Crossing Analysis

Prepared for:
Mark Goerner
1900 Garden Street
Santa Barbara, CA 93101

Prepared By:
Ashley & Vance Engineering, Inc.
210 East Cota Street
Santa Barbara, CA 93101
805-962-9966

Goerner Residence

1017 Hot Springs Road
Santa Barbara, CA 93150

APN 011-010-08 & 011-010-015

March 8, 2021

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Mark Goerner
1900 Garden Street
Santa Barbara, CA 93101

Subject: **Goerner Residence**
Re: **NFIP No Rise Certification**

Mr. Goerner:

Please find enclosed the NFIP No Rise Certification Report for the above referenced project.

The analysis in this report was prepared using HEC-RAS 5.0.3 Hydraulic modeling software.

As explained in the project analysis, this project does not increase the 100-year flood elevation, floodway elevations, or floodway widths and therefore qualifies for a no rise certification.

Please contact me for any clarifications or supporting information you need with reference to this report.

Regards,

Jason J. Gotsis, P.E.
Principal Engineer

Contents

“NO-RISE CERTIFICATION”

This is to certify that I am a duly qualified registered professional engineer licensed to practice in the State of California.

It is further to certify that the attached technical data support the fact that the proposed replacement of the existing low-water crossing at Hot Springs Creek with a new bridge to support a proposed development at 1017 Hot Springs Road Montecito, CA will not increase the 100-year flood elevations, floodway elevations, or floodway widths on Hot Springs Creek based on flow data from the Santa Barbara Flood Recovery Mapping – Hydrology dated April 2018.

See the following report for documentation supporting these findings:

Signature: ______________________

Title: Principal Engineer

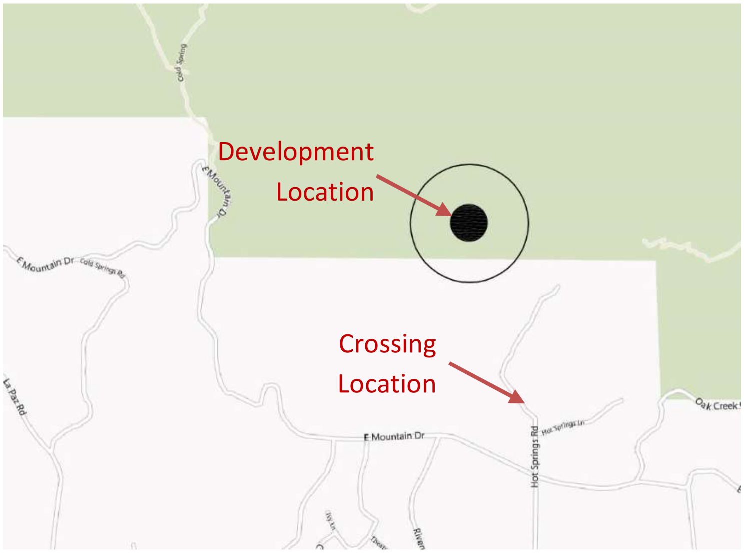
Purpose of Report

The purpose of this report is to demonstrate that the work in the floodway for the proposed development will not result in an increase in the 100-year flood elevation, floodway elevations, or floodway widths. The proposed development includes the replacement of an existing low water crossing with a free span bridge including abutments and grading work in the creek. Hydraulic analysis using HEC-RAS 5.0.7 modeling software indicates the proposed improvements will not increase water surface elevation during the 100-year storm event at a tolerance of one hundredth of a foot for all sections in the analyzed reach.

Project Description

Site Location Map

The proposed project site is located on Hot Springs Road at the crossing of Hot Springs Creek .



Existing Condition

The work site consists of a concrete low water crossing across Hot Springs Creek providing access to several residential lots. Crossing does not meet fire access requirements and replacement is required as part of the proposed development at 1017 Hot Springs Road.

The November 04, 2015 Flood Insurance Study for Hot Springs Creek does not extend to the project location. As such, flow information is based on flow data from the Santa Barbara Flood Recovery Mapping – Hydrology dated April 2018.

Proposed Condition

The work within the floodway includes removal of an existing concrete low water crossing, removal of sediment fill within the creek bed, construction of concrete bridge abutments, and installation of a 100-foot clear span bridge.

Bridge alignment based on existing right of way and easements, alignment of bridge perpendicular to channel flow is not a viable option given physical barriers on neighboring properties outside of the access easement.

Hydraulic Analysis

HEC-RAS model

Flow rates for design storm based on Santa Barbara Flood Recovery Mapping – Hydrology dated April 2018 which provides a 100-year flood flow for the post-burn condition of Hot Springs Creek section HOT1 of 1,594 cubic feet per second. Topographic model based on sections taken from site LiDAR survey conducted for the entire reach.

A Manning's n of 0.035 was used for channel section based on the primarily earth channel bed with limited vegetation. Downstream model boundary condition based on control of water surface elevation to match 100-year flood water flow at a critical depth for a 7% channel slope. Upstream model boundary condition based on control of water surface elevation to match 100-year flood water flow at a critical depth for a 6% channel slope.

Model for proposed condition was developed by modifying the existing condition model at sections to include the removal of the low water crossing and installation of a free span bridge.

Analysis Results

Results of the analysis are summarized in the following tables:

Channel Bed, Water Surface Elevation, and Depth – HEC-RAS Model

Station	44+00	43+50	43+00	42+80	42+60	42+40	42+20	42+00
Existing Channel Bed	759.85	755.29	751.56	749.02	748.10	747.76	745.89	742.03
Existing WSE (100-yr)	764.48	761.21	757.37	754.94	753.71	752.93	750.61	749.44
Existing Depth (100-yr)	4.63	5.92	5.81	5.92	5.61	5.17	4.72	7.41
Proposed Channel Bed	759.85	755.29	751.56	749.02	748.18	746.20	744.35	744.35
Propose WSE (100-yr)	764.48	761.21	757.37	754.94	753.62	751.86	749.24	748.51
Proposed Depth (100-yr)	4.63	5.92	5.81	5.92	5.44	5.66	4.89	4.16

Station	41+80	41+60	41+40	41+20	41+00
Existing Channel Bed	739.54	736.95	735.84	733.97	731.93
Existing WSE (100-yr)	745.74	743.78	741.63	739.27	738.29
Existing Depth (100-yr)	6.2	6.83	5.79	5.3	6.36
Proposed Channel Bed	740.79	738.06	735.84	733.97	731.93
Propose WSE (100-yr)	745.74	743.78	741.63	739.27	738.29

The tables above show that the water surface flood elevation for the post-project model is equal to or less than the water surface flood elevation for the pre-project model within a hundredth of a foot. The highlighted sections represent the areas where water surface elevation was decreased.

Scour Analysis

The scour analysis uses information from the HEC-RAS model developed to establish water surface elevation for the 100-year storm under the proposed crossing. Due to the limitations of the HEC-RAS scour analysis in steep channels with a significant percentage of channel bed area consisting of boulders and cobbles. Scour analysis performed using the Froehlich Scour equation (TRB 1989) using flow information from the HEC-RAS model to estimate scour at both bridge abutments.

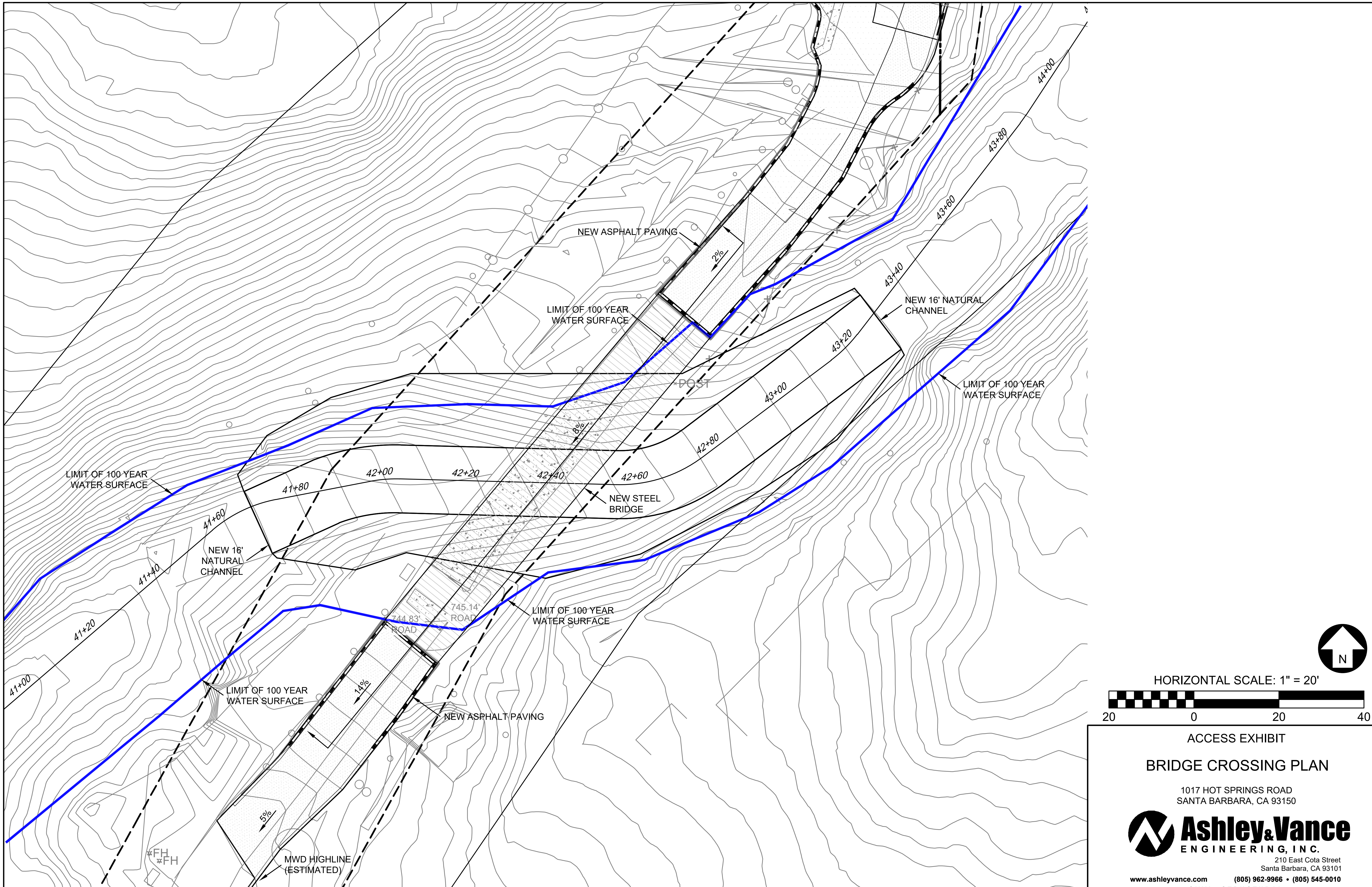
Analysis of left bank abutment based on vertical wall abutment with an embankment angle of 120 degrees, obstructed length of 13 feet, obstructed area of 7 square feet and obstructed flow rate of 14 cubic feet per second. Analysis of right bank abutment based on vertical wall abutment with an embankment angle of 15 degrees, obstructed length of 14 feet, obstructed area of 5 square feet and obstructed flow rate of 20 cubic feet per second.

Estimated scour depth based on the analysis of this letter provided in the table below:

Left Bank Abutment Scour Depth	4.2’
Right Bank Abutment Scour Depth	6.0’

Report Conclusion

Based on the preceding analysis and results, the proposed project will not result in an increase in the 100-year flood elevation, floodway elevations, or floodway widths.



ACCESS EXHIBIT

BRIDGE CROSSING PLAN

1017 HOT SPRINGS ROAD
SANTA BARBARA, CA 93150

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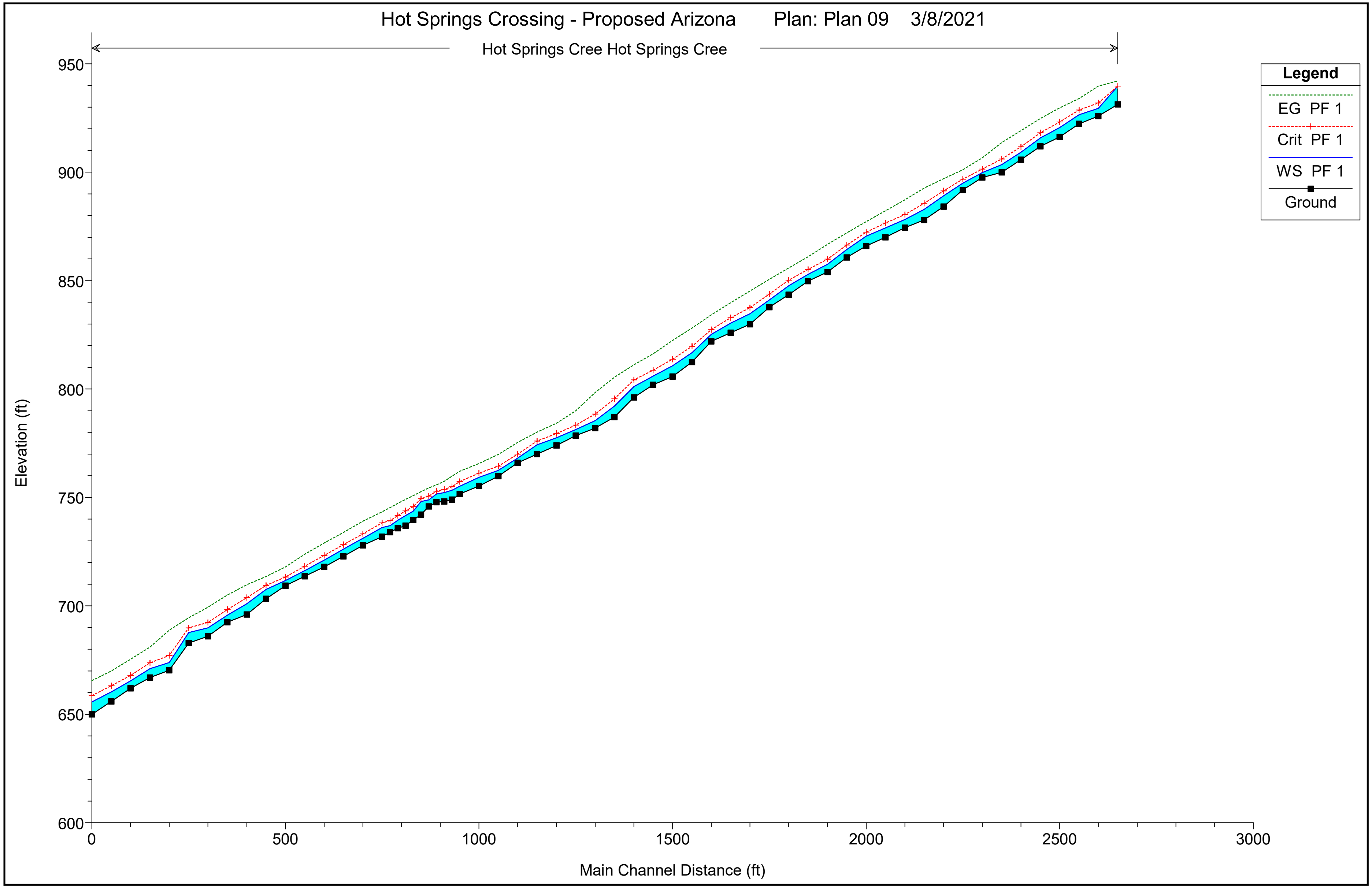
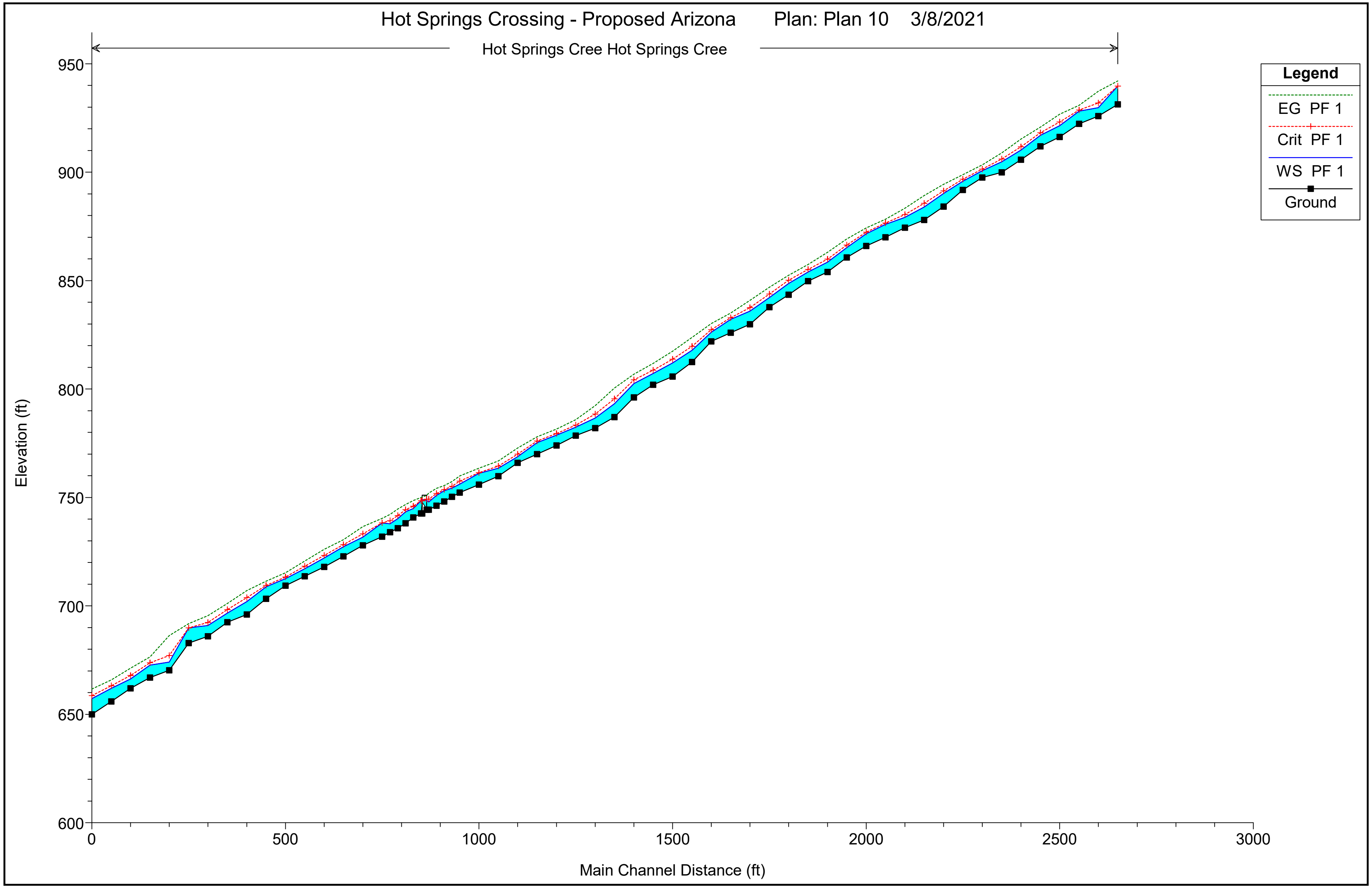


Hot Springs Crossing - Proposed Arizona Plan: Plan 09 3/8/2021
Hot Springs Cree Hot Springs Cree
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Elevation (ft)
950
900
850
800
750
700
650
600
0
500
1000
1500
2000
2500
3000
Main Channel Distance (ft)



Hot Springs Crossing - Proposed Arizona Plan: Plan 10 3/8/2021
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