CITY OF SCOTTSDALE

Drainage Reports

Onsite Drainage Report

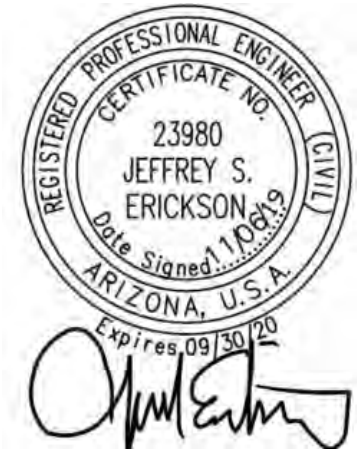
For

One Scottsdale

Southeast Corner of Scottsdale Road and Thompson Peak Parkway
Scottsdale, Arizona

Prepared for

DMB
7600 E Doubletree Ranch Road, Suite 300
Scottsdale, AZ 85258



November 6, 2019

CEC PN # 180-168

Civil & Environmental Consultants, Inc.

Phoenix | 11811 N. Tatum Boulevard, Suite 3057 | Phoenix, AZ 85028 | p: 602-760-2324 f: 602-760-2330 | www.cecinc.com

Table of Contents

1.0 INTRODUCTION

The One Scottsdale project is a proposed 21.73 net acre commercial/retail project located southeast of the intersection of Hayden Road and Thompson Peak Parkway in Scottsdale, Arizona. The site is further described as a portion of the NW1/4 of Section 26, Township 4 North, Range 4 East of the Gila and Salt River Base and Meridian, Maricopa County, Arizona. Refer to the Vicinity Map on the following page.

The site will consist of Class A office buildings, underground and above ground parking structures, a hotel, and retail pads. Phase I of the project will incorporate the hotel, drives and rough pad preparation for the remainder of the site. This Preliminary Drainage Report will document onsite and offsite drainage requirements to meet City of Scottsdale drainage guidelines and ordinance criteria for the entire project and will describe Phase I improvements that will be interim until final build out is accomplished.

This report is also based on prior calculations and assumptions as determined in the "One Scottsdale Master Drainage Plan", prepared by Wood/Patel revised June 20, 2013, the "Drainage Report for TDI at One Scottsdale, Phase I dated May 17, 2012, prepared by Wood/Patel, and the "Final Drainage Report for One Scottsdale PU III Infrastructure Improvements" (PUIII), prepared by Bowman Consulting, dated July 23, 2012. The TDI Phase I and II projects are located directly east of the project site on the east side of 73rd Street (a private drive with public access). Only drainage from the TDI project along with previously defined offsite flows from Thompson Peak Parkway will affect the site. TDI drainage is directed to the east and south.

Offsite flows that will impact the project site have been calculated and quantified in both of these reports and have various impacts on the design considerations for the One Scottsdale commercial site. These impacts will be discussed in more detail later in this report.

It should be mentioned that this property does not have to provide onsite retention or detention. A stormwater storage waiver and subsequent construction of downstream improvements along with

payment of in-lieu fees have satisfied this requirement. It is our understanding that first flush will be required. This will be accomplished through the use of the existing basin on-site in the interim condition. Contech Vortech structures will be used in the final condition. In addition, the post-development 100-year flows have been accounted for within the Master Drainage Plan HEC-1 models. Copies of correspondence and the Stormwater Storage Waiver are located in Appendix A.

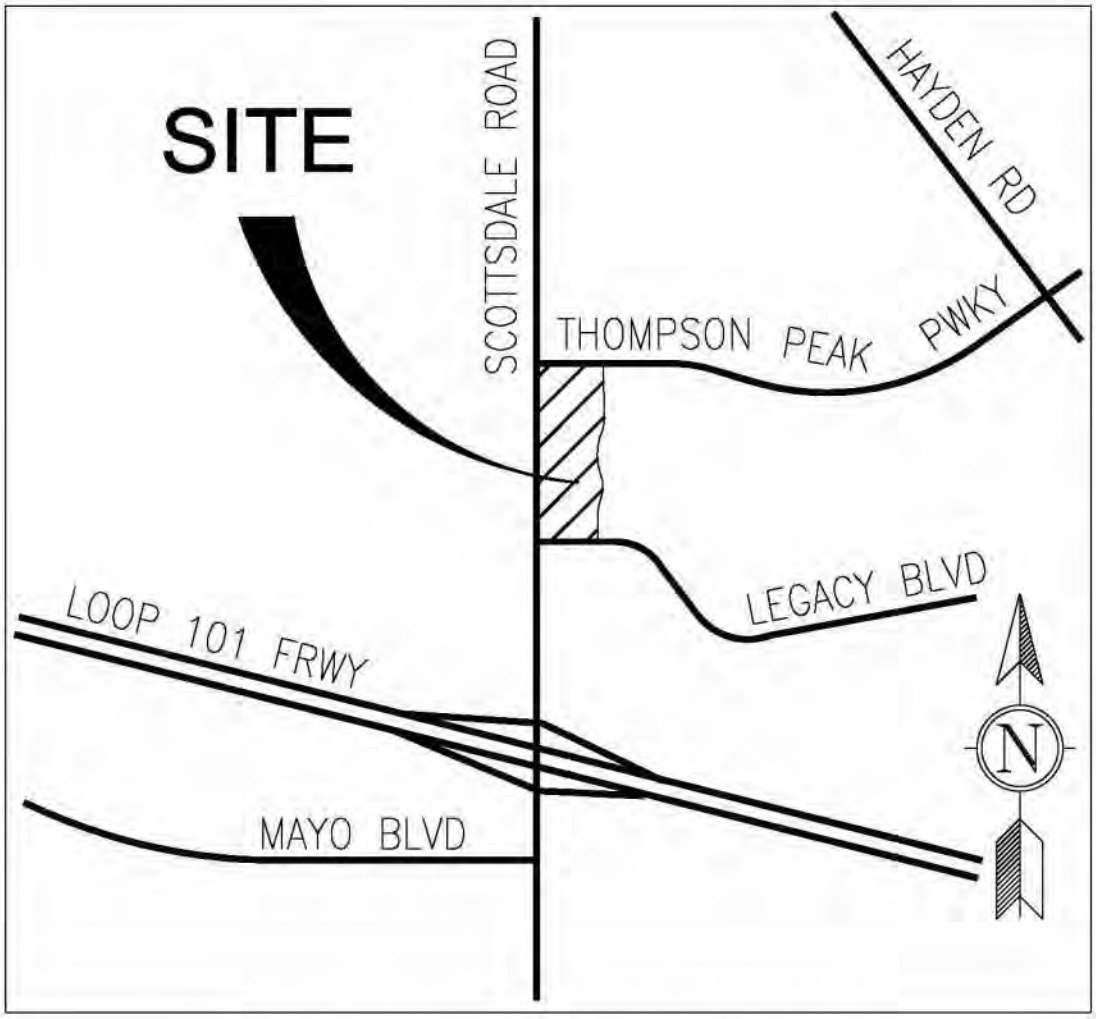
This site is currently located within a Zone "AO" designation as identified on Flood Insurance Rate Map (FIRM) panel number 1320L (Maricopa County) dated October 16, 2013 from the Federal Emergency Management Agency (FEMA) and labeled "Zone AO, Depth 1', Velocity 3 FPS". Zone AO is described as, "Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined." Refer to the FIRM in Appendix E.

The proposed lowest habitable finished floors will be set a minimum of 2 feet above the highest existing natural adjacent grade elevation on the upstream side of each building or structure. Earthen fill will be incorporated to provide the correct elevation for finished floor protection. Underground parking structures will also be flood proofed to 2 feet above the highest adjacent existing ground elevation along with any entry points into the parking structure. Refer to the FEMA Structure Exhibit in Appendix E and the Highest Adjacent Grade Exhibit (HAG) at the back of this report. This exhibit shows the anticipated finished floor elevations for each proposed building envelope for this development. The topographic base map was compiled in the pre-development existing condition and the datum is on current City of Scottsdale and Maricopa County standards and is reflected on the exhibit. All buildings will be structurally independent and will be flood-proofed to 2 feet above highest adjacent natural grade within the regulatory floodplain Zone AO – Depth=1 foot.

Drainage flow paths and storm drain pipe will be provided around the exterior of the buildings that will allow storm water to flow around the buildings and through the parking lots. Drainage/Pedestrian easements will be dedicated over the exterior drainage swales/culverts/pedestrian paths and on a proposed storm drain that conveys flows from the TDI Phase I project across the site to the west swale

along the east side of Scottsdale Road. Refer to the Drainage Easement Exhibit at the back of this report for locations and approximate widths.

The low lot outfall on the site is 1635.17 at the southwest corner of the site on Scottsdale Road. Lowest finished floors range from 1665.80 on the north to 1644.90 on the southwest. Currently, the site is unimproved with desert vegetation. The site generally slopes form the northeast to the southwest at approximately 1.5%.



VICINITY MAP

N.T.S.

2.0 OFFSITE DRAINAGE AND EXISTING IMPROVEMENTS

Offsite Drainage

The offsite drainage analysis was prepared by Wood, Patel & Associates, Inc., in the "One Scottsdale Master Drainage Plan", revised June 20, 2013. Pre- and Post-development 100-year, 6-hour discharges were computed in a HEC-1 models prepared with that report. Future build-out of the development was taken into account within that model. Two additional reports, "Final Drainage Report for One Scottsdale PU III Infrastructure Improvements"(PUIII), prepared by Bowman Consulting, dated July 23, 2012; and "Drainage Report for TDI at One Scottsdale, Phase I"(TDII), prepared by Wood/Patel, dated May 17, 2012. Flo-2D data was also used to analyze offsite drainage. It was calculated that there is 489 cfs at the intersection of Thompson Peak and 73rd Street. This section was analyzed using HY8 and the report is included in Appendix F.

Both of these reports addressed offsite flows that will impact the One Scottsdale Commercial site. The following table identifies the major 100-year, 6-hour post-development flows and locations where they enter or exit the site.

Existing Offsite Flows from Master Drainage HEC-1 Model/Flo 2D

Location	Structure	HEC-1 ID (WP Master Report)	100-Year Q, cfs (Post Developed)	Flo 2D (Post Developed)
Thompson Peak Parkway (just east of Scottsdale Road)	3-36" RGRCP	CPOFF3	138 (enter)	
73rd Street (just south of Thompson Peak Parkway)	3-36" RGRCP	33A.1	11 (enter)	489 (enter)
73rd Street (660' south of Thompson Peak Parkway	36" RGRCP	33A.2	34 (enter)	
Scottsdale Road(north of Legacy Drive-Convey Flows Southwest)	8'x4'RCBC	33A3	226 (exit)	

Existing Offsite Flows from TDI and PU III

Location	Structure	Report	100-Year Q, cfs (Post Developed)	100-Year Q, cfs (Post Developed) Flo 2D
73rd Street (just south of Thompson Peak Parkway)	3-36" RGRCP	PU III	119.4	489
73rd Street (660' south of Thompson Peak Parkway	36" RGRCP	TDII	45.4	N/A

Excerpts from the "One Scottsdale Master Drainage Plan", "Drainage Report for TDI at One Scottsdale-Phase I", and Final Drainage Report for One Scottsdale PU II Infrastructure improvements are included in Appendix G to verify the above flows.

The 3-36" culverts that cross 73rd Street were sized based on the PU III project. The City of Scottsdale directed Bowman Consultants to account for 119.4 cfs within a 30' drainage swale and the culverts were sized accordingly to convey this flow to the west. Since then, Westwood has been studying this area using Flo 2D data. It was determined that there is 489 cfs in this cross section. This section has been analyzed using HY8 and the results and shown in Appendix F.

The TDII report shows flows were collected from within the north portion of the apartment complex and conveyed to a 36" outlet storm drain that crosses 73rd Street onto the One Scottsdale site.

There are a number of curb openings located along 73rd Street that take the entire street section flows into the project site and are conveyed southwesterly across the site to the existing wash along the east side of Scottsdale Road. Curb openings on Scottsdale Road drain the half street section of Scottsdale

Road itself directly into the adjacent wash. These flows are then conveyed south to the existing 8' x 4' box culvert that crosses Scottsdale Road to the southwest.

A scupper is located on Thompson Peak Parkway (just west of 73rd Street) and directs flow into an existing swale on the south side of the road. Catch basins are located on the north and south side of Thompson Peak Parkway, just east of Scottsdale Road, and tie into the existing pipe crossing of Thompson Peak Parkway. The 3-36" RGRCP collect flows from the north of Thompson Peak Parkway and convey them to the wash located on the site just east of Scottsdale Road.

Catch basins are also located on Legacy Boulevard just east of Scottsdale Road and tie directly to the existing 8' x 4' box culvert. The 8'x4' box culvert collects flows and directs them southwest across Scottsdale Road to an existing wash. Refer to the Drainage Exhibit in the envelope at the back of this report for locations of existing drainage structures.

3.0 PROPOSED DRAINAGE AND INFRASTRUCTURE IMPROVEMENTS

A number of drainage improvements are anticipated with this project and consist of the following:

- A combination of wash and 4-36" HDPE pipe culverts with drop inlet structures along the east side of Scottsdale Road.
- New catch basins at three locations along Scottsdale Road connecting to adjacent culvert crossings. Existing catch basin north of Legacy Boulevard will remain.
- New catch basin on Thompson Peak Parkway west of 73rd Street connecting to a proposed 3-36" storm drain onsite. This will replace the existing scupper at that location.
- Detention basins and swale along the southern end of 73rd Street.
- 3-36" HDPE Storm drain pipe and swale along the south side of Thompson Peak Parkway to convey 489 cfs to the west.
- 24" HDPE Storm drain pipe and swale along the north side of Legacy Boulevard to convey flows to the west.

- Catch basins and 15”-42” HDPE pipe within the northern portion of the development to drain parking lot, buildings, northern portion of 73rd Street, and offsite flow from TDI Phase I.
- Catch basins and 15”-42” HDPE pipe within the future southern portion of the development.
- Existing Curb cuts and grouted native riprap spillways to drain the roadway drainage areas along 73rd Street and Scottsdale Road.
- Grouted native indigenous stone to protect the berm face, spillways, and culvert or storm drain inflow and outflow points.

These drainage infrastructure items are incorporated to provide an overall drainage design that will help to protect the One Scottsdale project during the 100-year storm event. Finished floors will be elevated a minimum of 2 feet above the highest adjacent existing natural grade for each building and a minimum of 1 foot will maintained from proposed grades to protect the buildings within the FEMA Zone AO floodplain. Underground parking structures will be flood proofed to the same standards and will withstand hydrostatic pressures and buoyancy effects. Structural calculations will be submitted with the final improvement plans to justify the design.

Hydrology

The Flood Control District of Maricopa County DDMS computer program was used to calculate 100-year peak flows for each subbasin area. Preliminary hydrology calculations were performed utilizing the Rational Method with a weighted runoff coefficient. Onsite storm drain sizing utilizes peak flows added directly to each subsequent downstream drainage area with no adjustment for time of concentration or routing storage. The conservative approach was used at this time to adequately size preliminary storm drain capacities onsite. A more detailed analysis will be performed with the final drainage report to assure that drainage infrastructure is sized correctly.

Culvert crossing peak flows utilized the rational method with overall combined drainage areas for each subsequent downstream watershed. This provides a more reasonable solution based on increased times of concentration for the larger overall contributing watershed to that specific point of concentration.

These flows also conform closely to the Master Report HEC-1 analysis peak flows for sizing the downstream infrastructure.

Hydrology calculations are located in Appendix C and a summary table of peak flows is included on the Drainage Exhibit located in an envelope at the back of this report.

Hydraulics

Catch basins will consist of MAG Std. Det. 535 Type F or MAG Std. Det. 537 type G. At a depth of 0.5', these catch basins can intercept 7.7 cfs and 6.1 cfs respectively with a 50% clogging factor applied. Subbasin drainage areas will be smaller than the capacities of these catch basins and may have break over depths less than 0.5'. This will be determined during final design. Catch basins on Scottsdale Road will be sized based on half street flows and will generally be the size of the existing curb opening located there. A typical calculation for onsite catch basin capacity is located in Appendix D.

The culvert capacities along Scottsdale Road were calculated using the Federal Highway Administration HY-8 computer program. Drop inlet headwalls are utilized at each crossing to keep the wash slope and erosive velocities within reasonable parameters and to provide cover under the driveways. A small sediment basin will be incorporated at the lip of the drop structure to help settle out sand and small rocks that typically occur within these types of washes. Refer to calculations in Appendix D.

Grouted riprap will also be utilized at inflow and out flow locations to help prevent erosion in those areas. Riprap sizing and lengths will be calculated within the Final Drainage Report. A multi-use trail will meander through the bottom of the wash and will incorporate stabilized decomposed granite along with a turndown edge and riprap along the exterior to help prevent erosion within the wash itself.

Storm drain pipe were sized based on the addition of contributing subbasin areas downstream.

Hydraulic Toolbox 4.1, also provided by the Federal Highway Administration, was utilized to size storm drain throughout the project. This program does not analyze pressure flow conduit and the storm drains were sized only using normal depth which is somewhat conservative at this preliminary design stage. A detailed analysis will be performed with approved backwater analysis during the preparation of final plans and the final drainage report.

Refer to the Drainage Exhibit at the back of this report for locations of the drainage infrastructure and to Appendix D calculations. Roof leaders will connect to storm drain onsite and will be sized during final design. Drops may be incorporated at manhole or catch basin locations due to the natural steep nature of the site. This will help to reduce slopes and velocities within the system. Final hydraulic grade line calculations and profiles will be performed with final design as well. Pipe sizing was initially based on an estimated 1.0% slope for each run.

Wash and swales capacities were computed with Hydraulic Toolbox 4.1. This includes the main wash along Scottsdale Road and smaller swales on the east side. Cross section locations, water surface elevations, and limits of inundation are shown on the Drainage Exhibit and calculations are included in Appendix D. Velocities are generally in the 5 fps range to keep with the non-erosive velocity regime. Small sediment basins at the drop inlets will also help to keep channel inverts stabilized. Swales on the north and south side of the project are typically more of a catchment area design and stormwater will be collected in catch basins or small swales and conveyed to the west or south. These are small subbasins and will not covey any significant flow. Inflow areas to the main west wash will still require rock rip rap to prevent head cutting into the upstream swale area that will have higher elevations than the bottom of the wash.

404 Discussion

A 404 jurisdictional delineation was previously performed on the entire Scottsdale One project, referred to as Stack 40. A letter was received from the U.S. Army Corps of Engineers dated February 5th, 2002 and states that no Section 404 permit is required due to flows being cut off by the Grayhawk

development. A copy of the Section 404 Certification for this project and the Corps letter is included in Appendix B

Water Quality Requirements /NOI Discussion

Any disturbed area over 1.0 acres will require a Notice of Intent (NOI) Certification from the Arizona Department of Environmental Quality prior to construction. An AZCON number will be acquired and provided to the City of Scottsdale during the Improvement Plans submittal process. A Storm Water Pollution Prevention Plan (SWPPP) and Report will be prepared to address erosion and water quality issues both pre- and post-construction and will be implemented by the contractor during construction to minimize erosion and sediment runoff during the design storm event. In addition, a Maricopa County Dust Control Permit will need to be obtained prior to any construction. Street sweeping for construction track-out will be addressed in the SWPPP Report as well.

Temporary Parking Garage Excavation Discussion

The parking garage for Phase I will include the west half of the full structure including underground parking. The east side will be excavated to depth and left open in the interim condition. A wall on the north and side will be built and an earthen berm will be constructed to an elevation of 1666.00 to flood proof the open excavation. A 6' interim fence will be placed around the perimeter of this temporary excavation. The maximum slope into the excavation will be a 2:1 slope to a collection area/temporary detention basin below the bottom of the bottom floor elevation of 1644.66. This area will be sloped from north to south and a temporary sump will be installed to dewater this area after storm events. A rip rap spillway and curb opening will allow pumped volumes to discharge onto the pavement/drive area south of the garage. The volume required for a 100-year, 2-hour storm event is as follows: $V = (2.32/12) \times 0.45 \times 35{,}406 = 3{,}080$ CF.

The volume provided at the bottom of the excavation with a bottom elevation average approximately 1642.5 and a high water of 1644.5 provides approximately 5,000 cf. This will provide ample freeboard even for storms above the 100-year, 2-hour event. Refer to the Phase I Concept Grading and Drainage

Exhibit at the back of this report for grading specifics in this area.

4.0 CONCLUSIONS

The One Scottsdale commercial project will be designed in accordance with the approved "One Scottsdale Master Drainage Plan", prepared by Wood/Patel dated June 20, 2013, the "Drainage Report for TDI at One Scottsdale, Phase I dated May 17, 2012, prepared by Wood/Patel, and the "Final Drainage Report for One Scottsdale PU III Infrastructure Improvements" (PUIII), prepared by Bowman Consulting, dated July 23, 2012.

The intent of the drainage design for this project is to provide protection for buildings in a Zone "AO" floodplain, depth = 1', velocity = 3 fps. The lowest habitable finished floor of the buildings will be set at a minimum of 2 foot above the highest adjacent existing grades. Entry points for the underground parking will also be elevated/flood proofed to this elevation for each structure that has underground parking incorporated within the footprint.

100-year flows will be directed around the exterior of the project in swales, washes, culvert crossings and storm drain pipe. Interior flows will be conveyed away from the edges of the building to parking lots and drive lanes that will collect flows in catch basins and storm drain pipe and convey them to the low lot outfall elevation of 1635.17 at the southwest corner of the site where an existing 8' x 4' box culvert conveys flows southwest across Scottsdale Road.

Culverts with drop inlet structures will be constructed along the west wash at driveway locations and at constricted areas. An 8' multi-use path and 8' sidewalk will be implemented within this corridor and stabilized granite and riprap along the side of the path will be incorporated to reduce erosion of this multi-use trail amenity. Drainage easements will be required on any wash or storm drain conveying more the 50 cfs. Easements for storm drains will be determined based on size and depth of the storm drain. Overlapping drainage and public utility easements may occur in certain instances and will overlap.

The lowest finished floors range from 1666.0 on the north to 1644.3 on the southwest. Curb openings with native stone riprap spillways or catch basins will be provided at locations around the perimeter of the project to accept adjacent half street flows.

No detention or retention is required on this site as prior improvements have been constructed and an in-lieu fee contribution has been paid to the City of Scottsdale. First flush will be handled using an existing on-site basin in the interim, and Contech Vortex structures in the ultimate condition. A 404 jurisdictional delineation has previously been performed on the overall project and no 404 washes are present. Water quality and sediment reduction will be addressed with final design construction documents.

APPENDIX A – STORMWATER STORAGE WAIVER AND CORRESPONDENCE

November 28, 2011

Mr. Ashley Couch, P.E.
Stormwater Planning Director
City of Scottsdale
7447 East Indian School Road
Suite 205
Scottsdale, AZ 85251

Phone: (480) 312-4317
Email: acouch@scottsdaleaz.gov

Re: One Scottsdale Regional Drainage Channel
WP# 073022, 113713.02

This letter is prepared by Wood, Patel & Associates Inc. (Wood/Patel) under contract to One Scottsdale Holdings, LLC for civil engineering services related to One Scottsdale, a 160-acre mixed use project. This letter is in response to a request by your office to communicate a professional opinion of any potential impacts to the approved watershed for One Scottsdale and its approved contract documents and drainage reports. Specifically, this letter provides an overview of the writer's belief of lack of substantial changes in the watershed pertaining to the Final Drainage Report for Interim Regional Drainage Channel dated October 1, 2008 which has been reviewed and approved by the City of Scottsdale (C.O.S. Plan Check # 1672-08-1).

The following items or matters are noted or observed:

- It is assumed all new projects and public infrastructure completed within the watershed were subject to City of Scottsdale drainage regulations and policies, therefore historic watershed boundaries did not change and drainage discharges were not increased.

- A review of aerial maps dated 2008 when compared to maps dated 2010 displayed a limited number of new projects in the watershed, none of which are believed to cause watershed boundary changes or create higher peak discharges.

I hereby certify that to the best of my knowledge and based on my understanding of the items disclosed above that the watershed is in substantial conformance to the watershed referenced in the Wood/Patel 2008 report.

Sincerely,

Wood, Patel & Associates, Inc.

Darrel E. Wood, P.E., R.L.S.
Principal

DEW/xxx

CC: Jill Kusy Hegardt

C:\Users\SAudsley\Desktop\One Scottsdale Regional Drainage Channel.doc

Stormwater Management

7447 E. Indian School Road, Suite 125
Scottsdale, AZ 85251

PHONE 480-312-2500
FAX 480-312-7781
WEB www.ScottsdaleAZ.gov

June 5, 2013

Via Electronic Mail: jhegardt@dmbinc.com

Attention: Jill Kusy Hegardt, Vice President of Entitlements, DMB Associates, Inc.

Subject: Permanency of Stormwater Storage Waiver for One Scottsdale

Dear Ms. Kusy-Hegardt:

Pursuant to your request, I am writing to document that the regional drainage improvements along the east side of Scottsdale Road, from Mayo Boulevard to approximately 375 feet north of the centerline of Princess Boulevard, have been completed. This work has received a passing final inspection by the city. Therefore, the conditions that justify the approved partial stormwater storage waiver shown in the attached exhibit have been satisfied. Provided that development in One Scottsdale proceeds consistent with the latest approved stormwater master plan for One Scottsdale, no additional stormwater storage will be required. The city's approval of the attached waiver will not expire.

The city's agreement with DMB Associates, Inc., and the Arizona State Land Department regarding this matter is attached for reference.

Please let me know if I can be of further assistance.

Best regards,

C. Ashley Couch

C. Ashley Couch, PE, CFM
Stormwater Manager and Floodplain Administrator

CAC/cac

c: Kroy Ekblaw, Executive Assistant for Strategic Projects
Derek Earle, Acting Public Works Director
Randy Grant, Planning, Neighborhood, and Transportation Administrator
Michael Clack, Director of Development Services
Joe Padilla, Senior Assistant City Attorney
Mohammad Rahman, Senior Stormwater Engineer

Attachments: Approved Stormwater Storage Waiver for One Scottsdale
City's agreement with DMB Associates, Inc., and ASLD regarding construction of a regional drainage conveyance facility

Ref 6787-06-17 ASLD

Request for Stormwater Storage Waiver

City of Scottsdale Case Numbers: 1187-08-4

55 - PA - 2008 19 - ZN - 2007 ___ - UP - ___ ___ - DR - ___ ___ - PP - ___ PC# ___

The applicant/developer must complete and submit this form to the city for processing and obtain approval of waiver request ***before submitting improvement plans***. Denial of the waiver may require the developer to submit a revised site plan to the Development Review Board.

Date 1.5.12 Project Name ONE SCOTTSDALE

Project Location H&C S.R.101 + Scottsdale Rd.

Applicant Contact Darrel Wood Company Name WOOD/PATEL

Phone 602.335.8500 Fax ~ E-mail dwood@woodpatel.com

Address 2051 W. Northern PHX AZ 85021

Waiver Criteria

A project must meet at least one of four criteria listed below for the city to consider waiving some or all required stormwater storage. **However, regardless of the criteria, a waiver will only be granted if the applicant can demonstrate that the effect of a waiver will not increase the potential for flooding on any property.** Check the applicable box and provide a signed engineering report and supporting engineering analysis that demonstrate the project meets the criteria and that the effect of a waiver will not increase the potential for flooding on any property.

If the runoff for the project has been included in a storage facility at another location, the applicant must demonstrate that the stormwater storage facility was specifically designed to accommodate runoff from the subject property and that the runoff will be conveyed to this location through an adequately designed conveyance facility.

- [X] 1. The development is adjacent to a watercourse or channel that an engineering analysis shows is designed and constructed to handle the additional runoff. (will be)
- [ ] 2. The development is on a parcel less than one-half acre in size.
- [ ] 3. Stormwater storage requirements conflict with requirements of the Environmentally Sensitive Lands Ordinance (ESLO). A conflict with ESLO is limited to:
  - Property located in the hillside landform as defined in the city Zoning Ordinance.
  - Property where more than thirty-five (35) percent is covered by required natural area open space as defined in the city Zoning Ordinance.
- [ ] 4. The project is located within the Downtown Area as delineated by the Figure 1 below.

By signing below, I certify that the stated project meets the waiver criteria selected above as demonstrated by the attached documentation.

Engineer Darrel S. Wood Date 1.5.12

Planning, Neighborhood & Transportation Division
7447 E Indian School Road, Suite 105, Scottsdale, AZ 85251 • Phone: 480-312-7000 • Fax: 480-312-7088

Request for Stormwater Storage Waiver

City of Scottsdale Case Numbers:

___ - PA - ___ ___ - ZN - ___ ___ - UP - ___ ___ - DR - ___ ___ - PP - ___ PC# 1672-08-4

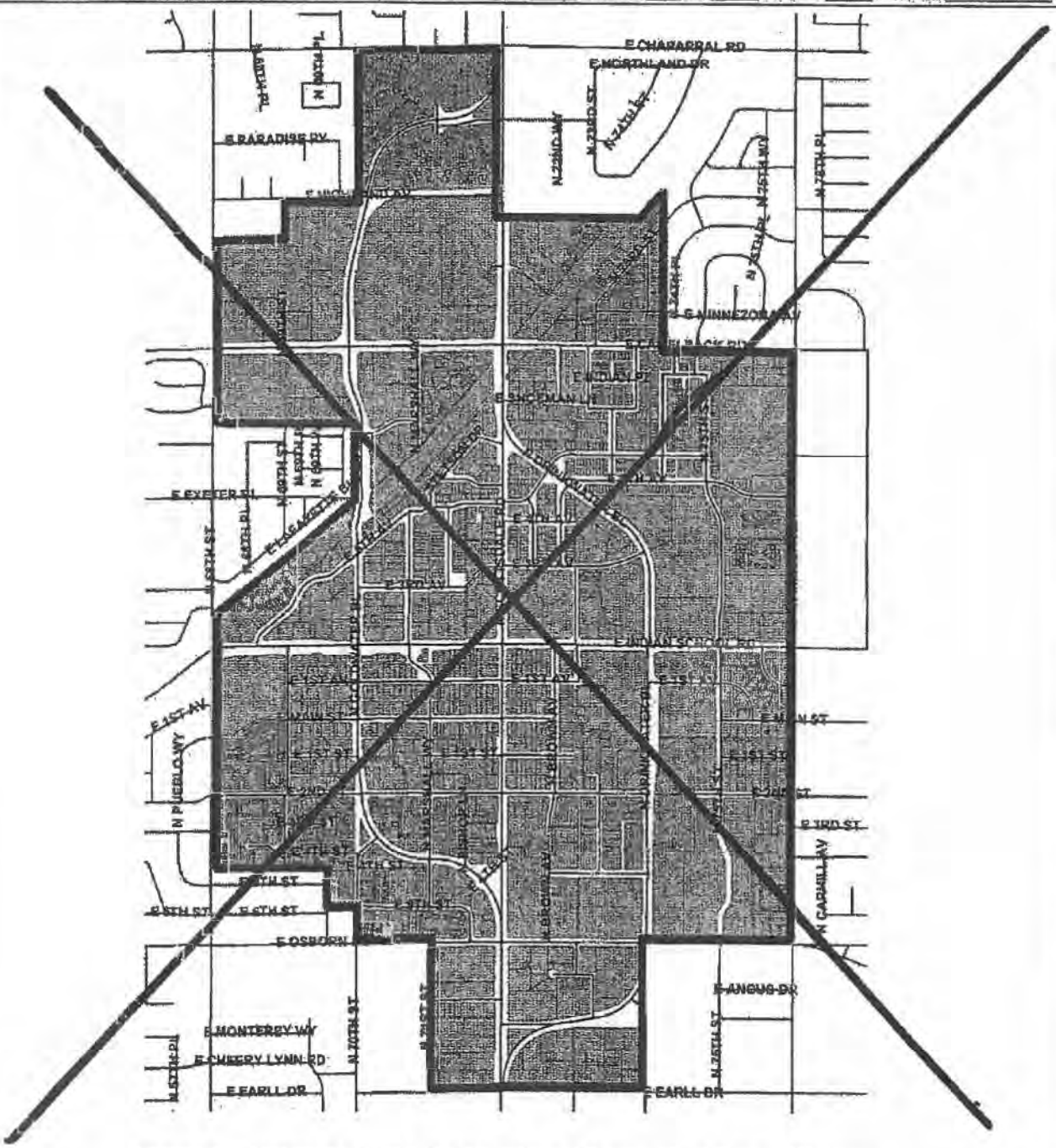


Figure 1. Designated Area for Downtown Stormwater Storage Waivers

Planning, Neighborhood & Transportation Division

7447 E Indian School Road, Suite 105, Scottsdale, AZ 85251 • Phone: 480-312-7000 • Fax: 480-312-7088

Request for Stormwater Storage Waiver

City of Scottsdale Case Numbers: 1172.08.4

___ - PA - ___ ___ - ZN - ___ ___ - UP - ___ ___ - DR - ___ ___ - PP - ___ PC#_____

CITY STAFF TO COMPLETE THIS PAGE

Project Name ONE SCOTTSDALE

Check Appropriate Boxes:

☑ Meets waiver criteria (specify): ☑1 ☐2 ☐3 ☐4

☑ Recommend approve waiver.

☐ Recommend deny waiver:
- ☐ None of waiver criteria met.
- ☐ Downstream conditions prohibit waiver of any storage.
- ☐ Other:

Explain: _____

☐ Return waiver request:
- ☐ Insufficient data provided.
- ☐ Other: _____

Explain: _____

Recommended Conditions of Waiver:
- ☐ All storage requirements waived.
- ☐ Pre development conditions must be maintained.
- ☑ Other:

Explain: please see attachment.

☑ **Waiver approved per above conditions.**

☐ **Waiver denied.**

C. Ashley Caverly — 1/31/2012

Floodplain Administrator or Designee — Date

Planning, Neighborhood & Transportation Division
7447 E Indian School Road, Suite 105, Scottsdale, AZ 85251 • Phone: 480-312-7000 • Fax: 480-312-7088

Request for Stormwater Storage Waiver

City of Scottsdale Case Numbers: 1672-08-4

___ - PA - ___ ___ - ZN - ___ ___ - UP - ___ ___ - DR - ___ ___ - PP - ___ PC# ___

In-Lieu Fee and In-Kind Contributions

If the city grants a waiver, the developer is required to calculate and contribute an in-lieu fee based on what it would cost the city to provide the waived storage volume, including costs such as land acquisition, construction, landscaping, design, construction management, and maintenance over a 75-year design life. The fee for this cost is $3.22 per cubic foot of stormwater storage waived. This unit cost will be updated annually, but the city reserves the right to revise the unit cost at any time.

The Floodplain Administrator considers in-kind contributions on a case-by-case basis. An in-kind contribution can serve as part of or instead of the calculated in-lieu fee. In-kind contributions must be stormwater related and must constitute a public benefit. In-lieu fees and in-kind contributions are subject to the approval of the Floodplain Administrator or designee.

Project Name ONE SCOTTSDALE

The waived stormwater storage volume is calculated as follows:

V = CRA; where
V = stormwater storage volume required, in cubic feet,
C = weighted average runoff coefficient over disturbed area,
R = 100-year/2-hour precipitation depth, in feet (DSPM, Appendix 4-1D, page 11), and
A = area of disturbed ground, in square feet

Furthermore,

$V_w = V - V_p$; where
V_w = volume waived,
V = volume required, and
V_p = volume provided

C = ___
A = ___
V = 12.6 Ac FT
V_p = 8.3 Ac FT
V_w = 8.3 Ac FT

___ An in-lieu fee will be paid, based on the following calculations and supporting documentation:
in-lieu fee ($) = V_w (cu. ft.) x $3.22 per cubic foot = $2,126,390.

X An in-kind contribution will be made, as follows:
See Attachment dated Jan 4, 2012
documenting regional drainage costs of $3,300,000.

___ No In-Lieu Fee is required. Reason:

Approved by: C Ashley Couch 1/31/2012

Floodplain Administrator or Designee — Date

Planning, Neighborhood and Transportation Division
7447 E Indian School Road, Suite 105, Scottsdale, AZ 85251 • Phone: 480-312-7000 • Fax: 480-312-7088

Prepared by Wood, Patel & Associates, Inc. January 4, 2012
WP#113713.02

Attachment to Stormwater Storage Wavier
Regional Drainage Solution

This project completes the City of Scottsdale's regional drainage improvements initially constructed a few years ago beginning at the south side of ADOT State Route 101 (just east of Scottsdale Road) and ending just south of Union Hills Road (east of Scottsdale Road). Specifically this project extends a drainage channel along Union Hills Drive and Scottsdale Road; to regional flood control improvements just north of Princess Drive (see Exhibit 1). Drainage will be conveyed to its historic location which is the north side of U.S. Bureau's Central Arizona Project (C.A.P.). Completion of the regional drainage system increases public health and safety with regard to potential regional drainage issues and serves Scottsdale Road, as well, affords reduced detention requirements for two parcels. The ASLD Core South parcel benefits by having 32.5 acres not require onsite detention, the One Scottsdale project benefits by having an outlet thus allowing its detention requirements to be reduced. The privately funded regional drainage solution completes the regional drainage solution for the area and becomes a valuable asset to the residents and businesses in the community at large. .

The land area designated for the extension of the drainage channel on the Core South parcel could become the permanent location or the drainage channel could be relocated to another portion of Core South during the land planning process for the parcel. Accordingly, it is anticipated that at the time of disposition of the Core South parcel, a City of Scottsdale drainage easement will be retained for the permanent location of the drainage channel.

- Summary:

Total Cost Value
To Complete Regional Drainage Improvements = $2,300,000 [1]

COS In Lieu Fee = $2,126,390 [2]

[1] Design Costs: $200,000
Channel Construction Cost: $500,000
Land Easement Value $1,600,000
$2,300,000

[2] 15.16 acre ft, (reduced detention) x $3.22/cu ft. = $2,126,390
Of the 15.16 acre ft of detention being waived; 6.86 ac ft applies to ASLD's 32.5 acres (Exhibit 1) and 8.3 ac ft applies to One Scottsdale. (8.3 + 6.86 = 15.16 ac ft)

DMB

A PASSION FOR GREAT PLACES

January 30, 2012

Mr. Darrel Wood
Wood/Patel
2051 West Northern
Phoenix, AZ 85021

RE: One Scottsdale – Regional Drainage Channel

Dear Darrel:

This letter is in response to your request for information regarding the drainage channel construction estimate submitted as part of the regional drainage channel storm water waiver.

As you know, in late spring of 2011, the potential buyer of the State Land parcel obtained estimates from 5 different construction companies for the cost of the work shown on the approved regional drainage channel drawings prepared by your firm. The information provided to DMB wasn't acceptable to us, but did result in several estimates near the $500,000 amount.

Since the information provided by the potential buyer was the estimated cost of the channel, DMB assembled a complete bid package to determine the cost of the work. The package was delivered in May of 2011 to the following qualified bidders:

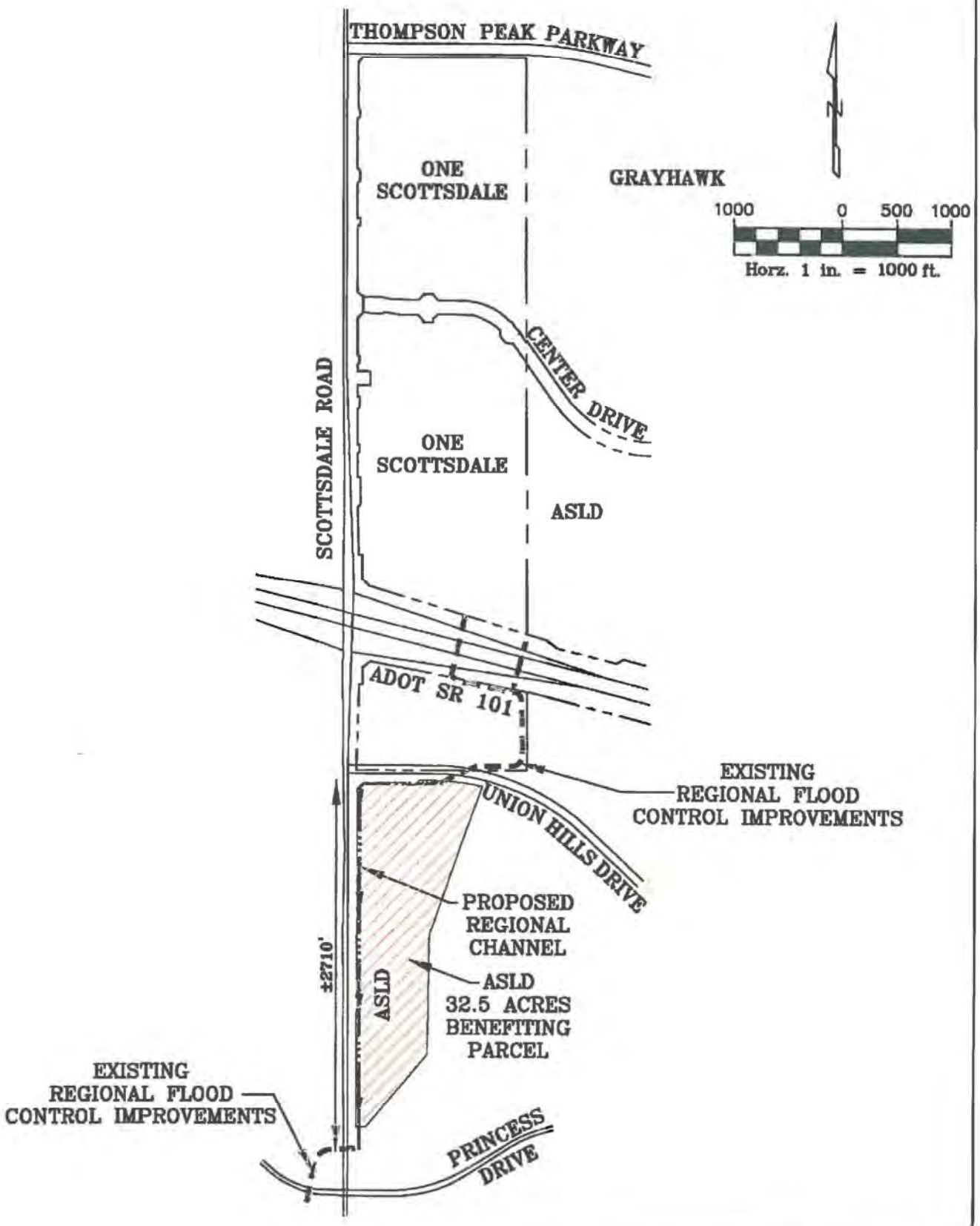
Achen Gardner
Hunter
Markham
DCS Contracting

The analysis of the bids resulted in four qualified bids with total costs between $413,083.75 and $643,935.90. Based estimates and bids indicating a construction cost of less than $500,000, DMB, the City of Scottsdale and the State Land Department agreed on a maximum contribution from DMB towards the construction of the channel at $500,000.

Hopefully, this letter will serve to provide you with the back-up support for the construction costs of the channel requested by the City. Let us know if you required additional information.

Very truly yours,

Michael F. Burke
Vice President of Development
DMB Associates, Inc,
Manager of One Scottsdale Holdings, LLC



S:\2007\072228\Dwg\Exhibits\Proposed Reg Drainage Solution-1.dwg

EXHIBIT 1

PROPOSED REGIONAL DRAINAGE SOLUTION	WOOD/PATEL
JOB #: 113713.02 | DATE: 01/03/12	

APPENDIX B – 404 CERTIFICATION AND LETTER

Section 404 Certification

Before the City issues development permits for a project, the developer's Engineer or the property owner must certify that it complies with, or is exempt from, Section 404 of the Clean Water Act of the United States. Section 404, administered by the U.S. Army Corps of Engineers (COE), regulates the discharge of dredged or fill material into a wetland, lake, (including dry lakes), river, stream (including intermittent streams, ephemeral washes, and arroyos), or other waters of the United States.

Prior to submittal of improvement plans to Project Review the form below must be completed (and submitted with the improvement plans) as evidence of compliance

Certification of Section 404 Permit Status

Owner's Name: Ryan Companies U.S., Inc. Phone No. 602-322-6100

Project Name/Description: One Scottsdale Plan Check No.

Project Location/Address: SE Corner Intersection Scottsdale Road & Thompson Peak Parkway

A registered Engineer or the property Owner must check the applicable condition and certify by signing below that:

1. **Section 404 <u>does</u> apply to the project because there will be a discharge of dredged or fill material to waters of the U.S., and:**

   ☐ A Section 404 Permit has already been obtained for this project.

   -or-

   ☐ This project qualifies for a "Nationwide Permit," and this project will meet all terms and conditions of the applicable nationwide permit.

2. **Section 404 <u>does not</u> apply to the project because:**

   ☐ No watercourses or other waters of the U.S. exist on the property.

   ☒ No jurisdictional waters of the U.S. exist on the property. Attached is a copy of the COE's Jurisdictional Determination.

   ☐ Watercourses or other waters of the U.S. do exist on the property, but the project will not involve the discharge of dredged or fill material into any of these waters.

I certify that the above statement is true.

Engineer's Signature and Seal, or Owner's Signature

Registered Professional Engineer (Civil) CERTIFICATE NO. 23980 JEFFREY S. ERICKSON DATE SIGNED 11.19.15 ARIZONA U.S.A. Expires 9/30/2017

11.19.15
Date

Planning & Development Services Department
7447 E Indian School Road, Suite 100, Scottsdale, AZ 85251 • Phone: 480-312-2500 • Fax: 480-312-7088

DEPARTMENT OF THE ARMY
LOS ANGELES DISTRICT, CORPS OF ENGINEERS
ARIZONA-NEVADA AREA OFFICE
3636 NORTH CENTRAL AVENUE, SUITE 760
PHOENIX, ARIZONA 85012-1936

REPLY TO
Office of the Chief
Regulatory Branch

February 5, 2002

Corrigan Real Estate Investment LLC
and Corrigan Land & Livestock Limited Partnership
C/O Robert D. Anderson
Withey, Anderson & Morris
3101 North Central Avenue, Suite 1690
Phoenix, Arizona 85012-2615

File Number: 2002-00484-RWF

Dear Mr. Anderson:

Reference is made to your letter of July 5, 2001 and the accompanying information provided by Wood, Patel & Associates in which you inquired as to whether or not a Clean Water Act Section 404 permit is required from the U.S. Army Corps of Engineers to construct a commercial development within a 160 acre parcel (Stack 40) situated along Scottsdale Road, north of the Central Arizona Project aqueduct at (Section 26, T4N, R4E), Scottsdale, Maricopa County, Arizona.

We have reviewed our records and have determined that the waters of the United States that historically transversed the subject property have been impacted and redirected by the construction of the GrayHawk development. The washes observed on the Stack 40 parcel are remnants of watercourses that no longer receive upstream flows. Since there are no longer any waters of the United States within the Stack 40 proposed project area, no Section 404 permit is required from our office.

The receipt of your application and/or letter is appreciated. If you have questions, please contact Ron Fowler at (602) 640-5385 x 226.

Sincerely,

Cindy Lester

Cindy Lester
Chief, Arizona Section
Regulatory Branch

Enclosure

EXHIBIT 2

APPENDIX C – HYDROLOGY CALCULATIONS

NOAA Atlas 14, Volume 1, Version 5
Location name: Scottsdale, Arizona, USA*
Latitude: 33.6672°, Longitude: -111.9242°
Elevation: 1651.8 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic, Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao, Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches/hour)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**2.38** (1.97-2.90)	**3.10** (2.59-3.79)	**4.18** (3.46-5.11)	**5.00** (4.13-6.11)	**6.13** (4.97-7.44)	**6.98** (5.59-8.41)	**7.86** (6.18-9.46)	**8.74** (6.77-10.5)	**9.92** (7.49-11.9)	**10.8** (8.00-13.1)
10-min	**1.81** (1.50-2.21)	**2.35** (1.97-2.89)	**3.18** (2.63-3.89)	**3.81** (3.14-4.64)	**4.66** (3.78-5.66)	**5.32** (4.25-6.40)	**5.98** (4.70-7.19)	**6.65** (5.15-7.99)	**7.55** (5.69-9.08)	**8.24** (6.09-9.93)
15-min	**1.49** (1.24-1.83)	**1.94** (1.63-2.39)	**2.63** (2.18-3.21)	**3.15** (2.59-3.84)	**3.85** (3.12-4.68)	**4.39** (3.52-5.29)	**4.94** (3.89-5.95)	**5.50** (4.25-6.60)	**6.24** (4.70-7.51)	**6.81** (5.03-8.21)
30-min	**1.00** (0.834-1.23)	**1.31** (1.10-1.61)	**1.77** (1.46-2.16)	**2.12** (1.75-2.58)	**2.59** (2.10-3.15)	**2.96** (2.37-3.56)	**3.33** (2.62-4.00)	**3.70** (2.86-4.45)	**4.20** (3.17-5.06)	**4.58** (3.39-5.53)
60-min	**0.621** (0.516-0.761)	**0.811** (0.678-0.995)	**1.09** (0.906-1.34)	**1.31** (1.08-1.60)	**1.61** (1.30-1.95)	**1.83** (1.47-2.21)	**2.06** (1.62-2.48)	**2.29** (1.77-2.75)	**2.60** (1.96-3.13)	**2.84** (2.10-3.42)
2-hr	**0.362** (0.306-0.436)	**0.469** (0.396-0.566)	**0.624** (0.524-0.748)	**0.744** (0.617-0.890)	**0.906** (0.744-1.08)	**1.03** (0.834-1.22)	**1.16** (0.920-1.37)	**1.28** (1.01-1.52)	**1.46** (1.11-1.72)	**1.59** (1.19-1.89)
3-hr	**0.266** (0.224-0.325)	**0.341** (0.288-0.418)	**0.445** (0.374-0.544)	**0.528** (0.439-0.641)	**0.644** (0.527-0.777)	**0.736** (0.595-0.883)	**0.831** (0.659-0.998)	**0.932** (0.727-1.12)	**1.07** (0.809-1.28)	**1.18** (0.871-1.41)
6-hr	**0.160** (0.138-0.190)	**0.202** (0.174-0.241)	**0.258** (0.221-0.305)	**0.303** (0.257-0.356)	**0.364** (0.304-0.426)	**0.411** (0.339-0.480)	**0.460** (0.373-0.536)	**0.511** (0.407-0.596)	**0.579** (0.449-0.675)	**0.632** (0.480-0.739)
12-hr	**0.090** (0.078-0.106)	**0.114** (0.098-0.133)	**0.144** (0.123-0.168)	**0.167** (0.143-0.194)	**0.198** (0.168-0.231)	**0.223** (0.186-0.258)	**0.248** (0.204-0.287)	**0.273** (0.222-0.316)	**0.307** (0.243-0.357)	**0.333** (0.259-0.390)
24-hr	**0.053** (0.046-0.061)	**0.067** (0.059-0.078)	**0.087** (0.076-0.101)	**0.103** (0.089-0.119)	**0.125** (0.107-0.144)	**0.142** (0.121-0.164)	**0.160** (0.136-0.185)	**0.179** (0.150-0.207)	**0.206** (0.169-0.238)	**0.227** (0.184-0.264)
2-day	**0.029** (0.025-0.033)	**0.037** (0.032-0.042)	**0.048** (0.042-0.055)	**0.057** (0.049-0.066)	**0.070** (0.060-0.080)	**0.080** (0.068-0.092)	**0.091** (0.076-0.105)	**0.102** (0.085-0.118)	**0.118** (0.096-0.136)	**0.130** (0.105-0.152)
3-day	**0.021** (0.018-0.024)	**0.026** (0.023-0.030)	**0.035** (0.030-0.040)	**0.041** (0.036-0.047)	**0.051** (0.044-0.058)	**0.059** (0.050-0.067)	**0.067** (0.057-0.077)	**0.076** (0.064-0.087)	**0.088** (0.073-0.102)	**0.098** (0.080-0.114)
4-day	**0.017** (0.015-0.019)	**0.021** (0.019-0.024)	**0.028** (0.025-0.032)	**0.034** (0.029-0.038)	**0.042** (0.036-0.047)	**0.048** (0.042-0.055)	**0.055** (0.047-0.063)	**0.063** (0.053-0.072)	**0.073** (0.061-0.084)	**0.082** (0.067-0.095)
7-day	**0.011** (0.009-0.012)	**0.014** (0.012-0.016)	**0.018** (0.016-0.021)	**0.022** (0.019-0.025)	**0.027** (0.023-0.031)	**0.031** (0.027-0.036)	**0.036** (0.030-0.041)	**0.041** (0.034-0.047)	**0.048** (0.040-0.055)	**0.053** (0.044-0.062)
10-day	**0.008** (0.007-0.009)	**0.010** (0.009-0.012)	**0.014** (0.012-0.016)	**0.017** (0.014-0.019)	**0.020** (0.018-0.023)	**0.024** (0.020-0.027)	**0.027** (0.023-0.031)	**0.031** (0.026-0.035)	**0.036** (0.030-0.041)	**0.040** (0.033-0.046)
20-day	**0.005** (0.004-0.006)	**0.006** (0.006-0.007)	**0.009** (0.008-0.010)	**0.010** (0.009-0.012)	**0.012** (0.011-0.014)	**0.014** (0.012-0.016)	**0.016** (0.014-0.018)	**0.018** (0.015-0.020)	**0.020** (0.017-0.023)	**0.022** (0.018-0.026)
30-day	**0.004** (0.003-0.004)	**0.005** (0.004-0.006)	**0.007** (0.006-0.008)	**0.008** (0.007-0.009)	**0.010** (0.008-0.011)	**0.011** (0.010-0.012)	**0.012** (0.011-0.014)	**0.014** (0.012-0.016)	**0.016** (0.013-0.018)	**0.017** (0.014-0.020)
45-day	**0.003** (0.003-0.003)	**0.004** (0.004-0.005)	**0.005** (0.005-0.006)	**0.006** (0.005-0.007)	**0.007** (0.007-0.008)	**0.008** (0.007-0.010)	**0.009** (0.008-0.011)	**0.010** (0.009-0.012)	**0.012** (0.010-0.014)	**0.013** (0.011-0.015)
60-day	**0.003** (0.002-0.003)	**0.003** (0.003-0.004)	**0.004** (0.004-0.005)	**0.005** (0.005-0.006)	**0.006** (0.005-0.007)	**0.007** (0.006-0.008)	**0.008** (0.007-0.009)	**0.008** (0.007-0.010)	**0.010** (0.008-0.011)	**0.010** (0.009-0.012)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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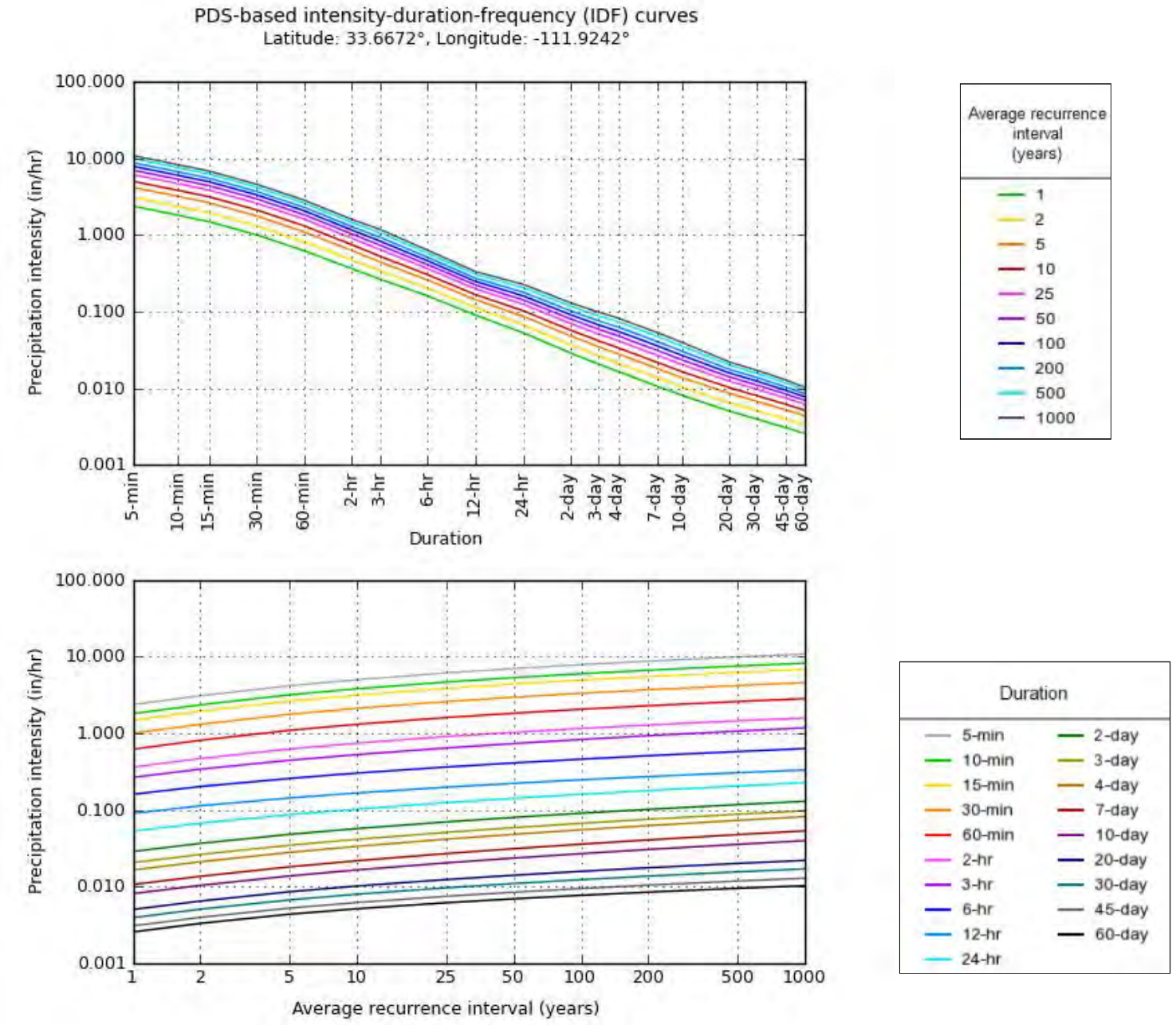
PF graphical



NOAA Atlas 14, Volume 1, Version 5

Created (GMT): Tue Jan 22 15:32:05 2019

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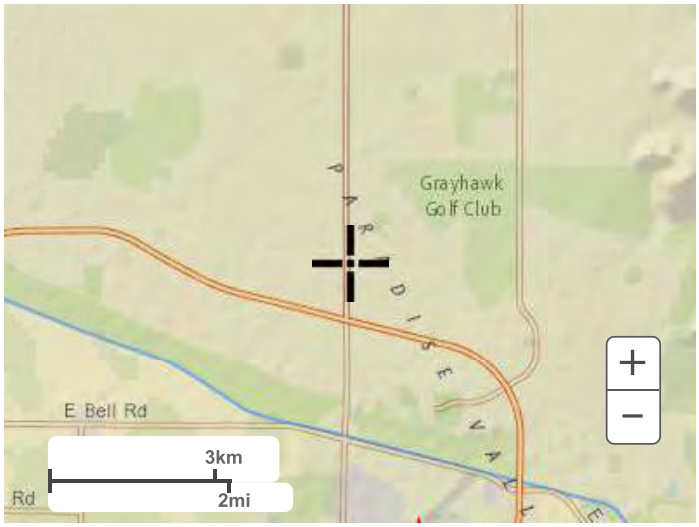
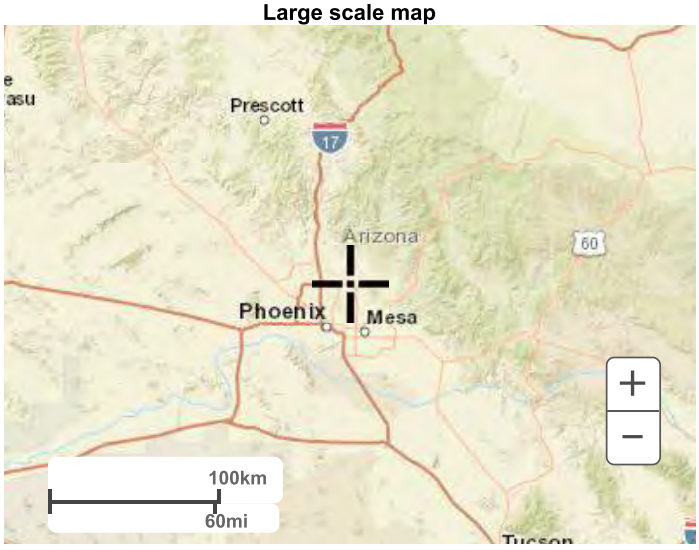
Maps & aerials

Small scale terrain

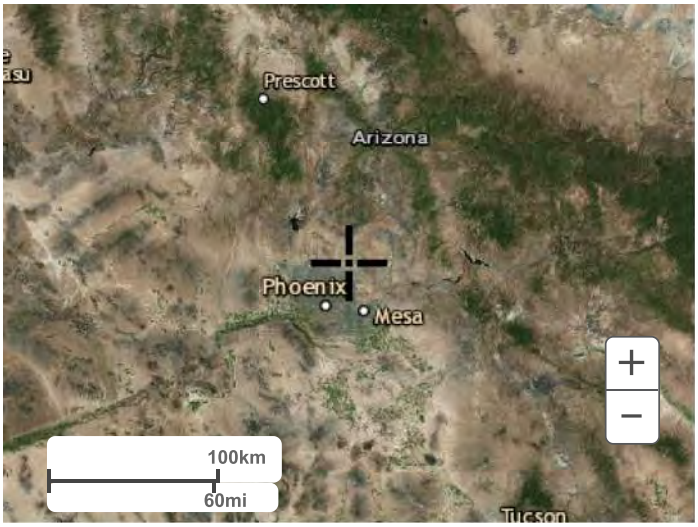


Large scale terrain

Large scale map



Large scale aerial



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US Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

Disclaimer

ONE SCOTTSDALE
CEC PN:180-168
DATE: JULY 2019
PREPARED BY: BB
CHECKED BY: JSE

CULVERT AREA ID	AREA S.F.	AREA A.C.
C1	6,569.13	0.15
C2	230,170.58	5.28
C3	280,605.76	6.44
C4	595,727.01	13.68
C5	668,012.40	15.34
C6	711,215.79	16.33
C7	76,609.42	1.76
C8	115,171.59	2.64
C9	139,537.80	3.20
C10	218,266.45	5.01
C11	1,268,779.00	29.13

ID	Sub Basin Data							Sub Basin Hydrology Summary					
	Area (acres)	Length (ft)	USGE	DSGE	Slope (ft/mi)	Kb		2 Year	5 Year	10 Year	25 Year	50 Year	100 Year
Major Basin ID: 01													
A1	1.0	440	66.00	59.50	78.0	0.040	Q (cfs)	2.3	3.4	4.2	5.4	6.1	6.9
							C	0.79	0.80	0.82	0.85	0.85	0.85
							CA (ac)	0.81	0.82	0.84	0.87	0.87	0.87
							Tc (min)	6	6	5	5	5	5
							i (in/hr)	2.89	4.09	5.00	6.16	7.01	7.88
A2	1.1	460	60.40	54.40	68.9	0.040	Q (cfs)	1.8	2.6	3.4	4.3	5.0	5.7
							C	0.61	0.61	0.65	0.66	0.68	0.68
							CA (ac)	0.65	0.65	0.69	0.70	0.72	0.72
							Tc (min)	7	6	6	5	5	5
							i (in/hr)	2.82	4.00	4.89	6.16	7.01	7.88
A3	5.9	1,200	64.30	49.00	67.3	0.035	Q (cfs)	11.1	15.8	20.6	26.4	32.0	36.8
							C	0.83	0.83	0.86	0.86	0.89	0.89
							CA (ac)	4.93	4.93	5.11	5.11	5.29	5.29
							Tc (min)	11	10	9	8	8	7
							i (in/hr)	2.25	3.21	4.04	5.17	6.05	6.95
A4	0.7	460	65.00	60.00	57.4	0.082	Q (cfs)	0.7	1.0	1.3	1.6	2.0	2.3
							C	0.46	0.46	0.49	0.49	0.52	0.52
							CA (ac)	0.30	0.30	0.32	0.32	0.34	0.34
							Tc (min)	12	10	9	8	8	8
							i (in/hr)	2.23	3.19	4.00	5.11	5.98	6.88
A5	0.7	200	62.80	58.50	113.5	0.041	Q (cfs)	1.8	2.4	3.0	3.7	4.3	4.9
							C	0.86	0.86	0.89	0.89	0.92	0.92
							CA (ac)	0.58	0.58	0.60	0.60	0.62	0.62
							Tc (min)	5	5	5	5	5	5
							i (in/hr)	3.11	4.20	5.03	6.16	7.01	7.88
A6	0.3	200	58.50	56.00	66.0	0.087	Q (cfs)	0.3	0.5	0.7	0.9	1.1	1.2
							C	0.37	0.37	0.42	0.42	0.45	0.45

ID	Sub Basin Data							Sub Basin Hydrology Summary					
	Area (acres)	Length (ft)	USGE	DSGE	Slope (ft/mi)	Kb		2 Year	5 Year	10 Year	25 Year	50 Year	100 Year
Major Basin ID: 01													
							CA (ac)	0.12	0.12	0.14	0.14	0.15	0.15
							Tc (min)	7	6	6	5	5	5
							i (in/hr)	2.82	4.00	4.89	6.16	7.01	7.88
A7	0.7	300	53.50	52.00	26.4	0.082	Q (cfs)	0.9	1.3	1.7	2.2	2.7	3.1
							C	0.60	0.60	0.63	0.63	0.66	0.66
							CA (ac)	0.41	0.41	0.43	0.43	0.46	0.46
							Tc (min)	12	10	10	9	8	8
							i (in/hr)	2.21	3.16	3.93	5.05	5.92	6.80
A8	0.9	460	48.70	44.00	53.9	0.081	Q (cfs)	1.2	1.7	2.1	2.7	3.4	3.9
							C	0.60	0.60	0.63	0.63	0.66	0.66
							CA (ac)	0.52	0.52	0.54	0.54	0.57	0.57
							Tc (min)	12	10	9	9	8	8
							i (in/hr)	2.22	3.18	3.98	5.08	5.95	6.88
A9	0.6	270	43.50	42.00	29.3	0.041	Q (cfs)	0.9	1.3	1.7	2.1	2.5	2.8
							C	0.55	0.55	0.58	0.58	0.61	0.61
							CA (ac)	0.32	0.32	0.34	0.34	0.36	0.36
							Tc (min)	7	6	6	5	5	5
							i (in/hr)	2.80	3.98	4.87	6.12	7.01	7.88
A10	1.2	470	39.20	36.00	35.9	0.040	Q (cfs)	1.9	2.7	3.4	4.3	5.3	6.1
							C	0.61	0.61	0.64	0.64	0.67	0.67
							CA (ac)	0.73	0.73	0.76	0.76	0.80	0.80
							Tc (min)	9	8	7	6	6	6
							i (in/hr)	2.54	3.64	4.51	5.70	6.64	7.59
A11	1.6	430	55.20	50.60	56.5	0.039	Q (cfs)	3.8	5.5	6.9	8.7	10.3	11.6
							C	0.84	0.84	0.87	0.87	0.90	0.90
							CA (ac)	1.37	1.37	1.42	1.42	1.47	1.47
							Tc (min)	7	6	6	5	5	5
							i (in/hr)	2.80	3.98	4.89	6.12	7.01	7.88

* Non default value

ID	Sub Basin Data							Sub Basin Hydrology Summary					
	Area (acres)	Length (ft)	USGE	DSGE	Slope (ft/mi)	Kb		2 Year	5 Year	10 Year	25 Year	50 Year	100 Year
Major Basin ID: 01													
A12	4.5	860	53.60	41.40	74.9	0.036	Q (cfs)	9.6	13.8	17.8	22.4	27.0	30.9
							C	0.86	0.86	0.89	0.89	0.92	0.92
							CA (ac)	3.84	3.84	3.98	3.98	4.11	4.11
							Tc (min)	9	8	7	7	6	6
							i (in/hr)	2.50	3.60	4.46	5.64	6.56	7.51
A13	0.7	475	56.00	47.00	100.0	0.082	Q (cfs)	0.7	1.0	1.3	1.6	2.1	2.4
							C	0.39	0.39	0.42	0.42	0.45	0.45
							CA (ac)	0.27	0.27	0.29	0.29	0.32	0.32
							Tc (min)	10	8	8	7	7	6
							i (in/hr)	2.43	3.52	4.36	5.55	6.46	7.38
A14	0.6	530	47.00	37.00	99.6	0.083	Q (cfs)	0.5	0.8	1.1	1.4	1.7	1.9
							C	0.39	0.39	0.42	0.42	0.45	0.45
							CA (ac)	0.23	0.23	0.25	0.25	0.27	0.27
							Tc (min)	10	9	8	7	7	7
							i (in/hr)	2.35	3.39	4.22	5.40	6.28	7.22
A15	0.2	180	37.00	35.00	58.7	0.044	Q (cfs)	0.2	0.3	0.4	0.5	0.6	0.7
							C	0.39	0.39	0.42	0.42	0.45	0.45
							CA (ac)	0.08	0.08	0.08	0.08	0.09	0.09
							Tc (min)	5	5	5	5	5	5
							i (in/hr)	3.11	4.20	5.03	6.16	7.01	7.88
A16	0.3	240	36.00	34.00	44.0	0.088	Q (cfs)	0.4	0.5	0.7	0.9	1.1	1.2
							C	0.53	0.53	0.56	0.56	0.59	0.59
							CA (ac)	0.14	0.14	0.15	0.15	0.16	0.16
							Tc (min)	9	8	7	7	6	6
							i (in/hr)	2.51	3.62	4.48	5.67	6.60	7.55
A17	0.4	140	33.50	32.00	56.6	0.086	Q (cfs)	0.4	0.6	0.8	1.0	1.2	1.3
							C	0.42	0.42	0.45	0.45	0.48	0.48

ID	Sub Basin Data							Sub Basin Hydrology Summary					
	Area (acres)	Length (ft)	USGE	DSGE	Slope (ft/mi)	Kb		2 Year	5 Year	10 Year	25 Year	50 Year	100 Year
Major Basin ID: 01													
							CA (ac)	0.15	0.15	0.16	0.16	0.17	0.17
							Tc (min)	6	5	5	5	5	5
							i (in/hr)	2.97	4.18	5.03	6.16	7.01	7.88
O1	0.8	330	65.00	59.50	88.0	0.041	Q (cfs)	2.3	3.2	3.8	4.6	5.3	5.9
							C	0.95	0.95	0.95	0.95	0.95	0.95
							CA (ac)	0.75	0.75	0.75	0.75	0.75	0.75
							Tc (min)	5	5	5	5	5	5
							i (in/hr)	3.07	4.20	5.03	6.16	7.01	7.88
O2	1.2	610	59.50	50.20	80.5	0.039	Q (cfs)	3.1	4.4	5.5	6.9	8.0	9.1
							C	0.95	0.95	0.95	0.95	0.95	0.95
							CA (ac)	1.15	1.15	1.15	1.15	1.15	1.15
							Tc (min)	8	7	6	6	5	5
							i (in/hr)	2.71	3.85	4.74	5.99	6.93	7.88
O3	0.7	340	50.20	45.20	77.6	0.041	Q (cfs)	1.9	2.6	3.1	3.8	4.3	4.9
							C	0.95	0.95	0.95	0.95	0.95	0.95
							CA (ac)	0.62	0.62	0.62	0.62	0.62	0.62
							Tc (min)	6	5	5	5	5	5
							i (in/hr)	3.02	4.20	5.03	6.16	7.01	7.88
O4	1.0	520	45.20	36.60	87.3	0.040	Q (cfs)	2.6	3.6	4.5	5.6	6.4	7.2
							C	0.95	0.95	0.95	0.95	0.95	0.95
							CA (ac)	0.91	0.91	0.91	0.91	0.91	0.91
							Tc (min)	7	6	5	5	5	5
							i (in/hr)	2.83	4.00	4.92	6.16	7.01	7.88
O5	0.4	340	66.00	60.60	83.9	0.043	Q (cfs)	1.0	1.4	1.7	2.0	2.3	2.6
							C	0.95	0.95	0.95	0.95	0.95	0.95
							CA (ac)	0.33	0.33	0.33	0.33	0.33	0.33
							Tc (min)	6	5	5	5	5	5
							i (in/hr)	3.02	4.20	5.03	6.16	7.01	7.88

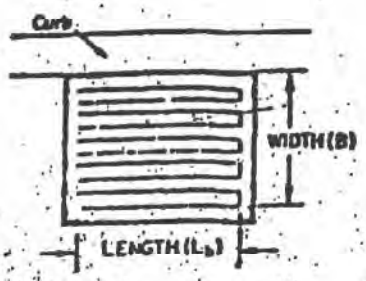
* Non default value

ID	Sub Basin Data							Sub Basin Hydrology Summary					
	Area (acres)	Length (ft)	USGE	DSGE	Slope (ft/mi)	Kb		2 Year	5 Year	10 Year	25 Year	50 Year	100 Year
Major Basin ID: 01													
O6	0.2	180	60.60	58.00	76.3	0.045	Q (cfs)	0.5	0.7	0.9	1.0	1.2	1.3
							C	0.95	0.95	0.95	0.95	0.95	0.95
							CA (ac)	0.17	0.17	0.17	0.17	0.17	0.17
							Tc (min)	5	5	5	5	5	5
							i (in/hr)	3.11	4.20	5.03	6.16	7.01	7.88
O7	0.1	140	58.00	56.40	60.3	0.045	Q (cfs)	0.4	0.5	0.7	0.8	0.9	1.0
							C	0.95	0.95	0.95	0.95	0.95	0.95
							CA (ac)	0.13	0.13	0.13	0.13	0.13	0.13
							Tc (min)	5	5	5	5	5	5
							i (in/hr)	3.11	4.20	5.03	6.16	7.01	7.88
O8	0.1	110	56.40	54.40	96.0	0.046	Q (cfs)	0.3	0.4	0.5	0.6	0.7	0.8
							C	0.95	0.95	0.95	0.95	0.95	0.95
							CA (ac)	0.10	0.10	0.10	0.10	0.10	0.10
							Tc (min)	5	5	5	5	5	5
							i (in/hr)	3.11	4.20	5.03	6.16	7.01	7.88
O9	0.2	190	54.40	51.70	75.0	0.044	Q (cfs)	0.6	0.8	1.0	1.2	1.3	1.5
							C	0.95	0.95	0.95	0.95	0.95	0.95
							CA (ac)	0.19	0.19	0.19	0.19	0.19	0.19
							Tc (min)	5	5	5	5	5	5
							i (in/hr)	3.11	4.20	5.03	6.16	7.01	7.88
O10	0.3	300	51.70	47.10	81.0	0.043	Q (cfs)	0.9	1.2	1.5	1.8	2.0	2.3
							C	0.95	0.95	0.95	0.95	0.95	0.95
							CA (ac)	0.29	0.29	0.29	0.29	0.29	0.29
							Tc (min)	5	5	5	5	5	5
							i (in/hr)	3.07	4.20	5.03	6.16	7.01	7.88
O11	0.3	320	47.10	42.40	77.6	0.043	Q (cfs)	1.0	1.3	1.6	2.0	2.2	2.5
							C	0.95	0.95	0.95	0.95	0.95	0.95

ID	Sub Basin Data							Sub Basin Hydrology Summary					
	Area (acres)	Length (ft)	USGE	DSGE	Slope (ft/mi)	Kb		2 Year	5 Year	10 Year	25 Year	50 Year	100 Year
Major Basin ID: 01													
							CA (ac)	0.32	0.32	0.32	0.32	0.32	0.32
							Tc (min)	6	5	5	5	5	5
							i (in/hr)	3.02	4.20	5.03	6.16	7.01	7.88
O12	0.1	110	42.40	39.40	144.0	0.045	Q (cfs)	0.4	0.5	0.7	0.8	0.9	1.0
							C	0.95	0.95	0.95	0.95	0.95	0.95
							CA (ac)	0.13	0.13	0.13	0.13	0.13	0.13
							Tc (min)	5	5	5	5	5	5
							i (in/hr)	3.11	4.20	5.03	6.16	7.01	7.88
C1	1.8	720	61.00	58.50	18.3	0.077	Q (cfs)	2.3	3.3	4.4	5.6	6.7	7.7
							C	0.80	0.80	0.83	0.83	0.86	0.86
							CA (ac)	1.42	1.42	1.48	1.48	1.53	1.53
							Tc (min)	22	19	18	16	15	15
							i (in/hr)	1.61	2.35	2.94	3.75	4.37	5.06
C2	3.1	1,000	61.00	56.00	26.4	0.073	Q (cfs)	4.0	5.8	7.5	9.6	11.7	13.4
							C	0.80	0.80	0.83	0.83	0.86	0.86
							CA (ac)	2.51	2.51	2.61	2.61	2.70	2.70
							Tc (min)	23	20	18	17	16	15
							i (in/hr)	1.58	2.31	2.89	3.69	4.32	4.96
C3	5.2	1,340	61.00	52.00	35.5	0.070	Q (cfs)	6.4	9.4	12.2	15.6	19.0	21.9
							C	0.80	0.80	0.83	0.83	0.86	0.86
							CA (ac)	4.17	4.17	4.32	4.32	4.48	4.48
							Tc (min)	24	21	19	18	16	16
							i (in/hr)	1.53	2.26	2.83	3.62	4.25	4.88
C4	15.3	1,620	61.00	42.00	61.9	0.064	Q (cfs)	20.6	29.9	38.6	49.0	59.8	69.4
							C	0.80	0.80	0.83	0.83	0.86	0.86
							CA (ac)	12.20	12.20	12.66	12.66	13.12	13.12
							Tc (min)	21	18	16	15	14	13
							i (in/hr)	1.69	2.45	3.05	3.87	4.56	5.29

ID	Sub Basin Data							Sub Basin Hydrology Summary					
	Area (acres)	Length (ft)	USGE	DSGE	Slope (ft/mi)	Kb		2 Year	5 Year	10 Year	25 Year	50 Year	100 Year
Major Basin ID: 01													
C5	16.4	2,000	61.00	36.00	66.0	0.063	Q (cfs)	20.9	30.6	39.9	50.8	61.4	71.0
							C	0.80	0.80	0.83	0.83	0.86	0.86
							CA (ac)	13.15	13.15	13.65	13.65	14.14	14.14
							Tc (min)	23	20	18	17	16	15
							i (in/hr)	1.59	2.33	2.92	3.72	4.34	5.02
C6	26.6	2,210	61.00	33.50	65.7	0.060	Q (cfs)	33.0	48.8	63.4	80.9	98.0	112.9
							C	0.80	0.80	0.83	0.83	0.86	0.86
							CA (ac)	21.30	21.30	22.10	22.10	22.90	22.90
							Tc (min)	24	20	19	17	16	15
							i (in/hr)	1.55	2.29	2.87	3.66	4.28	4.93

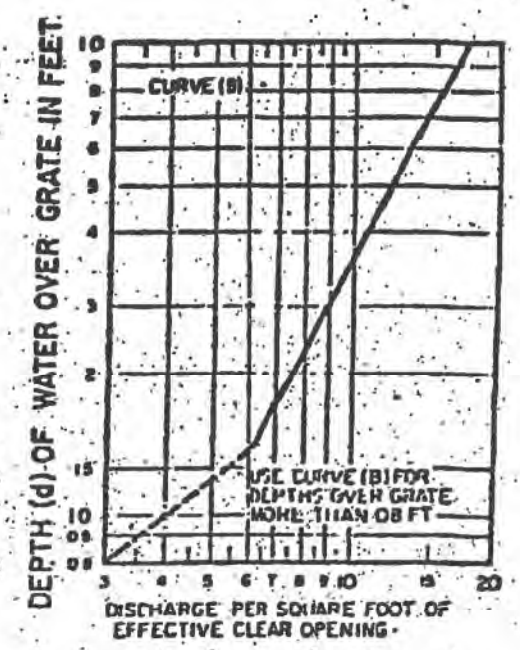
APPENDIX D – HYDRAULIC CALCULATIONS



P = $2B + L_b$

A = AREA OF CLEAR OPENING IN GRATE TO ALLOW FOR CLOGGING DIVIDE P OR A BY 2 BEFORE OBTAINING $\frac{A}{P}$

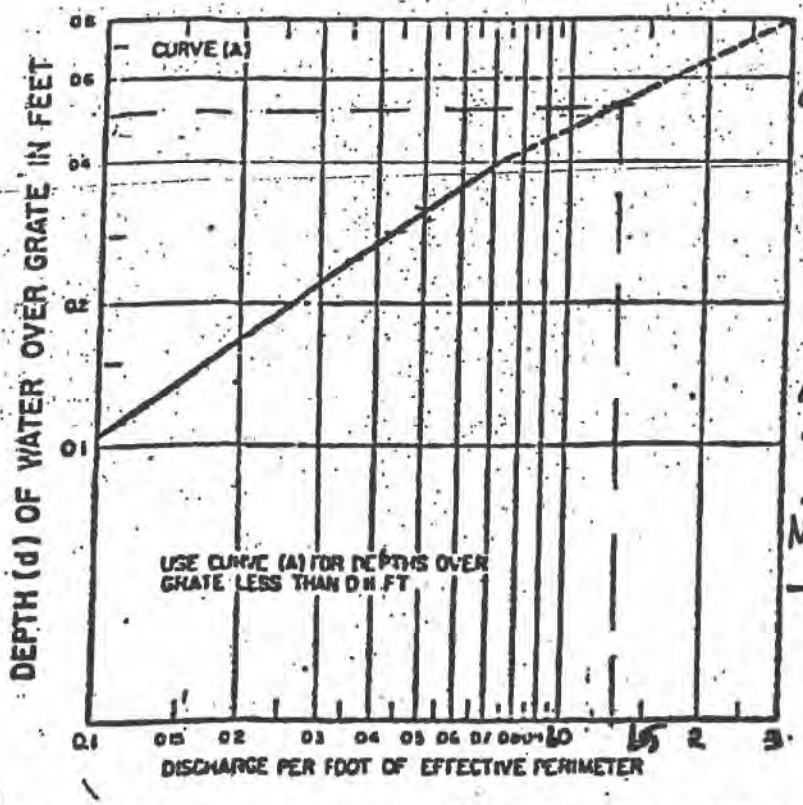
WITHOUT CURB P = $2B + L_b$



MAG 537, Type G
@ 0.5' Depth
Q/L = 1.3
Q = 1.3 x 9.33
Q = 12.2 cfs/2
Q = 6.1 cfs

MAG 535, Type F
@ 0.5' Depth
Q/L = 1.3
Q = 1.3 x 11.83
Q = 15.4 cfs/2
Q = 7.7 cfs

Neenah 2554
@ 0.5' Depth
Q/L = 1.3
Q = 1.3 x 6.30
Q = 8.2 cfs/2
Q = 4.1 cfs



GRATE TYPE	AREA	P
"F"	5.42	11.83
"26"	7.28	13.25
"6"	3.64	9.33
"N"	5.09	10.00
"2N"	10.18	17.33
"3N"	15.27	24.00
Neenah 2554	1.90	6.30

BUREAU OF PUBLIC ROADS
REV. AUG. 1968

HYDRAULIC CAPACITY OF GRATE INLET IN SUMP

Hydraulic Analysis Report

Project Data

Project Title: One Scottsdale

Designer:

Project Date: Thursday, November 05, 2015

Project Units: U.S. Customary Units

Notes:

Channel Analysis: Section A-A

Notes:

Input Parameters

Channel Type: Trapezoidal

Side Slope 1 (Z1): 4.0000 ft/ft

Side Slope 2 (Z2): 4.0000 ft/ft

Channel Width: 8.0000 ft

Longitudinal Slope: 0.0080 ft/ft

Manning's n: 0.0350

Flow: 152.2000 cfs

Result Parameters

Depth: 2.0460 ft

Area of Flow: 33.1137 ft^2

Wetted Perimeter: 24.8722 ft

Average Velocity: 4.5963 ft/s

Top Width: 24.3684 ft

Froude Number: 0.6948

Critical Depth: 1.6890 ft

Critical Velocity: 6.1070 ft/s

Critical Slope: 0.0174 ft/ft

Critical Top Width: 21.5118 ft

Calculated Max Shear Stress: 1.0214 lb/ft^2

Calculated Avg Shear Stress: 0.6646 lb/ft^2

Channel Analysis: Section B-B

Notes:

Input Parameters

Channel Type: Trapezoidal

Side Slope 1 (Z1): 4.0000 ft/ft

Side Slope 2 (Z2): 4.0000 ft/ft

Channel Width: 8.0000 ft

Longitudinal Slope: 0.0080 ft/ft

Manning's n: 0.0350

Flow: 165.6000 cfs

Result Parameters

Depth: 2.1315 ft

Area of Flow: 35.2263 ft^2

Wetted Perimeter: 25.5772 ft

Average Velocity: 4.7010 ft/s

Top Width: 25.0524 ft

Froude Number: 0.6986

Critical Depth: 1.7666 ft

Critical Velocity: 6.2219 ft/s

Critical Slope: 0.0172 ft/ft

Critical Top Width: 22.1325 ft

Calculated Max Shear Stress: 1.0641 lb/ft^2

Calculated Avg Shear Stress: 0.6875 lb/ft^2

Channel Analysis: Section C-C

Notes:

Input Parameters

Channel Type: Trapezoidal

Side Slope 1 (Z1): 4.0000 ft/ft

Side Slope 2 (Z2): 4.0000 ft/ft

Channel Width: 8.0000 ft

Longitudinal Slope: 0.0080 ft/ft

Manning's n: 0.0350

Flow: 174.1000 cfs

Result Parameters

Depth: 2.1838 ft

Area of Flow: 36.5472 ft^2

Wetted Perimeter: 26.0084 ft

Average Velocity: 4.7637 ft/s

Top Width: 25.4707 ft

Froude Number: 0.7008

Critical Depth: 1.8140 ft

Critical Velocity: 6.2909 ft/s

Critical Slope: 0.0171 ft/ft

Critical Top Width: 22.5122 ft

Calculated Max Shear Stress: 1.0902 lb/ft^2

Calculated Avg Shear Stress: 0.7015 lb/ft^2

Channel Analysis: Section D-D

Notes:

Input Parameters

Channel Type: Trapezoidal

Side Slope 1 (Z1): 4.0000 ft/ft

Side Slope 2 (Z2): 4.0000 ft/ft

Channel Width: 8.0000 ft

Longitudinal Slope: 0.0080 ft/ft

Manning's n: 0.0350

Flow: 221.6000 cfs

Result Parameters

Depth: 2.4509 ft

Area of Flow: 43.6356 ft^2

Wetted Perimeter: 28.2109 ft

Average Velocity: 5.0784 ft/s

Top Width: 27.6074 ft

Froude Number: 0.7119

Critical Depth: 2.0585 ft

Critical Velocity: 6.6311 ft/s

Critical Slope: 0.0165 ft/ft

Critical Top Width: 24.4683 ft

Calculated Max Shear Stress: 1.2235 lb/ft^2

Calculated Avg Shear Stress: 0.7721 lb/ft^2

Channel Analysis: Section E-E

Notes:

Input Parameters

Channel Type: Trapezoidal

Side Slope 1 (Z1): 4.0000 ft/ft

Side Slope 2 (Z2): 4.0000 ft/ft

Channel Width: 8.0000 ft

Longitudinal Slope: 0.0080 ft/ft

Manning's n: 0.0350

Flow: 223.2000 cfs

Result Parameters

Depth: 2.4594 ft

Area of Flow: 43.8700 ft^2

Wetted Perimeter: 28.2808 ft

Average Velocity: 5.0878 ft/s

Top Width: 27.6753 ft

Froude Number: 0.7121

Critical Depth: 2.0662 ft

Critical Velocity: 6.6414 ft/s

Critical Slope: 0.0165 ft/ft

Critical Top Width: 24.5299 ft

Calculated Max Shear Stress: 1.2277 lb/ft^2

Calculated Avg Shear Stress: 0.7744 lb/ft^2

Channel Analysis: Section F-F

Notes:

Input Parameters

Channel Type: Trapezoidal

Side Slope 1 (Z1): 4.0000 ft/ft

Side Slope 2 (Z2): 4.0000 ft/ft

Channel Width: 8.0000 ft

Longitudinal Slope: 0.0080 ft/ft

Manning's n: 0.0350

Flow: 226.0000 cfs

Result Parameters

Depth: 2.4735 ft

Area of Flow: 44.2619 ft^2

Wetted Perimeter: 28.3973 ft

Average Velocity: 5.1060 ft/s

Top Width: 27.7883 ft

Froude Number: 0.7130

Critical Depth: 2.0797 ft

Critical Velocity: 6.6594 ft/s

Critical Slope: 0.0165 ft/ft

Critical Top Width: 24.6372 ft

Calculated Max Shear Stress: 1.2348 lb/ft^2

Calculated Avg Shear Stress: 0.7781 lb/ft^2

Channel Analysis: Section G-G

Notes:

Input Parameters

Channel Type: Trapezoidal

Side Slope 1 (Z1): 4.0000 ft/ft

Side Slope 2 (Z2): 4.0000 ft/ft

Channel Width: 3.0000 ft

Longitudinal Slope: 0.0100 ft/ft

Manning's n: 0.0350

Flow: 6.9000 cfs

Result Parameters

Depth: 0.5732 ft

Area of Flow: 3.0335 ft^2

Wetted Perimeter: 7.7263 ft

Average Velocity: 2.2746 ft/s

Top Width: 7.5852 ft

Froude Number: 0.6339

Critical Depth: 0.4459 ft

Critical Velocity: 3.2346 ft/s

Critical Slope: 0.0266 ft/ft

Critical Top Width: 6.5674 ft

Calculated Max Shear Stress: 0.3576 lb/ft^2

Calculated Avg Shear Stress: 0.2450 lb/ft^2

Channel Analysis: Section H-H

Notes:

Input Parameters

Channel Type: Trapezoidal

Side Slope 1 (Z1): 4.0000 ft/ft

Side Slope 2 (Z2): 4.0000 ft/ft

Channel Width: 5.0000 ft

Longitudinal Slope: 0.0100 ft/ft

Manning's n: 0.0350

Flow: 5.7000 cfs

Result Parameters

Depth: 0.4196 ft

Area of Flow: 2.8024 ft^2

Wetted Perimeter: 8.4603 ft

Average Velocity: 2.0340 ft/s

Top Width: 8.3570 ft

Froude Number: 0.6190

Critical Depth: 0.3139 ft

Critical Velocity: 2.9023 ft/s

Critical Slope: 0.0283 ft/ft

Critical Top Width: 7.5115 ft

Calculated Max Shear Stress: 0.2618 lb/ft^2

Calculated Avg Shear Stress: 0.2067 lb/ft^2

Channel Analysis: Section I-I

Notes:

Input Parameters

Channel Type: Trapezoidal

Side Slope 1 (Z1): 4.0000 ft/ft

Side Slope 2 (Z2): 4.0000 ft/ft

Channel Width: 5.0000 ft

Longitudinal Slope: 0.0100 ft/ft

Manning's n: 0.0350

Flow: 6.2000 cfs

Result Parameters

Depth: 0.4399 ft

Area of Flow: 2.9734 ft^2

Wetted Perimeter: 8.6274 ft

Average Velocity: 2.0851 ft/s

Top Width: 8.5191 ft

Froude Number: 0.6220

Critical Depth: 0.3305 ft

Critical Velocity: 2.9674 ft/s

Critical Slope: 0.0279 ft/ft

Critical Top Width: 7.6439 ft

Calculated Max Shear Stress: 0.2745 lb/ft^2

Calculated Avg Shear Stress: 0.2151 lb/ft^2

Channel Analysis: Section J-J

Notes:

Input Parameters

Channel Type: Trapezoidal

Side Slope 1 (Z1): 4.0000 ft/ft

Side Slope 2 (Z2): 4.0000 ft/ft

Channel Width: 3.0000 ft

Longitudinal Slope: 0.0100 ft/ft

Manning's n: 0.0350

Flow: 11.6000 cfs

Result Parameters

Depth: 0.7414 ft

Area of Flow: 4.4225 ft^2

Wetted Perimeter: 9.1134 ft

Average Velocity: 2.6229 ft/s

Top Width: 8.9309 ft

Froude Number: 0.6569

Critical Depth: 0.5932 ft

Critical Velocity: 3.6396 ft/s

Critical Slope: 0.0246 ft/ft

Critical Top Width: 7.7456 ft

Calculated Max Shear Stress: 0.4626 lb/ft^2

Calculated Avg Shear Stress: 0.3028 lb/ft^2

Channel Analysis: Section K-K

Notes:

Input Parameters

Channel Type: Trapezoidal

Side Slope 1 (Z1): 4.0000 ft/ft

Side Slope 2 (Z2): 20.0000 ft/ft

Channel Width: 6.0000 ft

Longitudinal Slope: 0.0100 ft/ft

Manning's n: 0.0350

Flow: 1.1500 cfs

Result Parameters

Depth: 0.1455 ft

Area of Flow: 1.1266 ft^2

Wetted Perimeter: 9.5124 ft

Average Velocity: 1.0208 ft/s

Top Width: 9.4909 ft

Froude Number: 0.5221

Critical Depth: 0.0976 ft

Critical Velocity: 1.6432 ft/s

Critical Slope: 0.0409 ft/ft

Critical Top Width: 8.3422 ft

Calculated Max Shear Stress: 0.0908 lb/ft^2

Calculated Avg Shear Stress: 0.0739 lb/ft^2

Channel Analysis: Section L-L

Notes:

Input Parameters

Channel Type: Trapezoidal

Side Slope 1 (Z1): 4.0000 ft/ft

Side Slope 2 (Z2): 50.0000 ft/ft

Channel Width: 6.0000 ft

Longitudinal Slope: 0.0100 ft/ft

Manning's n: 0.0350

Flow: 2.3000 cfs

Result Parameters

Depth: 0.1901 ft

Area of Flow: 2.1168 ft^2

Wetted Perimeter: 16.2923 ft

Average Velocity: 1.0865 ft/s

Top Width: 16.2670 ft

Froude Number: 0.5308

Critical Depth: 0.1346 ft

Critical Velocity: 1.7734 ft/s

Critical Slope: 0.0388 ft/ft

Critical Top Width: 13.2690 ft

Calculated Max Shear Stress: 0.1186 lb/ft^2

Calculated Avg Shear Stress: 0.0811 lb/ft^2

Channel Analysis: Section M-M

Notes:

Input Parameters

Channel Type: Trapezoidal

Side Slope 1 (Z1): 20.0000 ft/ft

Side Slope 2 (Z2): 4.0000 ft/ft

Channel Width: 8.0000 ft

Longitudinal Slope: 0.0100 ft/ft

Manning's n: 0.0350

Flow: 0.7000 cfs

Result Parameters

Depth: 0.0947 ft

Area of Flow: 0.8648 ft^2

Wetted Perimeter: 10.2858 ft

Average Velocity: 0.8094 ft/s

Top Width: 10.2718 ft

Froude Number: 0.4916

Critical Depth: 0.0601 ft

Critical Velocity: 1.3359 ft/s

Critical Slope: 0.0468 ft/ft

Critical Top Width: 9.4420 ft

Calculated Max Shear Stress: 0.0591 lb/ft^2

Calculated Avg Shear Stress: 0.0525 lb/ft^2

Channel Analysis: Section N-N

Notes:

Input Parameters

Channel Type: Trapezoidal

Side Slope 1 (Z1): 50.0000 ft/ft

Side Slope 2 (Z2): 4.0000 ft/ft

Channel Width: 10.0000 ft

Longitudinal Slope: 0.0100 ft/ft

Manning's n: 0.0350

Flow: 1.2000 cfs

Result Parameters

Depth: 0.1092 ft

Area of Flow: 1.4146 ft^2

Wetted Perimeter: 15.9136 ft

Average Velocity: 0.8483 ft/s

Top Width: 15.8990 ft

Froude Number: 0.5012

Critical Depth: 0.0715 ft

Critical Velocity: 1.4069 ft/s

Critical Slope: 0.0452 ft/ft

Critical Top Width: 13.8606 ft

Calculated Max Shear Stress: 0.0682 lb/ft^2

Calculated Avg Shear Stress: 0.0555 lb/ft^2

APPENDIX E – FIMA FIRM MAP AND STRUCTURE EXHIBIT

MAP SCALE 1" = 1000'

500 0 1000 2000 FEET

METE

ONE SCOTTSDALE

PANEL 1320L

NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

MARICOPA COUNTY, ARIZONA

AND INCORPORATED AREAS

PANEL 1320 OF 4425

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
MARICOPA COUNTY	040037	1320	L
PHOENIX, CITY OF	040051	1320	L
SCOTTSDALE, CITY OF	045012	1320	L

Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.

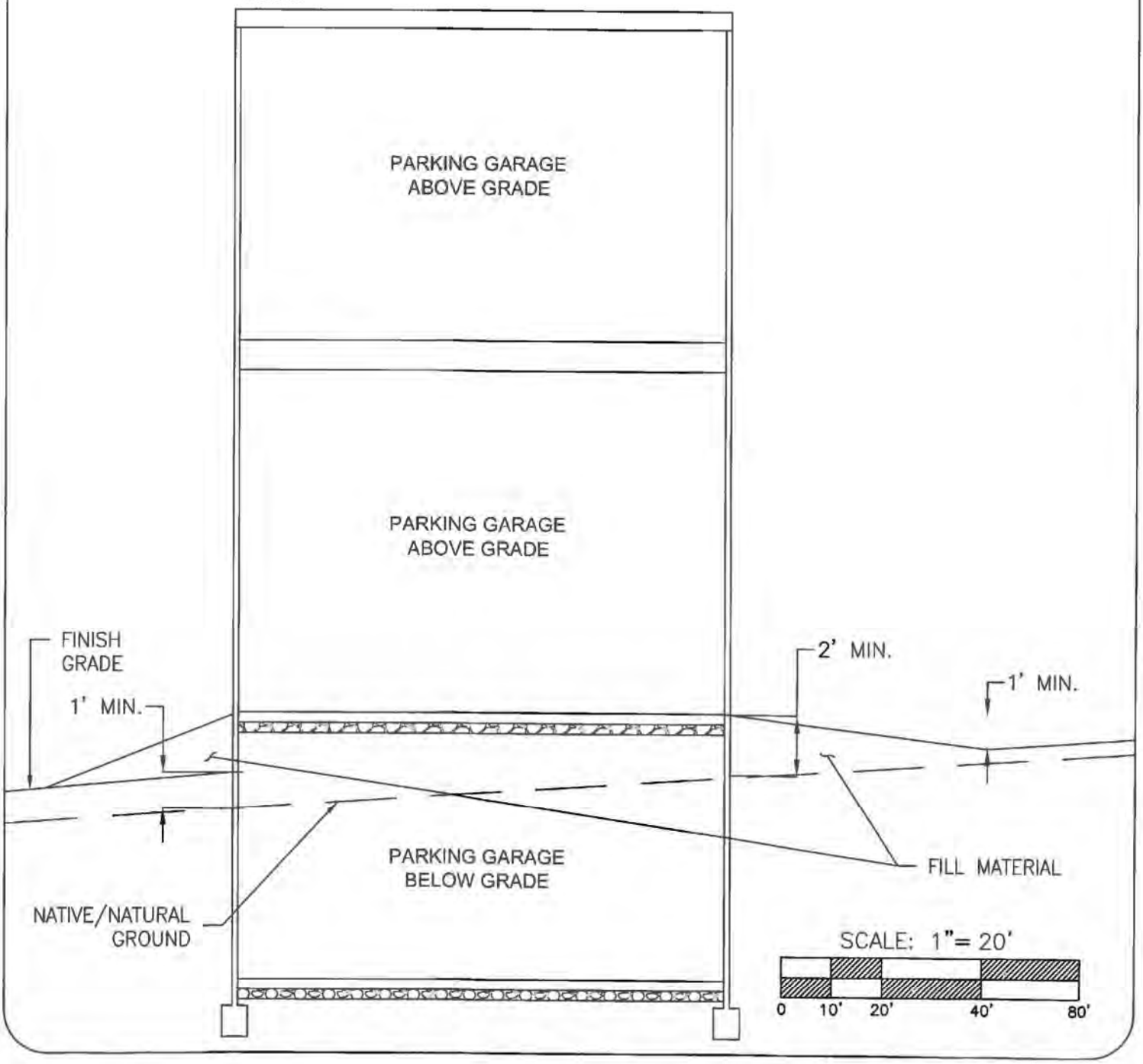
MAP NUMBER
04013C1320L

MAP REVISED
OCTOBER 16, 2013

Federal Emergency Management Agency

REGULATORY FLOODPLAIN NOTE:

ALL BUILDINGS WILL BE STRUCTURALLY INDEPENDENT AND WILL BE FLOODPROOFED TO 2 FEET ABOVE THE HIGHEST ADJACENT NAUTRAL GRADE WITHIN THE REGULATORY FLOODPLAIN – ZONE AO, DEPTH=1 FOOT.



PRELIMINARY
NOT FOR CONSTRUCTION
OR RECORDING

ONE
SCOTTSDALE

FEMA STRUCTURE
EXHIBIT

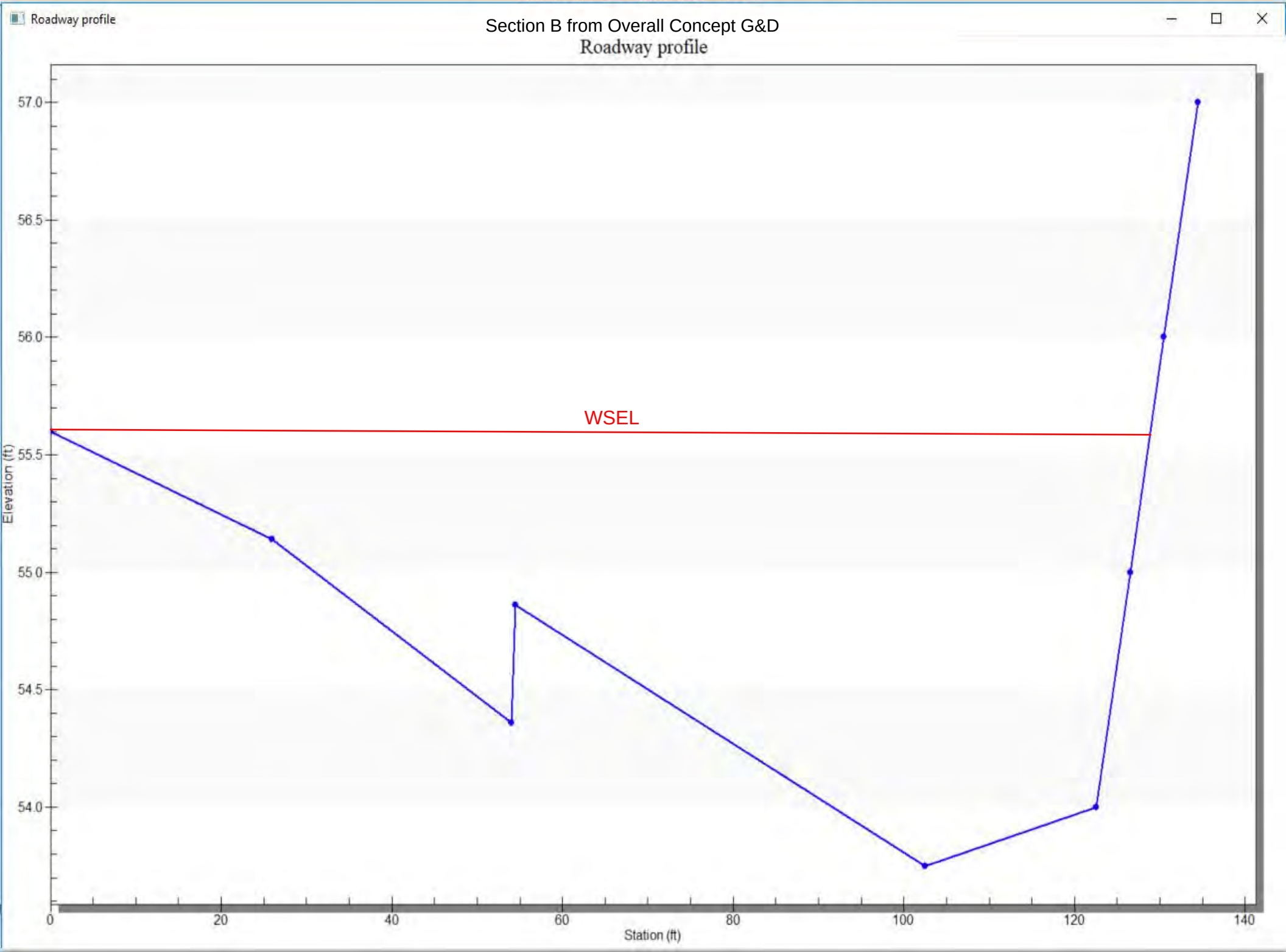
EME

Erickson & Meeks
Engineering, L.L.C.

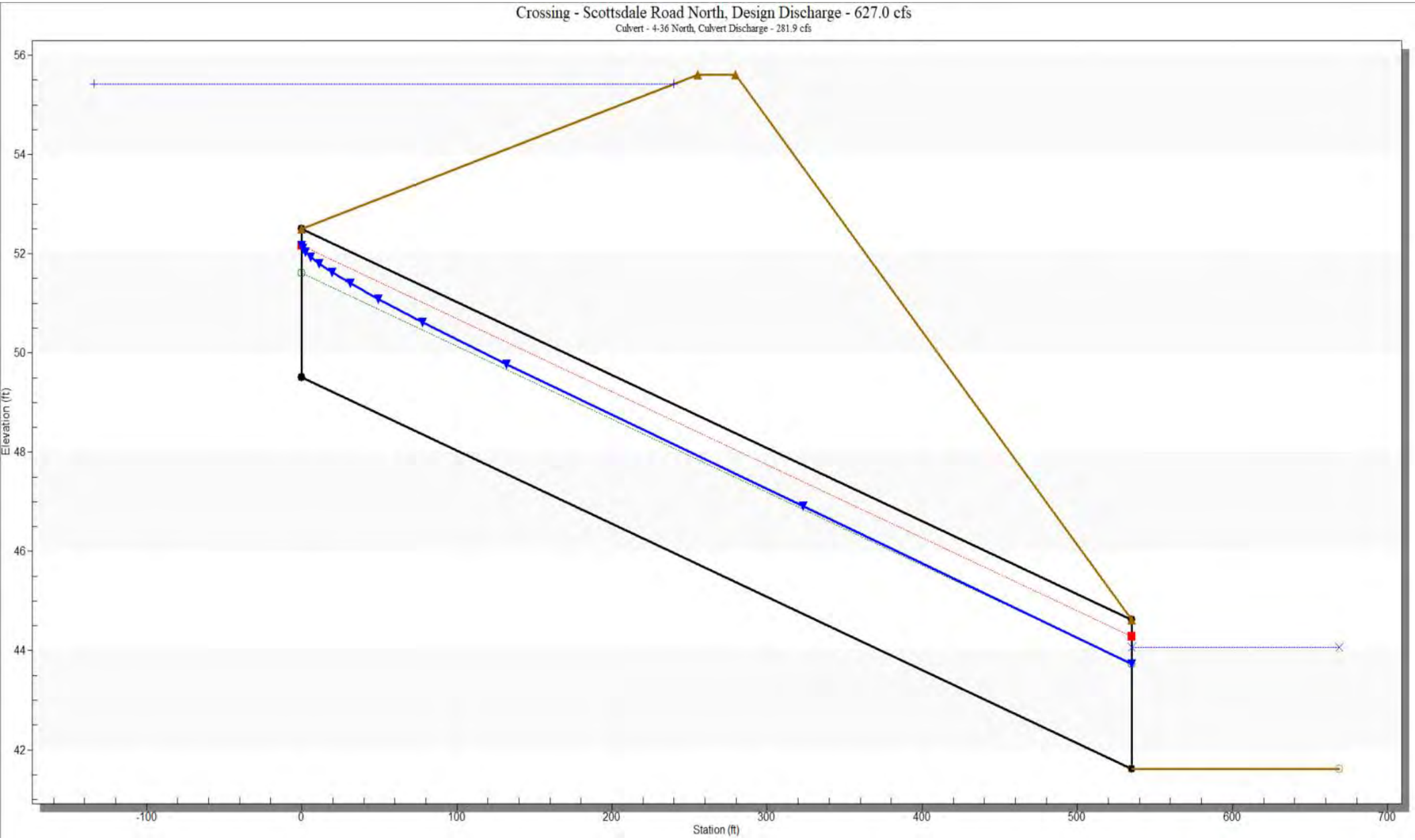
APPENDIX F – HY8 REPORTS

Crossing - Scottsdale Road North, Design Discharge - 627.0 cfs

Culvert - 4-36 North, Culvert Discharge - 281.9 cfs



Section B from Overall Concept G&D



HY-8 Analysis Results

Crossing Summary Table

Culvert Crossing: Scottsdale Road North

Headwater Elevation	Total Discharge (cfs)	4-36 North Discharg (cfs)	Roadway Discharge (cfs)	Iterations
51.05	50.00	50.00	0.00	1
52.00	107.70	107.70	0.00	1
52.87	165.40	165.40	0.00	1
53.92	223.10	221.54	1.44	9
54.39	280.80	242.62	38.09	7
54.67	338.50	254.04	84.28	7
54.88	396.20	262.09	133.89	6
55.03	453.90	268.06	185.42	5
55.17	511.60	273.28	238.16	5
55.30	569.30	277.79	291.13	4
55.41	627.00	281.88	344.92	4
53.75	213.59	213.59	0.00	Overtopping

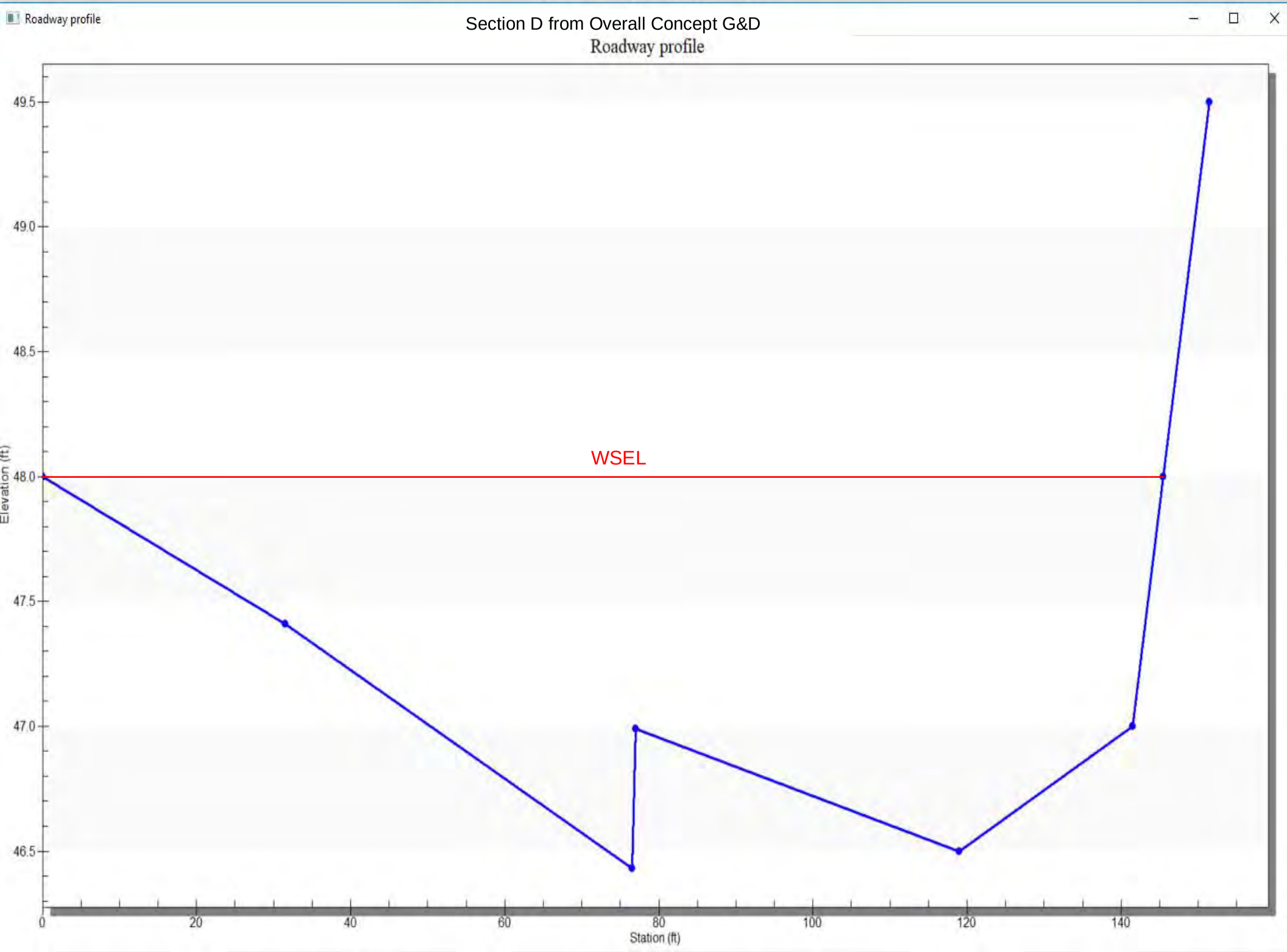
Section B from Overall Concept G&D

Crossing - Scottsdale Road Middle, Design Discharge - 718.0 cfs

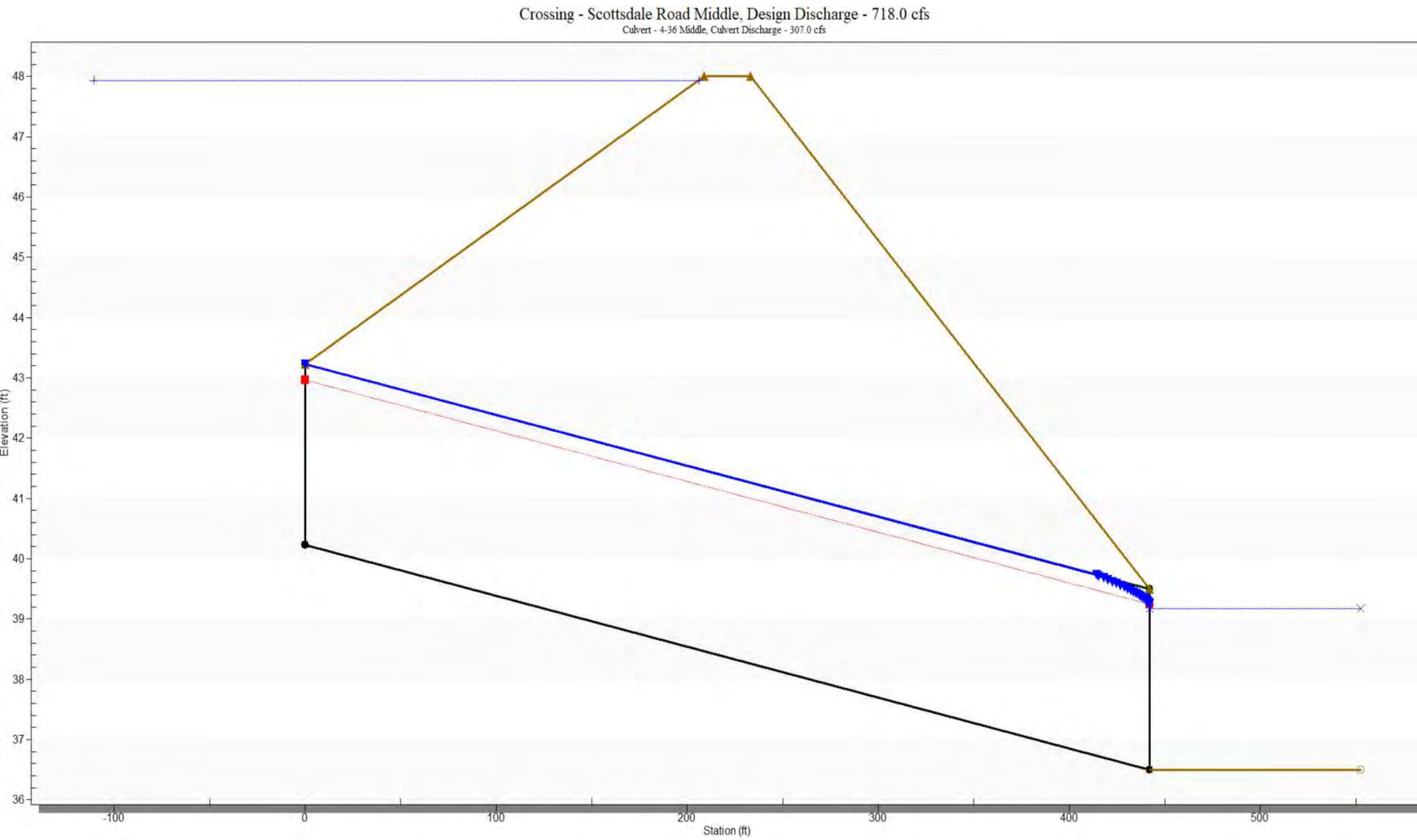
Culvert - 4-36 Middle, Culvert Discharge - 307.0 cfs

Roadway profile

Section D from Overall Concept G&D



Section D from Overall Concept G&D



HY-8 Analysis Results

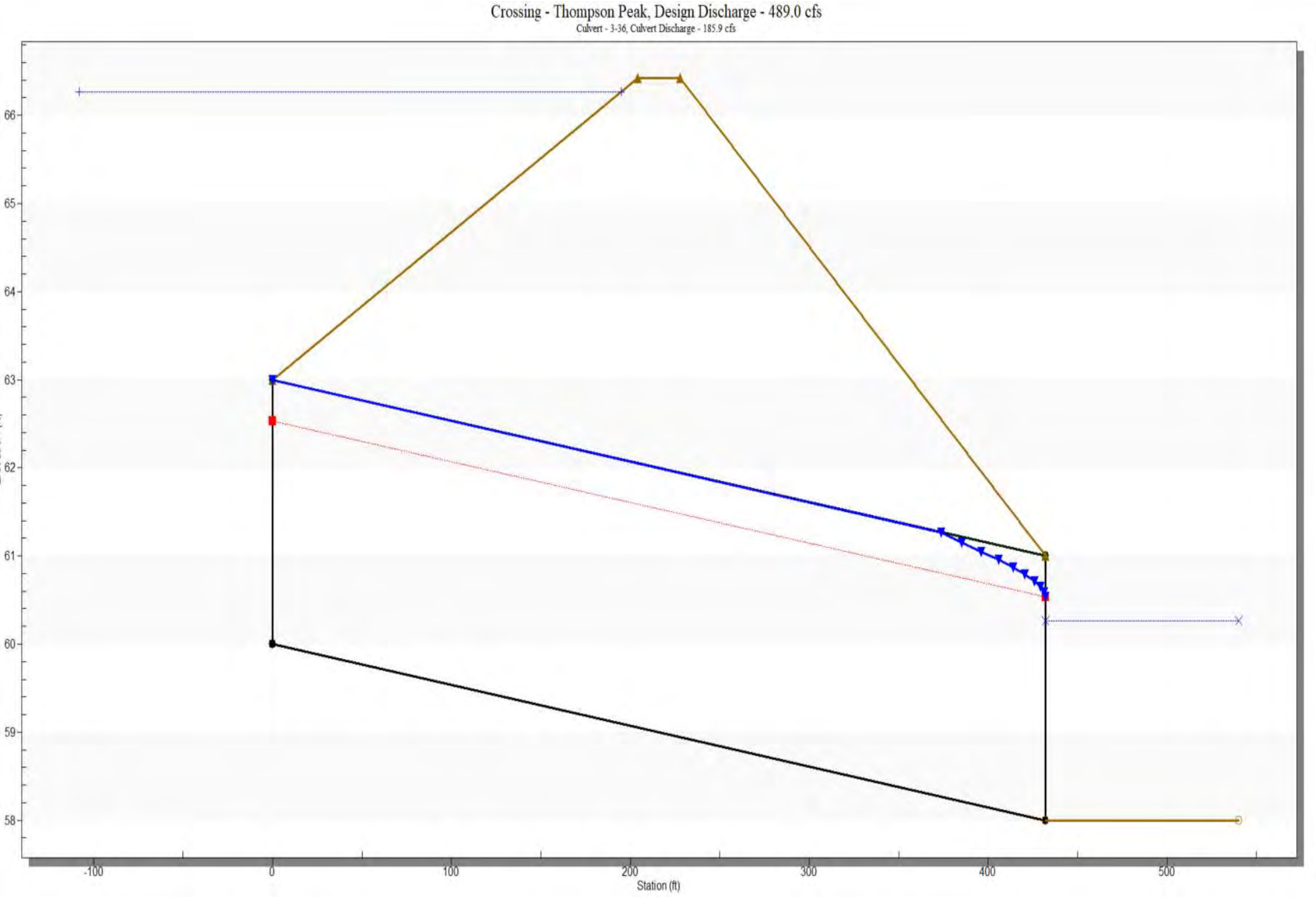
Crossing Summary Table

Culvert Crossing: Scottsdale Road Middle

Headwater Elevation	Total Discharge (cfs)	4-36 Middle Discharge (cfs)	Roadway Discharge (cfs)	Iterations
41.79	50.00	50.00	0.00	1
42.87	116.80	116.80	0.00	1
43.92	183.60	183.60	0.00	1
45.32	250.40	250.40	0.00	1
46.94	317.20	289.62	27.37	10
47.21	384.00	294.44	89.47	7
47.41	450.80	297.83	152.69	6
47.56	517.60	300.44	216.79	5
47.70	584.40	302.91	281.41	5
47.82	651.20	305.04	345.84	4
47.94	718.00	307.01	410.91	4
46.43	280.84	280.84	0.00	Overtopping

Section D from Overall Concept G&D

Section K from Overall Concept G&D



HY-8 Analysis Results

Crossing Summary Table

Culvert Crossing: Thompson Peak

Headwater Elevation	Total Discharge (cfs	3-36 Discharge (cfs	Roadway Discharge (cfs)	Iterations
60.00	0.00	0.00	0.00	1
61.85	48.90	48.90	0.00	1
62.85	97.80	97.80	0.00	1
63.94	146.70	146.70	0.00	1
65.09	195.60	167.38	28.12	9
65.49	244.50	173.68	70.71	8
65.74	293.40	177.47	115.67	8
65.91	342.30	180.47	161.45	6
66.05	391.20	182.68	208.11	5
66.17	440.10	184.28	255.61	5
66.27	489.00	185.88	302.98	4
64.20	154.03	154.03	0.00	Overtopping

Section K from Overall Concept G&D

APPENDIX F – EXCERPTS FROM ONE SCOTTSDALE MASTER DRAINAGE PLAN, DRAINAGE REPORT FOR TDI AT ONE SCOTTSDALE, PHASE I, AND FINAL DRAINAGE REPORT FOR ONE SCOTTSDALE PU III INFRASTRUCTURE IMPROVEMENTS (PUIII)

ONE SCOTTSDALE
MASTER DRAINAGE PLAN

Revised June 20, 2013
Revised March 26, 2012
Revised April 13, 2009
September 26, 2006
WP# 021584

Submitted to:

City of Scottsdale
7447 East Indian School Road
Suite 205
Scottsdale, Arizona 85251

Prepared for:

DMB Associates, Inc.
7600 East Doubletree Ranch Road
Suite 300
Scottsdale, Arizona 85258
Phone: (480) 367-7000
Fax: (480) 367-9788
Contact: Mr. Steve Loken

Prepared by:

Wood, Patel & Associates, Inc.
2051 West Northern Avenue
Suite 100
Phoenix, Arizona 85021
Phone: (602) 335-8500
Fax: (602) 335-8580
Contact: Mr. Darrel E. Wood, P.E., R.L.S.

WOOD/PATEL
MISSION: CLIENT SERVICE™

ONE SCOTTSDALE
MASTER DRAINAGE PLAN

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WOOD/PATEL
MISSION: CLIENT SERVICE

TABLE OF CONTENTS

PLATES

EXHIBITS

APPENDICES

ju

Y:\WP\Reports\Hydrology\021584 One Scottsdale Master Drainage Plan_Revised_June2013.doc

1	0410	51	79.	*	1	1025	126	5.	*	1	1640	201	1.	*	1	2255	276	0.
1	0415	52	74.	*	1	1030	127	5.	*	1	1645	202	1.	*	1	2300	277	0.
1	0420	53	71.	*	1	1035	128	5.	*	1	1650	203	1.	*	1	2305	278	0.
1	0425	54	67.	*	1	1040	129	5.	*	1	1655	204	1.	*	1	2310	279	0.
1	0430	55	65.	*	1	1045	130	4.	*	1	1700	205	1.	*	1	2315	280	0.
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1	0510	63	48.	*	1	1125	138	4.	*	1	1740	213	1.	*	1	2355	288	0.
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1	0525	66	44.	*	1	1140	141	3.	*	1	1755	216	1.	*	2	0010	291	0.
1	0530	67	42.	*	1	1145	142	3.	*	1	1800	217	1.	*	2	0015	292	0.
1	0535	68	41.	*	1	1150	143	3.	*	1	1805	218	1.	*	2	0020	293	0.
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1	0605	74	34.	*	1	1220	149	3.	*	1	1835	224	0.	*	2	0050	299	0.
1	0610	75	33.	*	1	1225	150	3.	*	1	1840	225	0.	*	2	0055	300	0.
				*					*					*				

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
(CFS)	(HR)	(CFS)				
111.	3.67		43.	13.	12.	12.
		(INCHES)	46.262	53.855	53.871	53.871
		(AC-FT)	21.	25.	25.	25.

CUMULATIVE AREA = .01 SQ MI

100-YEAR - 6 HOUR POST-DEVELOPED PEAK FLOWS FROM HEC-1 MASTER

1

RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

	OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD			BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
					6-HOUR	24-HOUR	72-HOUR			
*	HYDROGRAPH AT	1A1	44.	3.17	4.	1.	1.	.02		
+	ROUTED TO	DET1A1	12.	3.50	4.	1.	1.	.02		
+									1.73	3.50
*	ROUTED TO	RA1-C4	11.	3.50	4.	1.	1.	.02		
*									.91	3.50
*	HYDROGRAPH AT	1C4	9.	3.17	1.	0.	0.	.00		
+	2 COMBINED AT	CP1C4	15.	3.17	4.	1.	1.	.02		
+	ROUTED TO	RC4-C3	15.	3.25	4.	1.	1.	.02		
+									1.05	3.25
*	HYDROGRAPH AT	1Da3	38.	3.08	3.	1.	1.	.01		
+	ROUTED TO	DE1Da3	3.	3.67	2.	1.	1.	.01		
*									2.51	3.67
+	HYDROGRAPH AT	1Da4	29.	3.08	2.	1.	1.	.01		
+	2 COMBINED AT	CP1Da4	30.	3.08	4.	1.	1.	.02		
+	ROUTED TO	DE1Da4	6.	3.58	4.	1.	1.	.02		
+									3.14	3.58
+	HYDROGRAPH AT	1Da5	7.	3.17	1.	0.	0.	.00		
+	3 COMBINED AT	CP1C3I	25.	3.17	9.	3.	3.	.05		
+	ROUTED TO	RC3-C3	24.	3.25	9.	3.	3.	.05		
+									1.52	3.25
+	HYDROGRAPH AT	Off-1A	21.	3.08	2.	0.	0.	.01		
+	HYDROGRAPH AT	1A2	11.	3.08	1.	0.	0.	.00		
+	HYDROGRAPH AT	1A3	18.	3.08	1.	0.	0.	.01		

+	3 COMBINED AT	CPA3	50.	3.08	4.	1.	1.	.02	
+ +	ROUTED TO	DET1A3	33.	3.17	4.	1.	1.	.02	2.84 3.17
+ +	ROUTED TO	RA3-A6	35.	3.25	4.	1.	1.	.02	.60 3.25
+	HYDROGRAPH AT	1A6	12.	3.08	1.	0.	0.	.00	
+	2 COMBINED AT	CP1A6	80.	3.25	5.	1.	1.	.03	
+ +	ROUTED TO	DET1A6	35.	3.33	5.	1.	1.	.03	2.87 3.33
+	HYDROGRAPH AT	1A5	42.	3.08	4.	1.	1.	.02	
+	2 COMBINED AT	CP1A5	59.	3.25	8.	2.	2.	.04	
+ +	ROUTED TO	DET1A5	53.	3.33	8.	2.	2.	.04	2.96 3.33
+	HYDROGRAPH AT	1A4	27.	3.08	2.	1.	1.	.01	
+ +	ROUTED TO	RA4-A7	25.	3.17	2.	1.	1.	.01	.50 3.17
+ +	ROUTED TO	DET1A4	14.	3.33	2.	1.	1.	.01	2.65 3.33
+	HYDROGRAPH AT	1A7	21.	3.08	2.	0.	0.	.01	
+	3 COMBINED AT	CP1A7	74.	3.33	12.	3.	3.	.06	
+ +	ROUTED TO	DET1A7	66.	3.42	12.	3.	3.	.06	3.62 3.42
+	HYDROGRAPH AT	1C1	57.	3.17	5.	1.	1.	.02	
+	2 COMBINED AT	CP1C1	85.	3.33	17.	4.	4.	.08	
+ +	ROUTED TO	DET1C1	78.	3.50	16.	4.	4.	.08	4.86 3.50
+	HYDROGRAPH AT	1C2	54.	3.17	5.	1.	1.	.02	
+	2 COMBINED AT	CP1C2	92.	3.50	21.	6.	5.	.11	
+ +	ROUTED TO	DE1C2A	93.	3.50	21.	6.	5.	.11	5.05 3.50
+ +	ROUTED TO	DE1C2B	90.	3.50	21.	6.	5.	.11	5.02 3.50
+ +	ROUTED TO	DE1C2C	92.	3.50	21.	6.	5.	.11	5.04 3.50
+	HYDROGRAPH AT	1C3	68.	3.08	5.	1.	1.	.03	
+	3 COMBINED AT	CP1C3	128.	3.50	33.	10.	9.	.19	
+ +	ROUTED TO	DET1C3	109.	3.67	33.	10.	9.	.19	2.55 3.67
+ +	ROUTED TO	RC3COM	108.	3.67	33.	10.	9.	.19	11.14 3.67
+	HYDROGRAPH AT	COMB	110.	3.08	10.	2.	2.	.03	
+ +	ROUTED TO	DETCOM	11.	3.67	7.	2.	2.	.03	2.55 3.67
+	2 COMBINED AT	CPCOM	119.	3.67	41.	12.	12.	.22	

+	ROUTED TO	COMOF1	119.	3.75	41.	12.	12.	.22	
+									11.20 3.75
+	HYDROGRAPH AT	OFF1	84.	3.08	6.	2.	2.	.02	
+	ROUTED TO	DEOFF1	11.	3.50	6.	2.	2.	.02	
+									2.61 3.50
+	2 COMBINED AT	CPOFF1	130.	3.75	46.	14.	13.	.24	
+	ROUTED TO	OF1OF3	129.	3.75	46.	14.	13.	.24	
+									11.31 3.75
+	HYDROGRAPH AT	OFF3	58.	3.08	5.	1.	1.	.02	
+	ROUTED TO	DEOFF3	10.	3.50	5.	1.	1.	.02	
+									2.20 3.50
+	2 COMBINED AT	CPOFF3	138.	3.75	51.	15.	14.	.25	
+	ROUTED TO	33A1	137.	3.83	51.	15.	14.	.25	
+	HYDROGRAPH AT	33A	150.	3.17	15.	4.	4.	.05	
+	HYDROGRAPH AT	33A.1	11.	3.17	1.	0.	0.	.00	
+	HYDROGRAPH AT	33A.2	34.	3.08	3.	1.	1.	.01	
+	ROUTED TO	33A2	30.	3.08	3.	1.	1.	.01	
+	4 COMBINED AT	33A3	226.	3.17	67.	20.	19.	.31	
+	HYDROGRAPH AT	1Db	104.	3.08	8.	2.	2.	.04	
+	ROUTED TO	DE1Db	13.	3.58	7.	2.	2.	.04	
+									2.99 3.58
+	HYDROGRAPH AT	1Da1	25.	3.08	2.	0.	0.	.01	
+	ROUTED TO	DE1Da1	4.	3.50	2.	0.	0.	.01	
+									2.95 3.50
+	HYDROGRAPH AT	1Da2	5.	3.17	0.	0.	0.	.00	
+	3 COMBINED AT	CP1Dab	18.	3.50	9.	3.	3.	.05	
+	ROUTED TO	RDabE2	18.	3.50	9.	3.	3.	.05	
+									.75 3.50
+	HYDROGRAPH AT	1Ea1	44.	3.17	4.	1.	1.	.02	
+	ROUTED TO	DE1Ea1	4.	3.75	3.	1.	1.	.02	
+									2.81 3.75
+	HYDROGRAPH AT	1Ea2	65.	3.08	5.	1.	1.	.02	
+	2 COMBINED AT	CP1Ea2	66.	3.08	7.	2.	2.	.04	
+	ROUTED TO	DE1Ea2	16.	3.50	7.	2.	2.	.04	
+									3.25 3.50
+	2 COMBINED AT	CP1Ea2	34.	3.50	16.	5.	5.	.09	
+	HYDROGRAPH AT	PARK	37.	3.08	3.	1.	1.	.02	
+	HYDROGRAPH AT	SCHOOL	59.	3.08	5.	1.	1.	.01	
+	ROUTED TO	DETSCH	12.	3.42	4.	1.	1.	.01	
+									2.84 3.42
+	ROUTED TO	SCH12	12.	3.42	4.	1.	1.	.01	
+									10.43 3.42

+	HYDROGRAPH AT	1Ec	33.	3.08	3.	1.	1.	.01		
+	ROUTED TO	DE1Ec	9.	3.33	3.	1.	1.	.01		
+									2.47	3.33
+	2 COMBINED AT	CP1Ec	21.	3.42	7.	2.	2.	.02		
+	ROUTED TO	1EcEa2	21.	3.42	7.	2.	2.	.02		
+									10.59	3.42
+	3 COMBINED AT	CP1Ea	67.	3.17	26.	7.	7.	.14		
+	ROUTED TO	REaTPP	67.	3.17	26.	7.	7.	.14		
+									10.92	3.17
+	HYDROGRAPH AT	1Eb	151.	3.17	14.	4.	3.	.06		
+	ROUTED TO	DET1Eb	39.	3.50	13.	4.	3.	.06		
+									2.26	3.50
+	HYDROGRAPH AT	OFF2	121.	3.08	11.	3.	3.	.03		
+	ROUTED TO	DEOFF2	11.	3.67	8.	3.	3.	.03		
+									2.59	3.67
+	3 COMBINED AT	CPOFF2	115.	3.50	46.	14.	13.	.23		
+	ROUTED TO	1Kr.1	115.	3.50	46.	14.	13.	.23		
+	HYDROGRAPH AT	1Kr	118.	3.17	13.	3.	3.	.05		
+	ROUTED TO	DET1K	18.	3.75	11.	3.	3.	.05		
+									2.77	3.75
+	2 COMBINED AT	1Kr.2	133.	3.50	57.	17.	16.	.28		
+	ROUTED TO	1Kr.3	133.	3.50	57.	17.	16.	.28		
+	HYDROGRAPH AT	33E.3	45.	3.08	4.	1.	1.	.01		
+	2 COMBINED AT	1Kr.4	148.	3.17	60.	18.	17.	.29		
+	ROUTED TO	1Kr.5	147.	3.17	60.	18.	17.	.29		
+	HYDROGRAPH AT	33E.4	28.	3.08	2.	0.	0.	.01		
+	2 COMBINED AT	1Kr.6	161.	3.17	62.	18.	18.	.30		
+	ROUTED TO	1Mr.1	160.	3.17	62.	18.	18.	.30		
+	HYDROGRAPH AT	33E	68.	3.08	5.	1.	1.	.01		
+	2 COMBINED AT	1Mr.2	207.	3.08	66.	19.	19.	.32		
+	ROUTED TO	1Mr.3	203.	3.08	66.	19.	19.	.32		
+	HYDROGRAPH AT	1Mr	152.	3.17	14.	4.	3.	.05		
+	ROUTED TO	DET1M	49.	3.42	13.	4.	3.	.05		
+									3.70	3.42
+	HYDROGRAPH AT	33BE	3.	3.17	0.	0.	0.	.00		
+	3 COMBINED AT	33E.2	219.	3.17	80.	23.	22.	.37		
+	ROUTED TO	R33E.2	219.	3.17	80.	23.	22.	.37		
+	HYDROGRAPH AT	33D	61.	3.17	5.	1.	1.	.04		
+	HYDROGRAPH AT	S40ET	76.	3.08	6.	1.	1.	.02		
	HYDROGRAPH AT									

+		S40CN	180.	3.08	14.	4.	3.	.04		
+	4 COMBINED AT	CT13.0	472.	3.08	103.	30.	28.	.47		
+	HYDROGRAPH AT	33C	115.	3.08	9.	2.	2.	.03		
+	2 COMBINED AT	CT13.1	587.	3.08	111.	32.	31.	.50		
+	DIVERSION TO	P-PIPE	70.	3.08	56.	18.	17.	.50		
+	HYDROGRAPH AT	D_BAS	517.	3.08	55.	14.	13.	.50		
+	DIVERSION TO	D-BAS2	77.	3.08	2.	1.	0.	.50		
+	HYDROGRAPH AT	D_BAS1	517.	3.08	53.	13.	13.	.50		
+	DIVERSION TO	D-SURF	517.	3.33	22.	5.	5.	.50		
+	HYDROGRAPH AT	D_SURF	251.	3.33	31.	8.	8.	.50		
+	HYDROGRAPH AT	B_PIPE	70.	2.75	56.	18.	17.	.00		
+	HYDROGRAPH AT	B_SURF	77.	2.92	2.	1.	0.	.00		
+	3 COMBINED AT	CS40B	321.	3.33	90.	26.	25.	.50		
+	ROUTED TO	S40BA3	237.	3.67	89.	26.	25.	.50		
+									5.71	3.67
+	DIVERSION TO	D33C.2	109.	3.67	41.	12.	12.	.50		
+	HYDROGRAPH AT	33E.1	128.	3.67	48.	14.	14.	.50		
+	HYDROGRAPH AT	R33C.2	109.	3.67	41.	12.	12.	.00		
+	HYDROGRAPH AT	S40WT	40.	3.08	3.	1.	1.	.01		
+	2 COMBINED AT	33C.2	111.	3.67	43.	13.	12.	.01		

1

SUMMARY OF KINEMATIC WAVE - MUSKINGUM-CUNGE ROUTING
(FLOW IS DIRECT RUNOFF WITHOUT BASE FLOW)

ISTAO	ELEMENT	DT	PEAK	TIME TO PEAK	VOLUME	INTERPOLATED TO COMPUTATION INTERVAL DT	PEAK	TIME TO PEAK	VOLUME
		(MIN)	(CFS)	(MIN)	(IN)	(MIN)	(CFS)	(MIN)	(IN)
33A1	MANE	1.55	137.77	227.80	2.21	5.00	136.79	230.00	2.21

CONTINUITY SUMMARY (AC-FT) INFLOW= .2975E+02 EXCESS= .0000E+00 OUTFLOW= .2975E+02 BASIN STORAGE= .2975E-02 PERCENT ERROR= .0

33A	MANE	1.40	150.51	189.00	2.92	5.00	150.01	190.00	2.92

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .7359E+01 OUTFLOW= .7348E+01 BASIN STORAGE= .1343E-02 PERCENT ERROR= .1

33A.1	MANE	2.44	11.88	191.75	2.92	5.00	11.36	190.00	2.92

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .5457E+00 OUTFLOW= .5452E+00 BASIN STORAGE= .1375E-04 PERCENT ERROR= .1

33A.2	MANE	.34	35.43	185.97	2.92	5.00	34.38	185.00	2.92

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .1356E+01 OUTFLOW= .1354E+01 BASIN STORAGE= .8402E-04 PERCENT ERROR= .1

33A2	MANE	.69	33.99	186.47	2.93	5.00	29.73	185.00	2.93

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1356E+01 EXCESS= .0000E+00 OUTFLOW= .1357E+01 BASIN STORAGE= .5409E-05 PERCENT ERROR= -.1

1Kr.1	MANE	.33	115.27	209.94	2.20	5.00	115.26	210.00	2.20

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2702E+02 EXCESS= .0000E+00 OUTFLOW= .2702E+02 BASIN STORAGE= .3385E-03 PERCENT ERROR= .0

1Kr.3	MANE	.21	132.52	210.12	2.22	5.00	132.51	210.00	2.22

FLOW SUMMARY			
STORM EVENT	CONCENTRATION POINT	PRE-EXISTING FLOW (CFS)	POST-DEVELOPED FLOW (CFS)
10-YR, 6-HOUR	33A3	120	125
	33B	5	0
	33C-2	44	56
	33E	36	41
50-YR, 6-HOUR	33A3	208	195
	33B	12	0
	33C-2	96	81
	33E	96	93
100-YR, 6-HOUR	33A3	242	228
	33B	16	0
	33C-2	105	91
	33E	135	120

NOTES:
1. ESTIMATED PRE-DEVELOPMENT PEAK FLOWS AND RUNOFF VOLUMES PER HEC-1 MODELS INCLUDED IN APPENDIX A-HYDROLOGY.
2. CONCENTRATION POINTS INDICATED ARE ALONG DOWNSTREAM SITE BOUNDARY. REFER TO EXHIBIT 1a - OFFSITE WATERSHED MAP AND EXISTING CONDITIONS HEC-1 SCHEMATIC MAP - FOR LOCATION OF PRE-DEVELOPMENT CONCENTRATION POINTS. REFER TO EXHIBIT 1b - ONSITE WATERSHED MAP AND PROPOSED CONDITION HEC-1 SCHEMATIC MAP - FOR LOCATION OF POST-DEVELOPMENT CONCENTRATION POINTS.
3. CONCENTRATION POINT 33E1 REFLECTS COMBINATION OF 33E AND 33D WHICH COMBINE IN AN OPEN CHANNEL IMMEDIATELY DOWNSTREAM OF THE ADOT 101 FREEWAY.

OFFSITE CULVERT SUMMARY		
CULVERT ID	CULVERT SIZE AND TYPE	NOTES
1	5-36"ø RCP	EXISTING CULVERTS
2	18'W x 4'H RCBC	EXISTING CULVERT
3	12'W x 4'H RCBC	EXISTING CULVERT
4	5-42"ø RCP	EXISTING ADOT CULVERT
5	6-48"ø RCP	EXISTING ADOT CULVERT
6	6-48"ø RCP	EXISTING ADOT CULVERT
7	5-36"ø RCP	EXISTING CULVERTS

LEGEND

- POST-DEVELOPMENT CONDITION FLOW ARROW
- SUBBASIN BOUNDARY
- SUBBASIN
- CHANNEL ROUTE
- STORAGE ROUTE
- COMBINE
- DIVERSION

N

200 0 100 200
Horz. 1 in. = 200 ft.

ONE SCOTTSDALE
ONSITE WATERSHED MAP AND PROPOSED CONDITION HEC-1 SCHEMATIC MAP

Wood, Patel & Associates, Inc.
[illegible] Phoenix, Arizona [illegible] (602) [illegible]

Exhibit 1.b

S:\2002\02584-04\Project Support\Drainage MP\HEC1_Update_June2012\Exhibits\ EXHIBIT - 1B - 2012-06-11.dwg

THOMPSON PEAK PARKWAY

SCOTTSDALE ROAD

75' ROW
SCENIC CORRIDOR

TDI PHASE I

TDI PHASE II

33A.1

33A.2

33E.3

33E.4

33A

33E

33BE

33C

33rd ST

LEGACY BLVD

A

B

D

3-36" RCP (EXISTING)
Q_{100} =136cfs
Q_{50} =101cfs
Q_{10} =50cfs
CP OFF.3 ①

8'X4' RCBC (EXISTING)
Q_{100} =226cfs
Q_{50} =195cfs
Q_{10} =125cfs
33A3 ②

24" RCP (EXISTING)
Q_{100} =0cfs
Q_{50} =0cfs
Q_{10} =0cfs
33B ③

Q_{100} =115cfs
Q_{50} =99cfs
Q_{10} =65cfs
33C

Q_{100} =40cfs
Q_{50} =35cfs
Q_{10} =25cfs
S40WT
FLOWS DIRECTLY TO CULVERT 4

5.75' WEIR EXISTING BASIN OUTLET

24" PIPE EXISTING BASIN OUTLET

Q_{100} =111cfs
Q_{50} =81cfs
Q_{10} =56cfs
INV=1600.58
33C.2 ④

3-36" RCP (EXISTING)
Q_{100} =115cfs
Q_{50} =96cfs
Q_{10} =62cfs
CP OFF.2 ⑦

EAST DRAINAGE STORM DRAIN

Q_{100} =133cfs
Q_{50} =110cfs
Q_{10} =72cfs
CP IKr.2
OFFSITE FLOW FROM ADJACENT STORAGE BASIN

Q_{100} =148cfs
Q_{50} =126cfs
Q_{10} =8cfs
CP IKr.4
ONSITE FLOW FROM SUBBASIN 33E.3

SWALE ALONG EASTERN BOUNDARY SEE CROSS SECTION A

Q_{100} =161cfs
Q_{50} =136cfs
Q_{10} =86cfs
CP IKr.6
ONSITE FLOW FROM SUBBASIN 33E.4

60" CIPP (PROPOSED)

Q_{100} =207cfs
Q_{50} =176cfs
Q_{10} =111cfs
CP IMr.2
ONSITE FLOW FROM SUBBASIN 33E

Q_{100} =219cfs
Q_{50} =190cfs
Q_{10} =124cfs
CP 33E.2
AT EXISTING CATCH BASINS (OFFSITE FLOW FROM ADJACENT STORAGE BASIN)

2 EA 54" EXISTING

2 EA 54" EXISTING

S40ET

S40CN

S40WT

Q_{100} =76cfs
Q_{50} =65cfs
Q_{10} =43cfs
S40ET

SWALE ALONG EASTERN BOUNDARY SEE CROSS SECTION B

2 EA 54" EXISTING

Q_{100} =472cfs
Q_{50} =400cfs
Q_{10} =256cfs
CP CT13.0
AT JUNCTION STRUCTURE

3 EA 54" TO STORAGE BASIN PUMP STATION

EXISTING DIAL BUILDING

STORAGE BASIN

PIMA FREEWAY

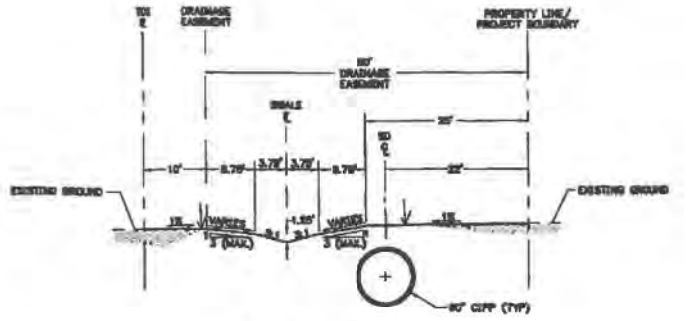
6.75' WEIR EXISTING BASIN OUTLET
30" PIPE WITH 26.4" ORIFICE PLATE EXISTING BASIN OUTLET
EMERGENCY OUTFALL

⑤ INV=1598.22
⑥ INV=1599.22

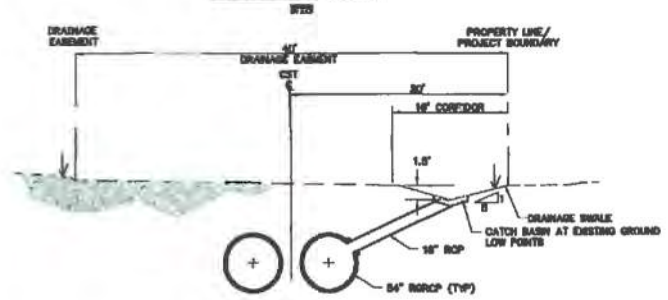
EXISTING 2 EA 54" WITH ORIFICE PLATES CONNECTED TO ADOT BOX CULVERT

COMBINED FLOWS
Q_{100} =128cfs
Q_{50} =93cfs
Q_{10} =41cfs
33E.1

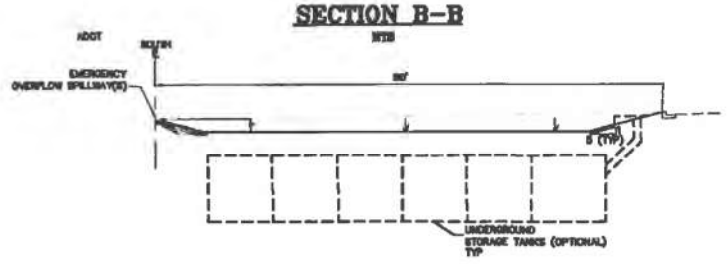
200 0 100 200
Horz. 1 in. = 200 ft.



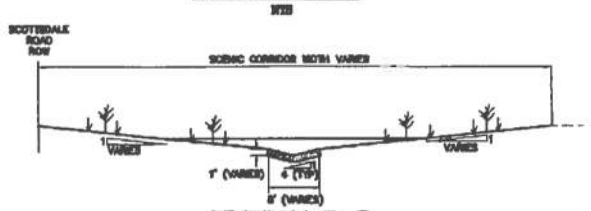
SECTION A-A



SECTION B-B



SECTION C-C



SECTION D-D

OFFSITE CULVERT SUMMARY		
CULVERT ID	CULVERT SIZE AND TYPE	NOTES
1	3-36" RCP	EXISTING CULVERTS
2	8'X4' RCBC	EXISTING CULVERT
3	24" RCP	EXISTING CULVERT
4	3-36"ø RCP	EXISTING ADOT CULVERT
5	2-8'X5' RCBC	EXISTING ADOT CULVERT
6	2-8'X5' RCBC	EXISTING ADOT CULVERT
7	3-36"ø RCP	EXISTING CULVERTS

LEGEND

- SUBBASIN BOUNDARY
- 33A SUBBASIN
- S40WT POST-DEVELOPMENT CONDITION HEC-1 CONCENTRATION POINT
- B TYPICAL CROSS-SECTION. SEE EXHIBIT I.d FOR CROSS-SECTION DETAILS.
- POST-DEVELOPMENT CONDITION FLOW ARROW
- PROPOSED CHANNEL/SWALE CONCEPTUAL LAYOUT

NOTES:
1. ALL STORM DRAINS SHOWN ARE CONCEPTUAL AND ARE SUBJECT TO CHANGE.
2. CHANNEL LAYOUT IS CONCEPTUAL AND IS SUBJECT TO CHANGE.

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ONE SCOTTSDALE
PROPOSED DRAINAGE FACILITIES AND CROSS-SECTIONS

Wood, Patel & Associates, Inc.
2051 West Northern, Suite 100
Phoenix, Arizona 85021
(602) 335-8500

Exhibit I.d

1415-12-2

2nd 5/7/12 TSS

DRAINAGE

DRAINAGE REPORT
FOR
TDI AT ONE SCOTTSDALE, PHASE I
SCOTTSDALE, ARIZONA

May 17, 2012
WP# 113738

Plan # 1415-12-2
Case # _____
Q-S # _____
[X] Accepted
[ ] Corrections
M. Rahman 6/5/12
Reviewed By Date

WOOD/PATEL
MISSION: CLIENT SERVICE™

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APPENDICES

EXHIBITS

Expires 9/30/2013

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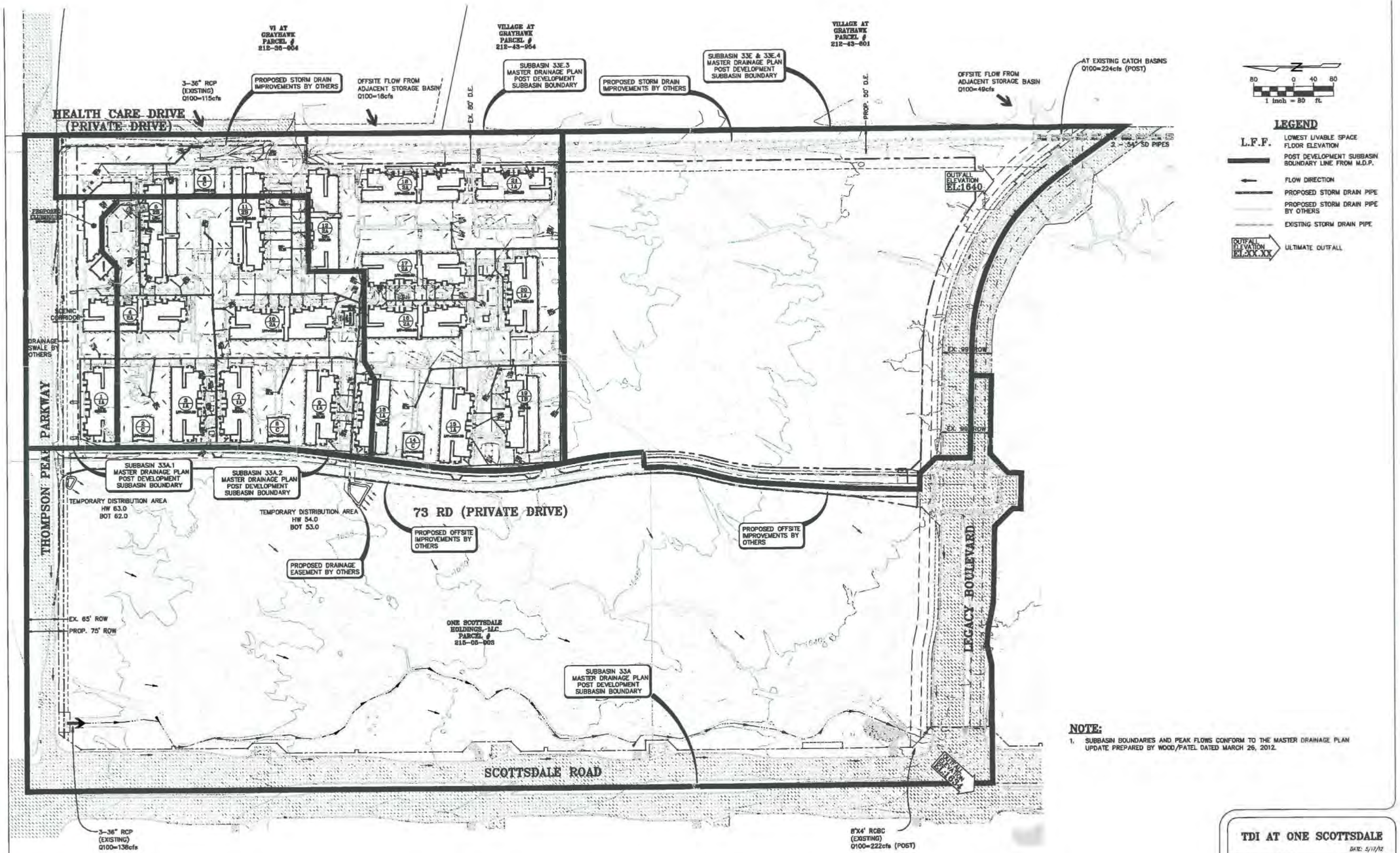
Y:\WP\Reports\Commercial\113738 TDI One Scottsdale Phase 1 Drainage Report.docx.doc



NOTE:

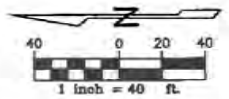
1. SUBBASIN BOUNDARIES AND PEAK FLOWS CONFORM TO THE MASTER DRAINAGE PLAN UPDATE PREPARED BY WOOD/PATEL DATED MARCH 26, 2012.

TDI AT ONE SCOTTSDALE

DATE: 5/17/12

FINAL DRAINAGE MAP (1 OF 2)

WOOD/PATEL



LEGEND

L.F.F.	LOWEST LIVABLE SPACE FLOOR ELEVATION
	TDI PHASE 1 MAJOR SUBBASIN BOUNDARY LINE
B19	TDI PHASE 1 MAJOR SUBBASIN BOUNDARY ID (SITE)
R3	TDI PHASE 1 MAJOR SUBBASIN BOUNDARY ID (ROOF)
	TDI PHASE 1 MINOR SUBBASIN BOUNDARY LINE
B19A	TDI PHASE 1 MINOR SUBBASIN BOUNDARY ID (SITE)
R3A	TDI PHASE 1 MINOR BASIN BOUNDARY ID (ROOF)
CB19B	STORMCAD INLET ID
OF-3	STORMCAD OUTFALL ID
	FLOW DIRECTION
	PROPOSED STORM DRAIN PIPE
	PROPOSED STORM DRAIN PIPE BY OTHERS
	EXISTING STORM DRAIN PIPE
OUTFALL ELEVATION EL.XX.XX	ULTIMATE OUTFALL

TABLE 1: LOWEST LIVABLE SPACE FLOOR ELEVATIONS

BUILDING ID	LOWEST LIVABLE SPACE FLOOR ELEVATION (LFF)	HIGHEST NATURAL GRADE ADJACENT TO BUILDING (HG)	ELEVATION DIFFERENCE (LFF - HG)	HIGHEST FINISH GRADE ADJACENT TO BUILDING (FG)	ELEVATION DIFFERENCE (LFF - FG)
1	1668.0	1666.9	2.1	1669.0	1.0
2	1668.9	1665.0	3.9	1667.0	1.0
3	1667.0	1664.0	3.0	1666.0	1.0
4	1669.0	1667.0	2.0	1668.0	1.0
5	1668.0	1666.0	2.0	1667.0	1.0
6	1667.0	1664.1	2.9	1666.0	1.0
7	1665.0	1662.7	2.3	1664.0	1.0
8	1664.0	1660.6	3.4	1663.0	1.0
9	1663.0	1659.4	3.6	1662.0	1.0
10	1664.0	1661.6	2.4	1663.0	1.0
11	1666.0	1663.3	2.7	1665.0	1.0
12	1664.0	1662.0	2.0	1663.0	1.0
13	1661.0	1657.5	3.5	1660.0	1.0
14	1659.0	1656.2	4.8	1658.0	1.0
15	1659.0	1654.6	4.4	1658.0	1.0
16	1660.0	1658.0	2.0	1659.0	1.0
17	1662.0	1658.4	3.6	1661.0	1.0
18	1662.2	1660.2	2.0	1661.2	1.0
19	1658.0	1652.5	3.5	1655.0	1.0
20	1658.0	1656.2	2.8	1657.0	1.0
21	1659.2	1656.2	3.0	1658.2	1.0
CLUBHOUSE	1670.0	1668.0	2.0	1669.0	1.0

NOTE:

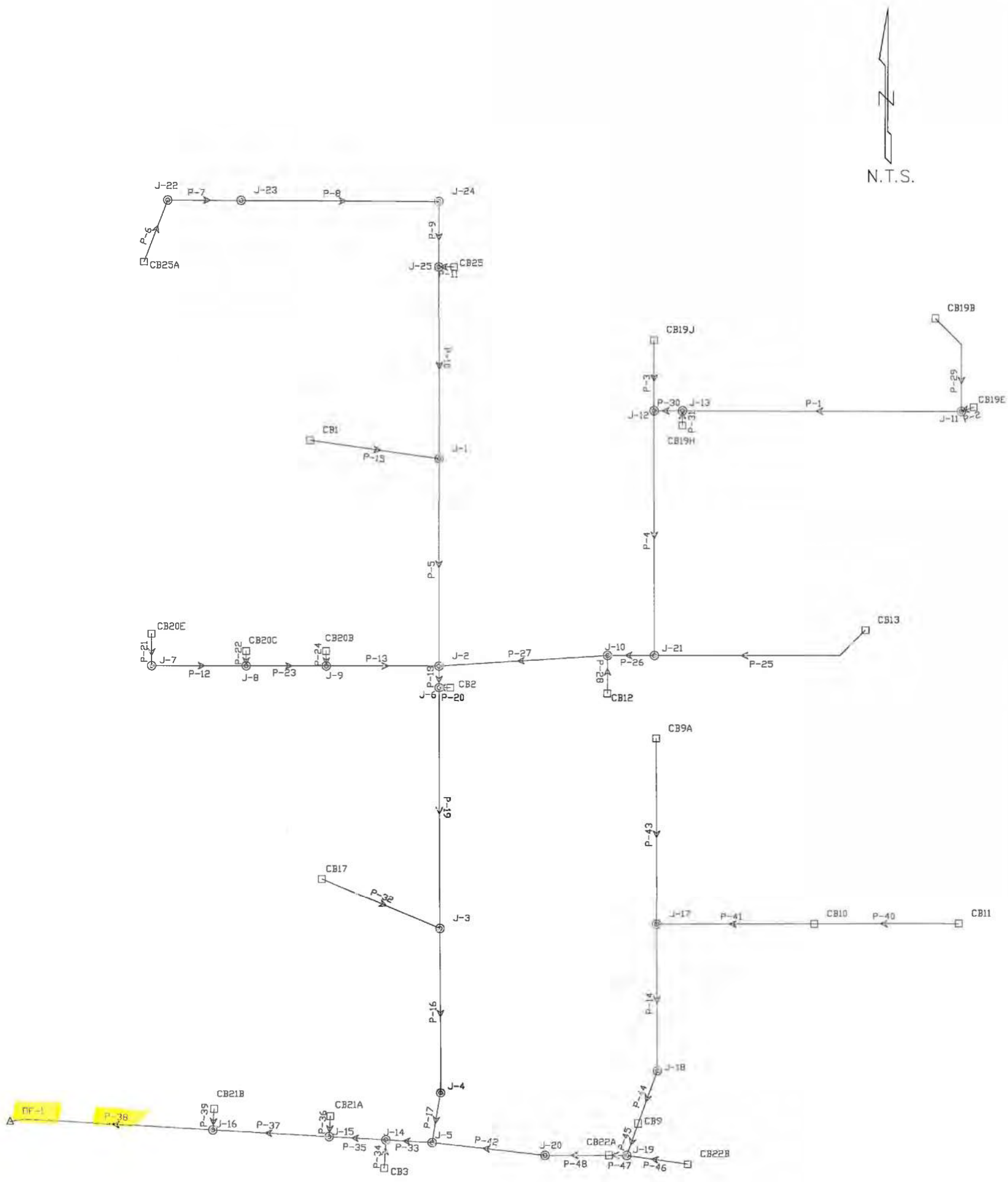
1. SUBBASIN BOUNDARIES AND PEAK FLOWS CONFORM TO THE MASTER DRAINAGE PLAN UPDATE PREPARED BY WOOD/PATEL DATED MARCH 28, 2012.

TDI AT ONE SCOTTSDALE

DATE: 5/17/12

FINAL DRAINAGE MAP (2 OF 2)

WOOD/PATEL



NOT
FOR CONSTRUCTION
OR RECORDING

TDI AT ONE SCOTTSDALE
PHASE 1

WEST OUTFALL
STORMCAD MODEL
SCHEMATIC

WOOD/PATEL
CIVIL ENGINEERS
HYDROLOGISTS
LAND SURVEYORS
CONSTRUCTION MANAGERS
(602) 335-8500
PHOENIX • MESA • GOODYEAR • TUCSON

Scenario: 100 YR Storm
WEST OUTFALL
Pipe Report

Label	Upstream Node	Downstream Node	Length (ft)	Slope (ft/ft)	Diameter (in)	Material	Manning's n	Total System Flow (ft³/s)	Upstream Invert (ft)	Downstream Invert (ft)	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)	Average Velocity (ft/s)
P-36	CB21A	J-15	12.0	0.121	12.0	Corrugated HDPE (Smooth Interior)	0.012	1.71	1,655.90	1,654.45	1,656.63	1,656.66	11.72
P-37	J-15	J-16	69.0	0.005	36.0	Corrugated HDPE (Smooth Interior)	0.012	43.53	1,653.45	1,653.10	1,656.21	1,656.03	8.17
P-38	J-16	OF-1	121.0	0.005	36.0	Corrugated HDPE (Smooth Interior)	0.012	45.42	1,653.10	1,652.50	1,655.31	1,654.70	8.14
P-39	CB21B	J-16	12.0	0.117	12.0	Corrugated HDPE (Smooth Interior)	0.012	1.89	1,655.50	1,654.10	1,656.09	1,656.03	11.92
P-40	CB11	CB10	85.0	0.009	18.0	Corrugated HDPE (Smooth Interior)	0.012	2.88	1,658.00	1,657.22	1,658.75	1,658.79	5.21
P-41	CB10	J-17	93.0	0.005	18.0	Corrugated HDPE (Smooth Interior)	0.012	5.60	1,657.22	1,656.76	1,658.63	1,658.42	4.90
P-42	J-20	J-5	67.0	0.005	24.0	Corrugated HDPE (Smooth Interior)	0.012	11.40	1,655.09	1,654.75	1,657.75	1,657.61	3.63
P-43	CB9A	J-17	111.0	0.010	18.0	Corrugated HDPE (Smooth Interior)	0.012	1.90	1,659.41	1,658.30	1,659.93	1,658.71	4.78
P-44	J-18	CB9	33.0	0.005	24.0	Corrugated HDPE (Smooth Interior)	0.012	7.50	1,655.59	1,655.43	1,658.25	1,658.22	2.39
P-45	CB9	J-19	20.0	0.005	24.0	Corrugated HDPE (Smooth Interior)	0.012	10.40	1,655.43	1,655.33	1,658.10	1,658.06	3.31
P-46	CB22B	J-19	36.0	0.005	18.0	Corrugated HDPE (Smooth Interior)	0.012	0.31	1,656.01	1,655.83	1,658.06	1,658.06	0.18
P-47	J-19	CB22A	11.0	0.005	24.0	Corrugated HDPE (Smooth Interior)	0.012	10.71	1,655.33	1,655.28	1,658.01	1,657.99	3.41
P-48	CB22A	J-20	38.0	0.005	24.0	Corrugated HDPE (Smooth Interior)	0.012	11.40	1,655.28	1,655.09	1,657.84	1,657.76	3.63

Bowman
CONSULTING

FINAL DRAINAGE REPORT
FOR
ONE SCOTTSDALE PU III INFRASTRUCTURE IMPROVEMENTS

SEC, SCOTTSDALE ROAD & THOMPSON PEAK PARKWAY
SCOTTSDALE, ARIZONA

Prepared for:
ONE SCOTTSDALE HOLDINGS LLC
7600 E. Doubletree Ranch Road, Suite 300
Scottsdale, Arizona 85258
480-367-7000

Prepared by:
BOWMAN CONSULTING
3010 South Priest Drive, Suite 103
Tempe, Arizona 85282
480-629-8830

Plan # 1415-12-5
Case # _____
O-S # _____
☒ Accepted
☐ Corrections
M. Rahman 8/7/12
Reviewed By Date

35199
SHERRI L.
KOSHIOL
7-23-12

July 23, 2012
Project No. 9622
3rd Submittal

III. PROPOSED DRAINAGE PLAN

Post-developed Drainage Conditions

A. Streets and Drainage Tracts Flows

The private drive (73rd Street) has been designed to convey the 10-year flow below the top of curb and the 100-year peak flows within the roadway tract area at a maximum depth of 8 inches. Refer to Appendix B for these calculations. On-grade curb openings are proposed at several locations along the private roadway to remove storm water runoff from the travel lanes and allow it to flow over existing ground to the outlet under Scottsdale Road north of Legacy Drive. These curb openings will have rip-rap protection to mitigate potential erosion. Curb openings design calculations for both the 10-year and 100-year storm conditions are included in Appendix B. The curb opening locations are shown on Figure 5 – Proposed Onsite Drainage Map.

In the future, these street flows may be conveyed to the outfall location under Scottsdale Road through a variety of means including but not limited to: storm drain pipes, channel systems, detention basin areas or any combination thereof. The ultimate design of the property between Scottsdale Road and 73rd Avenue will need to accommodate these flows through the site or within a drainage tract alongside the roadways.

A catchbasin is proposed along Scottsdale Healthcare Drive to intercept upstream contributing areas and convey them to an existing stormdrain system. The location of this catchbasin is shown on Figure 5. Hydraulic calculations are included in Appendix B. As discussed in Offsite Drainage Conditions of Section II of this report, the flow from drainage subbasin 33.A1 (Q100 = 11 cfs) is planned to be conveyed in a drainage channel along the south side of Thompson Peak Parkway and then into a pipe culvert under 73rd Street. Per City of Scottsdale recommendations, the proposed drainage channel has been optimized within the available space to provide a capacity estimated to be 119.4 cfs (100-year flow), which exceeds the contributing flow. Three 36-inch pipes are proposed under 73rd Street to accommodate this channel capacity. Hydraulic calculations for the drainage channel and pipes are included in Appendix B.

A 24-inch pipe culvert is proposed under a sidewalk in the drainage tract located along the north side of Legacy Boulevard. This pipe culvert was sized to accommodate the flow generated within the drainage tract only(subbasin 8 on Figure 5). Hydraulic calculations for the drainage channel and pipe culvert are included in Appendix B.

B. Stormwater Detention

As detailed in the *One Scottsdale Master Drainage Plan* and as approved by the City of Scottsdale, the drainage plan concept for the large master planned mixed use project, and thereby for this individual site development project, was based on waiving retention requirements and maintaining post-development peak flows to

NORMAL DEPTH CALCULTIONS IN CHANNELS

USING MANNING EQUATION

Xcel Sheet Prepared By: GA

Project :	Oak Shadows PH II
Proj. No :	3622
Date :	5/21/12
By:	GA

Sec # **Channel Along South Side of Thompson Peak Pkwy**

Enter 1 if "n" varies by banks (LB,CH,& RB), or 2 if by station: 1

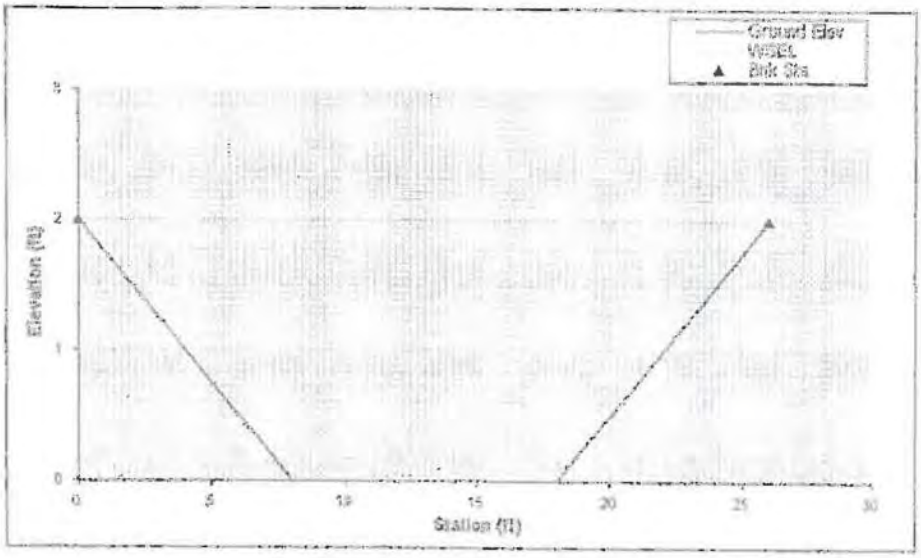
Point no.	Elev. (FT)	Sta. (FT)		n by sta N/A	Left Bank Sta. (ft)		Right Bank Sta. (ft)
1	2.00	0.00	*		0.00		36.00
2	0.00	8.00			n-LB	* n-CH *	n-RB
3	0.00	18.00			0.028	0.028	0.028
4	2.00	26.00	*		Channel n values		HEC-RAS
					S	0.0060	ft/ft

Solve for : (d or Q)		Q
d =	2.000	ft

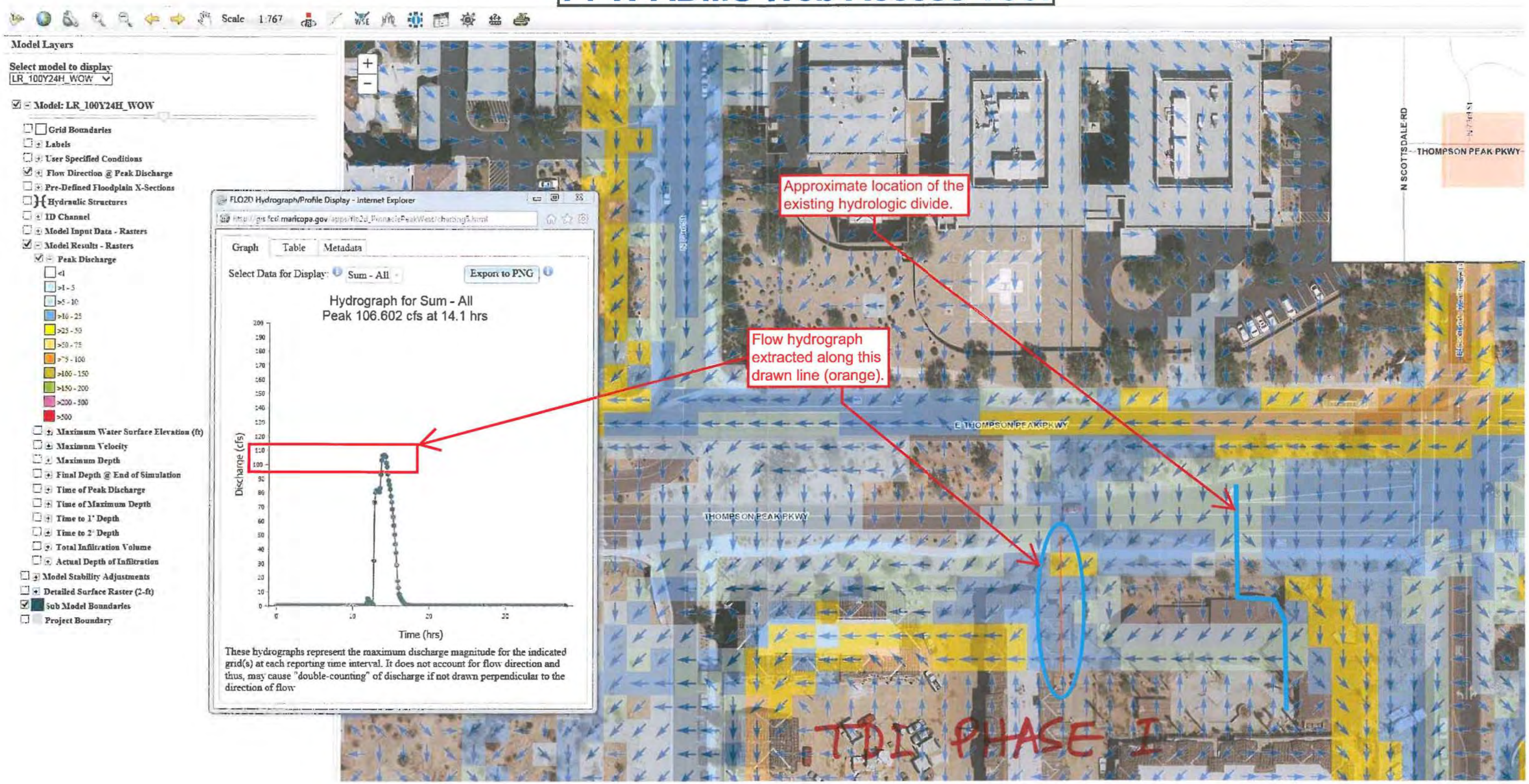
Qcalc.	119.4	cfs
WSEL	2.00	ft
V_{chnl}	4.3	fps
Fr	0.50	---

HYDRAULIC SUMMARY.

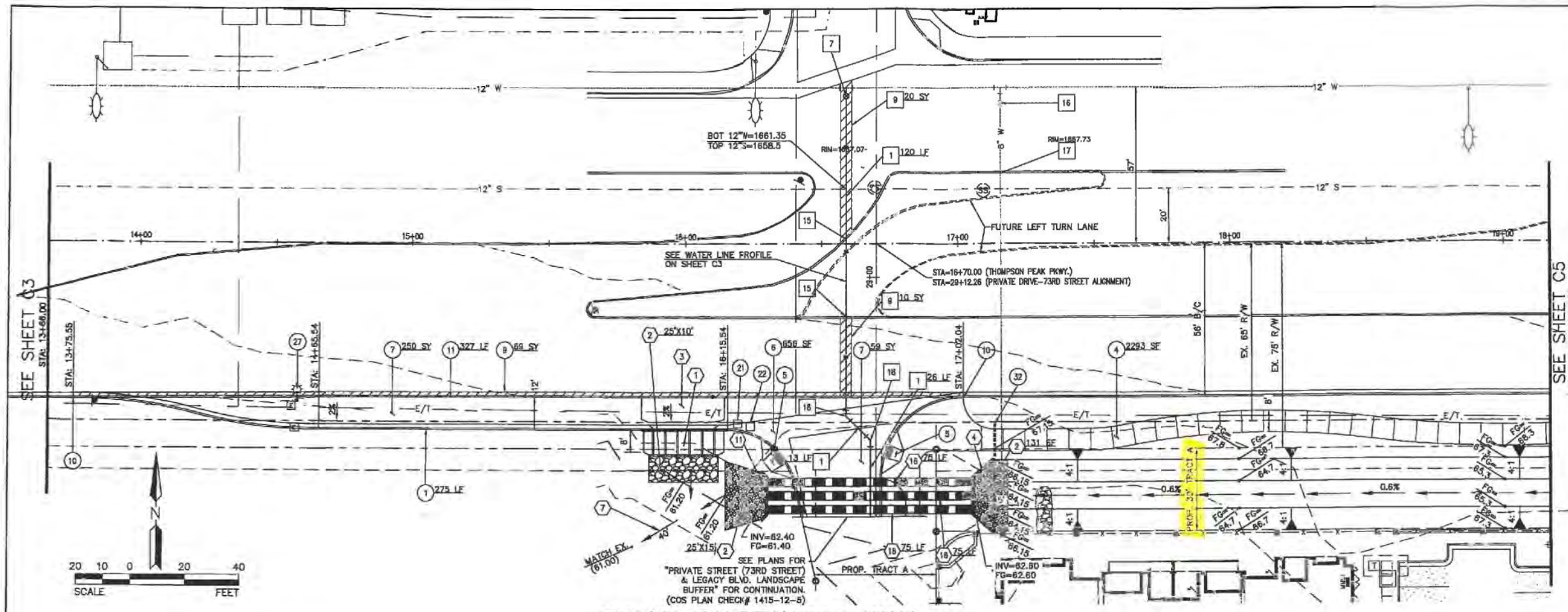
Calc. Flow (cfs)	Q_{calc}	119.4
L-Bank Flow (cfs)	Q_L	0.0
Chnl Flow (cfs)	Q_{chan}	119.4
R-Bank Flow (cfs)	Q_R	0.0
Avg Section Vel (fps)	V_{avg}	4.3
Main Channel Vel (fps)	V_{chn}	4.3
Weighted Manning m.	n_w	0.0426
Slope (ft/ft)	S	0.0060
Max Flow Depth (ft)	d	2.00
WSEL (ft)	WSEL	2.00
Min Elev (ft)	Min Elv	0.00
Area (sf)	A	36.0
Wet. Perim. (ft)	P	26.5
Hyd. Radius	R	1.36
Froude No.	Fr	0.50
LL Floodplain Sta. (ft)	FP_{LL}	0.0
RL Floodplain Sta. (ft)	FP_{RL}	26.0
Floodplain Width (ft)	W_{FP}	26.0

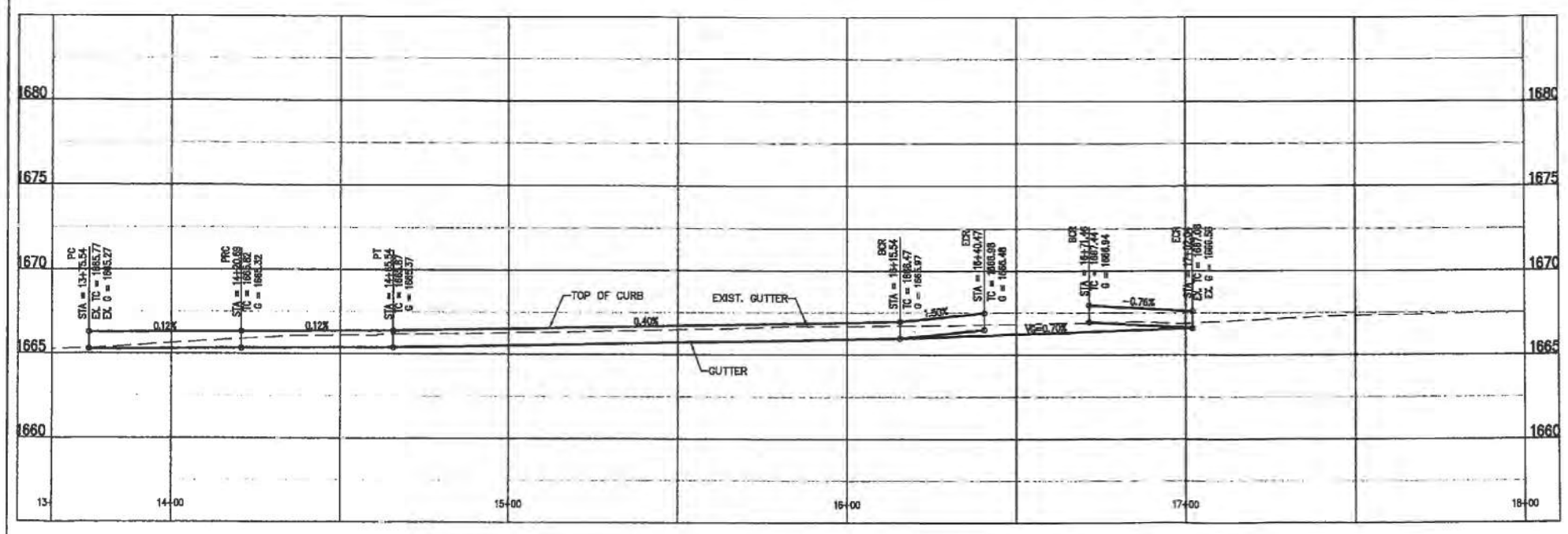


PPW ADMS Web Access Tool



PPW ADMS Flo 2D Viewer





PAVING NOTES

1	CONSTRUCT 6 – INCH VERTICAL CURB & GUTTER PER MAG STD. DET. 220 TYPE A.	275 LF
4	CONSTRUCT MEANDERING SIDWALK PER MAG STD. DET. 230. SEE LANDSCAPE PLANS FOR ADDITIONAL DETAILS.	2293 SF
5	CONSTRUCT SIDEWALK RAMP PER C.O.S. DETAIL 2234.	2 EA
6	CONSTRUCT 6 – FOOT WIDE CONCRETE VALLEY GUTTER PER C.O.S. DETAIL 2240.	656 SF
7	INSTALL NEW AC PAVEMENT – SEE DETAIL SHEET C2.	309 SY
9	SAWCUT AND REMOVE 2 – FOOT MINIMUM EXISTING ASPHALT PAVEMENT.	69 SY
10	MATCH EXISTING CURB AND GUTTER.	
11	REMOVE EXISTING CURB AND GUTTER.	327 LF
21	EXISTING CTV BOX TO BE RELOCATED BY OTHERS.	
22	EXISTING ELECTRIC BOX TO BE RELOCATED BY OTHERS.	
27	EXISTING STREET LIGHT TO BE RELOCATED PER PLANS BY WRIGHT ENGINEERING CORPORATION.	
32	LANDSCAPE IRRIGATION SLEEVES. SEE LANDSCAPE PLANS FOR DETAILS.	

STORM DRAIN NOTES

1	CONSTRUCT SCUPPER PER MAG STD DETS. 206-1 & 206.2 (WIDTH=22 FEET; EXCLUDE SPILLWAY).	1 EA
2	INSTALL EROSION PROTECTION PER DETAIL SHEET C2.	406 SF
3	REMOVE EXISTING SCUPPER.	1 EA
4	CONSTRUCT HEADWALL PER MAG STD. DET. 501-2 MODIFIED FOR 3-36" PIPES. WITH "U" TYPE WINGS (L1=10' 0"). INSTALL HANDRAIL PER C.O.S. DETAIL 2508	1 EA
7	GRADE TO DRAIN AS SHOWN	
11	CONTRUCT HEADWALL PER MAG STD. DET. 501-2 MODIFIED FOR 3 – 36" PIPES. WITH "U" TYPE WINGS (L1=3' 4") – INSTALL HANDRAIL PER C.O.S. DETAIL 2508	1 EA
16	INSTALL 36 – INCH RGRCP CLASS V STORM DRAIN PIPE	225 LF

WATER NOTES

1	INSTALL 12 – INCH D.I.P. (CLASS 350) WATER PIPE WITH JOINT RESTRAINTS PER MAG STD. DETS. 302 & 303.	159 LF
7	INSTALL 12"x12" T.S.V.B. & COVER PER MAG STD. DETS. 340 & 391-1-TYPE C.	1 EA
9	REMOVE AND REPLACE EXISTING PAVEMENT FOR UTILITY INSTALLATION PER C.O.S. DETAIL 2200.	30 SY
15	BORE UNDER EXISTING CONCRETE CURB.	2 EA
16	REMOVE EXISITING VALVE, BOX & COVER. PLUG EXISTING WATER LINE AT TEE.	1 EA
17	EXISTING 8 – INCH WATER LINE TO BE ABANDONED IN PLACE.	
18	INSTALL 12"X45" BEND.	2 EA

NO.	REVISION	DATE

35156
SHERRI L. KOSHIOL
Bowman CONSULTING
Bowman Consulting Group, Ltd.
301 E South Priest Drive, Suite 103
Tempe, Arizona 85282
Phone: (480) 629-8830
www.bowmanconsulting.com

ONE SCOTTSDALE PU III

THOMPSON PEAK PARKWAY & SCOTTSDALE HEALTHCARE DRIVE

CIVIL IMPROVEMENT PLANS

PROJECT NO: 9822	SCALE: H: 1"=20' V: 1"=4'	SHEET NO.	FILE NO.
DRAWN: JAB CHECK: JAB APPROVED: GB		C4 OF 7	
DATE: 07-22-12 DATE: 07-25-12 DATE: 07-23-12			

1415-12-4, 52-DR-2011, 359-SA-2011,376-SA-2011,377-SA-2011,378-SA-2011, Q.S. 40-45, 12-NP-1415

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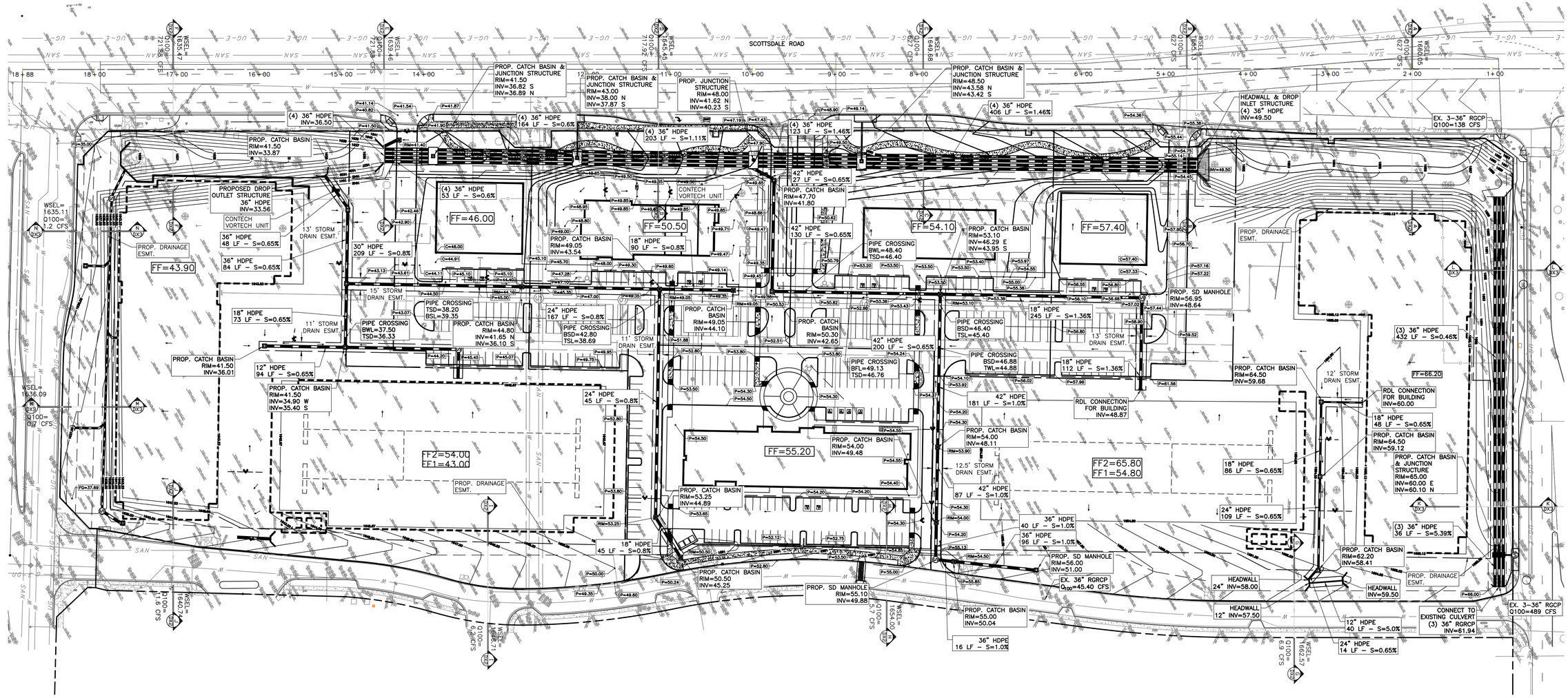

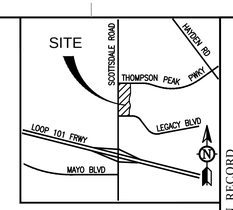

VICINITY MAP
N.T.S.

PROPOSED LEGEND

PAVEMENT ELEVATION	P=58.00
ONSITE DRAINAGE ARROW	
CURB OPENING	
GRADE BREAK	G B

NORTH

SCALE IN FEET
0 60 120

PRELIMINARY
NOT FOR CONSTRUCTION OR RECORDING

Call at least two full working days before you begin excavation.
Arizona Blue Stake, Inc.
ARIZONA811
Dial 8-1-1 or 1-800-STAKE-IT (782-5348)
In Maricopa County: (602) 263-1100

REGISTERED PROFESSIONAL ENGINEER
CERTIFICATE NO.
23980
JEFFREY S. ERICKSON
Date Signed 11/8/19
ARIZONA, U.S.A.
Expires 09/30/20

REVISION RECORD

NO	DATE	DESCRIPTION

Civil & Environmental Consultants, Inc.
11811 N. Tatum Blvd., Suite 3057 - Phoenix, AZ 85028
Ph: 602.760.2324 - 877.231.2324 - Fax: 602.760.2330
www.cecinc.com

ONE SCOTTSDALE
CIVIL IMPROVEMENT PLANS
SCOTTSDALE, AZ

OVERALL
CONCEPT GRADING & DRAINAGE

DATE:	NOVEMBER 2019	DRAWN BY:	BB
DWG SCALE:	1"=60'	CHECKED BY:	KE
PROJECT NO:			180-168
APPROVED BY:			JSE

DRAWING NO.:
CG01
SHEET 1 OF 1

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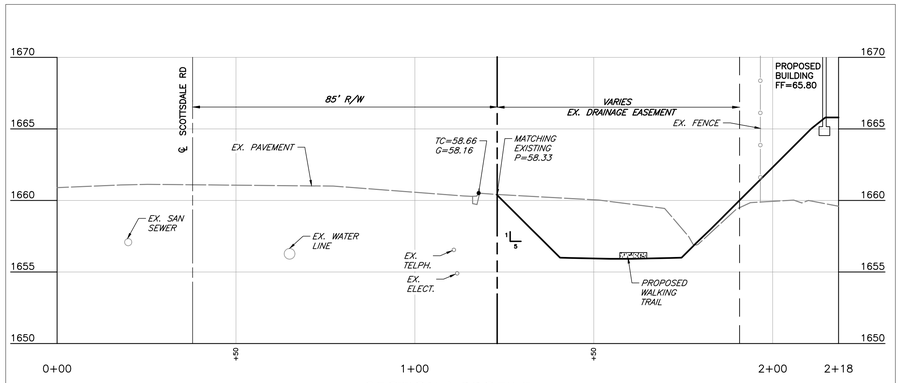

SECTION A PROFILE

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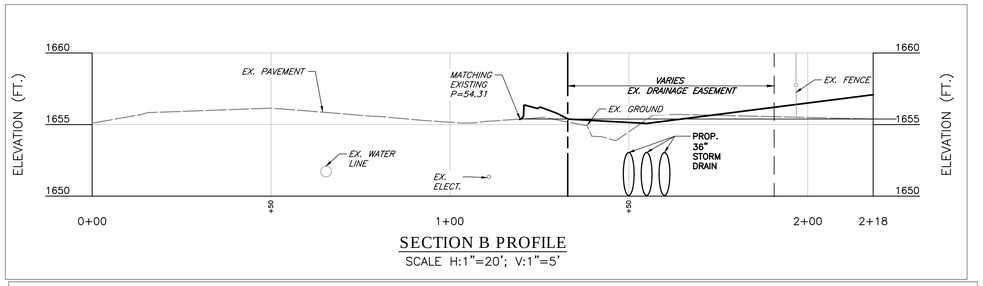

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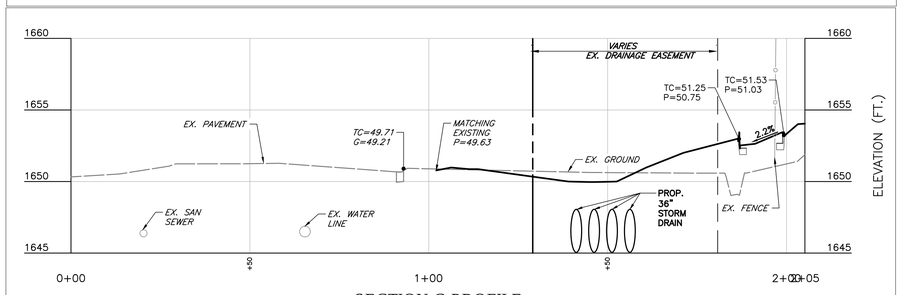

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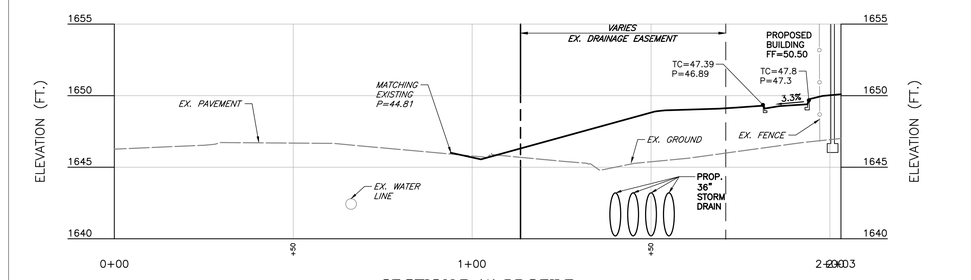

SECTION D (1) PROFILE

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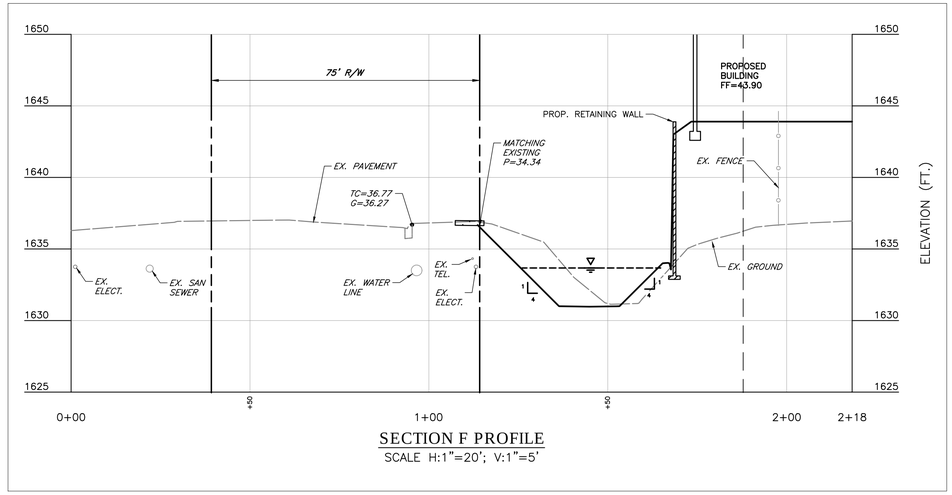

SECTION F PROFILE

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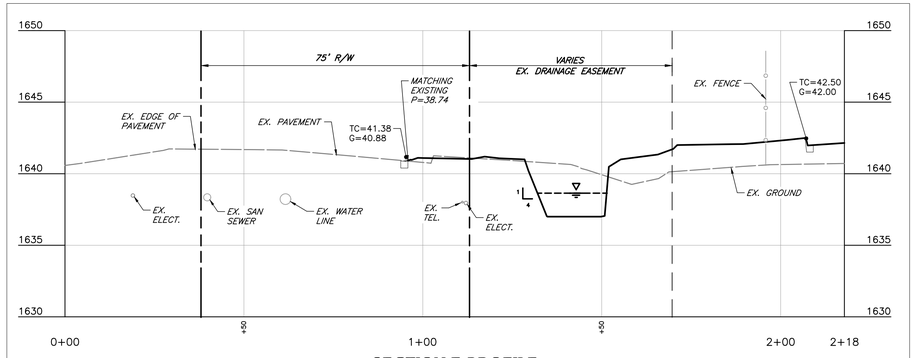

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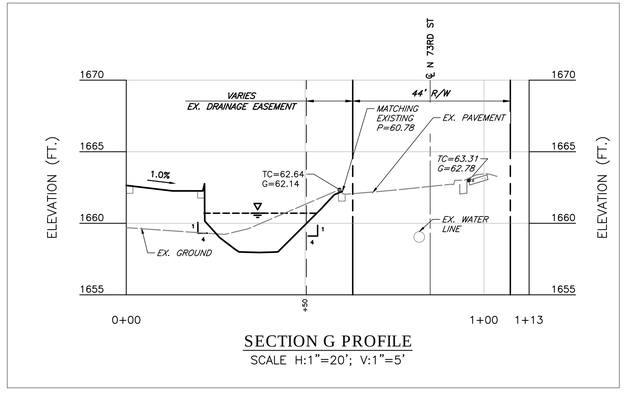

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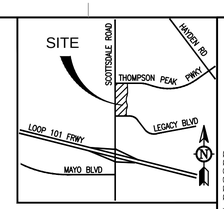

VICINITY MAP

N.T.S.

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OR RECORDING

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Arizona Blue Stake, Inc.
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In Maricopa County: (602) 263-1100

REGISTERED PROFESSIONAL ENGINEER
CERTIFICATE NO.
23980
JEFFREY S. ERICKSON
Date Signed 1-29-20
ARIZONA, U.S.A.
Expires 09/30/20

REVISION RECORD

NO	DATE	DESCRIPTION

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11811 N. Tatum Blvd., Suite 3057 - Phoenix, AZ 85028
Ph: 602.760.2324 - 877.231.2324 - Fax: 602.760.2330
www.ceiinc.com

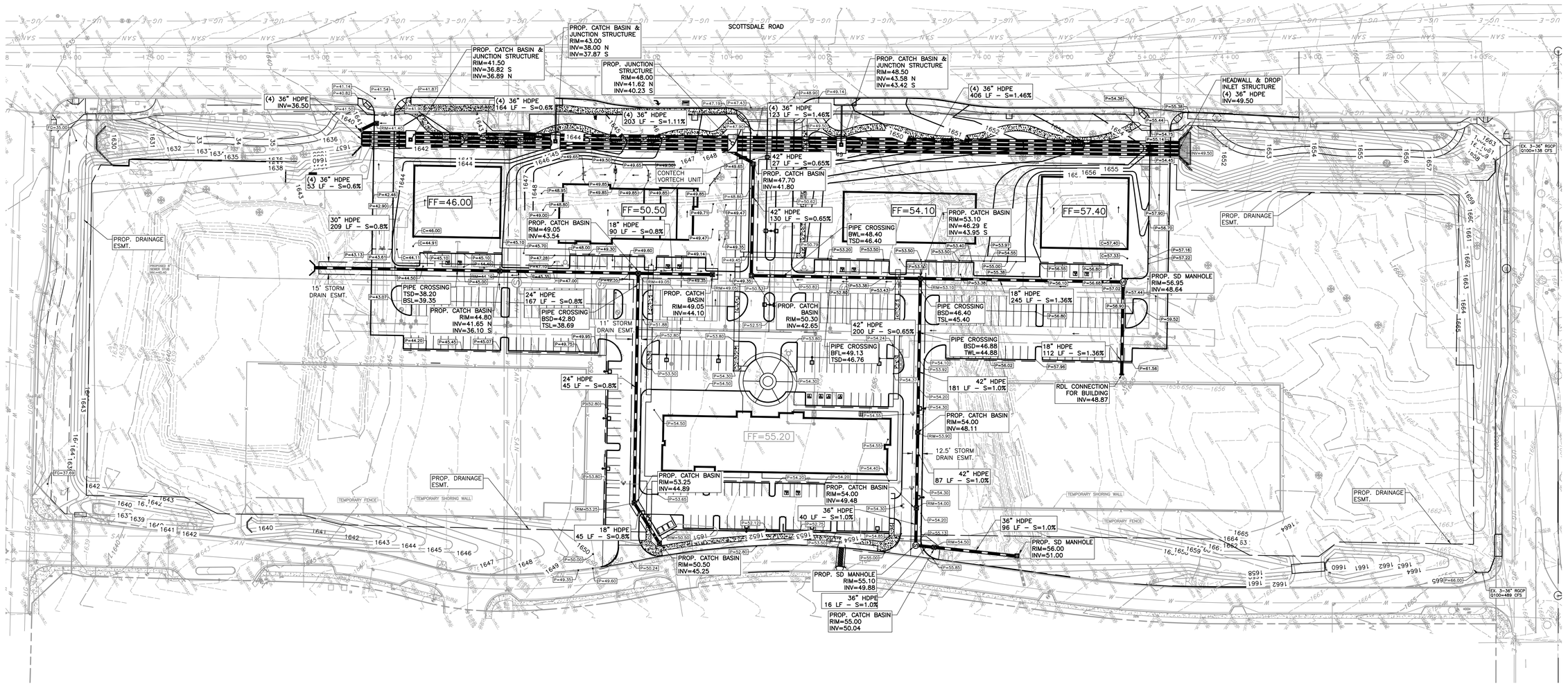
ONE SCOTTSDALE
CIVIL IMPROVEMENT PLANS
SCOTTSDALE, AZ

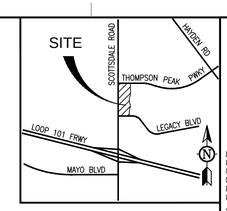
OVERALL
CONCEPT GRADING & DRAINAGE

DATE:	NOVEMBER 2019
DWG SCALE:	AS SHOWN
PROJECT NO:	180-168
DRAWN BY:	BB
CHECKED BY:	KE
APPROVED BY:	JSE

DRAWING NO.:
CG01
SHEET 2 OF 2

P:\180\180-168\--CAD\Dwg\CIVIL\Concept Grading & Drainage\180168--CP01--Concept_GRD Overall.dwg(SECTIONS) LD:(11/8/2019 - bbartlett) - LP: 11/8/2019 4:25 PM





VICINITY MAP
N.T.S.

FLOOD ZONE

ALL BUILDINGS WILL BE STRUCTURALLY INDEPENDENT AND WILL BE FLOODPROOFED TO 2 FEET ABOVE THE HIGHEST ADJACENT NATURAL GRADE WITHIN THE REGULATORY FLOODPLAIN – ZONE AO, DEPTH=1 FOOT.

OWNER

DMB
7600 E DOUBLETREE RANCH RD
SUITE 300
SCOTTSDALE, AZ 85258
CONTACT: MIKE BURKE

ARCHITECT

DAVIS
74 E. RIO SALADO PARKWAY, STE. 200
TEMPE, AZ 85281
PH: 480-638-1100
CONTACT: MIKE DAVIS

ENGINEER

CIVIL & ENVIRONMENTAL CONSULTANTS, INC.
118111 N. TATUM BLVD., SUITE 3057
PHOENIX, ARIZONA 85028
PH: 602-760-2324
FX: 602-760-2330
CONTACT: KALEY BUETHE, PE

PROPOSED LEGEND

- DRAINAGE AREA BOUNDARY
- PAVEMENT ELEVATION P=58.00
- ONSITE DRAINAGE ARROW
- OFFSITE DRAINAGE ARROW
- CURB OPENING
- GRADE BREAK G.B.
- RETENTION BASIN

NORTH

PRELIMINARY
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SCALE IN FEET
0 60 120

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23980
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Date Signed 11/06/19
ARIZONA, U.S.A.
Expires 09/30/20

REVISION RECORD

NO	DATE	DESCRIPTION

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Ph: 602.760.2324 - 877.231.2324 - Fax: 602.760.2330
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ONE SCOTTSDALE
CIVIL IMPROVEMENT PLANS
SCOTTSDALE, AZ

CONCEPT GRADING & DRAINAGE PHASE 2

DATE:	NOVEMBER 2019
DRAWN BY:	BB
DWG SCALE:	1"=60'
CHECKED BY:	KE
PROJECT NO:	180-168
APPROVED BY:	JSE

DRAWING NO.: CG01

SHEET 1 OF 1

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SCOTTSDALE ROAD

LEGACY BLVD

THOMPSON PEAK PKWY

D18 D13 D8 D3 D19 D14 D17 D16 D12 D11 D15 D10 D9 D4 D7 D6 D5 D2 D2A C8 B12 B9 B8 B11 B7A B2 A14 A13 A12 B1 C7 B10 B7 B3 A10 A11 A1 A2 C4 C2 B4 A7 A3 C6 C3 B6 A9 A8 A4 D1 C5 B5 C1 A6 A5

(4) 36" HDPE SD45-48 Q100=721.56 CFS
8" RGRCP SD21 Q100=0.32 CFS
18" RGRCP SD30 Q100=3.64 CFS
(4) 36" HDPE SD41-44 Q100=721.56 CFS
(4) 36" HDPE SD37-40 Q100=717.92 CFS
(3) 36" HDPE SD34-36 Q100=631.20 CFS
18" RGRCP SD29 Q100=4.20 CFS
(3) 36" HDPE SD31-33 Q100=627 CFS
EX. 3-36" RGCP Q100=138 CFS
42" RGRCP SD11 Q100=86.72 CFS
42" RGRCP SD10 Q100=83.60 CFS
30" RGRCP SD27 Q100=25.01 CFS
36" RGRCP SD20 Q100=41.92 CFS
36" RGRCP SD19 Q100=40.71 CFS
12" RGRCP SD26 Q100=1.26 CFS
30" RGRCP SD25B Q100=23.76 CFS
18" RGRCP SD18 Q100=6.74 CFS
18" RGRCP SD25A Q100=7.55 CFS
24" RGRCP SD25 Q100=16.21 CFS
12" RGRCP SD17 Q100=2.19 CFS
18" RGRCP SD17A Q100=4.55 CFS
30" RGRCP SD16 Q100=27.30 CFS
24" RGRCP SD15 Q100=18.69 CFS
18" RGRCP SD12A Q100=8.34 CFS
18" RGRCP SD12 Q100=7.54 CFS
42" RGRCP SD9B Q100=75.44 CFS
18" RGRCP SD9A Q100=4.97 CFS
(3) 36" HDPE SD52-54 Q100= CFS
18" RGRCP SD1 Q100=7.55 CFS
18" RGRCP SD2 Q100=8.49 CFS
24" RGRCP SD4 Q100=9.30 CFS
(3) 36" HDPE SD49-51 Q100=489 CFS
8" RGRCP SD28 Q100=0.64 CFS
12" RGRCP SD24 Q100=1.98 CFS
24" RGRCP SD23 Q100=14.23 CFS
24" RGRCP SD22 Q100=9.83 CFS
24" RGRCP SD14 Q100=10.35 CFS
42" RGRCP SD9 Q100=69.52 CFS
42" RGRCP SD8 Q100=68.84 CFS
36" RGRCP SD7 Q100=45.40 CFS
24" RGRCP SD5 Q100=9.81 CFS
18" RGRCP SD13 Q100=6.66 CFS
42" RGRCP SD8 Q100=68.84 CFS
12" RGRCP SD6 Q100=1.47 CFS
36" RGRCP OFFSITE 1 Q100=45.40 CFS

CB1 CB2 CB3 CB4 CB5 CB6 CB7 CB8 CB9 CB10 CB11 CB12 CB13 CB14 CB15 CB16 CB17 CB18 CB19 CB20 CB21 CB23
C01 C02 C03 C04 C05 C06 C07 C08 C09 C010 C011

LEGEND:

- PROPOSED STORM DRAIN PIPE
- DIRECTION OF PROPOSED DRAINAGE
- D1 — PROPOSED DRAINAGE AREA IDENTIFICATION
- PROPOSED DRAINAGE AREA BOUNDARY
- PROPOSED CURB OPENING
- PROPOSED CATCH BASIN
- PROPOSED CULVERT AND HEADWALLS
- 24" RGRCP SD15 Q100=18.69 CFS — PRELIMINARY STORM DRAIN IDENTIFICATION

NORTH
SCALE IN FEET
0 60 120

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

REGISTERED PROFESSIONAL ENGINEER (CIVIL) CERTIFICATE NO. 23980 JEFFREY S. ERICKSON Date Signed 10/29/19 ARIZONA, U.S.A.

NO	DATE	REVISION RECORD DESCRIPTION

CEC
Civil & Environmental Consultants, Inc.
11811 N. Tatum Blvd., Suite 3057 - Phoenix, AZ 85028
Ph: 602.760.2324 - 877.231.2324 - Fax: 602.760.2330
www.ceceinc.com

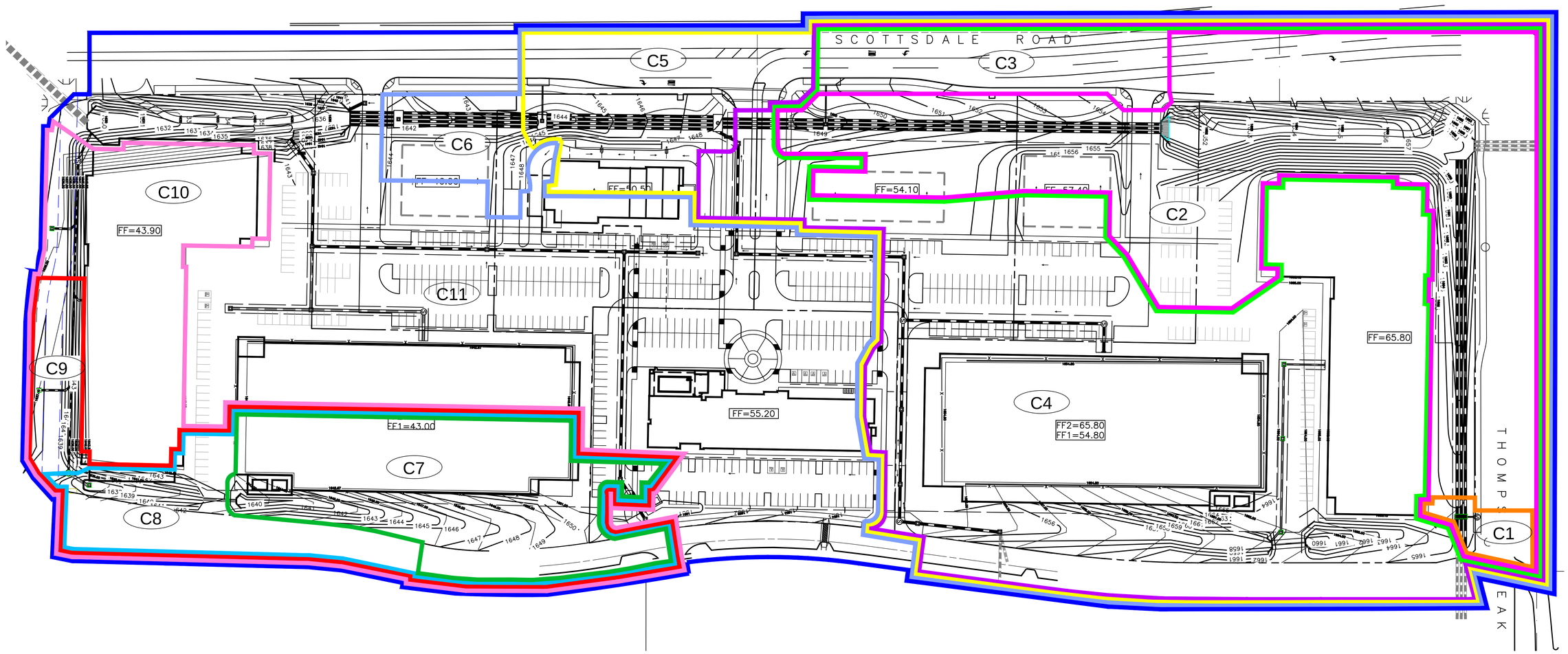
ONE SCOTTSDALE
CIVIL IMPROVEMENT PLANS
SCOTTSDALE, AZ

DRAINAGE EXHIBIT

DATE:	10/29/19
DWG SCALE:	1" = 60'
PROJECT NO:	180-168
APPROVED BY:	JSE
DRAWN BY:	BB
CHECKED BY:	KE

DRAWING NO.: DX
SHEET 1 OF 1

P:\2018\180-168 - CADD\Dwg\Exhibits\180-168drainage exhibit.dwg(LAYOUT1) 10/30/2019 - dp, 11/8/2019 4:11 PM



ONESCOTTSDALE	
CEC PN:180-168	
DATE: OCT 29, 2019	
PREPARED BY: BB	
CHECKED BY: JSE	

CULVERT AREA ID	AREA S.F.	AREA A.C.
C1	6,569.13	0.15
C2	230,170.58	5.28
C3	280,605.76	6.44
C4	595,727.01	13.68
C5	668,012.40	15.34
C6	711,215.79	16.33
C7	76,609.42	1.76
C8	115,171.59	2.64
C9	139,537.80	3.20
C10	218,266.45	5.01
C11	1,268,779.00	29.13

LEGEND:

- C7 — PROPOSED CULVERT AREA IDENTIFICATION
- PROPOSED CULVERT AREA C1 BOUNDARY
- PROPOSED CULVERT AREA C2 BOUNDARY
- PROPOSED CULVERT AREA C3 BOUNDARY
- PROPOSED CULVERT AREA C4 BOUNDARY
- PROPOSED CULVERT AREA C5 BOUNDARY
- PROPOSED CULVERT AREA C6 BOUNDARY
- PROPOSED CULVERT AREA C7 BOUNDARY
- PROPOSED CULVERT AREA C8 BOUNDARY
- PROPOSED CULVERT AREA C9 BOUNDARY
- PROPOSED CULVERT AREA C10 BOUNDARY
- PROPOSED CULVERT AREA C11 BOUNDARY

NOTE:

BOUNDARIES ARE SHOWN FOR CLARIFICATION PURPOSES. THEY WOULD IN ACTUALITY OVERLAP AT CERTAIN LOCATIONS.

NORTH

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

REGISTERED PROFESSIONAL ENGINEER CERTIFICATE NO. 23980 JEFFREY S. ERICKSON ARIZONA, U.S.A. Date Signed 10/29/19 Expires 09/30/20

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www.ceceinc.com

ONE SCOTTSDALE
CIVIL IMPROVEMENT PLANS
SCOTTSDALE, AZ

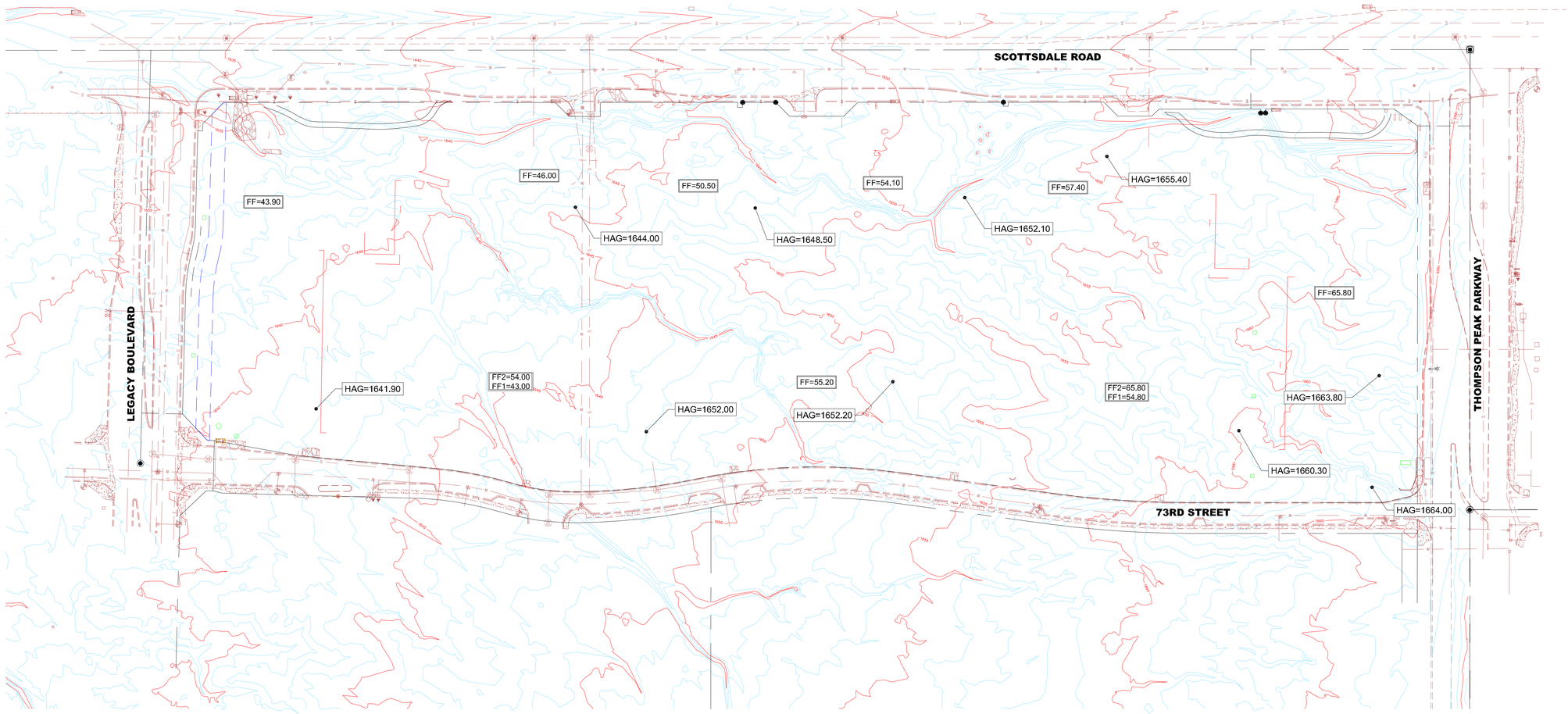
CULVERT EXHIBIT

DATE:	OCTOBER 2019
DWG SCALE:	1" = 80'
PROJECT NO:	180-168
APPROVED BY:	JSE
DRAWN BY:	BB
CHECKED BY:	KE

DRAWING NO.: CUL

SHEET 1 OF 1

P:\2018\180--168\--CAD\Dwg\Exhibits\180--168culvert-drainage--exhibit.dwg[LAYOUT1] 10/29/2019 - kbenkel - LP: 10/29/2019 3:15 PM



BENCHMARK

MARICOPA COUNTY HIGHWAY DEPARTMENT BRASS CAP IN HANDHOLE, SCOTTSDALE GPS POINT 2272, LOCATED AT THE INTERSECTION OF SCOTTSDALE ROAD AND THOMPSON PEAK PARKWAY, HAVING AN ELEVATION OF 1662.878, CITY OF SCOTTSDALE NAVD 88 DATUM.

LOWEST FLOOR ELEVATIONS AND FLOODPROOFING IN NONRESIDENTAL STRUCTURES

IN FLOOD HAZARD ZONE AO, THE LOWEST FLOOR SHALL BE ELEVATED TO OR ABOVE THE RFD, OR ELEVATED AT LEAST TWO (2) FEET ABOVE THE HIGHEST ADJACENT GRADE IF NO DEPTH NUMBER IS SPECIFIED, THIS SITE IS LOCATED IN ZONE AO WITH A DEPTH OF 1.0', VEL=3.0 FPS.

NONRESIDENTIAL CONSTRUCTION, NEW OR SUBSTANTIAL IMPROVEMENT, SHALL EITHER BE ELEVATED TO CONFORM WITH SECTION 37-25 ABOVE, OR, TOGETHER WITH ATTENDANT UTILITY AND SANITARY FACILITIES, SHALL:

(1) BE FLOODPROOFED BELOW THE ELEVATION RECOMMENDED ABOVE SO THAT THE STRUCTURE IS WATERTIGHT WITH WALL SUBSTANTIALLY IMPERMEABLE TO THE PASSAGE OF WATER;
(2) HAVE STRUCTURAL COMPONENTS CAPABLE OF RESISTING HYDROSTATIC AND HYDRODYNAMIC LOADS AND EFFECTS OF BUOYANCY; AND
(3) BE CERTIFIED BY A REGISTERED PROFESSIONAL ENGINEER OR ARCHITECT THAT THE STANDARDS OF THIS SECTION ARE SATISFIED. SUCH CERTIFICATION SHALL BE PROVIDED TO THE FLOODPLAIN ADMINISTRATOR.

NORTH

SCALE IN FEET
0 80 160

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REGISTERED PROFESSIONAL ENGINEER
CERTIFICATE NO.
23980
JEFFREY S. ERICKSON
Date Signed
ARIZONA, U.S.A.
Expires 09/30/20

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www.cecinc.com

ONE SCOTTSDALE
CIVIL IMPROVEMENT PLANS
SCOTTSDALE, AZ

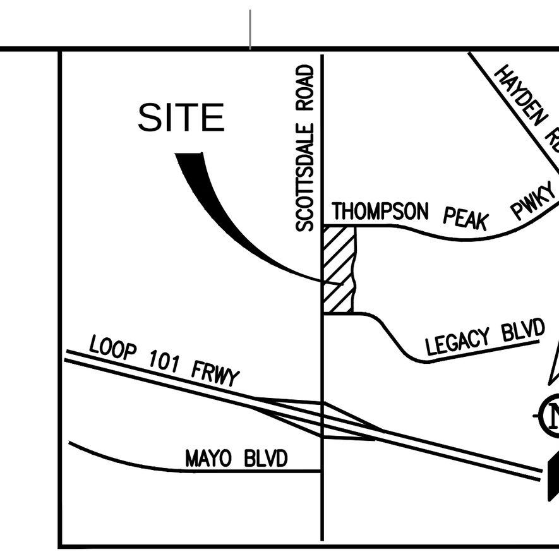
HAG EXHIBIT

DRAWN BY:	BB
CHECKED BY:	KE
DWG SCALE:	1"=80'
PROJECT NO:	180-168
APPROVED BY:	JSE
DATE:	OCTOBER 2019

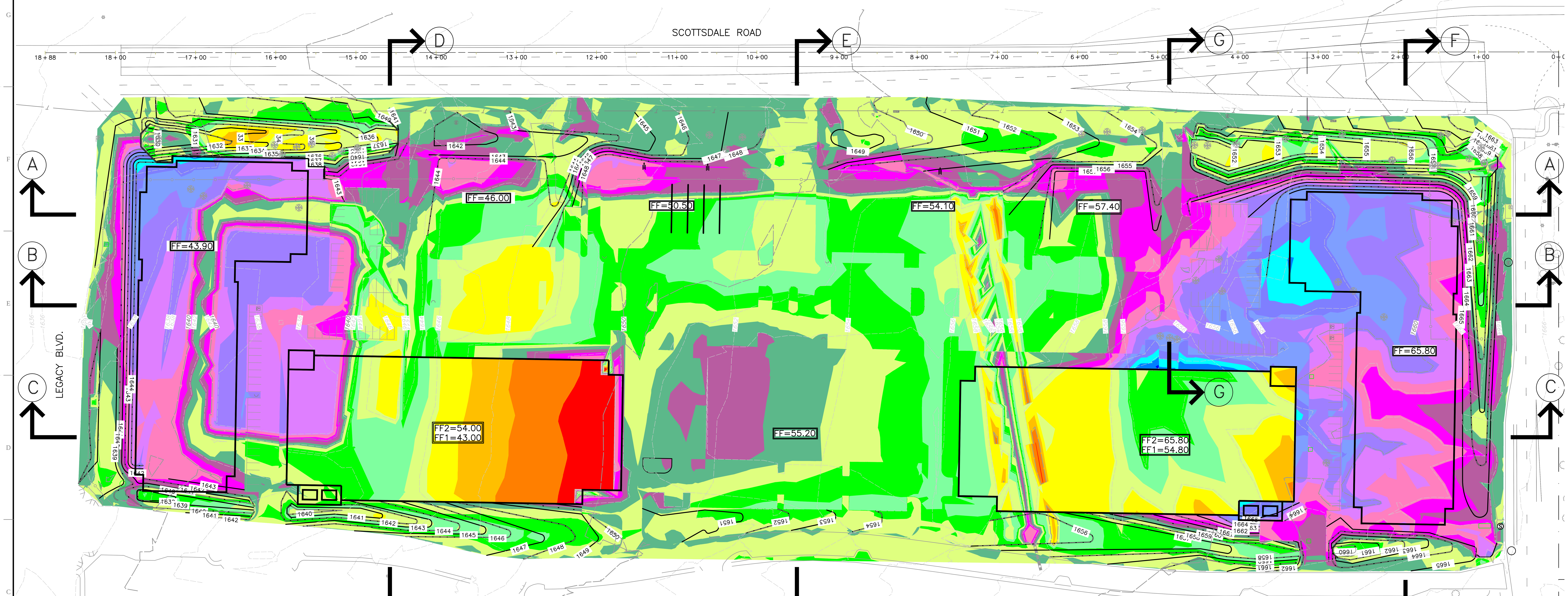
DRAWING NO.: HAG

SHEET 1 OF 1

P:\2018\180-168\CAD\Dwg\Exhibits\180-168HAG.dwg[EXHIBIT] LS:10/29/2019 - bbartlett - LP: 10/29/2019 3:16 PM



VICINITY MAP
N.T.S.



Elevations Table			
Number	Minimum Elevation	Maximum Elevation	Color
1	-8.000	-7.000	
2	-7.000	-6.000	
3	-6.000	-5.000	
4	-5.000	-4.000	
5	-4.000	-3.000	
6	-3.000	-2.000	
7	-2.000	-1.000	
8	-1.000	0.000	
9	0.000	1.000	
10	1.000	2.000	
11	2.000	3.000	
12	3.000	4.000	
13	4.000	5.000	
14	5.000	6.000	
15	6.000	7.000	
16	7.000	8.000	
17	8.000	9.000	
18	9.000	10.000	
19	10.000	11.000	

PRELIMINARY
NOT FOR CONSTRUCTION OR RECORDING

NORTH

SCALE IN FEET
0 60 120

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REGISTERED PROFESSIONAL ENGINEER
CERTIFICATE NO. 23980
JEFFREY S. ERICKSON
(CIVIL)
Date Signed 10/29/19
ARIZONA, U.S.A.
Expires 09/30/20

REVISION RECORD

NO	DATE	DESCRIPTION

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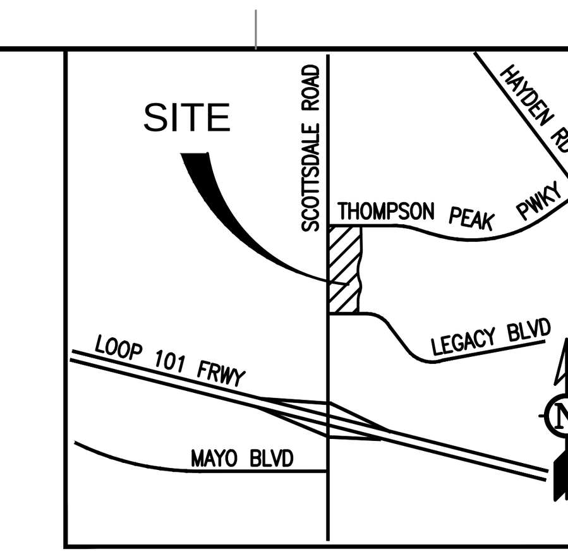
www.cecinc.com

ONE SCOTTSDALE
CIVIL IMPROVEMENT PLANS
SCOTTSDALE, AZ

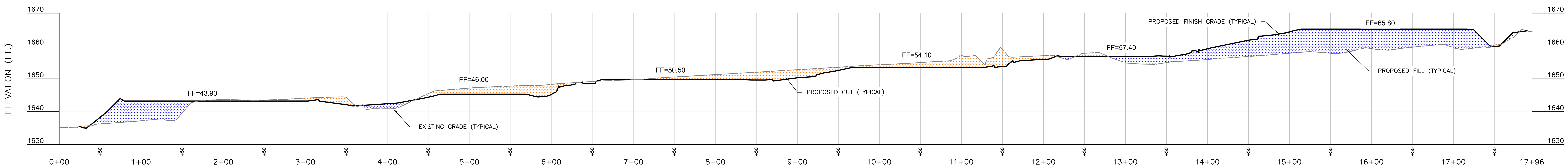
CUT AND FILL EXHIBIT

DATE:	
DRAWN BY:	BB
DWG SCALE:	
CHECKED BY:	KE
PROJECT NO:	180-168
APPROVED BY:	JSE

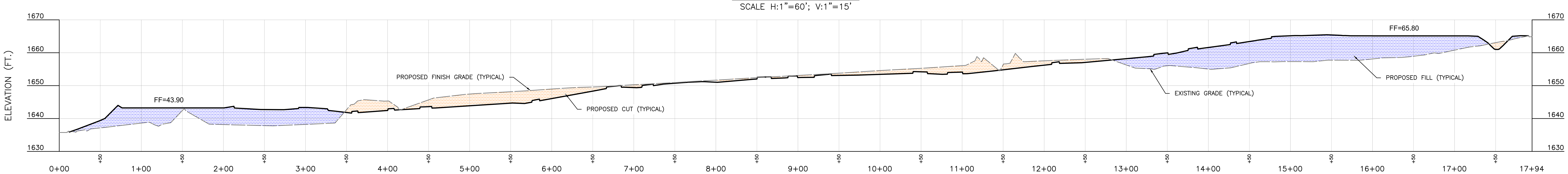
DRAWING NO.: CG01
SHEET 1 OF 1



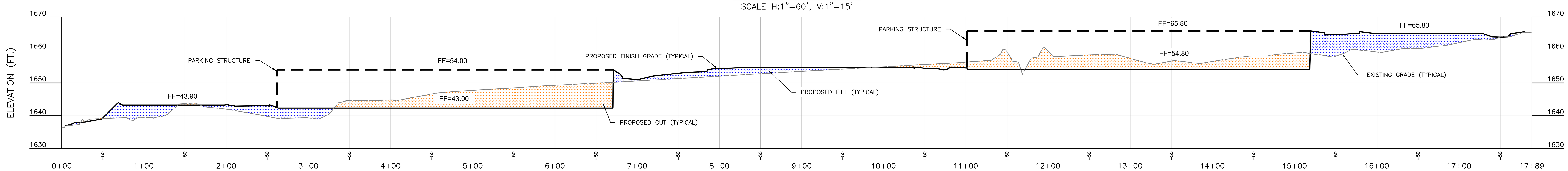
VICINITY MAP
N.T.S.



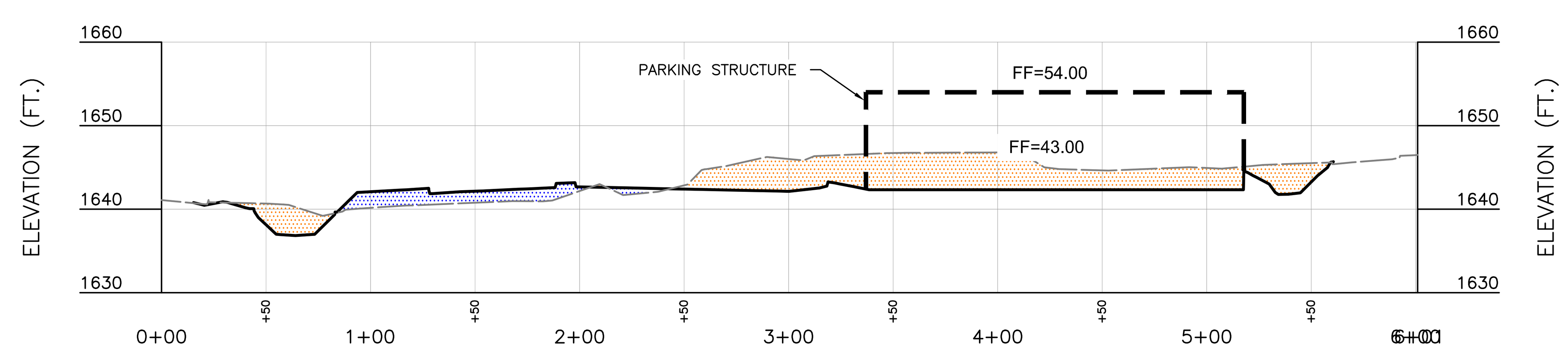
SECTION A-A PROFILE
SCALE H:1"=60'; V:1"=15'



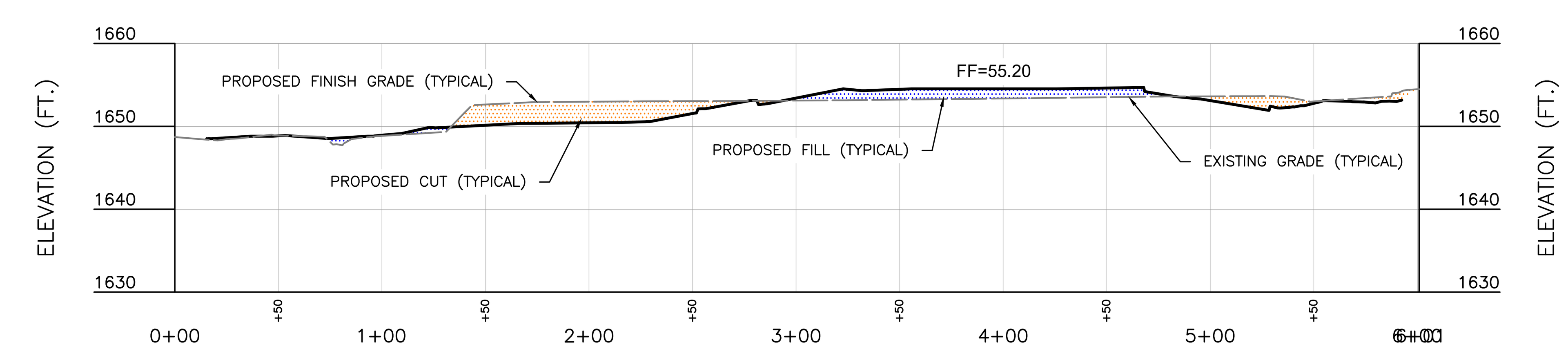
SECTION B-B PROFILE
SCALE H:1"=60'; V:1"=15'



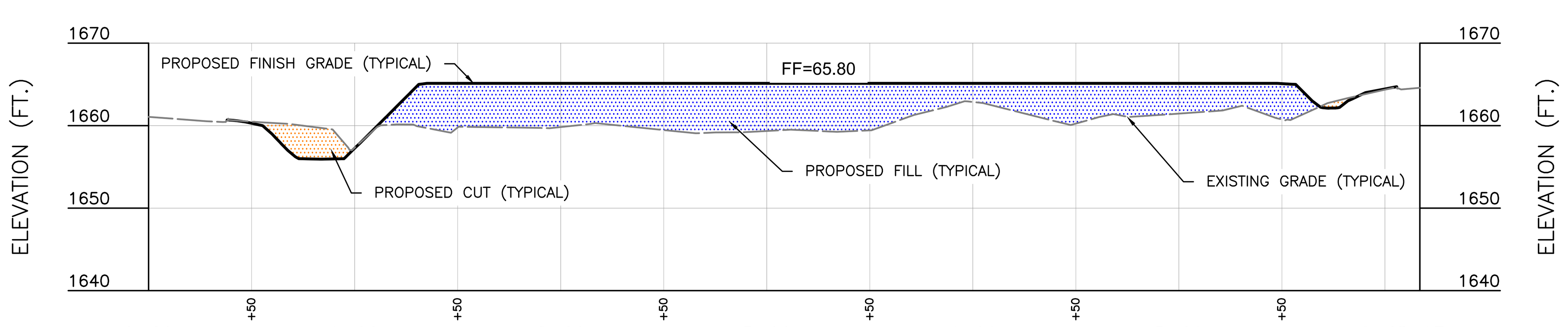
SECTION C-C PROFILE
SCALE H:1"=60'; V:1"=15'



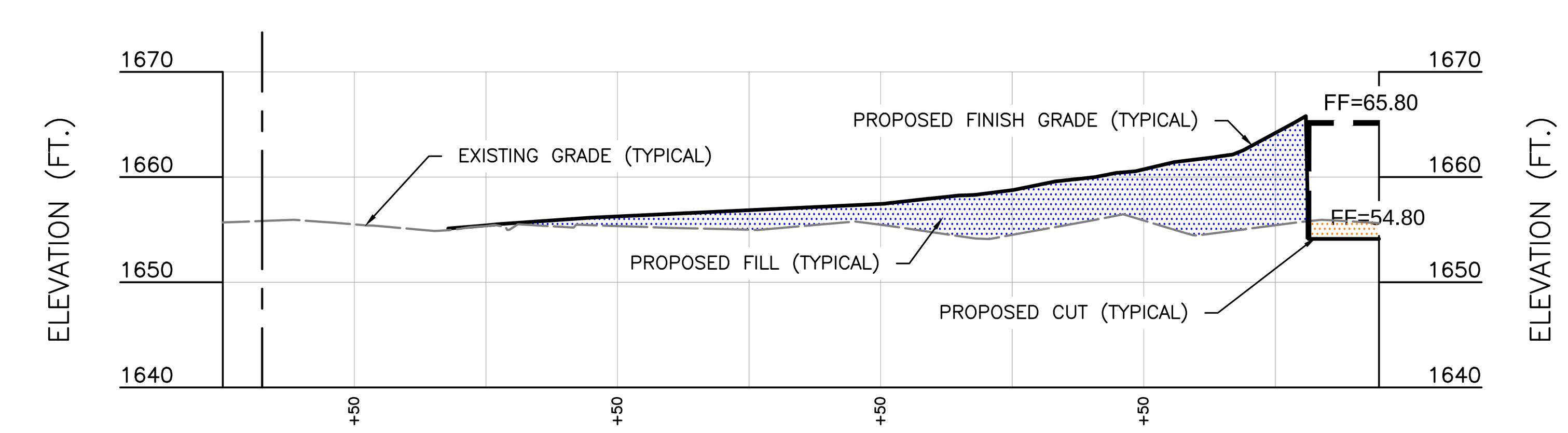
SECTION D-D PROFILE
SCALE H:1"=60'; V:1"=15'



SECTION E-E PROFILE
SCALE H:1"=60'; V:1"=15'



SECTION F-F PROFILE
SCALE H:1"=60'; V:1"=15'



SECTION G-G PROFILE
SCALE H:1"=60'; V:1"=15'

PRELIMINARY
NOT FOR CONSTRUCTION
OR RECORDING

SCALE IN FEET
0 60 120

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REGISTERED PROFESSIONAL ENGINEER
CERTIFICATE NO. 23980
JEFFREY S. ERICKSON
ARIZONA, U.S.A.

REVISION RECORD

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www.cecinc.com

ONE SCOTTSDALE
CIVIL IMPROVEMENT PLANS
SCOTTSDALE, AZ

CUT AND FILL SECTIONS

DRAWN BY:	BB
CHECKED BY:	KE
DATE:	
DWG SCALE:	
PROJECT NO:	180-168
APPROVED BY:	JSE

DRAWING NO.:
CG02
SHEET 1 OF 1