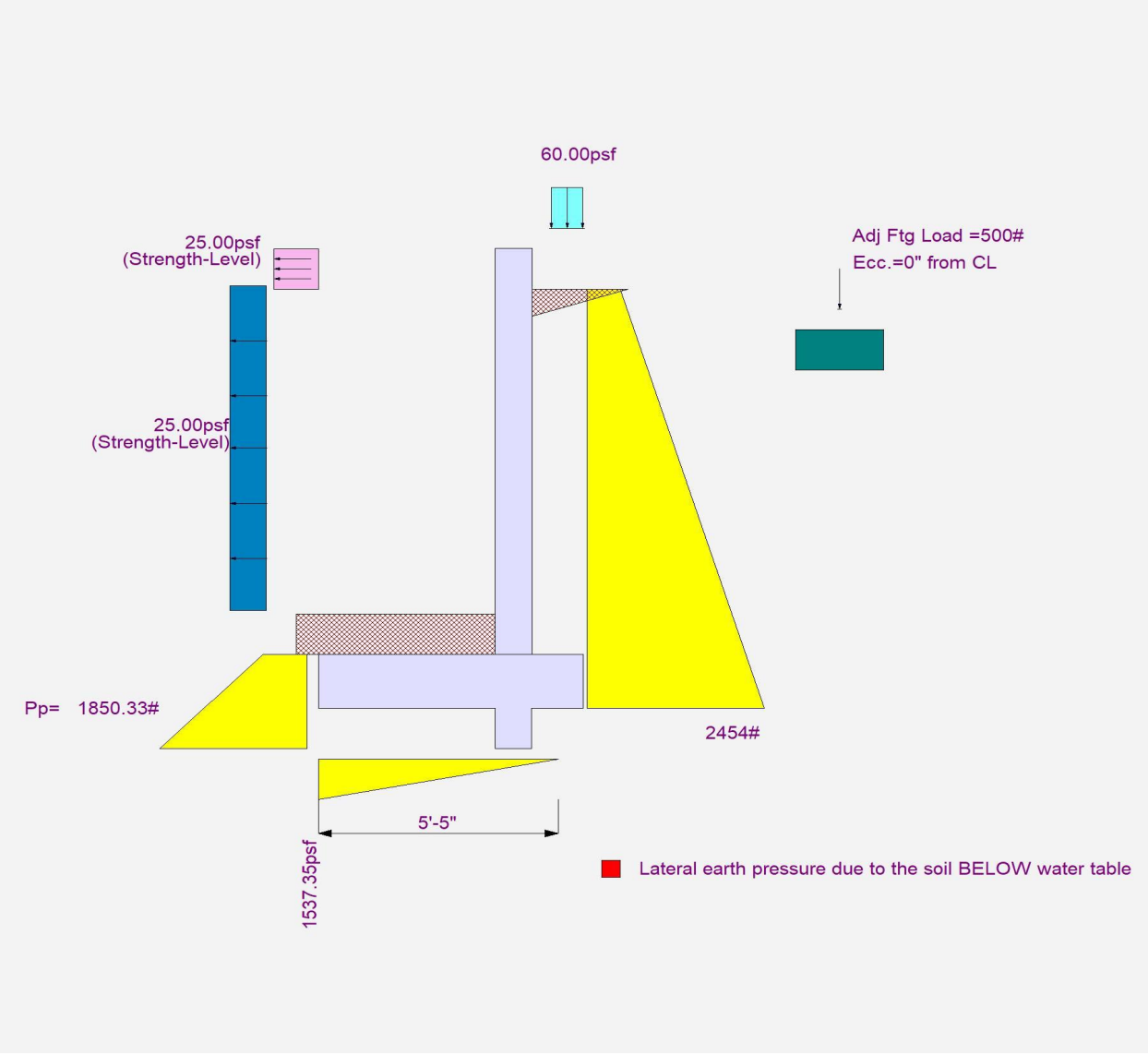


Project Title:
Engineer:
Project ID:
Project Descr:

Cantilevered Retaining Wall

Project File: 2420.70 PV Retaining Wall.ec6

DESCRIPTION: site retaining wall 9ft max



LETTER OF AUTHORIZATION

Date: June 16, 2025

To Whom It May Concern,

I, **Phillip V. Westbrooks**, as the legal owner of the property located at **6341 N North 34th Place Paradise Valley AZ, 85253**, hereby authorize **Steven Fromme** to act on my behalf in matters related to the permitting and processing of the **Pre-Application (PA-25-21) Variance – 6341 N North 34th Pl (164-05-023)** associated with the construction of a retaining wall on the aforementioned property.

This authorization includes, but is not limited to, submitting required documentation, communicating with relevant city departments or agencies, and performing any other tasks necessary to move forward with the permit process.

Should you require any additional information or verification, please do not hesitate to contact me directly.

Best Regards,

Phillip Westbrooks
Owner
4802063999
phillwestpa@gmail.com

WESTBROOKS RESIDENCE
DRAINAGE REPORT

6341 N. 34TH PLACE
PARADISE VALLEY, AZ.

PREPARED FOR
Westbrooks Residence
6341 N. 34th Place
Paradise Valley, AZ

PREPARED BY
KBell Engineering LLC
1355 N. 86TH Place
Mesa, AZ 85207

July 11, 2025

KBELL ENGINEERING

Table of Contents

Appendices

Introduction

Owner Name

Phillip Westbrooks
6341 N. 34th Place
Paradise Valley, AZ.

Assessor's Parcel Number

APN 164-05-023

Township, Range and Section

Township 2 North, Range 3 East and Section 12

Location Map showing Property in Relation to Major Streets – See **Appendix B**

Project Description & General Background

The project consists of a new retaining wall to support the existing house on a 1.18 ac residential parcel located south of Lincoln Drive, along the 34th Place alignment. The project is intended to add the retaining wall to support the house structure and replace an older failing retaining wall. The site is located off of 34th Place in Paradise Valley. The wash on the north side of the site is an offsite conveyance from a portion of the Cudia City Wash drainage basin from the mountainous area to the north of the site.

Scope of the Drainage Report

The drainage report addresses the existing drainage conditions impacting the site, and the proposed drainage design concept for post construction of the new retaining wall. This drainage report has been prepared in accordance with Town of Paradise Valley's *Storm Drainage Design Manual* and the Flood Control District of Maricopa County (FCDMC) drainage design standards and regulations. The report presents existing conditions hydrology from the upstream drainage area for the project and models the flows through an existing conditions model of the property prior to construction of the retaining wall and a proposed conditions model of the property after the retaining wall is constructed.

The floodplain was originally evaluated under "Lot 18- Mirada Los Arcos Phase 2, 6341 N. 34th Place, Paradise Valley, Az 85253" grading and drainage plan completed by Land Development Group and dated November 24, 2019 and a drainage easement was granted to the Town of Paradise Valley for the channel. A copy of the grading and drainage plan from the original submittal has been included as **Appendix C** and a copy of the drainage easement has been included as **Appendix D**.

Existing Conditions

The existing site is located within a platted residential development with a home, existing concrete driveway area and landscaping. The areas to the west, east and south of the property are developed as existing residential homes with perimeter walls. The area to the north has an existing drainage channel between the rear of the property and Lincoln Drive that conveys offsite flows from the Cudia City Wash. The existing drainage channel has heavy brush along the banks and a rocky bottom in the center of the channel. There is an existing drainage easement that covers the drainage channel.

Proposed Conditions

The project proposes to replace an existing retaining wall supporting the house in the wash on the north side of the site. The new retaining wall will be constructed between the house and the wash, effectively impacting the wash on its south side. The new retaining wall will replace the existing retaining wall.

Appendix E consists of a FIRMette from the Flood Insurance Rate Map (FIRM) #04013C1745L, dated October 16, 2013, for the project and shows that the parcel lies entirely in Zone X, which defines areas subject to less than one foot of flooding depth for the 100-year frequency rainfall event. An aerial photo of the site has been included as **Appendix F**.

Hydrologic Analysis - Offsite Conditions

The site is located south of the southern hillslope of RJ Peak and Piestewa Peak in Paradise Valley. The site is located south of E. Lincoln Drive. Flows from RJ Peak convey down the Lincoln Hills area, across Lincoln Drive and into the wash located north of the existing home. Flows convey generally from east to west of the site and then eventually to the Cudia City Wash. Generally, the offsite area on the south slope of RJ Peak slopes from north to southwest. Some hillslopes to the north are as steep as over 80% with near vertical rock outcroppings. The slope flattens in the southern portion of the draw near the Lincoln Hills area where there is a large lot development along 35th St. The peak elevation of the drainage area is approximately 1800 feet above mean sea level (MSL). The lowest elevation within the drainage area is approximately 1,365 feet above MSL, located at the west boundary of the residential parcel. A drainage area map for the offsite area has been included in the Appendix of this report as **Appendix G.**

The existing drainage area conveying to the channel was evaluated based on the Maricopa County Flood Control District Drainage Design Management System (MCFCD DDMS) program. As the offsite drainage area conveying flows to the channel is less than 150 acres, the rational method analysis within the program was utilized to calculate the hydrology contributing to the channel. The drainage area contributing was calculated at 115.18 acres with a time of concentration length of 5,651 LF was entered into the program. The land use of the offsite drainage area was evaluated based on 45.65 acres of estate residential (1/5 du per acres to 1 du per acre) and 69.53 acres of passive open space (includes mountain preserves and washes). The resulting flows for the offsite area was determined to be 315.6 cfs at the downstream cross section at the west boundary of the project. A copy of the resulting rational method flow summary has been included as **Appendix H.**

Hydraulic Modeling

The resulting flows were modeled through two hydraulic models in HECRas. The first hydraulic model assumed the existing conditions of the channel pre-construction of the new retaining wall. The second model assumed proposed conditions of the channel post construction of the new retaining wall. Cross Sections for the pre-construction model were based on existing conditions of the channel and post construction cross sections were based on proposed grading of the channel to install the retaining wall. A copy of the resulting models has been included in the Appendix as **Appendix I** for the existing conditions model and **Appendix J** for the proposed conditions model. The resulting information of Appendix I and Appendix J show that the construction of the new retaining wall has no impact at the eastern most and western most boundary of the site and does not raise the water surface or velocity of the channel as it enters or leaves the residential property.

The project proposes to change the existing drainage easement to account for more current information and the impact on the floodplain due to the retaining wall. The drainage easement has been shown to be outside the face of the retaining wall so that the retaining wall is not within the drainage easement.

Erosion Hazards

The existing building is adjacent to the existing floodplain on the southside of the floodplain. The retaining wall is proposed to protect the existing slope between the house and the floodplain and protect the house from erosion of the existing slope where the channel bends to the west. The floodplain area is already fairly incised with mostly existing boulders within the bottom of the wash area. The armoring of the channel with the retaining wall should protect the existing slope and house from any additional erosion.

Lowest Finished Floor Elevation

The building finished floor elevation is 1378.60 which 2.33 feet higher than the floodplain at the eastern end of the channel and is buffered by the proposed retaining wall between the building and floodplain. Mid way through the footprint, the elevation difference is 7.36 feet and on the west end, the elevation is 10.15 ft difference. The footings for the wall is proposed to be approximately a 1'-0" below the existing grade of the wash. Velocities of the channel in this area range from 7.42 ft/s to 8.20 ft/s in both the existing conditions and proposed conditions models.

Conclusion

The proposed construction of the new retaining wall to support the house has little change on the existing conditions of the channel and its flows. The new drainage easement is very similar to the existing drainage easement. All finished floors on the property are above the proposed and existing conditions floodplain elevations.

References

- Town of Paradise Valley "Storm Drainage Design Manual", June 2018.
- Flood Control District of Maricopa County, "Drainage Design Manual, Volume I" July 2023
- Flood Control District of Maricopa County, "Drainage Design Manual, Volume II" July 2018

Appendices

Appendix A	Warning and Disclaimer of Liability
Appendix B	Site Location Map
Appendix C	"Lot 18- Mirada Los Arcos Phase 2, 6341 N. 34th Place, Paradise Valley, Az 85253" grading and drainage plan completed by Land Development Group and dated November 24, 2019
Appendix D	Existing Drainage Easement
Appendix E	FEMA Flood Insurance Rate Map
Appendix F	Aerial Photo of Site
Appendix G	Drainage Area Map
Appendix H	Rational Method Analysis
Appendix I	Existing Conditions Hydraulic Model
Appendix J	Proposed Conditions Hydraulic Model

Appendix A
Warning and Disclaimer of Liability

WARNING AND DISCLAIMER OF LIABILITY

The Town's Stormwater and Floodplain Management Ordinance is intended to minimize the occurrence of losses, hazards and conditions adversely affecting the public health, safety and general welfare which might result from flooding.

The Stormwater and Floodplain Management Ordinance identifies floodplains, floodways, flood fringes and special flood hazard areas. However, a property outside these areas could be inundated by floods. Also, much of the Town is a dynamic flood area; floodways, floodplains, flood fringes and special flood hazard areas may shift from one location to another, over time, due to natural processes.

WARNING AND DISCLAIMER OF LIABILITY

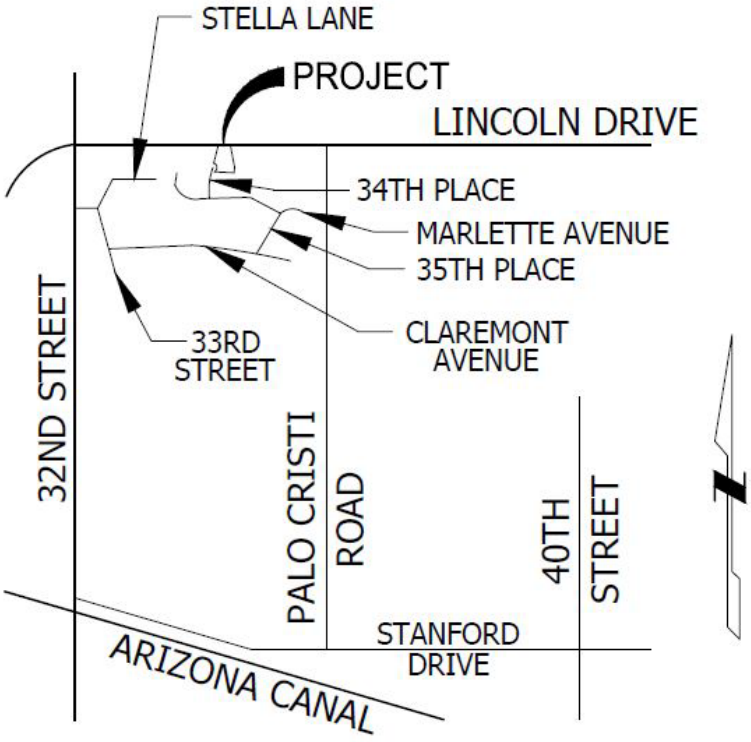
The flood protection provided by the Stormwater and Floodplain Management Ordinance is considered reasonable for regulatory purposes and is based on scientific and engineering considerations. Floods larger than the base flood can and will occur on rare occasions. Floodwater heights may be increased by constructed or natural causes. The Stormwater and Floodplain Management Ordinance does not create liability on the part of the Town, any officer or employee thereof, or the federal, state or county government for any flood damages that result from reliance on the Ordinance or any administrative decision lawfully made thereunder.

Compliance with the Stormwater and Floodplain Management Ordinance does not ensure complete protection from flooding. Flood-related problems such as natural erosion, streambed meander, or constructed obstructions and diversions may occur and have an adverse effect in the event of a flood. You are advised to consult your own engineer or other expert regarding these considerations.

I have read and understand the above.

_____	_____	_____
Plan Check #	Owner	Date

Appendix B
Site Location Map



VICINITY MAP
NOT TO SCALE

Appendix C

"Lot 18- Mirada Los Arcos Phase 2, 6341 N. 34th Place, Paradise Valley, Az 85253" grading and drainage plan completed by Land Development Group and dated November 24, 2019

PARTIAL GRADING & DRAINAGE PLAN
6341 N 34TH PL., PARADISE VALLEY, AZ 85253
LOT 18 - MIRADA LOS ARCOS PHASE 2
A SUBDIVISION PLAT RECORDED IN BOOK 159 OF MAPS, PAGE 35, MCR., LOCATED IN A PORTION OF THE NW 1/4 OF THE NE 1/4 OF THE SW 1/4 OF SECTION 12, T.2N, R.3E OF THE GILA & SALT RIVER BASE AND MERIDIAN, MARICOPA COUNTY, ARIZONA

TOWN OF PARADISE VALLEY NOTES

1. GRADING SHALL BE IN CONFORMANCE WITH 2015 IBC.
2. PRIOR TO FIRST FOOTING INSPECTION OF ANY TYPE, ALL PROPERTY PINS SHALL BE PLACED BY A REGISTERED LAND SURVEYOR OF THE STATE OF ARIZONA, AND PROPERTY LINES MUST BE PHYSICALLY IDENTIFIED PRIOR TO INSPECTION.
3. WHERE EXCAVATION IS TO OCCUR THE TOP 4" OF EXCAVATED NATIVE SOIL SHALL REMAIN ON THE SITE AND SHALL BE REUSED IN A MANNER THAT TAKES ADVANTAGE OF THE NATURAL SOIL SEED BANK IT CONTAINS.
4. ALL CONSTRUCTION SHALL CONFORM TO THE LATEST MARICOPA ASSOCIATION OF GOVERNMENTS (M.A.G.) SPECIFICATIONS AND STANDARD DETAILS.
5. ALL EXTERIOR SITE LIGHTING SHALL COMPLY WITH REQUIREMENTS OF SECTION 1023 OF THE TOWN OF PARADISE VALLEY ZONING ORDINANCES FOR FUTURE TYPE, LOCATION, HEIGHT, WATTAGE BASED UPON FIXTURES INSTALLED.
6. A DUST CONTROL PLAN MEETING THE REQUIREMENTS OF RULE 310 OF THE MARICOPA COUNTY AIR POLLUTION CONTROL REGULATIONS, AS AMENDED, IS REQUIRED.
7. A SEPARATE PERMIT IS NECESSARY FOR ANY OFFSITE CONSTRUCTION.
8. AN APPROVED GRADING AND DRAINAGE PLAN SHALL BE ON THE JOB SITE AT ALL TIMES. DEVIATIONS FROM THE PLAN MUST BE PRECEDED BY AN APPROVED PLAN REVISION.
9. EAVE PROJECTIONS INTO REQUIRED SETBACKS ARE LIMITED TO A MAXIMUM OF 24" PURSUANT TO SECTION 1008 OF THE TOWN OF PARADISE VALLEY ZONING ORDINANCES.
10. ALL STRUCTURES AND LANDSCAPING WITHIN THE SIGHT VISIBILITY TRIANGLE SHALL HAVE A 2 FOOT MAXIMUM HEIGHT.
11. ALL NEW AND EXISTING ELECTRICAL SERVICE TO BE BURIED UNDERGROUND PER THE TOWN OF PARADISE VALLEY STANDARDS.
12. POOL, SPA, BARBECUE AND ANY PROPOSED STRUCTURES OVER 8 INCHES ABOVE GRADE REQUIRE SEPARATE PERMIT APPLICATIONS.
13. POOLS SHALL BE CONSTRUCTED BY SEPARATE PERMIT AND SECURED FROM UNWANTED ACCESS PER SECTION 5-11-1 OF THE TOWN OF PARADISE VALLEY ORDINANCES.
14. A SETBACK CERTIFICATION IS REQUIRED AND MUST BE GIVEN TO TOWN INSPECTOR AT STEM WALL INSPECTION.
15. MAIL BOX TO COMPLY WITH THE TOWN OF PARADISE VALLEY STANDARDS FOR MAIL BOXES IN THE R.O.W. FOR HEIGHT, WIDTH AND BREAK AWAY FEATURES.
16. ALL PATIOS, WALKS, AND DRIVES TO SLOPE AWAY FROM BUILDING AND GARAGES AT A MINIMUM SLOPE OF 1/4" PER FOOT UNLESS SPECIFIED OTHERWISE. ALL LAWN AREAS ADJOINING WALKS OR SLABS WILL BE GRADED TO 2" BELOW THE TOP OF SLAB. TYPICAL FINISHED GRADE AROUND PERIMETER OF BUILDING IS MINUS 6" BELOW FINISHED FLOOR UNLESS SPECIFIED OTHERWISE.
17. ALL MATERIAL TO BE UNDER SLABS AND WALKS SHALL BE COMPACTED TO NOT LESS THAN 95% PER ASTM D698.
18. SOILS COMPACTION TEST RESULTS MUST BE SUBMITTED TO THE TOWN ENGINEER'S OFFICE FOR BUILDING PADS THAT HAVE ONE (1) FOOT OR MORE OF FILL MATERIAL INDICATED. THIS INFORMATION MUST BE SUPPLIED PRIOR TO REQUEST FOR FINAL INSPECTION.
19. TRENCH BED SHALL BE FREE OF ROCKS AND DEBRIS.
20. REGULATION II RULE 20-3 OF THE MARICOPA COUNTY HEALTH DEPARTMENT, BUREAU OF AIR POLLUTION CONTROL SHALL BE OBSERVED AND ENFORCED.
21. ALL WORK REQUIRED TO COMPLETE THE CONSTRUCTION COVERED BY THIS PLAN SHALL BE IN ACCORDANCE WITH THE M.A.G. STANDARD SPECIFICATIONS AND DETAILS AND CURRENT SUPPLEMENTS THEREOF PER THE LOCAL CITY OR TOWN UNLESS SPECIFIED OTHERWISE IN THESE PLANS OR ELSEWHERE IN THE CONTRACT DOCUMENTS. CONTRACTORS SHALL FAMILIARIZE THEMSELVES WITH ALL REQUIRED STANDARD SPECIFICATIONS, DETAILS AND SUPPLEMENTS PRIOR TO BIDDING THE WORK FOR THE CONSTRUCTION COVERED BY THIS PLAN.
22. THE CONTRACTOR IS TO COMPLY WITH ALL LOCAL STATE, AND FEDERAL LAWS AND REGULATIONS APPLICABLE TO THE CONSTRUCTION COVERED BY THIS PLAN.
23. THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING AND COMPLYING WITH ALL PERMITS REQUIRED TO COMPLETE ALL WORK COVERED BY THIS PLAN.
24. ALL CONSTRUCTION IN THE PUBLIC RIGHTS-OF-WAY OR IN EASEMENTS GRANTED FOR PUBLIC USE MUST CONFORM TO THE LATEST MARICOPA ASSOCIATION OF GOVERNMENTS (MAG) UNIFORM STANDARD SPECIFICATIONS AND UNIFORM STANDARD DETAILS FOR PUBLIC WORKS CONSTRUCTION.
25. THE TOWN ONLY APPROVES THE SCOPE, NOT THE DETAIL, OF ENGINEERING DESIGNS; THEREFORE, IF CONSTRUCTION QUANTITIES ARE SHOWN ON THESE PLANS, THEY ARE NOT VERIFIED BY THE TOWN.
26. THE APPROVAL OF PLANS IS VALID FOR SIX (6) MONTHS. IF AN ENCROACHMENT PERMIT FOR THE CONSTRUCTION HAS NOT BEEN ISSUED WITHIN SIX MONTHS, THE PLANS MUST BE RESUBMITTED TO THE TOWN FOR RE-APPROVAL.
27. A PUBLIC WORKS INSPECTOR WILL INSPECT ALL WORKS WITHIN THE TOWN OF PARADISE VALLEY RIGHTS-OF-WAY AND IN EASEMENTS. NOTIFY INSPECTION SERVICES 24 HOURS PRIOR TO BEGINNING CONSTRUCTION BY CALLING 480-312-5750.
28. WHENEVER EXCAVATION IS NECESSARY, CALL THE BLUE STAKE CENTER, 602-263-1100, TWO WORKING DAYS BEFORE EXCAVATION BEGINS. THE CENTER WILL SEE THAT THE LOCATION OF THE UNDERGROUND UTILITY LINES IS IDENTIFIED FOR THE PROJECT. CALL "COLLECT" IF NECESSARY.
29. ENCROACHMENT PERMITS ARE REQUIRED FOR ALL WORK IN PUBLIC RIGHTS-OF-WAY AND EASEMENTS GRANTED FOR PUBLIC PURPOSES. AN ENCROACHMENT PERMIT WILL BE ISSUED BY THE TOWN ONLY AFTER THE REGISTRANT HAS PAID A BASE FEE PLUS A FEE FOR INSPECTION SERVICES. COPIES OF ALL PERMITS MUST BE RETAINED ON-SITE AND BE AVAILABLE FOR INSPECTION AT ALL TIMES. FAILURE TO PRODUCE THE REQUIRED PERMITS WILL RESULT IN IMMEDIATE SUSPENSION OF ALL WORK UNTIL THE PROPER PERMIT DOCUMENTATION IS OBTAINED.
30. ALL EXCAVATION AND GRADING THAT IS NOT IN THE PUBLIC RIGHTS-OF-WAY OR NOT IN EASEMENTS GRANTED FOR PUBLIC USE MUST CONFORM TO CHAPTER 70, EXCAVATION AND GRADING, OF THE LATEST EDITION OF THE INTERNATIONAL BUILDING CODE PREPARED BY THE INTERNATIONAL CODE COUNCIL. A PERMIT FOR THIS GRADING MUST BE SECURED FROM THE TOWN FOR A FEE ESTABLISHED BY THE INTERNATIONAL BUILDING CODE.
31. EXCAVATIONS SHALL COMPLY WITH REQUIREMENTS OF OSHA EXCAVATION STANDARDS (29 CFR, PART 1926, SUBPART P). UNDER NO CIRCUMSTANCES WILL THE CONTRACTORS BE ALLOWED TO WORK IN A TRENCH LOCATED WITHIN THE TOWN'S RIGHT-OF-WAY WITHOUT PROPER SHORING OR EXCAVATION METHODS.
32. ON DEMOLITION, GRADING, REMODELING AND NEW CONSTRUCTION PROJECTS, PERMITTEE MUST NOTIFY ADJACENT PROPERTY OWNERS REGARDING THE NATURE OF THE PROJECT, THE tIME PERIOD FOR CONSTRUCTION, AND ANY UNUSUAL ACTIVITIES THAT MAY CAUSE DISRUPTION OF THE NORMAL COURSE OF TRAFFIC DURING CONSTRUCTION.
33. ALL PERMITTEES MUST POST A 6 SQUARE FOOT (2'X3') IDENTIFICATION SIGN, MADE OF DURABLE MATERIAL, IN THE FRONT YARD OF SUBJECT PROPERTY AND NOT IN THE TOWN RIGHT-OF-WAY. THE SIGN MAY NOT EXCEED A MAXIMUM OF 6 FEET IN HEIGHT FROM GRADE TO TOP OF THE SIGN. THE SIGN MUST INCLUDE THE PERMITTEE OR COMPANY NAME, PHONE NUMBER. TYPE OF WORK, AND ADDRESS OF PROJECT.
34. WHEN DEEMED NECESSARY, A 6-FOOT HIGH CHAIN LINK FENCE MUST BE INSTALLED AROUND THE CONSTRUCTION AREA TO PREVENT ANY POTENTIAL SAFETY HAZARD FOR THE PUBLIC. THE FENCE SHALL BE SETBACK AT LEAST 10 FEET FROM ALL RIGHTS-OF-WAY AND HAVE A 50-FOOT STREET CORNER SITE TRIANGLE WHERE APPLICABLE.
35. CLEAR ACCESS FOR NEIGHBORING PROPERTIES AND EMERGENCY VEHICLES MUST BE MAINTAINED AT ALL TIMES. CONSTRUCTION RELATED VEHICLES MUST BE LEGALLY PARKED ONLY ON ONE SIDE OF THE STREET OR JOB SITE PROPERTY. IF A STAGING AREA IS NEEDED ON A PROPERTY OTHER THAN THE CONSTRUCTION SITE FOR CONSTRUCTION SUPPLIES AND EQUIPMENT, THE PERMITTEE MUST OBTAIN PROPERTY OWNER AND TOWN APPROVAL FIRST AND MUST INFORM THE ADJACENT PROPERTY OWNERS OF THE LOCATION OF STAGING AREA, AND TIME AND HOURS DURING THE DAY THE AREA WILL BE USED.
36. EXCEPT AS OUTLINED IN ITEM 4, ALL CONSTRUCTION DEBRIS AND EQUIPMENT MUST BE CONTAINED ON SITE AT ALL TIMES. CONTRACTOR AND PROPERTY OWNER MUST MAINTAIN THE JOB SITE FREE OF LITTER AND UNSIGHTLY MATERIALS AT ALL TIMES. CONSTRUCTION MATERIALS ARC PROHIBITED IN THE TOWN RIGHT-OF-WAY OR NEAR ADJACENT PROPERTIES.
37. BUILDING CONSTRUCTION MUST NOT START SOONER THAN SUNRISE AND MUST STOP NO LATER THAN SUNSET. ALSO, ORDINANCE #561 IMPOSES RESTRICTIONS ON CONSTRUCTION WORK ON SATURDAYS, SUNDAYS AND MAJOR BUSINESS HOLIDAYS. HILLSIDE PROJECTS MAY HAVE ADDITIONAL RESTRICTIONS. EQUIPMENT WITH AUDIBLE REVERSE DIRECTION WARNINGS MUST NOT BE OPERATED PRIOR TO 7:00 A.M.
38. THE USE AND OPERATION OF FUEL-FIRED GENERATORS ON ANY CONSTRUCTION SITE, NEW, EXISTING OR REMODELING, IS PROHIBITED UNLESS DUE TO A HARDSHIP TOWN APPROVAL IS OBTAINED.
39. THE CONTRACTOR AND PROPERTY OWNER WILL BE LIABLE FOR ANY DAMAGE DONE TO ANY PUBLIC PROPERTY AS A RESULT OF ANY CONSTRUCTION OR CONSTRUCTION RELATED ACTIVITIES. NO CERTIFICATE OF OCCUPANCY WILL BE ISSUED UNTIL ALL AFFECTED RIGHTS-OF-WAY ARE CLEANED AND/OR REPAIRED TO THEIR ORIGINAL CONDITION AND UNTIL ANY AND ALL DAMAGES TO AFFECTED PROPERTIES ARE RESTORED TO ORIGINAL CONDITION, OR UNTIL SUCH TIME THAT A WRITTEN, SIGNED AND LEGALLY BINDING AGREEMENT HAS BEEN REACHED BY THC PARTIES INVOLVED TO REMEDY ANY VIOLATION WITHIN A REASONABLE TIME PERIOD, AND UNTIL ALL REQUIRED FEES ARE PAID IN FULL.
40. THE NATURAL FLOW OF RAINWATER AND OTHER SURFACE DRAINAGE FROM THE PROPERTY MAY NOT BE ALTERED IN ANY WAY.
41. A KEY SWITCH SHALL BE REQUIRED ON ALL NEW AND EXISTING ELECTRIC ENTRY CONTROL GATES. THE KEY SWITCH SHALL BE INSTALLED IN A LOCATION ON THE GATE CONTROL PANEL THAT IS READILY VISIBLE AND ACCESSIBLE. KNOX BOX ORDER FORMS ARE AVAILABLE AT THE PARADISE VALLEY BUILDING DEPARTMENT.
42. ALL EQUIPMENT OF ALL TRADES ON OR AFFECTING THE JOB MUST BE CLEANED ONLY IN A PRE-DETERMINED AND DESIGNATED AREA. DEBRIS AND RUNOFF FROM SAID AREA MAY NOT EXTEND BEYOND THE BUILDING AREA.
43. PROPERTY OWNER, BUILDER, OR GENERAL CONTRACTOR WILL BE RESPONSIBLE FOR CONTROLLING DUST FROM THE SITE AT ALL TIMES. ALL MEANS NECESSARY SHALL BE USED BY THE BUILDER OR GENERAL CONTRACTOR TO CONTROL THE EXISTENCE OF DUST CAUSED BY ANY EARTHWORK, SPRAY APPLICATION OF MATERIALS, OR OTHER DUST-CAUSING PRACTICES REQUIRED BY THE CONSTRUCTION PROCESS.
44. AN INSPECTION FEE WILL BE CHARGED IF THE INSPECTION IS REQUIRED AS A RESULT OF A CODE VIOLATION.
45. FOR DEMOLITION INSPECTION OWNER OR PERMITTEE SHALL NOTIFY OSHA FOR ASBESTOS INSPECTION. ALL DEMOLITIONS AND ALL RENOVATION ACTIVITIES THAT WILL DISTURB FRIABLE ASBESTOS CONTAINING MATERIALS MUST BE REPORTED TO THE MARICOPA COUNTY ENVIRONMENTAL SERVICES DEPARTMENT.

ENGINEERS NOTES

1. MARICOPA ASSOCIATION OF GOVERNMENTS (M.A.G.) UNIFORM STANDARD SPECIFICATIONS AND DETAILS FOR PUBLIC WORKS CONSTRUCTION (LATEST EDITION INCLUDING LATEST REVISION AND CURRENT SUPPLEMENTS THEREOF PER THE LOCAL TOWN OR CITY) ARE INCORPORATED INTO THIS PLAN IN THEIR ENTIRETY.
2. ALL WORK REQUIRED TO COMPLETE THE CONSTRUCTION COVERED BY THIS PLAN SHALL BE IN ACCORDANCE WITH THE M.A.G. STANDARD SPECIFICATIONS AND DETAILS AND CURRENT SUPPLEMENTS THEREOF PER THE LOCAL CITY OR TOWN UNLESS SPECIFIED OTHERWISE IN THESE PLANS OR ELSEWHERE IN THE CONTRACT DOCUMENTS. CONTRACTORS SHALL FAMILIARIZE THEMSELVES WITH ALL REQUIRED STANDARD SPECIFICATIONS, DETAILS AND SUPPLEMENTS PRIOR TO BIDDING THE WORK FOR THE CONSTRUCTION COVERED BY THIS PLAN.
3. GRADING SHALL BE IN CONFORMANCE WITH 2015 IBC SEC. 1803 AND APPENDIX J.
4. 5% MINIMUM SLOPE AWAY FROM BUILDING FOR A MINIMUM 10', U.N.O.
5. ALL CONSTRUCTION SHALL CONFORM TO THE LATEST MARICOPA ASSOCIATION OF GOVERNMENTS (M.A.G.) SPECIFICATIONS AND STANDARD DETAILS.
6. A DUST CONTROL PLAN MEETING THE REQUIREMENTS OF RULE 310 OF THE MARICOPA COUNTY AIR POLLUTION CONTROL REGULATIONS, AS AMENDED, IS REQUIRED.
7. A SEPARATE PERMIT IS NECESSARY FOR ANY OFFSITE CONSTRUCTION.
8. AN APPROVED GRADING AND DRAINAGE PLAN SHALL BE ON THE JOB SITE AT ALL TIMES. DEVIATIONS FROM THE PLAN MUST BE PRECEDED BY AN APPROVED PLAN REVISION.
9. ALL DRAINAGE PROTECTIVE DEVICES SUCH AS SWALES, INTERCEPTOR DITCHES, PIPES, PROTECTIVE BERMS, BARRIER WALLS, CONCRETE CHANNELS OR OTHER MEASURES DESIGNED TO PROTECT ADJACENT BUILDINGS OR PROPERTY FROM STORM RUNOFF MUST BE COMPLETED PRIOR TO BUILDING CONSTRUCTION.
10. ALL STRUCTURES AND LANDSCAPING WITHIN THE SIGHT VISIBILITY TRIANGLE SHALL HAVE A 2 FOOT MAXIMUM HEIGHT.
11. ALL PATIOS, WALKS, AND DRIVES TO SLOPE AWAY FROM BUILDING AND GARAGES AT A MINIMUM SLOPE OF 1/4" PER FOOT UNLESS SPECIFIED OTHERWISE. ALL LAWN AREAS ADJOINING WALKS OR SLABS WILL BE GRADED TO 2" BELOW THE TOP OF SLAB. TYPICAL FINISHED GRADE AROUND PERIMETER OF BUILDING IS MINUS 6" BELOW FINISHED FLOOR UNLESS SPECIFIED OTHERWISE.
12. ALL MATERIAL TO BE UNDER SLABS AND WALKS SHALL BE COMPACTED TO NOT LESS THAN 95% PER ASTM D698.
13. THE QUANTITIES AND SITE CONDITIONS DEPICTED IN THESE PLANS ARE FOR INFORMATIONAL PURPOSES ONLY AND ARE SUBJECT TO ERROR AND OMISSION. CONTRACTORS SHALL SATISFY THEMSELVES AS TO ACTUAL QUANTITIES AND SITE CONDITIONS PRIOR TO BIDDING THE WORK FOR THE CONSTRUCTION COVERED BY THIS PLAN.
14. THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING AND COMPLYING WITH ALL PERMITS REQUIRED TO COMPLETE ALL WORK COVERED BY THIS PLAN.
15. THE CONTRACTOR IS RESPONSIBLE FOR ALL METHODS, SEQUENCING, AND SAFETY CONCERNS ASSOCIATED WITH THIS PROJECT DURING CONSTRUCTION, UNLESS SPECIFICALLY ADDRESSED OTHERWISE IN THIS PLAN OR ELSEWHERE.
16. A REASONABLE EFFORT HAS BEEN MADE TO SHOW THE LOCATIONS OF EXISTING UNDERGROUND FACILITIES AND UTILITIES IN THE CONSTRUCTION AREA. THE CONTRACTOR IS RESPONSIBLE FOR ANY DAMAGE TO UTILITIES AND/OR FACILITIES CAUSED DURING THEIR CONSTRUCTION OPERATIONS. THE CONTRACTOR SHALL CALL 48 HOURS IN ADVANCE FOR BLUE STAKE (1-800-STAKE-IT) PRIOR TO ANY EXCAVATION.
17. THE CONTRACTOR IS RESPONSIBLE FOR ALL COORDINATION OF CONSTRUCTION AFFECTING UTILITIES AND THE COORDINATION OF ANY NECESSARY UTILITY RELOCATION WORK.
18. ALL PAVING, GRADING, EXCAVATION, TRENCHING, PIPE BEDDING, CUT, FILL AND BACKFILL SHALL COMPLY WITH THE RECOMMENDATIONS SET FORTH IN THE SOILS (GEOTECHNICAL) REPORT FOR THIS PROJECT IN ADDITION TO THE REFERENCED REQUIRED SPECIFICATIONS AND DETAILS.
19. THE CONTRACTOR IS TO VERIFY THE LOCATION AND THE ELEVATIONS OF ALL EXISTING UTILITIES AT POINTS OF TIE-IN PRIOR TO COMMENCING ANY NEW CONSTRUCTION. SHOULD ANY LOCATION OR ELEVATION DIFFER FROM THAT SHOWN ON THESE PLANS, THE CONTRACTOR SHALL CONTACT THE OWNER'S AGENT.
20. CONTRACTOR TO VERIFY AND COORDINATE ALL DIMENSIONS AND SITE LAYOUT WITH ARCHITECTURE'S FINAL SITE PLAN AND FINAL BUILDING DIMENSIONS BEFORE STARTING WORK. REPORT DISCREPANCIES TO OWNER'S AGENT.
21. COORDINATION BETWEEN ALL PARTIES IS ESSENTIAL PART OF CONTRACT.
22. CONTRACTOR IS RESPONSIBLE FOR PROJECT AND SITE CONDITIONS, AND TO WORK WITH WEATHER CONDITIONS AS THE PROJECT SITE MAY BE LOCATED IN A FLOOD PRONE AREA AND SUBJECT TO FLOODING AND ITS HAZARDS.
23. THE CONTRACTOR IS TO VERIFY THE LOCATION, ELEVATION, CONDITION, AND PAVEMENT CROSS-SLOPE OF ALL EXISTING SURFACES AT POINTS OF TIE-IN AND MATCHING, PRIOR TO COMMENCEMENT OF GRADING, PAVING, CURB AND GUTTER, OR OTHER SURFACE CONSTRUCTION. SHOULD EXISTING LOCATIONS, ELEVATIONS, CONDITION, OR PAVEMENT CROSS-SLOPE DIFFER FROM THAT SHOWN ON THESE PLANS, RESULTING IN THE DESIGN INTENT REFLECTED ON THESE PLANS NOT ABLE TO BE CONSTRUCTED, THE CONTRACTOR SHALL NOTIFY THE OWNER'S AGENT IMMEDIATELY FOR DIRECTION ON HOW TO PROCEED PRIOR TO COMMENCEMENT OF CONSTRUCTION. THE CONTRACTOR ACCEPTS RESPONSIBILITY FOR ALL COSTS ASSOCIATED WITH CORRECTIVE ACTION IF THESE PROCEDURES ARE NOT FOLLOWED.
24. CONTRACTOR IS RESPONSIBLE TO COORDINATE UTILITY CROSSINGS AT CULVERT CROSSINGS BEFORE STARTING WORK ON CULVERT. COORDINATE WITH OWNER REPRESENTATIVE. VERIFY UTILITY LINES AND/OR CONDUITS ARE IN PLACE BEFORE STARTING CULVERT WORK.
25. ALL ON-SITE UTILITIES PER OTHERS.
26. THIS PROJECT REQUIRES A REGULAR ONGOING MAINTENANCE PROGRAM FOR THE DESIGNED DRAINAGE SYSTEM(S) TO PRESERVE THE DESIGN INTEGRITY AND THE ABILITY TO PERFORM ITS OPERATIONAL INTENT. FAILURE TO PROVIDE MAINTENANCE WILL JEOPARDIZE THE DRAINAGE SYSTEM(S)' PERFORMANCE AND MAY LEAD TO IT'S INABILITY TO PERFORM PROPERLY AND/OR CAUSE DAMAGE ELSEWHERE IN THE PROJECT.
27. IF A DISCREPANCY IS FOUND BETWEEN ENGINEER'S PLAN OR SURVEYOR'S STAKING AND THE ARCHITECTURAL PLAN. ENGINEER SHALL BE NOTIFIED IMMEDIATELY. FAILURE TO NOTIFY ENGINEER SHALL NEGATE ENGINEER'S LIABILITY.
28. ALL DISTURBED AREAS ARE TO BE ROPED AND ROPING MUST MATCH PLAN.
29. VEGETATION OUTSIDE OF CONSTRUCTION AREA TO REMAIN.
30. AREAS OUTSIDE THE WALL AND CUT AND FILL SLOPES SHALL BE REVEGETATED WITH SIMILAR PLANT TYPES AND DENSITIES FOUND ON THE SITE. REVEGETATION SHALL BE COMPLETED PRIOR TO OCCUPANCY AND THE ISSUANCE OF A CERTIFICATE OF OCCUPANCY.
31. MECHANICAL EQUIPMENT SHALL BE SCREENED TO A MINIMUM OF ONE FOOT ABOVE TOP OF EQUIPMENT.
32. ANY FUTURE IMPROVEMENTS SHOWN HEREON SHALL REQUIRE A SEPARATE PERMIT.
33. ANY POINTS OF DRAINAGE CONCENTRATION SHOULD BE PROTECTED AGAINST EROSION WITH NATIVE STONE.
34. THIS PLAN IS DESIGNED TO SHOW SITE GRADING AND DRAINAGE CONTRACTOR SHALL USE THE ARCHITECTURAL SITE PLAN TO DETERMINE FINAL HOUSE, WALL, STEP, ETC., LOCATIONS AND ELEVATIONS.
35. ALL DRAINAGE FACILITIES TO BE MAINTAINED BY HOMEOWNER.
36. SEE ARCHITECTURAL AND STRUCTURAL PLANS FOR SITE AND RETAINING WALLS LAYOUT, DIMENSIONS, AND DETAILS. TOP OF FOOTING ELEVATIONS SHOWN IN PLAN ARE APPROXIMATE ONLY. ACTUAL TOP OF FOOTINGS TO BE DETERMINED AT TIME OF CONSTRUCTION AND TO BE A MINIMUM OF SIX INCHES BELOW EXISTING NATURAL GRADE OR FINISHED GRADE WHICHEVER IS LOWER (TYPICAL).
37. REFER TO ARCHITECTURAL DRAWINGS FOR BUILDING LAYOUT, DIMENSIONS AND ELEVATIONS.
38. REFER TO STRUCTURAL DRAWINGS, DETAILS AND CALCULATIONS FOR ALL PROPOSED RETAINING WALLS.
39. FOR CHANGE IN ELEVATION THAT ARE GREATER THAN 30", PROVIDE 36" HIGH GUARDRAILS FOR TOTAL OF 42" FALL PROTECTION BARRIER U.N.O.
40. ALL WATER AND SEWER LINES AND CONNECTIONS MUST BE INSTALLED PER IPC 2015, MAG AND CITY OF PHOENIX SUPPLEMENT TO MAG.
41. ALL PIPES AND FITTINGS SHALL BE INSTALLED PER MANUFACTURE'S SPECIFICATIONS AND DETAILS.
42. ABANDONMENT OR REMOVAL OF EXISTING SEPTIC SYSTEMS SHALL BE PERFORMED IN ACCORDANCE WITH THE MARICOPA COUNTY ENVIRONMENTAL SERVICES DEPARTMENT RULES AND STANDARDS, AND WILL REQUIRE SEPARATE PERMIT.
43. COORDINATE RIPRAP COLOR WITH LANDSCAPE PLANS AND DETAILS.
44. VERIFY AND COORDINATE WITH ARCHITECTURAL AND LANDSCAPE PLANS LOCATION AND HEIGHT OF ALL SITE WALLS.
45. DISTURBED AREA 0.12 ACRES < 1 ACRE; NPDES PERMIT IS NOT REQUIRED.
46. REFER TO ARCHITECTURAL PLANS AND DETAILS FOR DEMOLITION OF EXISTING BUILDING STRUCTURE, SITE WALLS AND PAVEMENT.
47. VERIFY AND COORDINATE WITH LANDSCAPE PLANS FINAL LOCATION AND GRATE TYPE OF SPECIFIED AREA DRAINS AND TRENCH DRAINS.
48. THE SCOPE OF THIS GRADING AND DRAINAGE PLAN COVERS CERTAIN SITE DRAINAGE IMPROVEMENTS TO MITIGATE EXISTING EROSION ISSUES ALONG THE NORTH SIDE OF THE EXISTING RESIDENCE. LAND DEVELOPMENT GROUP (LDG) ASSUMES NO LIABILITY FOR DRAINAGE ISSUES BEYOND THE LIMITS OF THE CONSTRUCTION SHOWN ON THESE PLANS.
49. THE GRADING AND DRAINAGE DESIGN PRESENTED HEREIN IS BASED ON EVALUATING STORMWATER RUNOFF RESULTING FROM A STATISTICAL ANALYSIS OF STORM EVENTS OF PARTICULAR FREQUENCY, UP TO AND INCLUDING 100-YEAR EVENT AS REQUIRED BY THE CITY OF PHOENIX AND MARICOPA COUNTY DRAINAGE DESIGN MANUALS. A STORM EVENT EXCEEDING THE 100-YEAR EVENT MAY CAUSE OR CREATE THE RISK OF GREATER STORM IMPACT THAN IS PRESENTED AND ADDRESSED ON THIS PLAN.
50. IT IS RECOMMENDED ALL CONSTRUCTION WORK PRESENTED HEREIN TO OCCUR PAST THE MONSOON SEASON. VERIFY FORECAST AND WEATHER CONDITIONS BEFORE EXCAVATION. PROTECT EXPOSED BANK FROM FURTHER EROSION AND COLLAPSE DURING EXCAVATION WITH SHORING AND OTHER APPROVED METHODS APPLICABLE FOR THIS PROJECT.

LEGEND

▷○◁	1/4 QUARTER
◙	BRASS CAP IN HANDHOLE
◉	BRASS CAP FLUSH
●	FOUND REBAR OR AS NOTED
◎	SET 1/2" REBAR & TAG OR AS NOTED
○	CALCULATED POINT
━ ━ ━	PROPERTY LINE
—— ——	EASEMENT LINE
—— – ——	MONUMENT LINE
— —1321— —	EXISTING CONTOUR
	EXIST. DRAINAGE FLOW
x21.12	EXIST. SPOT ELEVATION
✳	PALO VERDE
	DRAINAGE FLOW ARROW
86.30	PROPOSED SPOT ELEVATION
—1390—	PROPOSED CONTOUR
TP: XX.XX	TOP OF PARAPET
TW: XX.XX	TOP OF WALL
TRW: XX.XX	TOP OF RETAINING WALL
FG: XX.XX	FINISH GRADE
TF: XX.XX	TOP OF FOOTING

ABBREVIATIONS

BC	BACK OF CURB
BSL	BUILDING SETBACK LINE
C11	CURVE LABEL
℄	CENTERLINE
DE	DRAINAGE EASEMENT
EG	EXISTING GRADE
EL, ELEV	ELEVATION
EP	EDGE OF PAVEMENT
ESMT	EASEMENT
EX, EXIST.	EXISTING
FG	FINISH GRADE
FL	FLOW LINE
FND	FOUND
G	GUTTER, GAS
INV	INVERT
JBE	JOINT USE & BENEFIT EASEMENT
L11	LINE LABEL
(M)	MEASURED
MCR	MARICOPA COUNTY RECORDER
MH	MANHOLE
P, PVMT	PAVEMENT
PUE	PUBLIC UTILITY EASEMENT
(R), REC.	RECORDED
R	RADIUS
R/W	RIGHT OF WAY
T	TANGENT, TELEPHONE
TC	TOP OF CURB
TG	TOP OF GRATE
TPV	TOWN OF PARADISE VALLEY
TRW	TOP OF RETAINING WALL
W	WEST, WATERLINE
WDO	WALL DRAINAGE OPENING
WM	WATER METER

GRADING SPECIFICATIONS

1. EXCAVATION AND GRADING OF THIS SITE IS CLASSIFIED AS "ENGINEERED GRADING" PER 2015 I.B.C. AND WILL BE PERFORMED ACCORDINGLY.
2. THE CONTRACTOR WILL RETAIN A SOILS ENGINEER DURING CONSTRUCTION TO INSPECT PROGRESS OF CONSTRUCTION. CONCERNING PREPARATION OF GROUND TO RECEIVE FILLS, TESTING AND REQUIRED COMPACTION STABILITY OF ALL FINISH SLOPES INCLUDING CUT SLOPES.
3. COMPACTION SHALL COMPLY WITH M.A.G. SECTION 601 AND PROVISIONS AS SET FORTH IN THE APPROVED GEOTECHNICAL REPORT.
4. CUT AND FILL SLOPES SHALL BE PER THE APPROVED GEOTECHNICAL REPORT.
5. ANY RETAINING WALLS ADJACENT TO THE PROPERTY LINES WILL BE UNDER THE SCOPE OF SPECIAL INSPECTION BY THE SOILS ENGINEER. THE DEVELOPER SHALL NOTIFY THE ADJOINING PROPERTY OWNERS IN WRITING, TEN DAYS PRIOR TO START OF CONSTRUCTION ON THESE WALLS PER SECTION 2903-B OF I.B.C. THE DEVELOPER WILL HAVE TO PROVIDE MEANS OF PROTECTION OF ADJACENT PROPERTY WHILE THIS WORK IS UNDER CONSTRUCTION.
5. THE USE OF HYDRAULIC RAM HAMMERS AND HEAVY EQUIPMENT SHALL BE LIMITED TO USE BETWEEN THE HOURS OF 7:00AM AND 6:00PM MONDAY THROUGH SATURDAY WITH NO WORK ON SUNDAY.

EARTHWORK QUANTITIES

CUT: 129 C.Y.
FILL: 203 C.Y.
NET FILL: 74 C.Y.

ALL QUANTITIES LISTED ON THESE PLANS ARE ESTIMATES ONLY. NO SHRINK OR SWELL IS ASSUMED. THE CONTRACTOR SHALL MAKE THEIR OWN DETERMINATION OF THE QUANTITIES AND BASE THEIR BIDS ON THEIR ESTIMATES.

NATIVE PLANTS

ALL NATIVE PLANTS IMPACTED BY CONSTRUCTION SHALL BE RELOCATED ON SITE. SEE LANDSCAPE PLAN AND NATIVE PLANT INVENTORY AND SALVAGE PLAN.

PROJECT DESCRIPTION

REALIGNMENT OF THE EXISTING DRAINAGE WASH FOR PROPER CONVEYANCE OF OFFSITE FLOWS.
NEW SCOUR WALL FOR EROSION AND EXISTING BUILDING FOOTPRINT PROTECTION.

SHEET INDEX

C1 – COVER SHEET
C2 – PARTIAL GRADING & DRAINAGE IMPROVEMENT PLAN

UTILITIES

WATER: CITY OF PHOENIX
SANITARY SEWER: CITY OF PHOENIX
ELECTRIC: SALT RIVER PROJECT
TELEPHONE: CENTURY LINK, COX COMMUNICATIONS
NATURAL GAS: SOUTHWEST GAS
CABLE TV: CENTURY LINK, COX COMMUNICATIONS

UTILITIES NOTES

HORIZONTAL AND VERTICAL LOCATIONS OF ALL EXISTING UTILITIES SHOWN ON THE PLAN ARE APPROXIMATE ONLY AND WILL BE FIELD VERIFIED BY CONTRACTOR PRIOR TO START OF CONSTRUCTION WORK. CALL BLUE STAKE @ (602) 263-1100.

FLOOD INSURANCE RATE MAP (FIRM) DATA

COMMUNITY # 040049	PANEL # 1745 OF 4425	SUFFIX L	BASE FLOOD ELEVATION N/A
MAP # 04013C	PANEL DATE 10/16/2013	ZONE X*	

*AREAS DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOODPLAIN

FINISH FLOOR CERTIFICATION

I HEREBY CERTIFY THAT FINISHED FLOOR ELEVATIONS SHOWN ON THE PLAN OF 1378.50 IS MINIMUM OF 12" ABOVE THE 100-YEAR STORM ELEVATION OF 1376.00 ACCORDING TO THE TOWN OF PARADISE VALLEY CODE OF ORDINANCE.

Nick Prodanov
REGISTERED CIVIL ENGINEER

11/24/19
DATE:

VICINITY MAP

NTS

OWNER

PHILLIP WESTBROOKS
6341 N 34TH PL.,
PARADISE VALLEY, AZ 85253

SITE DATA

APN: 164-05-023
ADDRESS: 6341 N 34TH PL., PARADISE VALLEY, AZ 85253
ZONING: R-43
LOT AREA: 51,603 S.F (1.185 AC.)
CONSTRUCTION YEAR: 1977
COP Q.S. 21-35

CIVIL ENGINEER

LAND DEVELOPMENT GROUP, LLC
8808 N CENTRAL AVE, SUITE 288
PHOENIX, AZ 85020
CONTACT: NICK PRODANOV, PE
P: 602-889-1984

STRUCTURAL ENGINEER

JRJ ENGINEERING, PLLC
2111 E BASELINE RD.,
TEMPE, AZ 85283
P: 480-734-9262

GEOTECHNICAL REPORT

VANN ENGINEERING INC.
9013 N 24TH AVE., SUITE 7
PHOENIX, AZ 85021
P: 602-943-6997
F: 602-943-7179

LEGAL DESCRIPTION

LOT 18, MIRADA LOS ARCOS, PHASE 2, ACCORDING TO BOOK 159 OF MAPS, PAGE 35, RECORDS OF MARICOPA COUNTY, ARIZONA.

BASIS OF BEARINGS

THE MONUMENT LINE OF LINCOLN DRIVE, THE BEARING OF WHICH IS N89°43'03"E.

BENCHMARK

BRASS CAP FLUSH AT THE WEST 1/4 CORNER OF SECTION 12, T2N, R3E, HAVING AN ELEVATION OF 1387.35, TOWN OF PARADISE VALLEY (NAVD 88) DATUM, GDACS# 24034-1.

AS-BUILT CERTIFICATION

I HEREBY CERTIFY THAT THE "RECORD DRAWING" MEASUREMENTS AS SHOWN HEREON WERE MADE UNDER MY SUPERVISION OR AS NOTED AND ARE CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF.

REGISTERED ENGINEER/ LAND SURVEYOR DATE

REGISTRATION NUMBER

APPROVAL

THIS SET OF PLANS HAS BEEN REVIEWED FOR COMPLIANCE WITH TOWN OF PARADISE VALLEY REQUIREMENTS PRIOR TO ISSUANCE OF PERMIT. THE TOWN NEITHER ACCEPTS NOR ASSUMES ANY LIABILITY FOR ERRORS OR OMISSIONS. THIS COMPLIANCE APPROVAL SHALL NOT PREVENT THE TOWN ENGINEER FROM REQUIRING CORRECTIONS OF ERRORS OR OMISSIONS IN THE PLANS TO BE FOUND IN VIOLATION OF LAWS OR ORDINANCES.

TOWN ENGINEER DATE
TOWN OF PARADISE VALLEY

REVISIONS:	DATE:	SCALE: N.T.S.	DATE: 11/24/19
		DESIGNED BY: NP	JOB: 1804080
		DRAWN BY: ZA	VERSION: 1.2
		CHECKED BY: JI	PLOT DATE: 11/24/19

PARTIAL GRADING & DRAINAGE PLAN COVER SHEET

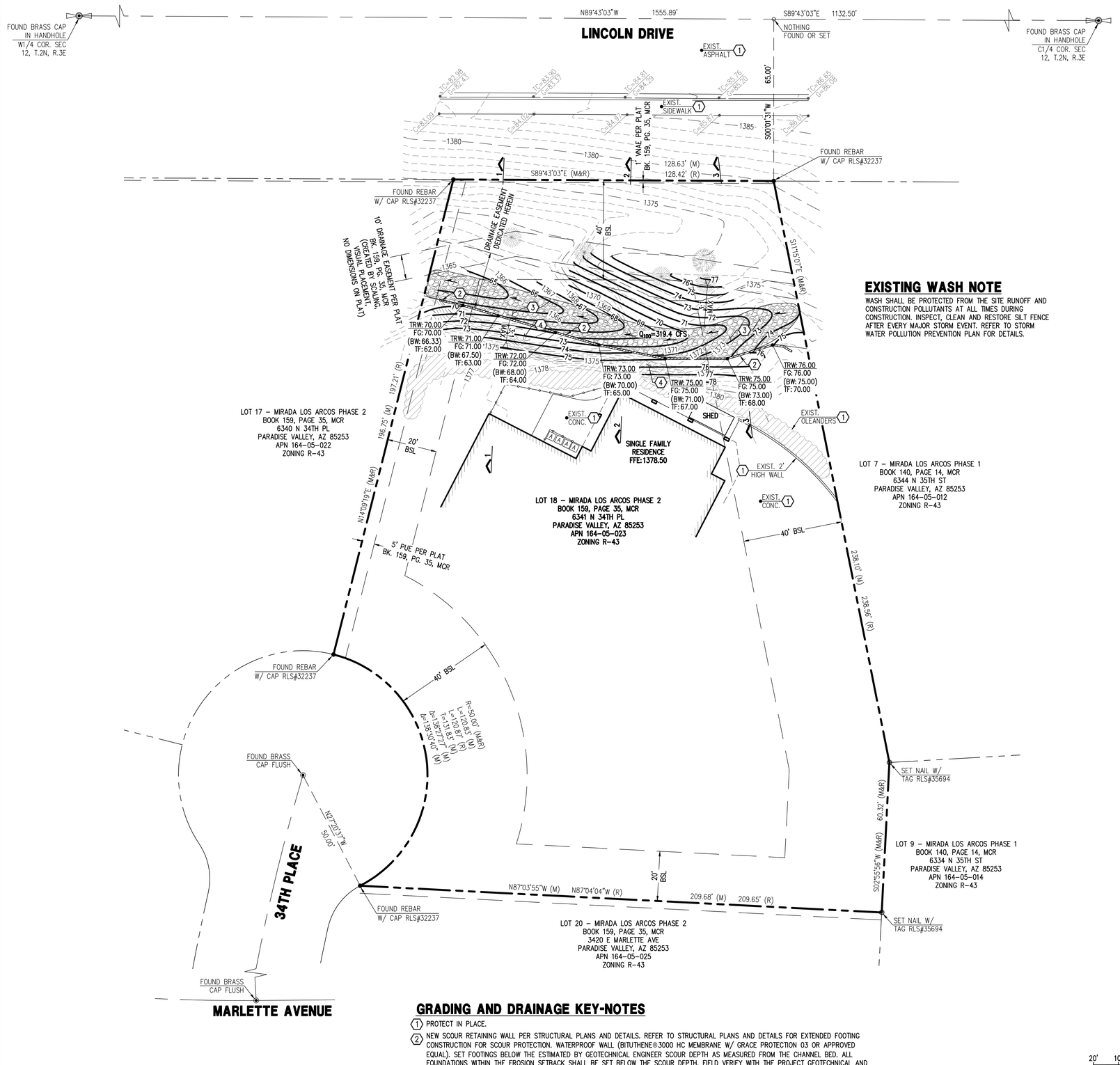
LOT 18 - MIRADA LOS ARCOS PHASE 2 6341 N 34TH PL., PARADISE VALLEY, AZ 85253

Land DEVELOPMENT GROUP
P 602 889 1984 | F 602 445 9482
8808 N CENTRAL AVE., SUITE 288
PHOENIX, AZ 85020
PHOENIX@LDGENG.COM

41005
NICKOLA J. PRODANOV
Date Signed 11/24/19

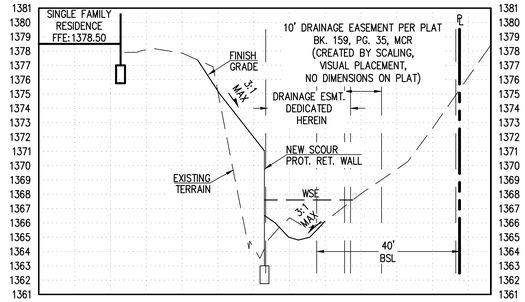
Nick Prodanov

C-1
1 OF 2



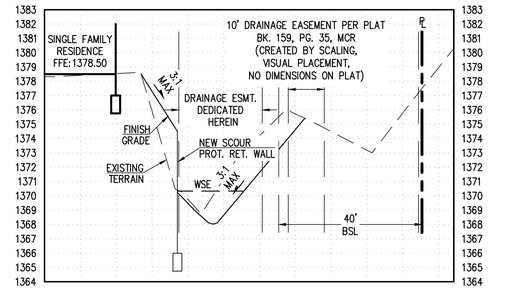
EXISTING WASH NOTE

WASH SHALL BE PROTECTED FROM THE SITE RUNOFF AND CONSTRUCTION POLLUTANTS AT ALL TIMES DURING CONSTRUCTION. INSPECT, CLEAN AND RESTORE SILT FENCE AFTER EVERY MAJOR STORM EVENT. REFER TO STORM WATER POLLUTION PREVENTION PLAN FOR DETAILS.



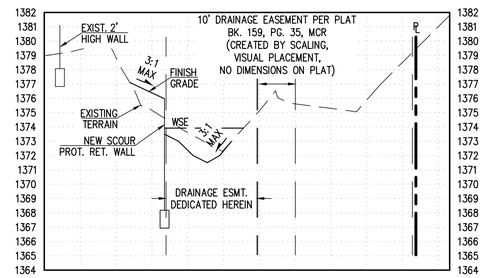
CROSS SECTION 1 - 1

SCALE HOR. 1" = 20', VER. 1" = 5'



CROSS SECTION 2 - 2

SCALE HOR. 1" = 20', VER. 1" = 5'



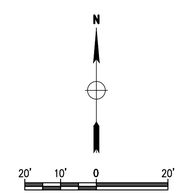
CROSS SECTION 3 - 3

SCALE HOR. 1" = 20', VER. 1" = 5'

PERCENT PASSING	SIZE	D_{50} CLASS, INCHES			
		4	6	8	12
100 TO 90	1.5 D_{50}	6	8	12	18
85 TO 70	1.3 D_{50}	5	7	10	16
50 TO 30	1.0 D_{50}	4	6	8	12
15 TO 5	0.67 D_{50}	3	4	5	8
5 TO 0	0.50 D_{50}	2	3	4	6

RIP-RAP GRADATION TABLE

N.T.S.



SCALE 1" = 20'

GRADING AND DRAINAGE KEY-NOTES

1. PROTECT IN PLACE.
2. NEW SCOUR RETAINING WALL PER STRUCTURAL PLANS AND DETAILS. REFER TO STRUCTURAL PLANS AND DETAILS FOR EXTENDED FOOTING CONSTRUCTION FOR SCOUR PROTECTION. WATERPROOF WALL (BITUTHENE®3000 HC MEMBRANE W/ GRACE PROTECTION 03 OR APPROVED EQUAL). SET FOOTINGS BELOW THE ESTIMATED BY GEOTECHNICAL ENGINEER SCOUR DEPTH AS MEASURED FROM THE CHANNEL BED. ALL FOUNDATIONS WITHIN THE EROSION SETBACK SHALL BE SET BELOW THE SCOUR DEPTH. FIELD VERIFY WITH THE PROJECT GEOTECHNICAL AND STRUCTURAL ENGINEERS IF DURING EXCAVATION, LAYER 2 AS DEFINED IN THE PROJECT GEOTECHNICAL REPORT IS REACHED. LAYER 2 IS DESIGNATED BY THE GEOTECHNICAL ENGINEER AS SOMEWHAT NON-EROSIVE AND NOT AFFECTED BY SCOUR, WHICH COULD ALLOW FOR REDUCTION OF THE EXCAVATION AND FOUNDATION DEPTH IF INSPECTED AND APPROVED BY THE GEOTECHNICAL AND STRUCTURAL ENGINEERS. REFER TO GEOTECHNICAL REPORT, VANN ENGINEERING, PROJECT 25192.
3. INSTALL ANGULAR RIP-RAP D50=12", 2' THICK PLACED ON NONWOVEN GEOTEXTILE FABRIC (MIRAFI N-SERIES OR APPROVED EQUAL).
4. BACKFILL BEHIND RETAINING WALL. REFER TO GEOTECHNICAL REPORT RECOMMENDATION.

Contact Arizona 811 at least two full working days before you begin excavation

Call 811 or click Arizona811.com

REVISIONS: | DATE:

DATE: 11/24/19
JOB: 1804080
DESIGNED BY: NP
DRAWN BY: ZA
CHECKED BY: JB
SCALE: 1"=20'
VERSION: 1.2
PLOT DATE: 11/24/19

PARTIAL GRADING & DRAINAGE PLAN IMPROVEMENT PLAN

LOT 18 - MIRADA LOS ARCOS PHASE 2 6341 N 34TH PL., PARADISE VALLEY, AZ 85253

land DEVELOPMENT GROUP
P. 602 889 1984 | F. 602 445 9482
8808 N. CENTRAL AVE., SUITE 288
PHOENIX, AZ 85020
PHOENIX@LDGENG.COM

REGISTERED PROFESSIONAL ENGINEER
CERTIFICATE NO.
41005
NICKOLA J. PRODANOV
Date Signed 11/24/19
ARIZONA U.S.A.

C-2
2 OF 2

Appendix D
Existing Drainage Easement

159-35

61159

FINAL PLAT
MIRADA LOS ARCOS
PHASE 2

A SUBDIVISION OF A PORTION OF THE SW 1/4 SECTION 12, T. 2 N., R3E. G&SRB&M., MARICOPA COUNTY, ARIZONA

STATE OF ARIZONA } ss
County of Maricopa }

I hereby certify that the within instrument was filed and recorded at request of Holmquist & King
MAR 7 '73-3 35
in Book 159
on page 35
Witness my hand and official seal the day and year aforesaid.
Paul N. Marston County Recorder
By Phyllis Lester Deputy Recorder

CURVE DATA				
NO.	R	Δ	L	T
1	1975.00'	1°35'44"	55.00'	27.50'
2	1975.00'	0°52'13"	30.00'	15.00'
3	350.00'	8°42'50"	53.23'	26.67'
4	300.00'	8°47'42"	46.05'	23.07'
5	25.00'	50°17'26"	21.94'	11.73'
6	25.00'	46°16'37"	20.19'	10.68'
7	25.00'	90°34'52"	39.52'	25.26'
8	25.00'	93°51'12"	40.95'	26.74'
9	25.00'	48°11'20"	21.03'	11.18'
10	25.00'	48°11'20"	21.03'	11.18'
11	25.00'	84°29'17"	36.86'	22.70'
12	25.00'	98°28'21"	42.97'	29.00'
13	2000.00'	10°17'38"	359.32'	180.15'
14	2000.00'	3°36'24"	125.90'	62.97'

NOTE: DRAINAGE EASEMENTS ARE FOR THE PURPOSE OF ALLOWING STORM, FLOOD AND OTHER WATERS TO PASS OVER UNDER OR THROUGH THE LAND SET ASIDE FOR THE EASEMENT AND NOTHING SHALL BE CONSTRUCTED, PLANTED OR ALLOWED TO GROW ON THIS EASEMENT WHICH WOULD IMPEDE THE FLOW OF WATERS, AND THE TOWN OF PARADISE VALLEY, A MUNICIPAL CORPORATION OF THE STATE OF ARIZONA, MAY, IF IT SO DESIRES, CONSTRUCT AND OR MAINTAIN DRAIN FACILITIES ON OR UNDER THE LAND DESCRIBED IN THIS EASEMENT. ACCESS TO THIS EASEMENT SHALL NOT BE OBSTRUCTED. CONSTRUCTION WITHIN THE EASEMENT SHALL BE LIMITED TO UTILITIES AND WOOD, WIRE OR REMOVABLE SECTION TYPE FENCING

○ DENOTES SUBDIVISION CORNER SET 1/2" IRON PIPE UNLESS OTHERWISE NOTED.
MINIMUM SETBACK LINES 40' FRONT & REAR, 20' SIDES, unless as indicated.

TYPICAL SERVICE EASEMENT FOR UNDERGROUND UTILITIES GAS, POWER & COMMUNICATION

DEDICATION

STATE OF ARIZONA } SS
COUNTY OF MARICOPA }

KNOW ALL MEN BY THESE PRESENTS: THAT TRANSAMERICA TITLE INSURANCE COMPANY OF ARIZONA, AN ARIZONA CORPORATION, AS TRUSTEE, HAS SUBDIVIDED UNDER THE NAME OF MIRADA LOS ARCOS PHASE 2, THAT PORTION OF THE SW1/4 OF SECTION 12, T.2N, R3E, G&S.R.B&M, MARICOPA COUNTY, ARIZONA, AS SHOWN PLATTED HEREON, AND HEREBY PUBLISHES THIS PLAT AS AND FOR THE PLAT OF SAID MIRADA LOS ARCOS PHASE 2, AND HEREBY DECLARES THAT SAID PLAT SETS FORTH THE LOCATION AND GIVES THE DIMENSIONS OF THE LOTS AND STREETS CONSTITUTING SAME AND THAT EACH LOT AND STREET SHALL BE KNOWN BY THE NUMBER OR NAME GIVEN TO EACH RESPECTIVELY ON SAID PLAT AND THE TRANSAMERICA TITLE INSURANCE COMPANY OF ARIZONA, AS TRUSTEE, HEREBY DEDICATES TO THE PUBLIC FOR USE AS SUCH, THE STREETS AS SHOWN ON SAID PLAT AND INCLUDED IN THE ABOVE DESCRIBED PREMISES. EASEMENTS ARE DEDICATED FOR PURPOSES SHOWN.

IN WITNESS WHEREOF: TRANSAMERICA TITLE INSURANCE COMPANY OF ARIZONA, AS TRUSTEE, HAS HEREUNTO CAUSED ITS CORPORATE NAME TO BE SIGNED AND ITS CORPORATE SEAL TO BE AFFIXED BY THE UNDERSIGNED OFFICER THEREUNTO DULY AUTHORIZED.
DONE AT PHOENIX, ARIZONA, THIS 29 DAY OF JANUARY, 1973.

TRANSAMERICA TITLE INSURANCE COMPANY OF ARIZONA, AS TRUSTEE
BY: Richard Brittain
TRUST OFFICER

ACKNOWLEDGEMENT

STATE OF ARIZONA } SS
COUNTY OF MARICOPA }

ON THIS THE 29 DAY OF JANUARY, 1973, BEFORE ME, THE UNDERSIGNED OFFICER, PERSONALLY APPEARED RICHARD BRITTAIN WHO ACKNOWLEDGED HIMSELF TO BE A TRUST OFFICER OF THE TRANSAMERICA TITLE INSURANCE COMPANY OF ARIZONA, AN ARIZONA CORPORATION, AND THAT HE AS SUCH OFFICER BEING AUTHORIZED SO TO DO, EXECUTED THE FOREGOING INSTRUMENT FOR THE PURPOSE THEREIN CONTAINED BY SIGNING THE NAME OF CORPORATION AS TRUSTEE, BY HIMSELF AS SUCH OFFICER.
IN WITNESS WHEREOF, I HEREUNTO SET MY HAND AND OFFICIAL SEAL.

MY COMMISSION EXPIRES 3-2-76 Karen A. Merrick nee: Karen A. Long
NOTARY PUBLIC

APPROVALS

APPROVED BY THE PARADISE VALLEY PLANNING AND ZONING COMMISSION THIS 6th DAY OF Feb, 1973.

ATTEST: _____ CLERK BY: _____ CHAIRMAN

APPROVED BY THE TOWN COUNCIL OF THE TOWN OF PARADISE VALLEY THIS _____ DAY OF _____, 1973.

ATTEST: _____ MAYOR BY: _____ CLERK

CERTIFICATION

THIS IS TO CERTIFY THAT THE SURVEY AND SUBDIVISION OF THE PREMISES AS DESCRIBED AND PLATTED HEREON WERE MADE UNDER MY DIRECTION DURING THE MONTH OF March, 1971.

_____ REGISTERED LAND SURVEYOR

Note "A": That the Maricopa County Health Dept. before each lot in this subdivision is sold be notified in writing by a professional engineer (registered, proficient in soil analysis) that the lot is suitable for the subsurface disposal of sewage effluent. Furthermore the registered professional engineer will submit plans for the proposed installation, make such inspections of the disposal area as necessary, notifying the Maricopa County Health Dept. in advance so that a representative may accompany him on his inspections, and notify the County Health Dept. in writing, that the disposal system, when completed, has been constructed in accordance with the plan submitted and will operate satisfactorily so as to cause no public health nuisance.

REGISTERED LAND SURVEYOR 15717 JAMES E. KING ARIZONA, U.S.A.

HOLMQUIST AND KING
CONSULTING ENGINEERS INC.

DWG. NO. E-13757

159-35

EA
Ho

When recorded mail to:

Town of Paradise Valley
Town Attorney
6401 E. Lincoln
Paradise Valley, AZ 85253

DRAINAGE EASEMENT and

DRAINAGE EASEMENT AGREEMENT

This Drainage Easement and Drainage Easement Agreement ("Agreement") is made and entered into as of this 3rd day of January 2020, by and between *Phillip Westbrooks* ("Grantor), and the TOWN OF PARADISE VALLEY, an Arizona municipal corporation ("Grantee" or "Town").

1. Grantor is the fee simple owner of that certain tract of land located in the Town of Paradise Valley, County of Maricopa, State of Arizona, as shown on Exhibit A and located at the following address: 6341 North 34th Place Paradise Valley, Arizona 85253 (the "Property").

2. Grantor grants to Grantee drainage easement rights in, over and across the parcels shown on Exhibit B (the "Drainage Easement") and Grantee has accepted same by its approval of Exhibit B and the acceptance of the Drainage Easement and this Agreement (as evidenced by the execution of this Agreement by the Mayor of the Town).

3. Grantor, for Grantor, its successors, and assigns (hereinafter "Owners") covenants with the Grantee and its successors and assigns, that Grantor and Owners, at all times after the effective date of this instrument, at its own cost and expense, will clean and maintain the Drainage Easement, and will keep the Drainage Easement area cleaned and maintained in a proper and workmanlike manner, and in compliance with all applicable ordinances, codes, rules and regulations. Grantor, and all future Owners, lessees, and residents of all or any part of the Property are bound by the provisions of this Agreement. This Agreement cannot be terminated, released, amended or modified without the express prior written consent of Grantee.

4. If for any reason the Grantor (or Owners) does not fulfill its duty to clean and maintain the Drainage Easement, the Grantee shall have the right of self help, in addition to powers and enforcement authorized by the Town of Paradise Valley Town Code and Arizona state law, and in connection with such rights, shall have the right to enter the Drainage Easement area and, as needed to access the Drainage Easement area, the Property, to clean or to maintain, and to be compensated by Grantors (or Owners) for the full and actual amount of the cleaning and maintenance as required by this Agreement and applicable ordinances, codes and regulations.

5. The Grantors (or Owners) of the Property shall be liable to the Town for reasonable maintenance costs incurred by the Town pursuant to Paragraph 4 above, together with interest at the legal rate and reasonable attorneys' fees. If those amounts are not paid within thirty (30) days after written demand to the Grantors (or Owners) for payment of maintenance costs incurred by the Town pursuant to Paragraph 4, the Town may record a Notice of Claim of Lien against the Property to secure the payment of such amounts, a copy of which will be forwarded to Grantor, or, as appropriate, the Owners.

6. The Town shall have the right, at its option, to enforce collection of any amounts owed to the Town under Paragraph 4 above in any manner allowed by law, including, without limitation, bringing an action against Grantor, or, as appropriate, the Owners of the Property to pay such amounts or bringing an action to foreclose its lien against the Property in the manner provided by law for the foreclosure of a realty mortgage. The Town shall have the power to bid at any foreclosure sale and to purchase the Property so sold.

7. This Agreement shall be in addition to any other agreements, law, ordinances or regulations relating to drainageways, easements and the subject matter herein.

8. This Agreement is binding upon and inures to the benefit of the parties hereto and their respective successors, assigns, affiliates, agents and tenants. This Agreement, the Drainage Easement and other rights and obligations created, granted and conveyed shall run with the land as a burden upon the Property.

9. Grantor warrants that (i) it is the fee simple owner of the Property, (ii) it has full right, power and authority to grant the Drainage Easement set forth herein and to execute this Agreement, and (iii) the execution hereof by Grantor does not conflict with or constitute a default under any agreement to which Grantor is a party or by which Grantor of the Drainage Easement is bound.

10. This Agreement shall terminate only upon mutual written agreement between the parties.

IN WITNESS WHEREOF, Grantor and Grantee have executed this Agreement as of the date first above written:

GRANTOR:

Phillip Westbrooks

Owner Signature

Co-Owner Signature (if applicable)

PHILLIP WESTBROOKS
Printed Name (and title if applicable)

Printed Name (& title if applicable)

LLC or Trust Name (if applicable)

STATE OF ARIZONA)
)
County of MARICOPA)

On this 3RD day of JANUARY, 20 20, before me personally appeared PHILLIP WESTBROOKS, (name of signer or signers) whose identity was proven to me on the basis of satisfactory evidence to be the person who he or she claims to be, and acknowledged that he or she signed the above document.

Notary Public

9/26/2023
My Commission Expires

[Notary Seal]

NIKISHA JOHNSON NOTARY PUBLIC MARICOPA COUNTY, AZ MY COMMISSION EXPIRES 09/26/2023 GREAT SEAL OF THE STATE OF ARIZONA 1912

GRANTEE:

TOWN OF PARADISE VALLEY

By: _____
Jerry Bien-Willner, Mayor

ATTEST:

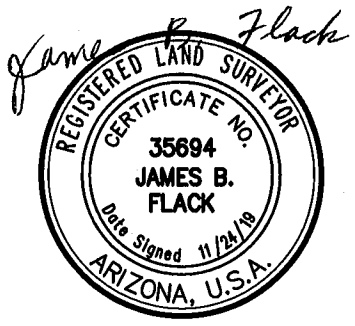
_____
Duncan Miller, Town Clerk

APPROVED AS TO FORM:

_____
Andrew Miller, Town Attorney

EXHIBIT 'A'
LEGAL DESCRIPTION OF THE PROPERTY FOR WHICH DRAINAGE EASEMENT IS DEDICATED HEREIN

LOT 18, MIRADA LOS ARCOS, PHASE 2, ACCORDING TO BOOK 159 OF MAPS, PAGE 35, RECORDS OF MARICOPA COUNTY, ARIZONA.



Land
DEVELOPMENT GROUP
P 602 889 1984 | F 602 889 0501
8808 N CENTRAL AVE, SUITE 288
PHOENIX, AZ 85020 PHOENIX@LDGENG.COM

EXHIBIT 'B'
LEGAL DESCRIPTION
DEDICATION OF DRAINAGE & FLOOD CONTROL EASEMENT

THAT PART OF LOT 18, OF THE MIRADA LOS ARCOS, PHASE 2, ACCORDING TO BOOK 159 OF MAPS, PAGE 35, RECORDS OF MARICOPA COUNTY ARIZONA.

MORE PARTICULARLY DESCRIBED AS FOLLOWS:

COMMENCING AT THE NORTHEASTERLY PROPERTY CORNER OF SAID LOT 18;

THENCE LEAVING SAID CORNER. CONTINUING ALONG EASTERLY PROPERTY LINE, SOUTH 11°15'07" EAST, A DISTANCE OF 42.25 FEET, TO A POINT ON SAID PROPERTY LINE, ALSO BEING **THE TRUE POINT OF BEGINNING;**

THENCE CONTINUING ALONG SAID PROPERTY LINE, SOUTH 11°15'07" EAST, A DISTANCE OF 26.39 FEET;

THENCE NORTH 82°33'22" WEST, A DISTANCE OF 13.97 FEET;

THENCE SOUTH 73°11'32" WEST, A DISTANCE OF 19.00 FEET;

THENCE NORTH 90°00'00" WEST, A DISTANCE OF 25.00 FEET;

THENCE NORTH 78°22'30" WEST, A DISTANCE OF 27.00 FEET;

THENCE NORTH 73°43'30" WEST, A DISTANCE OF 57.00 FEET;

THENCE NORTH 77°20'02" WEST, A DISTANCE OF 15.99 FEET TO A POINT ON WESTERLY PROPERTY LINE OF SAID LOT 18;

THENCE CONTINUING ALONG WESTERLY PROPERTY LINE NORTH 14°09'19" EAST. A DISTANCE OF 23.01 FEET;

THENCE LEAVING SAID PROPERTY LINE, SOUTH 77°20'02" EAST, A DISTANCE OF 16.11 FEET;

THENCE SOUTH 73°43'30" EAST, A DISTANCE OF 56.79 FEET;

THENCE SOUTH 78°22'30" EAST, A DISTANCE OF 23.72 FEET;

THENCE NORTH 90°00'00" EAST, A DISTANCE OF 12.34 FEET;

THENCE NORTH 73°11'32" EAST, A DISTANCE OF 27.59 FEET;

THENCE SOUTH 82°33'22" EAST, A DISTANCE OF 10.88 FEET, TO A POINT ON EASTERLY PROPERTY LINE OF SAID LOT 18, ALSO BEING **THE TRUE POINT OF BEGINNING;**

CONTAINING 3,584 S.F. (0.082 AC.); MORE OR LESS.

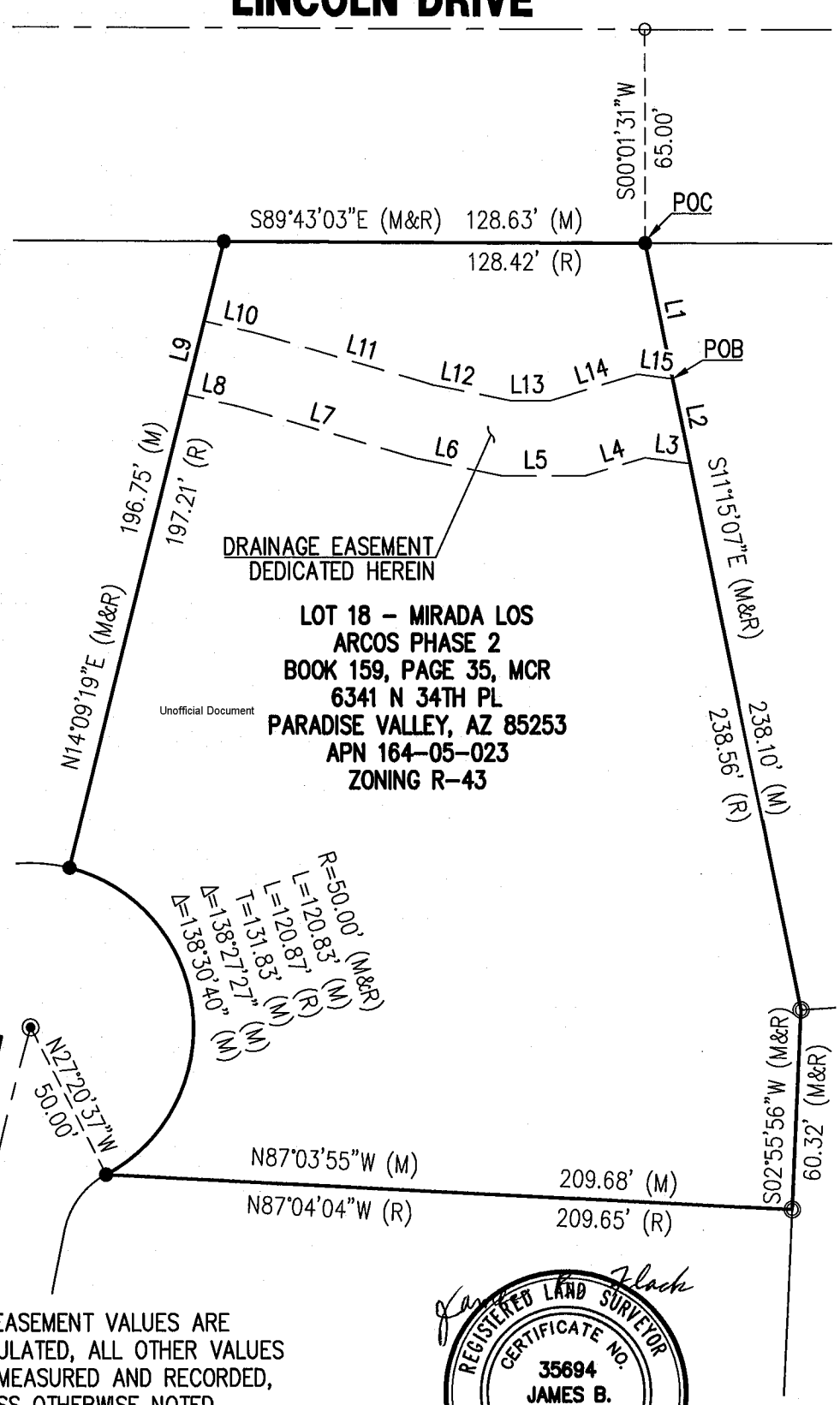
James B. Flack

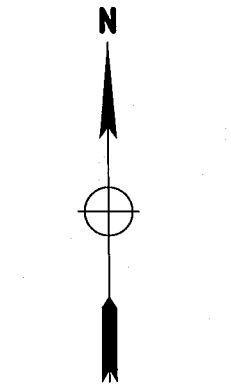
REGISTERED LAND SURVEYOR
CERTIFICATE NO.
35694
JAMES B.
FLACK
Date Signed 11/24/19
ARIZONA, U.S.A.

Land DEVELOPMENT GROUP
P 602 889 1984 | F 602 889 0501
8808 N CENTRAL AVE, SUITE 288
PHOENIX, AZ 85020 PHOENIX@LDGENG.COM

EXHIBIT "B"
DEDICATION OF DRAINAGE & FLOOD CONTROL EASEMENT

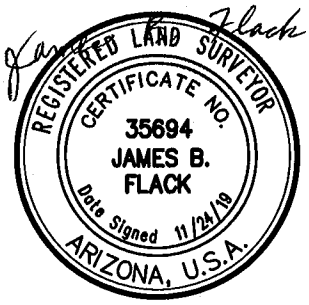
LINE TABLE		
LINE #	LENGTH	DIRECTION
L1	42.25'	S11°15'07"E
L2	26.39'	S11°15'07"E
L3	13.97'	N82°33'22"W
L4	19.00'	S73°11'32"W
L5	25.00'	N90°00'00"W
L6	27.00'	N78°22'30"W
L7	57.00'	N73°43'30"W
L8	15.99'	N77°20'02"W
L9	23.01'	N14°09'19"E
L10	16.11'	S77°20'02"E
L11	56.79'	S73°43'30"E
L12	23.72'	S78°22'30"E
L13	12.34'	N90°00'00"E
L14	27.59'	N73°11'32"E
L15	10.88'	S82°33'22"E





SCALE 1" = 50'

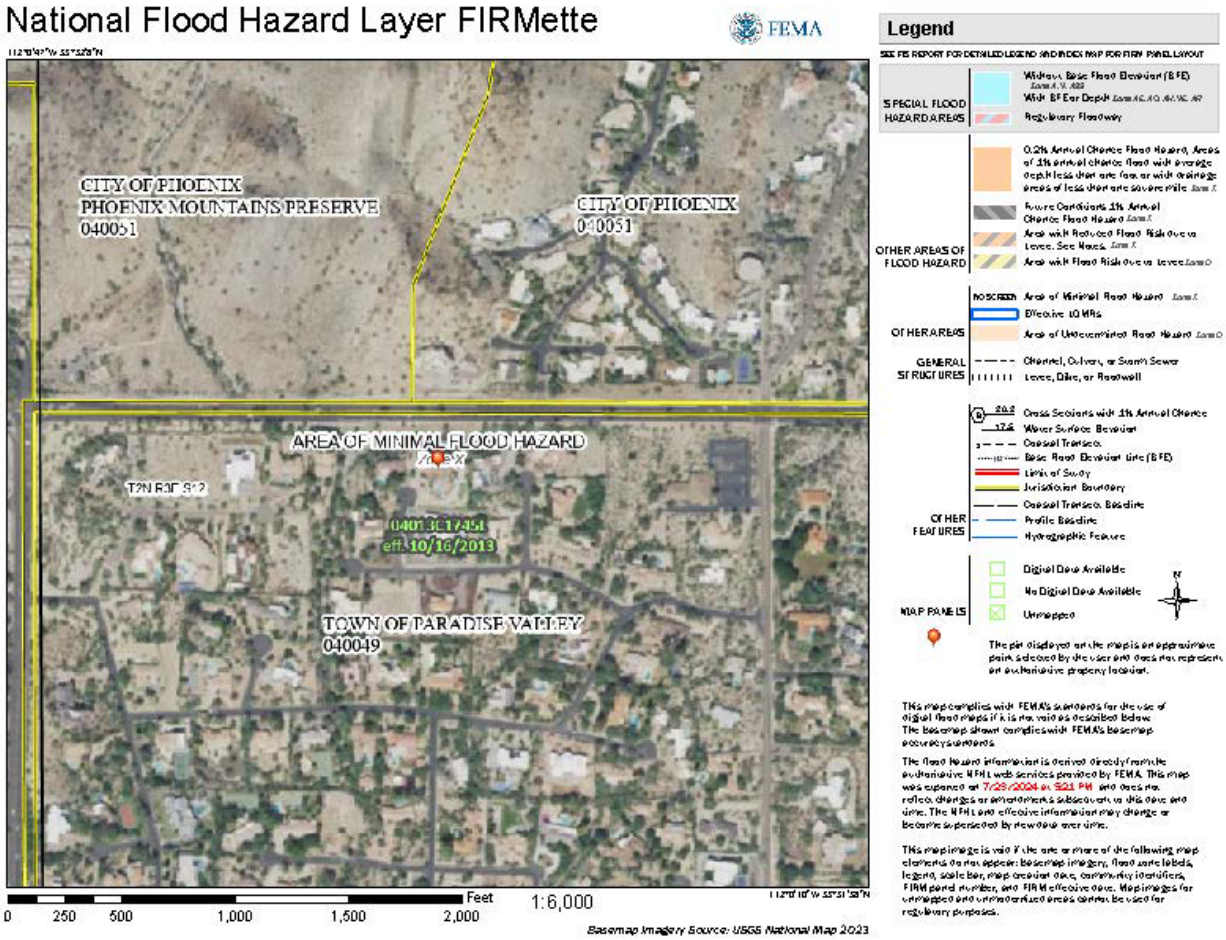
ALL EASEMENT VALUES ARE CALCULATED, ALL OTHER VALUES ARE MEASURED AND RECORDED, UNLESS OTHERWISE NOTED.



Land DEVELOPMENT GROUP
P 602 889 1984 | F 602 889 0501
8808 N CENTRAL AVE, SUITE 288
PHOENIX, AZ 85020 PHOENIX@LDGENG.COM

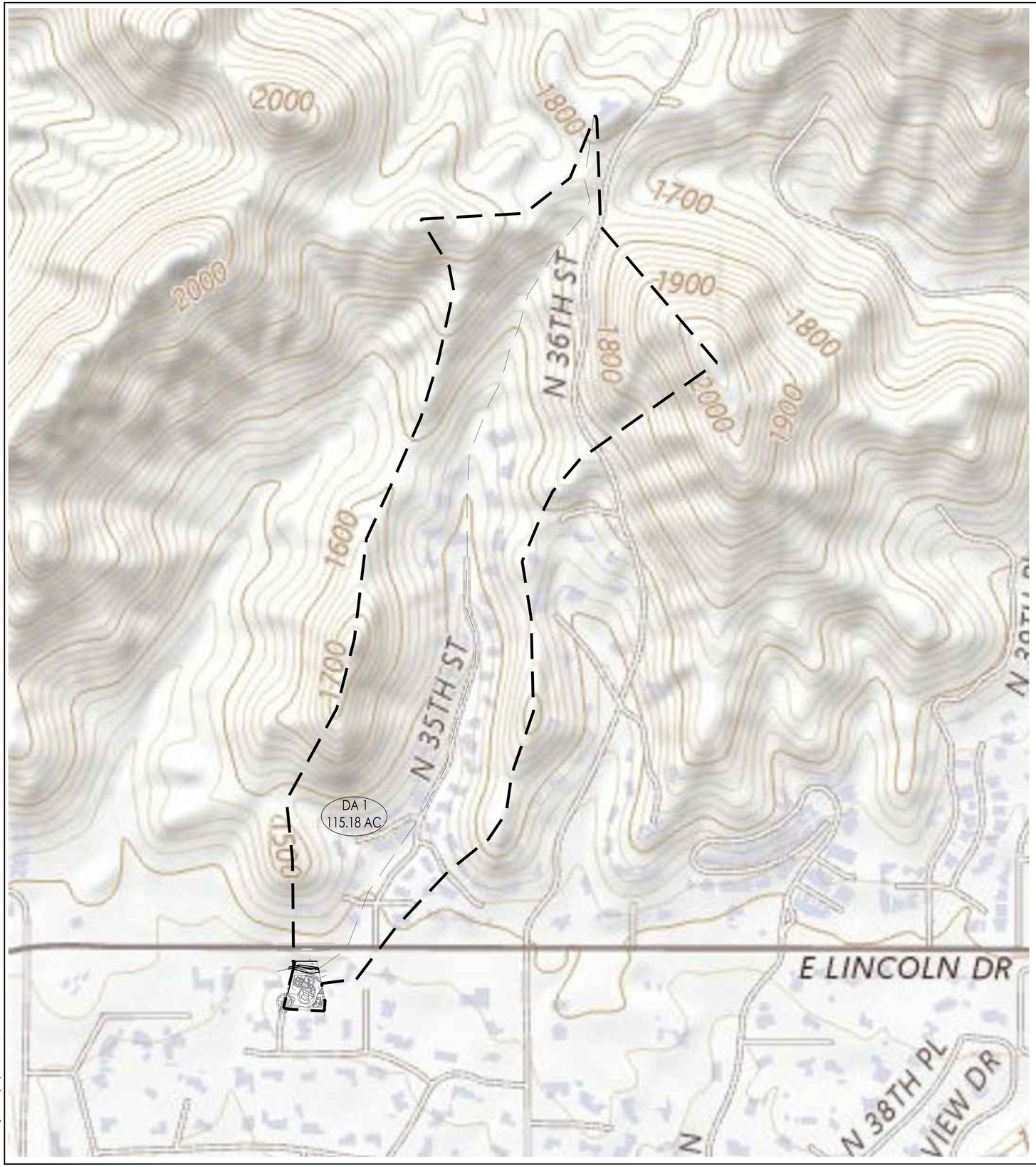
Appendix E

FEMA Flood Insurance Rate Map



Appendix F
Aerial Photo of Site

Appendix G
Drainage Area Map



75 225
0 150 300 600
SCALE: 1"=300'

KBELL
ENGINEERING
1355 N 86TH PLACE MESA, ARIZONA 85207
PH: 602.980.8246

CLIENT:
WESTBROOKS RESIDENCE
PROJECT NAME& ADDRESS:
NEW GUEST HOUSE AND ADDITIONAL HARDSCAPE
6341 N. 34TH PLACE, PARADISE VALLEY, ARIZONA
SHEET NAME:
DRAINAGE AREA MAP

PROJECT NO.: 1039-02
DESIGNED BY: KJB/GGM
DRAWN BY: KJB/GGM

SHEET

EXHIBIT

Appendix H
Rational Method Analysis

Flood Control District of Maricopa County
Drainage Design Management System
RATIONAL METHOD FLOW SUMMARY - ALL
Project Reference: 34TH ST SITE CUDIA W

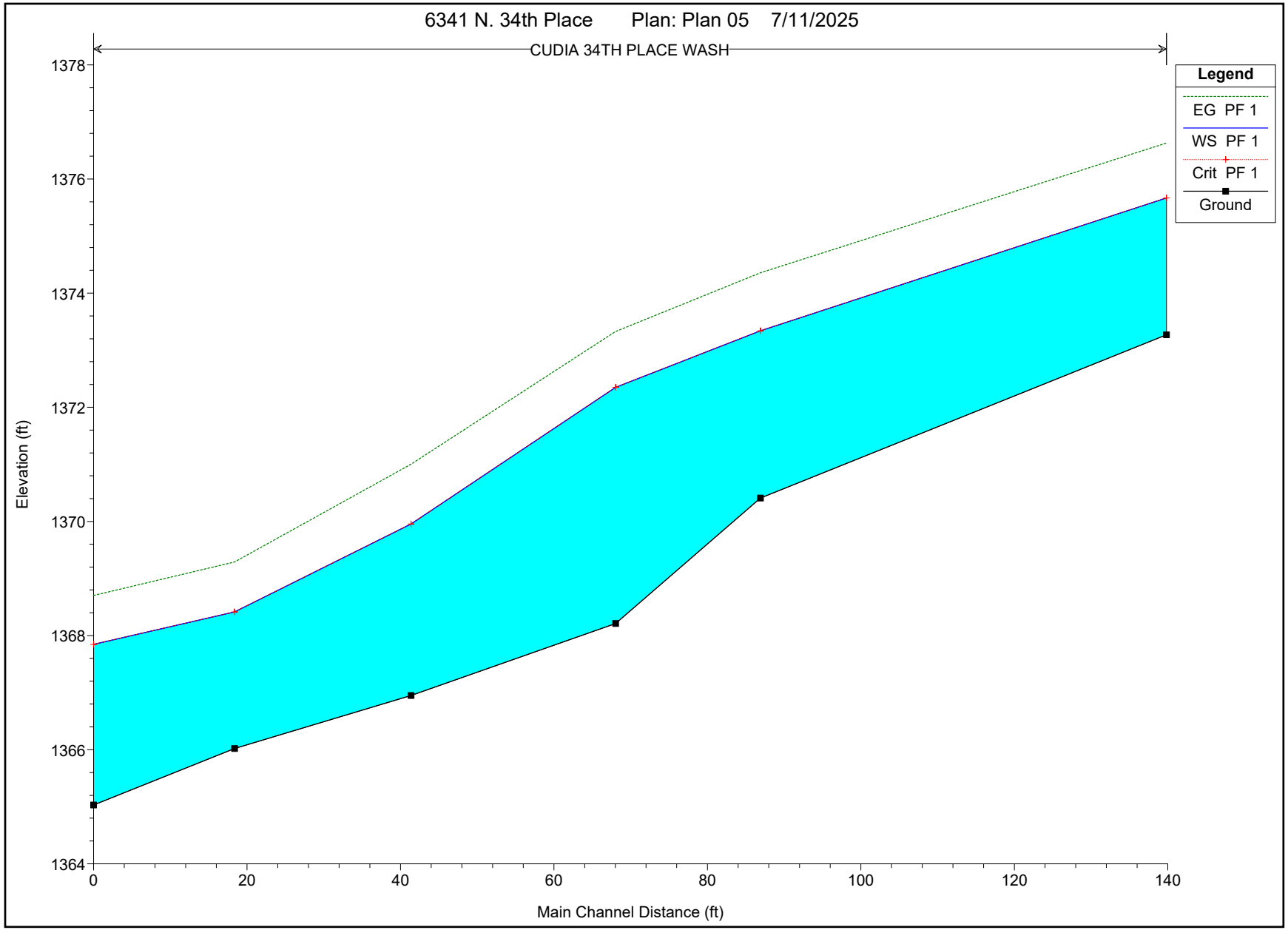
Type / ID	Length (ft)	Velocity (ft/sec)	Tpipe (min)	Combine		Return Period (Years) 2	5	10	25	50	100
cFirstPipe											
Maior Basin ID: 01											
Sub Basin	-	-	-	-	Q (cfs)	73.1	110.6	141.1	201.5	259.2	315.6
1					CA (ac)	57.59	57.59	57.59	63.35	69.11	72.56
					Tc (min)	29.3	25.0	22.8	20.6	19.4	18.3
					i (in/hr)	1.27	1.92	2.45	3.18	3.75	4.35
					Volume (ac-ft)	4.8952	7.0068	8.3985	11.3502	14.1676	16.6888
Hold	-	-	-	-	Q (cfs)	-	-	-	-	-	311.8
					CA (ac)	-	-	-	-	-	72.56
					Tc (min)	-	-	-	-	-	-
					i (in/hr)	-	-	-	-	-	-
					Volume (ac-ft)	-	-	-	-	-	16.6888
Receive	-	-	-	-	Q (cfs)	-	-	-	-	-	311.8
					CA (ac)	-	-	-	-	-	72.56
					Tc (min)	-	-	-	-	-	-
					i (in/hr)	-	-	-	-	-	-
					Volume (ac-ft)	-	-	-	-	-	16.6888

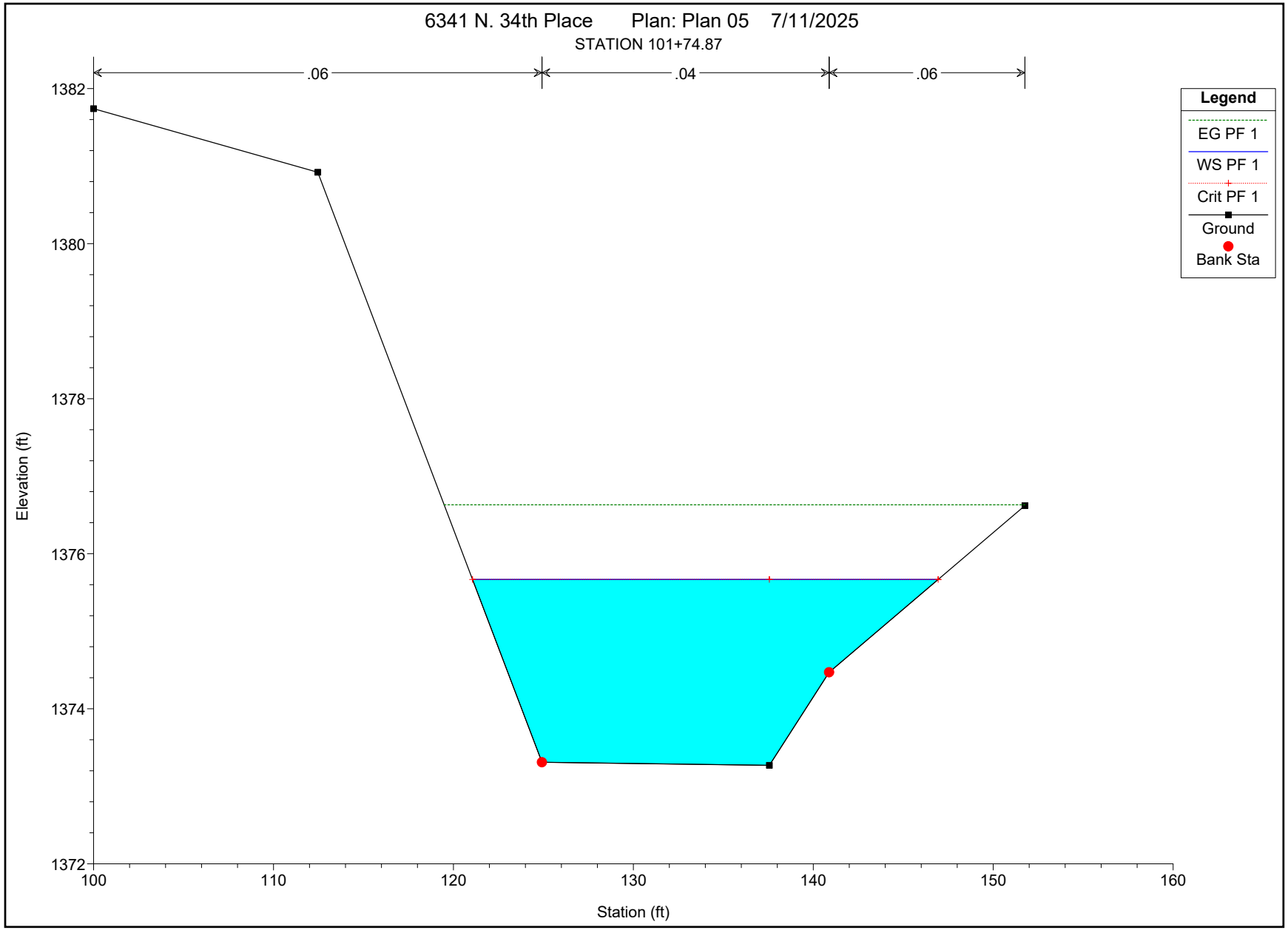
* First Pipe

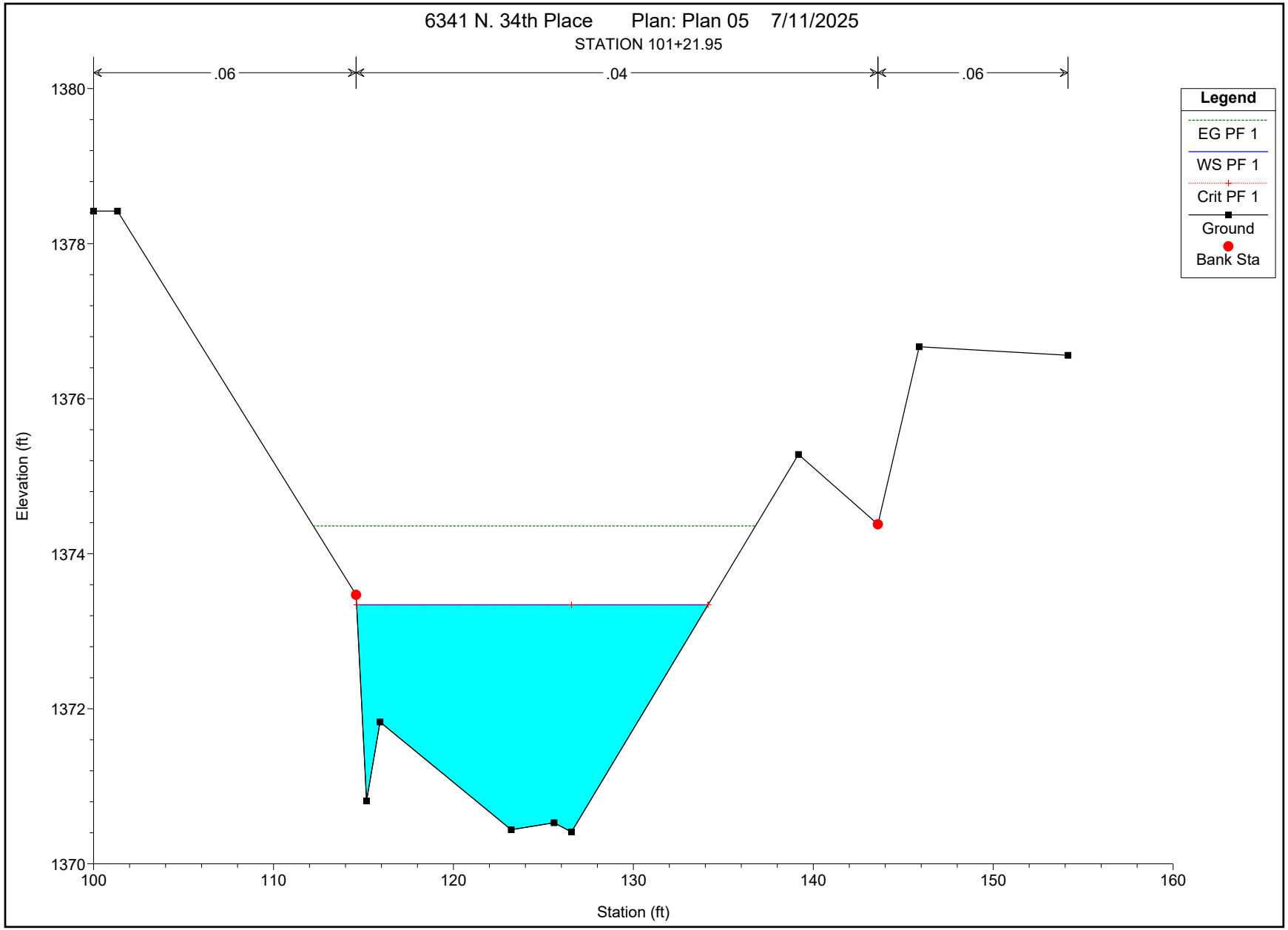
Appendix I
Existing Conditions Hydraulic Model

HEC-RAS Plan: Plan 05 River: CUDIA Reach: 34TH PLACE WASH Profile: PF 1

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
34TH PLACE WASH	174.87	PF 1	315.60	1373.27	1375.67	1375.67	1376.63	0.016486	8.13	44.19	25.88	0.95
34TH PLACE WASH	121.95	PF 1	315.60	1370.41	1373.34	1373.34	1374.36	0.023168	8.09	39.00	19.54	1.01
34TH PLACE WASH	103.07	PF 1	315.60	1368.21	1372.35	1372.35	1373.33	0.021778	7.94	39.75	21.16	1.02
34TH PLACE WASH	76.42	PF 1	315.60	1366.95	1369.96	1369.96	1371.00	0.020600	8.21	38.45	18.70	1.01
34TH PLACE WASH	53.42	PF 1	315.60	1366.02	1368.41	1368.41	1369.29	0.020617	7.51	42.02	24.27	1.01
34TH PLACE WASH	35.04	PF 1	315.60	1365.03	1367.85	1367.85	1368.70	0.021098	7.42	42.53	25.40	1.01


6341 N. 34th Place Plan: Plan 05 7/11/2025
CUDIA 34TH PLACE WASH
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Elevation (ft)
1378
1376
1374
1372
1370
1368
1366
1364
0
20
40
60
80
100
120
140
Main Channel Distance (ft)


6341 N. 34th Place Plan: Plan 05 7/11/2025
STATION 101+74.87
.06
.04
.06
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
1382
1380
1378
1376
1374
1372
100
110
120
130
140
150
160
Station (ft)


6341 N. 34th Place Plan: Plan 05 7/11/2025
STATION 101+21.95
.06
.04
.06
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
1380
1378
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1370
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110
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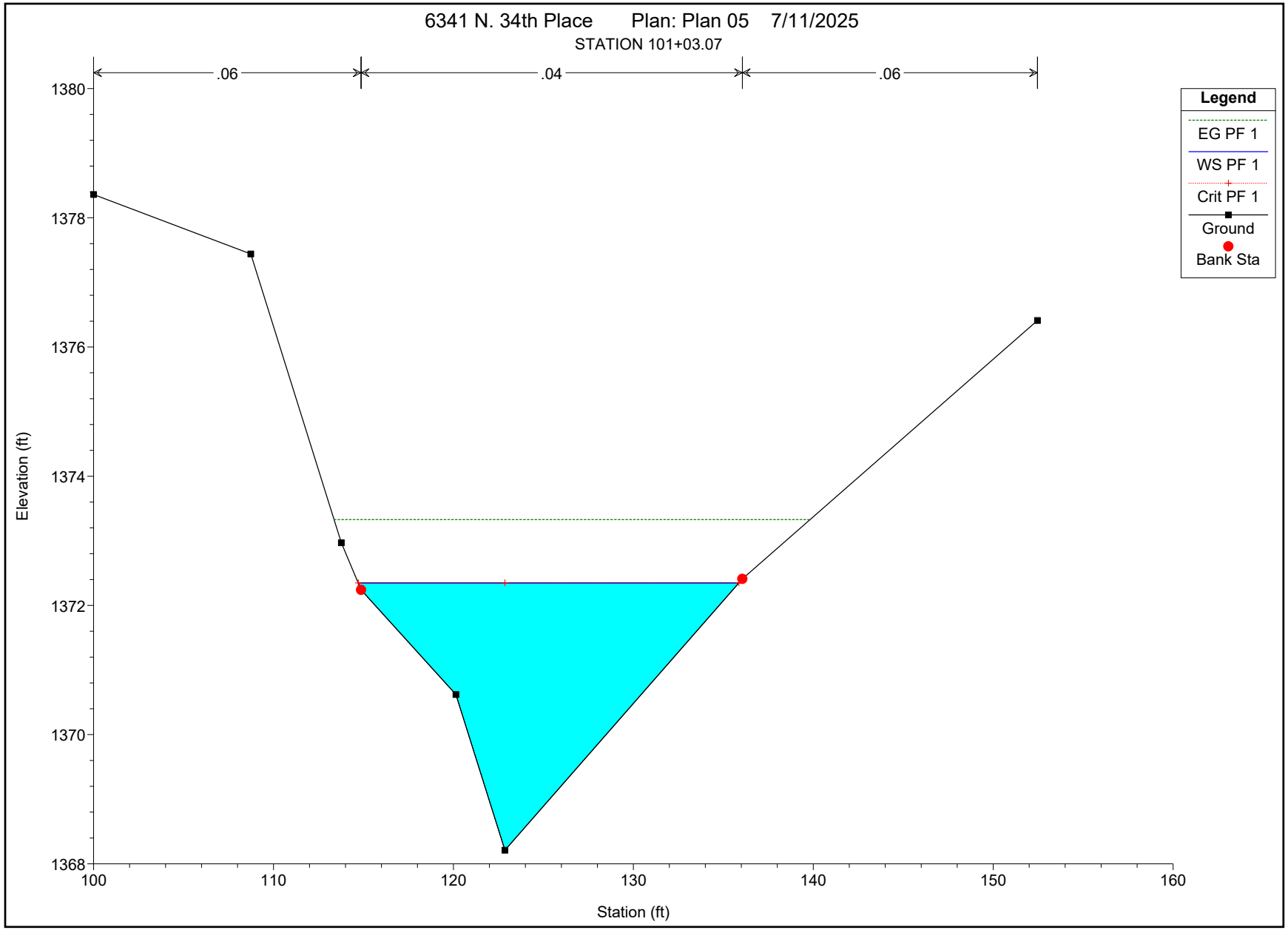
130
140
150
160
Station (ft)


6341 N. 34th Place Plan: Plan 05 7/11/2025
STATION 101+03.07
.06
.04
.06
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
1380
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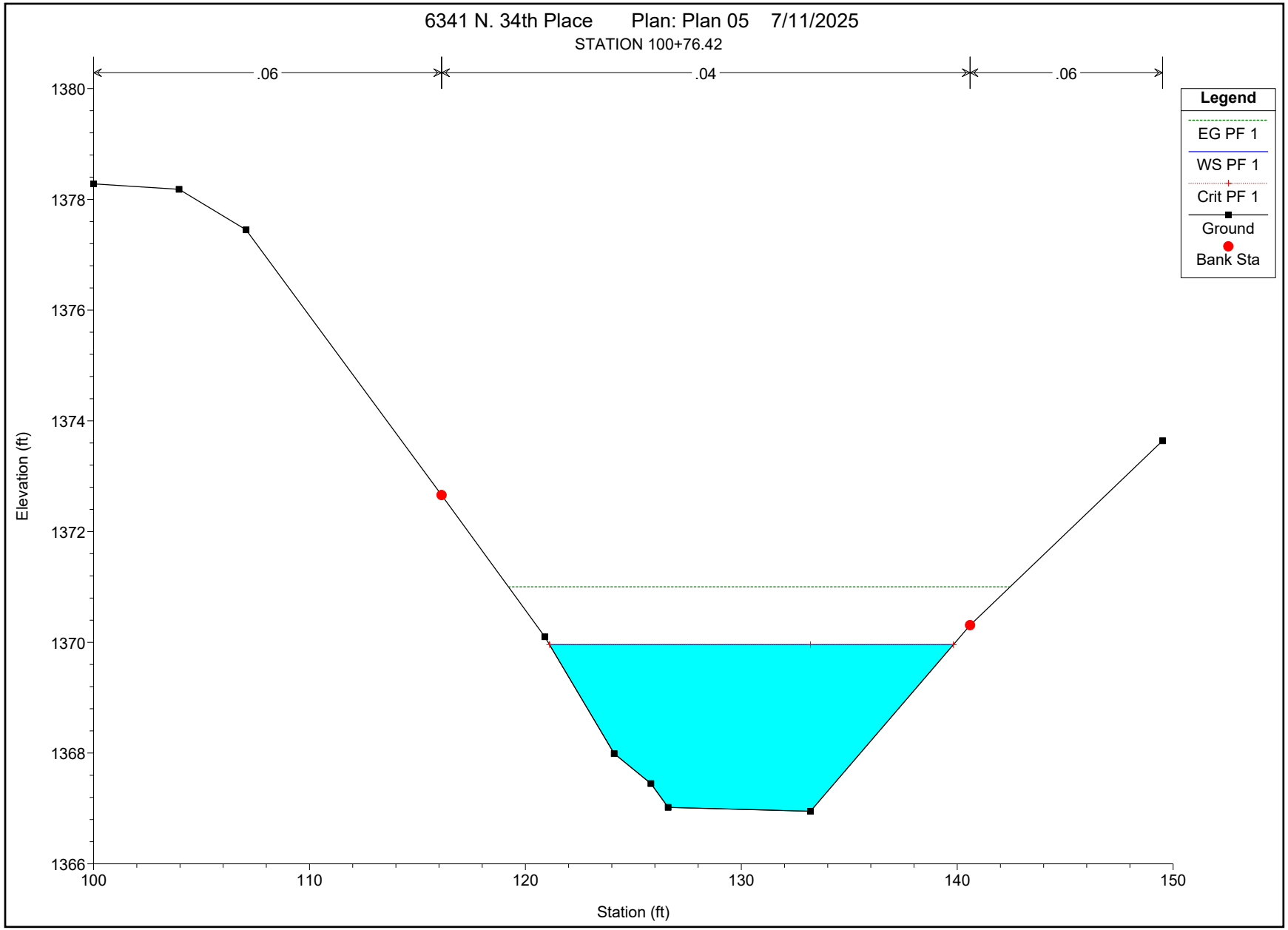
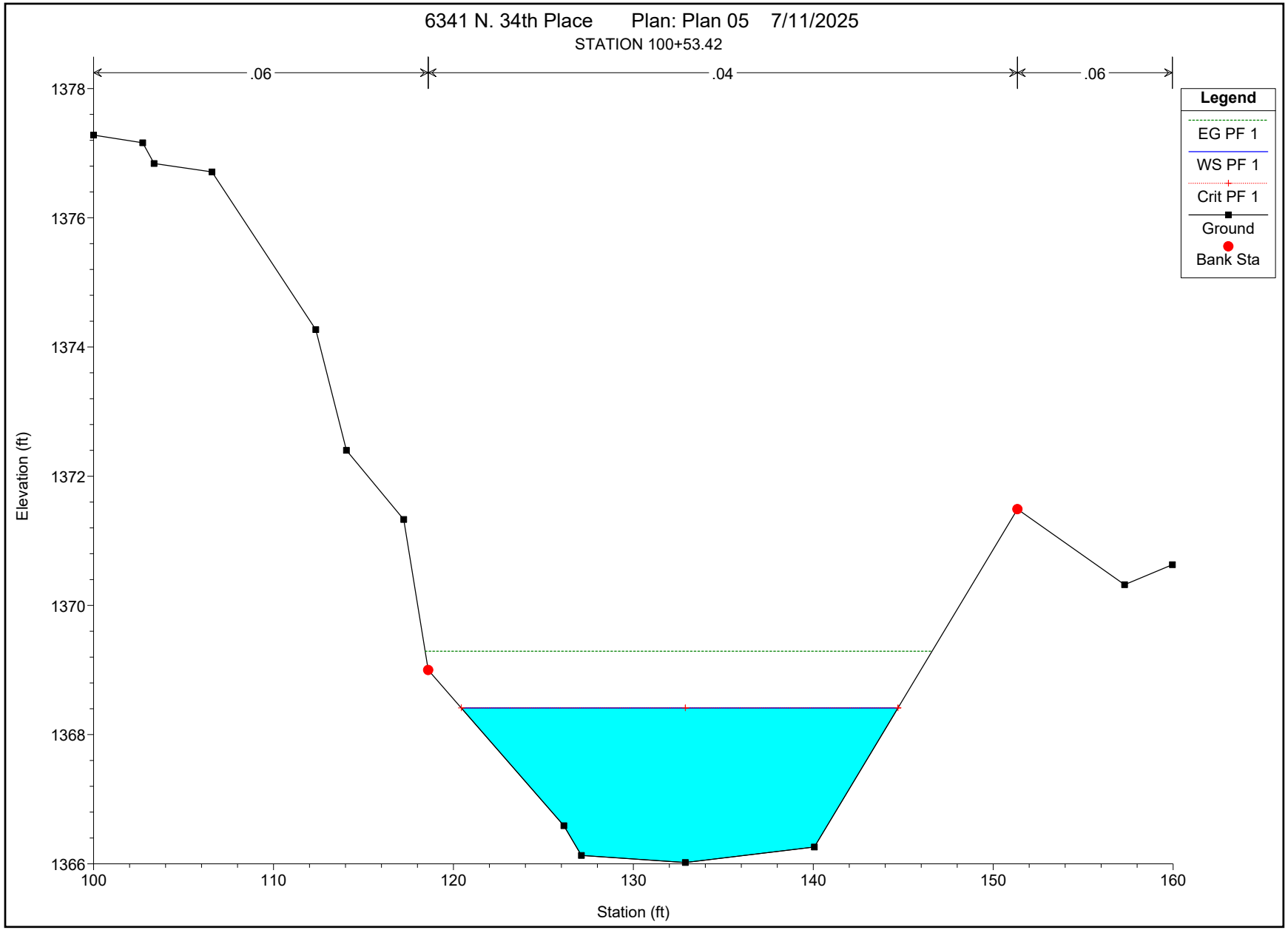
1376
1374
1372
1370
1368
100
110
120
130
140
150
160
Station (ft)


6341 N. 34th Place Plan: Plan 05 7/11/2025
STATION 100+76.42
.06
.04
.06
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
1380
1378
1376
1374
1372
1370
1368
1366
100
110
120
130
140
150
Station (ft)


6341 N. 34th Place Plan: Plan 05 7/11/2025
STATION 100+53.42
.06
.04
.06
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
1378
1376
1374
1372
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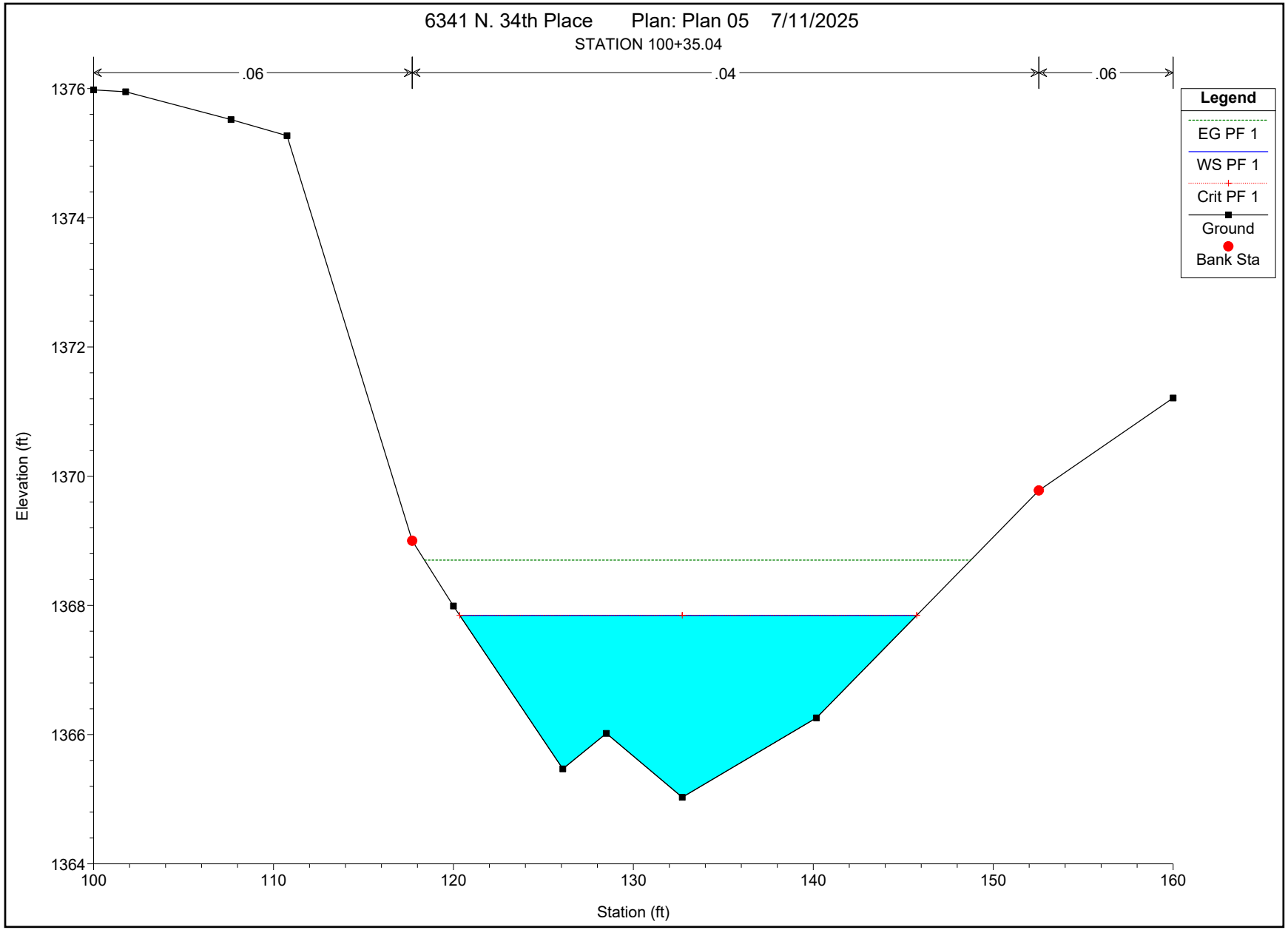
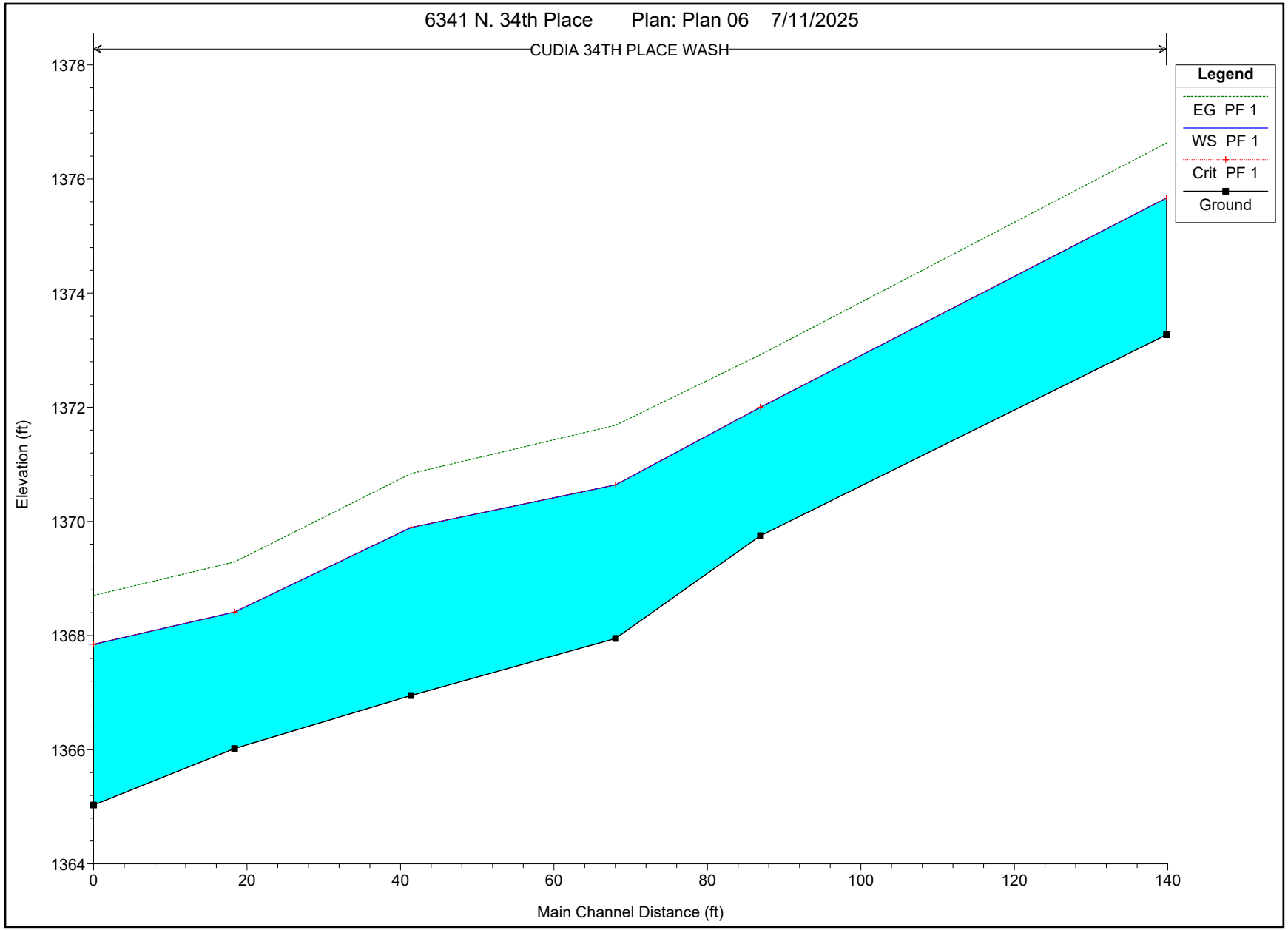
110
120
130
140
150
160
Station (ft)

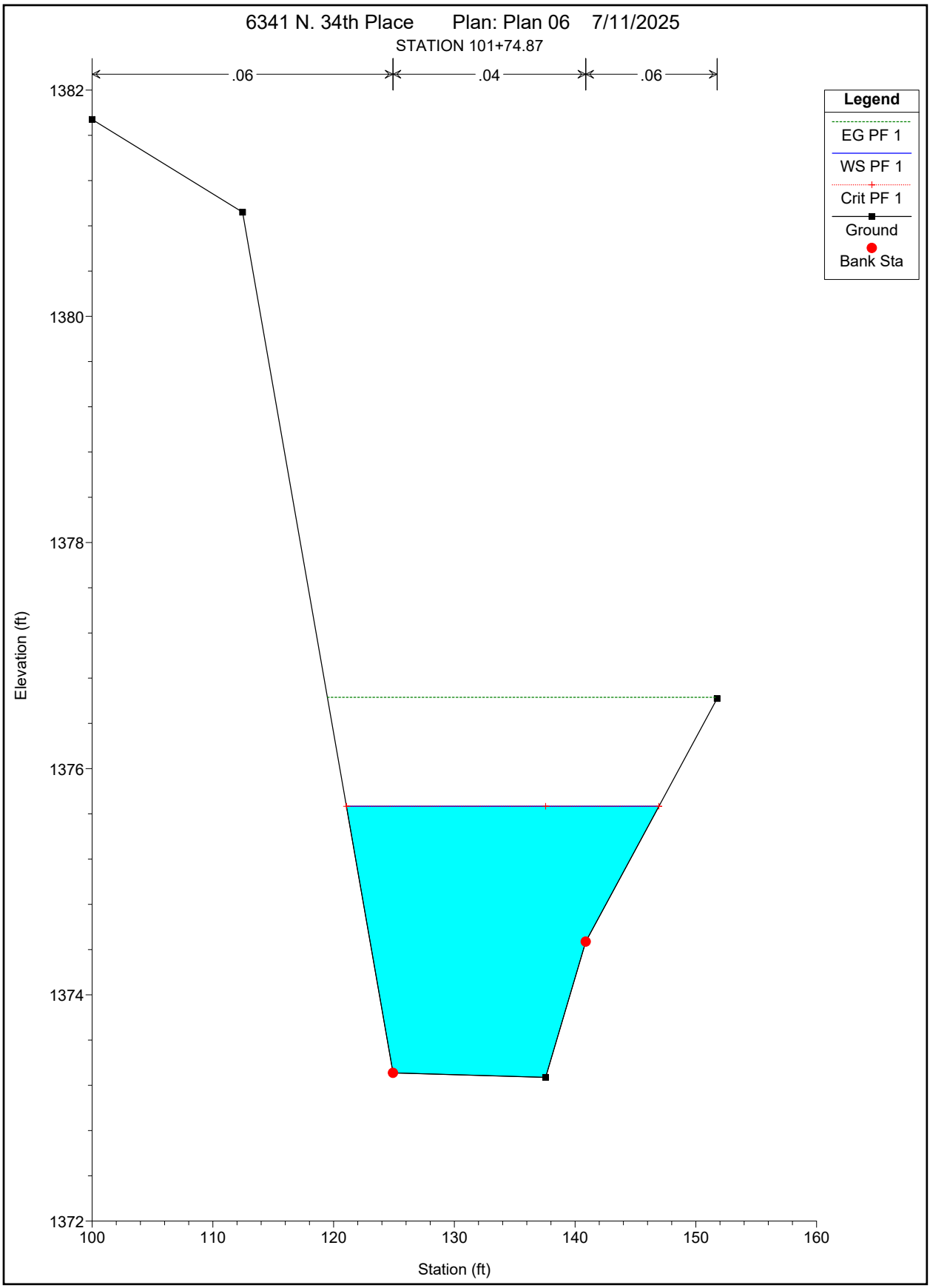

6341 N. 34th Place Plan: Plan 05 7/11/2025
STATION 100+35.04
.06
.04
.06
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
1376
1374
1372
1370
1368
1366
1364
100
110
120
130
140
150
160
Station (ft)

Appendix J
Proposed Conditions Hydraulic Model

HEC-RAS Plan: Plan 06 River: CUDIA Reach: 34TH PLACE WASH Profile: PF 1

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
34TH PLACE WASH	174.87	PF 1	315.60	1373.27	1375.67	1375.67	1376.63	0.016486	8.13	44.19	25.88	0.95
34TH PLACE WASH	121.95	PF 1	315.60	1369.75	1372.00	1372.00	1372.92	0.019125	7.72	41.58	23.63	1.00
34TH PLACE WASH	103.07	PF 1	315.60	1367.95	1370.64	1370.64	1371.69	0.021177	8.20	38.50	18.69	1.01
34TH PLACE WASH	76.42	PF 1	315.60	1366.95	1369.89	1369.89	1370.84	0.020648	7.80	40.47	21.80	1.01
34TH PLACE WASH	53.42	PF 1	315.60	1366.02	1368.41	1368.41	1369.29	0.020629	7.51	42.01	24.27	1.01
34TH PLACE WASH	35.04	PF 1	315.60	1365.03	1367.85	1367.85	1368.70	0.021098	7.42	42.53	25.40	1.01


6341 N. 34th Place Plan: Plan 06 7/11/2025
CUDIA 34TH PLACE WASH
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Elevation (ft)
1378
1376
1374
1372
1370
1368
1366
1364
0
20
40
60
80
100
120
140
Main Channel Distance (ft)


6341 N. 34th Place Plan: Plan 06 7/11/2025
STATION 101+74.87
.06
.04
.06
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
1382
1380
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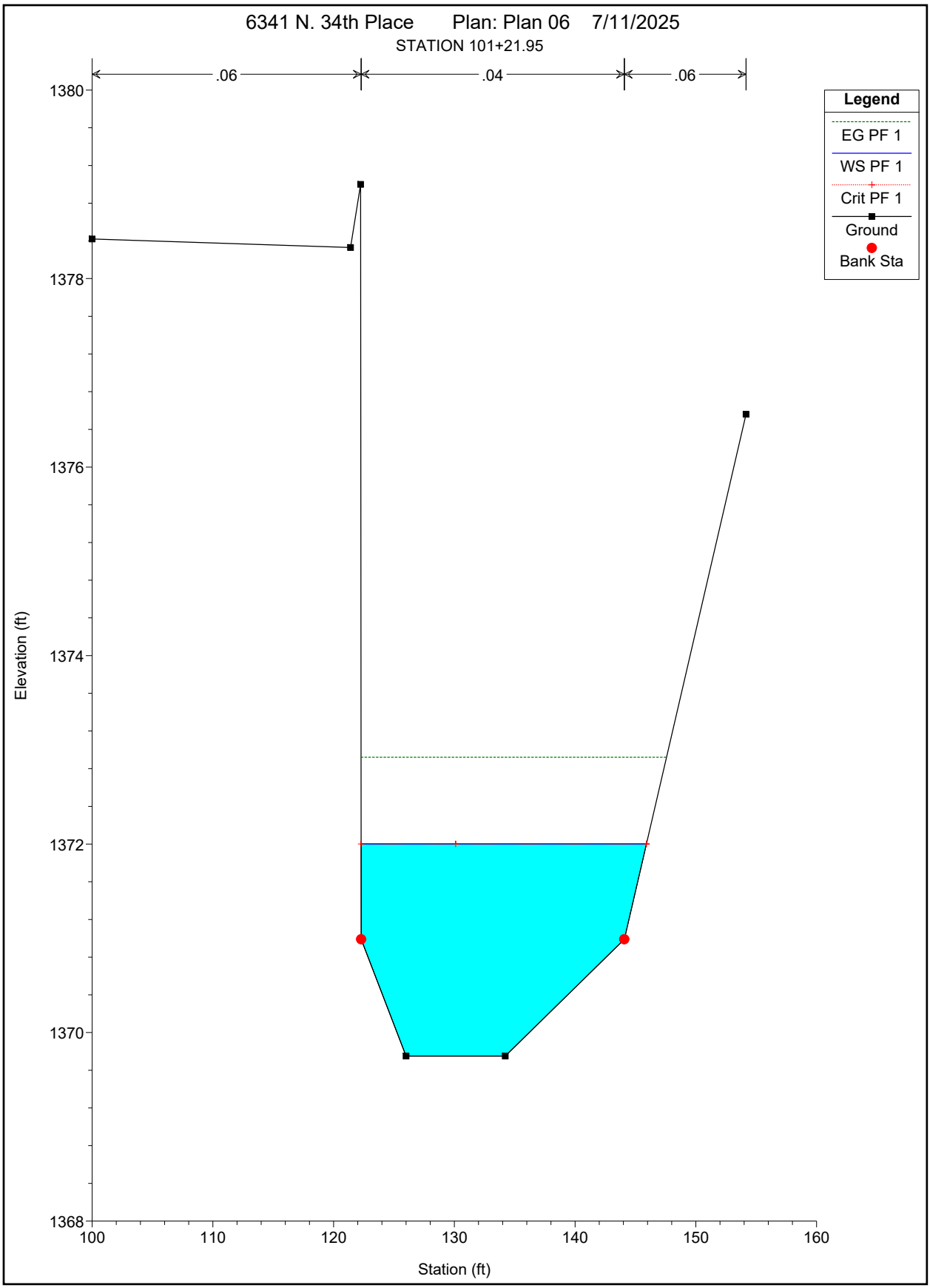
1372
Elevation (ft)
100
110
120
130
140
150
160
Station (ft)


6341 N. 34th Place Plan: Plan 06 7/11/2025
STATION 101+21.95
.06
.04
.06
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
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Elevation (ft)
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130
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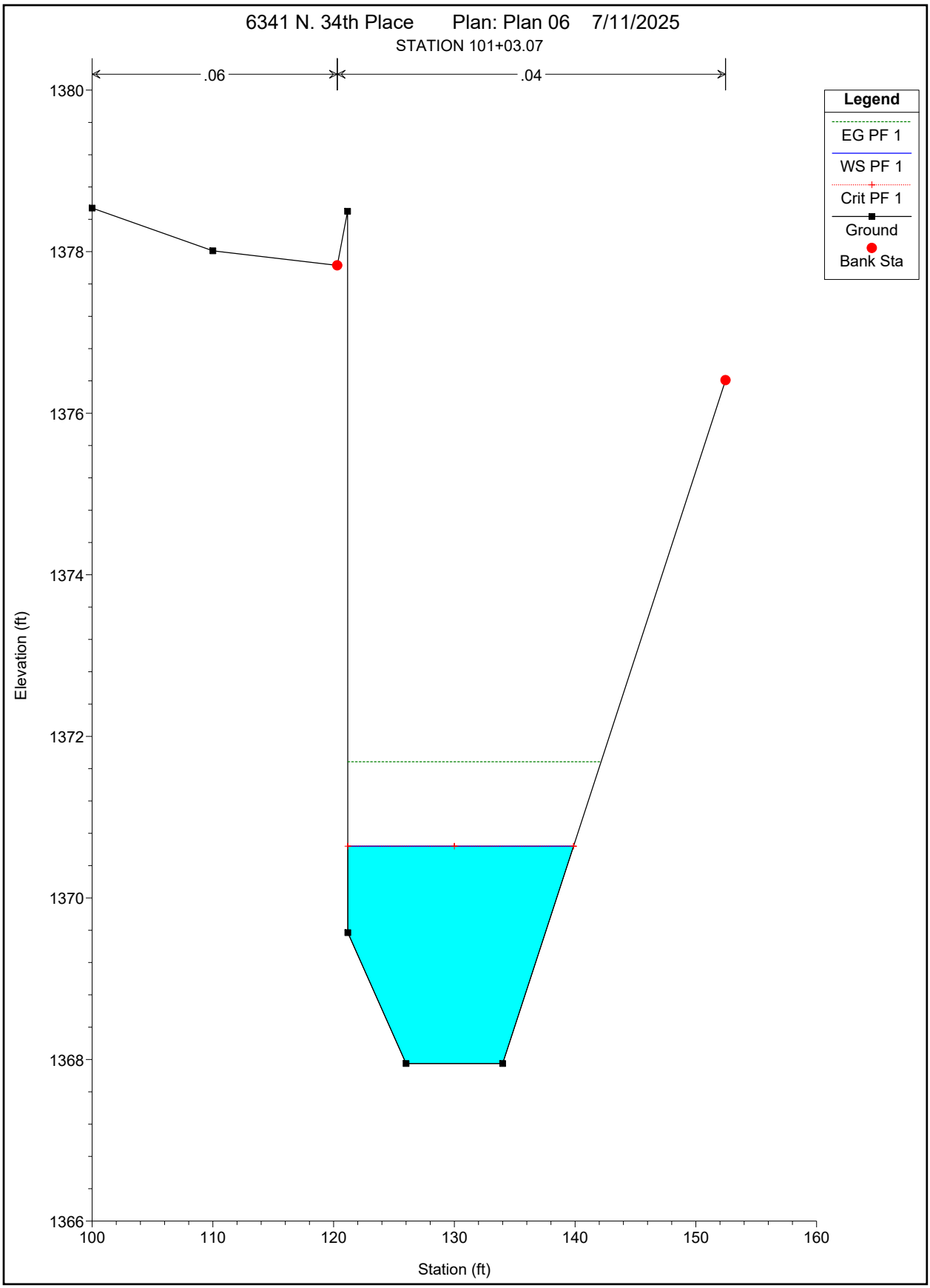
160
Station (ft)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.06
.04
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
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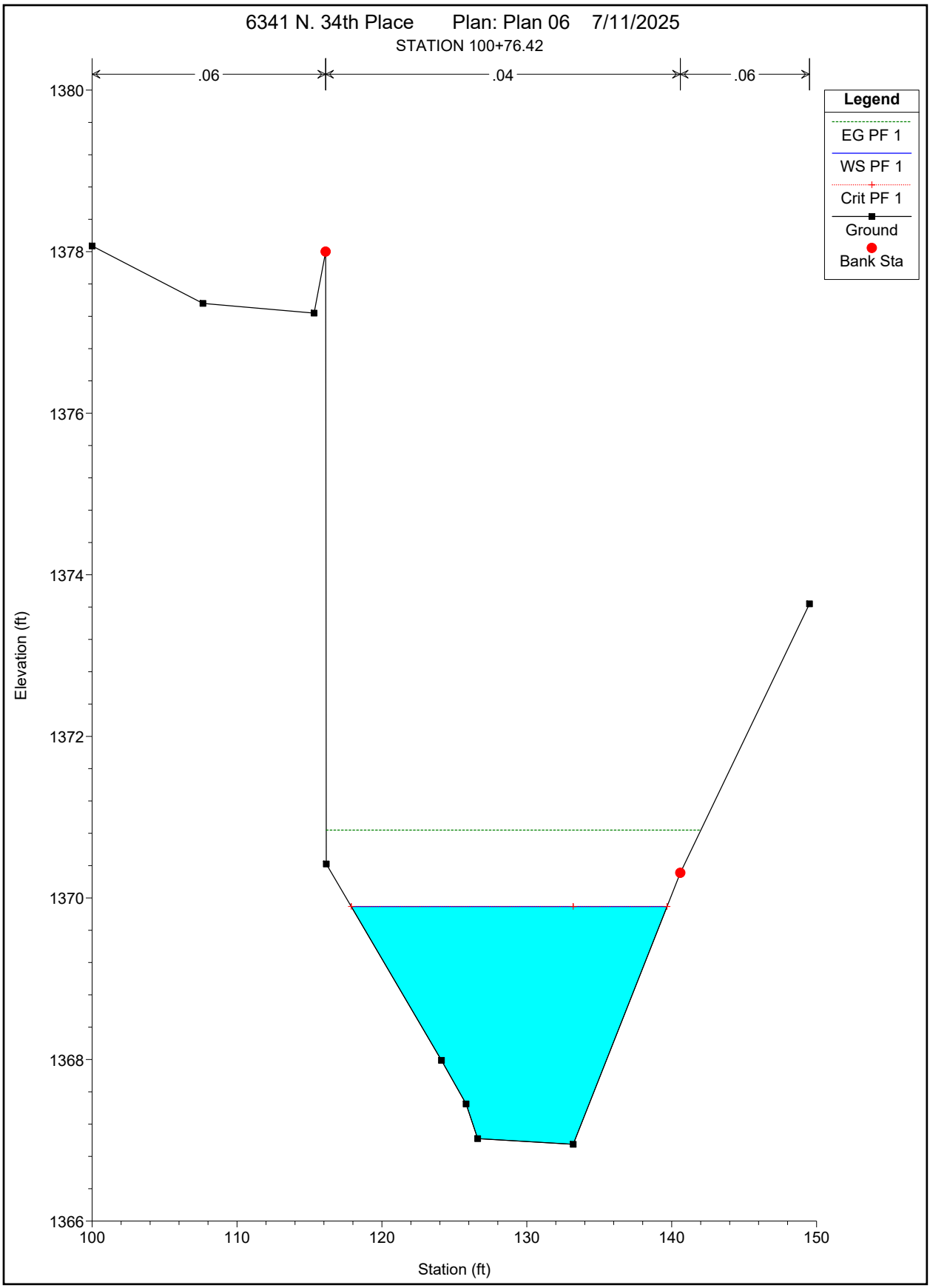
140
150
160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STATION 100+76.42
.06
.04
.06
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
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Elevation (ft)
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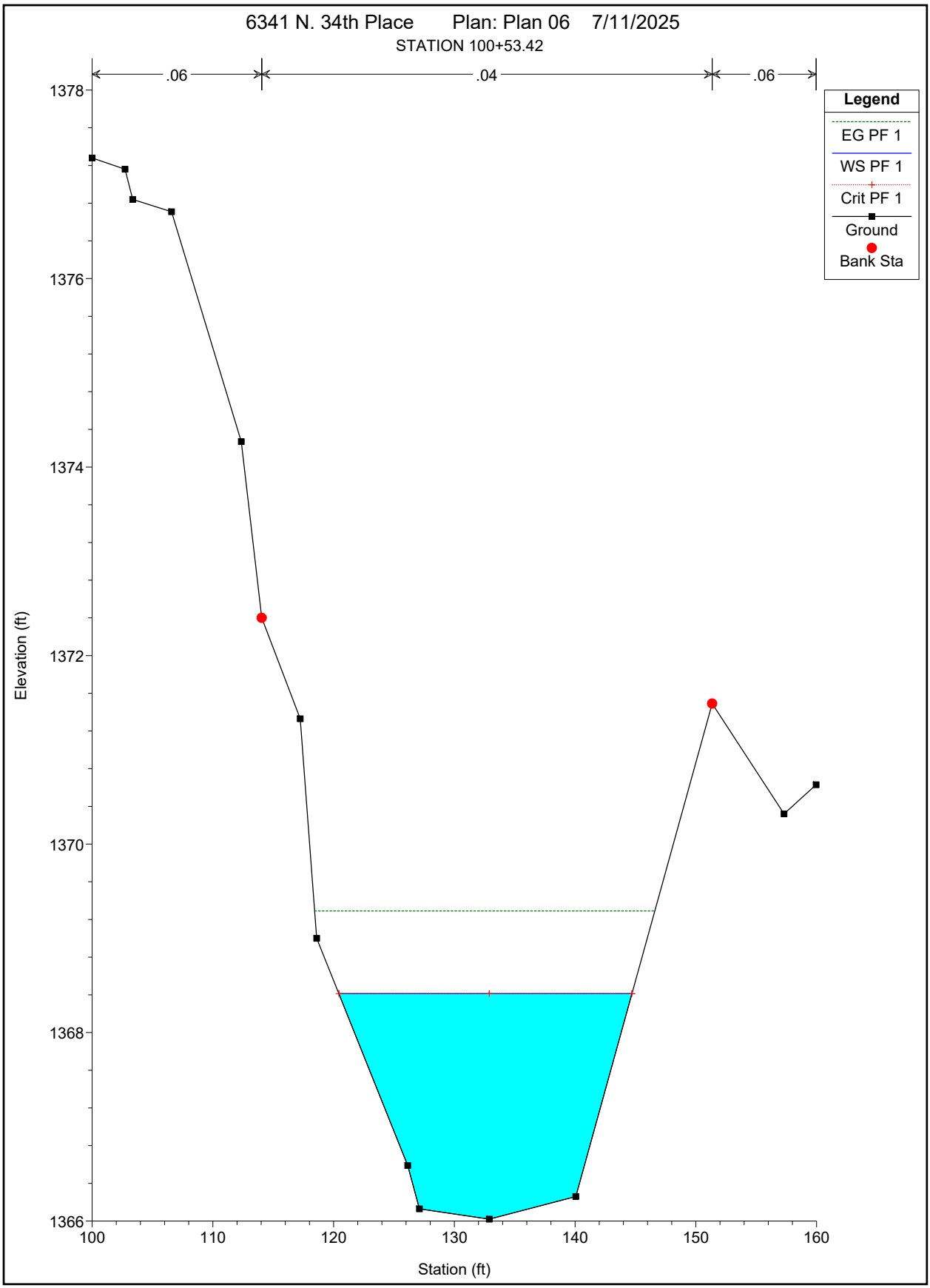
Station (ft)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STATION 100+53.42
.06
.04
.06
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
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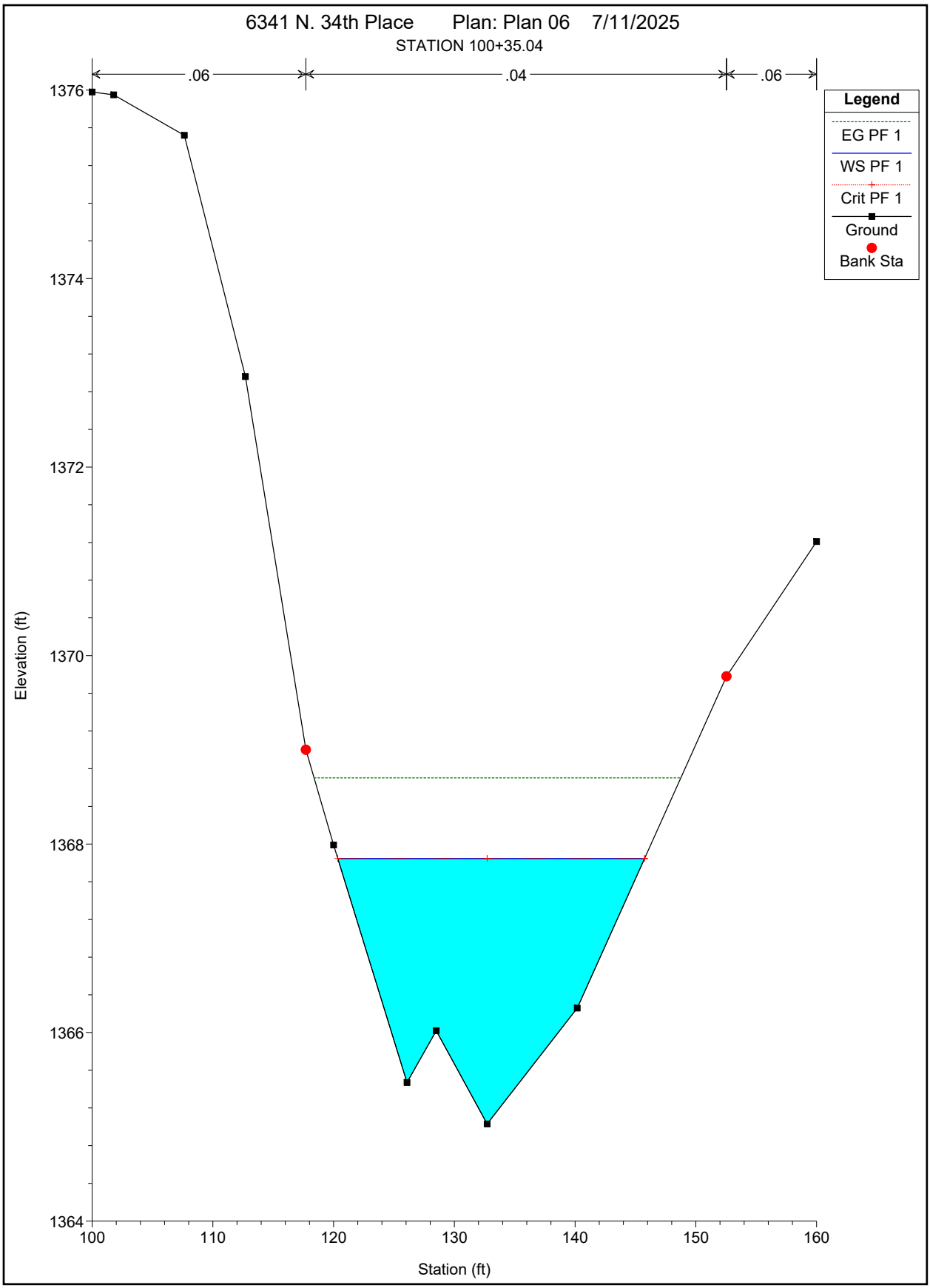
160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.06
.04
.06
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
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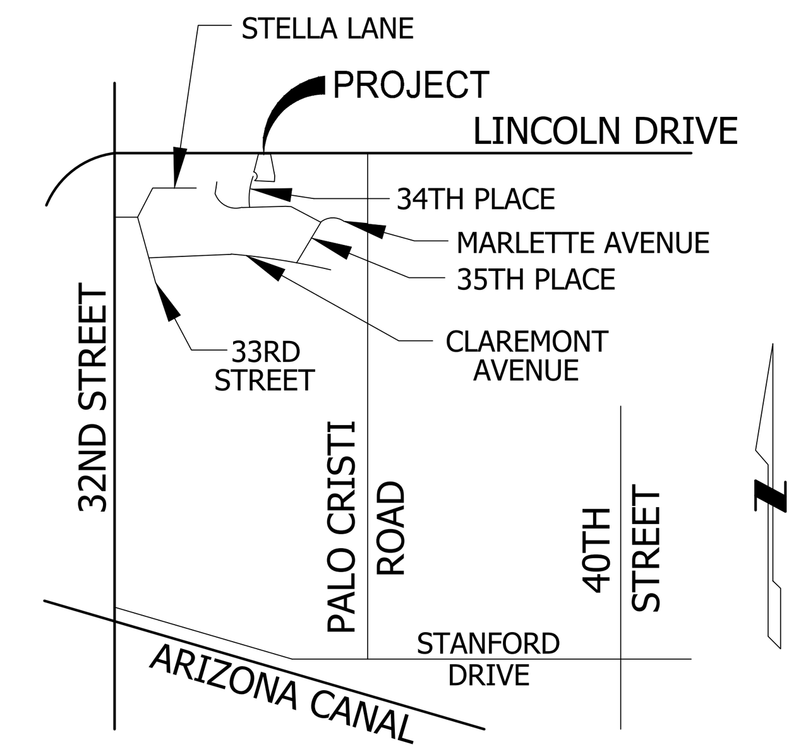
150
160

GRADING AND DRAINAGE PLAN
FOR
WESTBROOKS RESIDENCE NEW RETAINING WALL
PARADISE VALLEY, ARIZONA

TOWN OF PARADISE VALLEY GRADING AND DRAINAGE GENERAL NOTES

1. PRIOR TO THE FIRST INSPECTION OF STRUCTURES WITHIN 3 FEET OF A SETBACK LINE, THE PROPERTY PINS SHALL BE PLACED BY A REGISTERED CIVIL ENGINEER OR LAND SURVEYOR OF THE STATE OF ARIZONA, AND THE PROPERTY LINE(S) IDENTIFIED.
2. WHERE EXCAVATION IS TO OCCUR THE TOP 4" OF EXCAVATED NATIVE SOIL SHALL REMAIN ON THE SITE AND SHALL BE REUSED IN A MANNER THAT TAKES ADVANTAGE OF THE NATURAL SOIL SEED BANK IT CONTAINS.
3. ALL WORK REQUIRED TO COMPLETE THE CONSTRUCTION COVERED BY THIS PLAN SHALL BE IN ACCORDANCE WITH THE MARICOPA ASSOCIATION OF GOVERNMENTS (M.A.G.) STANDARD SPECIFICATIONS AND DETAILS AND CURRENT SUPPLEMENTS THEREOF PER THE LOCAL MUNICIPALITY UNLESS SPECIFIED OTHERWISE IN THESE PLANS OR ELSEWHERE IN THE CONTRACT DOCUMENTS.
4. THE CONTRACTOR IS TO COMPLY WITH ALL LOCAL STATE, AND FEDERAL LAWS AND REGULATIONS APPLICABLE TO THE CONSTRUCTION COVERED BY THIS PLAN.
5. THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING AND COMPLYING WITH ALL PERMITS REQUIRED TO COMPLETE ALL WORK COVERED BY THIS PLAN.
6. ALL EXTERIOR SITE LIGHTING SHALL COMPLY WITH THE APPLICABLE REQUIREMENTS FOR TYPE, LOCATION, HEIGHT, WATTAGE, AND LUMEN BASED UPON THE FIXTURES INSTALLED PURSUANT TO SECTION 1023 OF THE TOWN OF PARADISE VALLEY ZONING ORDINANCE FOR NON-HILLSIDE PROPERTIES, SECTION 2208 OF THE TOWN OF PARADISE VALLEY ZONING ORDINANCE FOR HILLSIDE PROPERTIES, OR AS SPECIFIED IN THE SPECIAL USE PERMIT FOR SPECIAL USE PERMIT PROPERTIES.
7. A DUST CONTROL PLAN AND PERMIT MEETING THE REQUIREMENTS OF RULE 310 OF THE MARICOPA COUNTY AIR POLLUTION CONTROL REGULATIONS, AS AMENDED, IS REQUIRED.
8. A SEPARATE RIGHT-OF-WAY PERMIT IS NECESSARY FOR ANY OFF-SITE CONSTRUCTION.
9. AN APPROVED GRADING AND DRAINAGE PLAN SHALL BE ON THE JOB SITE AT ALL TIMES. DEVIATIONS FROM THE PLAN MUST BE PRECEDED BY AN APPROVED PLAN REVISION.
10. EAVE PROJECTIONS INTO REQUIRED SETBACKS ARE LIMITED TO A MAXIMUM OF 24" PURSUANT TO SECTION 1008 OF THE TOWN OF PARADISE VALLEY ZONING ORDINANCES.
11. ALL STRUCTURES AND LANDSCAPING WITHIN THE SIGHT VISIBILITY TRIANGLE SHALL HAVE A 2 FOOT MAXIMUM HEIGHT.
12. ALL NEW AND EXISTING ELECTRICAL SERVICE LINES SHALL BE BURIED PER THE TOWN OF PARADISE VALLEY REQUIREMENTS.
13. IT SHALL BE THE RESPONSIBILITY OF THE PERMITTEE TO ARRANGE FOR THE RELOCATION AND RELOCATION COSTS OF ALL UTILITIES, AND TO SUBMIT A UTILITY RELOCATION SCHEDULE PRIOR TO THE ISSUANCE OF AN ENGINEERING CONSTRUCTION PERMIT.
14. EXISTING AND/OR NEW UTILITY CABINETS AND PEDESTALS SHALL BE LOCATED A MINIMUM OF 4' BEHIND ULTIMATE BACK OF CURB LOCATION.
15. POOL, SPA, BARBECUE AND ANY PROPOSED STRUCTURES OVER 8" ABOVE GRADE REQUIRE SEPARATE PERMIT APPLICATIONS.
16. POOLS SHALL BE CONSTRUCTED BY SEPARATE PERMIT AND SECURED FROM UNWANTED ACCESS PER TOWN CODE, ARTICLE 5-2.
17. ALL FILL MATERIAL UNDER SLABS AND WALKS SHALL BE COMPACTED TO NOT LESS THAN 95%.
18. SETBACK CERTIFICATION IS REQUIRED AND SHALL BE PROVIDED TO TOWN INSPECTOR PRIOR TO STEM WALL INSPECTION.
19. FOR BUILDING PADS THAT HAVE 1' OR MORE OF FILL MATERIAL, SOILS COMPACTION TEST RESULTS ARE REQUIRED AND SHALL BE PROVIDED TO TOWN INSPECTOR PRIOR TO PRE-SLAB INSPECTION.
20. FINISHED FLOOR ELEVATION CERTIFICATION IS REQUIRED AND SHALL BE PROVIDED TO TOWN INSPECTOR PRIOR TO STRAP AND SHEAR INSPECTION.
21. MAIL BOXES SHALL COMPLY WITH THE TOWN OF PARADISE VALLEY STANDARDS FOR MAIL BOXES IN THE RIGHTOF-WAY FOR HEIGHT, WIDTH AND BREAK AWAY FEATURES.
22. ALL PATIOS, WALKS, AND DRIVES TO SLOPE AWAY FROM BUILDING AND GARAGES AT A MINIMUM SLOPE OF 1/4" PER FOOT UNLESS SPECIFIED OTHERWISE.
23. TRENCH BEDDING AND SHADING SHALL BE FREE OF ROCKS AND DEBRIS.
24. THE TOWN ONLY APPROVES THE SCOPE OF WORK AND NOT THE ENGINEERING DESIGN. ANY CONSTRUCTION QUANTITIES SHOWN ARE NOT VERIFIED BY THE TOWN.
25. THE APPROVAL OF THE PLANS IS VALID FOR 180 DAYS. IF A PERMIT FOR CONSTRUCTION HAS NOT BEEN ISSUED WITHIN 180 DAYS, THE PERMIT MUST BE RENEWED.
26. A TOWN INSPECTOR WILL INSPECT ALL WORK WITHIN THE TOWN'S RIGHTS-OF-WAY. NOTIFY TOWN INSPECTION SERVICES TO SCHEDULE A PRECONSTRUCTION MEETING PRIOR TO STARTING CONSTRUCTION.
27. WHENEVER EXCAVATION IS NECESSARY, CALL ARIZONA811 BY DIALING 811 or 602-263-1100, TWO (2) WORKING DAYS BEFORE EXCAVATION BEGINS.
28. EXCAVATIONS SHALL COMPLY WITH REQUIREMENTS OF OSHA EXCAVATION STANDARDS (29 CFR, PART 1926, SUBPART P). UNDER NO CIRCUMSTANCES WILL THE CONTRACTORS BE ALLOWED TO WORK IN A TRENCH LOCATED WITHIN THE TOWN'S RIGHT-OF-WAY WITHOUT PROPER SHORING OR EXCAVATION METHODS.
29. PERMIT HOLDER SHALL POST A 6 SQUARE FOOT (2'X3') IDENTIFICATION SIGN, MADE OF DURABLE MATERIAL, IN THE FRONT YARD OF SUBJECT PROPERTY AND NOT IN THE TOWN'S RIGHT-OF-WAY. THE SIGN MAY NOT EXCEED A MAXIMUM OF 6 FEET IN HEIGHT FROM GRADE TO TOP OF THE SIGN. THE SIGN MUST INCLUDE THE PERMITTEE OR COMPANY NAME, PHONE NUMBER. TYPE OF WORK, ADDRESS OF PROJECT AND TOWN CONTACT NUMBER, 480-348-3556.
30. WHEN DEEMED NECESSARY, A 6-FOOT HIGH CHAIN LINK FENCE MUST BE INSTALLED AROUND THE CONSTRUCTION AREA TO PREVENT ANY POTENTIAL SAFETY HAZARD FOR THE PUBLIC. THE FENCE SHALL BE SETBACK AT LEAST 10 FEET FROM ALL RIGHTS-OF-WAY AND HAVE A 50-FOOT STREET CORNER SITE TRIANGLE WHERE APPLICABLE.
31. CLEAR ACCESS FOR NEIGHBORING PROPERTIES AND EMERGENCY VEHICLES MUST BE MAINTAINED AT ALL TIMES. CONSTRUCTION RELATED VEHICLES MUST BE LEGALLY PARKED ONLY ON ONE SIDE OF THE STREET OR JOB SITE PROPERTY.
32. ALL CONSTRUCTION DEBRIS AND EQUIPMENT MUST BE CONTAINED ON SITE AT ALL TIMES. CONTRACTOR AND PROPERTY OWNER MUST MAINTAIN THE JOB SITE FREE OF LITTER AND UNSIGHTLY MATERIALS AT ALL TIMES. CONSTRUCTION MATERIALS ARE PROHIBITED IN THE TOWN'S RIGHT-OF-WAY.
33. CONSTRUCTION ACTIVITIES ARE PERMITTED BETWEEN THE HOURS OF 7 AM AND 5 PM MONDAY THROUGH FRIDAY. CONSTRUCTION ACTIVITIES MAY START ONE (1) HOUR EARLIER DURING THE SUMMER (MAY 1ST THROUGH SEPTEMBER 30TH).
34. THE USE AND OPERATION OF FUEL-FIRED GENERATORS IS PROHIBITED UNLESS DUE TO A HARDSHIP. TOWN APPROVAL SHALL BE REQUIRED.
35. THE CONTRACTOR AND PROPERTY OWNER SHALL BE LIABLE FOR ANY DAMAGE DONE TO ANY PUBLIC PROPERTY AS A RESULT OF ANY CONSTRUCTION OR CONSTRUCTION RELATED ACTIVITIES. NO CERTIFICATE OF OCCUPANCY WILL BE ISSUED UNTIL ALL AFFECTED RIGHTS-OF-WAY ARE CLEANED AND/OR REPAIRED TO THEIR ORIGINAL CONDITION AND UNTIL ANY AND ALL DAMAGES TO AFFECTED PROPERTIES ARE RESTORED TO ORIGINAL CONDITION.
36. A KEYED SWITCH SHALL BE REQUIRED ON ALL NEW AND EXISTING ELECTRIC ENTRY GATES. THE KEYED SWITCH SHALL BE INSTALLED IN A LOCATION THAT IS READILY VISIBLE AND ACCESSIBLE. KNOX BOX ORDER FORMS ARE AVAILABLE AT THE TOWN'S BUILDING SAFETY DEPARTMENT.
37. PROPERTY OWNER, BUILDER, OR GENERAL CONTRACTOR WILL BE RESPONSIBLE FOR CONTROLLING DUST FROM THE SITE AT ALL TIMES. ALL MEANS NECESSARY SHALL BE USED BY THE BUILDER OR GENERAL CONTRACTOR TO CONTROL THE EXISTENCE OF DUST CAUSED BY ANY EARTHWORK, SPRAY APPLICATION OF MATERIALS, OR OTHER DUST-CAUSING PRACTICES REQUIRED BY THE CONSTRUCTION PROCESS.
38. APPROVAL OF THESE PLANS ARE FOR PERMIT PURPOSES ONLY AND SHALL NOT PREVENT THE TOWN FROM REQUIRING CORRECTION OF ERRORS IN THE PLANS WHERE SUCH ERRORS ARE SUBSEQUENTLY FOUND TO BE IN VIOLATION OF ANY LAW, ORDINANCE, HEALTH, SAFETY, OR OTHER DESIGN ISSUES.
39. ALL DRAINAGE PROTECTIVE DEVICES SUCH AS SWALES, INTERCEPTION DITCHES, PIPES PROTECTIVE BERMS, CONCRETE CHANNELS OR OTHER MEASURES DESIGNED TO PROTECT PROPOSED AND EXISTING IMPROVEMENTS FROM RUNOFF OR DAMAGE FROM STORM WATER, MUST BE CONSTRUCTED PRIOR TO THE CONSTRUCTION OF ANY IMPROVEMENTS.



VICINITY MAP
NOT TO SCALE

ENGINEER'S NOTES

1. DIMENSIONS TO BE VERIFIED BY ARCHITECT AND LANDSCAPE ARCHITECT. INFORMATION PROVIDED FOR REFERENCE ONLY ON THIS PLAN.
2. EXISTING GRADE INFORMATION IS PROVIDED BASED ON TOPOGRAPHIC SURVEY COMPLETED BY SUPERIOUR SURVEYING SERVICES, INC. DATED JUNE 17, 2024.

LEGAL DESCRIPTION

LOT 18, MIRADA LOS ARCOS, PHASE 2, ACCORDING TO BOOK 159 OF MAPS PAGE 35, IN THE OFFICE OF THE COUNTY RECORDER OF MARICOPA COUNTY, AZ.

BENCHMARK

MARICOPA COUNTY DEPARTMENT OF TRANSPORTATION POINT ID 3185, BEING A 3" MARICOPA COUNTY HIGHWAY DEPARTMENT BRASS CAP IN HANDHOLE WITH A DEPTH OF 0.55 FEET, LOCATED AT THE INTERSECTION OF LINCOLN DRIVE AND 32ND STREET, MARKING THE WEST QUARTER CORNER OF SECTION 12, HAVING AN ELEVATION OF 1387.346, NAVD88

UTILITY PROVIDERS

WATER	EPCOR USA
SANITARY SEWER	CITY OF PHOENIX
ELECTRIC	ARIZONA PUBLIC SERVICE CO.
TELEPHONE	CENTURYLINK
NATURAL GAS	SOUTHWEST GAS
CABLE TV	COX COMMUNICATIONS

PROPERTY INFORMATION

PROPERTY:	APN 164-05-023
USE:	RESIDENTIAL
PROJECT ADDRESS:	6341 N. 34TH PLACE PARADISE VALLEY, AZ 85253
ZONING:	R-43
SUBDIVISION/ LEGAL DESCRIPTION:	LOT 13 PARADISE HILLS SUBDIVISION
LOT SIZE:	51,462 SF (1.18 AC)
CONSTRUCTION YEAR:	1993

CUT AND FILL QUANTITIES

CUT: 122 CY
FILL: 205 CY
NET: 83 CY FILL

QUANTITIES ARE IN PLACE ESTIMATES. NO SHRINK OR SWELL IS ASSUMED. NO GROUND LOSS IS INCLUDED.

NATIVE PLANTS STATEMENT

ALL NATIVE PLANTS IMPACTED BY CONSTRUCTION SHALL BE RELOCATED ON SITE.

PROJECT DESCRIPTION

THE INTENT OF THIS PROJECT IS TO CONSTRUCT A NEW RETAINING WALL ALONG THE NORTH SIDE OF THE PROPERTY TO PROTECT THE EXISTING HOUSE FROM THE CURRENT SCOURING HAPPENING WITHIN THE WASH.

SITE NOTES

THE LOWEST FINISHED FLOOR ELEVATION IS 1377.60 (NEW HOUSE) IS SAFE FROM INUNDATION DURING A 100-YEAR PEAK RUN-OFF EVENT IF CONSTRUCTED IN ACCORDANCE WITH THE APPROVED PLANS.

THE PROPOSED DEVELOPMENT DOES NOT IMPACT DRAINAGE CONDITIONS OF ADJOINING LOTS. OFFSITE FLOWS ARE CONTAINED WITHIN THE DRAINAGE EASEMENT.

FLOOD INSURANCE RATE MAP (FIRM) DATA:

THE SITE IS LOCATED IN FEMA FLOOD ZONE "X" AS SHOWN IN FEMA FIRM MAP NO.04013C1745L EFFECTIVE 10/16/2013, REVISED 4/7/2017.

ENGINEER CERTIFICATION

ENGINEER CERTIFIES BY SEALING THIS PLAN THAT THE RESIDENCE FINISH FLOOR ELEVATION SHOWN ON THE PLAN OF 1378.60 AND THE NEW GUEST HOUSE FINISHED FLOOR ELEVATION OF 1377.60 (NAVD 88) IS A MINIMUM OF 12" ABOVE THE 100-YEAR STORM ELEVATION OF 1376.50 FT.

OWNER / APPLICANT

PHILLIP WESTBROOKS
6341 N. 34TH PLACE
PARADISE VALLEY, ARIZONA
PH: 480.206.3999
CONTACT: PHILLIP WESTBROOKS
EMAIL: PHILL@SPECTURM-SOLINC.COM

ARCHITECT

SEFDESIGN, LLC
317 EAST LE MARCHE AVE
PHOENIX, AZ 85022
PH: 602.705.5558
CONTACT: STEVEN FROME, AIA
EMAIL: SEFDESIGN@COX.NET

ENGINEER/ CONTACT

KBELL ENGINEERING LLC
1355 N 86TH PLACE
MESA, AZ 85207
PH: 602.980.8246
CONTACT: KELLY BELL, P.E.
EMAIL: KBELL@KBELLENG.COM

SHEET INDEX:

AS-BUILT CERTIFICATION I HEREBY CERTIFY THAT THE "RECORD DRAWING" MEASUREMENTS AS SHOWN HEREON WERE MADE UNDER MY SUPERVISION OR AS NOTED AND ARE CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF.

REGISTERED ENGINEER/ LAND SURVEYOR DATE

REGISTRATION NUMBER

THIS SET OF PLANS HAS BEEN REVIEWED FOR COMPLIANCE WITH TOWN OF PARADISE VALLEY REQUIREMENTS PRIOR TO ISSUANCE OF PERMIT. THE TOWN NEITHER ACCEPTS NOR ASSUMES ANY LIABILITY FOR ERRORS OR OMISSIONS. THIS COMPLIANCE APPROVAL SHALL NOT PREVENT THE TOWN ENGINEER FROM REQUIRING CORRECTIONS OF ERRORS OR OMISSIONS IN THE PLANS TO BE FOUND IN VIOLATION OF LAWS AND ORDINANCES.

TOWN OF PARADISE VALLEY APPROVAL SIGNATURE DATE

LEGEND

PROP SURFACE FLOW DIRECTION	LIGHT POLE
EX SURFACE FLOW DIRECTION	STREET SIGN
BOUNDARY LINE	WATER METER
CENTER LINE	FL FLOW LINE
EXISTING CONTOURS	FFE FINISHED FLOOR ELEVATION
PROPOSED CONTOURS	FS FLAGSTONE
S SEWER MANHOLE	NG NATURAL GROUND
CO SEWER CLEANOUT	TC TOP OF CURB
E ELECTRIC BOX	FG FINISHED GRADE
FIRE HYDRANT	C CONCRETE
	EX EXISTING

CALL AT LEAST TWO FULL WORKING DAYS BEFORE YOU BEGIN EXCAVATION
ARIZONA811
Arizona Blue Stake, Inc.
DIAL 8-1-1 OR 1-800-STAKE-IT (782-5348)
IN MARICOPA COUNTY: (602) 263-1100

THE LOCATION OF EXISTING UNDERGROUND UTILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK. HE AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE OCCASIONED BY HIS FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UNDERGROUND UTILITIES.

KBELL
ENGINEERING
1355 N 86TH PLACE MESA, ARIZONA 85207
PH: 602.980.8246 Copyright © 2025

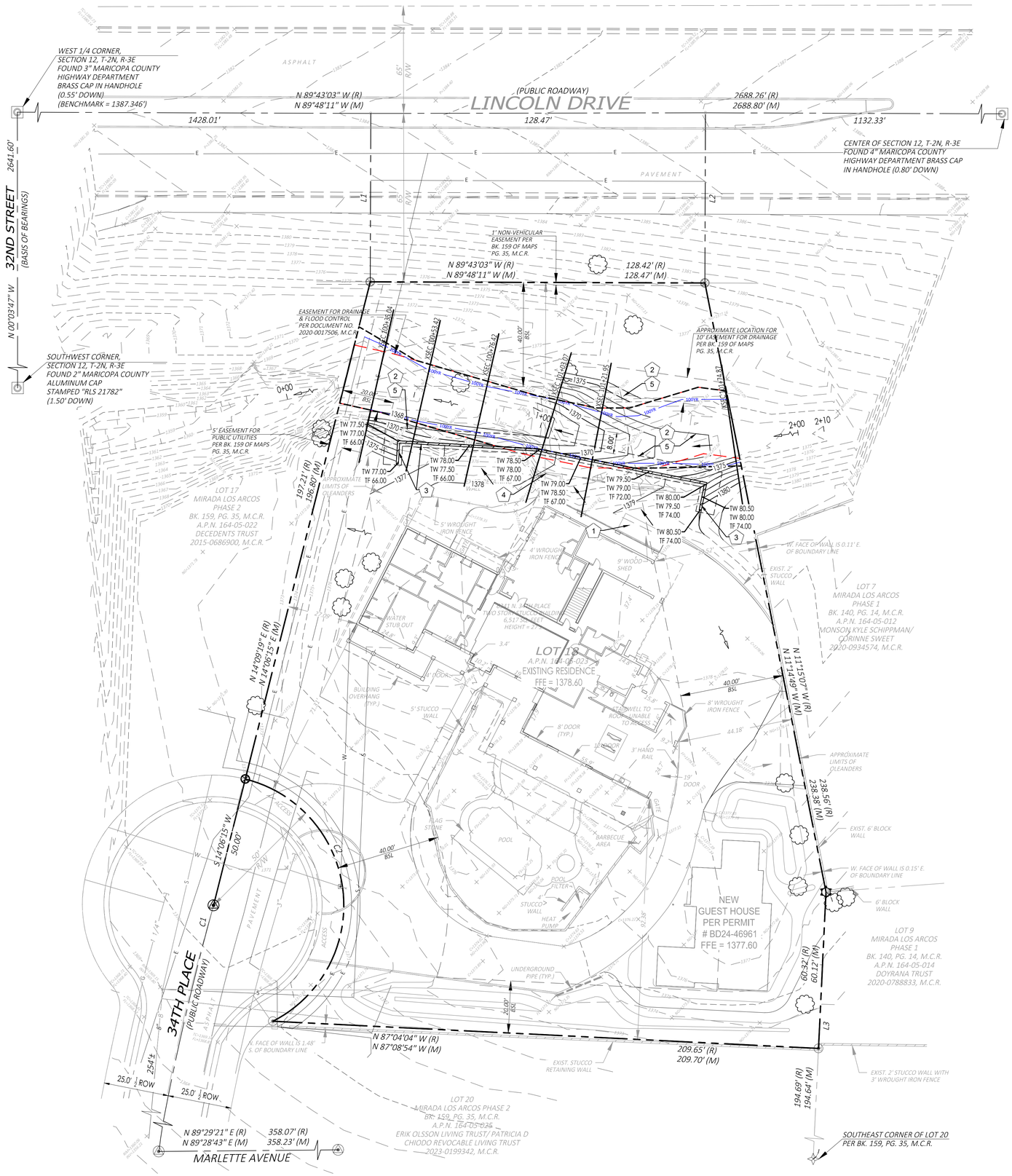
Registered Professional Engineer (Civil)
CERTIFICATE NO. 57116
KELLY J. BELL
Date Signed 07-14-2025
ARIZONA U.S.A.

CLIENT:
WESTBROOKS RESIDENCE
PROJECT NAME& ADDRESS:
WESTBROOKS RESIDENCE NEW RETAINING WALL
6341 N. 34TH PLACE, PARADISE VALLEY, ARIZONA
COVER SHEET

PROJECT NO.: 1039-02
DESIGNED BY: KJB/GGM
DRAWN BY: KJB/GGM

SHEET
C-1

103904 GrD Plans.dwg modified by gmiller on Jul 11, 25 5:58 PM



SOUTHEAST CORNER OF LOT 20 PER BK. 159, PG. 35, M.C.R.

GENERAL NOTES

1. GRADE SITE TO PROPOSED GRADES AS SHOWN ON THIS PLAN MEETING THE REQUIREMENTS OF THE GEOTECHNICAL REPORT. GRADES SHOWN REFLECT FINISH GRADE FOR THE SITE.
2. INFORMATION SHOWN ON THIS PLAN IS FOR REFERENCE ONLY. SEE GEOTECHNICAL REPORT FOR SLAB ON GRADE REQUIREMENTS.
3. GEOTECHNICAL REPORT REFERENCE:
   PREPARED FOR PHILL RESIDENCE ADDITIONS, BY VANN ENGINEERING INC. "PROJECT NUMBER 25878 - GEOTECHNICAL ENGINEERIIG REPORT, DATED 08.01.2024.
4. FOR WASH SECTIONS SEE SHEET C-3.

GRADING AND STORM DRAIN KEYNOTES

1. REMOVE EXISTING WOOD SHED TO BE COORDINATED WITH OWNER.
2. REMOVE VEGETATION AS NECESSARY TO INSTALL NEW CONSTRUCTION.
3. INSTALL NEW CONCRETE RETAINING WALL PER PLAN AND STRUCTURAL DTLS.
4. PROTECT EXISTING RETAINING WALL IN PLACE. TO BE BURIED OVER WITH NEW GRADING.
5. INSTALL NEW DRAINAGE CHANNEL PER PLAN GRADING ON PLAN. 3:1 SIDE SLOPES TYPICAL EXCEPT AT EDGES MATCHING INTO EXISTING.

GRADING LEGEND

—— 100YR ——	100YR FLOODPLAIN LINES
🟥 — — —	EX. WASH DRAINAGE ESMT. LINES
— — — — —	PROPOSED WASH DRAINAGE ESMT. LINES
C	CONCRETE
EX	EXISTING
NG	NATURAL GRADE
TW	TOP OF WALL
TF	TOP OF FOOTING
FFE	FINISHED FLOOR ELV.
FS	FLAG STONE

CALL AT LEAST TWO FULL WORKING DAYS BEFORE YOU BEGIN EXCAVATION
ARIZONA 811
Arizona Blue Stake, Inc.
DIAL 8-1-1 OR 1-800-STAKE-IT (782-5348)
IN MARICOPA COUNTY: (602) 263-1100

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PH: 602.980.8246 Copyright © 2025

57116
KELLY J. BELL
07-14-2025

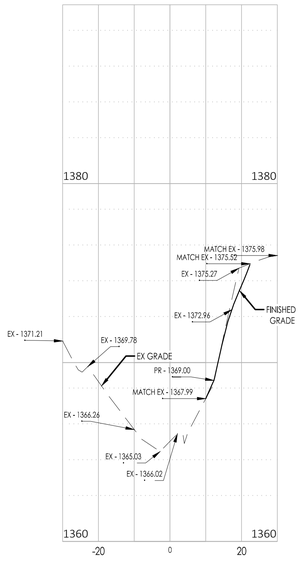
CLIENT:
WESTBROOKS RESIDENCE
PROJECT NAME& ADDRESS:
WESTBROOKS RESIDENCE NEW RETAINING WALL
6341 N. 34TH PLACE, PARADISE VALLEY, ARIZONA
GRADING AND DRAINAGE PLAN

PROJECT NO.: 1039-02
DESIGNED BY: KJB/GGM
DRAWN BY: KJB/GGM

SHEET
C-2

103904 GnD Plans.dwg modified by gmiller on Jul 11, 25 5:58 PM

100+35



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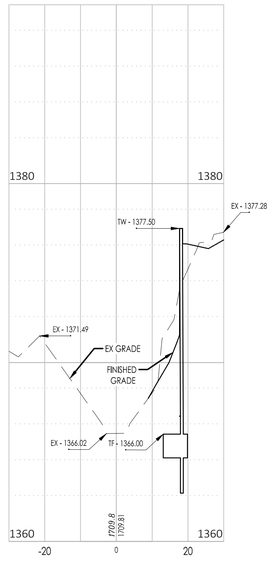

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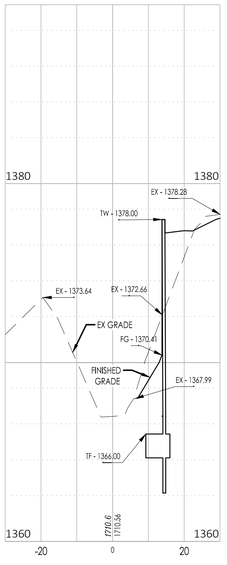

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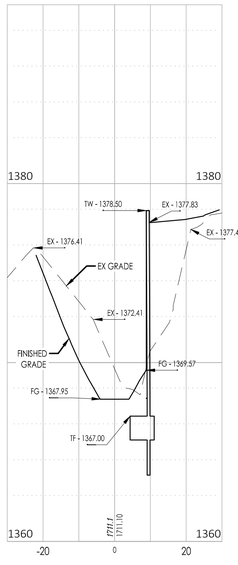
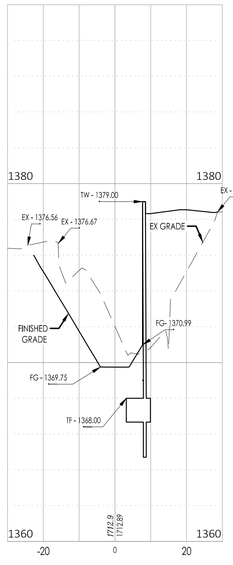


101+22



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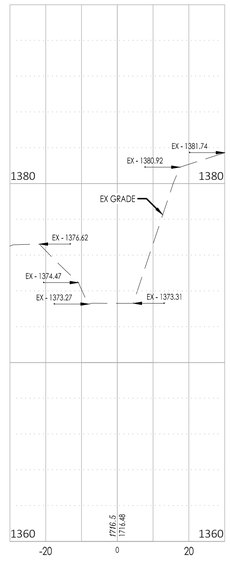

KBELL
ENGINEERING
1355 N 86TH PLACE MESA, ARIZONA 85207
PH: 602.980.8246

Registered Professional Engineer
57116
KELLY J. BELL
07-24-2025

5 15
0 10 20 40
HZ SCALE: 1"=20'
VT SCALE: 1"=4'

CALL AT LEAST TWO FULL WORKING DAYS BEFORE YOU BEGIN EXCAVATION
ARIZONA 811 Arizona Blue Stake, Inc.
DIAL 8-1-1 OR 1-800-STAKE-IT (782-5348)
IN MARICOPA COUNTY: (602) 263-1100

THE LOCATION OF EXISTING UNDERGROUND UTILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK. HE AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE OCCASIONED BY HIS FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UNDERGROUND UTILITIES.

CLIENT: WESTBROOKS RESIDENCE
PROJECT NAME & ADDRESS: WESTBROOKS RESIDENCE NEW RETAINING WALL
6341 N. 34TH PLACE, PARADISE VALLEY, ARIZONA
WASH SECTIONS

PROJECT NO.: 1039-02
DESIGNED BY: KJB/GGM
DRAWN BY: KJB/GGM

SHEET
C-3

VANN ENGINEERING INC

GEOTECHNICAL INVESTIGATION REPORT

Proposed Phill Residence Additions
APN 164-05-023
6341 North 34th Place
Paradise Valley, Arizona 85253

Prepared for:

Phillip Westbrooks
6341 North 34th Place
Paradise Valley, Arizona 85253

May 1, 2025

Project 25878

GEOTECHNICAL ENGINEERING ▪ ENVIRONMENTAL CONSULTING
CONSTRUCTION TESTING & OBSERVATION

VANN ENGINEERING INC
GEOTECHNICAL ENGINEERING ▪ ENVIRONMENTAL CONSULTING ▪ CONSTRUCTION TESTING & OBSERVATION

May 1, 2025 Project 25878

Phillip Westbrooks
6341 North 34th Place
Paradise Valley, Arizona 85253

RE: Geotechnical Investigation Report
Proposed Phill Residence Additions
APN 164-05-023
6341 North 34th Place
Paradise Valley, Arizona 85253

Mr. Westbrooks:

Transmitted herewith is a copy of the final report of the geotechnical investigation on the above-mentioned project. The services performed provide an evaluation at selected locations of the subsurface soil conditions throughout the zone of significant foundation influence. The materials encountered on the site are believed to be representative of the total area; however, soil and rock materials do vary in character between points of investigation. The recommendations contained in this report assume that the soil conditions do not deviate appreciably from those disclosed by the investigation. Should unusual material or conditions be encountered during construction, this firm must be notified so that we may make any required supplemental recommendations.

As an additional service, this firm would be pleased to review the project plans and structural notes for conformance to the intent of this report. We trust that this report will assist you in the construction of the proposed project. Vann Engineering, Inc. appreciates the opportunity to provide our services on this project and looks forward to collaborating with you during construction and on future projects. This firm possesses the capability of performing testing and inspection services during construction. Such services include, but are not limited to, compaction testing as related to fill control, foundation inspections and concrete sampling. Please notify this firm if a proposal for these services is desired. Should any questions arise concerning the content of this report, please feel free to contact this office as soon as possible.

Respectfully submitted,

VANN ENGINEERING, INC.

Registered Professional Engineer (Civil) CERTIFICATE NO. 83294 JEREMY MINNICK Date Signed 5/1/2025 ARIZONA, U.S.A.

Jeremy Minnick, PE
Geotechnical Director

Registered Professional Engineer (Civil) CERTIFICATE NO. 81143 JEFFRY VANN Date Signed 5/1/2025 ARIZONA, U.S.A.

Jeffry D. Vann, PhD PE D.GE F.ASCE
Principal Engineer

Distribution: Addressee via email, phillwestpa@gmail.com
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TABLE OF CONTENTS

SECTION I

1.0 INTRODUCTION

Vann Engineering, Inc. understands that additions are proposed for construction at the above-mentioned site, including a new residential structure in the southeast portion of the site and a new retaining wall along the north-northeastern perimeter of the existing residence. There are to be no planned basement levels. This document presents the results of a geotechnical investigation conducted by Vann Engineering, Inc. for the:

Proposed Phill Residence Additions
APN 164-05-023
6341 North 34th Place, Paradise Valley, Arizona 85253

Refer to the following aerial photograph that depicts the site (outlined in cyan) and the immediate vicinity:

Figure 1: Aerial photograph of the site (outlined in cyan) and the immediate vicinity

The services performed provide an evaluation at selected locations of the subsurface soil conditions throughout the zone of significant foundation influence.

1.1 Purpose

The purpose of the investigation was two-fold: 1) to determine the physical characteristics of the soil underlying the site, and 2) to provide final geotechnical recommendations. The maximum column and wall loads have been assumed to be as summarized in the following table:

Table 1: Anticipated Loads

Foundation Type	Maximum Column Load (kips)	Maximum Wall Load (KLF)
Conventional surface-level spread foundations bearing on native undisturbed soil or engineered fill with total and differential settlements limited to ½ inch and ¼ inch, respectively.	100	5

Anticipated structural loads more than those stated above will need to be addressed in an addendum, since they are not covered by the scope of services of this effort.

1.2 Scope of Services

The scope of services for this project includes the following:

- Description of the subject site
- Description of the major soil layers
- Site Plan indicating the locations of all points of exploration
- Recommendations for surface-level conventional spread foundations; allowable bearing capacity based on settlement analysis of ½ inch total settlement and ¼ inch differential settlement (allowable bearing pressure and depth for shallow spread foundations)
- General excavation conditions
- Lateral stability analyses including active pressure, passive pressure, and base friction
- Recommendations for site grading - necessary earthwork for conventional systems
- Recommendations for drainage
- Recommendations for slab support
- Anticipated shrinkage of the surface soil
- Limited soil-related corrosion discussion
- IBC Site Classification
- Recommendations for on-site pavement thickness

Note: This report does not include, either specifically or by implication, any environmental assessment of the site or identification of contaminated or hazardous materials or conditions. If the owner is concerned about the potential for such contamination, other studies should be undertaken. We are available to discuss the scope of work of such studies with you. Recommendations for basement level facilities have not been included in the scope of work for this effort.

Vann Engineering is not a corrosion engineering firm. A corrosion engineer must be consulted if the potential corrosion of construction materials, underground utilities, and structures is a concern. Additionally, any corrosion related laboratory testing must be provided to the on-site contractors and material specifiers to obtain recommendations on corrosion from the suppliers of the materials that will be used.

1.3 Authorization

The obtaining of data from the site and the preparation of this geotechnical investigation report have been conducted according to this firm's proposal **(VE24GT0628KM2 dated June 28, 2024)** authorized by **Phillip Westbrooks on July 1, 2024**, to proceed with the work. Our efforts and report are limited to the scope and limitations set forth in the proposal.

1.4 Standard of Care

Since our investigation is based upon review of background data, observation of site materials, and engineering analysis, the conclusions and recommendations are professional opinions. Our professional services have been performed using that degree of skill ordinarily exercised, under similar circumstances, by reputable geotechnical engineers practicing in this or similar localities.

These opinions have been derived in accordance with current standards of practice and no other warranty, express or implied, is made. The limitations of this report and geotechnical issues which further explain the limitations of the information contained in this report are listed at 7.0.

2.0 PROJECT DESCRIPTION

2.1 Proposed Development

Vann Engineering, Inc. understands that additions are proposed for construction at the above-mentioned site, including a new residential structure in the southeast portion of the site and a new retaining wall along the north-northeastern perimeter of the existing residence. There are to be no planned basement levels.

2.2 Site Description

The subject property features an existing single-family residence with a regional wash traversing from east to west along the north boundary. The soil layer at the base of the wash appears consistent with fluvial alluvial soils overlying shallow heavily weathered and fractured fanglomerate rock that gives the appearance of Class IV caliche. The wash is heavily incised, exposing the fanglomerate rock in the lower portions of the sides of the wash. There is landscaping, including a mature plant wall along the north of the house, adjacent to the wash. Irrigation from this plant wall appears to be soaking through terrace soils and allowing seep erosion undercutting in the fanglomerate on the northwest side of the existing house's boundary with the wash. There is also undercutting next to the existing retaining wall. Minor undercutting is evident on the north boundary of the area where there is planned construction. Approximately 6.0 inches of spread fill at the locations of TB-1 and TB-2 were detected during the course of the site investigation. Greater thicknesses of spread fill may be encountered at locations not explicitly explored by this firm. Refer to the following images which depict the current site conditions.

Figure 2: Current site conditions

Figure 3: Current site conditions

Figure 4: Current site conditions – fanglomerate undercutting

Figure 5: Current site conditions – fanglomerate undercutting

Figure 6: Current site conditions – fanglomerate undercutting

Figure 7: Current site conditions

Figure 8: Current site conditions – fanglomerate undercutting

Figure 9: Current site conditions

3.0 SUBSURFACE INVESTIGATION AND LABORATORY TESTING

3.1 Subsurface Investigation

The subsurface soils were explored through the utilization of three (3) exploratory test borings. The test borings were advanced to depths of 15.0 and 5.0 feet. The locations of the test borings are shown on the Site Plan in Section II of this report and presented as TB-1, TB-2, and HS-1.

The soils encountered were examined, visually classified and wherever applicable, sampled. Field logs were prepared for each test boring. The field logs contain visual classifications of the materials encountered during drilling as well as interpolation of the subsurface conditions between samples. Final logs, included in Section II, and tests of the field samples. The final logs describe the materials encountered, their thicknesses represent our interpretation of the field logs and may include modifications based on laboratory observation, and the locations where samples were obtained. The sample locations are noted graphically on the final logs. The Unified Soil Classification System was used to classify soils. The soil classification symbols are presented on the final logs and are briefly described in Section II.

The materials encountered on the site are believed to be representative of the total area; however, soil and rock materials do vary in character between points of investigation. The recommendations contained in this report assume that the soil conditions do not deviate appreciably from those disclosed by the investigation. Should unusual materials or conditions be encountered during construction, the soil engineer must be notified so that they may make supplemental recommendations if required.

3.2 Laboratory Testing

Laboratory analyses were performed on representative soil samples to aid in material classification and to estimate pertinent engineering properties of the on-site soils in preparation of this report. Testing was performed in general accordance with applicable test methods. Representative samples obtained during the field investigation were subjected to the following laboratory analyses:

Table 2: Laboratory Testing

Test	Sample(s)	Purpose
Response to Wetting	Undisturbed native soils (3)	Settlement analyses and bearing capacity
Sieve Analysis, Atterberg Limits, and Moisture Content	Native subgrade soils (2)	Soil classification
Soluble Sulfates and Chlorides	Native subgrade soils (1)	Limited soil-related corrosion discussion

Refer to Section III of this report for the complete results of the laboratory testing. The samples will be stored for 30 days from the date of issue of this report, and then disposed of unless otherwise instructed in writing by the client.

4.0 SUBSURFACE CONDITIONS

4.1 Engineering Properties of the Site Soils

Expansive soils are soils that expand or swell and are typically known to have a shrink/swell potential. Cohesive soils, or clay soils, tend to shrink as they are dried, and swell as they become wetted. The clay content of the soil determines the extent of the shrink/swell potential. The soils encountered at the site are considered to be cohesionless (measured plasticity index values of 5 and 6). Based on field and laboratory test data, this firm has determined that the potential for soil expansion is low for the site surface soils.

Collapsible soils are typically comprised of silt and sand size grains with lesser amounts of clay. The collapse potential of a soil depends on the in-situ density, depth of the deposit and the extent of a porous structure. When loading is applied to collapsible soils, originating from the weight of the structure, along with wetting, settlement occurs. Wetting sources are most commonly associated with landscape irrigation, inadequate surface drainage, utility line leakage, proximity of retention basins and water features to a structure, and long-term ponding next to the structure. Based on laboratory test data and standard penetration test data, the soils are considered to have a moderate potential for collapse and excessive differential soil movement.

It should be noted that the site soils, whether they are utilized for foundation support alone, or as engineered fill, will need to be recompacted through hand-tamping efforts, following the completion of the foundation excavation. This is necessary because of the inability of the site soils to maintain stability while withstanding the adverse effects of backhoe teeth. Hence the need for hand-tamping to regain soil bearing. Therefore, the bottom of the footing excavations must be hand-tamped to eliminate the probable adverse effects of the disturbance due to the backhoe. Prior to the placement of reinforcing steel, the base of all foundation excavations must be compacted with a "jumping jack" or plate tamper,

resulting in compaction of the foundation bearing soils to a depth of 6.0 inches. The final compaction must be to at least 95% of the ASTM D698 maximum density. Some degree of moisture processing may be required to facilitate proper compaction, although no moisture specification will apply.

4.2 Limited Soil-Related Corrosion Discussion

The values presented for corrosion related laboratory testing should be used to determine potentially corrosive characteristics of the on-site soils tested with respect to their contact with the various construction materials that will be used at the subject property. The corrosion related laboratory testing results are specific to the locations and elevations sampled and no other inference is implied. If the actual on-site soils that will be in contact with structures and construction materials are from different locations and elevations than those presented herein, additional corrosion testing must be performed.

Table 3: Corrosion Test Results Summary

Sample Location	Test Interval (feet)	Sulfate (%)	Chlorides (ppm)
TB-1	2.5 - 3.5	0.143	106

The project structural engineer should cross reference the soluble sulfate and chloride testing results from the locations and depth intervals presented with Table 19.3.1.1 of Section 318 of the American Concrete Institute (ACI) Building Code Requirements for Structural Concrete to determine the appropriate exposure class to utilize for the project.

All corrosion related laboratory testing presented herein must be provided to the on-site contractors and material specifiers to obtain recommendations on corrosion from the suppliers of the materials that will be used. Corrosion can result from many combinations of environmental conditions, materials, construction, landscaping, and other factors, and no single guideline addresses all corrosion possibilities. Nevertheless, important corrosion information can be obtained from the American Wood Protection Association (AWPA), the International Building Code (IBC), International Residential Code (IRC), and local building codes.

Landscape material, including but not limited to decorative gravel, sand, and fill soils, may contain substantially higher concentrations of corrosive elements than the native site soils. The landscaping contractor must have all materials to be utilized in the landscape design evaluated for corrosion properties and submit the test results to the project general contractor for review prior to their use at the site. Vann Engineering is not a corrosion engineering firm, and the scope of our work was limited to performing corrosion related laboratory testing on selected samples at specific locations and elevations, presenting the results herein, and providing a brief comparison of the corrosion related laboratory testing results to selected criteria. A registered corrosion engineer must be consulted if the potential corrosion of construction materials, underground utilities, and structures is a concern.

4.3 Groundwater

No groundwater was encountered to a depth of 15.0 feet. Groundwater is expected to be at a depth of approximately 216.3 feet according to nearest relevant well data in the area, as shown on the following Arizona Groundwater Site Inventory (GWSI)

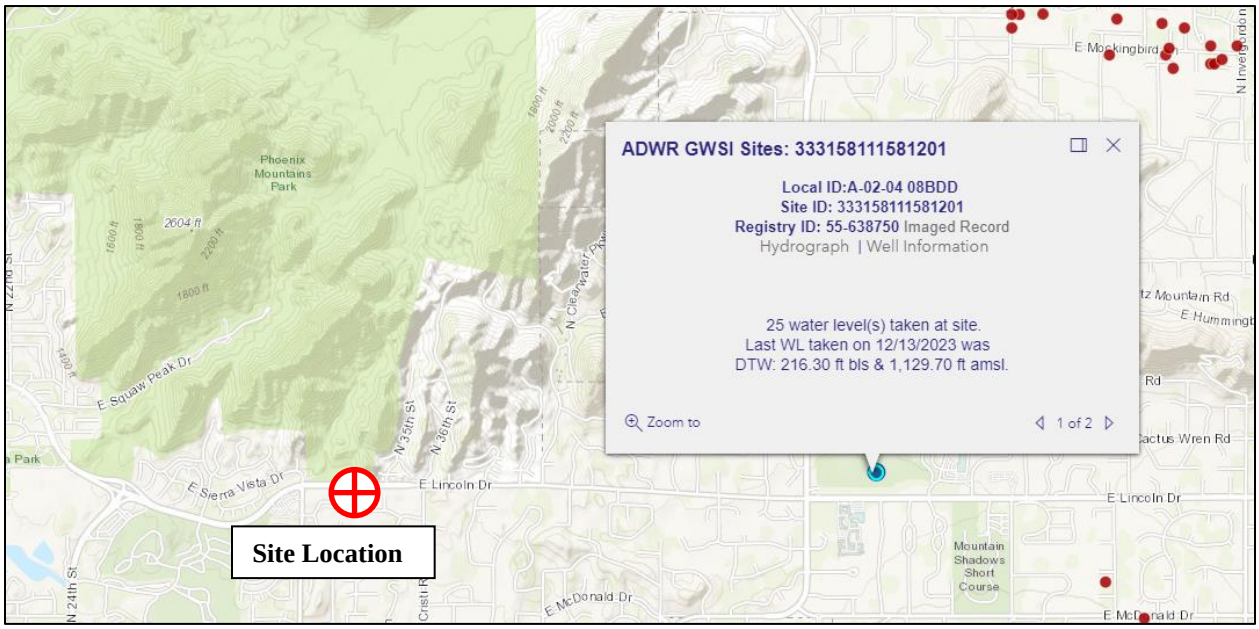


Figure 10: Groundwater Map

5.0 RECOMMENDATIONS

The following recommendations are presented as a guide in the compilation of construction specifications. The recommendations are not comprehensive contract documents and should not be utilized as such. The recommendations contained herein are based upon the properties of the surface and subsurface soils and rocks as described by the field evaluation, the results of which are presented and discussed in this report. Alternate recommendations may be possible and will be considered upon request.

5.1 Excavating Conditions

Excavations into the site surface and subsurface soils extending to approximate depths ranging from 3.0 to 5.0 feet should be possible with conventional excavating equipment. Heavier excavating equipment (hard dig) will be necessary below approximate depths ranging from 3.0 to 5.0 feet to the presence of highly weathered and fractured fanglomerate rock.

The subsurface soils extending to contact with the highly weathered and fracture fanglomerate rock will be susceptible to sloughing. It is recommended that the soil strata details from the boring logs in Section II of this report be utilized in conjunction with on-site observations to determine when appropriate measures be incorporated in the final design and construction to mitigate potential damage and injuries associated with sloughing.

Excavations greater than 4.0 feet should be sloped or braced as required to provide personnel safety and satisfy local safety code regulations. Temporary construction slopes should be

excavated in strict compliance with the rules and regulations of the Federal Register, Volume 54, No. 209 (October 1989), the United States Department of Labor, Occupational Safety and Health Administration (OSHA), 29 CFR, Part 1926. This document was prepared to better ensure the safety of workers entering trenches or excavations and requires that all excavations conform to new OSHA guidelines. The contractor is solely responsible for protecting excavations by shoring, sloping, benching or other means as required to maintain stability of both the excavation sides and bottom. Vann Engineering Inc. does not assume any responsibility for construction site safety or the activities of the contractor.

The subsurface soils extending to an approximate depth of 3.0 to 5.0 feet are considered to be OSHA Type C soil. Temporary excavations into Type C soils are to be configured at no steeper than a 1.5H:1V incline. The underlying fanglomerate rock layer is OSHA Type A rock. Temporary excavations into Type A rock must be configured no steeper than a 0.75H:1V incline. The maximum trench depth, without the use of shoring, is 20.0 feet (OSHA maximum). Deviation from these recommendations will necessitate a trench support system or shielding.

5.2 Site Preparation

Although underground facilities such as septic tanks, cesspools, basements, and dry wells were not encountered, such features might be encountered during construction. These features should be demolished or abandoned in accordance with the recommendations of the geotechnical engineer. Such measures may include backfill with 2-sack ABC/cement slurry.

It is recommended that all vegetation, all remnants associated with any demolition or remodel of any existing structures (inclusive of slabs, foundations, and buried utilities), and all other deleterious materials be removed at the commencement of site grading activities.

Following the removal of the above-listed items, all existing spread fill soils must be removed in the proposed building, hardscape, and pavement areas. At the locations of TB-1 and TB-2, approximately 6.0 inches of spread fill were encountered. Greater thicknesses of spread fill may be encountered at locations not explicitly explored by this firm, specifically beneath or adjacent to any existing structure. The presence of native soils at the base and sides of the spread fill removal excavation must be verified by the project geotechnical engineer.

Following the removal of the above listed items, the uppermost 8.0 inches of the native soils within structure and pavement areas must be reworked to establish a stable condition. All final compactions shall be as specified herein. Any site cut soil may be reused as structural supporting fill provided the maximum particle size is 3.0 inches, it is free of the above-mentioned items, and that a suitable percentage of fines will be generated to ensure a stable mixture.

Complete removal and cleaning of any undesirable materials and proper backfilling of depressions will be necessary to develop support for the proposed facilities. Widen all depressions as necessary to accommodate compaction equipment and provide a level base for placing any fill. All fills shall be properly moistened and compacted as specified in the section on compaction and moisture recommendations.

All subbase fill required to bring the structure areas up to subgrade elevation should be placed in horizontal lifts not exceeding 6.0 inches compacted thickness or in horizontal lifts with thicknesses compatible with the compaction equipment utilized.

Special Note: Conventional Surface Level Systems (Vicinity of Test Borings 1 and 2)

In regard to conventional surface-level systems, it is necessary that a minimum of 1.0 feet of engineered fill lie beneath all foundations for the structures in order to utilize the bearing capacity for engineered fill for design (to be completed by others) of foundation width. The engineered fill should have a lateral extent of at least 2.0 feet beyond the edges of all footings. If there is less than 1.0 feet of engineered fill beneath the footings, consider the bearing condition to be unacceptable. The base of any zone of subexcavation (cut surface below foundations and floor slabs) must be moisture processed and compacted to a depth of 8.0 inches.

It should be noted that the site soils, whether they are utilized for foundation support alone, or as engineered fill, will need to be recompacted through hand-tamping efforts, following the completion of the foundation excavation. This is necessary because of the inability of the site soils to maintain stability while withstanding the adverse effects of backhoe teeth. Hence the need for hand-tamping to regain soil bearing. Therefore, the bottom of the footing excavations must be hand-tamped to eliminate the probable adverse effects of the disturbance due to the backhoe. Prior to the placement of reinforcing steel, the base of all foundation excavations must be compacted with a "jumping jack" or plate tamper, resulting in compaction of the foundation bearing soils to a depth of 6.0 inches. The final compaction must be to at least 95% of the ASTM D698 maximum density. Some degree of moisture processing may be required to facilitate proper compaction, although no moisture specification will apply.

Any tree removal efforts made to accommodate the new structure must include removal of the root systems, followed by backfilling of the volume occupied by the root ball. Typically, to remove all significant roots such that the maximum diameter of any root is no greater than ½ inch, it is required to excavate to a depth of 4.0 feet to capture all applicable roots. Further, the lateral extent of each tree root excavation is generally 8.0 feet (twice the depth).

Complete removal and cleaning of any undesirable materials and proper backfilling of depressions will be necessary to develop support for the proposed facilities. Widen all depressions as necessary to accommodate compaction equipment and provide a level base for placing any fill. All fills shall be properly moistened and compacted as specified in the section on compaction and moisture recommendations. All subbase fill required to bring the structure areas up to subgrade elevation should be placed in horizontal lifts not exceeding 6.0 inches compacted thickness or in horizontal lifts with thicknesses compatible with the compaction equipment utilized.

It is the understanding of this firm that various utility trenches may traverse the completed pad. The backfill of all utility trenches, if not in conformance with this report, may adversely impact the integrity of the completed pad. This firm recommends that all utility trench backfill crossing the pads be inspected and tested to ensure full conformance with this report. Untested utility trench backfill will nullify any as-built grading report regarding the existence of engineered fill beneath the proposed building foundations and place the owner at greater risk in terms of potential unwanted foundation and floor slab movement.

Compaction of backfill, subgrade soil, subbase fill, and base course materials should be accomplished to the following density and moisture criteria prior to concrete placement:

Table 4: Compaction Requirements

Material	Building Area	Percent Compaction (ASTM D698)	Compaction Moisture Content Range (%)
On-site soils with $12 \leq PI < 15$	Below Foundation Level and Below Pavement Sections	95 min	optimum -1 to optimum +3
	Above Foundation Level[1]	92 - 97	optimum to optimum +4
On-site soils with $PI < 12$	Below Foundation Level and Below Pavement Sections	95 min	optimum -2 to optimum +2
	Above Foundation Level[1]	95 min	optimum -2 to optimum +2
Imported fill material	Below Foundation Level and Below Pavement Sections	95 min	optimum -2 to optimum +2
	Above Foundation Level[1]	90 min	optimum -2 to optimum +2
Base course	Below Interior Concrete Slabs	95 min	-

[1]Also applies to the subgrade in exterior slab, sidewalk, curb, gutter, and pool deck areas.

Any soil disturbed during construction shall be compacted to the applicable percent compaction as specified herein. **Increase the required degree of compaction to a minimum of 98 percent for fill materials greater than 5.0 feet below final grade.** Natural undisturbed soils or compacted soils subsequently disturbed or removed by construction operations should be replaced with materials compacted as specified above.

All imported (engineered) fill material to be used as structural supporting fill should be free of vegetation, debris and other deleterious material and meet the following requirements:

Table 5: Imported Fill Soil Parameters

Soil Parameter	Requirement
Plasticity Index:	14 (Maximum)
Particle Size:	3 inches (Maximum)
Passing #200 Sieve:	60 % (Maximum)
Expansion Potential*:	1.5 % (Maximum)
Sulfates:	0.19 %(Maximum)

*Performed on a sample remolded to 95 percent of the maximum ASTM D698 density at 2 percent below the optimum moisture content, under a 100 PSF Surcharge.

Please note that all imported fill material is to be tested for soluble sulfate and chloride content (corrosion testing). Results of the corrosion testing must be presented to the project structural engineer in order to utilize the appropriate exposure class per Table 19.3.1.1 of Section 318 of the American Concrete Institute (ACI) Building Code Requirements for Structural Concrete. All concrete for the project should be designed (by others) in accordance with the provisions presented in Section 318, Chapter 19 of the ACI Building Code Requirements for Structural Concrete.

Water settling and/or slurry shall not, in any case, be used to compact or settle surface soils, fill material, or trench backfill within 10.0 feet of a structure area or within an area, which is to be paved. When trench backfill consists of permeable materials that would allow percolation of water into a structure or pavement area, water settling shall not be used to settle such materials in any part of the trench.

5.3 Fill Slope Stability

Maximum fill slopes may conform to a 2.5:1 (horizontal: vertical) ratio if fill is placed in accordance with the recommendations contained herein.

5.4 Shrinkage

For balancing grading plans, the estimated shrink of on-site soils has been provided below. The calculated shrink assumes oversized material will be processed and used on the project (i.e., oversized material is crushed and used in engineered fill). Assuming the average degree of compaction will approximate 97 percent of the standard maximum density, the approximate shrinkage of the reworked on-site soils are as follows:

Table 6: Shrinkage

Material	Estimated Shrinkage (Based on ASTM D698A)
Native Soils	15% ± 3

The above value does not consider losses due to erosion, waste, variance of on-site soils, over-excavation, re-compaction of zones disturbed by demolition, previous site usage or the screening of oversized particles and/or debris. In other words, additional factors can and will create situations where seemingly balanced grading and drainage plans do not balance during construction.

5.5 Site Classification

This project is not located over any known active faults or fault associated disturbed zones. An IBC Site Class of C may be utilized for the proposed structures, as the representative N-Value is greater than 50 for the uppermost 100 feet of substrata at the site.

5.6 Conventional Surface-Level Spread Foundations for the New Residential Structure (Area of Test Borings 1 and 2)

It is recommended that all perimeter foundations and isolated exterior foundations bearing on 1.0 feet of engineered fill that has been hand-tamped post footing excavating be embedded a minimum of 1.5 feet below the lowest adjacent finish pad grade within 5.0 feet of proposed exterior walls. Interior footings bearing on 1.0 feet of engineered fill that has been hand-tamped post footing excavation should be founded a minimum of 1.5 feet below finish floor level.

Foundations bearing on native undisturbed soil that has been hand-tamped post footing excavation in lieu of engineered fill must be embedded a minimum depth of 2.5 feet.

For all construction, 2.0 feet and 1.33 feet are recommended as the minimum width of spread and continuous footings, respectively. The following tabulations may be used for shallow spread (column) and continuous (wall) foundations for the proposed structures.

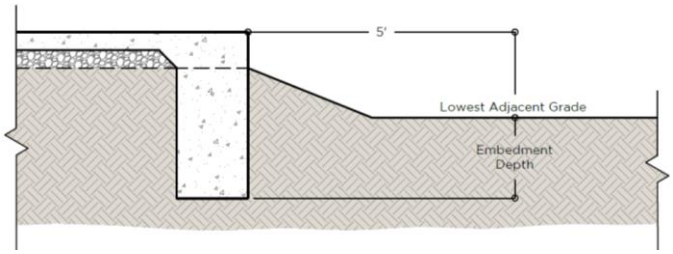
Table 7: Conventional Surface Level Foundations for the New Residential Structure

Foundation Embedment Depth[1]	Bearing Stratum[2]	Allowable Soil Bearing Capacity[3]
2.5 Feet	Native Undisturbed Soil[4, 6]	1500 PSF
1.5 Feet	1.0 Feet of Engineered Fill[5, 6]	1500 PSF

[1]Conditions for foundation embedment depth:

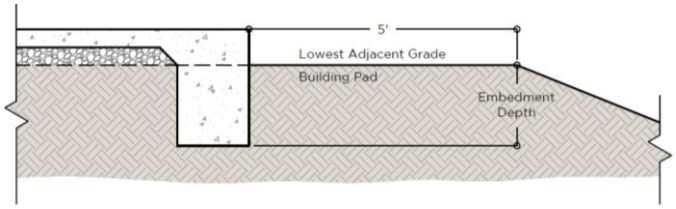
a) The depth below the lowest adjacent exterior pad grade within 5.0 feet of proposed exterior walls.

Condition A



b) The depth below finish compacted pad grade provided that a sufficient pad blow-up (the lateral extent to which the building pad is constructed beyond the limits of the exterior walls or other structural elements, inclusive of exterior column foundations) has been incorporated into the grading and drainage considerations (5.0 feet or greater).

Condition B



[2]Refers to the soil layer that the footing pad rests on, and does not mean to imply that the foundation be fully embedded into that particular stratum

[3]**The allowable soil bearing capacity value and associated allowable loads are based on a total settlement of ½-inch and a differential settlement of ¼ inch.** The maximum estimated footing settlements (in situ) should be within tolerable limits if constructed in accordance with the recommendations contained in this report and a reasonable effort is made to balance loads on the footings

[4]A mixture of 2-sack ABC/cement slurry may be utilized in the lower portions of the foundation excavations for footings bearing on native undisturbed soil.

[5]It is necessary that a minimum of 1.0 feet of engineered fill lie beneath all foundations for the structures *in order to utilize the bearing capacity for engineered fill for considerations of foundation width.* The engineered fill should have a lateral extent of at least 2.0 feet beyond the edges of all footings. If there is less than 1.0 feet of engineered fill beneath the footings, consider the bearing condition to be unacceptable. The base of any zone of subexcavation (cut surface below foundations and floor slabs) must be moisture processed and compacted to a depth of 8.0 inches.

[6]It should be noted that the site soils, whether they are utilized for foundation support alone, or as engineered fill, will need to be recompacted through hand-tamping efforts, following the completion

of the foundation excavation. This is necessary because of the inability of the site soils to maintain stability while withstanding the adverse effects of backhoe teeth. Hence the need for hand-tamping to regain soil bearing. Therefore, the bottom of the footing excavations must be hand-tamped to eliminate the probable adverse effects of the disturbance due to the backhoe. Prior to the placement of reinforcing steel, the base of all foundation excavations must be compacted with a "jumping jack" or plate tamper, resulting in compaction of the foundation bearing soils to a depth of 6.0 inches. The final compaction must be to at least 95% of the ASTM D698 maximum density. Some degree of moisture processing may be required to facilitate proper compaction, although no moisture specification will apply.

The weight of the foundation below grade may be neglected in dead load computations. The above recommended bearing capacities should be considered allowable maximums for dead plus live loads. The maximum allowable foundation bearing pressure for foundation toe pressures may be increased by ⅓ for resistance to short-term/temporary wind loads and or eccentric or lateral loading.

Retaining wall or building foundations to be constructed in close proximity to retention basins (*within 5.0 feet*) should be embedded 1.0 feet deeper than the stated depths in the preceding bearing capacity tables.

We recommend that continuous footings and stem walls are reinforced and bearing walls be constructed with frequent joints to better distribute stresses in the event of localized settlements. Similarly, all masonry walls should be provided with both vertical and horizontal reinforcement. It is recommended that the footing excavations be inspected by the Vann Engineering Inc. project geotechnical engineer or their representative to ensure that they are free of loose soil which may have blown or sloughed into the excavations. It will also be necessary for the geotechnical engineer to verify that the footing embedment depths and bearing stratum adhere to the recommendations presented herein.

All concrete for the project should be in accordance with the provisions presented in Section 318, Chapter 19 of the ACI Building Code Requirements for Structural Concrete.

5.7 Conventional Surface-Level Spread Foundations for the Perimeter Retaining Wall Near the Wash

To account for the possibility of scour, the footings for the perimeter retaining wall foundations must be socketed a minimum of 1.0 feet into the underlying fanglomerate rock layer for an allowable soil bearing capacity of 3500 PSF.

Table 8: Conventional Surface Level Foundations for the Perimeter Retaining Wall

Foundation Embedment Depth	Bearing Stratum	Allowable Soil Bearing Capacity[1]
Socketed 1.0 feet into highly weathered and fractured fanglomerate rock	Non-permeable highly weathered and fractured fanglomerate rock (clastic sedimentary rock that gives the appearance of Class IV caliche)	3500 PSF

[1]**The allowable soil bearing capacity value and associated allowable loads are based on a total settlement of ½-inch and a differential settlement of ¼ inch.** The maximum estimated footing settlements

(in situ) should be within tolerable limits if constructed in accordance with the recommendations contained in this report and a reasonable effort is made to balance loads on the footings

The weight of the foundation below grade may be neglected in dead load computations. The above recommended bearing capacities should be considered allowable maximums for dead plus live loads. The maximum allowable foundation bearing pressure for foundation toe pressures may be increased by ⅓ for resistance to short-term/temporary wind loads and or eccentric or lateral loading.

We recommend that continuous footings and stem walls are reinforced and bearing walls be constructed with frequent joints to better distribute stresses in the event of localized settlements. Similarly, all masonry walls should be provided with both vertical and horizontal reinforcement. It is recommended that the footing excavations be inspected by the Vann Engineering Inc. project geotechnical engineer or their representative to ensure that they are free of loose soil which may have blown or sloughed into the excavations. It will also be necessary for the geotechnical engineer to verify that the footing embedment depths and bearing stratum adhere to the recommendations presented herein.

All concrete for the project should be in accordance with the provisions presented in Section 318, Chapter 19 of the ACI Building Code Requirements for Structural Concrete.

The lower portions of the retained side of the wall may be filled with a 2-sack ABC/cement slurry to ensure that all undercut cavities are completely filled. Engineered fill soils may be used to backfill the balance of the wall area and must be placed in 6.0-inch lifts utilizing the compaction and moisture requirements as presented herein. A diagram showing the proposed retaining wall and surrounding features is presented below:

5.8 Drainage

The major cause of soil problems in this locality is moisture increase in soils below structures. Therefore, it is extremely important that positive drainage be provided during construction and maintained throughout the life of any proposed development. In no case should long-term ponding be allowed near structures. Infiltration of water into utility or foundation excavations must be prevented during construction. Planters or other surface features that could retain water adjacent to buildings should not be constructed. **In areas where sidewalks or paving do not immediately adjoin structures, protective slopes should be provided with an outfall of at least 5 percent for at least 10 feet from perimeter walls.**

Backfill against footings, exterior walls, retaining walls, and in utility or sprinkler line trenches should be well compacted and free of all construction debris to minimize the possibility of moisture infiltration through loose soil. Roof drainage systems, such as gutters or rain dispenser devices, are recommended all around the roofline. Rain runoff from roofs should be discharged at least 10.0 feet from any perimeter wall or column footing. If a roof drainage system is not installed, rainwater will drip over the eaves and fall next to the foundations resulting in sub-grade soil erosion, creating depressions in the soil mass, which may allow water to seep directly under the foundations and slabs.

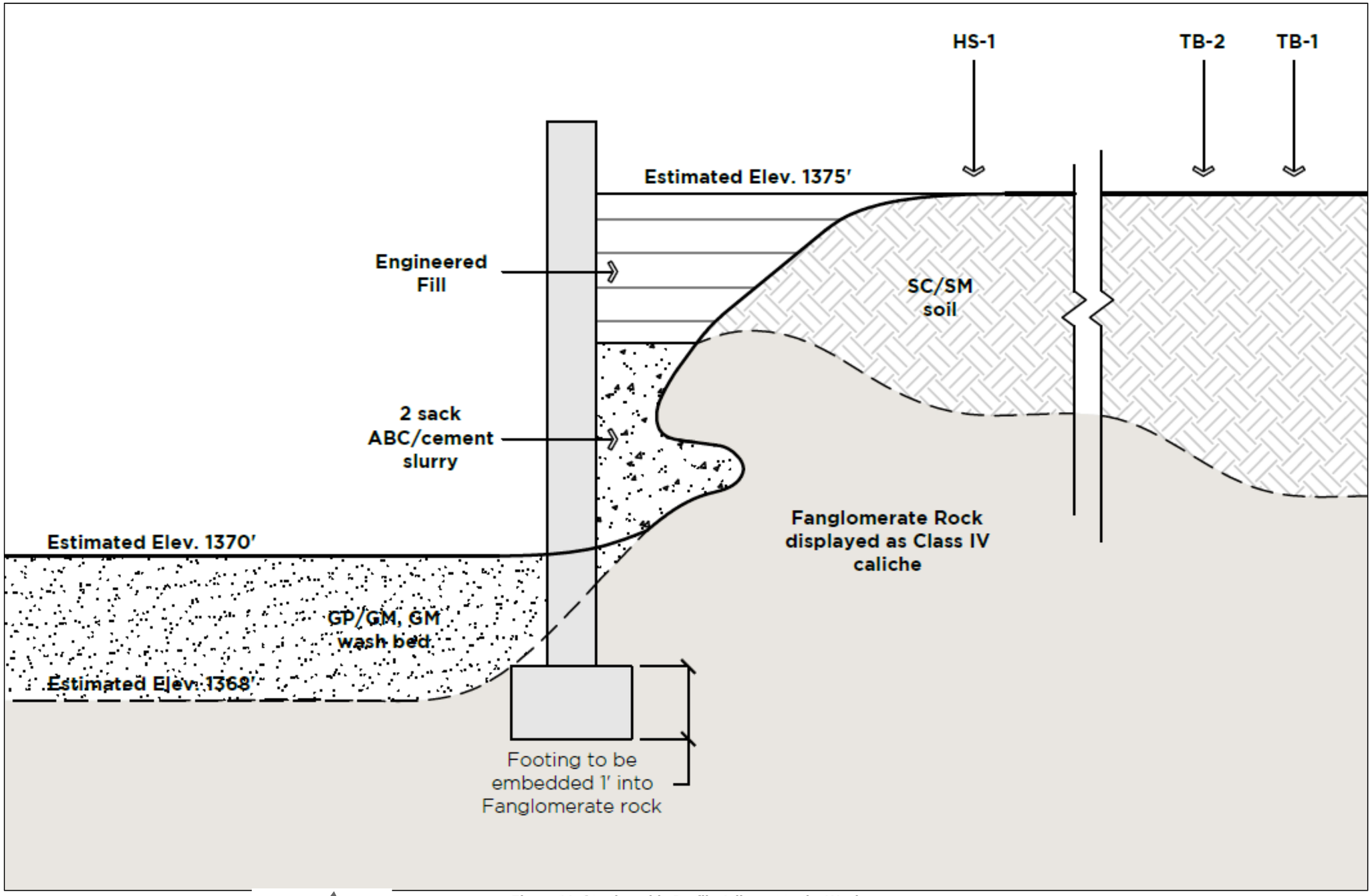


Figure 11: Stratigraphic Profile Adjacent to the Wash

5.9 Lateral Stability Analyses

All on-site retaining walls must be constructed to resist the anticipated lateral earth pressures. Unrestrained (free-end) retaining walls should be constructed for active earth pressures (K_a) and are assumed to allow small movement of the wall. Restrained (fixed-end) retaining walls should be constructed for at-rest earth pressures (K_o) with no assumed wall movement. Soil or rock present in front of the toe of the retaining wall will provide resistance to movement and should be modeled as passive earth pressure (K_p). The following presents recommendations for lateral stability analyses for the site soils:

Table 9: Lateral Stability

Parameter	Wall Type	Engineered Fill	Native Undisturbed Soil	Fanglomerate Rock
Active (K_a) Pressure[1]	Free-end retaining conditions	34 psf/ft	38 psf/ft	31 psf/ft
At-Rest (K_o) Pressure[2]	Fixed-end retaining conditions	52 psf/ft	56 psf/ft	50 psf/ft
Passive (K_p) Resistance	Free-end and fixed-end conditions that are entirely independent of base friction	358 psf/ft	291 psf/ft	546 psf/ft
	Free-end and fixed-end conditions in conjunction with base friction	240 psf/ft	195 psf/ft	366 psf/ft
Coefficient of Base Friction (μ)	Free-end and fixed-end conditions that are entirely independent of passive resistance	0.62	0.53	0.078
	Free-end and fixed-end conditions in conjunction with passive resistance	0.42	0.36	0.52

[1]Equivalent fluid pressures for vertical walls and horizontal backfill surfaces (*maximum 12.0 feet in height*). Pressures do not include temporary forces during compaction of the backfill, expansion pressures developed by over-compacted clayey backfill, hydrostatic pressures from inundation of backfill, or surcharge loads. Walls should be suitably braced during backfilling to prevent damage and excessive deflection.

[2]The backfill pressure can be reduced to the unrestrained lateral pressure if the backfill zone between the wall and cut slope is a narrow wedge (*width less than ½ the height*)

The equivalent fluid pressures presented herein do not include the lateral pressures arising from the presence of:

- Hydrostatic conditions, submergence, or partial submergence
- Sloping backfills, positively or negatively
- Surcharge loading, permanent or temporary
- Seismic or dynamic conditions

Fill against footings, stem walls, and any retaining walls should be compacted to the densities specified in Site Preparation. High plasticity clay soils should not be used as backfill against retaining walls. Compaction of each lift adjacent to walls should be accomplished with hand-operated tampers or other lightweight compactors. Overcompaction may cause excessive lateral earth pressures that could result in wall movements.

We recommend a free-draining soil layer or manufactured geosynthetic material, be constructed adjacent to the back of any retaining walls serving as basement walls. A filter fabric may be required between the soil backfill and drainage layer. The drainage zone should help prevent development of hydrostatic pressure on the wall. This vertical drainage zone should be tied into a gravity drainage system at the base of the wall.

5.10 Conventional Slab Support

Site grading within the building areas should be accomplished as recommended herein. Four inches of aggregate base course (ABC) floor fill should immediately underlie interior grade floor slabs. The aggregate base material should conform to the requirements of local practice. The use of vapor retarders may be considered for any slab-on-grade where the floor will be covered by products using water-based adhesives, wood, vinyl backed carpet, impermeable floor coatings (urethane, epoxy, or acrylic terrazzo). When used, the installation should be in accordance with the recommendation given in ACI 302.1R.

Building pads for conventional systems may be constructed with sufficient lateral pad “blow-up” to accommodate the entire perimeter slab width. To further reduce the potential for slab related damage in conjunction with conventional systems, we recommend the following:

1. Placement of effective control joints on relatively close centers.
2. Proper moisture and density control during placement of subgrade fills.
3. Provision for adequate drainage in areas adjoining the slabs.
4. Use of recommendations that allow for the differential vertical movement described herein between the slabs and adjoining structural elements, **i.e., ¼ inch** (**unless the slabs are reinforced).**
5. 2-sack ABC/cement slurry should be utilized as backfill at the intersection of utility trenches with the building perimeter.

All concrete for the project should be designed (by others) in accordance with the provisions presented in Section 318, Chapter 19 of the ACI Building Code Requirements for Structural Concrete.

5.11 On-Site Pavement Thickness Recommendations

Site grading within pavement areas should provide requisite subgrade support for flexible pavements. A compacted subgrade of on-site soils or soils with comparable properties is assumed. Pavement materials and placement requirements should be in accordance with the local government standard specifications. The stability of compacted pavement subgrade soils is reduced under conditions of increased soil moisture. Therefore, base course or pavement materials should not be placed when the surface is in a wet condition. Adequate surface drainage should be provided away from the edge of paved areas to minimize lateral moisture transmission into the subgrade. The following presents minimum recommended pavement sections for anticipated traffic conditions.

Table 10: On-Site Pavement Criteria

Traffic Loads	Alternate	Prepared Subgrade (Inches)	ABC (Inches)	Asphaltic Concrete (Inches)	Concrete Pavement (Inches)
Light Vehicles or Low Volume Traffic Areas **(0 to 45 psi tire pressures)**	A[a]	8.0	4.0	2.0	
	B[a]	8.0		3.5	
	C[b]	8.0			4.5[c]
Heavy Vehicle Areas **(45 to 90 psi tire pressures)**	A[a]	8.0	4.0	3.0	
	B[a]	8.0		4.5	
	C[b]	8.0			5.5[c]
Very Heavy Vehicle Areas **(90 to 135 psi tire pressures)**	A[a]	8.0	4.0	4.0	
	B[a]	8.0		5.5	
	C[b]	8.0			7.0[c]

[a] 10 to 15-year life, with typical maintenance
[b] 20-year life, with typical maintenance
[c] Based on a modulus of rupture of 600 PSI.

Compaction of subbase fill, and base course materials should be accomplished to the density criteria listed herein. Compaction of asphalt surfacing should be accomplished to 95% minimum using the 75-blow method.

5.12 Landscaping Considerations

The potential for unwanted foundation and slab movements can often be reduced or minimized by following certain landscape practices. The main goal for proper landscape design (by others) should be to minimize fluctuations in the moisture content of the soils surrounding the structure. In addition to maintaining positive drainage away from the structure, appropriate plant/tree selections and sprinkler/irrigation practices are extremely important to the long-term performance of the foundations and slabs. The conventional practice of planting near foundations is not recommended. Flower, shrub, and tree distances should be maintained according to the following table. Note that for planting distances less than 5.0 and 10.0 feet for flowers/shrubs and trees respectively, the adjoining foundation embedment depths will need to increase as indicated in the following table:

Table 11: Foundation Alterations Due to Landscaping

Flowers & Shrub Planting Distance	Tree Planting Distance	Foundation Alterations Due to Landscaping
5 feet	10 feet	-
4 feet[1]	9 feet	Increase footing embedment depth by 6.0 inches[2]
3 feet[1]	8 feet	Increase footing embedment depth by 12.0 inches[2]
2 feet[1]	7 feet	Increase footing embedment depth by 18.0 inches[2]

[1]Verification from the landscape architect that ADWR recommended low-water-use / drought-tolerant flowers and shrubs are being installed must be submitted to this office for approval.

[2]The use of 2-sack ABC cement slurry may be implemented to provide the requisite embedment depth increase below a more conventional foundation detail.

For flowers and shrubs installed within 5.0 feet of perimeter foundations, it is recommended that the landscape architect select plants with very low to low relative water use from the Arizona Department of Water Resources (ADWR) Low-Water-Use / Drought-Tolerant Plant List available at https://www.azwater.gov/conservation/landscaping.

Ground cover plants with low water requirements may be acceptable for landscaping near foundations. Ground cover vegetation helps to reduce fluctuations in the soil moisture content. Limit the watering to the minimum needed to maintain the ground cover vegetation near foundations. For greater moisture control, water these areas by hand. For planters and general landscaping, we recommend the following:

- Planters should be sealed.
- Grades should slope away from the structures.
- Only shallow rooted landscaping material should be used.
- Watering should be kept to a minimum.

Some trees may have extensive shallow root system that may grow under and displace shallow foundations. In addition, tree roots draw moisture from the surrounding soils, which may exacerbate shrink/swell cycles of the surface soils. The amount of moisture drawn out of the soil will depend on the tree species, size, and location. If trees are planted well away from foundations in irrigated areas, the chances of foundation damage are greatly reduced. If irrigation/sprinkler systems are to be used, we recommend installing the system all around the structure to provide uniform moisture throughout the year. The sprinkler system should be checked for leakages once per month. Significant foundation movements can occur if the soils under the foundations are exposed to a source of free water.

In lieu of deepened footings, a root barrier system can be implemented on individual trees. To reduce the minimum distance of tree installation to 7.0 feet from the foundation of adjacent structures, UB 24 root barriers from DeepRoot Green Infrastructure, LLC (or equivalent) may be implemented in box formations, surrounding the protection sides of installed trees. A minimum depth of embedment of 23.5 inches of the DeepRoot UB 24 (or equivalent) root barriers, is required by this firm to redirect root growth downward and prevent moisture by landscape irrigation from entering the foundation zone of the adjacent structures. A minimum 0.5 inch of the root barrier must extend above the soil surface to prevent tree roots from growing over the top of the barrier. A minimum protection barrier around 3 sides of all installed trees must be utilized as a root barrier.

5.13 Foundations and Risks

The factors that aid in the construction of lightly loaded foundations include economics, risk, soil type, foundation shape and structural loading. It should be noted that some levels of risk are associated with all foundation systems and there is no such thing as a “zero-risk” foundation.

It also should be noted that the previous foundation recommendations are not permitted to resist soil movements as a result of sewer/plumbing leaks, excessive irrigation, poor drainage, and

water ponding near the foundation system. It is recommended that the owner implement a foundation maintenance program to help reduce potential future unwanted foundation/slab movements throughout the useful life of the structure. The owner should conduct yearly observation of foundations and slabs and perform any maintenance necessary to improve drainage and minimize infiltrations of water from precipitation and/or irrigation. Irrigation/sprinkler systems should be periodically monitored for leaks and malfunctioning sprinkler heads, which should be repaired immediately. Post-construction landscaping must preserve initial site grading.

6.0 ADDITIONAL SERVICES

As an additional service, this firm would be pleased to review the project plans and structural notes for conformance to the intent of this report. Vann Engineering, Inc. should be retained to provide documentation that the recommendations set forth are met. These include but are not limited to documentation of site clearing activities, verification of fill suitability and compaction, and inspection of footing excavations.

Relative to field density testing, a minimum of 1 field density test should be taken for every 2500 square feet of building area, per 6.0-inch layer of compacted fill. This firm possesses the capability of performing testing and inspection services during the course of construction. Such services include, but are not limited to, compaction testing as related to fill control, foundation inspections and concrete sampling. Please notify this firm if a proposal for these services is desired. The recommendations contained in this report are contingent on Vann Engineering, Inc. observing and/or monitoring:

A. Proof rolling and fill subgrade conditions
B. Suitability of borrow materials
C. Fill control for building pads (verification of subexcavation depths and overexcavation lateral extents, compaction testing, and the general monitoring of fill placement)
D. Foundation observations (compliance with the General Structural Notes, depths, bearing strata, etc.)
E. Basement, structural or retaining wall backfill testing
F. Backfilling and compaction of excavations (e.g., Utility trench backfill)
G. Special inspections as dictated by the local municipality
H. Concrete sampling and testing for footings, stem walls and floor slabs
I. Subgrade testing for proposed pavement areas
J. ABC testing for proposed pavement areas
K. Asphaltic concrete testing for proposed pavement areas
L. Subgrade preparation for on-site sidewalk areas
M. Grout sampling and testing, where applicable
N. Mortar sampling and testing, where applicable
O. Compliance with the geotechnical recommendations

7.0 LIMITATIONS

This report is not intended as a bidding document, and any contractor reviewing this report must draw their own conclusions regarding specific construction techniques to be used on this project. The scope of services conducted by this firm does not include an evaluation pertaining to environmental issues. If these services are required by the lender, we would be most pleased to discuss the varying degrees of environmental site assessments. This report is issued with the

understanding that it is the responsibility of the owner to see that its provisions are conducted or brought to the attention of those concerned. In the event that any changes of the proposed project are planned, the conclusions and recommendations contained in this report shall be reviewed and the report shall be modified or supplemented, as necessary.

The materials encountered on the site are believed to be representative of the total area; however, soil and rock materials do vary in character between points of investigation. The recommendations contained in this report assume that the soil conditions do not deviate appreciably from those disclosed by the investigation. Should unusual material or conditions be encountered during construction, the soil engineer must be notified so that supplemental recommendations may be considered if they are required.

Prior to construction, we recommend the following:

1. Consultation with the construction team in all areas that concern soils and rocks to ensure a clear understanding of all key elements contained within this report.
2. Review of the General Structural Notes to confirm compliance to this report and determination of which allowable soil bearing capacity has been selected by the project structural engineer (this directly affects the extent of earthwork and foundation preparation at the site).
3. This firm be notified of all specific areas to be treated as special inspection items (assigned by the architect, structural engineer, or governmental agency).

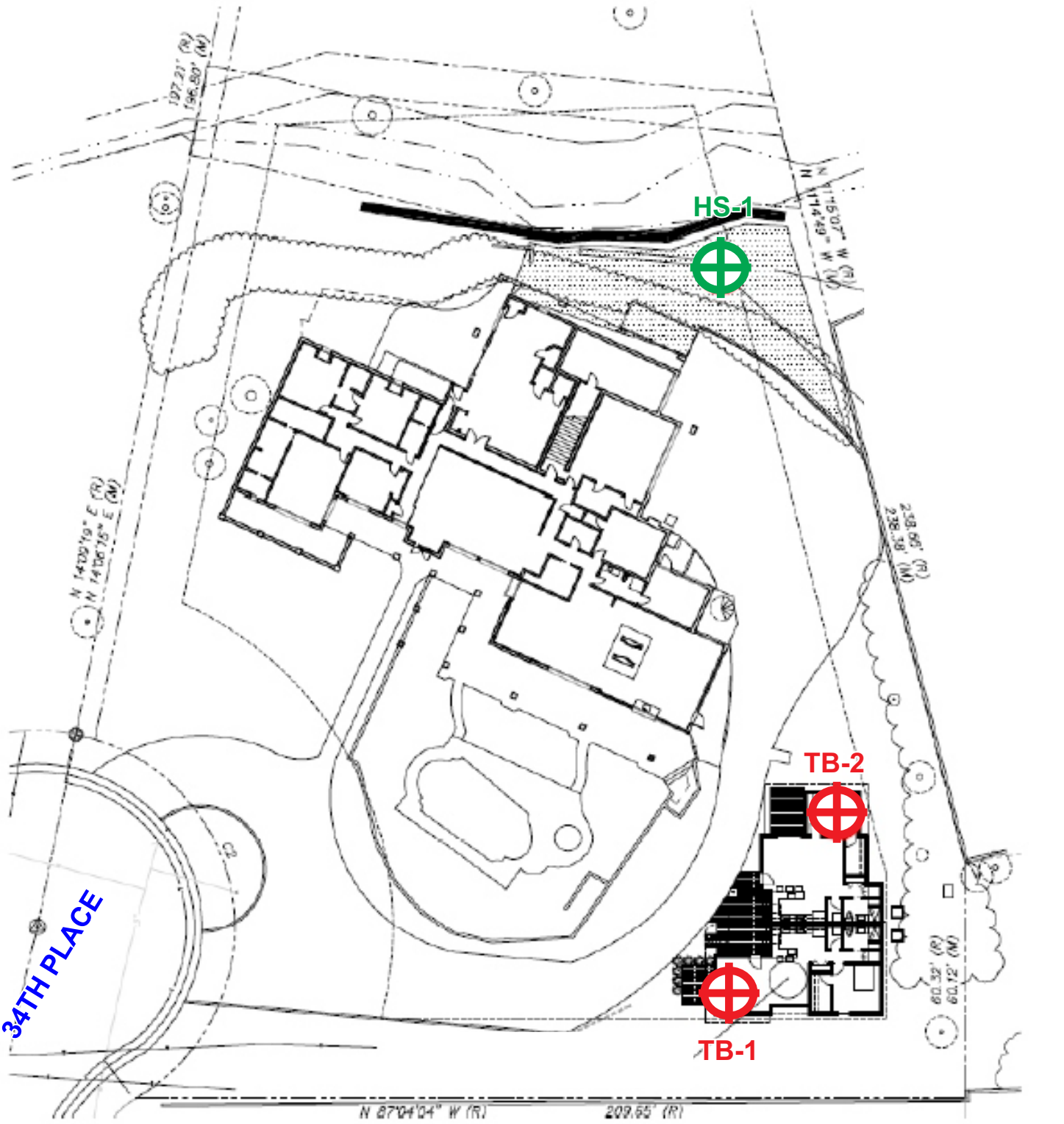
Relative to this firm's involvement with the project during the course of construction, we offer the following recommendations:

1. The site or development owner should be solely responsible for the selection of the geotechnical consultant to provide testing and observation services during the course of construction.
2. This firm should be contracted by the owner to provide the course of construction testing and observation services for this project, as we are most familiar with the interpretation of the methodology followed herein.
3. All parties concerned should understand that there exists a priority surrounding the testing and observation services completed at the site.

DEFINITION OF TERMINOLOGY

Allowable Soil Bearing Capacity Allowable Foundation Pressure	The recommended maximum contact stress developed at the interface of the foundation element and the supporting material.
Aggregate Base Course (ABC)	A sand and gravel mixture of specified gradation, used for slab and pavement support.
Backfill	A specified material placed and compacted in a confined area.
Base Course	A layer of specified material placed on a subgrade or subbase.
Base Course Grade	Top of base course.
Bench	A horizontal surface in a sloped deposit.
Caisson	A concrete foundation element cased in a circular excavation, which may have an enlarged base. Sometimes referred to as a cast-in-place pier.
Concrete Slabs-on-Grade	A concrete surface layer cast directly upon a base, subbase, or subgrade.
Controlled Compacted Fill	Engineered Fill. Specific material placed and compacted to specified density and/or moisture conditions under observation of a representative of a soil engineer.
Differential Settlement	Unequal settlement between or within foundation elements of a structure.
Existing Fill	Materials deposited through the action of man prior to exploration of the site.
Expansive Potential	The potential of a soil to increase in volume due to the absorption of moisture.
Fill	Materials deposited by the action of man.
Finish Grade	The final grade created as a part of the project.
Heave	Upward movement due to expansion or frost action.
Native Grade	The naturally occurring ground surface.
Native Soil	Naturally occurring on-site soil.
Overexcavate	Lateral extent of subexcavation.
Rock	A natural aggregate of mineral grains connected by strong and permanent cohesive forces. Usually requires drilling, wedging, blasting, or other methods of extraordinary force for excavation.
Scarify	To mechanically loosen soil or break down the existing soil structure.
Settlement	Downward movement of the soil mass and structure due to vertical loading.
Soil	Any unconsolidated material composed of disintegrated vegetable or mineral matter, which can be separated by gentle mechanical means, such as agitation in water.
Strip	To remove from present location.
Subbase	A layer of specified material between the subgrade and base course.
Subexcavate	Vertical zone of soil removal and recompaction required for adequate foundation or slab support
Subgrade	Prepared native soil surface.

SECTION II



SITE PLAN | PROJECT 25878
PROPOSED PHILL RESIDENCE ADDITIONS
APN 164-05-023
6341 NORTH 34TH PLACE
PARADISE VALLEY, ARIZONA 85253

TEST BORING LOCATION

HAND-SAMPLE LOCATION

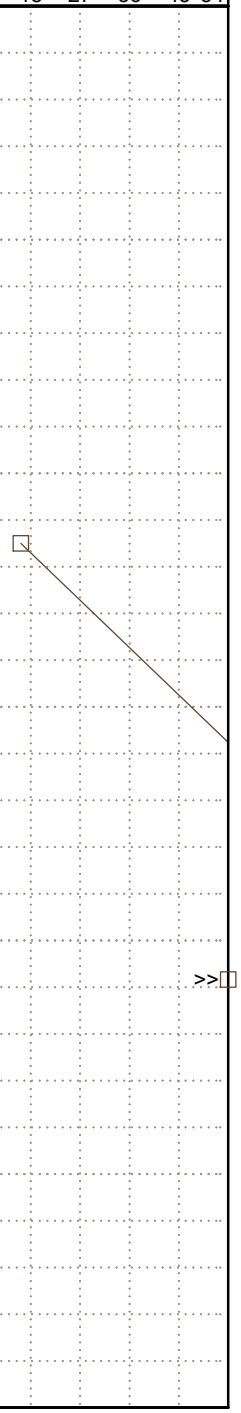
TEST BORING 1

Vann Engineering, Inc.

CLIENT Phillip Westbrooks
PROJECT NAME Phill Residence Additions
PROJECT NUMBER 25878
PROJECT LOCATION 341 North 34th Place
DATE STARTED 7/24/24 **COMPLETED** 7/24/24
GROUND ELEVATION _____ **HOLE SIZE** 4.5 inches
DRILLING CONTRACTOR VEI
LOGGED BY JD **CHECKED BY** CM
DRILLING METHOD 4.5 Inch Continuous Flight Auger
NOTES _____

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	REMARKS	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)
0.0		SPREAD FILL, 6 inches, with gravel, slightly damp, 15% gravel, 25% sand, 60% fines, poorly graded, subangular coarse-grained particles, loose, PI of 10-12, no cementation			
		(SC-SM) GRAVELLY SILTY CLAYEY SAND, slightly damp, 25% gravel, 45% sand, 30% fines, poorly graded, subangular coarse-grained particles, medium dense, PI of 6, weak cementation		R	11-15
2.5				GB	
5.0		FANGLOMERATE, very highly weathered and fractured, green-gray		SPT	9-9-9 (18)
7.5					
10.0		Highly weathered and fractured below 10 feet		SPT	34-50/4"
12.5					
15.0		Discontinued test boring at 15.0 feet.			

SPT N VALUE □
0 10 20 30 40 50 60
MOISTURE (%) △
0 5 10 15 20 25 30
PLASTICITY INDEX ○
0 9 18 27 36 45 54



TEST BORING 2

Vann Engineering, Inc.

CLIENT Phillip Westbrooks
PROJECT NAME Phill Residence Additions
PROJECT NUMBER 25878
PROJECT LOCATION 341 North 34th Place
DATE STARTED 7/24/24 **COMPLETED** 7/24/24
GROUND ELEVATION _____ **HOLE SIZE** 4.5 inches
DRILLING CONTRACTOR VEI
LOGGED BY JD **CHECKED BY** CM
DRILLING METHOD 4.5 Inch Continuous Flight Auger
NOTES _____

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	REMARKS	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	SPT N VALUE □ / MOISTURE (%) △ / PLASTICITY INDEX ○
0.0		SPREAD FILL, 6 inches, with gravel, slightly damp, 15% gravel, 25% sand, 60% fines, poorly graded, subangular coarse-grained particles, loose, PI of 10-12, no cementation				
		(SC-SM) GRAVELLY SILTY CLAYEY SAND, slightly damp, 25% gravel, 45% sand, 30% fines, poorly graded, subangular coarse-grained particles, medium dense, PI of 6, weak cementation		R	12-18	
2.5		FANGLOMERATE, very highly weathered and fractured, green-gray				
5.0						
7.5						
10.0		Highly weathered and fractured below 10 feet				
12.5						
15.0		Discontinued test boring at 15.0 feet.				

SPT N VALUE □: 0 10 20 30 40 50 60
MOISTURE (%) △: 0 5 10 15 20 25 30
PLASTICITY INDEX ○: 0 9 18 27 36 45 54

TEST BORING HS-1

Vann Engineering, Inc.

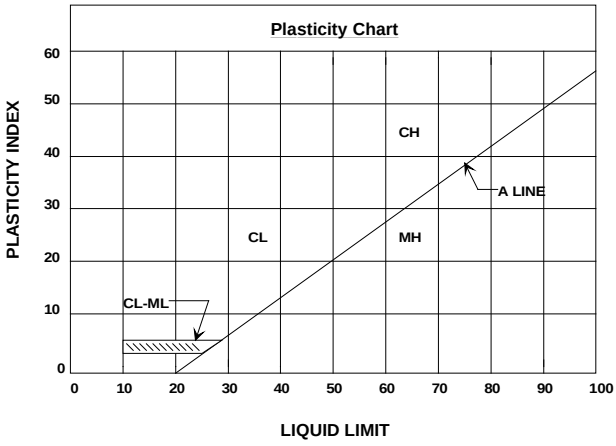
CLIENT Phillip Westbrooks
PROJECT NAME Phill Residence Additions
PROJECT NUMBER 25878
PROJECT LOCATION 341 North 34th Place
DATE STARTED 7/24/24 **COMPLETED** 7/24/24
GROUND ELEVATION _____ **HOLE SIZE** 4.5 inches
DRILLING CONTRACTOR VEI
LOGGED BY JD **CHECKED BY** CM
DRILLING METHOD 4.5 Inch Continuous Flight Auger
NOTES _____

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	REMARKS	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	SPT N VALUE □ / MOISTURE (%) △ / PLASTICITY INDEX ○
0.0		(SC-SM) GRAVELLY SAND, with fines, slightly damp, 35% gravel, 50% sand, 15% fines, poorly graded, subangular coarse-grained particles, loose, PI of 5, weak cementation Medium dense below 1 foot		R	12-25	0 10 20 30 40 50 60 0 5 10 15 20 25 30 0 9 18 27 36 45 54
2.5				GB		
5.0		Discontinued test boring at 5.0 feet.				

LEGEND

Major Divisions				Group Symbol	Typical Names
Coarse-Grained Soils (Less than 50% passes No. 200 sieve)	Gravels (50% or less or coarse fraction passes No. 4 sieve)	Clean Gravels (Less than 5% passes No. 200 sieve)		GW	Well graded gravels, gravel-sand mixtures, or sand-gravel-cobble mixtures.
				GP	Poorly graded gravels, gravel-sand mixtures, or sand-gravel-cobble mixtures.
		Gravels with Fines (More than 12% passes No. 200 sieve)	Limits plot below "A" line & hatched zone on Plasticity Chart.	GM	Silty gravels, gravel-sand-silt mixtures.
			Limits plots above "A" line & hatched zone on Plasticity Chart.	GC	Clayey gravels, gravel-sand-clay mixtures.
	Sands (More than 50% of coarse fraction passes No. 4 sieve)	Clean Sands (Less than 5% passes No. 200 sieve)		SW	Well graded sands, gravelly sands.
				SP	Poorly graded sands, gravelly sands.
		Sands with Fines (More than 12% passes No. 200 sieve)	Limits plots below "A" line & hatched zone on Plasticity Chart.	SM	Silty sands, sand-silt mixtures.
			Limits plots above "A" line & hatched zone on Plasticity Chart.	SC	Clayey sands, sand-clay mixtures.
Fine-Grained Soils (50% or more passes No. 200 sieve)	Silts-Plot below "A" line & hatched zone on Plasticity Chart	Silts of Low Plasticity (Liquid Limit Less Than 50)		ML	Inorganic silts, clayey silts with slight plasticity.
		Silts of High Plasticity (Liquid Limit More Than 50)		MH	Inorganic silts, micaceous or diatomaceous silty soils, elastic silts.
	Clays-Plot above "A" line & hatched zone on Plasticity Chart	Clays of Low Plasticity (Liquid Limit Less Than 50)		CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays.
		Clays of High Plasticity (Liquid Limit More Than 50)		CH	Inorganic clays of high plasticity, fat clays, sandy clays of high plasticity.

Note: Coarse grained soils with between 5% & 12% passing the No. 200 sieve and fine grained soils with limits plotting in the hatched zone on the Plasticity Chart to have double symbol.



DEFINITIONS OF SOIL FRACTIONS

SOIL COMPONENT	PARTICLE SIZE RANGE
Cobbles	Above 3 in.
Gravel	3 in. to No. 4 sieve
Coarse gravel	3 in. to 3/4 in.
Fine gravel	3/4 in. to No. 4 sieve
Sand	No. 4 to No. 200
Coarse	No. 4 to No. 10
Medium	No. 10 to No. 40
Fine	No. 40 to No. 200
Fines (silt or clay)	Below No. 200 sieve

TEST DRILLING EQUIPMENT & PROCEDURES

Drilling Equipment

VANN ENGINEERING INC uses a CME-55 drill-rig capable of auger drilling to depths of 150 feet in southwestern soils. The drill is truck-mounted for rapid, low cost mobilization to the jobsite and on the jobsite. The CME-55 owned by this firm is powered by a 300 cubic inch, 6-cylinder Ford industrial engine that produces 124 horsepower. This energy is transmitted through a rugged mechanical drive that provides 7,000 foot-lbs of torque on the drillstring. Two 72-inch hydraulic cylinders develop 16,000 lbs of downward thrust and 24,000 lbs of retractive force. Two hydraulic cable hoists and a mechanical cathead allow downhole sampling and testing at any depth to be accomplished with great speed and accuracy. For drilling operations, the truck is stabilized with platform mounted vertical hydraulic jacks with a 48-inch stroke. Drilling through soil or softer rock is performed with 6¾ inch O.D. hollow-stem, or 4½-inch continuous flight auger. Carbide insert teeth are normally used on the auger bits so they can often penetrate rock or very strongly cemented soils that require blasting or very heavy equipment for excavation. The operation of well-maintained equipment by an experienced crew allows VANN ENGINEERING INC to complete any type of drilling job with minimum downtime and maximum efficiency.

Sampling Procedures

Dynamically driven tube samples are usually obtained at selected intervals in the borings by the ASTM D1586 procedure. In many cases, 2 inch O.D., $1^{3}/_{8}$-inch I.D. samplers are used to obtain the standard penetration resistance. "Undisturbed" samples of firmer soils are often obtained with 3-inch O.D. samplers lined with 2.42 inch I.D. brass rings. The driving energy is generally recorded as a number of blows of a 140-pound hammer, utilizing a 30-inch free fall drop, per foot of penetration. However, in stratified soils, driving resistance is sometimes recorded in 2 or 3-inch increments so that soil changes and the presence of scattered gravel or cemented layers can be readily detected and the realistic penetration values obtained for consideration in design. These values are expressed in blows per foot on the logs. Undisturbed sampling of softer soils is sometimes performed with thin-walled Shelby tubes (ASTM D1587). Tube samples are labeled and placed in watertight containers to maintain field moisture contents for testing from auger cuttings.

Continuous Penetration Tests

Continuous penetration tests are performed by driving a 2-inch O.D. blunt nosed penetrometer adjacent to or in the bottom of test borings. The penetrometer is attached to $1^{5}/_{8}$-inch O.D. drill rods to provide clearance and thus minimize side friction so that penetration values are as nearly as possible a measure of end resistance. Penetration values are recorded as the number of blows of a 140 pound hammer, utilizing a 30-inch drop required to advance the penetrometer in one foot increments or less.

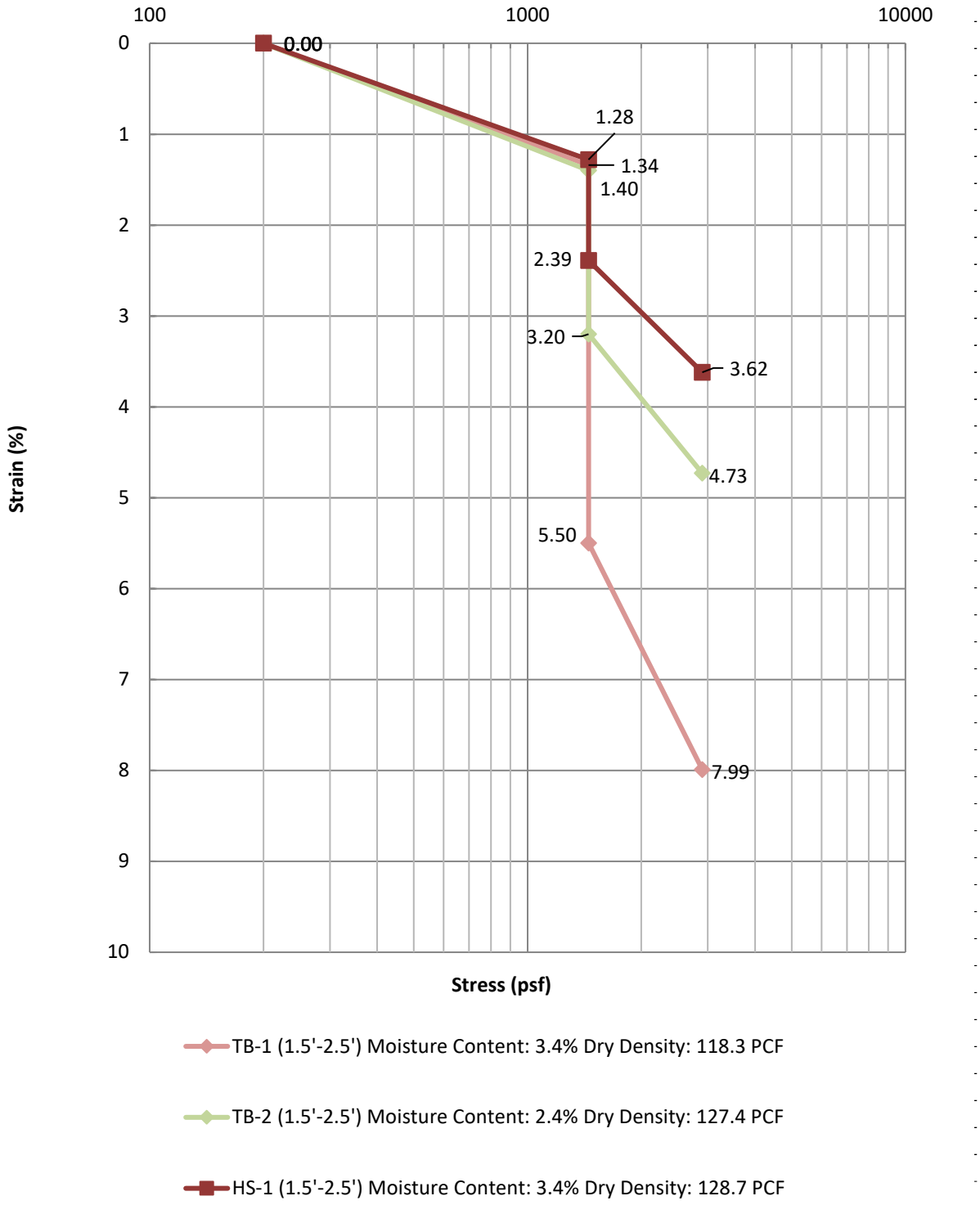
As an alternate, Cone Penetration Testing may be utilized in an effort to determine the point capacity of the cone tip, and skin friction measured on the cone sleeve.

Boring Records

Drilling operations are directed by our field engineer or geologist who examines soil recovery and prepares boring logs. Soils are visually classified in accordance with the Unified Soil Classification System (ASTM D2487) with appropriate group symbols being shown on the logs.

SECTION III

Response to Wetting Test Data
Project 25878



CLASSIFICATION TEST DATA

PROPOSED PHILL RESIDENCE ADDITIONS
APN 164-05-023
6341 NORTH 34TH PLACE
PARADISE VALLEY, ARIZONA 85253

Sample Location	*Sieve Analysis* (% Passing Sieve Size)																			*Atterberg Limits*		*USCS*	*Moisture Content %*
	4"	*3"*	*2"*	*1 ½"*	*1 ¼"*	*1"*	*¾"*	*½"*	*⅜"*	*¼"*	*#4*	*#8*	*#10*	*#16*	*#30*	*#40*	*#50*	*#100*	*#200*	*LL*	*PI*		
TB-1 (2.5'-3.5')	-	-	-	-	-	100	99	95	89	80	74	61	58	52	44	41	38	33	28	24	6	SC-SM	2.9
HS-1 (2.5-3.5')	-	-	100	94	90	88	86	81	78	71	64	21	48	40	32	29	25	20	15	23	5	SC-SM	2.2

SULFATES AND CHLORIDES TEST RESULTS

PROPOSED PHILL RESIDENCE ADDITIONS
APN 164-05-023
6341 NORTH 34TH PLACE
PARADISE VALLEY, ARIZONA 85253

Sample Location	*Test Interval (feet)*	*Sulfate (%)*	*Chloride (ppm)*
TB-1	2.5-3.5	0.143	106