



ADDENDUM #2 TO THE TECHNICAL DRAINAGE STUDY

Iron Mountain

APRIL 2022

PREPARED FOR:
Tri Pointe Homes, Nevada, Inc.
Las Vegas, Nevada

PREPARED BY:

Westwood

Iron Mountain

Addendum #2 to the Technical Drainage Study

City of Las Vegas, Nevada

Prepared For:

Tri Pointe Homes Nevada, Inc.
4675 W. Teco Ave, Suite 115
Las Vegas, NV 89118

Prepared By:

Westwood Professional Services
5725 W. Badura Avenue, Suite 100
Las Vegas, NV 89118
Phone: (702) 284-5300
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Project Number: TRI2101-000
Date: April 2022

Mark Failla, P.E., CFM
NV Professional Engineer No. 14566
Assisted by: Jonathan S. Rocha

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL
DRAINAGE STUDY INFORMATION FORM

Name of Development: Iron Mountain (Addendum #2) Date: April 2022
Location of Development: a) Descriptive (Cross Streets): North/South: Alpine Ridge Way / Shaumber Road
East/West: Iron Mountain Road
b) Section: 1 Township: 19 South Range: 19 East
c) APN: 126-01-801-010, -011, -012, -013, -014, -015, -016

Name of Owner: Tri Pointe Homes Nevada, Inc.
Telephone No.: 702-614-1400 Fax No.: 873-6881 E-mail Address: Jim.Jordano@TriPointeHomes.com
Address: 4675 W. Teco Ave, Suite 115 Las Vegas NV 89118

Contact Person – Name: Mark Failla, P.E. Telephone No.: (702) 284-5300
*E-mail Address: mark.failla@westwoodps.com Fax No.: (702) 284-5399
Firm: Westwood Professional Services
Address: 5725 W. Badura Ave, #100 Las Vegas NV 89118

Type of Land Development/Land Disturbance Process:

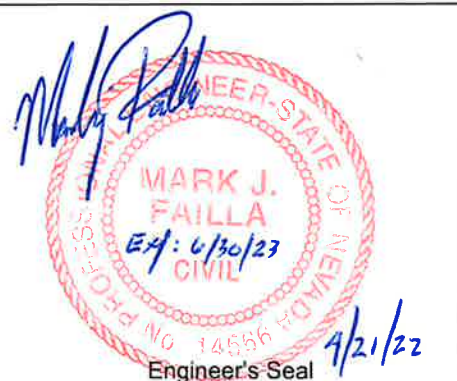
☐ Rezoning	☐ Subdivision Map	☐ Clearing and grading Only
☐ Parcel Map	☒ Planned Unit Development	☐ Other (Please specify below)
☐ Large Parcel Map	☐ Building Permit	☐

1. Total Owned Land Area: At Site: +/- 25.0 ac Being Developed/Disturbed: +/- 25.0 ac
2. Is a portion or all of the subject property located in a FEMA Flood Hazard Area? ☐ Yes** ☒ No
3. Is the property bordered or crossed by an existing or proposed Clark County Regional Flood Control District Master Planned Facility? ☒ Yes** ☐ No
4. Proposed type of development (Residential, Commercial, Etc.): Residential
5. Approximate upstream land area which drains to the subject site: +/- 9.5 acres
6. Has the site drainage been evaluated in the past? ☒ Yes** ☐ No If yes, please identify documentation: _____

Technical Drainage Study for Skye Canyon Phases 3B & 3C Infrastructure & Updates (DS-4953)

7. If known, please briefly identify the proposed discharge point(s) of runoff from the site: north and northeasterly into Radley Street as storm drain flow

8. Briefly describe your proposed schedule for the subject project: Unit 1 ASAP, Unit 2 ASAP upon receipt of BLM grant.



Submit this form as part of the required drainage study to the local entity which has jurisdiction over The subject property. This form may provide sufficient information to serve as the Conceptual Drainage Study.

***Newly Required Field**

****Review and concurrence of the Clark County Regional Flood Control District is required**

Local Entity File No.	Revision	Date

REFERENCE:

STANDARD FORM 1

Updated 05/01/2008

TRI2101.000

04/21/22

Peter Jackson, P.E.
City of Las Vegas
495 S. Main Street
Las Vegas, NV 89101

Subject: Technical Drainage Study Addendum #2 for Iron Mountain

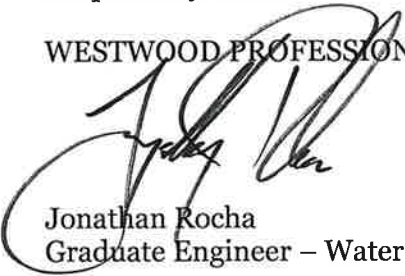
Dear Mr. Jackson

This letter certifies that all items provided on the electronic submittal CD matches the Technical Drainage Study Addendum #2 for Iron Mountain bound paper version.

Please contact me if you have any questions.

Respectfully Submitted,

WESTWOOD PROFESSIONAL SERVICES



Jonathan Rocha
Graduate Engineer – Water Resources Department

TRI2101-000

April 21, 2022

City of Las Vegas
495 S. Main Street
1st Floor
Las Vegas, Nevada 89101

**Subject: Addendum #2 to the Technical Drainage Study for Iron Mountain
(DS 5508)**

This letter is submitted in response to the comments contained in the March 18, 2022 review memorandum, regarding the above referenced project. A copy of the City of Las Vegas Flood Control review comment letter has been provided in Appendix A. It is noted that the limits of the Unit 1 Phase have been revised subsequent to the prior submittal. These changes are described in detail later in this letter. The comments in the review memorandum have been individually addressed as follows:

1. **Comment:** *This Drainage Study shows that the site will be developed in two Phases/Units. The off-site improvements may be phased; however the requirements of Title 19.02.130.2 & 19.02.130.3 shall be met. Paraphrasing – “All building permits beyond 50% will be withheld until all required off-site improvements are guaranteed (bonded). When 75% of the development is complete, 100% of the off-sites shall be complete.” Coordinate the proposed Unit Boundaries and off-site Improvements with Devco for compliance with the Title 19 requirements prior to final approval of the Drainage Study and/or final approval of any Final Map.*

Response: Acknowledged. Unit 1 only proposes 25% of the total building permits, so this requirement should not be an issue. The developer has been informed of the requirement as it may apply to Unit 2 if the offsite improvements are delayed.

2. **Comment:** *The Provided copy of the Zoning/Planning Conditions associated with this site show required changes to Iron Mountain and Alpine Ridge per 21-0315-TMP1, Condition #9. Revise the Grading Plans to show the Right Turn Lane on Iron Mountain and the Bus Turn-out on Alpine Ridge with the next submittal to verify compliance with conditions or provide relief of the condition.*

Response: 21-0315-TMP1 has been reviewed and accepted for the amended traffic impact study. Condition #1 states that no bus turn out and right turn lane is required for the proposed improvements. Email coordination between Westwood and CLV Transportation Division has been included for verification of Condition #1 and compliance with proposed improvement plans.

3. **Comment:** *Coordinate the required improvements within the west half of Alpine Ridge with City of Las Vegas Right-of-Way (Nancy Logan 229-6545) and submit appropriate*

information to support BLM reservation on the Future Officer Soldo Memorial Park. No improvements may be constructed prior to BLM Grant.

Response: Acknowledged. Westwood has been in contact with Nancy Logan as well as the developer and engineer for the future Officer Soldo Memorial Park, adjacent to Alpine Ridge Way, regarding the necessary BLM reservations.

4. **Comment:** *This Study has addressed the Existing, Proposed, and Potential Conditions needed for this development to be adequately protected and therefore meet the intent of the MPU. It is understood that the flows are conveyed within the wash system north of the site (between Radley St. and Kyle Canyon Rd). The recognized flow conditions from the Supplemental HEC-1 submittal at Concentration CP8 are:*

Existing — 889 cfs, Proposed — 894 cfs, and Potential — 906 cfs

Response: The hydrology for the project site has been revised per Response to Comment #10. As requested, the project site has been split into two drainage basins to accommodate the difference in specific lot density and curve number in each drainage basin (as opposed to a single drainage basin utilizing a composite curve number). This change resulted in changes to flowrates at Concentration Point CP8 for the analyzed drainage conditions. The table below summarizes the updated flowrates for each condition from the revised HEC-1 models. Refer to Appendix C for the revised HEC-1 models.

- Existing Condition: 889 cfs
- Unit 1 Interim Condition: 896 cfs
- Unit 2 Proposed Condition: 895 cfs
- Potential Condition: 907 cfs

5. **Comment:** *Revise the on-site storm drain plans to reflect that the on-site storm drain system is to be "Privately Maintained". Where the proposed storm drain enters the Public Right-of-way, provide a nuisance inlet or Manhole to transition to a Public system. Show the "Privately Maintained" designation on the storm drain profiles. Include a note on the Grading Plans that "All onsite storm drain facilities within this development shall be Privately Maintained by the HOA". Revise the plans and quantities accordingly.*

Response: As requested, manholes have been added at the transition between private/public storm drain for each storm drain lateral location that discharges onsite flow to the public storm drain system in Radley Street. The storm drain plan and profile sheets have been revised to label respective private and public systems and respective maintenance of storm drain systems. Refer to the last appendix for the revised improvement plan sheets.

6. **Comment:** *Continue to Coordinate offsite efforts with the proposed commercial development to the east by Lochsa Engineers.*

Response: Acknowledged. Westwood has sent previous drainage study submittals to Lochsa and will continue to coordinate with proposed commercial development by Lochsa Engineers.

7. **Comment:** *Continue to Coordinate offsite efforts with the proposed development to the north "Alpine Ridge" by Westwood.*

Response: Acknowledged. The Iron Mountain project site is being coordinated in-house with the Alpine Ridge development.

8. **Comment:** *The site is adjacent to or crosses an existing or proposed Clark County Regional Flood Control District (CCRFCD) Master Planned Facility. The existing storm drain system within Iron Mountain Rd is a MPU Facility. Therefore, CCRFCD concurrence is required prior to final approval of the drainage study.*

*Please note that effective March 15, 2019, the CCRFCD adopted new requirements for drainage study concurrence submittal. Follow the link below for specific guidance.
<http://oustfront.ccrfcd.org/LandDev/LandDev.aspx>*

Response: Noted.

9. **Comment:** *The project proposes to build a temporary drainage facilities. Prior to final plan approval the developer must complete a maintenance and liability agreement for the interim drainage improvements (off-site berms or channels) and post a minimum maintenance bond of \$50,000 or 50-percent of the construction cost for the improvements, whichever is greater. The engineer must submit an estimate of the quantities for constructing the facility and an exhibit that adequately shows the location and limits of the drainage facility to City of Las Vegas Flood Control for approval. Once the drainage study is conditionally approved, the engineer should contact the City's Land Development Section (229-6371) to begin the agreement process.*

In order for the maintenance bond to be released in the future, a drainage update / letter will be required to justify that the offsite berms / channels are no longer necessary and can be removed.

Response: Acknowledged.

10. **Comment:** *Flood Control understands that the overall site has a composite CN value. The prorated flows shall account for the higher flow rate generated by the high density units. The prorated flows should not be the same for each development unit type. The previous comment still applies. The report states that sections G1, G2, and G3 analyze the worst case flow scenario, but utilize the flow rate from the onsite basin with the smallest amount of flow, a worst case scenario should utilize the basins that have a higher CN value and concentration of homes. Revise Exhibit F, G and H based upon the higher prorated flows. Update All Flow Tables.*

Response:

Subsequent to the prior submittal, the Unit 1 layout and overall phasing of the site has been revised and coordinated with Peter Jackson per virtual meeting on March 30, 2022. The revisions to the Unit 1 site have been discussed at the end of this report in detail.

As requested, the hydrologic analysis of the project site onsite basin has been revised to separate basins between the change in density (Basins IRON1 and IRON2) for the proposed lots for both the Unit 1 interim condition and Unit 2 proposed condition analyses. During the Unit 1 proposed condition, a portion of the site is mass graded and curve number computations have split into three onsite basins (Basins IRON-1, IRON2-I and IRON3-I) for the mass graded portions during the interim condition; the land use for newly graded and the townhome lots are equal and therefore Basin IRON-1 was considered developed and unchanged between conditions. Revised hydrologic computations and HEC-1 models have been included in Appendix C, and revised summary tables on the drainage exhibits included in Appendix B.

The revised hydrology has increased the flowrates impacting the interior roadways and therefore street depth and hydraulic sections revised. Additionally, the Unit 1 proposed condition drains both to the interior roadways and to a proposed trapezoidal channel (Section T1 and T2) within Radley and therefore street depth computations are included for the Unit 1 proposed drainage condition. The trapezoidal channels located in Radley are earthen-lined and are considered erosive, but the channels are temporary for the mass graded area and will be privately maintained until removal with the Unit 2 improvements. Storm drain computations have been revised for the revised hydrology and included for the Unit 1 interim condition.

Hydraulic computations have been revised for street depth, channel, and storm drain models based on the updated hydrologic models. The revised interior street computations are met for DxV criteria, and storm drain criteria is met for HGL with 1' cover below finished grade. Finished floors for the proposed lots meet applicable finished floor criteria and remain adequately flood protected for the worst-case flow depths generated between the Unit 1 interim and Unit 2 proposed conditions.

Revised hydraulic computations for street depth, proposed channels are included in Appendix D; revised storm drain models are included in Appendix E; and finished floor computations included in Appendix F.

11. **Comment:** *The proposed 5-foot drainage easements shall be "Public Drainage Easement to be Privately Maintained" for the cross lot drainage. Revise the grading Plan and show the "Public Drainage Easement to be Privately Maintained" on the Final Map.*

Response: The proposed 5-foot drainage easements for cross-lot drainage have been revised on the grading plans to be labelled as stated in Comment #11. Refer to the last appendix for the revised improvement plan sheets.

12. **Comment:** *Provide an 18-inch clear opening for the cross lot drainage. Revise the Details accordingly.*

Response: Per virtual meeting between Westwood and Peter Jackson on March 30, 2022, the block wall opening for cross-lot drainage have been revised to a height of two CMU blocks (1.6-ft) to satisfy Comment #12. Refer to Detail 11/D-1 on the revised Unit 1 improvement plans sheets.

13. **Comment:** *Shift the location of SDMH #2 into the Radley Right-of-Way. Revise Plans accordingly.*

Response: The location of SDMH #2 has been shifted within the Radley right-of-way. The storm drain model for 'MAIN-DI1' has been revised. in addition to Response to Comment #5, the storm drain models for Radley Street (RAD Model) and drop inlet laterals (LAT-DI3 and LAT-DI5 Models) for revised HGL

WSPGW computations and spreadsheet for lateral loss computations have been included in Appendix E. Refer to the last appendix for the revised improvement plan sheets.

14. **Comment:** *The provided WSPG Summary sheets for the proposed storm drain shall include a column showing the corresponding storm drain plan information to verify the facility type and location. This provides a correlation between the WSPG and the Plans.*

Response: The WSPGW summary sheets have been revised with corresponding improvement plan locations. The revised WSPGW sheets have been included in Appendix E, for ease of review the WSPGW models have been reincluded with revised summary sheets.

15. **Comment:** *Provide rip-rap Details that include cross sections. Provide adequate bedding for the rip-rap channel as outlined in Section 705.4.3 of the CCRFCD's Hydrologic Criteria and Drainage Design Manual.*

Response: No riprap channel is proposed for the project site improvements and offsite channels are designed as earthen-lined. Riprap is provided for the inlets in-sump condition, roadway transitions, and storm drain outlet protection. The proposed riprap is called out as D50=6" with 12" thickness over a 12" Type II aggregate base, as labelled on Construction Note #24. Since proposed channels are earthen-lined, no cross-section details are necessary as the riprap information has been labelled on construction note, where applicable. Refer to the last appendix for the revised detail sheets.

16. **Comment:** *Storm Drain profiles need to include the various pipe sizes at the Manholes for each line that is connected to the manhole.*

Response: The storm drain profiles have been revised to list the lateral pipe sizes at appropriate manhole locations. Refer to the last appendix for the revised storm drain plan and profile sheets.

17. **Comment:** *Provide the TC, Length, Depth, and # of Grates for all drop inlets on the Profile Sheets.*

Response: The storm drain profile sheets have been revised to include labels for TC, length, depth and number of grates. Refer to the last appendix for the revised storm drain plan and profile sheets.

18. **Comment:** *Street Plans need to include all sewer and water crossings with proper vertical clearance and the horizontal spacing.*

Response: The street plans have been revised to label vertical clearance and the horizontal spacing for the sewer and water crossings. Refer to the last appendix for the revised roadway profiles on the improvement plan sheets.

19. **Comment:** *Provide Plan and Profile for Iron Mountain Road.*

Response: Plan and profile has not been included for Iron Mountain Road because existing offsite improvements has designed and profiled Iron Mountain Road per the Skye Canyon Phase 3B, 3C Infrastructure Improvements - Iron Mountain Road from Shaumber to Skye Village (Plan #107V7514). A profile of the existing street centerline will be provided with the improvement plan review, if required at that time.

20. **Comment:** *Revise the note for all sections showing solid grouting for flood control to indicate "8-inch minimum solid grouted CMU block 3 courses above finish grade with all joints mortared." Revise Details accordingly.*

Response: Solid grouting notes have been revised as stated in Comment #20. Refer to applicable details in the revised improvement plans included the last appendix.

21. **Comment:** *Revise the Quantities Sheet and the Grading Plans to reflect the Drainage Improvement quantities to show both the Private and Public improvements. Update the quantities based upon the plan changes.*

Response: Quantity sheets have been revised to reflect private and public improvements. Refer to the last appendix for the revised improvement plan sheets.

22. **Comment:** *The Wrought Iron Fencing shall meet Std. Dwg. 425.S1.*

Response: Construction Note #33 and details 14/D-2 & 15/D-2 for the wrought iron fencing has been revised to meet Std. Dwg. 425.S1. Refer to the last appendix for the revised improvement plan sheets.

23. **Comment:** *Provide a Note on all Grading Plans: Post-Construction BMPs (PCBMPs) / Control Measures noted on the Grading Plans are mandatory permanent regulatory stormwater pollution controls. These PCBMPs must be installed per the approved plans and must be permanently maintained.*

Response: The improvement plan sheets have been updated to include the Note for PCBMPs. Refer to the last appendix for the revised improvement plan sheets.

24. **Comment:** *Update the Stormwater Management Notes to the current version with the Improvement Plan submittal to Building Department — Land Development.*

Response: The Stormwater Management Notes have been updated on the improvement plan General Notes Sheet C-2 and included in the last appendix of this study.

25. **Comment:** *Update the standard drainage compliance note on the grading plan: "I CERTIFY THAT THIS GRADING PLAN IS IN CONFORMANCE WITH THE APPROVED DRAINAGE STUDY ON FILE AT THE CITY OF LAS VEGAS FOR THIS PROJECT (DS5508)".*

Response: The standard drainage compliance note has been updated on the improvement plan G-sheets and included in the last appendix of this study.

Unit 1 Site Layout Changes:

As mentioned in Response to Comment #10, subsequent to the prior submittal, the Unit 1 phased portion of the project site has been revised. Site layout for the Unit 1 and Unit 2 phases are illustrated on Exhibit F and G.

- Proposed improvements for the Unit 1 site will include the model homes for the Tri-Pointe development and improvements include the Iron Mountain Road, Jordano Street, Bounds Street, portion of Vonbulin Avenue, Marler Street, and a portion of Rampa Street, and associated lots for aforementioned interior roadways; the rest of the site is mass graded.
- A temporary sidewalk is proposed to connect pedestrian access from the project site to Skye Village Road, located east of the project site. The sidewalk is proposed to maintain drainage patterns in the existing condition and no hydraulic sections are required as the sidewalk grading maintains sheet flow away from the sidewalk to maintain positive drainage.
- The Iron Mountain Road common element adjacent to the project site has increased by 1.5 feet and has been revised on the Unit 1 Plans Detail D/D-1 (Unit 2 Plans Detail F/D-1). The change is negligible to the hydrology and no revisions necessary to computations or affects site design.

- The Unit 2 improvements will include completion of the project site inclusive of roadway improvements of Alpine Ridge Way, Radley Street and the remaining lots, to be constructed upon BLM grant.

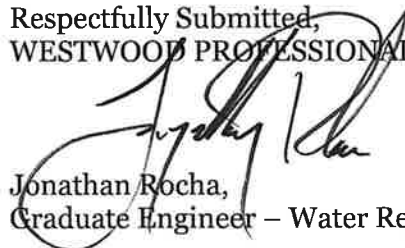
Drainage patterns for the Unit 1 interim condition drain a portion of onsite surface flow into a proposed trapezoidal channel in Radley Street right-of-way to be partially collected by a proposed exposed pipe end segment of storm drain in sump. This segment of storm drain will be extended to the west as part of the Phase 2 improvements. The collection of the channel and sump depth are limited to the ultimate design flow of Facility A2 during the Unit 2 proposed condition, performed by inlet control nomograph computations and sizing the depth of the sump inlet to collect channel flow (19.5 cfs at the inlet). Under Unit 1 interim conditions, the flow exceeding the capacity of the storm drain inlet design flow will surface flow to the natural wash to the north, adjacent to the discharge location of the proposed storm drain outlet, in order to maintain existing drainage patterns. Surface flows generated by the mass graded portion of the site will drain thru the interior roadways proposed by the Unit 1 phase and collected by Facility DI#1 at the northern terminus of Marler Street.

The hydraulic computations of the interim condition have been included in appropriate appendices, as stated in Response to Comment #10.

Conclusion:

We believe the above responses and revisions provided on the amended improvement plans have adequately satisfied the concerns in the subject review memorandum. The revised improvement plan sheets adopting the revisions addressed in this letter have been included in the last appendix of this addendum. If you have any questions or require additional information, please do not hesitate to contact our office at (702) 284-5300.

Respectfully Submitted,
WESTWOOD PROFESSIONAL SERVICES



Jonathan Rocha,
Graduate Engineer – Water Resources Services

CC: Mark Failla, P.E., CFM
Dan Poll, P.E.
Oscar Quiroz, P.E.

List of Appendices

Appendix A	City of Las Vegas Comment Letter
Appendix B	Drainage Exhibits • Exhibit F – Unit 1 Interim Condition Drainage Map • Exhibit G – Unit 2 Proposed Condition Drainage Map • Exhibit H – Ultimate Condition Drainage Map • Exhibit J3 – Proposed Condition Drainage Map Offsite Watershed East of Puli Drive • Exhibit J4 – Potential Condition Drainage Map Offsite Watershed East of Puli Drive
Appendix C	Hydrologic Analyses • CN Computation, Soils & Land Use Data • Lag Time Computations (Standard Form 4) • Unit 1 Interim Condition HEC-1 Model • Unit 2 Proposed Condition HEC-1 Model • Potential Condition HEC-1 Model
Appendix D	Street & Hydraulic Sections • Interior Street Flow Computations – 100 Yr Unit 1 Interim Condition • Interior Street Flow Computations – 100 Yr Unit 2 Proposed Condition • Drainage Easement Computations • Ditch Sizing Computations
Appendix E	Storm Drain Analyses • Drop Inlet Sizing Computations - Unit 1 Interim Condition • Drop Inlet Sizing Computations - Unit 2 Proposed Condition • WSPG Model Main-DI#1 Model • WSPG Model RAD Model • WSPG Model Lat-DI#5 Model • Lateral Sizing Computations
Appendix F	Finished Floor Analyses
Appendix G	Zoning & Planning Conditions • 21-0315-TMP1, TIA76138 - Acceptance Letter • Email Correspondence - October 14, 2021
Appendix H	Improvement Plans

APPENDIX A

City of Las Vegas Comment Letter

CITY OF LAS VEGAS			DATE:
INTER-OFFICE MEMORANDUM			March 18, 2022
TO: Land Development Services Department of Building & Safety			FROM: Peter Jackson, CFM Flood Control, Sr. Engr. Associate Department of Public Works
SUBJECT:	Drainage Study for:		COPIES TO:
	Iron Mountain		Westwood Professional Services
Cross Streets:	Alpine Ridge Way and Shaumber Road		Tri Pointe Homes Nevada, Inc.
File Number:	F:\Depot\DSMemos\DS05508B.doc		Bart Anderson, P.E., DevCo
Parcel Number:	126-01-801-010, 011, 012, 013, 014, 015, 016		CCRFCD
Zoning Action:	21-0315-TMP1		
FEMA Flood Zone	YES	NO X	
Proposed Storm Drain	YES X	NO	

HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES	FEES PAID Payment Trn #
1 st Submittal	10/14/2021	11/22/2021	See Comments Below	\$400.00	4492234: \$400
2nd Submittal & Supplement	12/28/2021 & 2/23/2022	3/18/2022	See Comments Below	\$400.00	\$400
			TOTAL FEES (LDDRS):	\$800.00	----

REMARKS: 2nd Submittal with Supplemental drainage.

The Drainage Study for the subject project has been reviewed and:

	is approved subject to conformance to all City standards and the following conditions:
X	must be resubmitted or supplemented including the following:
	is conditionally approved subject to Clark County Regional Flood Control District concurrence.
	is conditionally approved subject to Clark County Public Works Department concurrence.

1. This Drainage Study shows that the site will be developed in two Phases/Units. The off-site improvements may be phased, however the requirements of Title 19.02.130.2 & 19.02.130.3 shall be met. Paraphrasing – *"All building permits beyond 50% will be withheld until all required off-site improvements are guaranteed (bonded). When 75% of the development is complete, 100% of the off-sites shall be complete."* Coordinate the proposed Unit Boundaries and off-site Improvements with Devco for compliance with the Title 19 requirements prior to final approval of the Drainage Study and/or final approval of any Final Map.
2. The Provided copy of the Zoning/Planning Conditions associated with this site show required changes to Iron Mountain and Alpine Ridge per 21-0315-TMP1, Condition #9. Revise the Grading Plans to show the Right Turn Lane on Iron Mountain and the Bus Turn-out on Alpine Ridge with the next submittal to verify compliance with conditions or provide relief of the condition
3. Coordinate the required improvements within the west half of Alpine Ridge with City of Las Vegas Right-of-Way (Nancy Logan 229-6545) and submit appropriate information to support BLM reservation on the Future Officer Soldo Memorial Park. No improvements may be constructed prior to BLM Grant.

The following are comments pertaining to the subject site specific drainage study and grading plans:

4. This Study has addressed the Existing, Proposed, and Potential Conditions needed for this development to be adequately protected and therefore meet the intent of the MPU. It is understood that the flows are conveyed within the wash system north of the site (between Radley St. and Kyle Canyon Rd). The recognized flow conditions from the Supplemental HEC-1 submittal at Concentration CP8 are:

Existing – 889 cfs, Proposed – 894 cfs, and Potential – 906 cfs

5. Revise the on-site storm drain plans to reflect that the on-site storm drain system is to be “Privately Maintained”. Where the proposed storm drain enters the Public Right-of-way, provide a nuisance inlet or Manhole to transition to a Public system. Show the “Privately Maintained” designation on the storm drain profiles. Include a note on the Grading Plans that “All onsite storm drain facilities within this development shall be Privately Maintained by the HOA”. Revise the plans and quantities accordingly.
6. Continue to Coordinate offsite efforts with the proposed commercial development to the east by Lochsa Engineers.
7. Continue to Coordinate offsite efforts with the proposed development to the north “Alpine Ridge” by Westwood.
8. The site is adjacent to or crosses an existing or proposed *Clark County Regional Flood Control District* (CCRFCDD) Master Planned Facility. The existing storm drain system within Iron Mountain Rd is a MPU Facility. Therefore, CCRFCDD concurrence is required prior to final approval of the drainage study.

Please note that effective March 15, 2019, the CCRFCDD adopted new requirements for drainage study concurrence submittal. Follow the link below for specific guidance.

<http://gustfront.ccrfcd.org/LandDev/LandDev.aspx>

9. The project proposes to build a temporary drainage facilities. Prior to final plan approval the developer must complete a maintenance and liability agreement for the interim drainage improvements (off-site berms or channels) and post a minimum maintenance bond of \$50,000 or 50-percent of the construction cost for the improvements, whichever is greater. The engineer must submit an estimate of the quantities for constructing the facility and an exhibit that adequately shows the location and limits of the drainage facility to City of Las Vegas Flood Control for approval. Once the drainage study is conditionally approved, the engineer should contact the City's Land Development Section (229-6371) to begin the agreement process.

In order for the maintenance bond to be released in the future, a drainage update / letter will be required to justify that the offsite berms / channels are no longer necessary and can be removed.

10. Flood Control understands that the overall site has a composite CN value. The prorated flows shall account for the higher flow rate generated by the high density units. The prorated flows should not be the same for each development unit type. The previous comment still applies. The report states that sections G1, G2, and G3 analyze the worst case flow scenario, but utilize the flow rate from the onsite basin with the smallest amount of flow, a worst case scenario should utilize the basins that have a higher CN value and concentration of homes. Revise **Exhibit F, G and H** based upon the higher prorated flows. Update All Flow Tables.
11. The proposed 5-foot drainage easements shall be “Public Drainage Easement to be Privately Maintained” for the cross lot drainage. Revise the grading Plan and show the “Public Drainage Easement to be Privately Maintained” on the Final Map.

12. Provide an 18-inch clear opening for the cross lot drainage. Revise the Details accordingly.
13. Shift the location of SDMH #2 into the Radley Right-of-Way. Revise Plans accordingly.
14. The provided WSPG Summary sheets for the proposed storm drain shall include a column showing the corresponding storm drain plan information to verify the facility type and location. This provides a correlation between the WSPG and the Plans.
15. Provide rip-rap Details that include cross sections. Provide adequate bedding for the rip-rap channel as outlined in Section 705.4.3 of the CCRFCD's *Hydrologic Criteria and Drainage Design Manual*.
16. Storm Drain profiles need to include the various pipe sizes at the Manholes for each line that is connected to the manhole.
17. Provide the TC, Length, Depth, and # of Grates for all drop inlets on the Profile Sheets.
18. Street Plans need to include all sewer and water crossings with proper vertical clearance and the horizontal spacing.
19. Provide Plan and Profile for Iron Mountain Road.
20. Revise the note for all sections showing solid grouting for flood control to indicate "8-inch minimum solid grouted CMU block 3 courses above finish grade with all joints mortared." Revise Details accordingly.
21. Revise the Quantities Sheet and the Grading Plans to reflect the Drainage Improvement quantities to show both the Private and Public improvements. Update the quantities based upon the plan changes.
22. The Wrought Iron Fencing shall meet Std. Dwg. 425.S1
23. Provide a Note on all Grading Plans: *Post-Construction BMPs (PCBMPs) / Control Measures noted on the Grading Plans are mandatory permanent regulatory stormwater pollution controls. These PCBMPs must be installed per the approved plans and must be permanently maintained.*
24. Update the Stormwater Management Notes to the current version with the Improvement Plan submittal to Building Department – Land Development.
25. Update the standard drainage compliance note on the grading plan: *"I CERTIFY THAT THIS GRADING PLAN IS IN CONFORMANCE WITH THE APPROVED DRAINAGE STUDY ON FILE AT THE CITY OF LAS VEGAS FOR THIS PROJECT (DS5508)".*

NOTE: Please be advised that all land surface area disturbances over 1 acre or any area adjacent to a water way must submit to the *Nevada Division of Environmental Protection* a "Notice of Intent" to discharge that certifies a stormwater pollution prevention plan has been developed and is maintained on site; for inclusion in the Stormwater General Permit No. NVR100000. A phased construction unit in a contiguous subdivision is considered under construction until all stripped or disturbed surface areas have been covered by paving, building construction or planting. For more information, including forms and applications see <http://ndep.nv.gov/bwpc/storm01.htm> or call (775) 687-9429.

END OF REMARKS
HDR/JKS

T/R/S: T19S/R59E/S26
AREA F-26

APPENDIX B

Drainage Exhibits

\\h2101-000 Iron Mountain\Drawings\Technical\stud\addendum 2\figures\tr2101.txd add2 enh 1 unit 1 int condition drainage map.dwg 4/18/2022 12:42 PM Jonathan Rocha

Unit 1 Interim Condition Flow Rate Summary					
Basin/Concentration Point ID	Area (ac)	Area (sq. mi)	Q ₁₀₀ (cfs)	Q ₁₀ (cfs)	
OFF1-E	302.5	0.47	325	98	
OFF2-E	62.7	0.09	103	39	
OFF3-E	11.7	0.02	29	11	
OFF4-E	28.7	0.04	65	24	
OFF5-E	17.4	0.03	30	8	
AR1-E	3.8	0.01	7	2	
AR2-E	3.9	0.01	10	4	
AR3-E	2.2	<0.01	6	2	
AR4-E	0.9	<0.01	2	1	
OFF3	1013.8	1.58	755	225	
IRON1	10.1	0.02	33	15	
IRON2-I	5.9	0.01	17	7	
IRON3-I	7.2	0.01	25	12	
OF2-E	8.6	0.01	23	9	
ARW1	0.7	<0.01	3	1	
IMR1	1.9	<0.01	7	4	
RS1	1.4	<0.01	5	3	
Concentration Point ID	Area (ac)	Area (sq. mi)	Q ₁₀₀ (cfs)	Q ₁₀ (cfs)	
CP1					
Q = OFF3 + OFF1-E + AR1-E + OFF2-E	N/A	2.14	863	282	
CP2					
Q = OFF3-E + AR2-E	N/A	0.02	39	15	
CP3					
Q = OFF4-E + AR3-E + OF2-E	N/A	0.06	93	35	
CP4					
Q = CP1 + CP2 + CP3	N/A	2.23	879	293	
CP7					
Q = IRON1 + IRON2 + ARW1 + RS1	N/A	0.04	82	38	
CP8					
Q = CP4 + CP7 + AR4-E + OFF5-E	N/A	2.30	896	302	

Subbasin Prorated Flow Rate Summary Unit 1 Interim Condition					
Basin ID	Q ₁₀₀ (cfs)	Q ₁₀ (cfs)	Area (acres)	100-yr Unit Flow (cfs/acre)	10-yr Unit Flow (cfs/acre)
IRON1	33	17	10.1	3.3	1.7
IRON2-I	17	7	5.9	2.9	1.2
IRON3-I	25	12	7.2	3.5	1.7
IMR1	7	4	1.9	3.7	2.1
Subbasin ID	Q ₁₀₀ (cfs)	Q ₁₀ (cfs)	Area (acres)	100-yr Unit Flow (cfs/acre)	10-yr Unit Flow (cfs/acre)
IRON1(A2)	2.5	1	0.8	3.3	1.7
IRON1(A3)	3	1.5	0.9	3.3	1.7
IRON1(D1)	3	1.5	0.8	3.3	1.7
IRON1(D2)	1.5	1	0.5	3.3	1.7
IRON1(F1)	6	3	1.9	3.3	1.7
IRON1(F2)	9.5	5	2.9	3.3	1.7
IRON1(F3)	6	3	1.9	3.3	1.7
IRON1(F4)	1.5	1	0.4	3.3	1.7
TOTAL	33	17	10.1		
IRON2-I(B)	3	1.5	1.1	2.9	1.2
IRON2-I(C)	3	1	1.0	2.9	1.2
IRON2-I(D3)	1	0.5	0.4	2.9	1.2
IRON2-I(E)	6.5	2.5	2.2	2.9	1.2
IRON2-I(G1)	3.5	1.5	1.1	2.9	1.2
TOTAL	17	7	5.9		
IRON3-I(A1)	6	2.5	1.9	2.9	1.2
IRON3-I(G2)	5	2	1.8	2.9	1.2
IRON3-I(G3)	5	2	1.7	2.9	1.2
IRON3-I(G4)	5	2	1.8	2.9	1.2
TOTAL	21	9	7.2		
IMR1(A)	5	3	1.4	3.7	2.1
IMR1(B)	2	1	0.5	3.7	2.1
TOTAL	7	4	1.9		

Unit 1 Interim Condition 100-Year Street Flow Summary Interior Streets						
Section ID	Description	Q ₁₀₀ (cfs)	Slope (%)	Depth (ft)	Velocity (fps)	DxV
B	Q = IRON2-I(B) + 11 CFS (Overtop from Section C)		14	0.70	3.32	2.3
C	Q = Q = IRON1(A2 + A3) + IRON3-I(A1+C)		14	0.70	3.13	1.8
C (Capacity)	Q = Capacity		3	0.70	1.95	0.7
D2	Q = IRON1(D2)		1.5	3.20	2.98	0.8
D3	Q = IRON1(D2) + IRON2-I(D3) + 3 CFS (Overtop from Section E4)		5.5	3.20	4.02	1.4
D4	Q = IRON1(F2+F3)		15.5	3.20	5.14	2.5
E1	Q = D#2 Bypass + IRON1(A2+A3) + IRON2-I(B+C) + IRON3-I(A1)		46.0	0.88	3.84	2.5
E2	Q = IRON1(D2+F2+F3+F4) + IRON2-I(E+D3+G1) + IRON3-I(G2+G3+G4)		44.5	4.11	6.32	3.2
E3	Q = IRON1(D2+F2+F3+F4) + IRON2-I(D3+G1) + IRON3-I(G2)		28	4.11	5.49	2.5
E4	Q = IRON1(F2+F3) + IRON2-I(G1)		19	3.20	5.47	2.8
E4	Q = Capacity		16	3.20	5.20	2.5
G1	Q = IRON1(F4) + IRON2-I(G1)		5	1.07	2.16	0.8
F3	Q = IRON1(F3)		6	0.64	1.84	0.7

Onsite Hydraulic Section Summary Unit 1 Interim Condition					
Section ID	Q ₁₀₀ (cfs)	Section Description	Slope (%)	Depth (ft)	Velocity (fps)
Section V1	26	Earthen V-Ditch, 3:1 SS	1.00	1.39	4.50
Section T1	37	Earthen Trap Chnl, 3:1 SS, 2' BW (F1+D1) + (1/3)RS1	4.29	0.92	8.39
Section T2	40	Earthen Trap Chnl, 3:1 SS, 2' BW (F1+D1) + RS1	3.73 2.68 1.83	0.99 1.07 1.17	8.12 7.19 6.24

Recommended Mainline Facilities Summary Unit 1 Interim Condition			
Facility ID	Facility Description	Q _{Design} (cfs)	Notes
RADLEY SD SYSTEM			
A0	Proposed 48" RCP	-	Capped in proposed condition. To be extended for future SD extension, east in Radley Street.
A1	Proposed 48" RCP	81.5	To be removed for future SD extension, east in Radley Street.
A2	Proposed 24" RCP	19.5	
ONSITE SD SYSTEM			
B1	Proposed 42" RCP	62	

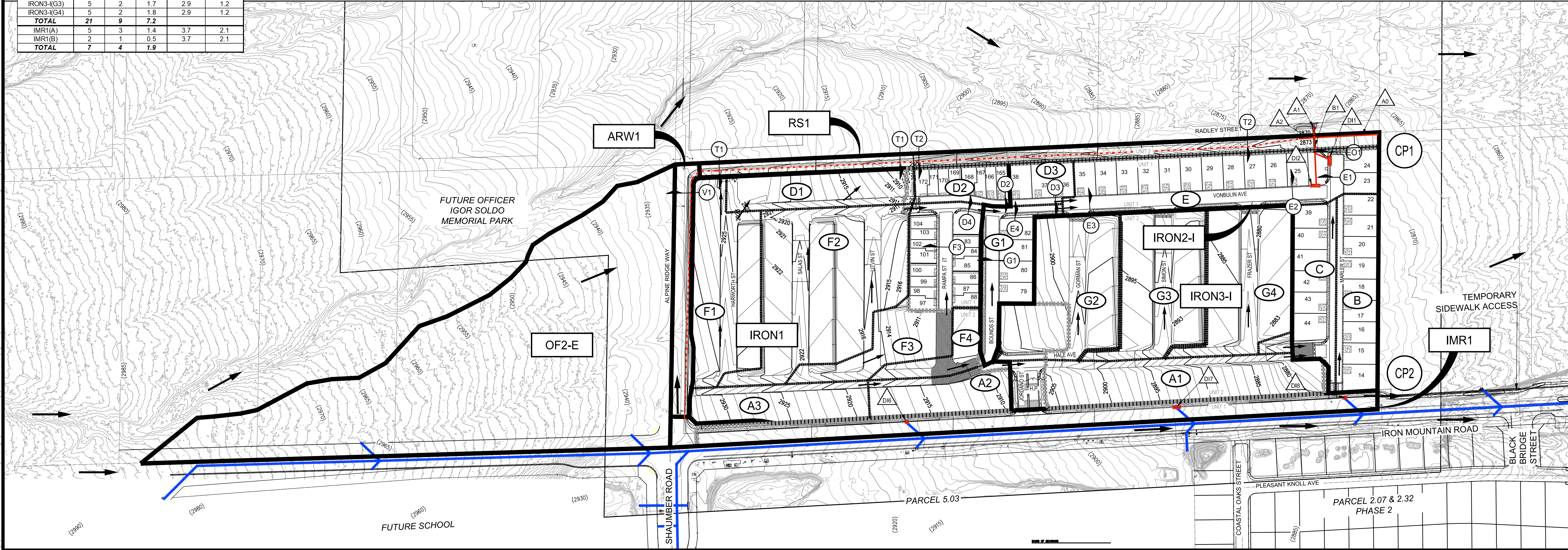
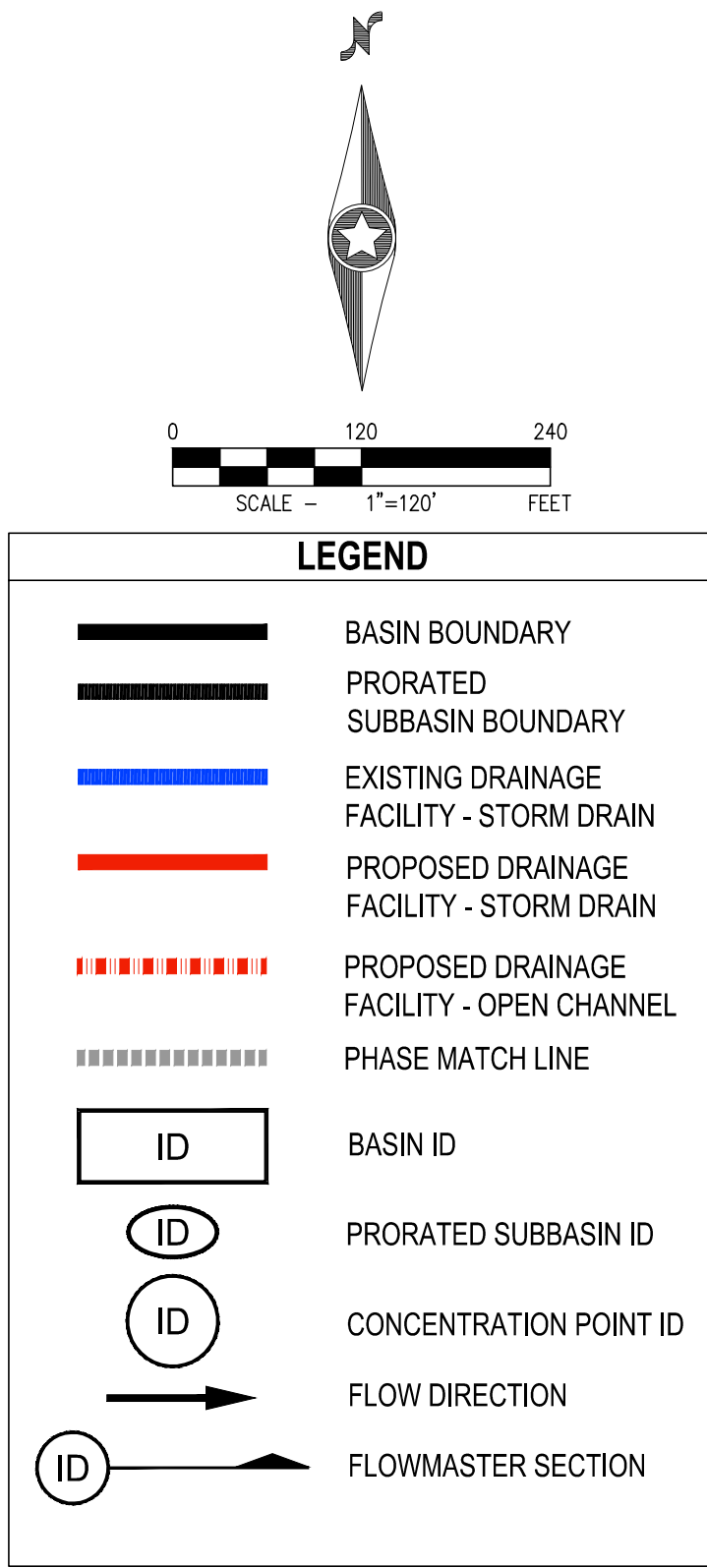
Recommended Drop Inlet Facility Summary Unit 1 Interim Condition					
Facility ID	Facility Description	Total/Approaching Flow (cfs) Q ₁₀₀	Facility Flow (cfs) Q ₁₀₀	Surface/Bypass Flow (cfs) Q ₁₀₀	Flow Description
ONSITE FACILITIES					
DI#1	Proposed 20.0" Type CM D.I. & 36" RCP Lateral	46	46	0	= D#2 Bypass + IRON1(A2+A3) + IRON2-I(B+C) + IRON3-I(A1) = 28.5 + (2.5 + 3) + (3 + 3) + 6
DI#2	Proposed 20.0" Type CM D.I. & 18" RCP Lateral	44.5	16	28.5	= IRON1(D2+F2+F3+F4) + IRON2-I(D3+E+G1) + IRON3-I(G2+G3+G4) = (1.5 + 9.5 + 6 + 1.5) + (1 + 6.5 + 3.5) + (5 + 5 + 5)

NOTES:

HYDRAULIC STREET SECTIONS & FACILITIES HAVE BEEN ANALYZED WITH FLOWS FROM UNIT 1 INTERIM.

WORST-CASE FLOWS AND FLOW DEPTHS ARE GENERATED BETWEEN UNIT 1 INTERIM AND UNIT 2 PROPOSED CONDITION.

REFER TO EXHIBIT G OR H FOR FULL LIST OF HYDRAULIC/FACILITY TABLES FOR UNIT 2 PROPOSED OR ULTIMATE CONDITION. REFER TO EXHIBIT J3 FOR OFFSITE EXTENTS OF UPSTREAM WATERSHED.



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CITY OF LAS VEGAS, NV

TRI POINTE HOMES

IRON MOUNTAIN

UNIT 1 INTERIM CONDITION DRAINAGE MAP

01
501
19S
R 59E

DATE: APRIL 2022

DRAFTER: PK

DESIGNER: JSR

CHECKED: MF

PROJECT NO.
TR12101.000

EXHIBIT F

SHEET 1 OF 1

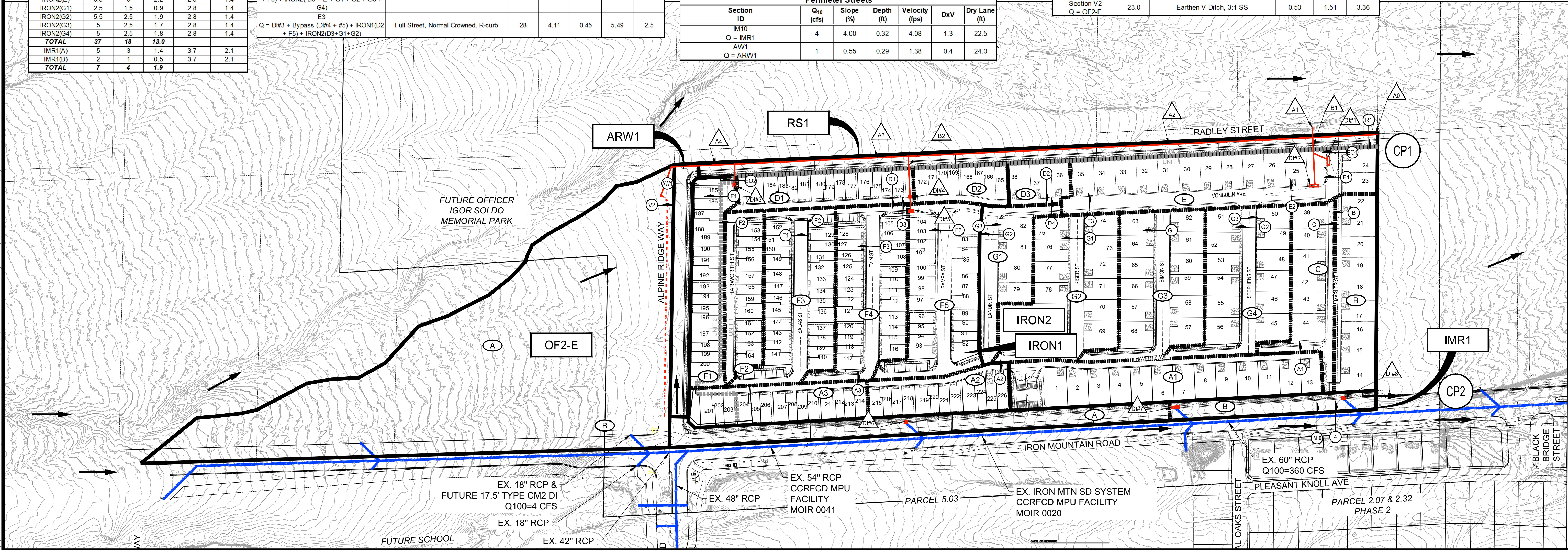
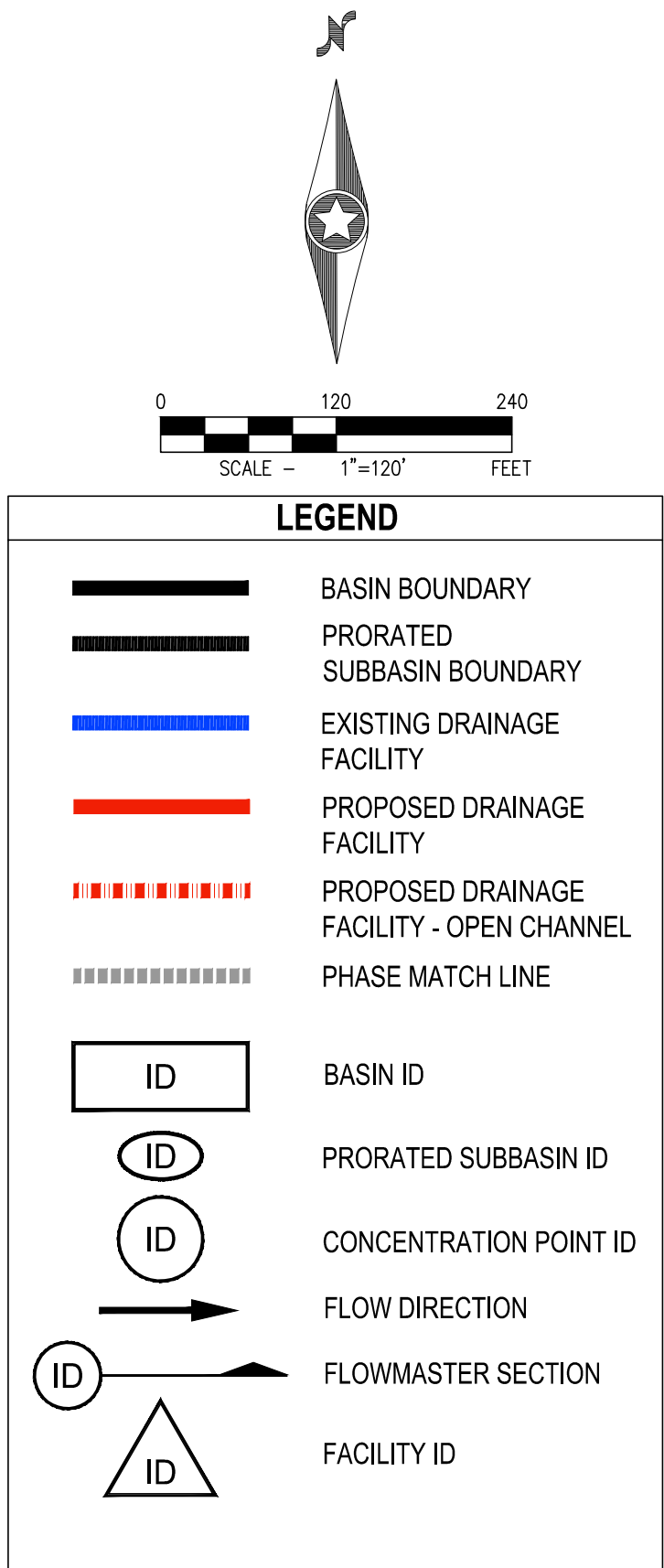
Basin ID	Q ₁₀₀ (cfs)	Q ₁₀ (cfs)	Area (acres)	100-yr Unit Flow (cfs/acre)	10-yr Unit Flow (cfs/acre)
IRON1	33	17	10.1	3.3	1.7
IRON2	37	18	13.0	2.8	1.4
IMR1	7	4	1.9	3.7	2.1
Subbasin ID	Q ₁₀₀ (cfs)	Q ₁₀ (cfs)	Area (acres)	100-yr Unit Flow (cfs/acre)	10-yr Unit Flow (cfs/acre)
IRON1(A2)	2.5	1	0.8	3.3	1.7
IRON1(A3)	3	1.5	0.9	3.3	1.7
IRON1(D1)	3	1.5	0.8	3.3	1.7
IRON1(D2)	1.5	1	0.5	3.3	1.7
IRON1(F1)	3	2	1.0	3.3	1.7
IRON1(F2)	3	1	0.9	3.3	1.7
IRON1(F3)	5.5	3	1.8	3.3	1.7
IRON1(F4)	5.5	3	1.7	3.3	1.7
IRON1(F5)	6	3	1.9	3.3	1.7
TOTAL	33	17	10.1		
IRON2(A1)	5.5	2.5	1.9	2.8	1.4
IRON2(B)	3	1.5	1.1	2.8	1.4
IRON2(C)	3	1.5	1.0	2.8	1.4
IRON2(D3)	1	0.5	0.4	2.8	1.4
IRON2(E)	6.5	3	2.2	2.8	1.4
IRON2(G1)	2.5	1.5	0.9	2.8	1.4
IRON2(G2)	5.5	2.5	1.9	2.8	1.4
IRON2(G3)	5	2.5	1.7	2.8	1.4
IRON2(G4)	5	2.5	1.8	2.8	1.4
TOTAL	37	18	13.0		
IMR1(A)	5	3	1.4	3.7	2.1
IMR1(B)	2	1	0.5	3.7	2.1
TOTAL	7	4	1.9		

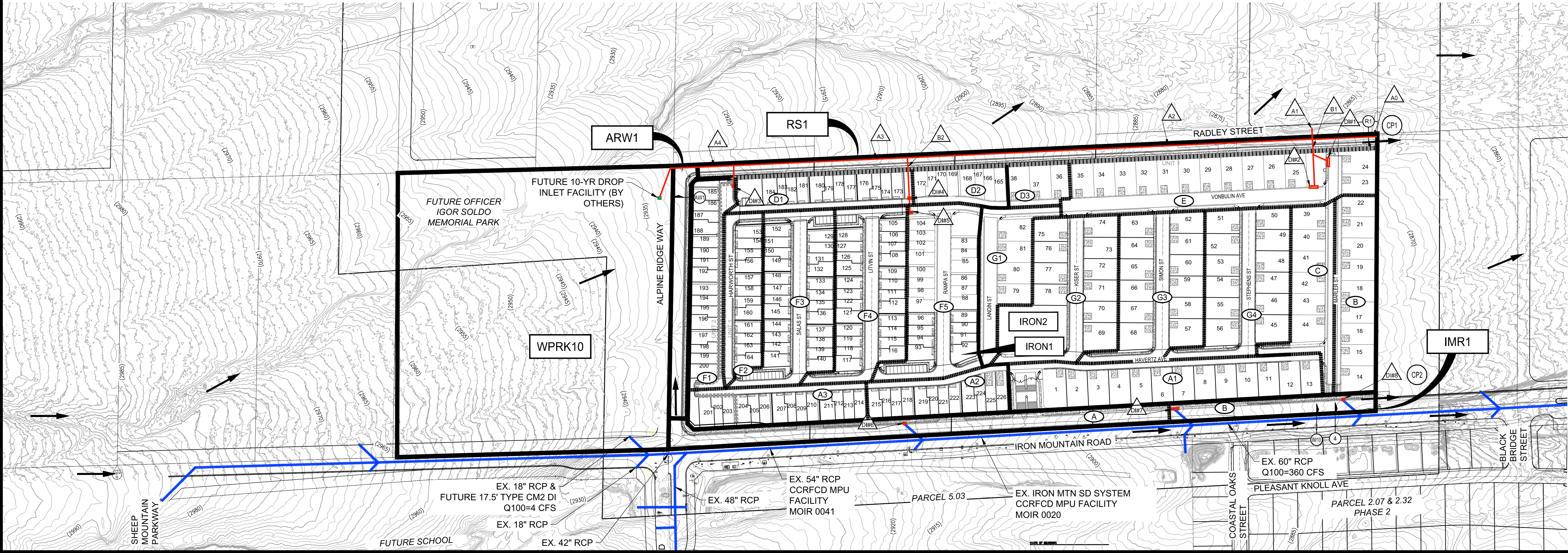
100-Year Street Flow Summary						
Interior Streets (Emergency Overflow)						
Section ID	Description	Q ₁₀₀ (cfs)	Slope (%)	Depth (ft)	Velocity (fps)	DxV
D1 Q = DI#3 + IRON1(D1)	Half Street, Normal Crowned, R-curb	6	3.20	0.38	4.04	1.5
D2 Q = DI#3 + Bypass DI#4 + IRON1(D2)	Half Street, Normal Crowned, R-curb	5.5	3.20	0.37	3.95	1.5
E1 Q = DI#3 + Bypass (DI#2 + IRON1(A2 + A3) + IRO2(A1 + B + C))	Full Street, Normal Crowned, R-curb	47	0.88	0.64	3.87	2.5
E2 Q = DI#3 + Bypass (DI#4 + #5) + IRON1(D2 F5) + IRO2(D2 + E + G1 + G2 + G3 + G4)	Full Street, Normal Crowned, R-curb	44.5	4.11	0.51	6.32	3.2
E3 Q = DI#3 + Bypass (DI#4 + #5) + IRON1(D2 + F5) + IRO2(D3+G1+G2)	Full Street, Normal Crowned, R-curb	28	4.11	0.45	5.49	2.5

Recommended Drop Inlet Facility Summary					
Facility ID	Facility Description	Total/Approaching Flow Q_{100}	Facility Flow (cfs) Q_{100}	Surface/Bypass Flow (cfs) Q_{100}	Flow Description
ONSITE FACILITIES					
D#1	Proposed 20.0' Type CM D.I. & 36" RCP Lateral	43.5	43.5	0	= (IRON1 + IRON2) - Drop Inlet Collection (#2 + #3 + #4 + #5) = (33 + 37) - (15 - 3 - 2 - 6.5)
D#2	Proposed 20.0' Type CM D.I. & 18" RCP Lateral	20.75	15	5.75	= (1/2)*[Bypass (D#4 + D#5) + IRON1(D2 + F5) + IRON2(D3 + E + G1 + G2 + G3 + G4)] = (1/2) * [(2 + 6.5)*(1.5+6)*(1+6.5+2+5.5+5+5+5)]
D#3	Proposed 5.0' Type CM D.I. & 18" RCP Lateral	3	3	0	IRON(F1)
D#4	Proposed 5.0' Type CM D.I. & 18" RCP Lateral	3	2	1	IRON(F1)
D#5	Proposed 10.0' Type CM D.I. & 18" RCP Lateral	14	6.5	7.5	IRON1(F2+F3+F4)
IRON MOUNTAIN FACILITIES					
D#6	Proposed 5.0' Type CM2 D.I. & Ex. 18" C900 Lateral	0	N/A	N/A	Nuisance Only
D#7	Proposed 5.0' Type CM2 D.I. & Ex. 18" RCP Lateral	5	3	2	IMR1(a)
D#8	Proposed 5.0' Type CM2 D.I. & Ex. 18" RCP Lateral	0	N/A	N/A	Nuisance Only

10-Year Street Flow Summary						
Perimeter Streets						
Section ID	Q ₁₀ (cfs)	Slope (%)	Depth (ft)	Velocity (fps)	DxV	Dry Lane (ft)
IM10 Q = IMR1	4	4.00	0.32	4.08	1.3	22.5
AW1 Q = ARW1	1	0.55	0.29	1.38	0.4	24.0

Offsite Hydraulic Section Summary					
Section ID	Q ₁₀₀ (cfs)	Section Description	Slope (%)	Depth (ft)	Velocity (fps)
Section V2 Q = OF2-E	23.0	Earthen V-Ditch, 3:1 SS	0.50	1.51	3.36





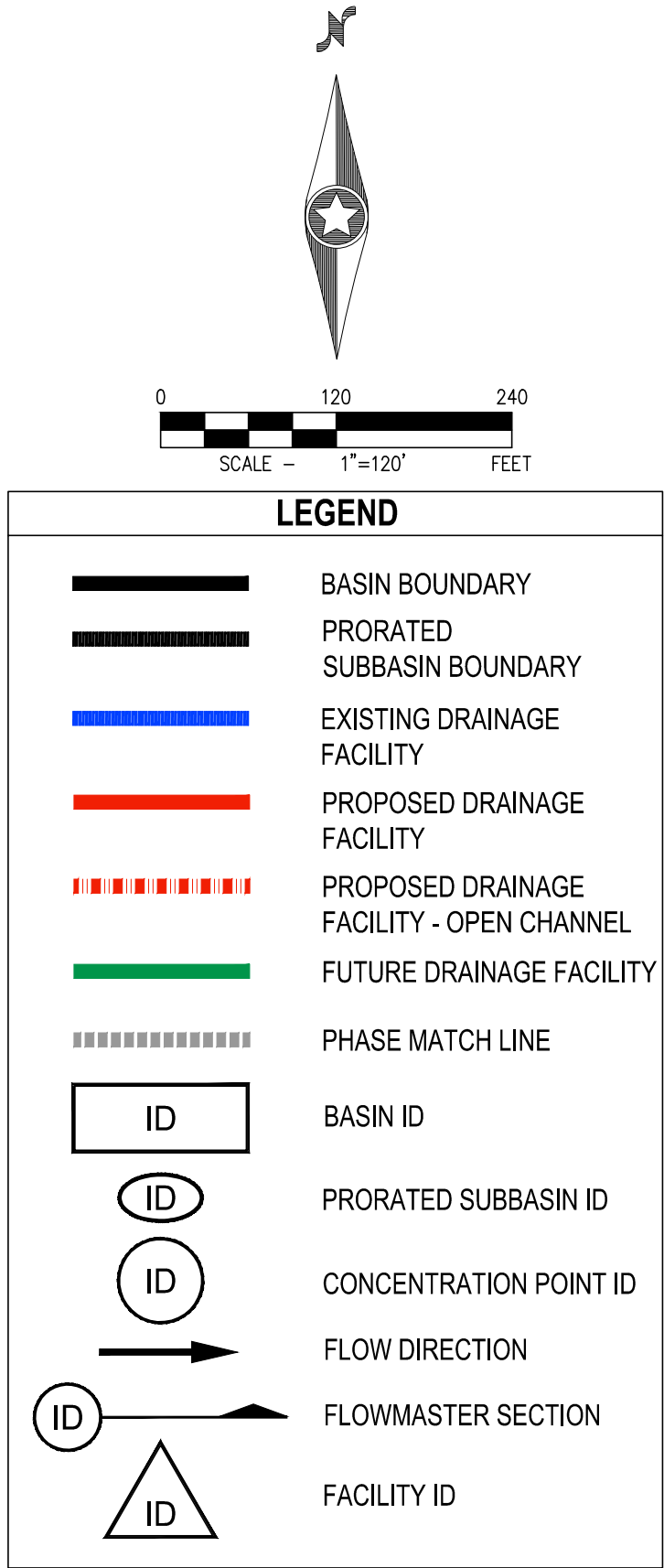
Ultimate Condition Flow Rate Summary				
Basin ID	Area (ac)	Q ₁₀₀ (cfs)	Q ₁₀ (cfs)	
IRON1	10.1	33	15	
IRON2	13.0	37	16	
WPRK10*	10.0	19	8	
ARW1	0.7	3	1	
IMR1	1.9	7	4	
RS1	1.4	5	3	
Concentration Point ID	Area (sq. mi)	Q ₁₀₀ (cfs)	Q ₁₀ (cfs)	
CP1	-	97	43	
Q = WPRK10 + ARW1 + IRON1 + IRON2 + RS1				
* REFERENCED FROM SKYE CANYON PHASE 3B & 3C INFRASTRUCTURE STUDY (DS 4943).				
CP1 HAS BEEN ALGEBRAICALLY ADDED.				

Subbasin Prorated Flow Rate Summary					
Basin ID	Q ₁₀₀ (cfs)	Q ₁₀ (cfs)	Area (acres)	100-yr Unit Flow (cfs/acre)	10-yr Unit Flow (cfs/acre)
IRON1	33	17	10.1	3.3	1.7
IRON2	37	18	13.0	2.8	1.4
IMR1	7	4	1.9	3.7	2.1
Subbasin ID	Q ₁₀₀ (cfs)	Q ₁₀ (cfs)	Area (acres)	100-yr Unit Flow (cfs/acre)	10-yr Unit Flow (cfs/acre)
IRON1(A2)	2.5	1	0.8	3.3	1.7
IRON1(A3)	3	1.5	0.9	3.3	1.7
IRON1(D1)	3	1.5	0.8	3.3	1.7
IRON1(D2)	1.5	1	0.5	3.3	1.7
IRON1(F1)	3	2	1.0	3.3	1.7
IRON1(F2)	3	1	0.9	3.3	1.7
IRON1(F3)	5.5	3	1.8	3.3	1.7
IRON1(F4)	5.5	3	1.7	3.3	1.7
IRON1(F5)	6	3	1.8	3.3	1.7
TOTAL	33	17	10.1		
IRON2(A1)	5.5	2.5	1.9	2.8	1.4
IRON2(B)	3	1.5	1.1	2.8	1.4
IRON2(C)	3	1.5	1.0	2.8	1.4
IRON2(D3)	1	0.5	0.4	2.8	1.4
IRON2(E)	6.5	3	2.2	2.8	1.4
IRON2(G1)	2.5	1.5	0.9	2.8	1.4
IRON2(G2)	5.5	2.5	1.9	2.8	1.4
IRON2(G3)	5	2.5	1.7	2.8	1.4
IRON2(G4)	5	2.5	1.8	2.8	1.4
TOTAL	37	18	13.0		
IMR1(A)	5	3	1.4	3.7	2.1
IMR1(B)	2	1	0.5	3.7	2.1
TOTAL	7	4	1.9		

Recommended Mainline Facilities Summary			
Facility ID	Facility Description	Q _{Design} (cfs)	Notes
RADLEY SD SYSTEM			
A0	Proposed 48" RCP	-	Capped in proposed condition. To be extended for future SD extension, east in Radley Street.
A1	Proposed 48" RCP	79	To be removed for future SD extension, east in Radley Street.
A2	Proposed 24" RCP	20.5	
A3	Proposed 24" RCP	12	
A4	Proposed 18" RCP	9	Open inlet in Unit 1 Interim & Unit 2 Proposed Conditions. For future SD extension for Alpine Ridge Way (by others)
ONSITE SD SYSTEM			
B1	Proposed 42" RCP	58.5	
B2	Proposed 18" RCP	8.5	

Recommended Drop Inlet Facility Summary					
Facility ID	Facility Description	Total/Approaching Flow (cfs) Q ₁₀₀	Facility Flow (cfs) Q ₁₀₀	Surface/Bypass Flow (cfs) Q ₁₀₀	Flow Description
ONSITE FACILITIES					
DI#1	Proposed 20.0" Type CM D.I. & 36" RCP Lateral	43.5	43.5	0	= (IRON1 + IRON2) - Drop Inlet Collection (#2 + #3 + #4 + #5) = (33 + 37) - (15 - 3 - 2 - 6.5)
DI#2	Proposed 20.0" Type CM D.I. & 18" RCP Lateral	20.75	15	5.75	= (1/2)*[Bypass (DI#4 + DI#5) + IRON1(D2 + F5) + IRON2(D3 + E + G1 + G2 + G3 + G4)] = (1/2) * [(2 + 6.5)*(1.5+6)+(1+6.5+2.5+5.5+5+5)]
DI#3	Proposed 5.0" Type CM D.I. & 18" RCP Lateral	3	3	0	IRON(F1)
DI#4	Proposed 5.0" Type CM D.I. & 18" RCP Lateral	3	2	1	IRON(D1)
DI#5	Proposed 10.0" Type CM D.I. & 18" RCP Lateral	14	6.5	7.5	IRON1(F2+F3+F4)
IRON MOUNTAIN FACILITIES					
DI#6	Proposed 5.0" Type CM2 D.I. & Ex. 18" C900 Lateral	0	N/A	N/A	Nuisance Only
DI#7	Proposed 5.0" Type CM2 D.I. & Ex. 18" RCP Lateral	5	3	2	IMR1(a)
DI#8	Proposed 5.0" Type CM2 D.I. & Ex. 18" RCP Lateral	0	N/A	N/A	Nuisance Only

NOTES:
HYDRAULIC STREET SECTIONS & FACILITIES UTILIZED FOR THE ULTIMATE CONDITION HAVE BEEN ANALYZED WITH FLOWS FROM UNIT 2 PROPOSED. REFER TO EXHIBIT G FOR SUMMARY TABLES OF HYDRAULIC SECTIONS AND FACILITIES NOT LISTED ON THIS EXHIBIT.



TRI POINTE HOMES

IRON MOUNTAIN

ULTIMATE CONDITION DRAINAGE MAP

01
97
19
R 59E

DATE: FEB 2022

DRAFTER: PK

DESIGNER: JSR

CHECKED: MF

PROJECT NO.
TRI2101.000

EXHIBIT H

SHEET 1 OF 1

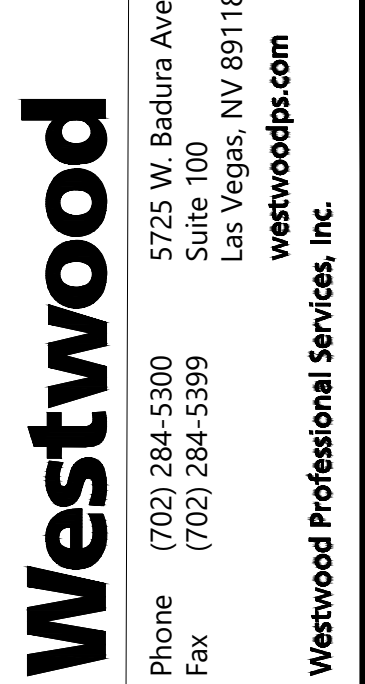
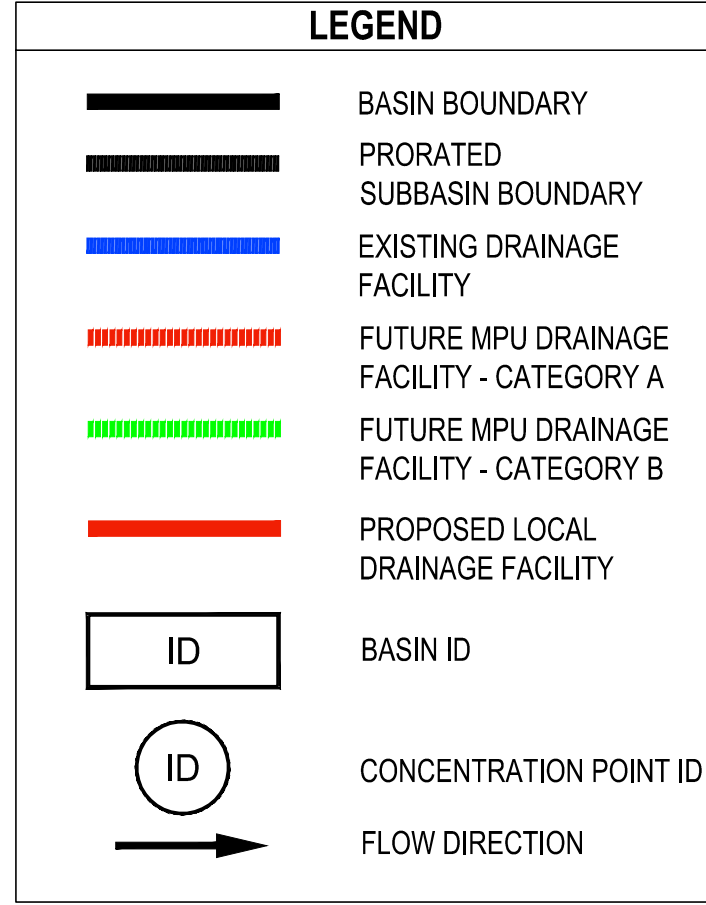
Westwood

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Phone (702) 284-5300
Fax (702) 284-5399
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Westwood Professional Services, Inc.

Unit 2 Proposed Condition Flow Rate Summary				
Basin/Concentration Point ID	Area (ac)	Area (sq. mi)	Q ₁₀₀ (cfs)	Q ₁₀ (cfs)
OFF1-E	302.5	0.47	325	98
OFF2-E	52.7	0.08	103	39
OFF3-E	11.7	0.02	29	11
OFF4-E	28.7	0.04	65	24
OFF5-E	17.4	0.03	30	8
AR1-E	3.8	0.01	7	2
AR2-E	3.9	0.01	10	4
AR3-E	2.2	<0.01	6	2
AR4-E	0.9	<0.01	2	1
OFF3	1013.8	1.58	755	225
IRON1	10.1	0.02	33	15
IRON2	13.0	0.02	37	16
OF2-E	8.6	0.01	23	9
ARW1	0.7	<0.01	3	1
MR1	1.9	<0.01	7	4
RS1	1.4	<0.01	5	3
Concentration Point ID	Area (ac)	Area (sq. mi)	Q ₁₀₀ (cfs)	Q ₁₀ (cfs)
CP1				
Q = OFF3 + OFF1-E + AR1-E + OFF2-E	N/A	2.14	863	282
CP2				
Q = OFF3-E + AR2-E	N/A	0.02	39	15
CP3				
Q = OFF4-E + AR3-E + OF2-E	N/A	0.06	93	35
CP4				
Q = CP1 + CP2 + CP3	N/A	2.23	879	293
CP7				
Q = IRON1 + IRON2 + ARW1 + RS1	N/A	0.04	77	35
CP8				
Q = CP4 + CP7 + AR4-E + OFE5-E	N/A	2.30	895	302

DRAINAGE CONDITION ASSUMPTIONS:

- IRON MOUNTAIN PROJECT SITE FULLY CONSTRUCTED FOR UNIT 1 & UNIT 2.
- NO FLOW SPLIT AT KYLE CANYON ROAD
- MPU FACILITY MOKC 0173, EXISTING LANDUSE CONSIDERED UPSTREAM OF DETENTION BASIN. DEVELOPED LANDUSE CONSIDERED DOWNSTREAM OF DETENTION BASIN.
- FUTURE PLANNED MPU FACILITIES ARE NOT CONSIDERED COMPLETE DURING THE DRAINAGE CONDITION PRESENTED ON THIS EXHIBIT. THEY ARE DISPLAYED ONLY FOR SPATIAL REFERENCE FOR WATERSHED COMPARISON WITH THE OTHER DRAINAGE CONDITIONS.

[illegible]

**MAP
DRIVE**

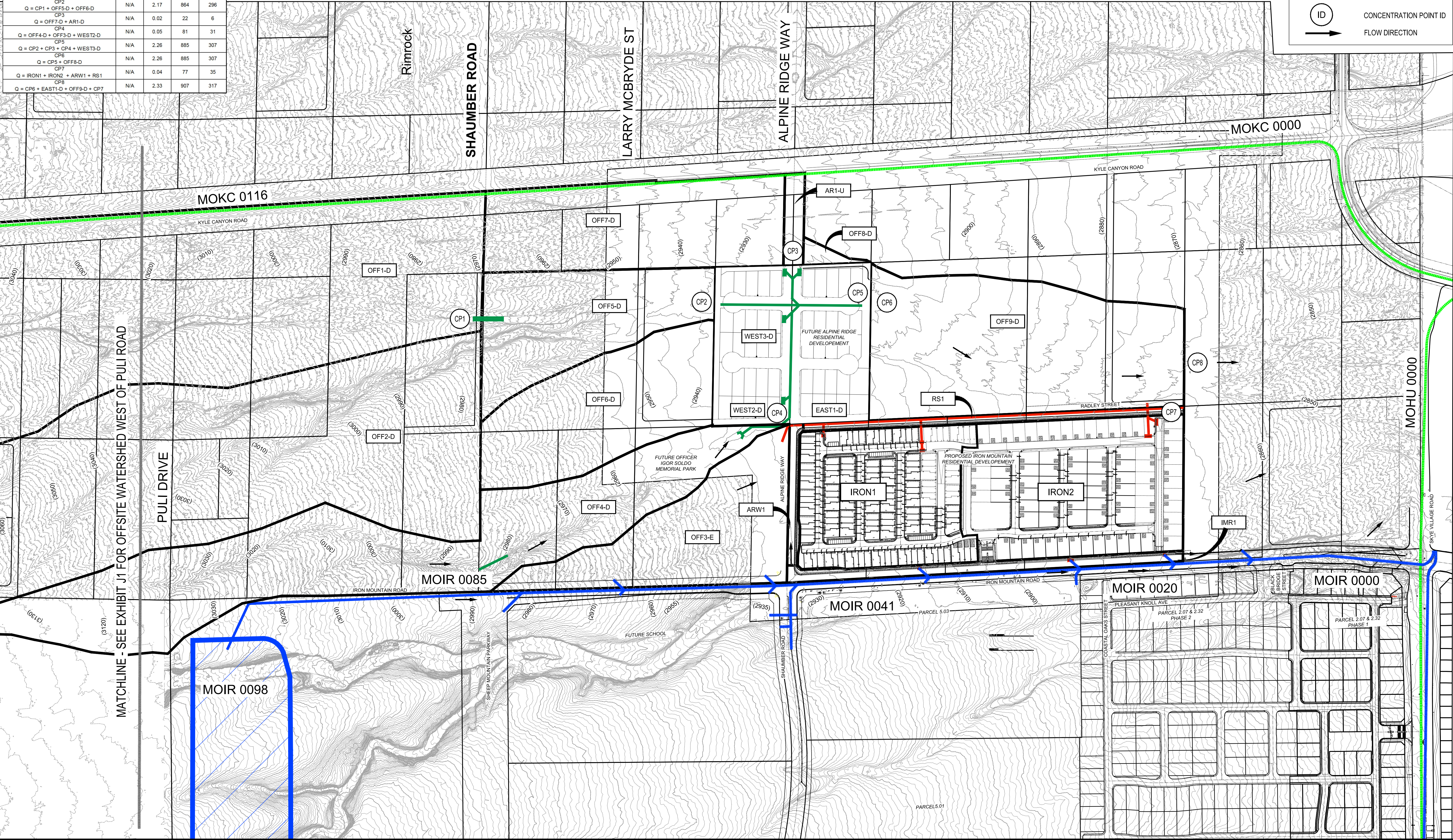
TRI POINTE HOMES
IRON MOUNTAIN
UNIT 2 PROPOSED CONDITION DRAINAGE
OFFSITE WATERSHED - EAST OF

DATE:	APRIL 2022
DRAFTER:	JSR
DESIGNER:	JSR
CHECKED:	MF
PROJECT NO.	TRI2101.000

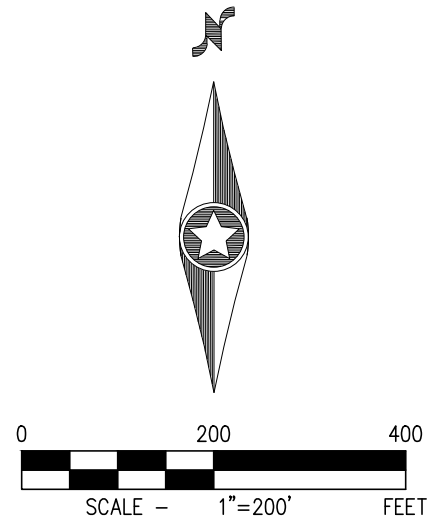
EXHIBIT J3
SHEET 1 OF 1

\\h2101-000 Iron Mountain\Drawings\Technical\studies\Iron Mountain\Drawings\2\figures\1210102_1a.dwg 4/14/2022 10:23 PM Jonathan Rocha

Potential Condition Flow Rate Summary				
Basin/Concentration Point ID	Area (ac)	Area (sq. mi)	Q ₁₀₀ (cfs)	Q ₁₀ (cfs)
OFF1-D	268.5	0.45	409	149
OFF2-D	55.1	0.09	136	57
OFF3-D	9.6	0.01	20	7
OFF4-D	24.5	0.04	59	24
OFF5-D	19.3	0.03	46	16
OFF6-D	10.5	0.02	31	13
OFF7-D	11.3	0.02	20	6
OFF8-D	0.4	<0.01	1	0
OFF9-D	17.4	0.03	39	14
EAST1-D	0.9	<0.01	3	1
WEST2-D	0.9	<0.01	3	1
WEST3-D	9.1	0.01	24	10
AR1-U	0.8	<0.01	2	1
OFF3	1013.8	1.58	755	225
IRON1	10.1	0.02	33	15
IRON2	13.0	0.02	37	16
ARW1	0.7	<0.01	3	1
IMR1	1.9	<0.01	7	4
RS1	1.4	<0.01	5	3
Concentration Point ID	Area (ac)	Area (sq. mi)	Q ₁₀₀ (cfs)	Q ₁₀ (cfs)
CP1	N/A	2.12	852	290
CP2	N/A	2.17	864	296
CP3	N/A	0.02	22	6
CP4	N/A	0.05	81	31
CP5	N/A	2.26	885	307
CP6	N/A	2.26	885	307
CP7	N/A	0.04	77	35
CP8	N/A	2.33	907	317



NOTES:
POTENTIAL CONDITION ASSUMPTIONS:
- NO FLOW SPLIT AT KYLE CANYON ROAD
- MPU FACILITY MOKC 0173, EXISTING LANDUSE CONSIDERED UPSTREAM OF DETENTION BASIN. DEVELOPED LANDUSE CONSIDERED DOWNSTREAM OF DETENTION BASIN. DETENTION BASIN MOKC 0173 NOT CONSTRUCTED.
-FUTURE PLANNED MPU FACILITIES ARE NOT CONSIDERED COMPLETE DURING THE DRAINAGE CONDITION PRESENTED ON THIS EXHIBIT. THEY ARE DISPLAYED ONLY FOR SPATIAL REFERENCE FOR WATERSHED COMPARISON WITH THE OTHER DRAINAGE CONDITIONS.



LEGEND

BASIN BOUNDARY

PRORATED SUBBASIN BOUNDARY

EXISTING DRAINAGE FACILITY

FUTURE MPU DRAINAGE FACILITY - CATEGORY A

FUTURE MPU DRAINAGE FACILITY - CATEGORY B

PROPOSED LOCAL DRAINAGE FACILITY

FUTURE LOCAL DRAINAGE FACILITY

BASIN ID

CONCENTRATION POINT ID

FLOW DIRECTION

Westwood

Phone (702) 284-5300
Fax (702) 284-5399

5725 W. Badura Ave.
Suite 100
Las Vegas, NV 89118

westwoodps.com

Westwood Professional Services, Inc.

CITY OF LAS VEGAS, NV

TRI POINTE HOMES

IRON MOUNTAIN

POTENTIAL CONDITION DRAINAGE MAP

OFFSITE WATERSHED - EAST OF PULI DRIVE

DATE: APRIL 2022

DRAFTER: JSR

DESIGNER: JSR

CHECKED: MF

PROJECT NO. TRI2101.000

EXHIBIT J4

SHEET 1 OF 1

APPENDIX C

Hydrologic Analyses

CN Computation, Soils & Land Use Data

Project Name & Number: TRI2101 Iron Mountain

By: JSR

Date: 4/4/2022

Data:

Reference:

2018 MPU
NRCS Soil Data

Soil Type - Soil Survey Area & Version, Soil Description				A	B	C	D
LV	155	Las Vegas Valley (NV788)	Cave gravelly fine sandy loam, 4 to 15 percent slopes	0%	0%	0%	100%
LV	400	Las Vegas Valley (NV788)	Tencee very gravelly fine sandy loam, 2 to 8 percent slopes	0%	0%	0%	100%

Land Use	A	B	C	D
6 High-Den Res, 4-8 units/acre	74	83	88	91
7 Public Facility/Res, 8-12 units/acre	84	89	92	94
Newly Graded	77	86	91	94

UNIT 1 INTERIM CONDITION

BASIN ID	IRON1		TOTAL AREA & COMPOSITE CURVE NUMBER:								10.10	94.0	
SURVEY AREA	SOIL TYPE	SUBAREA PERCENT	LAND USE	HYDROLOGIC SOIL				LAND USE CN				SUBAREA ACRES	CURVE NUMBER
				A	B	C	D	A	B	C	D		
LV	155	61.2%	7 Public Facility/Res, 8-12 units/acre	0%	0%	0%	100%	84	89	92	94	6.18	57.52
LV	400	38.8%	7 Public Facility/Res, 8-12 units/acre	0%	0%	0%	100%	84	89	92	94	3.92	36.48
TOTAL		100.00%											

BASIN ID	IRON2-I		TOTAL AREA & COMPOSITE CURVE NUMBER:								5.85	91.0	
SURVEY AREA	SOIL TYPE	SUBAREA PERCENT	LAND USE	HYDROLOGIC SOIL				LAND USE CN				SUBAREA ACRES	CURVE NUMBER
				A	B	C	D	A	B	C	D		
LV	155	25.0%	6 High-Den Res, 4-8 units/acre	0%	0%	0%	100%	74	83	88	91	1.46	22.71
LV	400	75.0%	6 High-Den Res, 4-8 units/acre	0%	0%	0%	100%	74	83	88	91	4.39	68.29
TOTAL		100.0%											

BASIN ID	IRON3-I		TOTAL AREA & COMPOSITE CURVE NUMBER:								7.16	94.0	
SURVEY AREA	SOIL TYPE	SUBAREA PERCENT	LAND USE	HYDROLOGIC SOIL				LAND USE CN				SUBAREA ACRES	CURVE NUMBER
				A	B	C	D	A	B	C	D		
LV	155	23.5%	Newly Graded	0%	0%	0%	100%	77	86	91	94	1.68	22.06
LV	400	76.5%	Newly Graded	0%	0%	0%	100%	77	86	91	94	5.48	71.94
TOTAL		100.0%											

UNIT 2 PROPOSED CONDITION

BASIN ID	IRON2		TOTAL AREA & COMPOSITE CURVE NUMBER:										13.01	91.0
SURVEY AREA	SOIL TYPE	SUBAREA PERCENT	LAND USE	HYDROLOGIC SOIL				LAND USE CN				SUBAREA ACRES	CURVE NUMBER	
				A	B	C	D	A	B	C	D			
LV	155	24.1%	6 High-Den Res, 4-8 units/acre	0%	0%	0%	100%	74	83	88	91	3.14	21.96	
LV	400	75.9%	6 High-Den Res, 4-8 units/acre	0%	0%	0%	100%	74	83	88	91	9.87	69.04	
TOTAL		100.0%												

Lag Time Computations (Standard Form 4)



Time of Concentration (Standard Form 4)

Project Name & Number: TRI2101 Iron Mountain

By: JSR

Date: 4/4/2022

BASIN DATA						INITIAL / OVERLAND TIME (Ti)			TRAVEL TIME (Tt)				Tc	Tc Check	Flag		
DESIG:	DEV./EX. (D or E)	CN	K	AREA Ac	AREA MI^2	INITIAL LENGTH Feet	SLOPE %	Ti Min	TRAVEL LENGTH Feet	SLOPE %	V1 VELOCITY FPS	V2 VELOCITY FPS	Tt Min	Tc Calc.	Tc Check	Flag	
			[1]		[2]			[3]			[4]	[5]	[6]	[7]	[8]	[9]	[10]
Unit 1 Interim Condition																	
IRON1	D	94.0	0.851	10.10	0.0158	75	1.00	3.88	1195	2.47	3.17	4.80	5.04	8.92	1270	17.056	0.089
IRON2-I	D	91.0	0.811	5.85	0.0091	85	1.00	4.79	1290	2.74	3.34	5.06	5.10	9.89	1375	17.639	0.099
IRON3-I	D	94.0	0.851	7.16	0.0112	170	4.12	3.65	760	4.64	4.35	6.59	2.57	6.22	930	15.167	0.062
Unit 2 Proposed Condition																	
IRON2	D	91.0	0.811	13.01	0.0203	85	1.00	4.79	1290	2.74	3.34	5.06	5.10	9.89	1375	17.639	0.099
[1]	K = 0.0132 (CN) - 0.39																
[2]	A = Area/640																
[3]	Ti = (1.8 (1.1-K) L^0.5)/S^0.33																
[4]	For Existing Conditions: V1 = 14.8 * (S/100)^0.5																
For Developed Conditions: V1 = 20.2 * (S/100)^0.5																	
Note: For Travel Time Calcs: V1 applies to first 500 feet and V2 applies to remaining distance.																	
Total L = Initial L + Travel L																	
Tc = Ti + Tt																	
Tc = (L/180) + 10																	
Flag = (0.6*Tc)/60																	
Min Flag =0.05																	

Unit 1 Interim Condition HEC-1 Model

INT.OUT

```
1*****
*
* FLOOD HYDROGRAPH PACKAGE (HEC-1)
*   JUN 1998
*   VERSION 4.1
*
* RUN DATE 04APR22 TIME 14:43:36
*
*****
```

```
*****
*
* U.S. ARMY CORPS OF ENGINEERS
* HYDROLOGIC ENGINEERING CENTER
* 609 SECOND STREET
* DAVIS, CALIFORNIA 95616
* (916) 756-1104
*
*****
```

```

X  X XXXXXXX XXXXX  X
X  X X  X  X  X  XX
X  X X  X  X  X  X
XXXXXXX XXXX X  XXXXX X
X  X X  X  X  X  X
X  X X  X  X  X  X
X  X XXXXXXX XXXXX  XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1

HEC-1 INPUT

PAGE 1

```

LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
*** FREE ***

*DIAGRAM
1  ID  WESTWOOD PROFESSIONAL SERVICES
2  ID  IRON MOUNTAIN
3  ID  UNIT 1 INTERIM DRAINAGE CONDITION
4  ID
5  ID  RETURN PERIOD ----- 100-YR
6  ID  DISTRIBUTION ----- 6-HOUR SDN3
7  ID  PROJECT NO. ----- TRI2104
8  ID  FILENAME ----- PRO.H1
9  ID  DATE ----- APRIL 2022
10 ID  MODELED BY ----- JR/PK
11 ID
12 ID  SIX HOUR DEPTH-AREA REDUCTION FACTORS
13 ID  DRAINAGE AREA (MI^2)  DARF
14 ID  0.0-0.49              1.00
15 ID  0.5-0.99              0.98
16 ID  1.0-1.99              0.97
17 ID  2.0-3.99              0.93
18 ID  10-YR                 0.54
19 ID
20 IT  5      0      0      300
21 IO  5      0      0
22 IN  5      0      0
23 JR  PREC  1.00  0.98  0.97  0.93  0.54
*

24 KK  OFF3
25 BA  1.584
26 PC  0      0.020  0.057  0.070  0.087  0.108  0.124  0.130  0.130  0.130
27 PC  0.130  0.130  0.130  0.133  0.140  0.142  0.148  0.158  0.172  0.181
28 PC  0.190  0.197  0.199  0.200  0.201  0.204  0.214  0.229  0.241  0.249
29 PC  0.251  0.256  0.270  0.278  0.281  0.283  0.295  0.322  0.352  0.409
30 PC  0.499  0.590  0.710  0.744  0.781  0.812  0.819  0.835  0.851  0.856
31 PC  0.860  0.868  0.876  0.888  0.910  0.926  0.937  0.950  0.970  0.976
32 PC  0.982  0.985  0.987  0.989  0.990  0.993  0.993  0.994  0.995  0.998
33 PC  0.998  0.999      1
34 PB  3.43
35 LS  0      79.3
36 UD  0.938
*

37 KK  ROFF3
38 KM  REFERENCED FROM KYLE CANYON GATEWAY 21-13876
39 KM  ROUTE OFF3 TO CP1
40 KM  NATURAL WASH TRAPEZOIDAL CHANNEL 32'W 3:1 SS
41 RD  8500  0.034  0.025      0  TRAP  32      3
*

42 KK  OFF1-E
43 BA  0.4726
```


INT.OUT

44 PB 3.00
 45 LS 0 82.5
 46 UD 0.512
 *

1

HEC-1 INPUT

PAGE 2

LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

47 KK AR1-E
 48 BA 0.0059
 49 PB 3.00
 50 LS 0 81.2
 51 UD 0.100
 *

52 KK DUMMY1
 53 HC 3
 *

54 KK OFF2-E
 55 BA 0.0823
 56 PB 3.00
 57 LS 0 88.0
 58 UD 0.248
 *

59 KK CP1
 60 HC 2
 *

61 KK OFF3-E
 62 BA 0.0182
 63 PB 3.00
 64 LS 0 88.0
 65 UD 0.108
 *

66 KK AR2-E
 67 BA 0.0061
 68 PB 3.00
 69 LS 0 88.0
 70 UD 0.100
 *

71 KK CP2
 72 HC 2
 *

73 KK OFF4-E
 74 BA 0.0448
 75 PB 3.00
 76 LS 0 88.0
 77 UD 0.174
 *

78 KK AR3-E
 79 BA 0.0034
 80 PB 3.00
 81 LS 0 88.0
 82 UD 0.100
 *

1

HEC-1 INPUT

PAGE 3

LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

83 KK OF2-E
 84 BA 0.0148
 85 PB 3.00
 86 LS 0 88.0
 87 UD 0.123
 *

88 KK CP3
 89 HC 3
 *

90 KK CP4
 91 HC 3
 *

92 KK AR4-E
 93 BA 0.0014
 94 PB 3.00
 95 LS 0 88.0
 96 UD 0.100
 *

INT.OUT

97	KK	OFF5-E	
98	BA	0.0272	
99	PB	3.00	
100	LS	0	80.1
101	UD	0.150	
	*		
102	KK	IRON1	
103	BA	0.0158	
104	LS	0	94.0
105	UD	0.089	
	*		
106	KK	IRON2-I	
107	BA	0.0091	
108	LS	0	91.0
109	UD	0.099	
	*		
110	KK	IRON3-I	
111	BA	0.0112	
112	LS	0	94.0
113	UD	0.062	
	*		
114	KK	ARW1	
115	BA	0.0011	
116	LS	0	98.0
117	UD	0.066	
	*		

1

HEC-1 INPUT

PAGE 4

LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

118	KK	RS1	
119	BA	0.0021	
120	LS	0	98.0
121	UD	0.073	
	*		
122	KK	CP7	
123	HC	5	
	*		
124	KK	CP8	
125	HC	4	
	*		
126	KK	IMR1	
127	BA	0.0030	
128	LS	0	98.0
129	UD	0.073	
	*		
130	ZZ		

1

SCHEMATIC DIAGRAM OF STREAM NETWORK

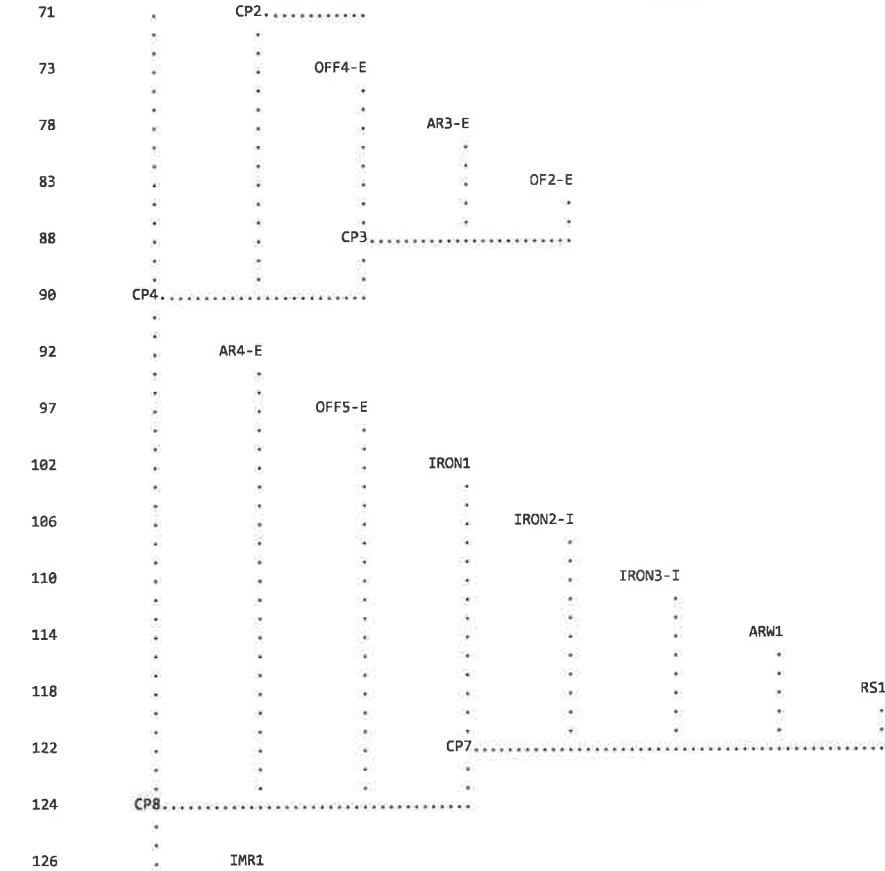
INPUT LINE (V) ROUTING (--->) DIVERSION OR PUMP FLOW

NO. (.) CONNECTOR (<---) RETURN OF DIVERTED OR PUMPED FLOW

```

24  OFF3
    V
    V
37  ROFF3
    *
    *
42  OFF1-E
    *
    *
47  AR1-E
    *
    *
52  DUMMY1.....
    *
    *
54  OFF2-E
    *
    *
59  CP1.....
    *
    *
61  OFF3-E
    *
    *
66  AR2-E
    *
    *
    
```


INT.OUT



(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
1*****
* FLOOD HYDROGRAPH PACKAGE (HEC-1) *
* JUN 1998 *
* VERSION 4.1 *
* RUN DATE 04APR22 TIME 14:43:36 *
* *****
```

```
*****
* U.S. ARMY CORPS OF ENGINEERS *
* HYDROLOGIC ENGINEERING CENTER *
* 609 SECOND STREET *
* DAVIS, CALIFORNIA 95616 *
* (916) 756-1104 *
* *****
```

WESTWOOD PROFESSIONAL SERVICES
IRON MOUNTAIN
UNIT 1 INTERIM DRAINAGE CONDITION

RETURN PERIOD ----- 100-YR
DISTRIBUTION ----- 6-HOUR SDN3
PROJECT NO. ----- TRI2104
FILENAME ----- PRO.H1
DATE ----- APRIL 2022
MODELED BY ----- JR/PK

SIX HOUR DEPTH-AREA REDUCTION FACTORS
DRAINAGE AREA (MI^2) DARF
0.0-0.49 1.00
0.5-0.99 0.98
1.0-1.99 0.97
2.0-3.99 0.93
10-YR 0.54

21 IO OUTPUT CONTROL VARIABLES
IPRNT 5 PRINT CONTROL
IPLOT 0 PLOT CONTROL
QSCAL 0. HYDROGRAPH PLOT SCALE

IT HYDROGRAPH TIME DATA
NMIN 5 MINUTES IN COMPUTATION INTERVAL

INT,OUT

IDATE 1 0 STARTING DATE
 ITIME 0000 STARTING TIME
 NQ 300 NUMBER OF HYDROGRAPH ORDINATES
 NDDATE 2 0 ENDING DATE
 NDTIME 0055 ENDING TIME
 ICENT 19 CENTURY MARK

COMPUTATION INTERVAL .08 HOURS
 TOTAL TIME BASE 24.92 HOURS

ENGLISH UNITS

DRAINAGE AREA SQUARE MILES
 PRECIPITATION DEPTH INCHES
 LENGTH, ELEVATION FEET
 FLOW CUBIC FEET PER SECOND
 STORAGE VOLUME ACRE-Feet
 SURFACE AREA ACRES
 TEMPERATURE DEGREES FAHRENHEIT

JP MULTI-PLAN OPTION
 NPLAN 1 NUMBER OF PLANS

JR MULTI-RATIO OPTION
 RATIOS OF PRECIPITATION
 1.00 .98 .97 .93 .54

1

PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
 FLOWS IN CUBIC FEET PER SECOND, AREA IN SQUARE MILES
 TIME TO PEAK IN HOURS

OPERATION	STATION	AREA	PLAN	RATIOS APPLIED TO PRECIPITATION				
				RATIO 1 1.00	RATIO 2 .98	RATIO 3 .97	RATIO 4 .93	RATIO 5 .54
HYDROGRAPH AT								
+	OFF3	1.58	1 FLOW	796.	769.	755.	700.	225.
			TIME	4.42	4.42	4.42	4.42	4.50
ROUTED TO								
+	ROFF3	1.58	1 FLOW	796.	769.	755.	701.	225.
			TIME	4.58	4.58	4.58	4.58	4.75
HYDROGRAPH AT								
+	OFF1-E	.47	1 FLOW	325.	315.	309.	288.	98.
			TIME	4.00	4.00	4.00	4.00	4.00
HYDROGRAPH AT								
+	AR1-E	.01	1 FLOW	7.	7.	7.	6.	2.
			TIME	3.50	3.50	3.50	3.50	3.58
3 COMBINED AT								
+	DUMMY1	2.06	1 FLOW	964.	930.	914.	847.	272.
			TIME	4.42	4.42	4.42	4.42	4.67
HYDROGRAPH AT								
+	OFF2-E	.08	1 FLOW	103.	101.	99.	93.	39.
			TIME	3.67	3.67	3.67	3.67	3.67
2 COMBINED AT								
+	CP1	2.14	1 FLOW	981.	947.	930.	863.	282.
			TIME	4.42	4.42	4.42	4.42	4.67
HYDROGRAPH AT								
+	OFF3-E	.02	1 FLOW	29.	28.	28.	26.	11.
			TIME	3.50	3.50	3.50	3.50	3.58
HYDROGRAPH AT								
+	AR2-E	.01	1 FLOW	10.	10.	10.	9.	4.
			TIME	3.50	3.50	3.50	3.50	3.50
2 COMBINED AT								
+	CP2	.02	1 FLOW	39.	38.	37.	35.	15.
			TIME	3.50	3.50	3.50	3.50	3.58
HYDROGRAPH AT								
+	OFF4-E	.04	1 FLOW	65.	63.	62.	58.	24.
			TIME	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT								
+	AR3-E	.00	1 FLOW	6.	5.	5.	5.	2.
			TIME	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT								
+	OF2-E	.01	1 FLOW	23.	23.	22.	21.	9.
			TIME	3.58	3.58	3.58	3.58	3.58

3 COMBINED AT

							INT. OUT		
+	CP3	.06	1	FLOW TIME	93. 3.58	90. 3.58	89. 3.58	84. 3.58	35. 3.58
3 COMBINED AT									
+	CP4	2.23	1	FLOW TIME	996. 4.50	963. 4.50	946. 4.50	879. 4.50	293. 4.67
HYDROGRAPH AT									
+	AR4-E	.00	1	FLOW TIME	2. 3.50	2. 3.50	2. 3.50	2. 3.50	1. 3.50
HYDROGRAPH AT									
+	OFF5-E	.03	1	FLOW TIME	30. 3.58	29. 3.58	28. 3.58	26. 3.58	8. 3.58
HYDROGRAPH AT									
+	IRON1	.02	1	FLOW TIME	33. 3.50	32. 3.50	31. 3.50	30. 3.50	15. 3.50
HYDROGRAPH AT									
+	IRON2-I	.01	1	FLOW TIME	17. 3.50	16. 3.50	16. 3.50	15. 3.50	7. 3.50
HYDROGRAPH AT									
+	IRON3-I	.01	1	FLOW TIME	25. 3.50	25. 3.50	24. 3.50	23. 3.50	12. 3.50
HYDROGRAPH AT									
+	ARW1	.00	1	FLOW TIME	3. 3.50	3. 3.50	3. 3.50	2. 3.50	1. 3.50
HYDROGRAPH AT									
+	RS1	.00	1	FLOW TIME	5. 3.50	5. 3.50	5. 3.50	5. 3.50	3. 3.50
5 COMBINED AT									
+	CP7	.04	1	FLOW TIME	82. 3.50	80. 3.50	79. 3.50	75. 3.50	38. 3.50
4 COMBINED AT									
+	CP8	2.30	1	FLOW TIME	1015. 4.50	981. 4.50	964. 4.50	896. 4.50	302. 4.67
HYDROGRAPH AT									
+	IMR1	.00	1	FLOW TIME	7. 3.50	7. 3.50	7. 3.50	7. 3.50	4. 3.50

1

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

ISTAQ	ELEMENT	DT	PEAK	TIME TO PEAK	VOLUME	DT	INTERPOLATED TO COMPUTATION INTERVAL PEAK	TIME TO PEAK	VOLUME
		(MIN)	(CFS)	(MIN)	(IN)	(MIN)	(CFS)	(MIN)	(IN)
FOR PLAN = 1	RATIO=	.00							
ROFF3	MANE	5.00	796.24	275.00	1.53	5.00	796.24	275.00	1.53

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1295E+03 EXCESS= .0000E+00 OUTFLOW= .1295E+03 BASIN STORAGE= .8991E-02 PERCENT ERROR= .0

FOR PLAN = 1	RATIO=	.00							
ROFF3	MANE	5.00	768.88	275.00	1.48	5.00	768.88	275.00	1.48

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1250E+03 EXCESS= .0000E+00 OUTFLOW= .1250E+03 BASIN STORAGE= .8848E-02 PERCENT ERROR= .0

FOR PLAN = 1	RATIO=	.00							
ROFF3	MANE	5.00	755.25	275.00	1.45	5.00	755.25	275.00	1.45

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1227E+03 EXCESS= .0000E+00 OUTFLOW= .1228E+03 BASIN STORAGE= .8775E-02 PERCENT ERROR= .0

FOR PLAN = 1	RATIO=	.00							
ROFF3	MANE	5.00	701.11	275.00	1.35	5.00	701.11	275.00	1.35

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1139E+03 EXCESS= .0000E+00 OUTFLOW= .1139E+03 BASIN STORAGE= .8159E-02 PERCENT ERROR= .0

FOR PLAN = 1	RATIO=	.00							
ROFF3	MANE	5.00	224.93	285.00	.45	5.00	224.93	285.00	.45

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3793E+02 EXCESS= .0000E+00 OUTFLOW= .3798E+02 BASIN STORAGE= .7709E-02 PERCENT ERROR= -.1

INT.OUT

*** NORMAL END OF HEC-1 ***

Unit 2 Proposed Condition HEC-1 Model

PRO.OUT

```
1*****
*
* FLOOD HYDROGRAPH PACKAGE (HEC-1)
* JUN 1998
* VERSION 4.1
*
* RUN DATE 04APR22 TIME 14:43:40
*
*****
```

```
*****
*
* U.S. ARMY CORPS OF ENGINEERS
* HYDROLOGIC ENGINEERING CENTER
* 609 SECOND STREET
* DAVIS, CALIFORNIA 95616
* (916) 756-1104
*
*****
```

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X X XXXXXX XXXXX X
X X X X X XX
X X X X X X
XXXXXXX XXXX X XXXXX X
X X X X X X
X X X X X X
X X XXXXXX XXXXX XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1

HEC-1 INPUT

PAGE 1

LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

*** FREE ***

```
*DIAGRAM
1 ID WESTWOOD PROFESSIONAL SERVICES
2 ID IRON MOUNTAIN
3 ID UNIT 2 PROPOSED DRAINAGE CONDITION
4 ID
5 ID RETURN PERIOD ----- 100-YR
6 ID DISTRIBUTION ----- 6-HOUR SDN3
7 ID PROJECT NO. ----- TRI2104
8 ID FILENAME ----- PRO.H1
9 ID DATE ----- APRIL2022
10 ID MODELED BY ----- JR/PK
11 ID
12 ID SIX HOUR DEPTH-AREA REDUCTION FACTORS
13 ID DRAINAGE AREA (MI^2) DARF
14 ID 0.0-0.49 1.00
15 ID 0.5-0.99 0.98
16 ID 1.0-1.99 0.97
17 ID 2.0-3.99 0.93
18 ID 10-YR 0.54
19 ID
20 IT 5 0 0 300
21 IO 5 0 0
22 IN 5 0 0
23 JR PREC 1.00 0.98 0.97 0.93 0.54
*
24 KK OFF3
25 BA 1.584
26 PC 0 0.020 0.057 0.070 0.087 0.108 0.124 0.130 0.130 0.130
27 PC 0.130 0.130 0.130 0.133 0.140 0.142 0.148 0.158 0.172 0.181
28 PC 0.190 0.197 0.199 0.200 0.201 0.204 0.214 0.229 0.241 0.249
29 PC 0.251 0.256 0.270 0.278 0.281 0.283 0.295 0.322 0.352 0.409
30 PC 0.499 0.590 0.710 0.744 0.781 0.812 0.819 0.835 0.851 0.856
31 PC 0.860 0.868 0.876 0.888 0.910 0.926 0.937 0.950 0.970 0.976
32 PC 0.982 0.985 0.987 0.989 0.990 0.993 0.993 0.994 0.995 0.998
33 PC 0.998 0.999 1
34 PB 3.43
35 LS 0 79.3
36 UD 0.938
*
37 KK ROFF3
38 KM REFERENCED FROM KYLE CANYON GATEWAY 21-13876
39 KM ROUTE OFF3 TO CP1
40 KM NATURAL WASH TRAPEZOIDAL CHANNEL 32'W 3:1 SS
41 RD 8500 0.034 0.025 0 TRAP 32 3
*
42 KK OFF1-E
43 BA 0.4726
```


44 PB 3.00
 45 LS 0 82.5
 46 UD 0.512
 *

HEC-1 INPUT

PAGE 2

LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

47 KK AR1-E
 48 BA 0.0059
 49 PB 3.00
 50 LS 0 81.2
 51 UD 0.100
 *

52 KK DUMMY1
 53 HC 3
 *

54 KK OFF2-E
 55 BA 0.0823
 56 PB 3.00
 57 LS 0 88.0
 58 UD 0.248
 *

59 KK CP1
 60 HC 2
 *

61 KK OFF3-E
 62 BA 0.0182
 63 PB 3.00
 64 LS 0 88.0
 65 UD 0.108
 *

66 KK AR2-E
 67 BA 0.0061
 68 PB 3.00
 69 LS 0 88.0
 70 UD 0.100
 *

71 KK CP2
 72 HC 2
 *

73 KK OFF4-E
 74 BA 0.0448
 75 PB 3.00
 76 LS 0 88.0
 77 UD 0.174
 *

78 KK AR3-E
 79 BA 0.0034
 80 PB 3.00
 81 LS 0 88.0
 82 UD 0.100
 *

HEC-1 INPUT

PAGE 3

LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

83 KK OF2-E
 84 BA 0.0148
 85 PB 3.00
 86 LS 0 88.0
 87 UD 0.123
 *

88 KK CP3
 89 HC 3
 *

90 KK CP4
 91 HC 3
 *

92 KK AR4-E
 93 BA 0.0014
 94 PB 3.00
 95 LS 0 88.0
 96 UD 0.100
 *

PRO.OUT

97	KK	OFF5-E	
98	BA	0.0272	
99	PB	3.00	
100	LS	0	80.1
101	UD	0.150	
	*		
102	KK	IRON1	
103	BA	0.0158	
104	LS	0	94.0
105	UD	0.089	
	*		
106	KK	IRON2	
107	BA	0.0203	
108	LS	0	91.0
109	UD	0.099	
	*		
110	KK	ARW1	
111	BA	0.0011	
112	LS	0	98.0
113	UD	0.066	
	*		
114	KK	RS1	
115	BA	0.0021	
116	LS	0	98.0
117	UD	0.073	
	*		

1

HEC-1 INPUT

PAGE 4

LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

118	KK	CP7	
119	HC	4	
	*		
120	KK	CP8	
121	HC	4	
	*		
122	KK	IMR1	
123	BA	0.0030	
124	LS	0	98.0
125	UD	0.073	
	*		
126	ZZ		

1

SCHEMATIC DIAGRAM OF STREAM NETWORK

INPUT LINE (V) ROUTING (--->) DIVERSION OR PUMP FLOW

NO. (.) CONNECTOR (<---) RETURN OF DIVERTED OR PUMPED FLOW

```

24  OFF3
    V
    V
37  ROFF3
    *
    *
42  OFF1-E
    *
    *
47  AR1-E
    *
    *
52  DUMMY1.....
    *
    *
54  OFF2-E
    *
    *
59  CP1.....
    *
    *
61  OFF3-E
    *
    *
66  AR2-E
    *
    *
71  CP2.....
    *
    *
73  OFF4-E
    *
    *

```


78
83
88
90
92
97
102
106
110
114
118
120
122

AR3-E
OF2-E
CP3
CP4
AR4-E
OFF5-E
IRON1
IRON2
ARW1
RS1
CP7
CP8
IMR1

PRO.OUT

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

* FLOOD HYDROGRAPH PACKAGE (HEC-1) *
* JUN 1998 *
* VERSION 4.1 *
* RUN DATE 04APR22 TIME 14:43:40 *

* U.S. ARMY CORPS OF ENGINEERS *
* HYDROLOGIC ENGINEERING CENTER *
* 609 SECOND STREET *
* DAVIS, CALIFORNIA 95616 *
* (916) 756-1104 *

WESTWOOD PROFESSIONAL SERVICES
IRON MOUNTAIN
UNIT 2 PROPOSED DRAINAGE CONDITION

RETURN PERIOD ----- 100-YR
DISTRIBUTION ----- 6-HOUR SDN3
PROJECT NO. ----- TRI2104
FILENAME ----- PRO.H1
DATE ----- APRIL2022
MODELED BY ----- JR/PK

SIX HOUR DEPTH-AREA REDUCTION FACTORS
DRAINAGE AREA (MI^2) DARF
0.0-0.49 1.00
0.5-0.99 0.98
1.0-1.99 0.97
2.0-3.99 0.93
10-YR 0.54

21 IO

OUTPUT CONTROL VARIABLES

IPRNT 5 PRINT CONTROL
IPLOT 0 PLOT CONTROL
QSCAL 0. HYDROGRAPH PLOT SCALE

IT

HYDROGRAPH TIME DATA

NMIN 5 MINUTES IN COMPUTATION INTERVAL
IDATE 1 0 STARTING DATE
ITIME 0000 STARTING TIME
NQ 300 NUMBER OF HYDROGRAPH ORDINATES
NDDATE 2 0 ENDING DATE
NDTIME 0055 ENDING TIME
ICENT 19 CENTURY MARK

COMPUTATION INTERVAL .08 HOURS
TOTAL TIME BASE 24.92 HOURS

PRO.OUT

ENGLISH UNITS
DRAINAGE AREA SQUARE MILES
PRECIPITATION DEPTH INCHES
LENGTH, ELEVATION FEET
FLOW CUBIC FEET PER SECOND
STORAGE VOLUME ACRE-Feet
SURFACE AREA ACRES
TEMPERATURE DEGREES FAHRENHEIT

JP MULTI-PLAN OPTION
NPLAN 1 NUMBER OF PLANS

JR MULTI-RATIO OPTION
RATIOS OF PRECIPITATION
1.00 .98 .97 .93 .54

1

PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND, AREA IN SQUARE MILES
TIME TO PEAK IN HOURS

OPERATION	STATION	AREA	PLAN	RATIOS APPLIED TO PRECIPITATION				
				RATIO 1 1.00	RATIO 2 .98	RATIO 3 .97	RATIO 4 .93	RATIO 5 .54
HYDROGRAPH AT								
+	OFF3	1.58	1 FLOW	796. 4.42	769. 4.42	755. 4.42	700. 4.42	225. 4.50
ROUTED TO								
+	ROFF3	1.58	1 FLOW	796. 4.58	769. 4.58	755. 4.58	701. 4.58	225. 4.75
HYDROGRAPH AT								
+	OFF1-E	.47	1 FLOW	325. 4.00	315. 4.00	309. 4.00	288. 4.00	98. 4.00
HYDROGRAPH AT								
+	AR1-E	.01	1 FLOW	7. 3.50	7. 3.50	7. 3.50	6. 3.50	2. 3.58
3 COMBINED AT								
+	DUMMY1	2.06	1 FLOW	964. 4.42	930. 4.42	914. 4.42	847. 4.42	272. 4.67
HYDROGRAPH AT								
+	OFF2-E	.08	1 FLOW	103. 3.67	101. 3.67	99. 3.67	93. 3.67	39. 3.67
2 COMBINED AT								
+	CP1	2.14	1 FLOW	981. 4.42	947. 4.42	930. 4.42	863. 4.42	282. 4.67
HYDROGRAPH AT								
+	OFF3-E	.02	1 FLOW	29. 3.50	28. 3.50	28. 3.50	26. 3.50	11. 3.58
HYDROGRAPH AT								
+	AR2-E	.01	1 FLOW	10. 3.50	10. 3.50	10. 3.50	9. 3.50	4. 3.50
2 COMBINED AT								
+	CP2	.02	1 FLOW	39. 3.50	38. 3.50	37. 3.50	35. 3.50	15. 3.58
HYDROGRAPH AT								
+	OFF4-E	.04	1 FLOW	65. 3.58	63. 3.58	62. 3.58	58. 3.58	24. 3.58
HYDROGRAPH AT								
+	AR3-E	.00	1 FLOW	6. 3.50	5. 3.50	5. 3.50	5. 3.50	2. 3.50
HYDROGRAPH AT								
+	OF2-E	.01	1 FLOW	23. 3.58	23. 3.58	22. 3.58	21. 3.58	9. 3.58
3 COMBINED AT								
+	CP3	.06	1 FLOW	93. 3.58	90. 3.58	89. 3.58	84. 3.58	35. 3.58
3 COMBINED AT								
+	CP4	2.23	1 FLOW	996. 4.50	963. 4.50	946. 4.50	879. 4.50	293. 4.67
HYDROGRAPH AT								
+	AR4-E	.00	1 FLOW	2. 2.	2. 2.	2. 2.	2. 2.	1. 1.

				TIME	3.50	3.50	PRO.OUT	3.50	3.50
HYDROGRAPH AT									
+	OFF5-E	.03	1	FLOW TIME	30.3.58	29.3.58	28.3.58	26.3.58	8.3.58
HYDROGRAPH AT									
+	IRON1	.02	1	FLOW TIME	33.3.50	32.3.50	31.3.50	30.3.50	15.3.50
HYDROGRAPH AT									
+	IRON2	.02	1	FLOW TIME	37.3.50	36.3.50	36.3.50	34.3.50	16.3.50
HYDROGRAPH AT									
+	ARW1	.00	1	FLOW TIME	3.3.50	3.3.50	3.3.50	2.3.50	1.3.50
HYDROGRAPH AT									
+	RS1	.00	1	FLOW TIME	5.3.50	5.3.50	5.3.50	5.3.50	3.3.50
4 COMBINED AT									
+	CP7	.04	1	FLOW TIME	77.3.50	75.3.50	74.3.50	71.3.50	35.3.50
4 COMBINED AT									
+	CP8	2.30	1	FLOW TIME	1014.4.50	980.4.50	963.4.50	895.4.50	302.4.67
HYDROGRAPH AT									
+	IMR1	.00	1	FLOW TIME	7.3.50	7.3.50	7.3.50	7.3.50	4.3.50

1

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

ISTAQ	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)
FOR PLAN = 1	RATIO=	.00							
ROFF3	MANE	5.00	796.24	275.00	1.53	5.00	796.24	275.00	1.53

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1295E+03 EXCESS= .0000E+00 OUTFLOW= .1295E+03 BASIN STORAGE= .8991E-02 PERCENT ERROR= .0

FOR PLAN = 1	RATIO=	.00							
ROFF3	MANE	5.00	768.88	275.00	1.48	5.00	768.88	275.00	1.48

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1250E+03 EXCESS= .0000E+00 OUTFLOW= .1250E+03 BASIN STORAGE= .8848E-02 PERCENT ERROR= .0

FOR PLAN = 1	RATIO=	.00							
ROFF3	MANE	5.00	755.25	275.00	1.45	5.00	755.25	275.00	1.45

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1227E+03 EXCESS= .0000E+00 OUTFLOW= .1228E+03 BASIN STORAGE= .8775E-02 PERCENT ERROR= .0

FOR PLAN = 1	RATIO=	.00							
ROFF3	MANE	5.00	701.11	275.00	1.35	5.00	701.11	275.00	1.35

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1139E+03 EXCESS= .0000E+00 OUTFLOW= .1139E+03 BASIN STORAGE= .8159E-02 PERCENT ERROR= .0

FOR PLAN = 1	RATIO=	.00							
ROFF3	MANE	5.00	224.93	285.00	.45	5.00	224.93	285.00	.45

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3793E+02 EXCESS= .0000E+00 OUTFLOW= .3798E+02 BASIN STORAGE= .7709E-02 PERCENT ERROR= .1

*** NORMAL END OF HEC-1 ***

Potential Condition HEC-1 Model

Potential.OUT

```

*****
* FLOOD HYDROGRAPH PACKAGE (HEC-1)
* JUN 1998
* VERSION 4.1
*
* RUN DATE 04APR22 TIME 14:43:42
*
*****

```

```

*****
* U.S. ARMY CORPS OF ENGINEERS
* HYDROLOGIC ENGINEERING CENTER
* 609 SECOND STREET
* DAVIS, CALIFORNIA 95616
* (916) 756-1104
*
*****

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X X X X X X
XXXXXX XXXX X XXXXX X
X X X X X X
X X X X X X
X X XXXXXX XXXX XXX

```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
 THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
 NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
 DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
 KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1 HEC-1 INPUT PAGE 1

LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

*** FREE ***

*DIAGRAM

```

1 ID WESTWOOD PROFESSIONAL SERVICES
2 ID IRON MOUNTAIN
3 ID POTENTIAL DRAINAGE CONDITION
4 ID
5 ID RETURN PERIOD ----- 100-YR
6 ID DISTRIBUTION ----- 6-HOUR SDN3
7 ID PROJECT NO. ----- TRI2101
8 ID FILENAME ----- Potential.H1
9 ID DATE ----- APRIL 2022
10 ID MODELED BY ----- JR/PK
11 ID
12 ID SIX HOUR DEPTH-AREA REDUCTION FACTORS
13 ID DRAINAGE AREA (MI^2) DARF
14 ID 0.0-0.49 1.00
15 ID 0.5-0.99 0.98
16 ID 1.0-1.99 0.97
17 ID 2.0-3.99 0.93
18 ID 10-YR 0.54
19 ID
20 IT 5 0 0 300
21 IO 5 0 0
22 IN 5 0 0
23 JR PREC 1.00 0.98 0.97 0.93 0.54
*
24 KK OFF3
25 BA 1.584
26 PC 0 0.020 0.057 0.070 0.087 0.108 0.124 0.130 0.130 0.130
27 PC 0.130 0.130 0.130 0.133 0.140 0.142 0.148 0.158 0.172 0.181
28 PC 0.190 0.197 0.199 0.200 0.201 0.204 0.214 0.229 0.241 0.249
29 PC 0.251 0.256 0.270 0.278 0.281 0.283 0.295 0.322 0.352 0.409
30 PC 0.499 0.590 0.710 0.744 0.781 0.812 0.819 0.835 0.851 0.856
31 PC 0.860 0.868 0.876 0.888 0.910 0.926 0.937 0.950 0.970 0.976
32 PC 0.982 0.985 0.987 0.989 0.990 0.993 0.993 0.994 0.995 0.998
33 PC 0.998 0.999 1
34 PB 3.43
35 LS 0 79.3
36 UD 0.938
*
37 KK ROFF3
38 KM ROUTE OFF3 TO CP1
39 KM NATURAL WASH TRAPEZOIDAL CHANNEL 32'W 3:1 SS
40 RD 8500 0.034 0.025 0 TRAP 32 3
*
41 KK OFF1-D
42 BA 0.4508
43 PB 3.00

```

Potential.OUT

44 LS 0 86.9
 45 UD 0.436
 *

1

HEC-1 INPUT

PAGE 2

LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

46 KK OFF2-D
 47 BA 0.0861
 48 PB 3.00
 49 LS 0 90.6
 50 UD 0.175
 *

51 KK CP1
 52 HC 3
 *

53 KK OFF5-D
 54 BA 0.0338
 55 PB 3.00
 56 LS 0 84.2
 57 UD 0.107
 *

58 KK OFF6-D
 59 BA 0.0164
 60 PB 3.00
 61 LS 0 91.0
 62 UD 0.087
 *

63 KK CP2
 64 HC 3
 *

65 KK OFF7-D
 66 BA 0.0177
 67 PB 3.00
 68 LS 0 80.3
 69 UD 0.127
 *

70 KK AR1-U
 71 BA 0.0012
 72 PB 3.00
 73 LS 0 85.6
 74 UD 0.079
 *

75 KK CP3
 76 HC 2
 *

77 KK OFF4-D
 78 BA 0.0382
 79 PB 3.00
 80 LS 0 89.3
 81 UD 0.165
 *

1

HEC-1 INPUT

PAGE 3

LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

82 KK OFF3-D
 83 BA 0.0149
 84 PB 3.00
 85 LS 0 84.3
 86 UD 0.138
 *

87 KK WEST2-D
 88 BA 0.0013
 89 PB 3.00
 90 LS 0 91.0
 91 UD 0.066
 *

92 KK CP4
 93 HC 3
 *

94 KK WEST3-D
 95 BA 0.0141
 96 PB 3.00
 97 LS 0 89.1
 98 UD 0.097

Potential.OUT

```

*
99      KK      CP5
100     HC      4
*
101     KK      OFF8-D
102     BA      0.0006
103     PB      3.00
104     LS      0      76.6
105     UD      0.100
*
106     KK      CP6
107     HC      2
*
108     KK      EAST1-D
109     BA      0.0013
110     PB      3.00
111     LS      0      91.0
112     UD      0.065
*
113     KK      OFF9-D
114     BA      0.0272
115     PB      3.00
116     LS      0      85.6
117     UD      0.118
*

```

1

HEC-1 INPUT

PAGE 4

```

LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
118       KK      IRON1
119       BA      0.0158
120       LS      0      94.0
121       UD      0.089
*
122       KK      IRON2
123       BA      0.0203
124       LS      0      91.0
125       UD      0.099
*
126       KK      ARW1
127       BA      0.0011
128       LS      0      98.0
129       UD      0.066
*
130       KK      RS1
131       BA      0.0021
132       LS      0      98.0
133       UD      0.073
*
134       KK      CP7
135       HC      4
*
136       KK      CP8
137       HC      4
*
138       KK      IMR1
139       BA      0.0030
140       LS      0      98.0
141       UD      0.073
*
142       ZZ

```

1

SCHEMATIC DIAGRAM OF STREAM NETWORK

```

INPUT
LINE  (V) ROUTING      (--->) DIVERSION OR PUMP FLOW
NO.   (.) CONNECTOR   (<---) RETURN OF DIVERTED OR PUMPED FLOW

24    OFF3
      V
      V
37    ROFF3
      *
      *
41    OFF1-D
      *
      *

```

Potential.OUT

46

51

53

58

63

65

70

75

77

82

87

92

94

99

101

106

108

113

118

122

126

130

134

136

138

OFF2-D

CP1

OFF5-D

OFF6-D

CP2

OFF7-D

AR1-U

CP3

OFF4-D

OFF3-D

WEST2-D

CP4

WEST3-D

CP5

OFF8-D

CP6

EAST1-D

OFF9-D

IRON1

IRON2

ARW1

RS1

CP7

CP8

IMR1

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```

FLOOD HYDROGRAPH PACKAGE (HEC-1)
      JUN 1998
      VERSION 4.1

RUN DATE 04APR22 TIME 14:43:42

```

U.S. ARMY CORPS OF ENGINEERS
HYDROLOGIC ENGINEERING CENTER
609 SECOND STREET
DAVIS, CALIFORNIA 95616
(916) 756-1104

WESTWOOD PROFESSIONAL SERVICES
IRON MOUNTAIN
POTENTIAL DRAINAGE CONDITION

RETURN PERIOD ----- 100-YR
DISTRIBUTION ----- 6-HOUR SDN3
PROJECT NO. ----- TRI2101
FILENAME ----- Potential.H1
DATE ----- APRIL 2022
MODELED BY ----- JR/PK

SIX HOUR DEPTH-AREA REDUCTION FACTORS
DRAINAGE AREA (MI^2) DARF
0.0-0.49 1.00
0.5-0.99 0.98
1.0-1.99 0.97
2.0-3.99 0.93
10-YR 0.54

21 IO OUTPUT CONTROL VARIABLES
 IPRNT 5 PRINT CONTROL
 IPLOT 0 PLOT CONTROL
 QSCAL 0. HYDROGRAPH PLOT SCALE

IT HYDROGRAPH TIME DATA
 NMIN 5 MINUTES IN COMPUTATION INTERVAL
 IDATE 1 0 STARTING DATE
 ITIME 0000 STARTING TIME
 NQ 300 NUMBER OF HYDROGRAPH ORDINATES
 NDDATE 2 0 ENDING DATE
 NDTIME 0055 ENDING TIME
 ICENT 19 CENTURY MARK

 COMPUTATION INTERVAL .08 HOURS
 TOTAL TIME BASE 24.92 HOURS

ENGLISH UNITS
DRAINAGE AREA SQUARE MILES
PRECIPITATION DEPTH INCHES
LENGTH, ELEVATION FEET
FLOW CUBIC FEET PER SECOND
STORAGE VOLUME ACRE-Feet
SURFACE AREA ACRES
TEMPERATURE DEGREES FAHRENHEIT

JP MULTI-PLAN OPTION
 NPLAN 1 NUMBER OF PLANS

JR MULTI-RATIO OPTION
 RATIOS OF PRECIPITATION
 1.00 .98 .97 .93 .54

1

PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND, AREA IN SQUARE MILES
TIME TO PEAK IN HOURS

OPERATION	STATION	AREA	PLAN	RATIOS APPLIED TO PRECIPITATION					
				RATIO 1 1.00	RATIO 2 .98	RATIO 3 .97	RATIO 4 .93	RATIO 5 .54	
HYDROGRAPH AT +	OFF3	1.58	1	FLOW TIME	796. 4.42	769. 4.42	755. 4.42	700. 4.42	225. 4.50
ROUTED TO +	ROFF3	1.58	1	FLOW TIME	796. 4.58	769. 4.58	755. 4.58	701. 4.58	225. 4.75
HYDROGRAPH AT +	OFF1-D	.45	1	FLOW TIME	409. 3.83	397. 3.83	391. 3.92	368. 3.92	149. 3.92
HYDROGRAPH AT +	OFF2-D	.09	1	FLOW TIME	136. 3.58	133. 3.58	131. 3.58	124. 3.58	57. 3.58
3 COMBINED AT +	CP1	2.12	1	FLOW TIME	966. 4.42	933. 4.42	917. 4.42	852. 4.50	290. 4.67
HYDROGRAPH AT +	OFF5-D	.03	1	FLOW TIME	46. 3.58	44. 3.58	44. 3.58	41. 3.58	16. 3.58
HYDROGRAPH AT +	OFF6-D	.02	1	FLOW	31.	30.	30.	28.	13.

					Potential.OUT				
TIME					3.50	3.50	3.50	3.50	3.50
3 COMBINED AT	CP2	2.17	1	FLOW	977.	945.	928.	864.	296.
				TIME	4.50	4.50	4.50	4.50	4.67
HYDROGRAPH AT	OFF7-D	.02	1	FLOW	20.	20.	19.	18.	6.
+				TIME	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT	AR1-U	.00	1	FLOW	2.	2.	2.	2.	1.
+				TIME	3.50	3.50	3.50	3.50	3.50
2 COMBINED AT	CP3	.02	1	FLOW	22.	21.	21.	19.	6.
+				TIME	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT	OFF4-D	.04	1	FLOW	59.	58.	57.	54.	24.
+				TIME	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT	OFF3-D	.01	1	FLOW	20.	19.	19.	18.	7.
+				TIME	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT	WEST2-D	.00	1	FLOW	3.	3.	3.	2.	1.
+				TIME	3.50	3.50	3.50	3.50	3.50
3 COMBINED AT	CP4	.05	1	FLOW	81.	79.	78.	73.	31.
				TIME	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT	WEST3-D	.01	1	FLOW	24.	24.	23.	22.	10.
+				TIME	3.50	3.50	3.50	3.50	3.50
4 COMBINED AT	CP5	2.26	1	FLOW	999.	966.	950.	885.	307.
+				TIME	4.58	4.58	4.58	4.58	4.67
HYDROGRAPH AT	OFF8-D	.00	1	FLOW	1.	1.	1.	1.	0.
+				TIME	3.50	3.58	3.58	3.58	3.58
2 COMBINED AT	CP6	2.26	1	FLOW	999.	966.	950.	885.	307.
+				TIME	4.58	4.58	4.58	4.58	4.67
HYDROGRAPH AT	EAST1-D	.00	1	FLOW	3.	3.	3.	2.	1.
+				TIME	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT	OFF9-D	.03	1	FLOW	39.	38.	37.	35.	14.
+				TIME	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT	IRON1	.02	1	FLOW	33.	32.	31.	30.	15.
+				TIME	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT	IRON2	.02	1	FLOW	37.	36.	36.	34.	16.
+				TIME	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT	ARW1	.00	1	FLOW	3.	3.	3.	2.	1.
+				TIME	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT	RS1	.00	1	FLOW	5.	5.	5.	5.	3.
+				TIME	3.50	3.50	3.50	3.50	3.50
4 COMBINED AT	CP7	.04	1	FLOW	77.	75.	74.	71.	35.
+				TIME	3.50	3.50	3.50	3.50	3.50
4 COMBINED AT	CP8	2.33	1	FLOW	1022.	989.	973.	907.	317.
+				TIME	4.58	4.58	4.58	4.58	4.67
HYDROGRAPH AT	IMR1	.00	1	FLOW	7.	7.	7.	7.	4.
+				TIME	3.50	3.50	3.50	3.50	3.50

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

ISTAQ	ELEMENT	DT (MIN)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)	Potential.OUT COMPUTATION		INTERVAL TIME TO PEAK (MIN)	VOLUME (IN)
						DT (MIN)	PEAK (CFS)		
FOR PLAN = 1 RATIO= .00									
ROFF3	MANE	5.00	796.24	275.00	1.53	5.00	796.24	275.00	1.53
CONTINUITY SUMMARY (AC-FT) - INFLOW= .1295E+03 EXCESS= .0000E+00 OUTFLOW= .1295E+03 BASIN STORAGE= .8991E-02 PERCENT ERROR= .0									
FOR PLAN = 1 RATIO= .00									
ROFF3	MANE	5.00	768.88	275.00	1.48	5.00	768.88	275.00	1.48
CONTINUITY SUMMARY (AC-FT) - INFLOW= .1250E+03 EXCESS= .0000E+00 OUTFLOW= .1250E+03 BASIN STORAGE= .8848E-02 PERCENT ERROR= .0									
FOR PLAN = 1 RATIO= .00									
ROFF3	MANE	5.00	755.25	275.00	1.45	5.00	755.25	275.00	1.45
CONTINUITY SUMMARY (AC-FT) - INFLOW= .1227E+03 EXCESS= .0000E+00 OUTFLOW= .1228E+03 BASIN STORAGE= .8775E-02 PERCENT ERROR= .0									
FOR PLAN = 1 RATIO= .00									
ROFF3	MANE	5.00	701.11	275.00	1.35	5.00	701.11	275.00	1.35
CONTINUITY SUMMARY (AC-FT) - INFLOW= .1139E+03 EXCESS= .0000E+00 OUTFLOW= .1139E+03 BASIN STORAGE= .8159E-02 PERCENT ERROR= .0									
FOR PLAN = 1 RATIO= .00									
ROFF3	MANE	5.00	224.93	285.00	.45	5.00	224.93	285.00	.45
CONTINUITY SUMMARY (AC-FT) - INFLOW= .3793E+02 EXCESS= .0000E+00 OUTFLOW= .3798E+02 BASIN STORAGE= .7709E-02 PERCENT ERROR= -.1									

*** NORMAL END OF HEC-1 ***

APPENDIX D

Street & Hydraulic Sections

**Interior Street Flow Computations –
100-Yr Unit 1 Interim Condition**

Worksheet for Section B - 100-yr (HALF offset crown) INT

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Channel Slope	0.70 %
Discharge	14.0 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.38
0+00.49	0.30
0+00.98	0.08
0+01.00	0.00
0+02.00	0.13
0+02.00	0.17
0+23.00	1.01

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.38)	(0+23.00, 1.01)	0.016

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results	
Normal Depth	0.68 ft
Roughness Coefficient	0.016
Elevation	0.68 ft
Elevation Range	0.00 to 1.01 ft
Flow Area	4.22 ft ²
Wetted Perimeter	15.11 ft
Hydraulic Radius	0.28 ft
Top Width	14.64 ft
Normal Depth	0.68 ft
Critical Depth	0.70 ft
Critical Slope	0.58 %
Velocity	3.32 ft/s
Velocity Head	0.17 ft
Specific Energy	0.85 ft

Worksheet for Section B - 100-yr (HALF offset crown) INT

Results

Froude Number	1.090
Flow Type	Supercritical

GVF Input Data

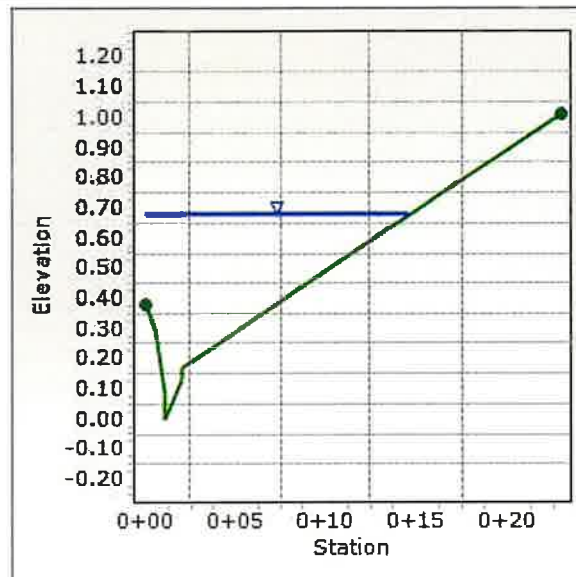
Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data

Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.68 ft
Critical Depth	0.70 ft
Channel Slope	0.70 %
Critical Slope	0.58 %

Cross Section for Section B - 100-yr (HALF offset crown) INT

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Channel Slope	0.70 %
Normal Depth	0.68 ft
Discharge	14.0 cfs



Worksheet for Section C - 100-yr (HALF offset crown w/ SW) INT

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth
Input Data	
Channel Slope	0.70 %
Discharge	14.0 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+23.00	1.01
0+33.00	0.81
0+33.00	0.77
0+34.00	0.64
0+34.02	0.72
0+34.51	0.94
0+35.00	1.02
0+40.00	1.12

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+23.00, 1.01)	(0+40.00, 1.12)	0.016

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results	
Normal Depth	0.57 ft
Roughness Coefficient	0.016
Elevation	1.21 ft
Elevation Range	0.64 to 1.12 ft
Flow Area	4.47 ft ²
Wetted Perimeter	17.45 ft
Hydraulic Radius	0.26 ft
Top Width	17.00 ft
Normal Depth	0.57 ft
Critical Depth	0.58 ft
Critical Slope	0.59 %
Velocity	3.13 ft/s
Velocity Head	0.15 ft

Worksheet for Section C - 100-yr (HALF offset crown w/ SW) INT

Results

Specific Energy	0.72 ft
Froude Number	1.078
Flow Type	Supercritical

GVF Input Data

Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data

Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.57 ft
Critical Depth	0.58 ft
Channel Slope	0.70 %
Critical Slope	0.59 %

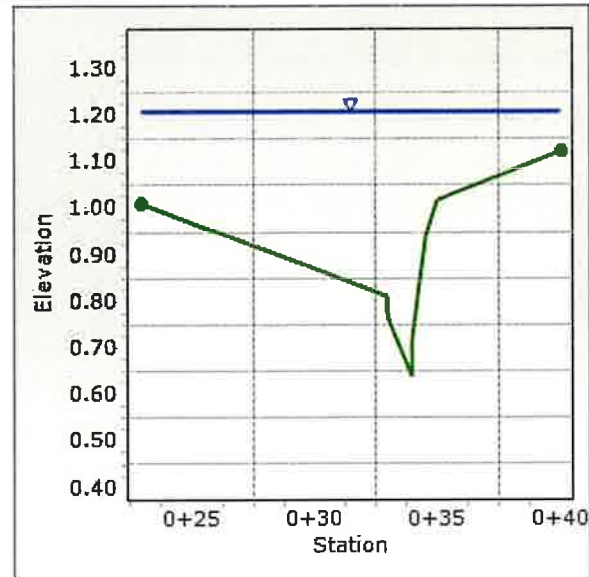
Cross Section for Section C - 100-yr (HALF offset crown w/ SW) INT

Project Description

Friction Method	Manning
Solve For	Formula
	Normal Depth

Input Data

Channel Slope	0.70 %
Normal Depth	0.57 ft
Discharge	14.0 cfs



Worksheet for Section D2 - 100-yr (normal Crown) HALF Rcurb INT

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Channel Slope	3.20 %
Discharge	1.5 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.38
0+00.49	0.30
0+00.98	0.08
0+01.00	0.00
0+02.00	0.13
0+02.00	0.17
0+17.50	0.48

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.38)	(0+17.50, 0.48)	0.016

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results	
Normal Depth	0.27 ft
Roughness Coefficient	0.016
Elevation	0.27 ft
Elevation Range	0.00 to 0.48 ft
Flow Area	0.50 ft ²
Wetted Perimeter	6.62 ft
Hydraulic Radius	0.08 ft
Top Width	6.47 ft
Normal Depth	0.27 ft
Critical Depth	0.32 ft
Critical Slope	0.83 %
Velocity	2.98 ft/s
Velocity Head	0.14 ft
Specific Energy	0.41 ft

Worksheet for Section D2 - 100-yr (normal Crown) HALF Rcurb INT

Results

Froude Number	1.885
Flow Type	Supercritical

GVF Input Data

Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data

Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.27 ft
Critical Depth	0.32 ft
Channel Slope	3.20 %
Critical Slope	0.83 %

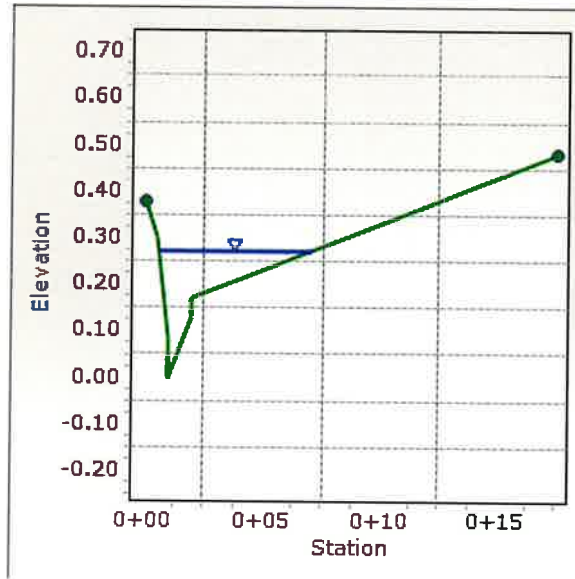
Cross Section for Section D2 - 100-yr (normal Crown) HALF Rcurb INT

Project Description

Friction Method	Manning
Solve For	Formula
	Normal Depth

Input Data

Channel Slope	3.20 %
Normal Depth	0.27 ft
Discharge	1.5 cfs



Worksheet for Section D3 - 100-yr (normal Crown) HALF L-Curb W/ SW INT

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Channel Slope	3.20 %
Discharge	5.5 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+17.50	0.48
0+33.00	0.17
0+33.00	0.13
0+34.50	0.00
0+34.50	0.48
0+35.00	0.50
0+40.00	0.60

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+17.50, 0.48)	(0+40.00, 0.60)	0.016

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results	
Normal Depth	0.36 ft
Roughness Coefficient	0.016
Elevation	0.36 ft
Elevation Range	0.00 to 0.60 ft
Flow Area	1.37 ft ²
Wetted Perimeter	11.52 ft
Hydraulic Radius	0.12 ft
Top Width	11.11 ft
Normal Depth	0.36 ft
Critical Depth	0.44 ft
Critical Slope	0.72 %
Velocity	4.02 ft/s
Velocity Head	0.25 ft

Worksheet for Section D3 - 100-yr (normal Crown) HALF L-Curb W/ SW INT

Results

Specific Energy	0.61 ft
Froude Number	2.017
Flow Type	Supercritical

GVF Input Data

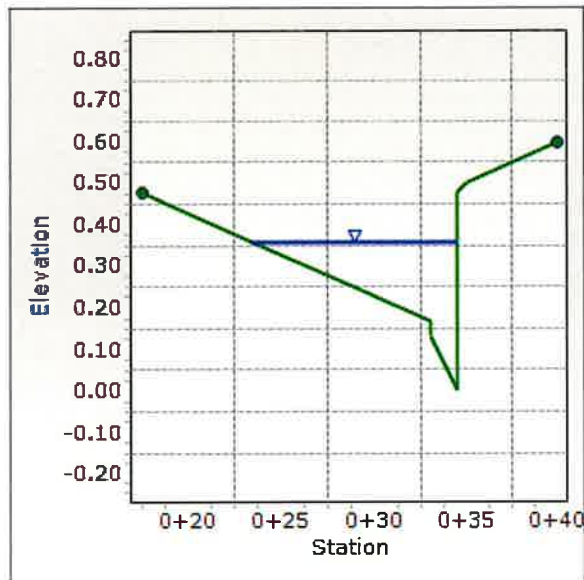
Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data

Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.36 ft
Critical Depth	0.44 ft
Channel Slope	3.20 %
Critical Slope	0.72 %

Cross Section for Section D3 - 100-yr (normal Crown) HALF L-Curb W/ SW INT

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Channel Slope	3.20 %
Normal Depth	0.36 ft
Discharge	5.5 cfs



Worksheet for Section D4 - 100-yr (normal Crown) HALF L-Curb W/ SW INT

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Channel Slope	3.20 %
Discharge	15.5 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+17.50	0.48
0+33.00	0.17
0+33.00	0.13
0+34.50	0.00
0+34.50	0.48
0+35.00	0.50
0+40.00	0.60

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+17.50, 0.48)	(0+40.00, 0.60)	0.016

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results	
Normal Depth	0.48 ft
Roughness Coefficient	0.016
Elevation	0.48 ft
Elevation Range	0.00 to 0.60 ft
Flow Area	3.01 ft ²
Wetted Perimeter	17.49 ft
Hydraulic Radius	0.17 ft
Top Width	16.96 ft
Normal Depth	0.48 ft
Critical Depth	0.61 ft
Critical Slope	0.62 %
Velocity	5.14 ft/s
Velocity Head	0.41 ft

Worksheet for Section D4 - 100-yr (normal Crown) HALF L-Curb W/ SW INT

Results

Specific Energy	0.89 ft
Froude Number	2.152
Flow Type	Supercritical

GVF Input Data

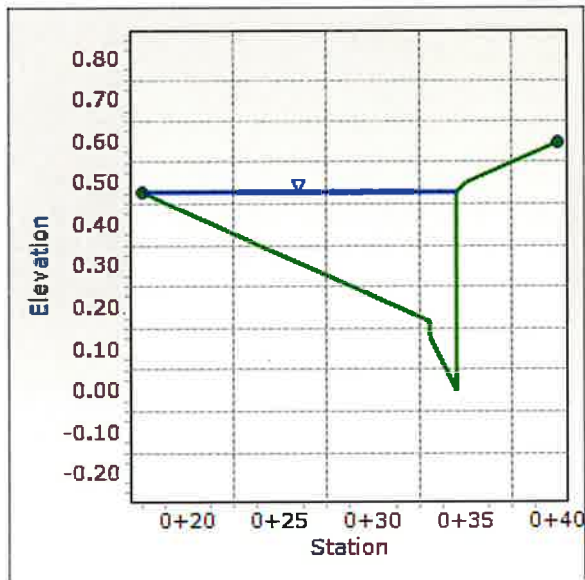
Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data

Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.48 ft
Critical Depth	0.61 ft
Channel Slope	3.20 %
Critical Slope	0.62 %

Cross Section for Section D4 - 100-yr (normal Crown) HALF L-Curb W/ SW INT

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Channel Slope	3.20 %
Normal Depth	0.48 ft
Discharge	15.5 cfs



Worksheet for Section E1 - 100-yr (normal crown) INT

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth
Input Data	
Channel Slope	0.88 %
Discharge	46.0 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.38
0+00.49	0.30
0+00.98	0.08
0+01.00	0.00
0+02.00	0.13
0+02.00	0.17
0+17.50	0.48
0+33.00	0.17
0+33.00	0.13
0+34.50	0.00
0+34.50	0.48
0+35.00	0.50
0+40.00	0.60

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.38)	(0+40.00, 0.60)	0.016

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results	
Normal Depth	0.64 ft
Roughness Coefficient	0.016
Elevation	0.64 ft
Elevation Range	0.00 to 0.60 ft
Flow Area	11.98 ft ²
Wetted Perimeter	40.99 ft
Hydraulic Radius	0.29 ft
Top Width	40.00 ft

Worksheet for Section E1 - 100-yr (normal crown) INT

Results

Normal Depth	0.64 ft
Critical Depth	0.68 ft
Critical Slope	0.55 %
Velocity	3.84 ft/s
Velocity Head	0.23 ft
Specific Energy	0.87 ft
Froude Number	1.236
Flow Type	Supercritical

GVF Input Data

Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data

Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.64 ft
Critical Depth	0.68 ft
Channel Slope	0.88 %
Critical Slope	0.55 %

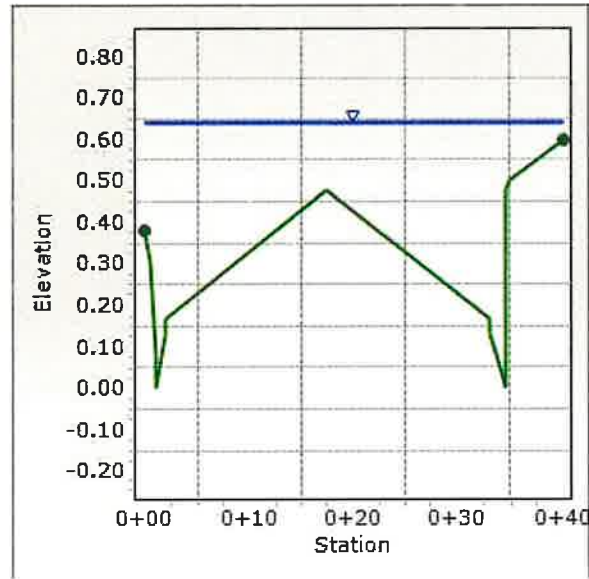
Cross Section for Section E1 - 100-yr (normal crown) INT

Project Description

Friction Method	Manning
	Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.88 %
Normal Depth	0.64 ft
Discharge	46.0 cfs



Worksheet for Section E2 - 100-yr (normal crown) INT

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Channel Slope	4.11 %
Discharge	44.5 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.38
0+00.49	0.30
0+00.98	0.08
0+01.00	0.00
0+02.00	0.13
0+02.00	0.17
0+17.50	0.48
0+33.00	0.17
0+33.00	0.13
0+34.50	0.00
0+34.50	0.48
0+35.00	0.50
0+40.00	0.60

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.38)	(0+40.00, 0.60)	0.016

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results	
Normal Depth	0.51 ft
Roughness Coefficient	0.016
Elevation	0.51 ft
Elevation Range	0.00 to 0.60 ft
Flow Area	7.04 ft ²
Wetted Perimeter	36.23 ft
Hydraulic Radius	0.19 ft
Top Width	35.40 ft

Worksheet for Section E2 - 100-yr (normal crown) INT

Results

Normal Depth	0.51 ft
Critical Depth	0.68 ft
Critical Slope	0.55 %
Velocity	6.32 ft/s
Velocity Head	0.62 ft
Specific Energy	1.13 ft
Froude Number	2.499
Flow Type	Supercritical

GVF Input Data

Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data

Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.51 ft
Critical Depth	0.68 ft
Channel Slope	4.11 %
Critical Slope	0.55 %

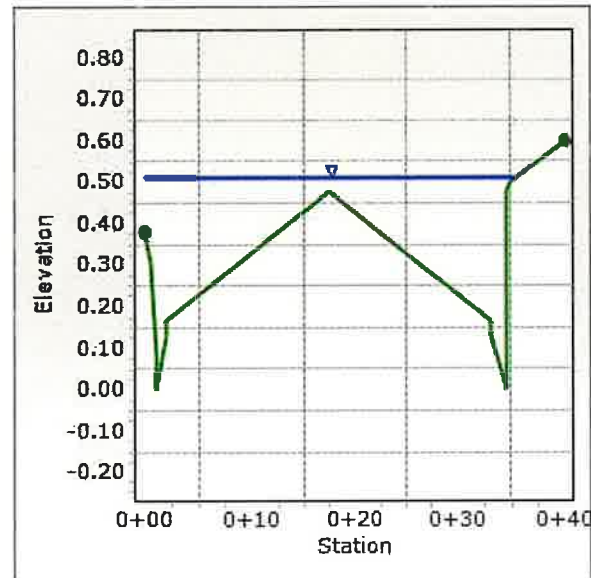
Cross Section for Section E2 - 100-yr (normal crown) INT

Project Description

Friction Method	Manning
Solve For	Formula
	Normal Depth

Input Data

Channel Slope	4.11 %
Normal Depth	0.51 ft
Discharge	44.5 cfs



Worksheet for Section E3 - 100-yr (normal crown) INT

Project Description

Friction Method	Manning
	Formula
Solve For	Normal Depth

Input Data

Channel Slope	4.11 %
Discharge	28.0 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.38
0+00.49	0.30
0+00.98	0.08
0+01.00	0.00
0+02.00	0.13
0+02.00	0.17
0+17.50	0.48
0+33.00	0.17
0+33.00	0.13
0+34.50	0.00
0+34.50	0.48
0+35.00	0.50
0+40.00	0.60

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.38)	(0+40.00, 0.60)	0.016

Options

Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Normal Depth	0.45 ft
Roughness Coefficient	0.016
Elevation	0.45 ft
Elevation Range	0.00 to 0.60 ft
Flow Area	5.10 ft ²
Wetted Perimeter	32.33 ft
Hydraulic Radius	0.16 ft
Top Width	31.59 ft

Worksheet for Section E3 - 100-yr (normal crown) INT

Results

Normal Depth	0.45 ft
Critical Depth	0.58 ft
Critical Slope	0.61 %
Velocity	5.49 ft/s
Velocity Head	0.47 ft
Specific Energy	0.92 ft
Froude Number	2.408
Flow Type	Supercritical

GVF Input Data

Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data

Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.45 ft
Critical Depth	0.58 ft
Channel Slope	4.11 %
Critical Slope	0.61 %

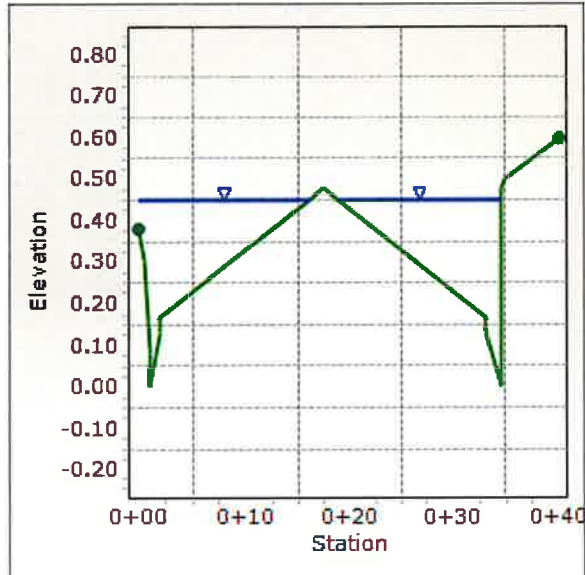
Cross Section for Section E3 - 100-yr (normal crown) INT

Project Description

Friction Method	Manning
	Formula
Solve For	Normal Depth

Input Data

Channel Slope	4.11 %
Normal Depth	0.45 ft
Discharge	28.0 cfs



Worksheet for Section E4 - 100-yr (normal Crown) HALF L-Curb W/ SW INT

Project Description	
Friction Method	Manning
Solve For	Formula
	Normal Depth
Input Data	
Channel Slope	3.20 %
Discharge	19.0 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+17.50	0.48
0+33.00	0.17
0+33.00	0.13
0+34.50	0.00
0+34.50	0.48
0+35.00	0.50
0+40.00	0.60

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+17.50, 0.48)	(0+40.00, 0.60)	0.016

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results	
Normal Depth	0.51 ft
Roughness Coefficient	0.016
Elevation	0.51 ft
Elevation Range	0.00 to 0.60 ft
Flow Area	3.47 ft ²
Wetted Perimeter	18.35 ft
Hydraulic Radius	0.19 ft
Top Width	17.79 ft
Normal Depth	0.51 ft
Critical Depth	0.64 ft
Critical Slope	0.59 %
Velocity	5.47 ft/s
Velocity Head	0.47 ft

Worksheet for Section E4 - 100-yr (normal Crown) HALF L-Curb W/ SW INT

Results

Specific Energy	0.97 ft
Froude Number	2.183
Flow Type	Supercritical

GVF Input Data

Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data

Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.51 ft
Critical Depth	0.64 ft
Channel Slope	3.20 %
Critical Slope	0.59 %

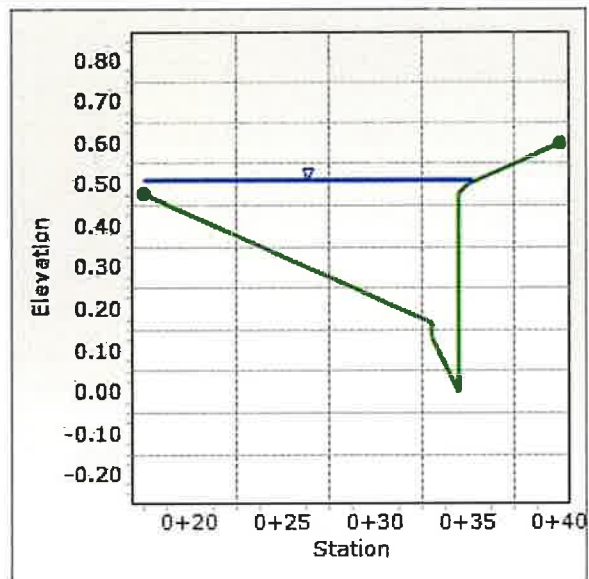
Cross Section for Section E4 - 100-yr (normal Crown) HALF L-Curb W/ SW INT

Project Description

Friction Method	Manning
	Formula
Solve For	Normal Depth

Input Data

Channel Slope	3.20 %
Normal Depth	0.51 ft
Discharge	19.0 cfs



Worksheet for Section F3 - 100-yr (normal crown) INT

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Channel Slope	0.64 %
Discharge	6.0 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.38
0+00.49	0.30
0+00.98	0.08
0+01.00	0.00
0+02.00	0.13
0+02.00	0.17
0+17.50	0.48
0+33.00	0.17
0+33.00	0.13
0+34.00	0.00
0+34.02	0.08
0+34.51	0.30
0+35.00	0.38
0+40.00	0.48

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.38)	(0+40.00, 0.48)	0.016

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results	
Normal Depth	0.39 ft
Roughness Coefficient	0.016
Elevation	0.39 ft
Elevation Range	0.00 to 0.48 ft
Flow Area	3.26 ft ²
Wetted Perimeter	26.41 ft
Hydraulic Radius	0.12 ft

Worksheet for Section F3 - 100-yr (normal crown) INT

Results

Top Width	26.07 ft
Normal Depth	0.39 ft
Critical Depth	0.38 ft
Critical Slope	0.77 %
Velocity	1.84 ft/s
Velocity Head	0.05 ft
Specific Energy	0.44 ft
Froude Number	0.919
Flow Type	Subcritical

GVF Input Data

Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data

Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.39 ft
Critical Depth	0.38 ft
Channel Slope	0.64 %
Critical Slope	0.77 %

Worksheet for Section F3 - 100-yr (normal crown) INT

Messages:

Water Surface Elevation exceeds lowest end station by 0.00710018959297332ft. Flow is divided.

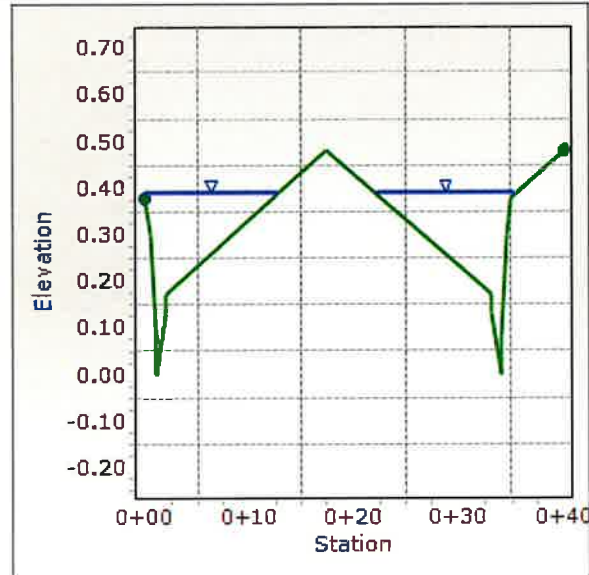
Cross Section for Section F3 - 100-yr (normal crown) INT

Project Description

Friction Method	Manning
Solve For	Formula
	Normal Depth

Input Data

Channel Slope	0.64 %
Normal Depth	0.39 ft
Discharge	6.0 cfs



Worksheet for Section G1 - 100-yr (normal crown) INT

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Channel Slope	1.07 %
Discharge	5.0 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.38
0+00.49	0.30
0+00.98	0.08
0+01.00	0.00
0+02.00	0.13
0+02.00	0.17
0+17.50	0.48
0+33.00	0.17
0+33.00	0.13
0+34.00	0.00
0+34.02	0.08
0+34.51	0.30
0+35.00	0.38
0+40.00	0.48

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.38)	(0+40.00, 0.48)	0.016

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results	
Normal Depth	0.35 ft
Roughness Coefficient	0.016
Elevation	0.35 ft
Elevation Range	0.00 to 0.48 ft
Flow Area	2.31 ft ²
Wetted Perimeter	21.64 ft
Hydraulic Radius	0.11 ft

Worksheet for Section G1 - 100-yr (normal crown) INT

Results

Top Width	21.32 ft
Normal Depth	0.35 ft
Critical Depth	0.36 ft
Critical Slope	0.78 %
Velocity	2.16 ft/s
Velocity Head	0.07 ft
Specific Energy	0.42 ft
Froude Number	1.156
Flow Type	Supercritical

GVF Input Data

Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data

Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.35 ft
Critical Depth	0.36 ft
Channel Slope	1.07 %
Critical Slope	0.78 %

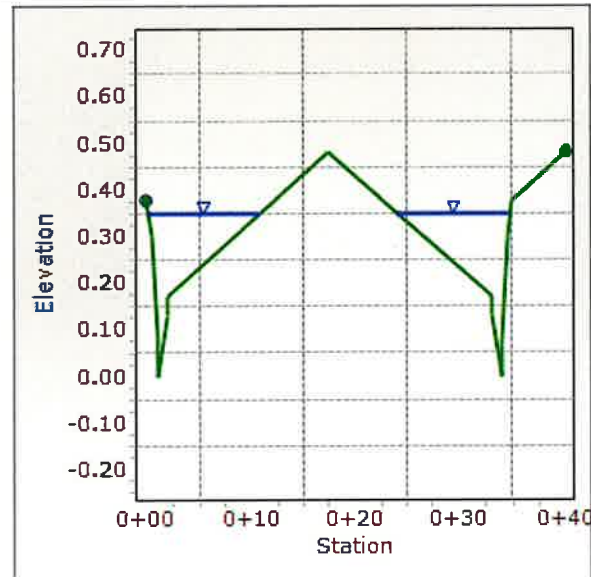
Cross Section for Section G1 - 100-yr (normal crown) INT

Project Description

Friction Method	Manning
	Formula
Solve For	Normal Depth

Input Data

Channel Slope	1.07 %
Normal Depth	0.35 ft
Discharge	5.0 cfs



**Interior Street Flow Computations –
100-Yr Unit 2 Proposed Condition**

Worksheet for Section A1 - 100-yr MIN% (HALF normal crown) PRO

Project Description

Friction Method	Manning
	Formula
Solve For	Normal Depth

Input Data

Channel Slope	2.70 %
Discharge	11.5 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.38
0+00.49	0.30
0+00.98	0.08
0+01.00	0.00
0+02.00	0.13
0+02.00	0.17
0+17.50	0.48

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.38)	(0+17.50, 0.48)	0.016

Options

Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Normal Depth	0.45 ft
Roughness Coefficient	0.016
Elevation	0.45 ft
Elevation Range	0.00 to 0.48 ft
Flow Area	2.58 ft ²
Wetted Perimeter	16.39 ft
Hydraulic Radius	0.16 ft
Top Width	16.15 ft
Normal Depth	0.45 ft
Critical Depth	0.54 ft
Critical Slope	0.62 %
Velocity	4.45 ft/s
Velocity Head	0.31 ft
Specific Energy	0.76 ft

Worksheet for Section A1 - 100-yr MIN% (HALF normal crown) PRO

Results

Froude Number	1.964
Flow Type	Supercritical

GVF Input Data

Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data

Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.45 ft
Critical Depth	0.54 ft
Channel Slope	2.70 %
Critical Slope	0.62 %

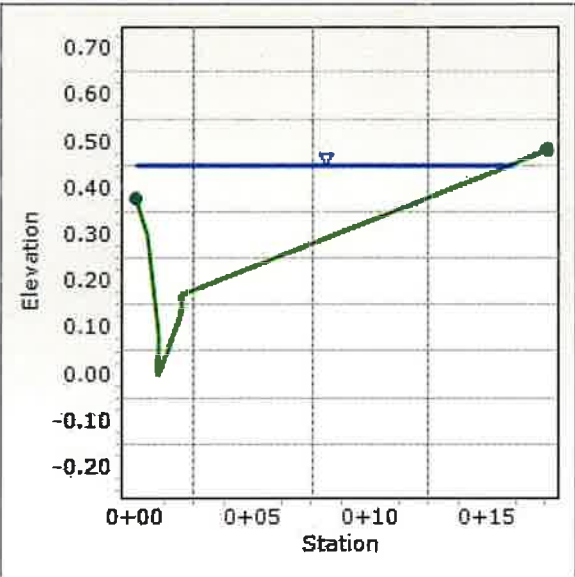
Cross Section for Section A1 - 100-yr MIN% (HALF normal crown) PRO

Project Description

Friction Method	Manning
	Formula
Solve For	Normal Depth

Input Data

Channel Slope	2.70 %
Normal Depth	0.45 ft
Discharge	11.5 cfs



Worksheet for Section A1 - 100-yr MAX% (HALF normal crown) PRO

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Channel Slope	5.57 %
Discharge	11.5 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.38
0+00.49	0.30
0+00.98	0.08
0+01.00	0.00
0+02.00	0.13
0+02.00	0.17
0+17.50	0.48

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.38)	(0+17.50, 0.48)	0.016

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results	
Normal Depth	0.41 ft
Roughness Coefficient	0.016
Elevation	0.41 ft
Elevation Range	0.00 to 0.48 ft
Flow Area	1.97 ft ²
Wetted Perimeter	14.31 ft
Hydraulic Radius	0.14 ft
Top Width	14.12 ft
Normal Depth	0.41 ft
Critical Depth	0.54 ft
Critical Slope	0.62 %
Velocity	5.85 ft/s
Velocity Head	0.53 ft
Specific Energy	0.94 ft

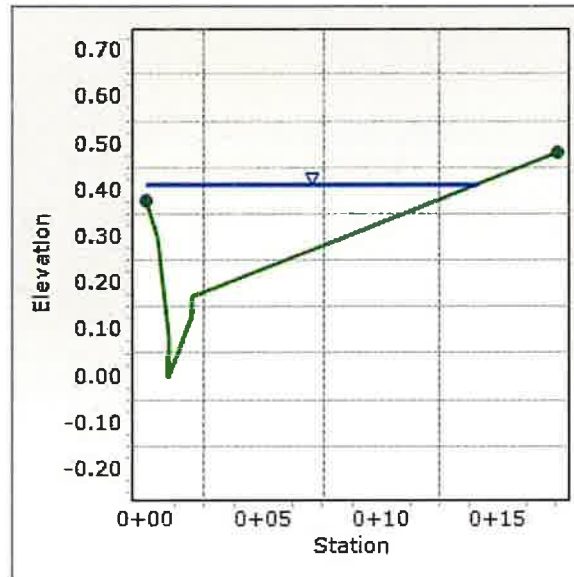
Cross Section for Section A1 - 100-yr MAX% (HALF normal crown) PRO

Project Description

Friction Method	Manning
Solve For	Formula
	Normal Depth

Input Data

Channel Slope	5.57 %
Normal Depth	0.41 ft
Discharge	11.5 cfs



Worksheet for Section A2 - 100-yr MIN% (HALF normal crown) PRO

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Channel Slope	2.70 %
Discharge	5.5 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.38
0+00.49	0.30
0+00.98	0.08
0+01.00	0.00
0+02.00	0.13
0+02.00	0.17
0+17.50	0.48

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.38)	(0+17.50, 0.48)	0.016

Options

Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Normal Depth	0.38 ft
Roughness Coefficient	0.016
Elevation	0.38 ft
Elevation Range	0.00 to 0.48 ft
Flow Area	1.48 ft ²
Wetted Perimeter	12.43 ft
Hydraulic Radius	0.12 ft
Top Width	12.26 ft
Normal Depth	0.38 ft
Critical Depth	0.45 ft
Critical Slope	0.71 %
Velocity	3.71 ft/s
Velocity Head	0.21 ft
Specific Energy	0.59 ft

Worksheet for Section A2 - 100-yr MIN% (HALF normal crown) PRO

Results

Froude Number	1.878
Flow Type	Supercritical

GVF Input Data

Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data

Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.38 ft
Critical Depth	0.45 ft
Channel Slope	2.70 %
Critical Slope	0.71 %

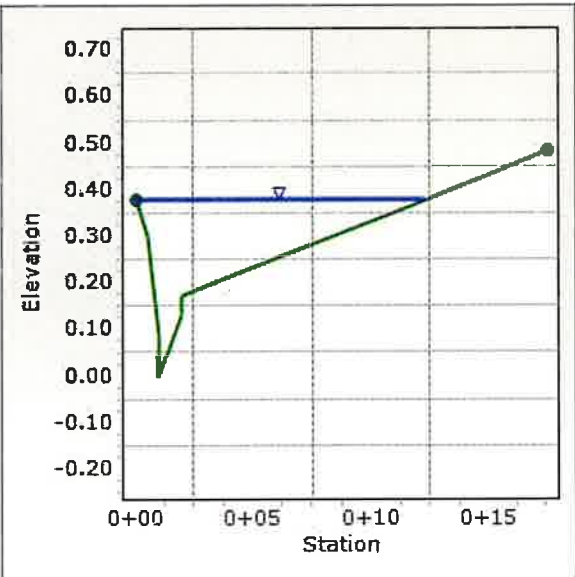
Cross Section for Section A2 - 100-yr MIN% (HALF normal crown) PRO

Project Description

Friction Method	Manning
Solve For	Normal Depth

Input Data

Channel Slope	2.70 %
Normal Depth	0.38 ft
Discharge	5.5 cfs



Worksheet for Section A2 - 100-yr MAX% (HALF normal crown) PRO

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Channel Slope	3.39 %
Discharge	5.5 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.38
0+00.49	0.30
0+00.98	0.08
0+01.00	0.00
0+02.00	0.13
0+02.00	0.17
0+17.50	0.48

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.38)	(0+17.50, 0.48)	0.016

Options

Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Normal Depth	0.37 ft
Roughness Coefficient	0.016
Elevation	0.37 ft
Elevation Range	0.00 to 0.48 ft
Flow Area	1.36 ft ²
Wetted Perimeter	11.86 ft
Hydraulic Radius	0.11 ft
Top Width	11.69 ft
Normal Depth	0.37 ft
Critical Depth	0.45 ft
Critical Slope	0.71 %
Velocity	4.04 ft/s
Velocity Head	0.25 ft
Specific Energy	0.62 ft

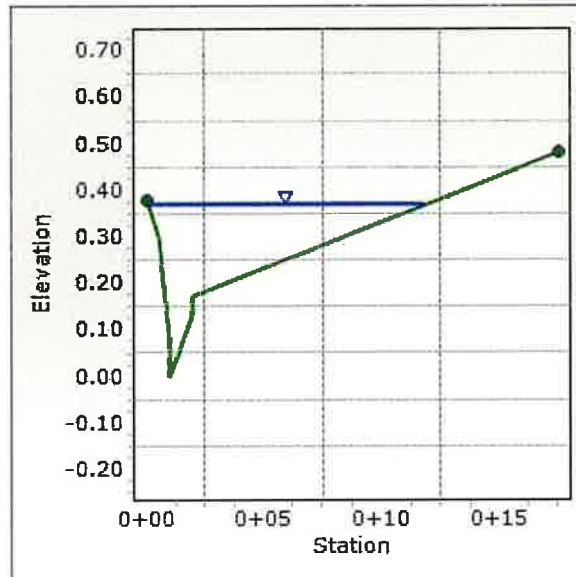
Worksheet for Section A2 - 100-yr MAX% (HALF normal crown) PRO

Results	
Froude Number	2.084
Flow Type	Supercritical
GVF Input Data	
Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.37 ft
Critical Depth	0.45 ft
Channel Slope	3.39 %
Critical Slope	0.71 %

Cross Section for Section A2 - 100-yr MAX% (HALF normal crown) PRO

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth

Input Data	
Channel Slope	3.39 %
Normal Depth	0.37 ft
Discharge	5.5 cfs



Worksheet for Section A3 - 100-yr (HALF normal crown) PRO

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Channel Slope	3.39 %
Discharge	3.0 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.38
0+00.49	0.30
0+00.98	0.08
0+01.00	0.00
0+02.00	0.13
0+02.00	0.17
0+17.50	0.48

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.38)	(0+17.50, 0.48)	0.016

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results	
Normal Depth	0.32 ft
Roughness Coefficient	0.016
Elevation	0.32 ft
Elevation Range	0.00 to 0.48 ft
Flow Area	0.85 ft ²
Wetted Perimeter	9.05 ft
Hydraulic Radius	0.09 ft
Top Width	8.89 ft
Normal Depth	0.32 ft
Critical Depth	0.38 ft
Critical Slope	0.77 %
Velocity	3.53 ft/s
Velocity Head	0.19 ft
Specific Energy	0.51 ft

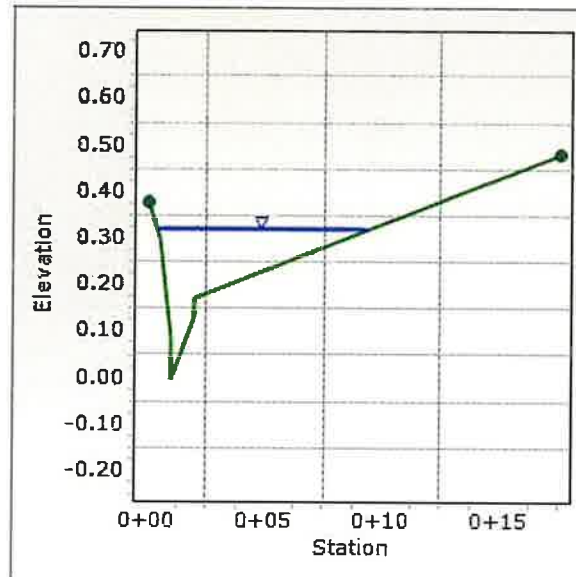
Worksheet for Section A3 - 100-yr (HALF normal crown) PRO

Results	
Froude Number	2.016
Flow Type	Supercritical
GVF Input Data	
Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.32 ft
Critical Depth	0.38 ft
Channel Slope	3.39 %
Critical Slope	0.77 %

Cross Section for Section A3 - 100-yr (HALF normal crown) PRO

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth

Input Data	
Channel Slope	3.39 %
Normal Depth	0.32 ft
Discharge	3.0 cfs



Worksheet for Section A1 - 100-yr MAX% (HALF normal crown) PRO

Results

Froude Number	2.761
Flow Type	Supercritical

GVF Input Data

Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data

Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.41 ft
Critical Depth	0.54 ft
Channel Slope	5.57 %
Critical Slope	0.62 %

Worksheet for Section B - 100-yr (HALF offset crown) PRO

Project Description

Friction Method	Manning
	Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.70 %
Discharge	14.0 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.38
0+00.49	0.30
0+00.98	0.08
0+01.00	0.00
0+02.00	0.13
0+02.00	0.17
0+23.00	1.01

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.38)	(0+23.00, 1.01)	0.016

Options

Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Normal Depth	0.68 ft
Roughness Coefficient	0.016
Elevation	0.68 ft
Elevation Range	0.00 to 1.01 ft
Flow Area	4.22 ft ²
Wetted Perimeter	15.11 ft
Hydraulic Radius	0.28 ft
Top Width	14.64 ft
Normal Depth	0.68 ft
Critical Depth	0.70 ft
Critical Slope	0.58 %
Velocity	3.32 ft/s
Velocity Head	0.17 ft
Specific Energy	0.85 ft

Worksheet for Section B - 100-yr (HALF offset crown) PRO

Results

Froude Number	1.090
Flow Type	Supercritical

GVF Input Data

Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data

Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.68 ft
Critical Depth	0.70 ft
Channel Slope	0.70 %
Critical Slope	0.58 %

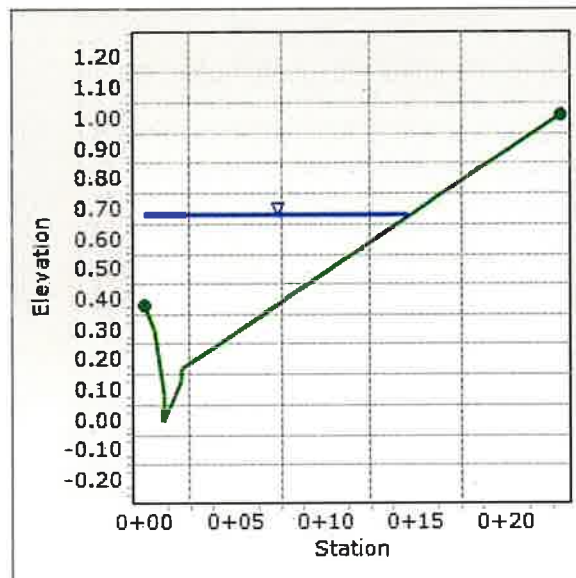
Cross Section for Section B - 100-yr (HALF offset crown) PRO

Project Description

Friction Method	Manning
	Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.70 %
Normal Depth	0.68 ft
Discharge	14.0 cfs



Worksheet for Section C - 100-yr (HALF offset crown w/ SW) PRO

Project Description	
Friction Method	Manning
Solve For	Formula
	Normal Depth
Input Data	
Channel Slope	0.70 %
Discharge	14.0 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+23.00	1.01
0+33.00	0.81
0+33.00	0.77
0+34.00	0.64
0+34.02	0.72
0+34.51	0.94
0+35.00	1.02
0+40.00	1.12

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+23.00, 1.01)	(0+40.00, 1.12)	0.016

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results	
Normal Depth	0.57 ft
Roughness Coefficient	0.016
Elevation	1.21 ft
Elevation Range	0.64 to 1.12 ft
Flow Area	4.47 ft ²
Wetted Perimeter	17.45 ft
Hydraulic Radius	0.26 ft
Top Width	17.00 ft
Normal Depth	0.57 ft
Critical Depth	0.58 ft
Critical Slope	0.59 %
Velocity	3.13 ft/s
Velocity Head	0.15 ft

Worksheet for Section C - 100-yr (HALF offset crown w/ SW) PRO

Results	
Specific Energy	0.72 ft
Froude Number	1.078
Flow Type	Supercritical
GVF Input Data	
Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.57 ft
Critical Depth	0.58 ft
Channel Slope	0.70 %
Critical Slope	0.59 %

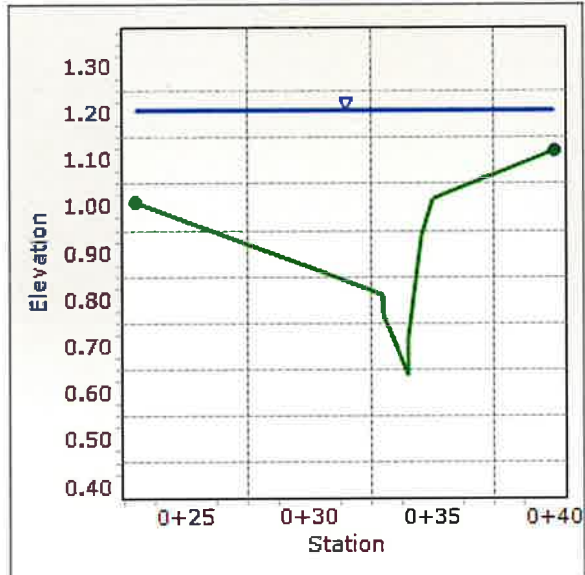
Cross Section for Section C - 100-yr (HALF offset crown w/ SW) PRO

Project Description

Friction Method	Manning
	Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.70 %
Normal Depth	0.57 ft
Discharge	14.0 cfs



Worksheet for Section D1 - 100-yr (normal Crown) HALF Rcurb PRO

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Channel Slope	3.20 %
Discharge	3.0 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.38
0+00.49	0.30
0+00.98	0.08
0+01.00	0.00
0+02.00	0.13
0+02.00	0.17
0+17.50	0.48

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.38)	(0+17.50, 0.48)	0.016

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results	
Normal Depth	0.32 ft
Roughness Coefficient	0.016
Elevation	0.32 ft
Elevation Range	0.00 to 0.48 ft
Flow Area	0.87 ft ²
Wetted Perimeter	9.17 ft
Hydraulic Radius	0.09 ft
Top Width	9.01 ft
Normal Depth	0.32 ft
Critical Depth	0.38 ft
Critical Slope	0.77 %
Velocity	3.46 ft/s
Velocity Head	0.19 ft
Specific Energy	0.50 ft

Worksheet for Section D1 - 100-yr (normal Crown) HALF Rcurb PRO

Results

Froude Number	1.962
Flow Type	Supercritical

GVF Input Data

Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data

Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.32 ft
Critical Depth	0.38 ft
Channel Slope	3.20 %
Critical Slope	0.77 %

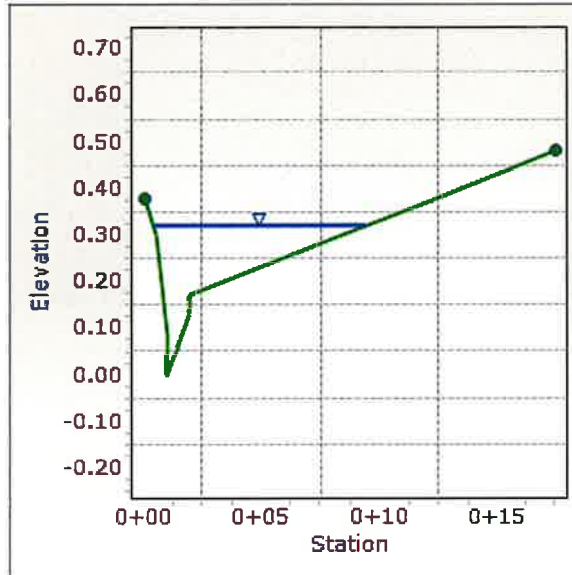
Cross Section for Section D1 - 100-yr (normal Crown) HALF Rcurb PRO

Project Description

Friction Method	Manning
	Formula
Solve For	Normal Depth

Input Data

Channel Slope	3.20 %
Normal Depth	0.32 ft
Discharge	3.0 cfs



Worksheet for Section D2 - 100-yr (normal Crown) HALF Rcurb PRO

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Channel Slope	3.20 %
Discharge	3.5 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.38
0+00.49	0.30
0+00.98	0.08
0+01.00	0.00
0+02.00	0.13
0+02.00	0.17
0+17.50	0.48

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.38)	(0+17.50, 0.48)	0.016

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

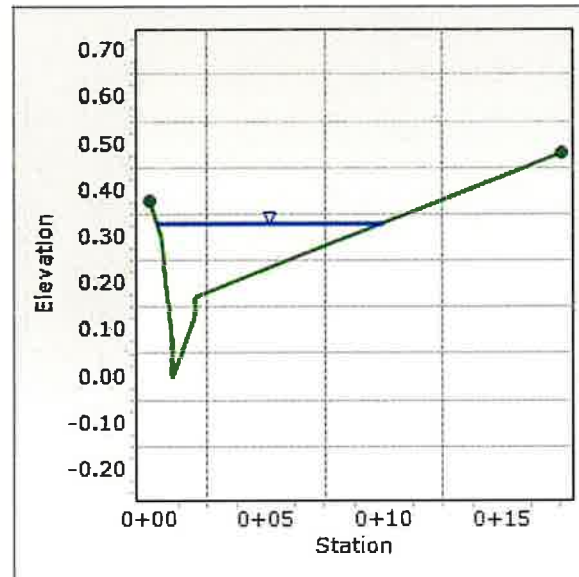
Results	
Normal Depth	0.33 ft
Roughness Coefficient	0.016
Elevation	0.33 ft
Elevation Range	0.00 to 0.48 ft
Flow Area	0.98 ft ²
Wetted Perimeter	9.85 ft
Hydraulic Radius	0.10 ft
Top Width	9.69 ft
Normal Depth	0.33 ft
Critical Depth	0.39 ft
Critical Slope	0.75 %
Velocity	3.56 ft/s
Velocity Head	0.20 ft
Specific Energy	0.53 ft

Worksheet for Section D2 - 100-yr (normal Crown) HALF Rcurb PRO

Results	
Froude Number	1.975
Flow Type	Supercritical
GVF Input Data	
Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.33 ft
Critical Depth	0.39 ft
Channel Slope	3.20 %
Critical Slope	0.75 %

Cross Section for Section D2 - 100-yr (normal Crown) HALF Rcurb PRO

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Channel Slope	3.20 %
Normal Depth	0.33 ft
Discharge	3.5 cfs



Worksheet for Section D3 - 100-yr (normal Crown) HALF L-Curb W/ SW PRO

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Channel Slope	3.20 %
Discharge	14.0 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+17.50	0.48
0+33.00	0.17
0+33.00	0.13
0+34.50	0.00
0+34.50	0.48
0+35.00	0.50
0+40.00	0.60

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+17.50, 0.48)	(0+40.00, 0.60)	0.016

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results	
Normal Depth	0.47 ft
Roughness Coefficient	0.016
Elevation	0.47 ft
Elevation Range	0.00 to 0.60 ft
Flow Area	2.79 ft ²
Wetted Perimeter	16.80 ft
Hydraulic Radius	0.17 ft
Top Width	16.29 ft
Normal Depth	0.47 ft
Critical Depth	0.59 ft
Critical Slope	0.63 %
Velocity	5.02 ft/s
Velocity Head	0.39 ft

Worksheet for Section D3 - 100-yr (normal Crown) HALF L-Curb W/ SW PRO

Results

Specific Energy	0.86 ft
Froude Number	2.140
Flow Type	Supercritical

GVF Input Data

Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data

Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.47 ft
Critical Depth	0.59 ft
Channel Slope	3.20 %
Critical Slope	0.63 %

Worksheet for Section D3 - 100-yr (normal Crown) HALF L-Curb W/ SW PRO

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Channel Slope	3.20 %
Discharge	14.0 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+17.50	0.48
0+33.00	0.17
0+33.00	0.13
0+34.50	0.00
0+34.50	0.48
0+35.00	0.50
0+40.00	0.60

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+17.50, 0.48)	(0+40.00, 0.60)	0.016

Options

Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Normal Depth	0.47 ft
Roughness Coefficient	0.016
Elevation	0.47 ft
Elevation Range	0.00 to 0.60 ft
Flow Area	2.79 ft ²
Wetted Perimeter	16.80 ft
Hydraulic Radius	0.17 ft
Top Width	16.29 ft
Normal Depth	0.47 ft
Critical Depth	0.59 ft
Critical Slope	0.63 %
Velocity	5.02 ft/s
Velocity Head	0.39 ft

Worksheet for Section D3 - 100-yr (normal Crown) HALF L-Curb W/ SW PRO

Results

Specific Energy	0.86 ft
Froude Number	2.140
Flow Type	Supercritical

GVF Input Data

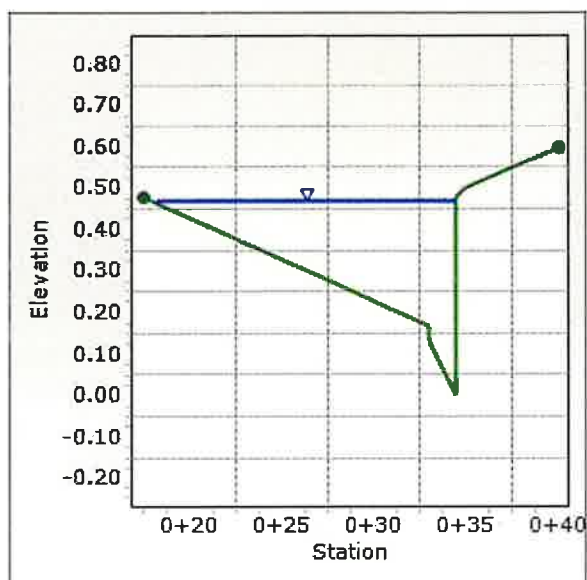
Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data

Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.47 ft
Critical Depth	0.59 ft
Channel Slope	3.20 %
Critical Slope	0.63 %

Cross Section for Section D3 - 100-yr (normal Crown) HALF L-Curb W/ SW PRO

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Channel Slope	3.20 %
Normal Depth	0.47 ft
Discharge	14.0 cfs



Worksheet for Section E1 - 100-yr (normal crown) PRO

Project Description

Friction Method	Manning
	Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.88 %
Discharge	43.5 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.38
0+00.49	0.30
0+00.98	0.08
0+01.00	0.00
0+02.00	0.13
0+02.00	0.17
0+17.50	0.48
0+33.00	0.17
0+33.00	0.13
0+34.50	0.00
0+34.50	0.48
0+35.00	0.50
0+40.00	0.60

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.38)	(0+40.00, 0.60)	0.016

Options

Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Normal Depth	0.63 ft
Roughness Coefficient	0.016
Elevation	0.63 ft
Elevation Range	0.00 to 0.60 ft
Flow Area	11.58 ft ²
Wetted Perimeter	40.97 ft
Hydraulic Radius	0.28 ft
Top Width	40.00 ft

Worksheet for Section E1 - 100-yr (normal crown) PRO

Results

Normal Depth	0.63 ft
Critical Depth	0.67 ft
Critical Slope	0.56 %
Velocity	3.76 ft/s
Velocity Head	0.22 ft
Specific Energy	0.85 ft
Froude Number	1.231
Flow Type	Supercritical

GVF Input Data

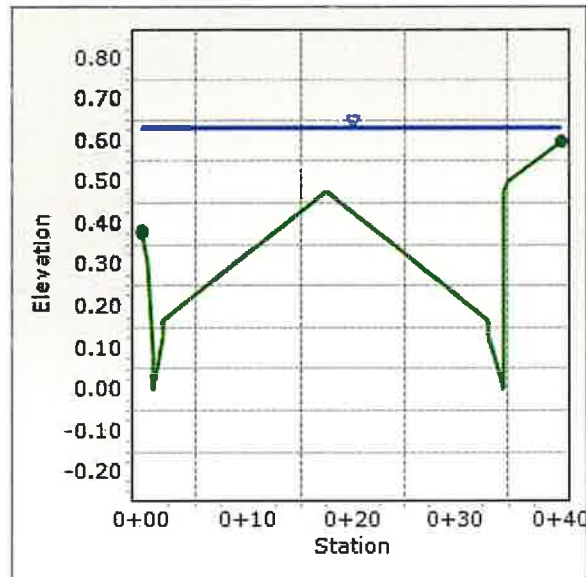
Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data

Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.63 ft
Critical Depth	0.67 ft
Channel Slope	0.88 %
Critical Slope	0.56 %

Cross Section for Section E1 - 100-yr (normal crown) PRO

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Channel Slope	0.88 %
Normal Depth	0.63 ft
Discharge	43.5 cfs



Worksheet for Section E2 - 100-yr (normal crown) PRO

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Channel Slope	4.11 %
Discharge	41.5 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.38
0+00.49	0.30
0+00.98	0.08
0+01.00	0.00
0+02.00	0.13
0+02.00	0.17
0+17.50	0.48
0+33.00	0.17
0+33.00	0.13
0+34.50	0.00
0+34.50	0.48
0+35.00	0.50
0+40.00	0.60

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.38)	(0+40.00, 0.60)	0.016

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results	
Normal Depth	0.50 ft
Roughness Coefficient	0.016
Elevation	0.50 ft
Elevation Range	0.00 to 0.60 ft
Flow Area	6.72 ft ²
Wetted Perimeter	35.79 ft
Hydraulic Radius	0.19 ft
Top Width	34.98 ft

Worksheet for Section E2 - 100-yr (normal crown) PRO

Results

Normal Depth	0.50 ft
Critical Depth	0.66 ft
Critical Slope	0.56 %
Velocity	6.17 ft/s
Velocity Head	0.59 ft
Specific Energy	1.09 ft
Froude Number	2.482
Flow Type	Supercritical

GVF Input Data

Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data

Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.50 ft
Critical Depth	0.66 ft
Channel Slope	4.11 %
Critical Slope	0.56 %

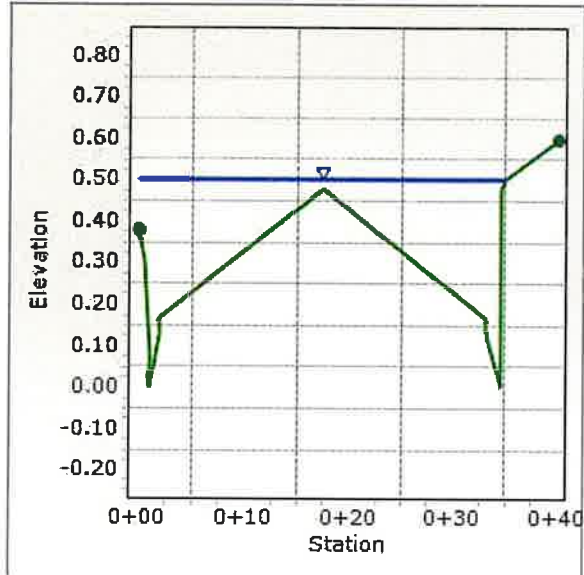
Cross Section for Section E2 - 100-yr (normal crown) PRO

Project Description

Friction Method	Manning
	Formula
Solve For	Normal Depth

Input Data

Channel Slope	4.11 %
Normal Depth	0.50 ft
Discharge	41.5 cfs



Worksheet for Section E3 - 100-yr (normal crown) PRO

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Channel Slope	4.11 %
Discharge	25.0 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.38
0+00.49	0.30
0+00.98	0.08
0+01.00	0.00
0+02.00	0.13
0+02.00	0.17
0+17.50	0.48
0+33.00	0.17
0+33.00	0.13
0+34.50	0.00
0+34.50	0.48
0+35.00	0.50
0+40.00	0.60

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.38)	(0+40.00, 0.60)	0.016

Options

Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Normal Depth	0.44 ft
Roughness Coefficient	0.016
Elevation	0.44 ft
Elevation Range	0.00 to 0.60 ft
Flow Area	4.68 ft ²
Wetted Perimeter	30.95 ft
Hydraulic Radius	0.15 ft
Top Width	30.24 ft

Worksheet for Section E3 - 100-yr (normal crown) PRO

Results

Normal Depth	0.44 ft
Critical Depth	0.56 ft
Critical Slope	0.62 %
Velocity	5.34 ft/s
Velocity Head	0.44 ft
Specific Energy	0.88 ft
Froude Number	2.391
Flow Type	Supercritical

GVF Input Data

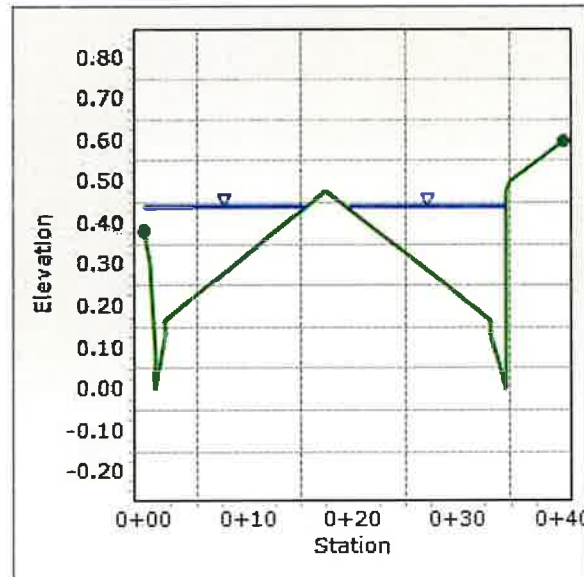
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Length	0.00 ft
Number Of Steps	0

GVF Output Data

Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.44 ft
Critical Depth	0.56 ft
Channel Slope	4.11 %
Critical Slope	0.62 %

Cross Section for Section E3 - 100-yr (normal crown) PRO

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Channel Slope	4.11 %
Normal Depth	0.44 ft
Discharge	25.0 cfs



Worksheet for Section F1 - 100-yr (HALF offset crown) PRO

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Channel Slope	1.00 %
Discharge	3.0 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.38
0+00.49	0.30
0+00.98	0.08
0+01.00	0.00
0+02.00	0.13
0+02.00	0.17
0+23.00	1.01

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.38)	(0+23.00, 1.01)	0.016

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results	
Normal Depth	0.40 ft
Roughness Coefficient	0.016
Elevation	0.40 ft
Elevation Range	0.00 to 1.01 ft
Flow Area	1.17 ft ²
Wetted Perimeter	8.06 ft
Hydraulic Radius	0.15 ft
Top Width	7.86 ft
Normal Depth	0.40 ft
Critical Depth	0.42 ft
Critical Slope	0.71 %
Velocity	2.56 ft/s
Velocity Head	0.10 ft
Specific Energy	0.51 ft

Worksheet for Section F1 - 100-yr (HALF offset crown) PRO

Results

Froude Number	1.171
Flow Type	Supercritical

GVF Input Data

Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data

Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.40 ft
Critical Depth	0.42 ft
Channel Slope	1.00 %
Critical Slope	0.71 %

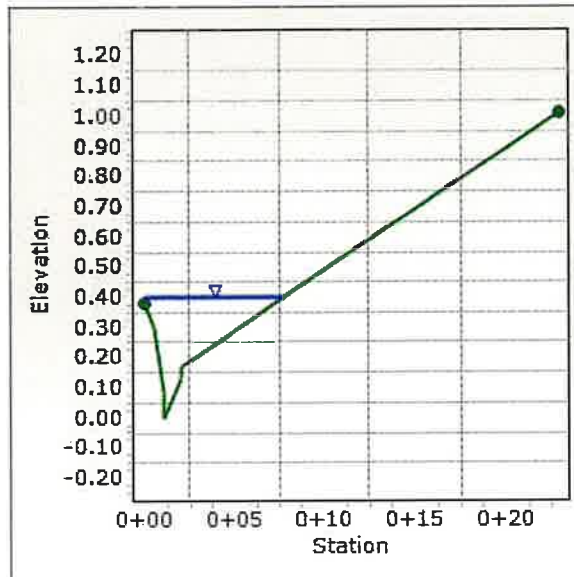
Cross Section for Section F1 - 100-yr (HALF offset crown) PRO

Project Description

Friction Method	Manning
	Formula
Solve For	Normal Depth

Input Data

Channel Slope	1.00 %
Normal Depth	0.40 ft
Discharge	3.0 cfs



Worksheet for Section F2 - 100-yr (HALF offset crown w/ SW) PRO

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Channel Slope	0.60 %
Discharge	3.0 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+23.00	1.01
0+33.00	0.81
0+33.00	0.77
0+34.00	0.64
0+34.02	0.72
0+34.51	0.94
0+35.00	1.02
0+40.00	1.12

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+23.00, 1.01)	(0+40.00, 1.12)	0.016

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results	
Normal Depth	0.39 ft
Roughness Coefficient	0.016
Elevation	1.03 ft
Elevation Range	0.64 to 1.12 ft
Flow Area	1.63 ft ²
Wetted Perimeter	12.58 ft
Hydraulic Radius	0.13 ft
Top Width	12.39 ft
Normal Depth	0.39 ft
Critical Depth	0.38 ft
Critical Slope	0.76 %
Velocity	1.84 ft/s
Velocity Head	0.05 ft

Worksheet for Section F2 - 100-yr (HALF offset crown w/ SW) PRO

Results	
Specific Energy	0.44 ft
Froude Number	0.894
Flow Type	Subcritical
GVF Input Data	
Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.39 ft
Critical Depth	0.38 ft
Channel Slope	0.60 %
Critical Slope	0.76 %

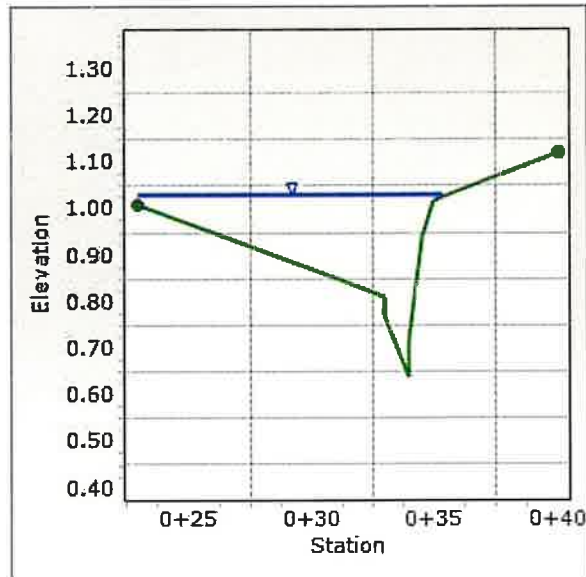
Worksheet for Section F2 - 100-yr (HALF offset crown w/ SW) PRO

Messages:

Water Surface Elevation exceeds lowest end station by 0.0178513526259687ft.

Cross Section for Section F2 - 100-yr (HALF offset crown w/ SW) PRO

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Channel Slope	0.60 %
Normal Depth	0.39 ft
Discharge	3.0 cfs



Worksheet for Section F3 - 100-yr (normal crown) PRO

Project Description

Friction Method	Manning
	Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.60 %
Discharge	5.0 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.38
0+00.49	0.30
0+00.98	0.08
0+01.00	0.00
0+02.00	0.13
0+02.00	0.17
0+17.50	0.48
0+33.00	0.17
0+33.00	0.13
0+34.00	0.00
0+34.02	0.08
0+34.51	0.30
0+35.00	0.38
0+40.00	0.48

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.38)	(0+40.00, 0.48)	0.016

Options

Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Normal Depth	0.37 ft
Roughness Coefficient	0.016
Elevation	0.37 ft
Elevation Range	0.00 to 0.48 ft
Flow Area	2.89 ft ²
Wetted Perimeter	24.47 ft
Hydraulic Radius	0.12 ft

Worksheet for Section F3 - 100-yr (normal crown) PRO

Results

Top Width	24.14 ft
Normal Depth	0.37 ft
Critical Depth	0.36 ft
Critical Slope	0.78 %
Velocity	1.73 ft/s
Velocity Head	0.05 ft
Specific Energy	0.42 ft
Froude Number	0.883
Flow Type	Subcritical

GVF Input Data

Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data

Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.37 ft
Critical Depth	0.36 ft
Channel Slope	0.60 %
Critical Slope	0.78 %

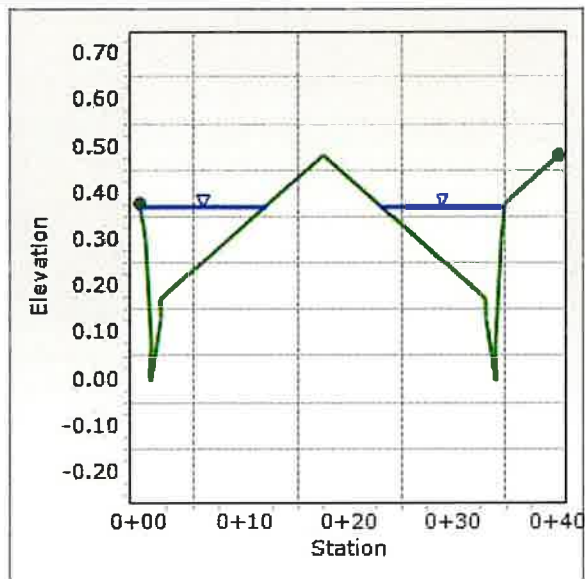
Worksheet for Section F3 - 100-yr (normal crown) PRO

Messages:

Flow is divided.

Cross Section for Section F3 - 100-yr (normal crown) PRO

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Channel Slope	0.60 %
Normal Depth	0.37 ft
Discharge	5.0 cfs



Worksheet for Section G1 - 100-yr (normal crown) PRO

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Channel Slope	1.07 %
Discharge	5.5 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.38
0+00.49	0.30
0+00.98	0.08
0+01.00	0.00
0+02.00	0.13
0+02.00	0.17
0+17.50	0.48
0+33.00	0.17
0+33.00	0.13
0+34.00	0.00
0+34.02	0.08
0+34.51	0.30
0+35.00	0.38
0+40.00	0.48

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.38)	(0+40.00, 0.48)	0.016

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results	
Normal Depth	0.36 ft
Roughness Coefficient	0.016
Elevation	0.36 ft
Elevation Range	0.00 to 0.48 ft
Flow Area	2.49 ft ²
Wetted Perimeter	22.54 ft
Hydraulic Radius	0.11 ft

Worksheet for Section G1 - 100-yr (normal crown) PRO

Results

Top Width	22.22 ft
Normal Depth	0.36 ft
Critical Depth	0.37 ft
Critical Slope	0.77 %
Velocity	2.21 ft/s
Velocity Head	0.08 ft
Specific Energy	0.43 ft
Froude Number	1.164
Flow Type	Supercritical

GVF Input Data

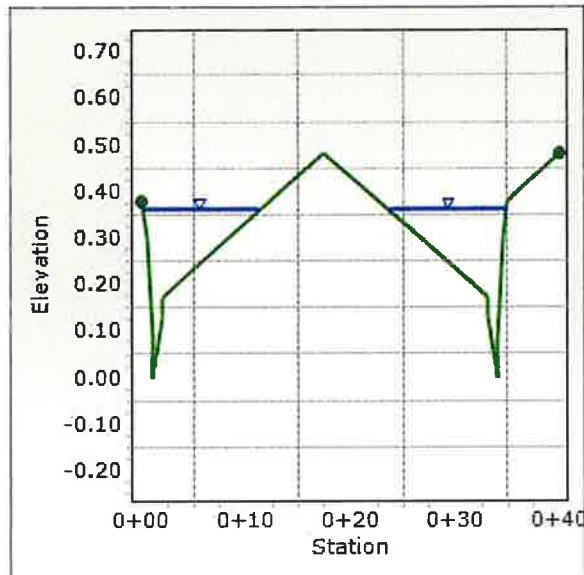
Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data

Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.36 ft
Critical Depth	0.37 ft
Channel Slope	1.07 %
Critical Slope	0.77 %

Cross Section for Section G1 - 100-yr (normal crown) PRO

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Channel Slope	1.07 %
Normal Depth	0.36 ft
Discharge	5.5 cfs



Worksheet for Section G2 - 100-yr (HALF offset crown) PRO

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth
Input Data	
Channel Slope	0.76 %
Discharge	2.5 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.38
0+00.49	0.30
0+00.98	0.08
0+01.00	0.00
0+02.00	0.13
0+02.00	0.17
0+23.00	1.01

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.38)	(0+23.00, 1.01)	0.016

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results	
Normal Depth	0.40 ft
Roughness Coefficient	0.016
Elevation	0.40 ft
Elevation Range	0.00 to 1.01 ft
Flow Area	1.13 ft ²
Wetted Perimeter	7.93 ft
Hydraulic Radius	0.14 ft
Top Width	7.74 ft
Normal Depth	0.40 ft
Critical Depth	0.40 ft
Critical Slope	0.73 %
Velocity	2.21 ft/s
Velocity Head	0.08 ft
Specific Energy	0.48 ft

Worksheet for Section G2 - 100-yr (HALF offset crown) PRO

Results

Froude Number	1.018
Flow Type	Supercritical

GVF Input Data

Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data

Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.40 ft
Critical Depth	0.40 ft
Channel Slope	0.76 %
Critical Slope	0.73 %

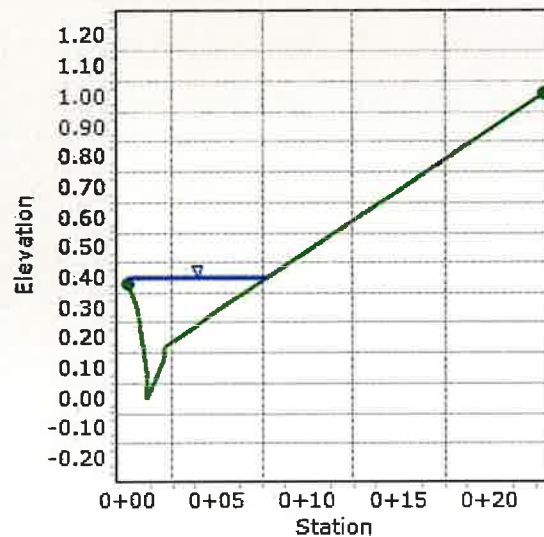
Cross Section for Section G2 - 100-yr (HALF offset crown) PRO

Project Description

Friction Method	Manning
	Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.76 %
Normal Depth	0.40 ft
Discharge	2.5 cfs



Worksheet for Section G3 - 100-yr (HALF offset crown w/ SW) PRO

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Channel Slope	0.76 %
Discharge	2.5 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+23.00	1.01
0+33.00	0.81
0+33.00	0.77
0+34.00	0.64
0+34.02	0.72
0+34.51	0.94
0+35.00	1.02
0+40.00	1.12

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+23.00, 1.01)	(0+40.00, 1.12)	0.016

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results	
Normal Depth	0.36 ft
Roughness Coefficient	0.016
Elevation	1.00 ft
Elevation Range	0.64 to 1.12 ft
Flow Area	1.32 ft ²
Wetted Perimeter	11.64 ft
Hydraulic Radius	0.11 ft
Top Width	11.48 ft
Normal Depth	0.36 ft
Critical Depth	0.36 ft
Critical Slope	0.78 %
Velocity	1.90 ft/s
Velocity Head	0.06 ft

Worksheet for Section G3 - 100-yr (HALF offset crown w/ SW) PRO

Results

Specific Energy	0.42 ft
Froude Number	0.986
Flow Type	Subcritical

GVF Input Data

Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data

Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.36 ft
Critical Depth	0.36 ft
Channel Slope	0.76 %
Critical Slope	0.78 %

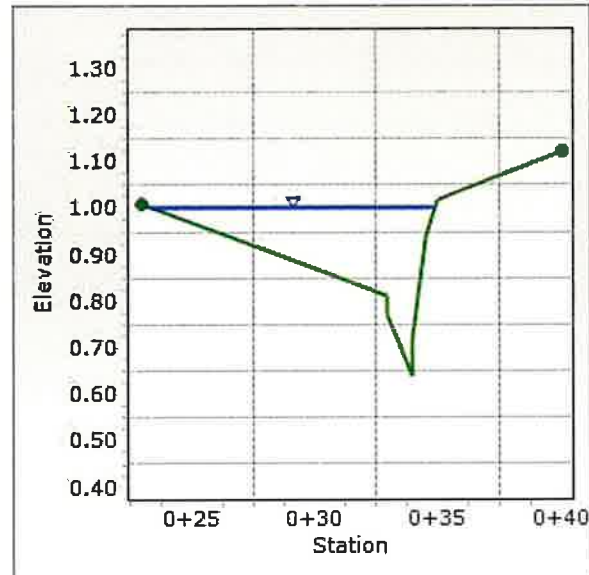
Cross Section for Section G3 - 100-yr (HALF offset crown w/ SW) PRO

Project Description

Friction Method	Manning
	Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.76 %
Normal Depth	0.36 ft
Discharge	2.5 cfs



**Miscellaneous Street Flow Computations –
Flow Capacity & Finished Floor Sections**

Worksheet for Capacity Section C - 100-yr INT

Project Description	
Friction Method	Manning
Solve For	Formula
	Normal Depth
Input Data	
Channel Slope	0.70 %
Discharge	3.0 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+23.00	1.01
0+33.00	0.81
0+33.00	0.77
0+34.00	0.64
0+34.02	0.72
0+34.51	0.94
0+35.00	1.02
0+40.00	1.12

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+23.00, 1.01)	(0+40.00, 1.12)	0.016

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results	
Normal Depth	0.38 ft
Roughness Coefficient	0.016
Elevation	1.02 ft
Elevation Range	0.64 to 1.12 ft
Flow Area	1.54 ft ²
Wetted Perimeter	12.18 ft
Hydraulic Radius	0.13 ft
Top Width	12.01 ft
Normal Depth	0.38 ft
Critical Depth	0.38 ft
Critical Slope	0.76 %
Velocity	1.95 ft/s
Velocity Head	0.06 ft

Worksheet for Capacity Section C - 100-yr INT

Results	
Specific Energy	0.44 ft
Froude Number	0.962
Flow Type	Subcritical
GVF Input Data	
Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.38 ft
Critical Depth	0.38 ft
Channel Slope	0.70 %
Critical Slope	0.76 %

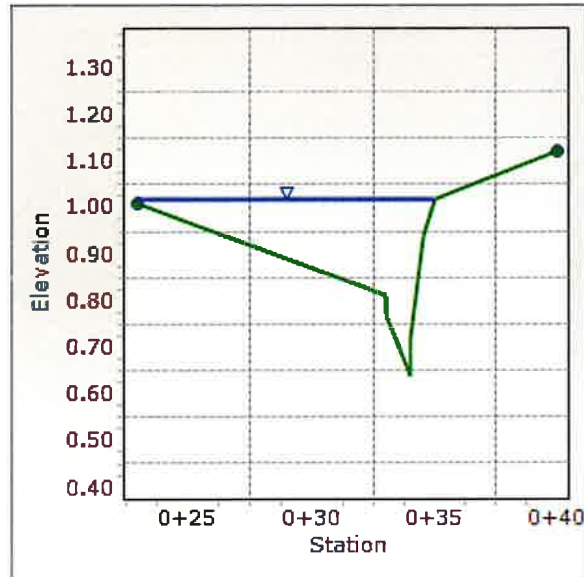
Worksheet for Capacity Section C - 100-yr INT

Messages:

Water Surface Elevation exceeds lowest end station by 0.0101659586048444ft.

Cross Section for Capacity Section C - 100-yr INT

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Channel Slope	0.70 %
Normal Depth	0.38 ft
Discharge	3.0 cfs



Worksheet for Capacity Section E4 - 100-yr INT

Project Description			
Friction Method	Manning Formula		
Solve For	Normal Depth		
Input Data			
Channel Slope	3.20 %		
Discharge	16.0 cfs		
Section Definitions			
Station (ft)	Elevation (ft)		
	0+17.50		0.48
	0+33.00		0.17
	0+33.00		0.13
	0+34.50		0.00
	0+34.50		0.48
	0+35.00		0.50
	0+40.00		0.60
Roughness Segment Definitions			
Start Station (0+17.50, 0.48)	Ending Station (0+40.00, 0.60)	Roughness Coefficient	0.016
Options			
Current Roughness Weighted Method	Pavlovskii's Method		
Open Channel Weighting Method	Pavlovskii's Method		
Closed Channel Weighting Method	Pavlovskii's Method		
Results			
Normal Depth	0.48 ft		
Roughness Coefficient	0.016		
Elevation	0.48 ft		
Elevation Range	0.00 to 0.60 ft		
Flow Area	3.08 ft ²		
Wetted Perimeter	17.61 ft		
Hydraulic Radius	0.17 ft		
Top Width	17.08 ft		
Normal Depth	0.48 ft		
Critical Depth	0.61 ft		
Critical Slope	0.62 %		
Velocity	5.20 ft/s		
Velocity Head	0.42 ft		
Specific Energy	0.90 ft		

Worksheet for Capacity Section E4 - 100-yr INT

Results	
Froude Number	2.158
Flow Type	Supercritical
GVF Input Data	
Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.48 ft
Critical Depth	0.61 ft
Channel Slope	3.20 %
Critical Slope	0.62 %

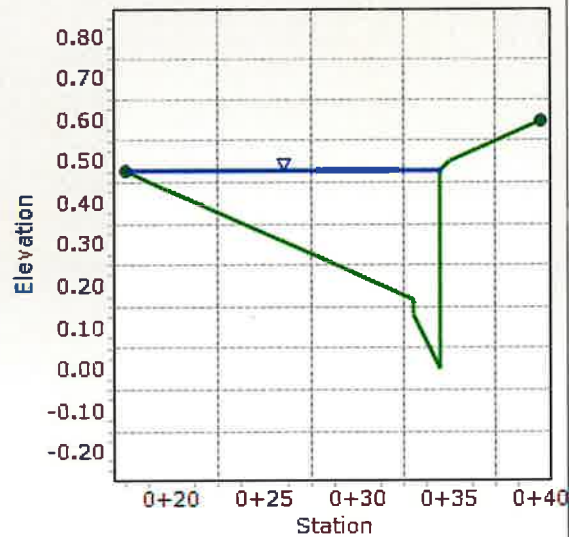
Cross Section for Capacity Section E4 - 100-yr INT

Project Description

Friction Method	Manning
	Formula
Solve For	Normal Depth

Input Data

Channel Slope	3.20 %
Normal Depth	0.48 ft
Discharge	16.0 cfs



Worksheet for Lot 88 Section F3-2 100-yr (normal crown)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth
Input Data	
Channel Slope	0.64 %
Discharge	2.6 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.38
0+00.49	0.30
0+00.98	0.08
0+01.00	0.00
0+02.00	0.13
0+02.00	0.17
0+17.50	0.48
0+33.00	0.17
0+33.00	0.13
0+34.00	0.00
0+34.02	0.08
0+34.51	0.30
0+35.00	0.38
0+40.00	0.48

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.38)	(0+40.00, 0.48)	0.016

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results	
Normal Depth	0.31 ft
Roughness Coefficient	0.016
Elevation	0.31 ft
Elevation Range	0.00 to 0.48 ft
Flow Area	1.66 ft ²
Wetted Perimeter	17.84 ft
Hydraulic Radius	0.09 ft

Worksheet for Lot 88 Section F3-2 100-yr (normal crown)

Results

Top Width	17.52 ft
Normal Depth	0.31 ft
Critical Depth	0.30 ft
Critical Slope	0.80 %
Velocity	1.56 ft/s
Velocity Head	0.04 ft
Specific Energy	0.35 ft
Froude Number	0.893
Flow Type	Subcritical

GVF Input Data

Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data

Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.31 ft
Critical Depth	0.30 ft
Channel Slope	0.64 %
Critical Slope	0.80 %

Worksheet for Lot 88 Section F3-2 100-yr (normal crown)

Messages:

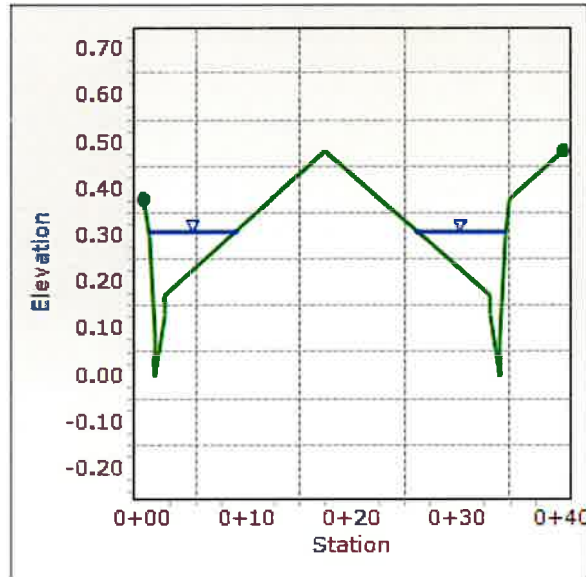
Flow is divided.

Notes:

Drainage area fronting Lot = 0.79 ac
Unit flow rate = 3.3 cfs/ac
Flow rate = $0.79 * 3.3 \text{ cfs} = 2.58 \text{ cfs}$

Cross Section for Lot 88 Section F3-2 100-yr (normal crown)

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Channel Slope	0.64 %
Normal Depth	0.31 ft
Discharge	2.6 cfs



Worksheet for Lot 136 Section F2-2 - 100-yr (HALF offset crown)

Project Description

Friction Method	Manning
	Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.60 %
Discharge	1.1 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.38
0+00.49	0.30
0+00.98	0.08
0+01.00	0.00
0+02.00	0.13
0+02.00	0.17
0+23.00	1.01

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.38)	(0+23.00, 1.01)	0.016

Options

Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Normal Depth	0.32 ft
Roughness Coefficient	0.016
Elevation	0.32 ft
Elevation Range	0.00 to 1.01 ft
Flow Area	0.63 ft ²
Wetted Perimeter	5.69 ft
Hydraulic Radius	0.11 ft
Top Width	5.53 ft
Normal Depth	0.32 ft
Critical Depth	0.31 ft
Critical Slope	0.81 %
Velocity	1.66 ft/s
Velocity Head	0.04 ft
Specific Energy	0.37 ft

Worksheet for Lot 136 Section F2-2 - 100-yr (HALF offset crown)

Results

Froude Number	0.865
Flow Type	Subcritical

GVF Input Data

Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data

Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.32 ft
Critical Depth	0.31 ft
Channel Slope	0.60 %
Critical Slope	0.81 %

Worksheet for Lot 136 Section F2-2 - 100-yr (HALF offset crown)

Notes:

Drainage area fronting Lot = 0.32 acres

Unit flow rate = 3.3 cfs/acre

Flow rate = 1.05 cfs

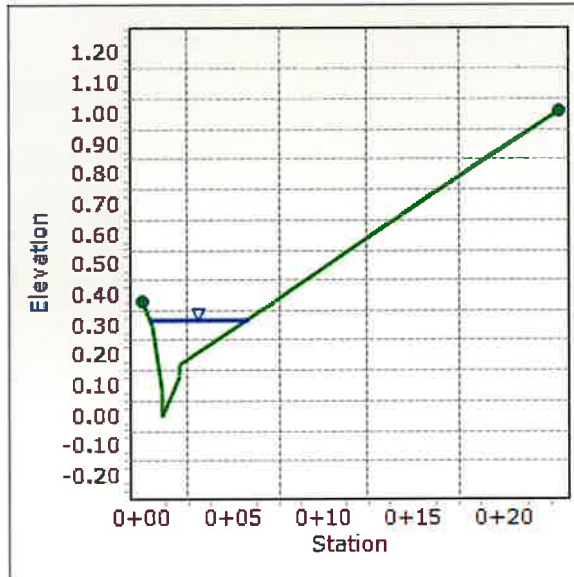
Cross Section for Lot 136 Section F2-2 - 100-yr (HALF offset crown)

Project Description

Friction Method	Manning
	Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.60 %
Normal Depth	0.32 ft
Discharge	1.1 cfs



Worksheet for Lot165-170 Section D2-2 - 100-yr (normal Crown) HALF Rcurb

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Channel Slope	3.20 %
Discharge	2.6 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.38
0+00.49	0.30
0+00.98	0.08
0+01.00	0.00
0+02.00	0.13
0+02.00	0.17
0+17.50	0.48

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.38)	(0+17.50, 0.48)	0.016

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results	
Normal Depth	0.30 ft
Roughness Coefficient	0.016
Elevation	0.30 ft
Elevation Range	0.00 to 0.48 ft
Flow Area	0.75 ft ²
Wetted Perimeter	8.39 ft
Hydraulic Radius	0.09 ft
Top Width	8.23 ft
Normal Depth	0.30 ft
Critical Depth	0.36 ft
Critical Slope	0.74 %
Velocity	3.41 ft/s
Velocity Head	0.18 ft

Worksheet for Lot165-170 Section D2-2 - 100-yr (normal Crown) HALF Rcurb

Results	
Specific Energy	0.48 ft
Froude Number	1.993
Flow Type	Supercritical
GVF Input Data	
Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.30 ft
Critical Depth	0.36 ft
Channel Slope	3.20 %
Critical Slope	0.74 %

Worksheet for Lot165-170 Section D2-2 - 100-yr (normal Crown) HALF Rcurb

Notes:

Drainage area fronting Lot 165 thru 172 = 0.49 acres

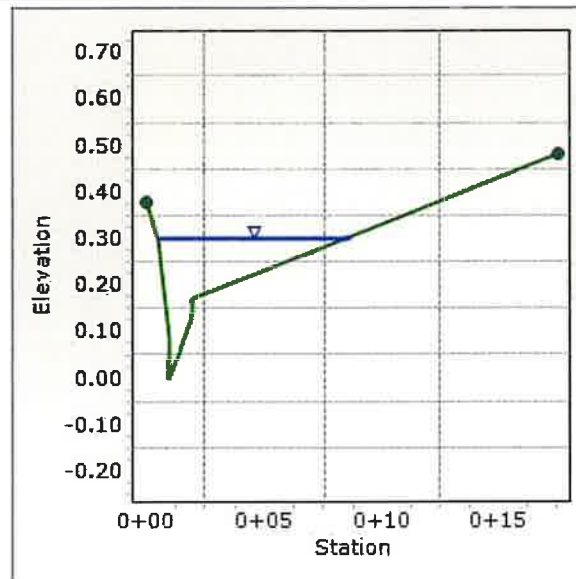
Unit flow rate = 3.3 cfs/acre

Flow rate = 1.60 cfs

Flowrate at Section = DI#4 bypass + 1.6 = 2.6 cfs

Cross Section for Lot165-170 Section D2-2 - 100-yr (normal Crown) HALF Rcurb

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Channel Slope	3.20 %
Normal Depth	0.30 ft
Discharge	2.6 cfs



Worksheet for Lots 215-219 Section A2-2 - 100-yr MAX% (HALF normal crown)

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Channel Slope	3.39 %
Discharge	4.5 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.38
0+00.49	0.30
0+00.98	0.08
0+01.00	0.00
0+02.00	0.13
0+02.00	0.17
0+17.50	0.48

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.38)	(0+17.50, 0.48)	0.016

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results	
Normal Depth	0.35 ft
Roughness Coefficient	0.016
Elevation	0.35 ft
Elevation Range	0.00 to 0.48 ft
Flow Area	1.18 ft ²
Wetted Perimeter	10.92 ft
Hydraulic Radius	0.11 ft
Top Width	10.75 ft
Normal Depth	0.35 ft
Critical Depth	0.42 ft
Critical Slope	0.72 %
Velocity	3.86 ft/s
Velocity Head	0.23 ft

Worksheet for Lots 215-219 Section A2-2 - 100-yr MAX% (HALF normal crown)

Results	
Specific Energy	0.58 ft
Froude Number	2.060
Flow Type	Supercritical
GVF Input Data	
Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.35 ft
Critical Depth	0.42 ft
Channel Slope	3.39 %
Critical Slope	0.72 %

Worksheet for Lots 215-219 Section A2-2 - 100-yr MAX% (HALF normal crown)

Notes:

Drainage area fronting Lot 215 thru 219 = 0.47 acres

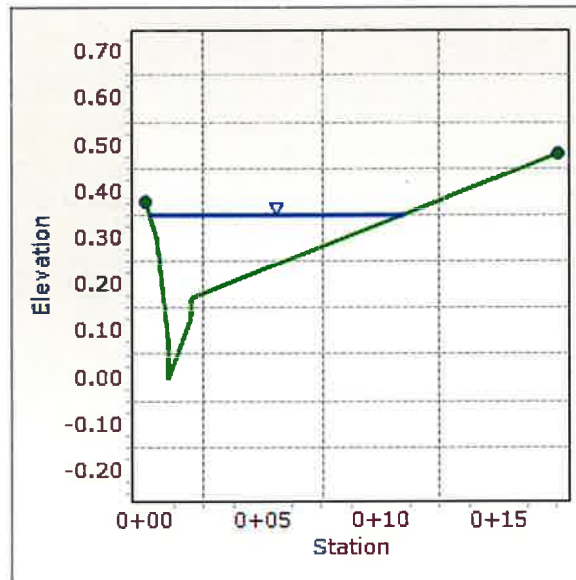
Unit flow rate = 3.3 cfs/acre

Flow rate = 1.54 cfs

Flowrate at Section = IRON(A3) + 1.54 = 4.54 cfs

Cross Section for Lots 215-219 Section A2-2 - 100-yr MAX% (HALF normal crown)

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Channel Slope	3.39 %
Normal Depth	0.35 ft
Discharge	4.5 cfs



Worksheet for Lots 219-222 Section A2-2 - 100-yr MIN% (HALF normal crown)

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Channel Slope	2.70 %
Discharge	4.5 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.38
0+00.49	0.30
0+00.98	0.08
0+01.00	0.00
0+02.00	0.13
0+02.00	0.17
0+17.50	0.48

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.38)	(0+17.50, 0.48)	0.016

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results	
Normal Depth	0.36 ft
Roughness Coefficient	0.016
Elevation	0.36 ft
Elevation Range	0.00 to 0.48 ft
Flow Area	1.27 ft ²
Wetted Perimeter	11.41 ft
Hydraulic Radius	0.11 ft
Top Width	11.24 ft
Normal Depth	0.36 ft
Critical Depth	0.42 ft
Critical Slope	0.73 %
Velocity	3.54 ft/s
Velocity Head	0.19 ft

Worksheet for Lots 219-222 Section A2-2 - 100-yr MIN% (HALF normal crown)

Results	
Specific Energy	0.55 ft
Froude Number	1.856
Flow Type	Supercritical
GVF Input Data	
Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.36 ft
Critical Depth	0.42 ft
Channel Slope	2.70 %
Critical Slope	0.73 %

Worksheet for Lots 219-222 Section A2-2 - 100-yr MIN% (HALF normal crown)

Notes:

Drainage area fronting Lot 215 thru 219 = 0.47 acres

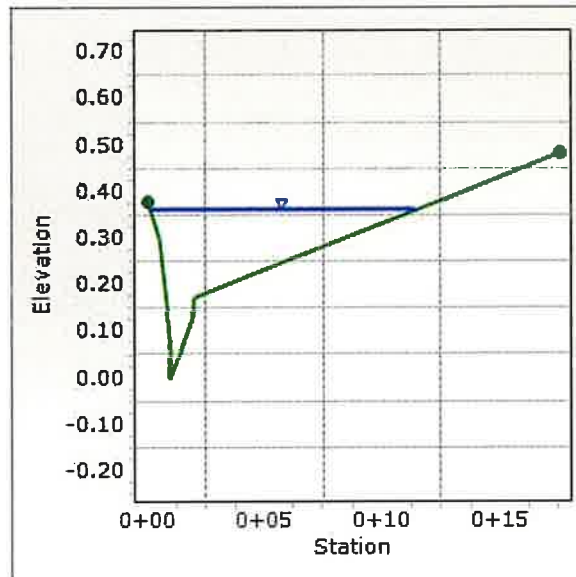
Unit flow rate = 3.3 cfs/acre

Flow rate = 1.54 cfs

Flowrate at Section = IRON(A3) + 1.54 = 4.54 cfs

Cross Section for Lots 219-222 Section A2-2 - 100-yr MIN% (HALF normal crown)

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Channel Slope	2.70 %
Normal Depth	0.36 ft
Discharge	4.5 cfs



Worksheet for Lots192/193 Section F1-2 - 100-yr (HALF offset crown)

Project Description

Friction Method	Manning
	Formula
Solve For	Normal Depth

Input Data

Channel Slope	1.00 %
Discharge	1.8 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.38
0+00.49	0.30
0+00.98	0.08
0+01.00	0.00
0+02.00	0.13
0+02.00	0.17
0+23.00	1.01

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.38)	(0+23.00, 1.01)	0.016

Options

Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Normal Depth	0.35 ft
Roughness Coefficient	0.016
Elevation	0.35 ft
Elevation Range	0.00 to 1.01 ft
Flow Area	0.79 ft ²
Wetted Perimeter	6.52 ft
Hydraulic Radius	0.12 ft
Top Width	6.35 ft
Normal Depth	0.35 ft
Critical Depth	0.37 ft
Critical Slope	0.76 %
Velocity	2.28 ft/s
Velocity Head	0.08 ft
Specific Energy	0.43 ft

Worksheet for Lots192/193 Section F1-2 - 100-yr (HALF offset crown)

Results	
Froude Number	1.139
Flow Type	Supercritical
GVF Input Data	
Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.35 ft
Critical Depth	0.37 ft
Channel Slope	1.00 %
Critical Slope	0.76 %

Worksheet for Lots192/193 Section F1-2 - 100-yr (HALF offset crown)

Notes:

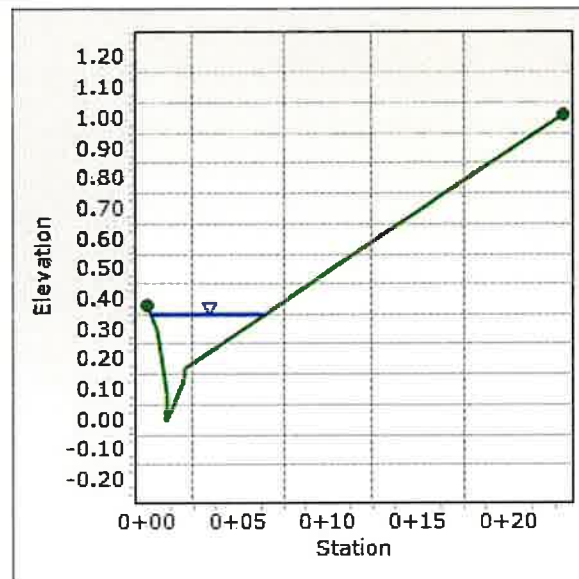
Drainage area fronting Lot 192/193 = 0.55 acres

Unit flow rate = 3.3 cfs/acre

Flow rate = 1.8 cfs

Cross Section for Lots192/193 Section F1-2 - 100-yr (HALF offset crown)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth
Input Data	
Channel Slope	1.00 %
Normal Depth	0.35 ft
Discharge	1.8 cfs



Worksheet for Lots188 Section F1-3 - 100-yr (HALF offset crown)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth
Input Data	
Channel Slope	1.00 %
Discharge	2.7 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.38
0+00.49	0.30
0+00.98	0.08
0+01.00	0.00
0+02.00	0.13
0+02.00	0.17
0+23.00	1.01

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.38)	(0+23.00, 1.01)	0.016

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results	
Normal Depth	0.38 ft
Roughness Coefficient	0.016
Elevation	0.38 ft
Elevation Range	0.00 to 1.01 ft
Flow Area	1.05 ft ²
Wetted Perimeter	7.65 ft
Hydraulic Radius	0.14 ft
Top Width	7.48 ft
Normal Depth	0.38 ft
Critical Depth	0.40 ft
Critical Slope	0.68 %
Velocity	2.53 ft/s
Velocity Head	0.10 ft
Specific Energy	0.48 ft

Worksheet for Lots188 Section F1-3 - 100-yr (HALF offset crown)

Results	
Froude Number	1.191
Flow Type	Supercritical
GVF Input Data	
Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.38 ft
Critical Depth	0.40 ft
Channel Slope	1.00 %
Critical Slope	0.68 %

Worksheet for Lots188 Section F1-3 - 100-yr (HALF offset crown)

Notes:

Drainage area fronting Lot 192/193 = 0.82 acres

Unit flow rate = 3.3 cfs/acre

Flow rate = 2.68 cfs

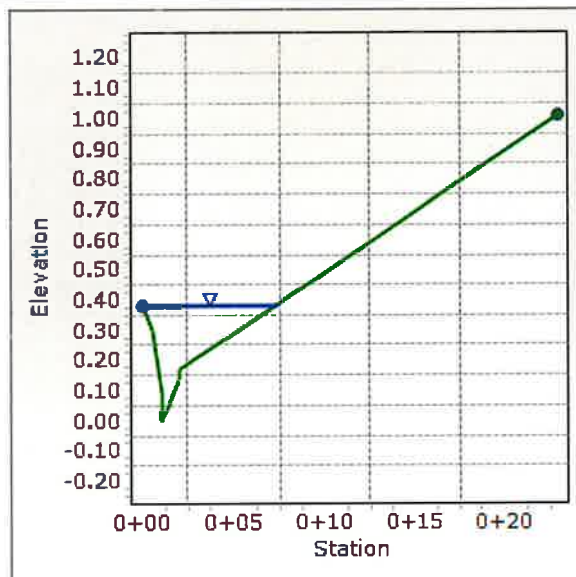
Cross Section for Lots188 Section F1-3 - 100-yr (HALF offset crown)

Project Description

Friction Method	Manning
	Formula
Solve For	Normal Depth

Input Data

Channel Slope	1.00 %
Normal Depth	0.38 ft
Discharge	2.7 cfs



Worksheet for Lot171/172 Section D2-3 - 100-yr (normal Crown) HALF Rcurb

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth
Input Data	
Channel Slope	3.20 %
Discharge	1.5 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.38
0+00.49	0.30
0+00.98	0.08
0+01.00	0.00
0+02.00	0.13
0+02.00	0.17
0+17.50	0.48

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.38)	(0+17.50, 0.48)	0.016

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results	
Normal Depth	0.27 ft
Roughness Coefficient	0.016
Elevation	0.27 ft
Elevation Range	0.00 to 0.48 ft
Flow Area	0.49 ft ²
Wetted Perimeter	6.54 ft
Hydraulic Radius	0.08 ft
Top Width	6.38 ft
Normal Depth	0.27 ft
Critical Depth	0.31 ft
Critical Slope	0.84 %
Velocity	2.96 ft/s
Velocity Head	0.14 ft

Worksheet for Lot171/172 Section D2-3 - 100-yr (normal Crown) HALF Rcurb

Results	
Specific Energy	0.41 ft
Froude Number	1.881
Flow Type	Supercritical
GVF Input Data	
Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.27 ft
Critical Depth	0.31 ft
Channel Slope	3.20 %
Critical Slope	0.84 %

Worksheet for Lot171/172 Section D2-3 - 100-yr (normal Crown) HALF Rcurb

Notes:

Drainage area fronting Lot 165 thru 172 = 0.14 acres

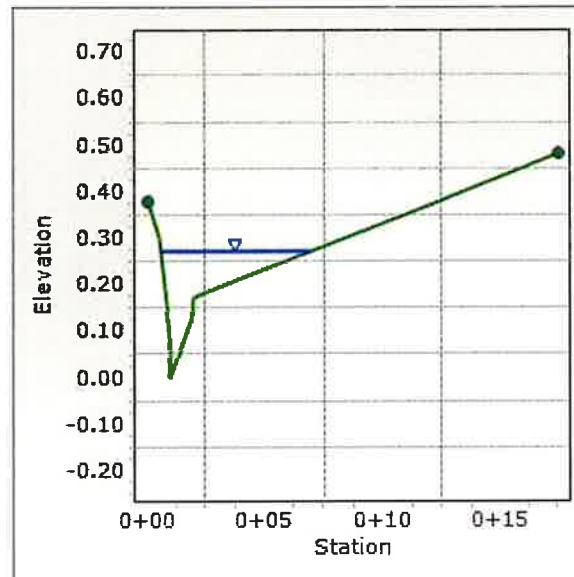
Unit flow rate = 3.3 cfs/acre

Area flow rate = 0.46 cfs

Flow at section = DI#4 bypass + area flowrate = 1.46 cfs

Cross Section for Lot171/172 Section D2-3 - 100-yr (normal Crown) HALF Rcurb

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Channel Slope	3.20 %
Normal Depth	0.27 ft
Discharge	1.5 cfs



Worksheet for Lot 204 Section A3-2 - 100-yr (HALF normal crown)

Project Description

Friction Method	Manning
	Formula
Solve For	Normal Depth

Input Data

Channel Slope	3.39 %
Discharge	1.0 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.38
0+00.49	0.30
0+00.98	0.08
0+01.00	0.00
0+02.00	0.13
0+02.00	0.17
0+17.50	0.48

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.38)	(0+17.50, 0.48)	0.016

Options

Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Normal Depth	0.24 ft
Roughness Coefficient	0.016
Elevation	0.24 ft
Elevation Range	0.00 to 0.48 ft
Flow Area	0.34 ft ²
Wetted Perimeter	5.11 ft
Hydraulic Radius	0.07 ft
Top Width	4.96 ft
Normal Depth	0.24 ft
Critical Depth	0.28 ft
Critical Slope	0.88 %
Velocity	2.81 ft/s
Velocity Head	0.12 ft
Specific Energy	0.36 ft

Worksheet for Lot 204 Section A3-2 - 100-yr (HALF normal crown)

Results	
Froude Number	1.898
Flow Type	Supercritical
GVF Input Data	
Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.24 ft
Critical Depth	0.28 ft
Channel Slope	3.39 %
Critical Slope	0.88 %

Worksheet for Lot 204 Section A3-2 - 100-yr (HALF normal crown)

Notes:

Drainage area fronting Lot 204 = 0.29 acres

Unit flow rate = 3.3 cfs/acre

Flow rate = 0.95 cfs

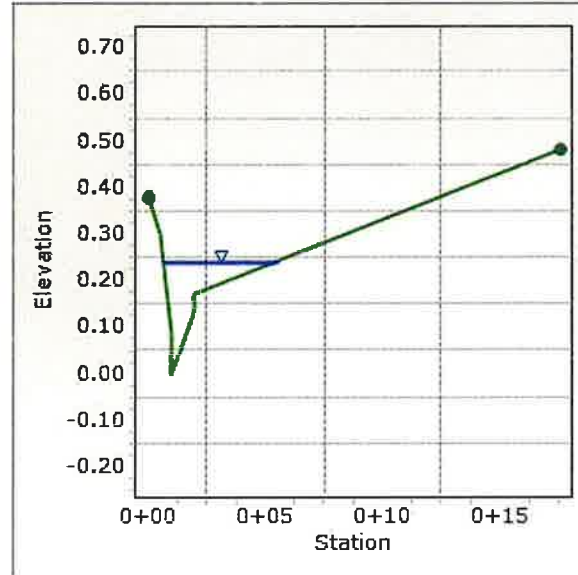
Cross Section for Lot 204 Section A3-2 - 100-yr (HALF normal crown)

Project Description

Friction Method	Manning
	Formula
Solve For	Normal Depth

Input Data

Channel Slope	3.39 %
Normal Depth	0.24 ft
Discharge	1.0 cfs



Drainage Easement Computations

Worksheet for E01 Drainage Easement (Em. Overflow)

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Roughness Coefficient	0.013
Channel Slope	0.50 %
Bottom Width	30.00 ft
Discharge	46.5 cfs
Results	
Normal Depth	0.37 ft
Flow Area	11.25 ft ²
Wetted Perimeter	30.75 ft
Hydraulic Radius	0.37 ft
Top Width	30.00 ft
Critical Depth	0.42 ft
Critical Slope	0.34 %
Velocity	4.13 ft/s
Velocity Head	0.27 ft
Specific Energy	0.64 ft
Froude Number	1.190
Flow Type	Supercritical
GVF Input Data	
Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.37 ft
Critical Depth	0.42 ft
Channel Slope	0.50 %
Critical Slope	0.34 %

Cross Section for E01 Drainage Easement (Em. Overflow)

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Roughness Coefficient	0.013
Channel Slope	0.50 %
Normal Depth	0.37 ft
Bottom Width	30.00 ft
Discharge	46.5 cfs



V: 1
H: 1

Worksheet for E01 Drainage Easement Weir (Em. Overflow)

Project Description

Solve For	Headwater Elevation
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Input Data

Discharge	46.5 cfs
Crest Elevation	0.00 ft
Tailwater Elevation	0.37 ft
Crest Surface Type	Paved
Crest Breadth	5.00 ft
Crest Length	30.00 ft

Results

Headwater Elevation	0.64 ft
Headwater Height Above Crest	0.64 ft
Tailwater Height Above Crest	0.37 ft
Weir Coefficient	$3.02 \text{ ft}^{1/2}/\text{s}$
Submergence Factor	1.000
Adjusted Weir Coefficient	$3.02 \text{ ft}^{1/2}/\text{s}$
Flow Area	19.23 ft^2
Velocity	2.42 ft/s
Wetted Perimeter	31.28 ft
Top Width	30.00 ft

Cross Section for E01 Drainage Easement Weir (Em. Overflow)

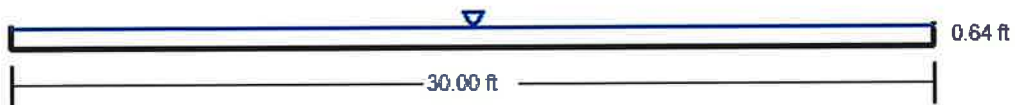
Project Description

Solve For

Headwater
Elevation

Input Data

Discharge	46.5 cfs
Headwater Elevation	0.64 ft
Crest Elevation	0.00 ft
Tailwater Elevation	0.37 ft
Crest Surface Type	Paved
Crest Breadth	5.00 ft
Crest Length	30.00 ft



V: 1
H: 1

Worksheet for EO2 Drainage Easement (Em. Overflow)

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Channel Slope	2.00 %
Discharge	3.0 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.10
0+10.00	0.00
0+20.00	0.10

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.10)	(0+20.00, 0.10)	0.025

Options

Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Normal Depth	0.14 ft
Roughness Coefficient	0.025
Elevation	0.14 ft
Elevation Range	0.00 to 0.10 ft
Flow Area	1.79 ft ²
Wetted Perimeter	20.08 ft
Hydraulic Radius	0.09 ft
Top Width	20.00 ft
Normal Depth	0.14 ft
Critical Depth	0.14 ft
Critical Slope	2.05 %
Velocity	1.68 ft/s
Velocity Head	0.04 ft
Specific Energy	0.18 ft
Froude Number	0.989
Flow Type	Subcritical

GVF Input Data

Worksheet for E02 Drainage Easement (Em. Overflow)

GVF Input Data

Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data

Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	0.00 ft/s
Upstream Velocity	0.00 ft/s
Normal Depth	0.14 ft
Critical Depth	0.14 ft
Channel Slope	2.00 %
Critical Slope	2.05 %

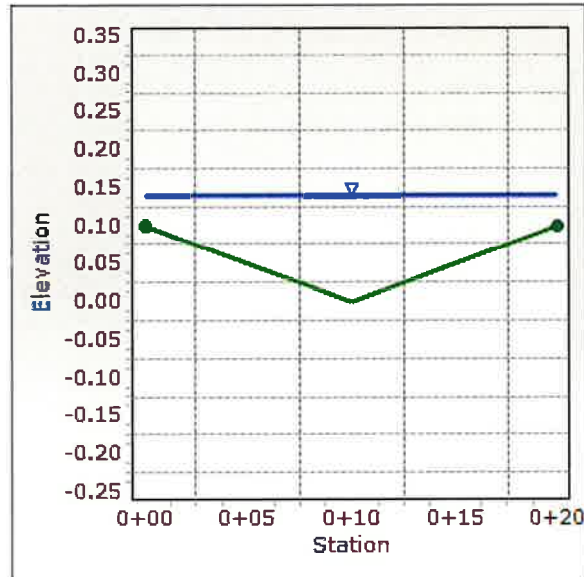
Worksheet for EO2 Drainage Easement (Em. Overflow)

Messages:

Water Surface Elevation exceeds lowest end station by 0.0394208720275884ft.

Cross Section for E02 Drainage Easement (Em. Overflow)

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Channel Slope	2.00 %
Normal Depth	0.14 ft
Discharge	3.0 cfs

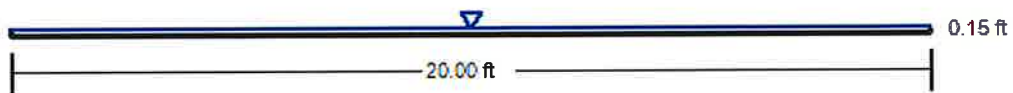


Worksheet for EO2 Drainage Easement Weir (Em. Overflow)

Project Description	
Solve For	Headwater Elevation
Input Data	
Discharge	3.0 cfs
Crest Elevation	0.00 ft
Tailwater Elevation	0.14 ft
Crest Surface Type	Paved
Crest Breadth	11.00 ft
Crest Length	20.00 ft
Results	
Headwater Elevation	0.15 ft
Headwater Height Above Crest	0.15 ft
Tailwater Height Above Crest	0.14 ft
Weir Coefficient	$2.95 \text{ ft}^{1/2}/\text{s}$
Submergence Factor	0.867
Adjusted Weir Coefficient	$2.56 \text{ ft}^{1/2}/\text{s}$
Flow Area	3.02 ft^2
Velocity	0.99 ft/s
Wetted Perimeter	20.30 ft
Top Width	20.00 ft

Cross Section for E02 Drainage Easement Weir (Em. Overflow)

Project Description	
Solve For	Headwater Elevation
Input Data	
Discharge	3.0 cfs
Headwater Elevation	0.15 ft
Crest Elevation	0.00 ft
Tailwater Elevation	0.14 ft
Crest Surface Type	Paved
Crest Breadth	11.00 ft
Crest Length	20.00 ft



V: 1
H: 1

Emergency Overflow Computations

Worksheet for Section D1 - 100-yr (HALF Street,Rcurb) (Em. Overflow)

Project Description

Friction Method	Manning
	Formula
Solve For	Normal Depth

Input Data

Channel Slope	3.20 %
Discharge	6.0 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.38
0+00.49	0.30
0+00.98	0.08
0+01.00	0.00
0+02.00	0.13
0+02.00	0.17
0+17.50	0.48

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.38)	(0+17.50, 0.48)	0.016

Options

Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Normal Depth	0.38 ft
Roughness Coefficient	0.016
Elevation	0.38 ft
Elevation Range	0.00 to 0.48 ft
Flow Area	1.49 ft ²
Wetted Perimeter	12.44 ft
Hydraulic Radius	0.12 ft
Top Width	12.27 ft
Normal Depth	0.38 ft
Critical Depth	0.46 ft
Critical Slope	0.70 %
Velocity	4.04 ft/s
Velocity Head	0.25 ft
Specific Energy	0.63 ft

Worksheet for Section D1 - 100-yr (HALF Street,Rcurb) (Em. Overflow)

Results

Froude Number	2.045
Flow Type	Supercritical

GVF Input Data

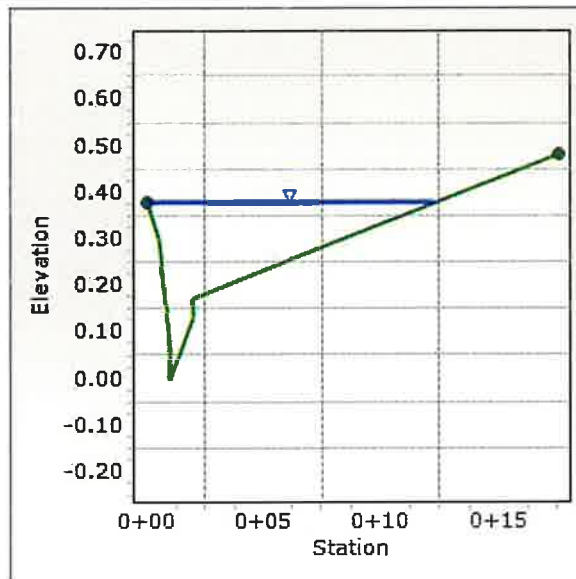
Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data

Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.38 ft
Critical Depth	0.46 ft
Channel Slope	3.20 %
Critical Slope	0.70 %

Cross Section for Section D1 - 100-yr (HALF Street,Rcurb) (Em. Overflow)

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Channel Slope	3.20 %
Normal Depth	0.38 ft
Discharge	6.0 cfs



Worksheet for Section D2 - 100-yr (HALF Street,Rcurb) (Em. Overflow)

Project Description

Friction Method	Manning
	Formula
Solve For	Normal Depth

Input Data

Channel Slope	3.20 %
Discharge	5.5 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.38
0+00.49	0.30
0+00.98	0.08
0+01.00	0.00
0+02.00	0.13
0+02.00	0.17
0+17.50	0.48

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.38)	(0+17.50, 0.48)	0.016

Options

Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Normal Depth	0.37 ft
Roughness Coefficient	0.016
Elevation	0.37 ft
Elevation Range	0.00 to 0.48 ft
Flow Area	1.39 ft ²
Wetted Perimeter	12.01 ft
Hydraulic Radius	0.12 ft
Top Width	11.84 ft
Normal Depth	0.37 ft
Critical Depth	0.45 ft
Critical Slope	0.71 %
Velocity	3.95 ft/s
Velocity Head	0.24 ft
Specific Energy	0.61 ft

Worksheet for Section D2 - 100-yr (HALF Street,Rcurb) (Em. Overflow)

Results

Froude Number	2.027
Flow Type	Supercritical

GVF Input Data

Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data

Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.37 ft
Critical Depth	0.45 ft
Channel Slope	3.20 %
Critical Slope	0.71 %

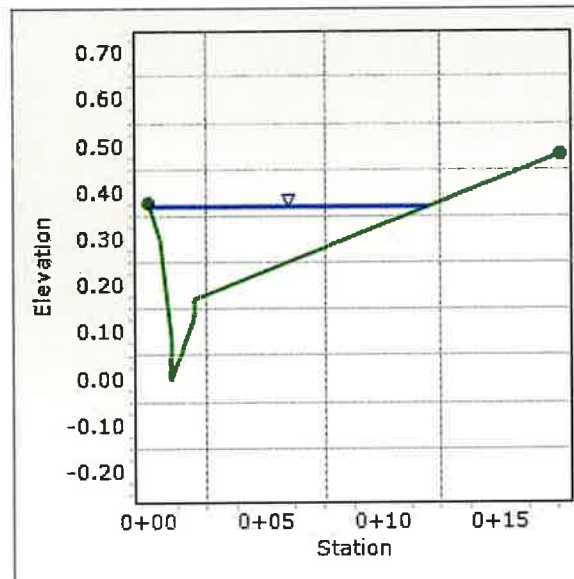
Cross Section for Section D2 - 100-yr (HALF Street,Rcurb) (Em. Overflow)

Project Description

Friction Method	Manning
	Formula
Solve For	Normal Depth

Input Data

Channel Slope	3.20 %
Normal Depth	0.37 ft
Discharge	5.5 cfs



Worksheet for Section E1 - 100-yr (Em. Overflow)

Project Description

Friction Method	Manning
	Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.88 %
Discharge	47.0 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.38
0+00.49	0.30
0+00.98	0.08
0+01.00	0.00
0+02.00	0.13
0+02.00	0.17
0+17.50	0.48
0+33.00	0.17
0+33.00	0.13
0+34.50	0.00
0+34.50	0.48
0+35.00	0.50
0+40.00	0.60

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.38)	(0+40.00, 0.60)	0.016

Options

Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Normal Depth	0.64 ft
Roughness Coefficient	0.016
Elevation	0.64 ft
Elevation Range	0.00 to 0.60 ft
Flow Area	12.14 ft ²
Wetted Perimeter	41.00 ft
Hydraulic Radius	0.30 ft
Top Width	40.00 ft

Worksheet for Section E1 - 100-yr (Em. Overflow)

Results

Normal Depth	0.64 ft
Critical Depth	0.69 ft
Critical Slope	0.55 %
Velocity	3.87 ft/s
Velocity Head	0.23 ft
Specific Energy	0.87 ft
Froude Number	1.239
Flow Type	Supercritical

GVF Input Data

Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data

Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.64 ft
Critical Depth	0.69 ft
Channel Slope	0.88 %
Critical Slope	0.55 %

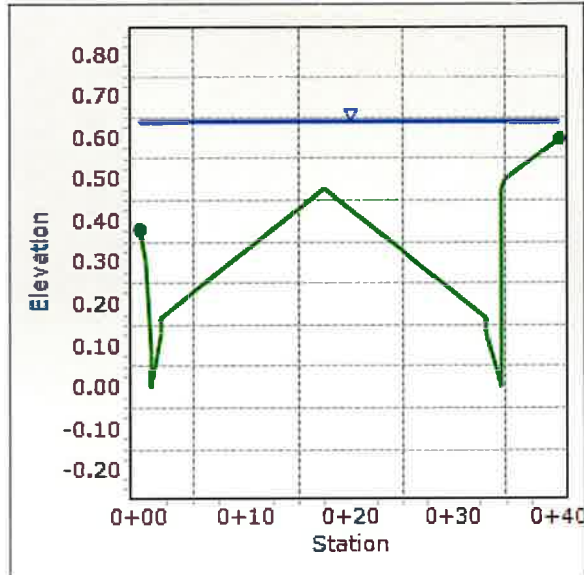
Cross Section for Section E1 - 100-yr (Em. Overflow)

Project Description

Friction Method	Manning
	Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.88 %
Normal Depth	0.64 ft
Discharge	47.0 cfs



Worksheet for Section E2 - 100-yr (Em. Overflow)

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Channel Slope	4.11 %
Discharge	44.5 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.38
0+00.49	0.30
0+00.98	0.08
0+01.00	0.00
0+02.00	0.13
0+02.00	0.17
0+17.50	0.48
0+33.00	0.17
0+33.00	0.13
0+34.50	0.00
0+34.50	0.48
0+35.00	0.50
0+40.00	0.60

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.38)	(0+40.00, 0.60)	0.016

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results	
Normal Depth	0.51 ft
Roughness Coefficient	0.016
Elevation	0.51 ft
Elevation Range	0.00 to 0.60 ft
Flow Area	7.04 ft ²
Wetted Perimeter	36.23 ft
Hydraulic Radius	0.19 ft
Top Width	35.40 ft

Worksheet for Section E2 - 100-yr (Em. Overflow)

Results

Normal Depth	0.51 ft
Critical Depth	0.68 ft
Critical Slope	0.55 %
Velocity	6.32 ft/s
Velocity Head	0.62 ft
Specific Energy	1.13 ft
Froude Number	2.499
Flow Type	Supercritical

GVF Input Data

Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data

Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.51 ft
Critical Depth	0.68 ft
Channel Slope	4.11 %
Critical Slope	0.55 %

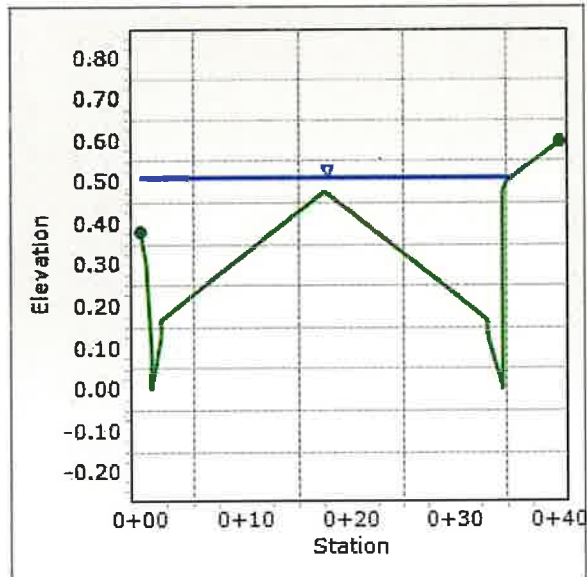
Cross Section for Section E2 - 100-yr (Em. Overflow)

Project Description

Friction Method	Manning
	Formula
Solve For	Normal Depth

Input Data

Channel Slope	4.11 %
Normal Depth	0.51 ft
Discharge	44.5 cfs



Worksheet for Section E3 - 100-yr (Em. Overflow)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth
Input Data	
Channel Slope	4.11 %
Discharge	28.0 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.38
0+00.49	0.30
0+00.98	0.08
0+01.00	0.00
0+02.00	0.13
0+02.00	0.17
0+17.50	0.48
0+33.00	0.17
0+33.00	0.13
0+34.50	0.00
0+34.50	0.48
0+35.00	0.50
0+40.00	0.60

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.38)	(0+40.00, 0.60)	0.016

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results	
Normal Depth	0.45 ft
Roughness Coefficient	0.016
Elevation	0.45 ft
Elevation Range	0.00 to 0.60 ft
Flow Area	5.10 ft ²
Wetted Perimeter	32.33 ft
Hydraulic Radius	0.16 ft
Top Width	31.59 ft

Worksheet for Section E3 - 100-yr (Em. Overflow)

Results

Normal Depth	0.45 ft
Critical Depth	0.58 ft
Critical Slope	0.61 %
Velocity	5.49 ft/s
Velocity Head	0.47 ft
Specific Energy	0.92 ft
Froude Number	2.408
Flow Type	Supercritical

GVF Input Data

Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data

Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.45 ft
Critical Depth	0.58 ft
Channel Slope	4.11 %
Critical Slope	0.61 %

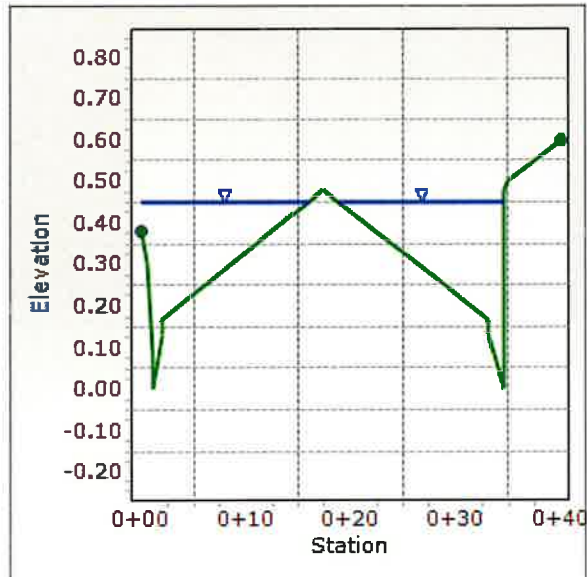
Cross Section for Section E3 - 100-yr (Em. Overflow)

Project Description

Friction Method	Manning
	Formula
Solve For	Normal Depth

Input Data

Channel Slope	4.11 %
Normal Depth	0.45 ft
Discharge	28.0 cfs



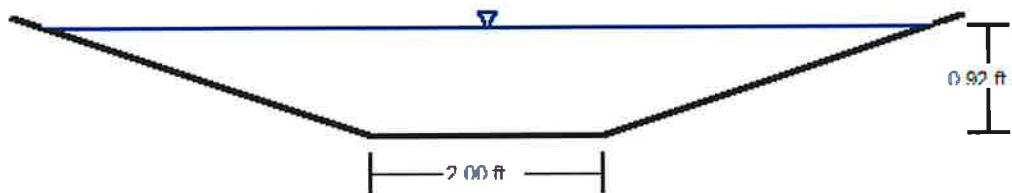
Ditch Sizing Computations

Worksheet for T1 Trap Riprap

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth
Input Data	
Roughness Coefficient	0.025
Channel Slope	4.29 %
Left Side Slope	3.000 H:V
Right Side Slope	3.000 H:V
Bottom Width	2.00 ft
Discharge	37.0 cfs
Results	
Normal Depth	0.92 ft
Flow Area	4.41 ft ²
Wetted Perimeter	7.85 ft
Hydraulic Radius	0.56 ft
Top Width	7.55 ft
Critical Depth	1.28 ft
Critical Slope	1.05 %
Velocity	8.39 ft/s
Velocity Head	1.09 ft
Specific Energy	2.02 ft
Froude Number	1.933
Flow Type	Supercritical
GVF Input Data	
Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.92 ft
Critical Depth	1.28 ft
Channel Slope	4.29 %
Critical Slope	1.05 %

Cross Section for T1 Trap Riprap

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Roughness Coefficient	0.025
Channel Slope	4.29 %
Normal Depth	0.92 ft
Left Side Slope	3.000 H:V
Right Side Slope	3.000 H:V
Bottom Width	2.00 ft
Discharge	37.0 cfs



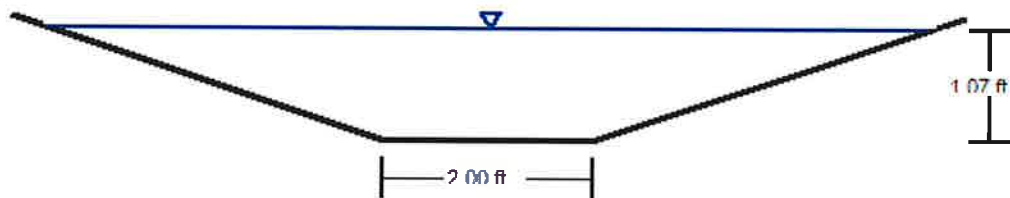
V: 1
H: 1

Worksheet for T2 Trap Riprap

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Roughness Coefficient	0.025
Channel Slope	2.68 %
Left Side Slope	3.000 H:V
Right Side Slope	3.000 H:V
Bottom Width	2.00 ft
Discharge	40.0 cfs
Results	
Normal Depth	1.07 ft
Flow Area	5.56 ft ²
Wetted Perimeter	8.76 ft
Hydraulic Radius	0.64 ft
Top Width	8.41 ft
Critical Depth	1.32 ft
Critical Slope	1.04 %
Velocity	7.19 ft/s
Velocity Head	0.80 ft
Specific Energy	1.87 ft
Froude Number	1.559
Flow Type	Supercritical
GVF Input Data	
Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	1.07 ft
Critical Depth	1.32 ft
Channel Slope	2.68 %
Critical Slope	1.04 %

Cross Section for T2 Trap Riprap

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Roughness Coefficient	0.025
Channel Slope	2.68 %
Normal Depth	1.07 ft
Left Side Slope	3.000 H:V
Right Side Slope	3.000 H:V
Bottom Width	2.00 ft
Discharge	40.0 cfs



V: 1
H: 1

Rating Table for T2 Trap Riprap

Project Description						
Friction Method		Manning Formula				
Solve For		Normal Depth				
Input Data						
Roughness Coefficient		0.025				
Channel Slope		2.68 %				
Left Side Slope		3.000 H:V				
Right Side Slope		3.000 H:V				
Bottom Width		2.00 ft				
Discharge		40.0 cfs				
Channel Slope (%)	Normal Depth (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)	
1.83	1.17	6.24	6.41	9.37	8.99	
1.93	1.15	6.36	6.29	9.29	8.91	
2.03	1.14	6.49	6.17	9.20	8.83	
2.13	1.13	6.60	6.06	9.12	8.76	
2.23	1.11	6.72	5.96	9.05	8.69	
2.33	1.10	6.83	5.86	8.98	8.62	
2.43	1.09	6.93	5.77	8.91	8.56	
2.53	1.08	7.04	5.68	8.85	8.50	
2.63	1.07	7.14	5.60	8.79	8.44	
2.73	1.06	7.24	5.53	8.73	8.38	
2.83	1.06	7.34	5.45	8.67	8.33	
2.93	1.05	7.43	5.38	8.62	8.28	
3.03	1.04	7.52	5.32	8.57	8.23	
3.13	1.03	7.62	5.25	8.52	8.19	
3.23	1.02	7.70	5.19	8.47	8.14	
3.33	1.02	7.79	5.13	8.43	8.10	
3.43	1.01	7.88	5.08	8.39	8.06	
3.53	1.00	7.96	5.02	8.34	8.02	
3.63	1.00	8.05	4.97	8.30	7.98	
3.73	0.99	8.12	4.92	8.26	7.94	

APPENDIX E

Storm Drain Analyses

**Drop Inlet Sizing Computations –
100-Yr Unit 1 Interim Condition**

Curb Inlet Sizing Computation		
Project Name & Number:	TRI2101 Iron Mountain - TDS	Westwood
Date:	4/5/2022	
By:	JSR	
Notes:		
Facility ID:	SDDI#1	
Drainage Condition	Unit 1 Interim	
Source of Flow	Q100 = DI#2 Bypass + IRON1(A2+A3) + IRON2-I(B+C) + IRON3-I(A1)	
Design Flow (cfs)	Q100 = 28.5 + (2.5 + 3) + (3 + 3) + 6	
Inlet Type:	Type CM2 (Sump)	
Inlet Length:	20.-ft	
Number of Grates:	7	
Input:	Variable:	Input:
Depth at Inlet (ft)	D	0.72
Grate Width (ft)	W	1.50
Length of Grate (ft)	L _g	17.25
Length of Curb Opening (ft)	L _c	19.50
Height of Curb Opening (ft)	H	0.50
Weir Coef. - Curb Opening	W _c	2.3
Weir Coef. - Grate	W _g	3.0
Orifice Coef.	O _c	0.67
Grate Coef.	G _c	0.60
Clogging Factor - Grate (%)	CF _g	50
Clogging Factor - Curb (%)	CF _c	50
Output (Grate):	Equation:	Output (Grate):
Effective Weir Length (ft)	2*W+L _g	22.50
Adjusted Effective Weir Length (ft)	2*(1-CF _g /100)*W+(1-CF _g /100)*L _g	10.13
Grate Open Area (sf)	W*L _g	25.88
Adjusted Grate Open Area (sf)	Grate Open Area * G _c *(1-CF _g /100)	7.76
Controlling Flow Type (weir/orifice)	If D<1.792*(Adj. Grate Open Area/Adj. Eff. Length) use weir, else orifice	weir
Intercepted Flow (cfs)	weir: W _g *(Adj. Eff. Weir Length)*D ^{1.5} orifice: O _c *(Adj. Grate Open Area)*(64.4*D) ^{0.5}	21.6
Output (Curb):	Equation:	Output (Curb):
Effective Weir Length (ft)	L+1.8*W	22.20
Adjusted Effective Weir Length (ft)	L+1.8*(1-CF _c /100)*W	20.91
Curb Open Area (sf)	L*H	9.75
Adjusted Curb Open Area (sf)	Curb Open Area * (1-CF _c /100)	4.88
Controlling Flow Type (weir/orifice)	If D<H, weir, else orifice	orifice
Intercepted Flow (cfs)	weir: W _c *(Adj. Eff. Weir Length)*D ^{1.5} orifice: O _c *(Adj. Curb Open Area)*(64.4*(D-H/2)) ^{0.5}	24.47
Output (Total):	Equation:	Output (Total):
Capacity Intercepted Flow (cfs)	Intercepted (Grate) + Intercepted (Curb)	46.03

Curb Inlet Sizing Computation		
Project Name & Number:	TRI2101 Iron Mountain - TDS	
Date:	4/7/2022	Westwood
By:	JSR	
Notes:		
Facility ID:	SDDI#2	
Drainage Condition:	Unit 1 Interim	
Source of Flow:	$Q_{100} = 1/2 * [\text{IRON1}(D2+F2+F3+F4) + \text{IRON2-I}(E+D3+G1) + \text{IRON3-I}(G2+G3+G4)]$ $Q_{100} = 1/2 * [(1.5+9.5+6+1.5)+(1+3.5+5)+(6.5+5+5)]$	
Inlet Type:	Type CM2 (Continuous Grade)	
Inlet Length:	20.-ft	
Number of Grates	7	
Input:	Variable:	Input:
Street Flow (cfs)	Q	22.25
Longitudinal Slope (ft/ft)	S _o	0.0324
Manning's Coefficient	n	0.016
Street Flow Velocity (fps)	V	5.84
Street Flow Depth (ft)	D	0.52
Street Cross Slope (ft/ft)	S _x	0.02
Grate Width (ft)	W	1.5
Grate Depression (in)	D _g	2.0
Length of Grate (ft)	L _g	17.25
Length of Curb Opening (ft)	L _c	19.50
Clogging Factor - Grate (%)	CF _g	50%
Clogging Factor - Curb (%)	CF _c	50%
Effective Grate Length (ft)	L _{ge}	8.6
Effective Curb Opening Length (ft)	L _{ce}	9.75
Output (Grate):	Equation:	Output (Grate):
¹ R _f - Frontal Flow Factor	1-0.09*(V-V _x) if V>V _x ; else Frontal Flow Factor=1	1.00
² V _o - Splash Over Velocity (fps)	V _x =p+q*L _g -r*L _{ge} ² +sy*L _{ge} ³ ; where p=0.30,q=4.85,r=1.31,sy=0.15 (for Vane Grate)	40.92
¹ E - Grate Flow Ratio	Frontal Flow/Side Flow	0.21
² Q _w - Frontal Flow (cfs)	Q _w = Q[1-(1-(W/T)) ^{2.67}]	4.69
¹ Q _s - Side Flow (cfs)	Q _s = Q-Q _w	17.6
T - Side Flow Spread (ft)	(D-D _g)/S _x	17.67
¹ R _s - Side Flow Factor	1/(1+(0.15*V ^{1.8})/(S _x *L _{ge} ^{2.3}))	0.44
¹ Q _{gi} - Intercepted Flow (cfs)	(R _f *E+R _s *(1-E))*Q	12.4
Output (Curb):	Equation:	Output (Curb):
¹ S _e - Equivalent Cross Slope (ft/ft)	S _x +S _a *E	0.043
Q _{sx} - Remaining Flow After Grate Interception (cfs)	Q-Q _{gi}	9.808
S _a - Gutter Cross Slope (ft/ft)	D _g /W	0.111
¹ L _t - Effective Interception Length (ft)	0.60*Q _{sx} ^{0.42} *S _o ^{0.30} *(1/n*S _e) ^{0.6}	43.91
¹ Q _{ci} - Intercepted Flow (cfs)	(1-(1-L _{ce} /L _t) ^{1.6})*Q _{sx} or Q _{sx} if L _t is less than L _{ce}	3.6
Output (Combination):	Equation:	Output (Combination):
Total Intercepted Flow (cfs)	Intercepted (Grate) + Intercepted (Curb)	16
Bypass Flow (cfs)	Street Flow - Total Intercepted Flow	6.25

¹ Formula referenced from the CCRFCD Manual
² Formula referenced from FHWA Urban Drainage Design Manual (HEC-22)

Worksheet for SDDI#2 - 100-yr (normal crown) INT

Project Description	
Friction Method	Manning
Solve For	Formula
	Normal Depth
Input Data	
Channel Slope	3.24 %
Discharge	44.5 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.38
0+00.49	0.30
0+00.98	0.08
0+01.00	0.00
0+02.00	0.13
0+02.00	0.17
0+17.50	0.48
0+33.00	0.17
0+33.00	0.13
0+34.50	0.00
0+34.50	0.48
0+35.00	0.50
0+40.00	0.60

Roughness Segment Definitions

Start Station (0+00.00, 0.38)	Ending Station (0+40.00, 0.60)	Roughness Coefficient 0.016
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Options

Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Normal Depth	0.52 ft
Roughness Coefficient	0.016
Elevation	0.52 ft
Elevation Range	0.00 to 0.60 ft
Flow Area	7.63 ft ²
Wetted Perimeter	37.06 ft
Hydraulic Radius	0.21 ft
Top Width	36.22 ft

Worksheet for SDDI#2 - 100-yr (normal crown) INT

Results

Normal Depth	0.52 ft
Critical Depth	0.68 ft
Critical Slope	0.55 %
Velocity	5.84 ft/s
Velocity Head	0.53 ft
Specific Energy	1.05 ft
Froude Number	2.242
Flow Type	Supercritical

GVF Input Data

Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data

Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.52 ft
Critical Depth	0.68 ft
Channel Slope	3.24 %
Critical Slope	0.55 %

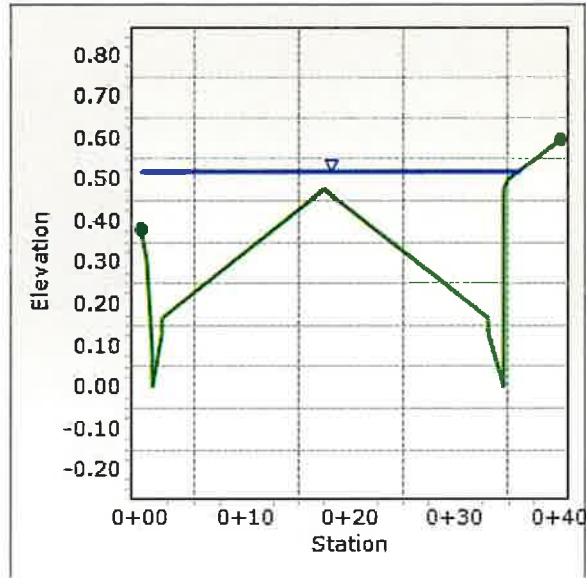
Cross Section for SDDI#2 - 100-yr (normal crown) INT

Project Description

Friction Method	Manning
Solve For	Normal Depth

Input Data

Channel Slope	3.24 %
Normal Depth	0.52 ft
Discharge	44.5 cfs



**Drop Inlet Sizing Computations –
100-Yr Unit 2 Proposed Condition**

Curb Inlet Sizing Computation		
Project Name & Number:	TRI2101 Iron Mountain - TDS	Westwood
Date:	4/5/2022	
By:	JSR	
Notes:		
Facility ID:	SDDI#1	
Drainage Condition	Unit 2 Proposed	
Source of Flow	Q100 = (IRON1 + IRON2) - Drop Inlet Collection (#2 + #3 + #4 + #5)	
Design Flow (cfs)	Q100 = (33 + 37) - (15 - 3 - 2 - 6.5)	
Inlet Type:	Type CM2 (Sump)	
Inlet Length:	20.-ft	
Number of Grates:	7	
Input:	Variable:	Input:
Depth at Inlet (ft)	D	0.72
Grate Width (ft)	W	1.50
Length of Grate (ft)	L _g	17.25
Length of Curb Opening (ft)	L _c	19.50
Height of Curb Opening (ft)	H	0.50
Weir Coef. - Curb Opening	W _c	2.3
Weir Coef. - Grate	W _g	3.0
Orifice Coef.	O _c	0.67
Grate Coef.	G _c	0.60
Clogging Factor - Grate (%)	CF _g	50
Clogging Factor - Curb (%)	CF _c	50
Output (Grate):	Equation:	Output (Grate):
Effective Weir Length (ft)	2*W+L _g	22.50
Adjusted Effective Weir Length (ft)	2*(1-CF _g /100)*W+(1-CF _g /100)*L _g	10.13
Grate Open Area (sf)	W*L _g	25.88
Adjusted Grate Open Area (sf)	Grate Open Area * G _c *(1-CF _g /100)	7.76
Controlling Flow Type (weir/orifice)	If D<1.792*(Adj. Grate Open Area/Adj. Eff. Length) use weir, else orifice	weir
Intercepted Flow (cfs)	weir: W _g *(Adj. Eff. Weir Length)*D ^{1.5} orifice: O _c *(Adj. Grate Open Area)*(64.4*D) ^{0.5}	21.6
Output (Curb):	Equation:	Output (Curb):
Effective Weir Length (ft)	L+1.8*W	22.20
Adjusted Effective Weir Length (ft)	L+1.8*(1-CF _c /100)*W	20.91
Curb Open Area (sf)	L*H	9.75
Adjusted Curb Open Area (sf)	Curb Open Area * (1-CF _c /100)	4.88
Controlling Flow Type (weir/orifice)	If D<H, weir, else orifice	orifice
Intercepted Flow (cfs)	weir: W _c *(Adj. Eff. Weir Length)*D ^{1.5} orifice: O _c *(Adj. Curb Open Area)*(64.4*(D-H/2)) ^{0.5}	24.47
Output (Total):	Equation:	Output (Total):
Capacity Intercepted Flow (cfs)	Intercepted (Grate) + Intercepted (Curb)	46.03

Curb Inlet Sizing Computation		
Project Name & Number:	TRI2101 Iron Mountain - TDS	
Date:	4/5/2022	Westwood
By:	JSR	
Notes:		
Facility ID:	SDDI#2	
Drainage Condition:	Unit 2 Proposed	
Source of Flow:	$Q_{100} = (1/2) * [\text{Bypass} (D1\#4 + \#5) + \text{IRON1}(D2 + F5) + \text{IRON2}(D3 + G1 + G2 + G3 + G4 + E)]$ $Q_{100} =$	
Inlet Type:	Type CM2 (Continuous Grade)	
Inlet Length:	20.-ft	
Number of Grates	7	
Input:	Variable:	Input:
Street Flow (cfs)	Q	20.75
Longitudinal Slope (ft/ft)	S_o	0.0324
Manning's Coefficient	n	0.016
Street Flow Velocity (fps)	V	5.70
Street Flow Depth (ft)	D	0.51
Street Cross Slope (ft/ft)	S_x	0.02
Grate Width (ft)	W	1.5
Grate Depression (in)	D_g	2.0
Length of Grate (ft)	L_g	17.25
Length of Curb Opening (ft)	L_c	19.50
Clogging Factor - Grate (%)	CF_g	50%
Clogging Factor - Curb (%)	CF_c	50%
Effective Grate Length (ft)	L_{ge}	8.6
Effective Curb Opening Length (ft)	L_{ce}	9.75
Output (Grate):	Equation:	Output (Grate):
¹ R_f - Frontal Flow Factor	$1 - 0.09 * (V - V_x)$ if $V > V_x$; else Frontal Flow Factor=1	1.00
² V_o - Splash Over Velocity (fps)	$V_x = p + q * L_g - r * L_{ge}^2 + s * L_{ge}^3$; where $p = 0.30, q = 4.85, r = 1.31, s = 0.15$ (for Vane Grate)	40.92
¹ E - Grate Flow Ratio	Frontal Flow/Side Flow	0.22
² Q_w - Frontal Flow (cfs)	$Q_w = Q [1 - (1 - (W/T))^{2.67}]$	4.49
¹ Q_s - Side Flow (cfs)	$Q_s = Q - Q_w$	16.3
T - Side Flow Spread (ft)	$(D - D_g) / S_x$	17.17
¹ R_s - Side Flow Factor	$1 / (1 + (0.15 * V^{1.8}) / (S_x * L_{ge}^{2.3}))$	0.45
¹ Q_{gi} - Intercepted Flow (cfs)	$(R_f * E + R_s * (1 - E)) * Q$	11.8
Output (Curb):	Equation:	Output (Curb):
¹ S_e - Equivalent Cross Slope (ft/ft)	$S_x + S_g * E$	0.044
Q_{sx} - Remaining Flow After Grate Interception (cfs)	$Q - Q_{gi}$	8.906
S_g - Gutter Cross Slope (ft/ft)	D_g / W	0.111
¹ L_t - Effective Interception Length (ft)	$0.60 * Q_{sx}^{0.42} * S_o^{0.30} * (1/n * S_e)^{0.6}$	41.80
¹ Q_{ci} - Intercepted Flow (cfs)	$(1 - (1 - L_{ce}/L_t)^{1.35}) * Q_{sx}$ or Q_{sx} if L_t is less than L_{ce}	3.4
Output (Combination):	Equation:	Output (Combination):
Total Intercepted Flow (cfs)	Intercepted (Grate) + Intercepted (Curb)	15
Bypass Flow (cfs)	Street Flow - Total Intercepted Flow	5.75

¹ Formula referenced from the CCRFCD Manual
² Formula referenced from FHWA Urban Drainage Design Manual (HEC-22)

Worksheet for SDDI#2 - 100-yr (normal crown) PRO

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Channel Slope	3.24 %
Discharge	41.5 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.38
0+00.49	0.30
0+00.98	0.08
0+01.00	0.00
0+02.00	0.13
0+02.00	0.17
0+17.50	0.48
0+33.00	0.17
0+33.00	0.13
0+34.50	0.00
0+34.50	0.48
0+35.00	0.50
0+40.00	0.60

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.38)	(0+40.00, 0.60)	0.016

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results	
Normal Depth	0.51 ft
Roughness Coefficient	0.016
Elevation	0.51 ft
Elevation Range	0.00 to 0.60 ft
Flow Area	7.28 ft ²
Wetted Perimeter	36.57 ft
Hydraulic Radius	0.20 ft
Top Width	35.74 ft

Worksheet for SDDI#2 - 100-yr (normal crown) PRO

Results

Normal Depth	0.51 ft
Critical Depth	0.66 ft
Critical Slope	0.56 %
Velocity	5.70 ft/s
Velocity Head	0.50 ft
Specific Energy	1.02 ft
Froude Number	2.227
Flow Type	Supercritical

GVF Input Data

Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data

Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.51 ft
Critical Depth	0.66 ft
Channel Slope	3.24 %
Critical Slope	0.56 %

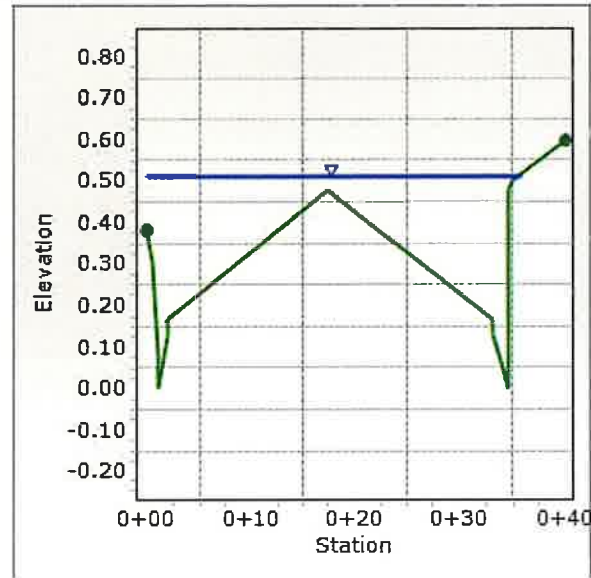
Cross Section for SDDI#2 - 100-yr (normal crown) PRO

Project Description

Friction Method	Manning
Solve For	Formula
	Normal Depth

Input Data

Channel Slope	3.24 %
Normal Depth	0.51 ft
Discharge	41.5 cfs



Curb Inlet Sizing Computation		
Project Name & Number:	TRI2101 Iron Mountain - TDS	Westwood
Date:	4/5/2022	
By:	JSR	
Notes:		
Facility ID:	SDDI#3	
Drainage Condition	Unit 2 Proposed	
Source of Flow	Q100 = IRON1(F1)	
Design Flow (cfs)	3.0	
Inlet Type:	Type CM2 (Sump)	
Inlet Length:	5.-ft	
Number of Grates:	1	
Input:	Variable:	Input:
Depth at Inlet (ft)	D	0.32
Grate Width (ft)	W	1.50
Length of Grate (ft)	L_g	2.25
Length of Curb Opening (ft)	L_c	4.50
Height of Curb Opening (ft)	H	0.50
Weir Coef. - Curb Opening	W_c	2.3
Weir Coef. - Grate	W_g	3.0
Orifice Coef.	O_c	0.67
Grate Coef.	G_c	0.60
Clogging Factor - Grate (%)	CF_g	50
Clogging Factor - Curb (%)	CF_c	50
Output (Grate):	Equation:	Output (Grate):
Effective Weir Length (ft)	$2*W+L_g$	5.25
Adjusted Effective Weir Length (ft)	$2*(1-CF_g/100)*W+(1-CF_g/100)*L_g$	2.63
Grate Open Area (sf)	$W*L_g$	3.38
Adjusted Grate Open Area (sf)	Grate Open Area * $G_c*(1-CF_g/100)$	1.01
Controlling Flow Type (weir/orifice)	If $D < 1.792*(\text{Adj. Grate Open Area}/\text{Adj. Eff. Length})$ use weir, else orifice	weir
Intercepted Flow (cfs)	weir: $W_g*(\text{Adj. Eff. Weir Length})*D^{1.5}$ orifice: $O_c*(\text{Adj. Grate Open Area})*(64.4*D)^{0.5}$	1.4
Output (Curb):	Equation:	Output (Curb):
Effective Weir Length (ft)	$L+1.8*W$	7.20
Adjusted Effective Weir Length (ft)	$L+1.8(1-CF_c/100)*W$	5.91
Curb Open Area (sf)	$L*H$	2.25
Adjusted Curb Open Area (sf)	Curb Open Area * $(1-CF_c/100)$	1.13
Controlling Flow Type (weir/orifice)	If $D < H$, weir, else orifice	weir
Intercepted Flow (cfs)	weir: $W_c*(\text{Adj. Eff. Weir Length})*D^{1.5}$ orifice: $O_c*(\text{Adj. Curb Open Area})*(64.4*(D-H/2))^{0.5}$	2.46
Output (Total):	Equation:	Output (Total):
Capacity Intercepted Flow (cfs)	Intercepted (Grate) + Intercepted (Curb)	3.9

Curb Inlet Sizing Computation		
Project Name & Number:	TRI2101 Iron Mountain - TDS	Westwood
Date:	4/5/2022	
By:	JSR	
Notes:		
Facility ID:	SDDI#4	
Drainage Condition:	Unit 2 Proposed	
Source of Flow:	Q100 = Basin IRON1(D1)	
Inlet Type:	Type CM2 (Continuous Grade)	
Inlet Length:	5.-ft	
Number of Grates	1	
Input:	Variable:	Input:
Street Flow (cfs)	Q	3.0
Longitudinal Slope (ft/ft)	S _o	0.0320
Manning's Coefficient	n	0.016
Street Flow Velocity (fps)	V	3.46
Street Flow Depth (ft)	D	0.32
Street Cross Slope (ft/ft)	S _x	0.02
Grate Width (ft)	W	1.5
Grate Depression (in)	D _g	2.0
Length of Grate (ft)	L _g	2.25
Length of Curb Opening (ft)	L _c	4.50
Clogging Factor - Grate (%)	CF _g	50%
Clogging Factor - Curb (%)	CF _c	50%
Effective Grate Length (ft)	L _{ge}	1.1
Effective Curb Opening Length (ft)	L _{ce}	2.25
Output (Grate):	Equation:	Output (Grate):
¹ R _f - Frontal Flow Factor	1-0.09*(V-V _x) if V>V _x ; else Frontal Flow Factor=1	1.00
² V _o - Splash Over Velocity (fps)	V _x =p+q*L _g -r*L _{ge} ² +sy*L _{ge} ³ ; where p=0.30,q=4.85,r=1.31,sy=0.15 (for Vane Grate)	4.31
¹ E - Grate Flow Ratio	Frontal Flow/Side Flow	0.44
² Q _w - Frontal Flow (cfs)	Q _w = Q[1-(1-(W/T)) ^{2.67}]	1.32
¹ Q _s - Side Flow (cfs)	Q _s = Q-Q _w	1.7
T - Side Flow Spread (ft)	(D-D _g)/S _x	7.67
¹ R _s - Side Flow Factor	1/(1+(0.15*V ^{1.8})/(S _x *L _{ge} ^{2.3}))	0.02
¹ Q _{gi} - Intercepted Flow (cfs)	(R _f *E+R _s *(1-E))*Q	1.4
Output (Curb):	Equation:	Output (Curb):
¹ S _e - Equivalent Cross Slope (ft/ft)	S _x +S _g *E	0.069
Q _{sx} - Remaining Flow After Grate Interception (cfs)	Q-Q _{gi}	1.647
S _g - Gutter Cross Slope (ft/ft)	D _g /W	0.111
¹ L _i - Effective Interception Length (ft)	0.60*Q _{sx} ^{0.42} *S _o ^{0.30} *(1/n*S _e) ^{0.5}	15.67
¹ Q _{ci} - Intercepted Flow (cfs)	(1-(1-L _{ce} /L _i) ^{1.6})*Q _{sx} or Q _{sx} if L _i is less than L _{ce}	0.4
Output (Combination):	Equation:	Output (Combination):
Total Intercepted Flow (cfs)	Intercepted (Grate) + Intercepted (Curb)	2
Bypass Flow (cfs)	Street Flow - Total Intercepted Flow	1

¹ Formula referenced from the CCRFCD Manual
² Formula referenced from FHWA Urban Drainage Design Manual (HEC-22)

Curb Inlet Sizing Computation		
Project Name & Number:	TRI2101 Iron Mountain - TDS	
Date:	4/5/2022	Westwood
By:	JSR	
Notes:		
Facility ID:	SDDI#5	
Drainage Condition:	Unit 2 Proposed	
Source of Flow:	Q100 = Basin IRON1(F2+F3+F4)	
Inlet Type:	Type CM2 (Continuous Grade)	
Inlet Length:	10.-ft	
Number of Grates	3	
Input:	Variable:	Input:
Street Flow (cfs)	Q	14.0
Longitudinal Slope (ft/ft)	S _o	0.0320
Manning's Coefficient	n	0.016
Street Flow Velocity (fps)	V	5.02
Street Flow Depth (ft)	D	0.47
Street Cross Slope (ft/ft)	S _x	0.02
Grate Width (ft)	W	1.5
Grate Depression (in)	D _g	2.0
Length of Grate (ft)	L _g	7.25
Length of Curb Opening (ft)	L _c	9.50
Clogging Factor - Grate (%)	CF _g	50%
Clogging Factor - Curb (%)	CF _c	50%
Effective Grate Length (ft)	L _{ge}	3.6
Effective Curb Opening Length (ft)	L _{ce}	4.75
Output (Grate):	Equation:	Output (Grate):
¹ R _f - Frontal Flow Factor	1-0.09*(V-V _x) if V>V _x ; else Frontal Flow Factor=1	1.00
² V _o - Splash Over Velocity (fps)	V _x =p+q*L _g -r*L _{ge} ² +sy*L _{ge} ³ ; where p=0.30,q=4.85,r=1.31,sy=0.15 (for Vane Grate)	7.81
¹ E - Grate Flow Ratio	Frontal Flow/Side Flow	0.24
² Q _w - Frontal Flow (cfs)	Q _w = Q[1-(1-(W/T)) ^{2.67}]	3.40
¹ Q _s - Side Flow (cfs)	Q _s = Q-Q _w	10.6
T - Side Flow Spread (ft)	(D-D _g)/S _x	15.17
¹ R _s - Side Flow Factor	1/(1+(0.15*V ^{1.8})/(S _x *L _{ge} ^{2.3}))	0.12
¹ Q _{gi} - Intercepted Flow (cfs)	(R _f *E+R _s *(1-E))*Q	4.7
Output (Curb):	Equation:	Output (Curb):
¹ S _e - Equivalent Cross Slope (ft/ft)	S _x +S _g *E	0.047
Q _{sx} - Remaining Flow After Grate Interception (cfs)	Q-Q _{gi}	9.289
S _g - Gutter Cross Slope (ft/ft)	D _g /W	0.111
¹ L _i - Effective Interception Length (ft)	0.60*Q _{sx} ^{0.42} *S _o ^{0.30} *(1/n*S _e) ^{0.5}	40.80
¹ Q _{ci} - Intercepted Flow (cfs)	(1-(1-L _{ce} /L _i) ^{1.5})*Q _{sx} or Q _{sx} if L _i is less than L _{ce}	1.9
Output (Combination):	Equation:	Output (Combination):
Total Intercepted Flow (cfs)	Intercepted (Grate) + Intercepted (Curb)	6.5
Bypass Flow (cfs)	Street Flow - Total Intercepted Flow	7.5

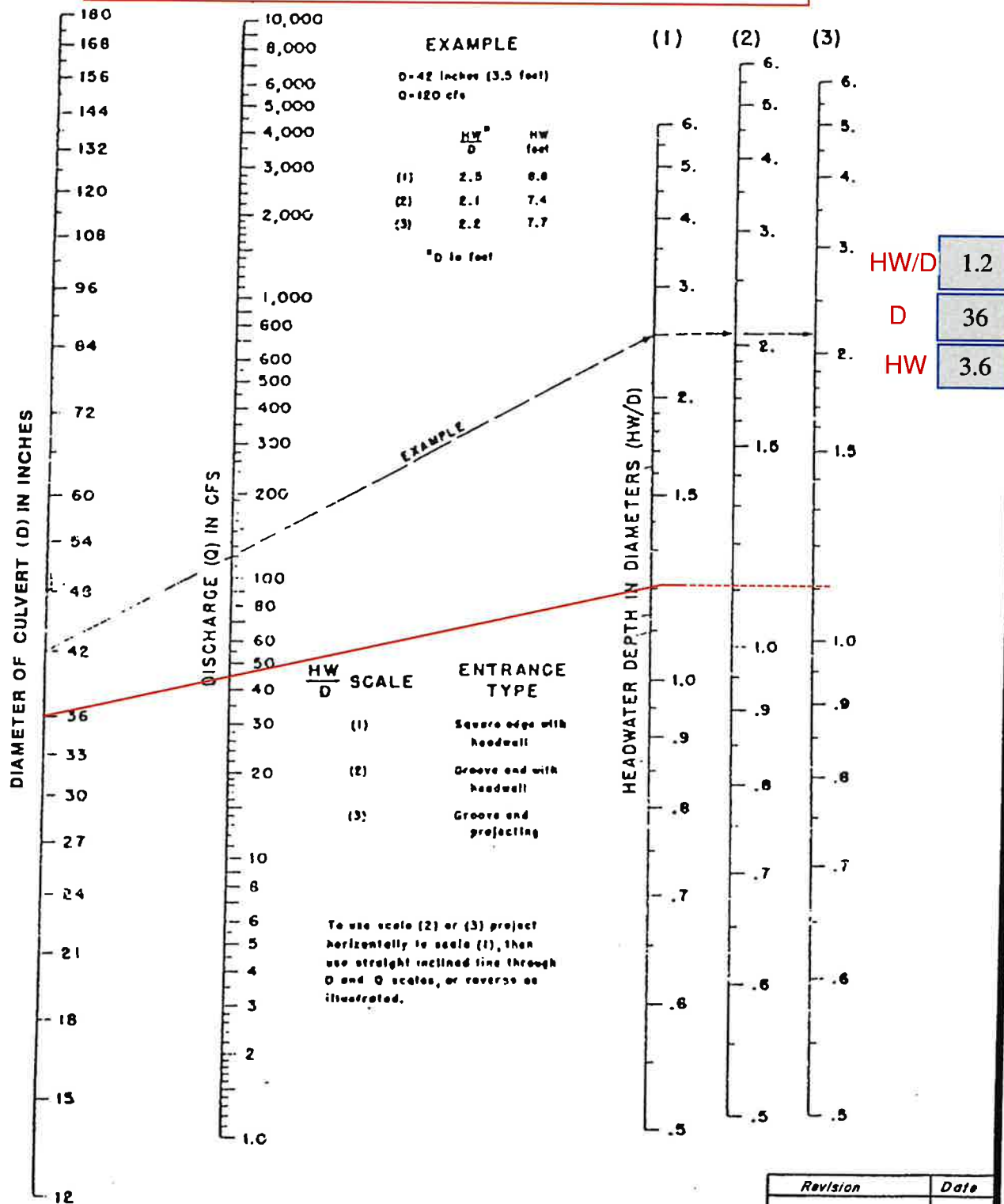
¹ Formula referenced from the CCRFCD Manual
² Formula referenced from FHWA Urban Drainage Design Manual (HEC-22)

Inlet Control Nomographs

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

NOMOGRAPH - INLET CONTROL RCP

SDDI 1: Q=46 CFS

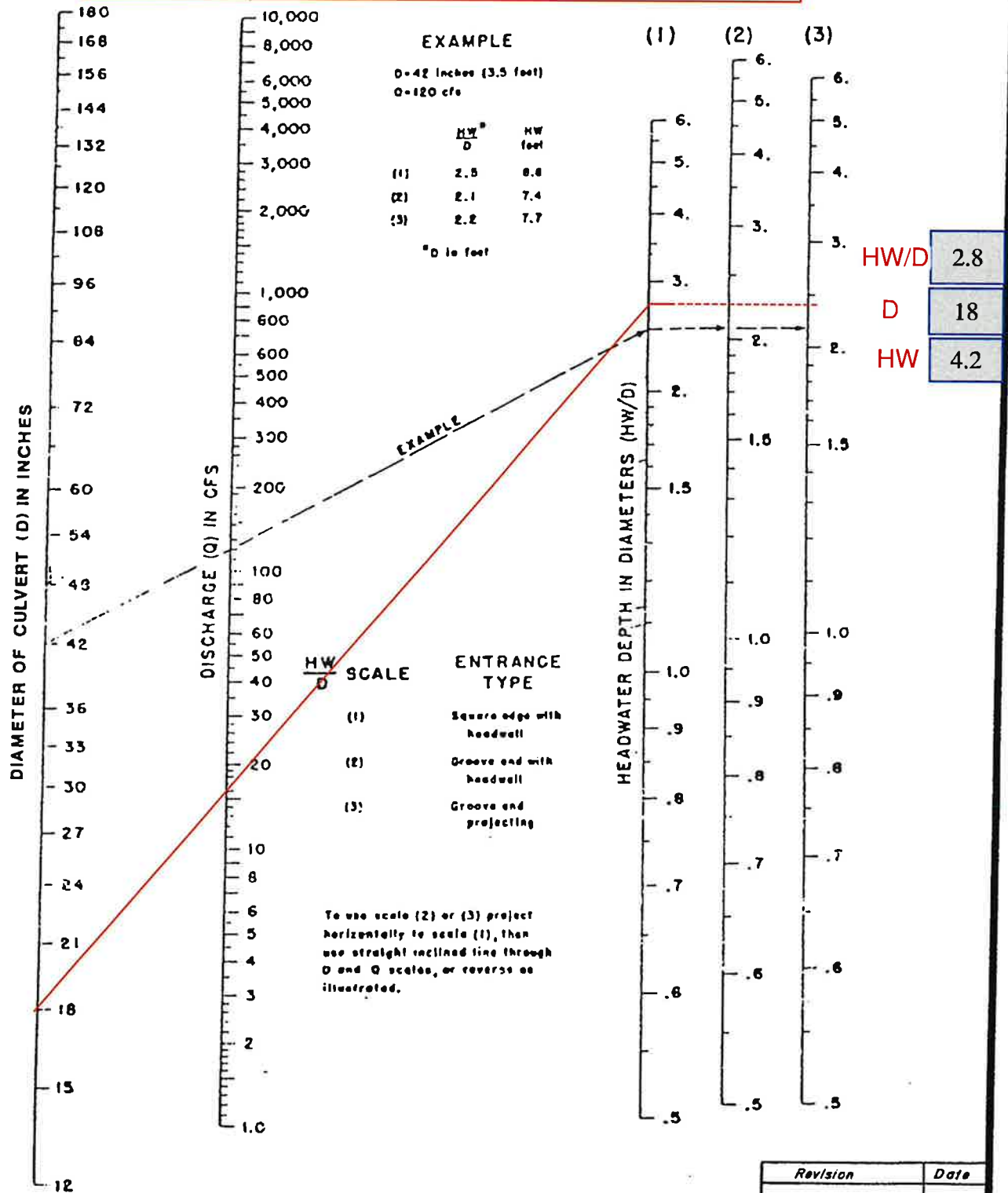


Revision	Date

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

NOMOGRAPH - INLET CONTROL RCP

SDDI 2: Q=16 CFS



Revision	Date

WRC
ENGINEERING

REFERENCE:

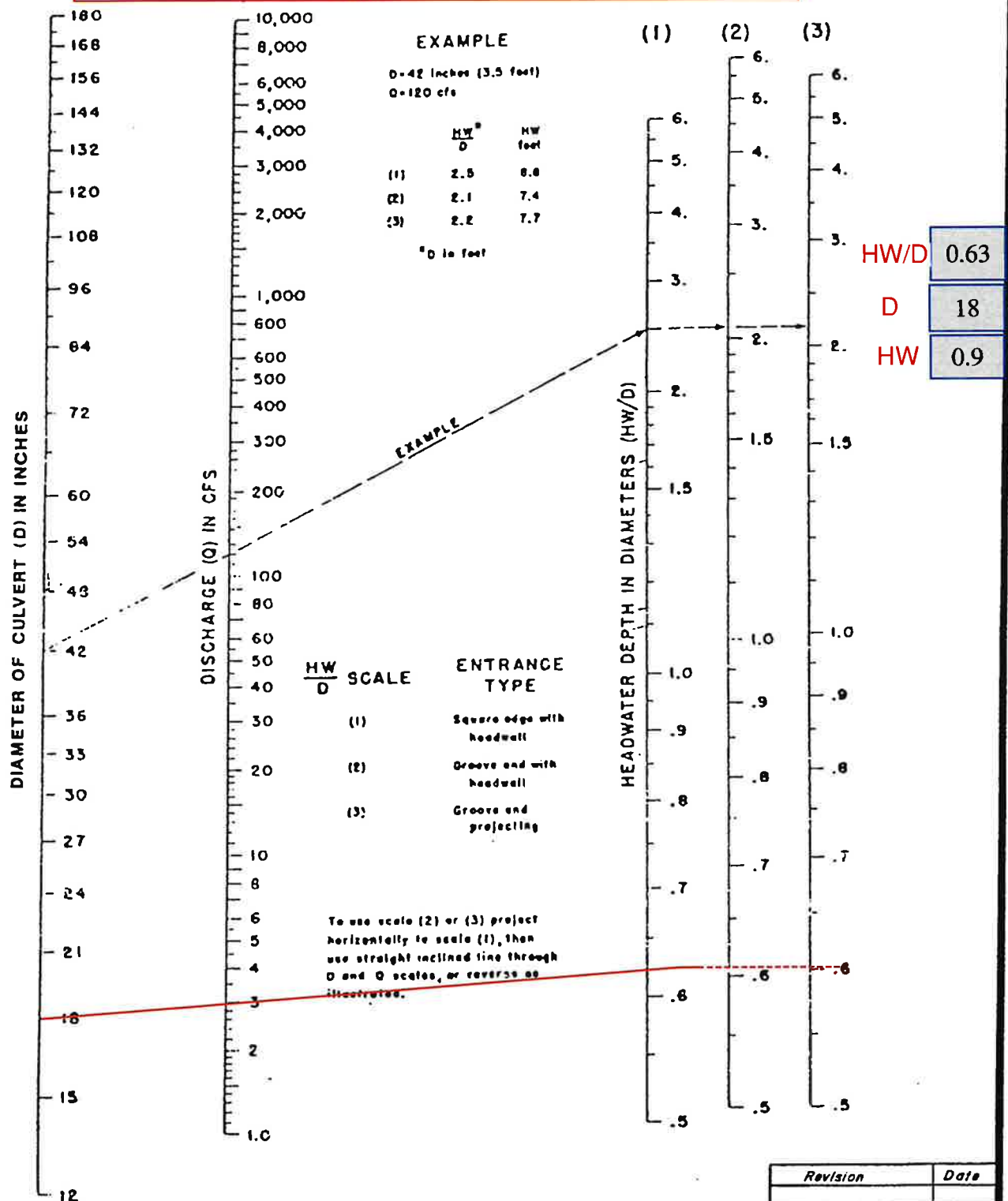
USDOT, FHWA, HDS, No. 5, 1985

FIGURE 1005

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

NOMOGRAPH - INLET CONTROL RCP

SDDI 3: Q=3 CFS

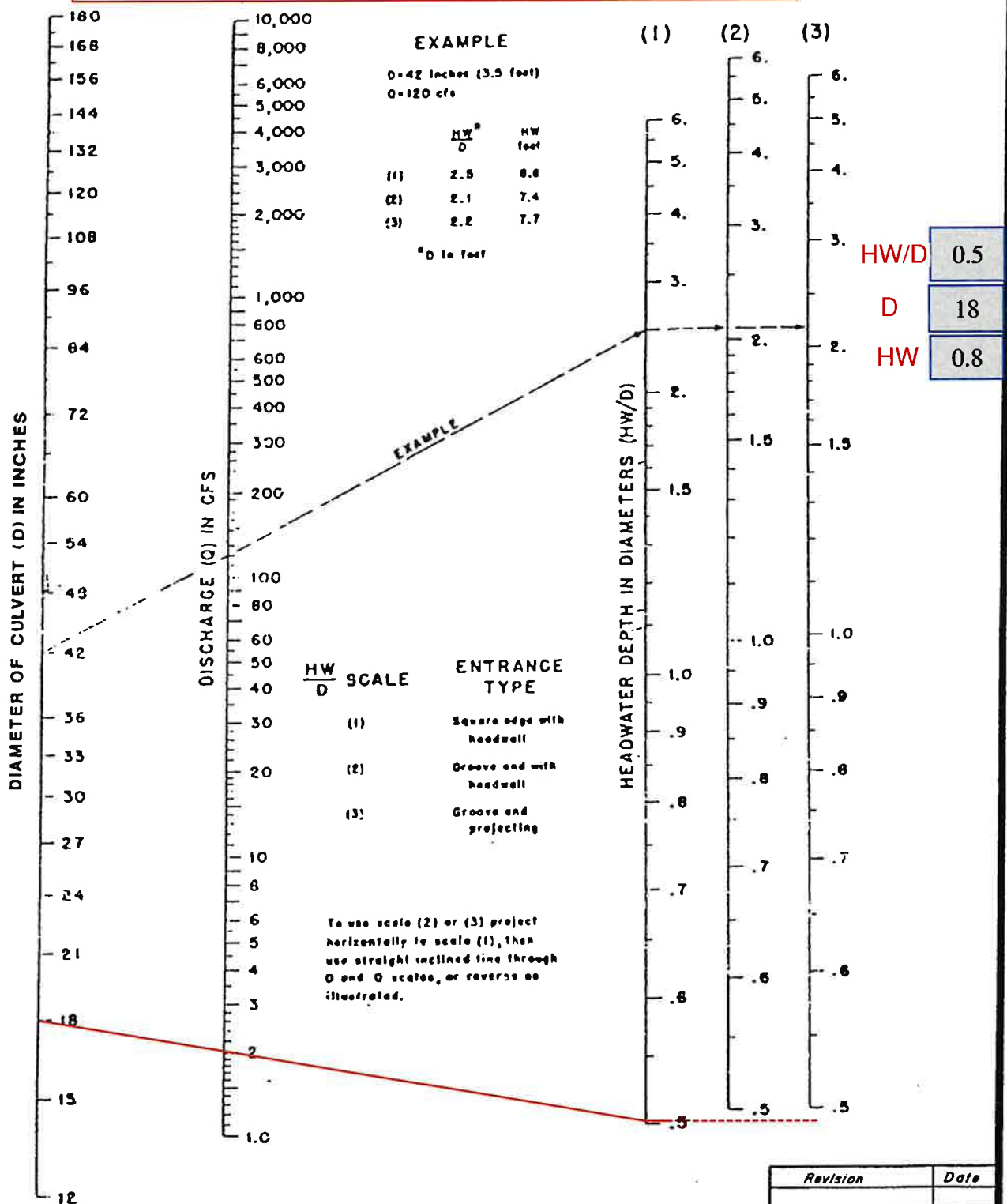


Revision	Date

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

NOMOGRAPH - INLET CONTROL RCP

SDDI 4: Q=2.0 CFS

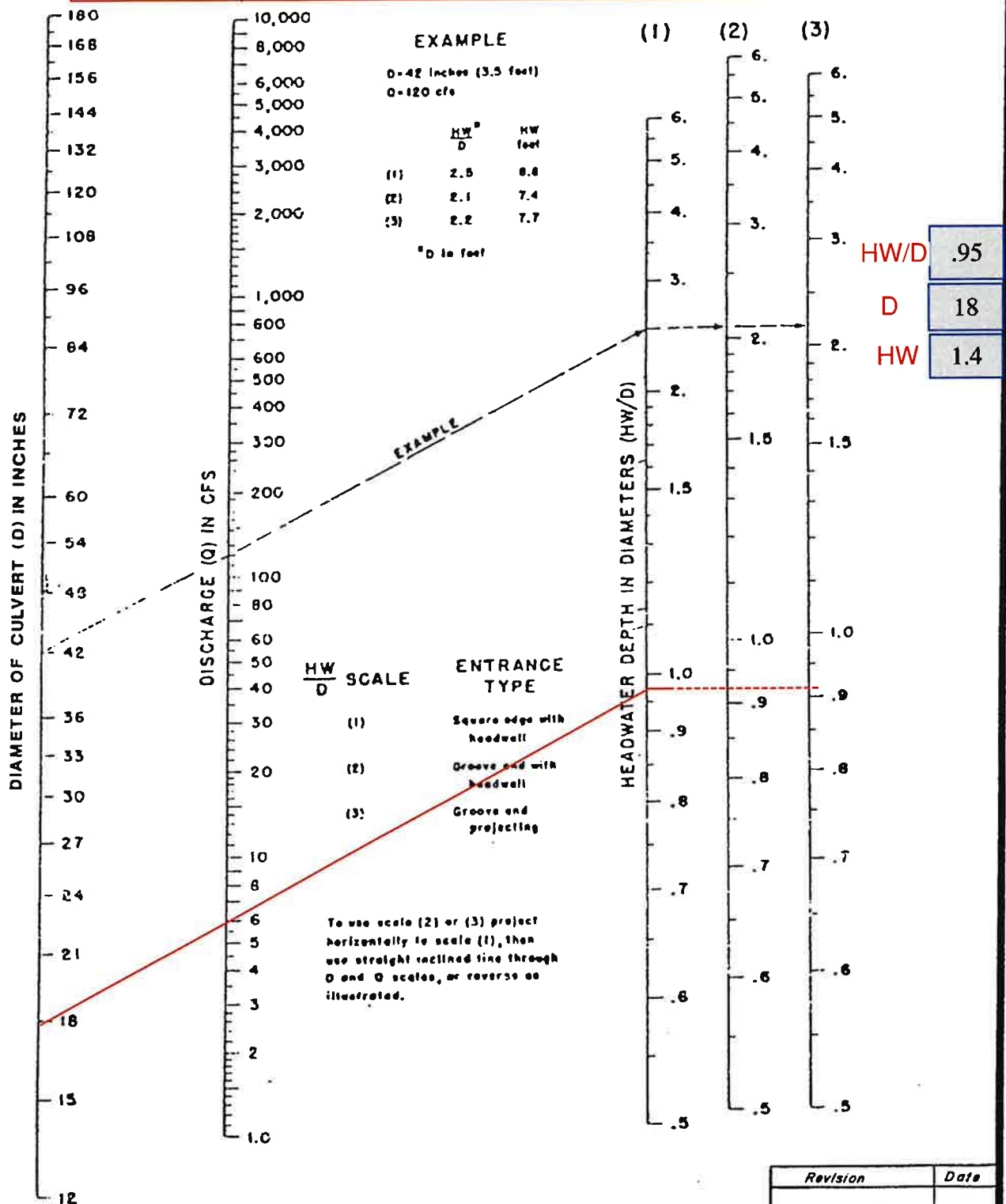


Revision	Date

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

NOMOGRAPH - INLET CONTROL RCP

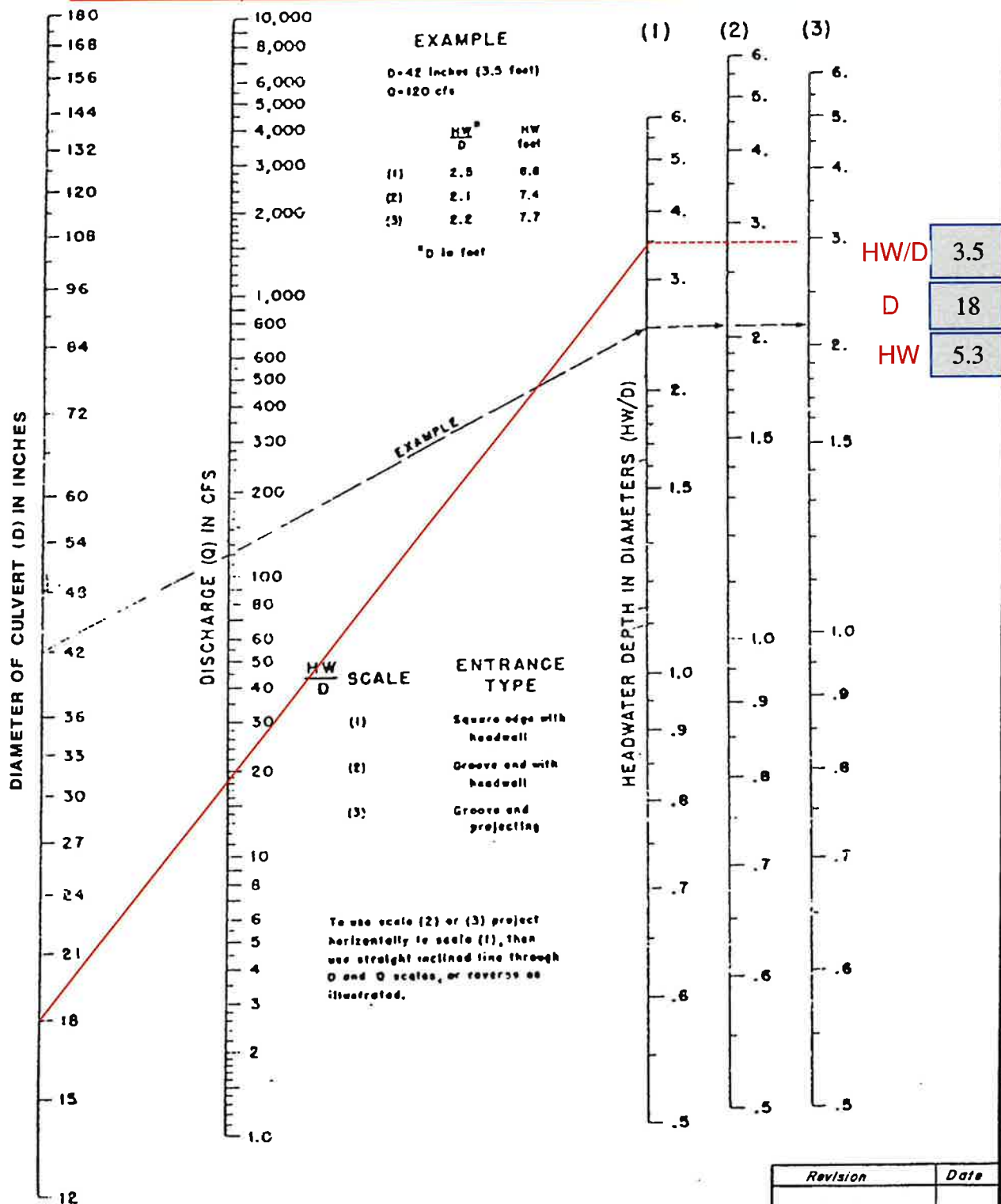
SDDI 5: Q=6 CFS



HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

NOMOGRAPH - INLET CONTROL RCP

Inlet A2: Q = 19.5 CFS (Interim)



Revision	Date

WRC
ENGINEERING

REFERENCE:

USDOT, FHWA, HDS, No. 5, 1985

FIGURE 1005

WSPG Model – MAIN-DI#1 Model
Unit 1 Interim Condition

Interim Condition WSPG Summary										
MAIN-DI1_INT MODEL										
WSPG Station	Equivalent Roadway Station	Improvement Plan Sheet	Storm Drain Dimension	Invert Elevation (ft)	Q ₁₀₀ (cfs)	WSE (ft)	Velocity (ft/s)	FG Elevation	Facility Description	HGL Check ¹
1000.00	N/A	Unit 1 SD-1	48" RCP	2865.46	81.50	2869.59	6.49	N/A	Outlet to wash	N/A
1012.83	10+76.63	Unit 1 SD-1	48" RCP	2865.56	81.50	2869.63	6.49	2873.52	SDMH 1 /	OK
1017.83	10+76.63	Unit 1 SD-1	42" RCP	2865.56	62.00	2870.01	6.44	2873.52	Connection to RAD model	OK
1034.57	10+49.88	Unit 1 SD-1	42" RCP	2865.66	62.00	2870.11	6.44	2873.66	SDMH 2 / Connection to SDDI2	OK
1036.24	10+49.88	Unit 1 SD-1	42" RCP	2865.69	62.00	2870.14	6.44	2873.66		OK
1037.91	10+49.88	Unit 1 SD-1	42" RCP	2865.70	62.00	2870.18	6.44	2873.66		OK
1039.58	10+49.88	Unit 1 SD-1	36" RCP	2866.20	46.00	2870.56	6.51	2873.66		OK
1089.46	10+00.	Unit 1 SD-1	36" RCP	2866.45	46.00	2870.80	6.51	2872.30	SDDI 1	OK

1 - 'HGL Check' reflects the minimum 1-ft below finished grade.

MAIN-DI1 INT.WSW

T1	TR12101	IRON MOUNTAIN TDS ADD2
T2	MAIN STORM DRAIN SYSTEM	
T3	FROM PROPOSED SDDI#1 TO WASH	
S	O	1000.0002865.460 48
R	R	1012.8302865.560 48 .013
JX	JX	1017.8302865.560 42 18 .013
R	R	1034.5702865.660 42 .013
R	R	1036.2402865.690 42 .013
R	R	1037.9102865.700 42 .013
JX	JX	1039.5802866.200 36 18 .013
R	R	1089.4602866.450 36 .013
SH	SH	1089.4602866.450 36
CD	CD	18 4 1 0.000 1.500 0.000 0.000 0.000 0.000 0.000
CD	CD	24 4 1 0.000 2.000 .000 .000 .000 .00
CD	CD	30 4 1 0.000 2.500 0.000 0.000 0.000 0.000 0.00
CD	CD	36 4 1 0.000 3.000 0.000 0.000 0.000 0.000 0.00
CD	CD	42 4 1 0.000 3.500 0.000 0.000 0.000 0.000 0.00
CD	CD	48 4 1 0.000 4.000 0.000 0.000 0.000 0.000 0.00
Q	Q	.0 46.000 .0

MAIN-DI1_INT.EDT

ELEMENT NO	8	IS A REACH			*	*
		U/S DATA	STATION	INVERT	SECT	
			1089.460	2866.450	36	
ELEMENT NO	9	IS A SYSTEM HEADWORKS			*	
		U/S DATA	STATION	INVERT	SECT	
			1089.460	2866.450	36	

	N		ANGLE	ANG PT	MAN H
	.013	*	.000	.000	0
			RADIUS		
			.000		
			W S ELEV		
			.000		

TRI2101 IRON MOUNTAIN TDS ADD2
 MAIN STORM DRAIN SYSTEM
 FROM PROPOSED SDDI#1 TO WASH

MAIN STORM DRAIN SYSTEM														
FROM PROPOSED SDDI#1 TO WASH														
Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Width	Height/Top Dia.-FT	Base Wt I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
1000.000	2865.460	4.130	2869.590	81.50	6.49	.65	2870.24	.00	2.73	.00	4.000	.000	.00	1 .0
12.830	.0078					.0032	.04	4.13	.00	2.33	.013	.00	.00	PIPE
1012.830	2865.560	4.071	2869.631	81.50	6.49	.65	2870.28	.00	2.73	.00	4.000	.000	.00	1 .0
JUNCT STR	.0000					.0035	.02	4.07	.00		.013	.00	.00	PIPE
1017.830	2865.560	4.450	2870.010	62.00	6.44	.64	2870.66	.00	2.47	.00	3.500	.000	.00	1 .0
16.740	.0060					.0038	.06	4.45	.00	2.36	.013	.00	.00	PIPE
1034.570	2865.660	4.446	2870.106	62.00	6.44	.64	2870.75	.00	2.47	.00	3.500	.000	.00	1 .0
1.670	.0180					.0038	.01	4.45	.00	1.67	.013	.00	.00	PIPE
1036.240	2865.690	4.454	2870.144	62.00	6.44	.64	2870.79	.00	2.47	.00	3.500	.000	.00	1 .0
1.670	.0060					.0038	.01	4.45	.00	2.36	.013	.00	.00	PIPE
1037.910	2865.700	4.482	2870.182	62.00	6.44	.64	2870.83	.00	2.47	.00	3.500	.000	.00	1 .0
JUNCT STR	.2994					.0043	.01	4.48	.00		.013	.00	.00	PIPE
1039.580	2866.200	4.362	2870.562	46.00	6.51	.66	2871.22	.00	2.21	.00	3.000	.000	.00	1 .0
49.880	.0050					.0048	.24	4.36	.00	2.39	.013	.00	.00	PIPE
1089.460	2866.450	4.350	2870.800	46.00	6.51	.66	2871.46	.00	2.21	.00	3.000	.000	.00	1 .0

**WSPG Model – MAIN-DI#1 Model
Unit 2 Proposed Condition**

Ultimate Condition WSPG Summary
MAIN-DI1 MODEL

WSPG Station	Equivalent Roadway Station	Improvement Plan Sheet	Storm Drain Dimension	Invert Elevation (ft)	Q ₁₀₀ (cfs)	WSE (ft)	Velocity (ft/s)	FG Elevation	Facility Description	HGL Check ¹
1000.00	N/A	Unit 1 SD-1	48" RCP	2865.46	79.00	2869.59	6.29	N/A	Outlet to wash	N/A
1012.83	10+76.63	Unit 1 SD-1	48" RCP	2865.56	79.00	2869.63	6.29	2873.52	SDMH 1 /	OK
1017.83	10+76.63	Unit 1 SD-1	42" RCP	2865.56	58.50	2870.04	6.08	2873.52	Connection to RAD model	OK
1034.57	10+49.88	Unit 1 SD-1	42" RCP	2865.66	58.50	2870.13	6.08	2873.66	SDMH 2 / Connection to SDDI2	OK
1036.24	10+49.88	Unit 1 SD-1	42" RCP	2865.69	58.50	2870.16	6.08	2873.66		OK
1037.91	10+49.88	Unit 1 SD-1	42" RCP	2865.70	58.50	2870.19	6.08	2873.66		OK
1039.58	10+49.88	Unit 1 SD-1	36" RCP	2866.20	43.50	2870.53	6.15	2873.66		OK
1089.46	10+00.	Unit 1 SD-1	36" RCP	2866.45	43.50	2870.74	6.15	2872.30	SDDI 1	OK

1 - 'HGL Check' reflects the minimum 1-ft below finished grade.

MAIN-DI1.EDT *

ELEMENT NO	9	IS A SYSTEM HEADWORKS	STATION	INVERT	SECT
		U/S DATA	1089.460	2866.450	36

000.
M S ELEV

Date: 4- 6-2022 Time: 9:52:32

WATER SURFACE PROFILE LISTING

TRI2101 IRON MOUNTAIN TDS ADD2
MAIN STORM DRAIN SYSTEM
FROM PROPOSED SDDI#1 TO WASH

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Width	Top Height/ Dia.-FT or I.D.	Base Wt	ZL	No Wth
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
1000.000	2865.460	4.130	2869.590	79.00	6.29	.61	2870.20	.00	2.69	.00	4.000	.000	.00	1 .0
12.830	.0078					.0030	.04	4.13	.00	2.29	.013	.00	.00	PIPE
1012.830	2865.560	4.069	2869.629	79.00	6.29	.61	2870.24	.00	2.69	.00	4.000	.000	.00	1 .0
JUNCT STR	.0000					.0032	.02	4.07	.00		.013	.00	.00	PIPE
1017.830	2865.560	4.479	2870.040	58.50	6.08	.57	2870.61	.00	2.40	.00	3.500	.000	.00	1 .0
16.740	.0060					.0034	.06	4.48	.00	2.27	.013	.00	.00	PIPE
1034.570	2865.660	4.465	2870.125	58.50	6.08	.57	2870.70	.00	2.40	.00	3.500	.000	.00	1 .0
1.670	.0180					.0034	.01	4.46	.00	1.61	.013	.00	.00	PIPE
1036.240	2865.690	4.469	2870.159	58.50	6.08	.57	2870.73	.00	2.40	.00	3.500	.000	.00	1 .0
1.670	.0060					.0034	.01	4.47	.00	2.26	.013	.00	.00	PIPE
1037.910	2865.700	4.493	2870.193	58.50	6.08	.57	2870.77	.00	2.40	.00	3.500	.000	.00	1 .0
JUNCT STR	.2994					.0038	.01	4.49	.00		.013	.00	.00	PIPE
1039.580	2866.200	4.327	2870.527	43.50	6.15	.59	2871.11	.00	2.15	.00	3.000	.000	.00	1 .0
49.880	.0050					.0043	.21	4.33	.00	2.27	.013	.00	.00	PIPE
1089.460	2866.450	4.289	2870.739	43.50	6.15	.59	2871.33	.00	2.15	.00	3.000	.000	.00	1 .0

Ultimate Condition WSPG Summary RAD MODEL										
WSPG Station	Equivalent Roadway Station	Improvement Plan Sheet	Storm Drain Dimension	Invert Elevation (ft)	Q ₁₀₀ (cfs)	WSE (ft)	Velocity (ft/s)	FG Elevation	Facility Description	HGL Check ¹
1000.00	35+61.37	Overall PP-7	18" RCP	2867.57	20.50	2870.04	11.03	2873.52	SDMH 1 / Connection to Main-DI1 Model	OK
1195.31	33+61.06	Overall PP-6	18" RCP	2868.95	20.50	2876.77	11.03	2879.28	SDMH 3	OK
1200.31	33+61.06	Overall PP-6	18" RCP	2868.99	20.50	2876.94	11.03	2879.28		OK
1589.48	29+66.89	Overall PP-5	18" RCP	2888.40	20.50	2890.35	11.03	2893.95	SDMH 4	OK
1594.48	29+66.89	Overall PP-5	18" RCP	2888.65	20.50	2890.53	11.03	2893.95		OK
1984.48	25+71.89	Overall PP-5	18" RCP	2901.45	20.50	2903.97	11.03	2908.69	SDMH 5 / Connection to DI5 Lateral	OK
1989.48	25+71.89	Overall PP-5	18" RCP	2901.61	12.00	2905.88	6.79	2908.69		OK
2196.71	23+59.66	Overall PP-4	18" RCP	2910.97	12.00	2911.80	12.03	2916.60	SDMH 6	OK
2201.71	23+59.66	Overall PP-4	18" RCP	2911.20	12.00	2912.03	11.89	2916.60		OK
2408.94	21+47.58	Overall PP-4	18" RCP	2918.82	12.00	2919.84	9.37	2925.51	SDMH 7 / Connection to DI3 Lateral	OK
2413.78	21+47.58	Overall PP-4	18" RCP	2919.00	9.00	2919.63	12.70	2925.51		OK
2549.65	20+06.72	Overall PP-4	18" C900	2926.24	9.00	2927.13	8.26	2931.50	SDMH 8	OK
2550.65	20+06.72	Overall PP-4	18" C900	2926.30	9.00	2927.21	7.99	2931.50		OK
2551.65	20+06.72	Overall PP-4	18" C900	2926.35	9.00	2927.29	7.75	2931.50		OK
2552.65	20+06.72	Overall PP-4	18" C900	2926.40	9.00	2927.37	7.47	2931.50		OK
2553.65	20+06.72	Overall PP-4	18" C900	2926.46	9.00	2927.48	7.01	2931.50		OK
2554.65	20+06.72	Overall PP-4	18" C900	2926.51	9.00	2927.67	6.14	2931.50		OK
2604.21	N/A	Overall PP-4	18" RCP	2926.76	9.00	2928.16	5.24	N/A	Open sump / Connection to Future SD	N/A

1 - 'HGL Check' reflects the minimum 1-ft below finished grade.

1 - 'HGL Check' reflects the minimum 1-ft below finished grade.

**WSPG Model – RAD Model
Unit 2 Proposed Condition**

[illegible]

WATER SURFACE PROFILE - CHANNEL DEFINITION LISTING

PAGE 1

CARD	SECT	CHN	NO OF	AVE PIER	HEIGHT 1	BASE	ZL	ZR	INV	Y(1)	Y(2)	Y(3)	Y(4)	Y(5)	Y(6)	Y(7)	Y(8)	Y(9)	Y(10)
CODE	NO	TYPE	PIER/PIP	WIDTH	DIAMETER	WIDTH			DROP										
CD	18	4	1		1.500														
CD	24	4	1		2.000														

W S P G W

PAGE NO 1

WATER SURFACE PROFILE - TITLE CARD LISTING

TRI2101 IRON MOUNTAIN TDS ADD2

RADLEY STORM DRAIN SYSTEM - UNIT 2 PROPOSED CONDITION

FROM MAIN-DI1 MODEL TO OPEN SUMP

W S P G W

PAGE NO 2

WATER SURFACE PROFILE - ELEMENT CARD LISTING

W S ELEV

2870.040

ELEMENT NO	1 IS A SYSTEM OUTLET	U/S DATA	STATION	INVERT	SECT	18	*	N	Q3	Q4	INVERT-3	INVERT-4	PHI 3	PHI 4	ANG PT	MAN H
ELEMENT NO	2 IS A REACH	U/S DATA	STATION	INVERT	SECT	18	*	.013	*	.000	.000	.000	*	.000	.000	0
ELEMENT NO	3 IS A JUNCTION	U/S DATA	STATION	INVERT	SECT	18	*	.013	.000	.000	.000	.000	.000	.000	.000	.000
ELEMENT NO	4 IS A REACH	U/S DATA	STATION	INVERT	SECT	18	*	.013	.000	.000	.000	.000	.000	.000	.000	.000
ELEMENT NO	5 IS A JUNCTION	U/S DATA	STATION	INVERT	SECT	18	*	.013	.000	.000	.000	.000	.000	.000	.000	.000
ELEMENT NO	6 IS A REACH	U/S DATA	STATION	INVERT	SECT	18	*	.013	.000	.000	.000	.000	.000	.000	.000	.000
ELEMENT NO	7 IS A JUNCTION	U/S DATA	STATION	INVERT	SECT	18	*	.013	.000	.000	.000	.000	.000	.000	.000	.000
ELEMENT NO	8 IS A REACH	U/S DATA	STATION	INVERT	SECT	18	*	.013	.000	.000	.000	.000	.000	.000	.000	.000
			1000.000	2867.570												
			1195.310	2868.950												
			1200.310	2868.990												
			1589.480	2888.400												
			1594.480	2888.650												
			1984.480	2901.450												
			1989.480	2901.610												
			2196.710	2910.970												

WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO	9 IS A JUNCTION U/S DATA	STATION	INVERT	SECT	LAT-1	LAT-2	N	Q3	RAD. EDT	Q4	INVERT-3	INVERT-4	PHI 3	PHI 4
		2201.710	2911.200	18	0	0	.013	.000		.000	.000	.000	.000	.000
ELEMENT NO 10	IS A REACH U/S DATA	2408.940	2918.820	18			.013							
ELEMENT NO 11	IS A JUNCTION U/S DATA	2413.780	2919.000	18	18	0	.013	3.000		.000	.000	.000	.000	.000
ELEMENT NO 12	IS A REACH U/S DATA	2549.650	2926.240	18			.013							
ELEMENT NO 13	IS A REACH U/S DATA	2550.650	2926.300	18			.013							
ELEMENT NO 14	IS A REACH U/S DATA	2551.650	2926.350	18			.013							
ELEMENT NO 15	IS A REACH U/S DATA	2552.650	2926.400	18			.013							
ELEMENT NO 16	IS A REACH U/S DATA	2553.650	2926.450	18			.013							
ELEMENT NO 17	IS A JUNCTION U/S DATA	2554.650	2926.510	18	0	0	.013	.000		.000	.000	.000	.000	.000
WATER SURFACE PROFILE - ELEMENT CARD LISTING														
ELEMENT NO 18	IS A REACH U/S DATA	2604.210	2926.760	18			.013							
ELEMENT NO 19	IS A SYSTEM HEADWORKS U/S DATA	2604.210	2926.760	18			.013							

PAGE NO 4

Date: 4- 6-2022 Time:10:40:24

WATER SURFACE PROFILE LISTING

TRI2101 IRON MOUNTAIN TDS ADD2
RADLEY STORM DRAIN SYSTEM - UNIT 2 PROPOSED CONDITION
FROM MAIN-DI1 MODEL TO OPEN SUMP

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Width	Height/Dia.-FT	Base Wt I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****
1000.000	2867.570	2.470	2870.040	20.50	11.03	1.89	2871.93	.00	1.46	.00	1.500	.000	.00	1 .0
195.310	.0071					.0345	6.73	2.47	.00	1.50	.013	.00	.00	PIPE
1195.310	2868.950	7.821	2876.771	20.50	11.03	1.89	2878.66	.00	1.46	.00	1.500	.000	.00	1 .0
JUNCT STR	.0080					.0345	.17	7.82	.00		.013	.00	.00	PIPE
1200.310	2868.990	7.953	2876.943	20.50	11.03	1.89	2878.83	.00	1.46	.00	1.500	.000	.00	1 .0
389.170	.0499					.0345	13.41	7.95	.00	1.04	.013	.00	.00	PIPE
1589.480	2888.400	1.954	2890.354	20.50	11.03	1.89	2892.24	.00	1.46	.00	1.500	.000	.00	1 .0
JUNCT STR	.0500					.0345	.17	1.95	.00		.013	.00	.00	PIPE
1594.480	2888.650	1.877	2890.526	20.50	11.03	1.89	2892.42	.00	1.46	.00	1.500	.000	.00	1 .0
390.000	.0328					.0345	13.44	1.88	.00	1.27	.013	.00	.00	PIPE
1984.480	2901.450	2.516	2903.966	20.50	11.03	1.89	2905.86	.00	1.46	.00	1.500	.000	.00	1 .0
JUNCT STR	.0320					.0238	.12	2.52	.00		.013	.00	.00	PIPE
1989.480	2901.610	4.265	2905.875	12.00	6.79	.72	2906.59	.00	1.31	.00	1.500	.000	.00	1 .0
64.104	.0452					.0131	.84	4.27	.00	.78	.013	.00	.00	PIPE
2053.584	2904.505	2.205	2906.711	12.00	6.79	.72	2907.43	.00	1.31	.00	1.500	.000	.00	1 .0
HYDRAULIC JUMP														
2053.584	2904.505	.783	2905.288	12.00	12.86	2.57	2907.86	.00	1.31	1.50	1.500	.000	.00	1 .0
26.446	.0452					.0452	1.19	.78	2.87	.78	.013	.00	.00	PIPE

WATER SURFACE PROFILE LISTING

Date: 4- 6-2022 Time:10:40:24

TRI2101 IRON MOUNTAIN TDS ADD2
RADLEY STORM DRAIN SYSTEM - UNIT 2 PROPOSED CONDITION
FROM MAIN-DI1 MODEL TO OPEN SUMP

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Width	Top Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****
2080.030	2905.700	.783	2906.483	12.00	12.86	2.57	2909.05	.00	1.31	1.50	1.500	.000	.00	1 .0
75.724	.0452					.0441	3.34	.78	2.87	.78	.013	.00	.00	PIPE
2155.754	2909.120	.795	2909.915	12.00	12.62	2.47	2912.39	.00	1.31	1.50	1.500	.000	.00	1 .0
40.956	.0452					.0404	1.66	.79	2.79	.78	.013	.00	.00	PIPE
2196.710	2910.970	.826	2911.796	12.00	12.03	2.25	2914.04	.00	1.31	1.49	1.500	.000	.00	1 .0
JUNCT STR	.0460					.0373	.19	.83	2.59		.013	.00	.00	PIPE
2201.710	2911.200	.834	2912.034	12.00	11.89	2.20	2914.23	.00	1.31	1.49	1.500	.000	.00	1 .0
3.603	.0368					.0368	.13	.83	2.55	.83	.013	.00	.00	PIPE
2205.313	2911.333	.834	2912.166	12.00	11.89	2.20	2914.36	.00	1.31	1.49	1.500	.000	.00	1 .0
77.096	.0368					.0367	2.83	.83	2.55	.83	.013	.00	.00	PIPE
2282.409	2914.167	.834	2915.002	12.00	11.89	2.19	2917.20	.00	1.31	1.49	1.500	.000	.00	1 .0
75.214	.0368					.0346	2.60	.83	2.54	.83	.013	.00	.00	PIPE
2357.623	2916.933	.867	2917.801	12.00	11.33	1.99	2919.79	.00	1.31	1.48	1.500	.000	.00	1 .0
23.493	.0368					.0305	.72	.87	2.36	.83	.013	.00	.00	PIPE
2381.116	2917.797	.902	2918.699	12.00	10.80	1.81	2920.51	.00	1.31	1.47	1.500	.000	.00	1 .0
13.125	.0368					.0270	.35	.90	2.19	.83	.013	.00	.00	PIPE
2394.241	2918.280	.940	2919.219	12.00	10.30	1.65	2920.87	.00	1.31	1.45	1.500	.000	.00	1 .0
8.628	.0368					.0240	.21	.94	2.03	.83	.013	.00	.00	PIPE

Date: 4- 6-2022 Time:10:40:24

WATER SURFACE PROFILE LISTING

TRI2101 IRON MOUNTAIN TDS ADD2

RADLEY STORM DRAIN SYSTEM - UNIT 2 PROPOSED CONDITION

FROM MAIN-DI1 MODEL TO OPEN SUMP

*****															No With
Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	Prs/Pip	
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch	
*****															*****
2402.869	2918.597	.979	2919.576	12.00	9.82	1.50	2921.07	.00	1.31	1.43	1.500	.000	.00	1 .0	
6.071	.0368					.0213	.13	.98	1.87	.83	.013	.00	.00	PIPE	
2408.940	2918.820	1.021	2919.841	12.00	9.37	1.36	2921.20	.00	1.31	1.40	1.500	.000	.00	1 .0	
JUNCT STR	.0372					.0367	.18	1.02	1.72		.013	.00	.00	PIPE	
2413.780	2919.000	.633	2919.633	9.00	12.70	2.51	2922.14	.00	1.16	1.48	1.500	.000	.00	1 .0	
20.502	.0533					.0532	1.09	.63	3.24	.63	.013	.00	.00	PIPE	
2434.282	2920.092	.633	2920.726	9.00	12.69	2.50	2923.23	.00	1.16	1.48	1.500	.000	.00	1 .0	
60.194	.0533					.0499	3.00	.63	3.23	.63	.013	.00	.00	PIPE	
2494.477	2923.300	.657	2923.956	9.00	12.10	2.27	2926.23	.00	1.16	1.49	1.500	.000	.00	1 .0	
19.307	.0533					.0438	.85	.66	3.02	.63	.013	.00	.00	PIPE	
2513.783	2924.329	.681	2925.010	9.00	11.54	2.07	2927.08	.00	1.16	1.49	1.500	.000	.00	1 .0	
11.012	.0533					.0385	.42	.68	2.81	.63	.013	.00	.00	PIPE	
2524.795	2924.916	.706	2925.622	9.00	11.00	1.88	2927.50	.00	1.16	1.50	1.500	.000	.00	1 .0	
7.439	.0533					.0339	.25	.71	2.62	.63	.013	.00	.00	PIPE	
2532.235	2925.312	.733	2926.045	9.00	10.49	1.71	2927.75	.00	1.16	1.50	1.500	.000	.00	1 .0	
5.433	.0533					.0298	.16	.73	2.44	.63	.013	.00	.00	PIPE	
2537.667	2925.602	.761	2926.363	9.00	10.00	1.55	2927.92	.00	1.16	1.50	1.500	.000	.00	1 .0	
4.139	.0533					.0263	.11	.76	2.27	.63	.013	.00	.00	PIPE	

TRI2101 IRON MOUNTAIN TDS ADD2

RADLEY STORM DRAIN SYSTEM - UNIT 2 PROPOSED CONDITION

FROM MAIN-DI1 MODEL TO OPEN SUMP

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Width	Flow Top Dia.-FT	Height/ I.D.	Base Wt	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch	
*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****
2541.807	2925.822	.790	2926.612	9.00	9.53	1.41	2928.02	.00	1.16	1.50	1.500	.000	.00	1	.0
3.239	.0533					.0232	.08	.79	2.12	.63	.013	.00	.00		PIPE
2545.046	2925.995	.821	2926.816	9.00	9.09	1.28	2928.10	.00	1.16	1.49	1.500	.000	.00	1	.0
2.566	.0533					.0205	.05	.82	1.97	.63	.013	.00	.00		PIPE
2547.612	2926.131	.854	2926.985	9.00	8.67	1.17	2928.15	.00	1.16	1.49	1.500	.000	.00	1	.0
2.038	.0533					.0181	.04	.85	1.83	.63	.013	.00	.00		PIPE
2549.650	2926.240	.888	2927.128	9.00	8.26	1.06	2928.19	.00	1.16	1.47	1.500	.000	.00	1	.0
1.000	.0601					.0163	.02	.89	1.69	.61	.013	.00	.00		PIPE
2550.650	2926.300	.913	2927.213	9.00	7.99	.99	2928.20	.00	1.16	1.46	1.500	.000	.00	1	.0
1.000	.0500					.0150	.01	.91	1.61	.64	.013	.00	.00		PIPE
2551.650	2926.350	.937	2927.287	9.00	7.75	.93	2928.22	.00	1.16	1.45	1.500	.000	.00	1	.0
1.000	.0498					.0138	.01	.94	1.53	.64	.013	.00	.00		PIPE
2552.650	2926.400	.967	2927.367	9.00	7.47	.87	2928.23	.00	1.16	1.44	1.500	.000	.00	1	.0
.294	.0601					.0129	.00	.97	1.44	.61	.013	.00	.00		PIPE
2552.944	2926.417	.981	2927.398	9.00	7.35	.84	2928.24	.00	1.16	1.43	1.500	.000	.00	1	.0
.706	.0601					.0119	.01	.98	1.40	.61	.013	.00	.00		PIPE
2553.650	2926.460	1.023	2927.483	9.00	7.01	.76	2928.25	.00	1.16	1.40	1.500	.000	.00	1	.0
JUNCT STR	.0500					.0097	.01	1.02	1.29	.013	.00	.00	.00		PIPE

Program Package Serial Number: 7189

Date: 4- 6-2022 Time:10:40:24

WATER SURFACE PROFILE LISTING

TRI2101 IRON MOUNTAIN TDS ADD2

RADLEY STORM DRAIN SYSTEM - UNIT 2 PROPOSED CONDITION

FROM MAIN-DI1 MODEL TO OPEN SUMP

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Width	Height/Dia.-FT or I.D.	Base Wt	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****
2554.650	2926.510	1.160	2927.670	9.00	6.14	.58	2928.25	.00	1.16	1.26	1.500	.000	.00	1 .0
2.059	.0050					.0078	.02	1.16	1.00	1.50	.013	.00	.00	PIPE
2556.709	2926.521	1.219	2927.740	9.00	5.85	.53	2928.27	.00	1.16	1.17	1.500	.000	.00	1 .0
9.225	.0050					.0071	.07	1.22	.90	1.50	.013	.00	.00	PIPE
2565.934	2926.567	1.287	2927.854	9.00	5.58	.48	2928.34	.00	1.16	1.05	1.500	.000	.00	1 .0
24.797	.0050					.0066	.16	1.29	.79	1.50	.013	.00	.00	PIPE
2590.731	2926.692	1.370	2928.062	9.00	5.32	.44	2928.50	.00	1.16	.85	1.500	.000	.00	1 .0
13.479	.0050					.0064	.09	1.37	.66	1.50	.013	.00	.00	PIPE
2604.210	2926.760	1.400	2928.160	9.00	5.24	.43	2928.59	.00	1.16	.75	1.500	.000	.00	1 .0

**WSPG Model – LAT-DI#5 Model
Unit 2 Proposed Condition**

Ultimate Condition WSPG Summary
LAT-DI5 MODEL

WSPG Station	Equivalent Roadway Station	Improvement Plan Sheet	Storm Drain Dimension	Invert Elevation (ft)	Q ₁₀₀ (cfs)	WSE (ft)	Velocity (ft/s)	FG Elevation	Facility Description	HGL Check ¹
1000.00	11+36.91	Overall PP2	18" RCP	2901.61	8.50	2905.88	4.81	2908.65	SDMH 5 / Connection to RAD Model	N/A
1024.50	11+12.41	Overall PP2	18" RCP	2901.73	8.50	2906.04	4.81	2908.87	SDMH 10	OK
1029.50	11+12.41	Overall PP2	18" RCP	2901.73	8.50	2906.07	4.81	2908.87		OK
1101.91	10+35.	Overall PP2	18" RCP	2902.12	8.50	2906.55	4.81	2910.20	SDDI 4	OK
1103.91	10+35.	Overall PP2	18" RCP	2902.12	6.50	2906.86	3.68	2910.20		OK
1138.91	10+00.	Overall PP2	18" RCP	2902.30	6.50	2906.99	3.68	2910.10	SDDI 5	OK

1 - 'HGL Check' reflects the minimum 1-ft below finished grade.

LAT-DI5.WSW

T1	TRI2101	IRON MOUNTAIN	TDS	ADD2
T2	MAIN STORM DRAIN SYSTEM			
T3	FROM SDMH#1 TO SDDI#5			
S0	1000.0002901.610	18		2905.880
R	1024.5002901.730	18	.013	
JX	1029.5002901.730	18	.013	
R	1101.9102902.120	18	.013	
JX	1103.9102902.120	18	.013	2902.120
R	1138.9102902.300	18	.013	
SH	1138.9102902.300	18		.000
CD	18 4 1	.000	.000	.000
Q	6.500	.0		

CARD SECT CHN NO OF AVE PIER HEIGHT 1 BASE ZL ZR INV Y(1) Y(2) Y(3) Y(4) Y(5) Y(6) Y(7) Y(8) Y(9) Y(10)
 CODE NO TYPE PIER/PIP WIDTH DIAMETER WIDTH DROP

CD 18 4 1 1.500
 WATER SURFACE PROFILE - TITLE CARD LISTING
 W S P G W
 PAGE NO 1

HEADING LINE NO 1 IS -
 TRI2101 IRON MOUNTAIN TDS ADD2

HEADING LINE NO 2 IS -
 MAIN STORM DRAIN SYSTEM

HEADING LINE NO 3 IS -
 FROM SDMH#1 TO SDDI#5

WATER SURFACE PROFILE - ELEMENT CARD LISTING
 W S P G W
 PAGE NO 2

ELEMENT NO	1	IS A SYSTEM OUTLET	*	STATION	INVERT	SECT	W S ELEV	RADIUS	ANGLE	ANG PT	MAN H
		U/S DATA		1000.000	2901.610	18	2905.880	.000	.000	.000	0
ELEMENT NO	2	IS A REACH	*	STATION	INVERT	SECT					
		U/S DATA		1024.500	2901.730	18		.000	.000	.000	0
ELEMENT NO	3	IS A JUNCTION	*	STATION	INVERT	SECT					
		U/S DATA		1029.500	2901.730	18		.000	.000	.000	0

THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV -WARNING
 THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV -WARNING

ELEMENT NO	4	IS A REACH	*	STATION	INVERT	SECT	*	N	RADIUS	ANGLE	ANG PT	MAN		
		U/S DATA		1101.910	2902.120	18		.013	.000	.000	.000	0		
ELEMENT NO	5	IS A JUNCTION	*	STATION	INVERT	SECT	LAT-1	LAT-2	Q3	Q4	INVERT-3	INVERT-4	PHI 3	PHI 4
		U/S DATA		1103.910	2902.120	18	18	0	2.000	.000	2902.120	.000	90.000	.000
											RADIUS	ANGLE		
											.000	.000		

THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV -WARNING
 THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV -WARNING

THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV WARNING											
ELEMENT NO	6	IS A REACH	*	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN
		U/S DATA		1138.910	2902.300	18	.013	.000	.000	.000	0
ELEMENT NO	7	IS A SYSTEM HEADWORKS	*	STATION	INVERT	SECT					
		U/S DATA		1138.910	2902.300	18		W S ELEV			
								.000			

THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV -WARNING
 THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV -WARNING

Date: 4- 6-2022 Time:10:45:17

WATER SURFACE PROFILE LISTING

TRI2101 IRON MOUNTAIN TDS ADD2

MAIN STORM DRAIN SYSTEM

FROM SDMH#1 TO SDDI#5

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Width	Height Dia.-FT	Base I.D.	ZL	No With Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****
1000.000	2901.610	4.270	2905.880	8.50	4.81	.36	2906.24	.00	1.13	.00	1.500	.000	.00	1 .0
24.500	.0049	- -	- -	- -	- -	.0065	.16	4.27	.00	1.50	.013	.00	.00	PIPE
1024.500	2901.730	4.310	2906.040	8.50	4.81	.36	2906.40	.00	1.13	.00	1.500	.000	.00	1 .0
JUNCT STR	.0000	- -	- -	- -	- -	.0065	.03	4.31	.00	- -	.013	.00	.00	PIPE
1029.500	2901.730	4.343	2906.073	8.50	4.81	.36	2906.43	.00	1.13	.00	1.500	.000	.00	1 .0
72.410	.0054	- -	- -	- -	- -	.0065	.47	4.34	.00	1.50	.013	.00	.00	PIPE
1101.910	2902.120	4.427	2906.547	8.50	4.81	.36	2906.91	.00	1.13	.00	1.500	.000	.00	1 .0
JUNCT STR	.0000	- -	- -	- -	- -	.0052	.01	4.43	.00	- -	.013	.00	.00	PIPE
1103.910	2902.120	4.736	2906.856	6.50	3.68	.21	2907.07	.00	.99	.00	1.500	.000	.00	1 .0
35.000	.0051	- -	- -	- -	- -	.0038	.13	4.74	.00	1.08	.013	.00	.00	PIPE
1138.910	2902.300	4.690	2906.990	6.50	3.68	.21	2907.20	.00	.99	.00	1.500	.000	.00	1 .0
- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	-

**WSPG Model – LAT-DI#3 Model
Unit 2 Proposed Condition**

Ultimate Condition WSPG Summary LAT-DI3 MODEL

WSPG Station	Equivalent Roadway Station	Improvement Plan Sheet	Storm Drain Dimension	Invert Elevation (ft)	Q ₁₀₀ (cfs)	WSE (ft)	Velocity (ft/s)	FG Elevation	Facility Description	HGL Check ¹
1000.00	10+52.87	Overall PP2	18" RCP	2919.00	3.00	2919.84	2.95	2925.51	SDMH 7 / Connection to RAD Model	N/A
1024.53	10+28.34	Overall PP2	18" RCP	2919.12	3.00	2919.86	3.48	2925.24	SDMH 9	OK
1029.53	10+28.34	Overall PP2	18" RCP	2919.12	3.00	2919.90	3.26	2925.24		OK
1052.87	10+00.	Overall PP2	18" RCP	2919.26	3.00	2919.92	4.02	2923.60	SDDI 3	OK

1 - 'HGL Check' reflects the minimum 1-ft below finished grade.

T1		TRI2101 IRON MOUNTAIN TDS ADD2			
T2		MAIN STORM DRAIN SYSTEM			
T3		FROM SDNH#7 TO SDDI#3			
S0		1000.0002919.000 18	.013		2919.840
R		1024.5302919.120 18	.013		
JX		1029.5302919.120 18	.013		
R		1052.8702919.260 18	.013		
SH		1052.8702919.260 18			
CQ	18	4 1 0.000 1.500	0.000	0.000	0.0000.00 0.00
Q				3.000	.0

Program Package Serial Number: 7189

WATER SURFACE PROFILE LISTING

Date: 4- 7-2022 Time: 9:50:45

TRI2101 IRON MOUNTAIN TDS ADD2

MAIN STORM DRAIN SYSTEM

FROM SDMH#7 TO SDDI#3

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Width	Top Height/Dia.-FT or I.D.	ZL	No With Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	ZR	Type Ch
1000.000	2919.000	.840	2919.840	3.00	2.95	.13	2919.97	.00	.66	1.49	1.500	.00	1 .0
7.307	.0049	-	-	-	-	.0024	.02	.84	.63	.67	.013	.00	PIPE
1007.307	2919.036	.808	2919.844	3.00	3.09	.15	2919.99	.00	.66	1.50	1.500	.00	1 .0
7.036	.0049	-	-	-	-	.0027	.02	.81	.68	.67	.013	.00	PIPE
1014.343	2919.070	.778	2919.848	3.00	3.24	.16	2920.01	.00	.66	1.50	1.500	.00	1 .0
6.809	.0049	-	-	-	-	.0031	.02	.78	.73	.67	.013	.00	PIPE
1021.152	2919.104	.749	2919.853	3.00	3.40	.18	2920.03	.00	.66	1.50	1.500	.00	1 .0
3.378	.0049	-	-	-	-	.0034	.01	.75	.78	.67	.013	.00	PIPE
1024.530	2919.120	.736	2919.856	3.00	3.48	.19	2920.04	.00	.66	1.50	1.500	.00	1 .0
JUNCT STR	.0000	-	-	-	-	.0032	.02	.74	.81	-	.013	.00	PIPE
1029.530	2919.120	.775	2919.895	3.00	3.26	.16	2920.06	.00	.66	1.50	1.500	.00	1 .0
4.232	.0060	-	-	-	-	.0031	.01	.77	.73	.63	.013	.00	PIPE
1033.762	2919.146	.746	2919.891	3.00	3.42	.18	2920.07	.00	.66	1.50	1.500	.00	1 .0
3.702	.0060	-	-	-	-	.0035	.01	.75	.79	.63	.013	.00	PIPE
1037.464	2919.168	.719	2919.886	3.00	3.59	.20	2920.09	.00	.66	1.50	1.500	.00	1 .0
3.079	.0060	-	-	-	-	.0040	.01	.72	.85	.63	.013	.00	PIPE
1040.543	2919.186	.693	2919.879	3.00	3.76	.22	2920.10	.00	.66	1.50	1.500	.00	1 .0
.769	.0060	-	-	-	-	.0046	.00	.69	.91	.63	.013	.00	PIPE

Program Package Serial Number: 7189 Date: 4- 7-2022 Time: 9:50:45

WATER SURFACE PROFILE LISTING

TRI2101 IRON MOUNTAIN TDS ADD2
MAIN STORM DRAIN SYSTEM
FROM SDMH#7 TO SDDI#3

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
1041.313	2919.191	.668	2919.859	3.00	3.94	.24	2920.10	.00	.66	1.49	1.500	.000	.00	1 .0
HYDRAULIC JUMP														
1041.313	2919.191	.631	2919.822	3.00	4.25	.28	2920.10	.00	.66	1.48	1.500	.000	.00	1 .0
7.807	.0060					.0059	.05	.63	1.09	.63	.013	.00	.00	PIPE
1049.120	2919.238	.634	2919.872	3.00	4.22	.28	2920.15	.00	.66	1.48	1.500	.000	.00	1 .0
3.750	.0060					.0055	.02	.63	1.07	.63	.013	.00	.00	PIPE
1052.870	2919.260	.658	2919.918	3.00	4.02	.25	2920.17	.00	.66	1.49	1.500	.000	.00	1 .0

Lateral Sizing Computations

Project Name:	Iron Mountain - TDS ADD2
Project Number:	TR12101
Date:	April 2022
By:	JSR



STORM DRAIN HYDRAULIC CALCULATIONS

STATION		CONDUIT DATA				FLOW DATA							LOSS	HGL		COMMENTS									
FROM	TO	SIZE / TYPE	Manning's Roughness n_s	INVERTS		LENGTH	A (FT^2)	R (FT)	Φ	Q (CFS)	V (FPS)	$H_v =$ $V^2/2g$ (FT)	S_f (FT/FT)	LOSS	HGL		OTHER								
				D / S ELEV.	U / S ELEV.									PIPE	D/S HGL ELEV.	U/S HGL ELEV.		PRESS. FLOW?							
Unit 2 Proposed Condition																									
1000	1094.49	ROUND 18" RCP	0.013	2867.70	2869.35	94.49	1.767	0.375	0.004925	15	8.49	1.118798	0.020308	1.919	2870.53	2872.45	Yes	SDMH2 TO SDDI2							
Unit 1 Interim Condition																									
1000	1094.49	ROUND 18" RCP	0.013	2867.70	2869.35	94.49	1.767	0.375	0.004925	16	9.05	1.272944	0.023106	2.183	2870.56	2872.74	Yes	SDMH2 TO SDDI2							
1000	1020.00	ROUND 18" RCP	0.013	2867.56	2867.7	20	1.767	0.375	0.004925	19.5	11.03	1.890769	0.034321	0.686	2870.01	2870.70	Yes	SDMH1 TO Open Sump (Radley Street)							
$S_f = \Phi H_v / R^{1.33}$																		$\Phi = 2g (n^2) / 2.21$		1 - Where pipes are not under pressure, assume U/S HGL is at top of pipe					

APPENDIX F

Finished Floor Analysis

TRI2101 Iron Mountain - TDS ADD#2
FINISHED FLOOR - CITY OF LAS VEGAS JURISDICTION

INPUT INFORMATION					FINISHED FLOORS					NOTES
Lot Number	Hydraulic Section Utilized	T/C ¹ (ft)	F/L ² (ft)	D ₁₀₀ (ft)	Flowline F.F. _{min} ³ (ft)	T/C + 6" F.F. _{min} ⁴ (ft)	F.F. _{Design} (ft)	Flowline Check	T/C + 6" Check	See References on Last Sheet
1	A1	2905.07	2904.69	0.45	2905.59	2905.57	2906.7	OK	OK	
2	A1	2903.46	2903.08	0.45	2903.98	2903.96	2905.1	OK	OK	
3	A1	2902.10	2901.72	0.45	2902.62	2902.60	2903.6	OK	OK	
4	A1	2900.49	2900.11	0.45	2901.01	2900.99	2902.0	OK	OK	
5	A1	2898.12	2897.74	0.45	2898.64	2898.62	2899.6	OK	OK	
6	A1	2895.29	2894.91	0.45	2895.81	2895.79	2896.8	OK	OK	
7	A1	2892.73	2892.35	0.45	2893.25	2893.23	2894.2	OK	OK	
8	A1	2890.17	2889.79	0.45	2890.69	2890.67	2891.7	OK	OK	
9	A1	2887.61	2887.23	0.45	2888.13	2888.11	2889.1	OK	OK	
10	A1	2885.05	2884.67	0.45	2885.57	2885.55	2886.6	OK	OK	
11	A1	2882.50	2882.12	0.45	2883.02	2883.00	2884.0	OK	OK	
12	A1	2880.05	2879.67	0.45	2880.57	2880.55	2881.6	OK	OK	
13	A1	2878.12	2877.74	0.45	2878.64	2878.62	2879.6	OK	OK	Lot is located near a high point and flow depth considered negligible. Therefore, finished floor is considered adequately elevated.
14	B	2877.29	2876.91	0.68	2878.27	2877.79	2878.2	CHECK	OK	
15	B	2876.35	2875.97	0.68	2877.33	2876.85	2878.0	OK	OK	
16	B	2875.99	2875.61	0.68	2876.97	2876.49	2877.6	OK	OK	
17	B	2875.63	2875.25	0.68	2876.61	2876.13	2877.2	OK	OK	
18	B	2875.26	2874.88	0.68	2876.24	2875.76	2876.9	OK	OK	
19	B	2874.90	2874.52	0.68	2875.88	2875.40	2876.5	OK	OK	
20	B	2874.53	2874.15	0.68	2875.51	2875.03	2876.1	OK	OK	
21	B	2874.17	2873.79	0.68	2875.15	2874.67	2875.8	OK	OK	
22	B	2873.70	2873.32	0.68	2874.68	2874.20	2875.3	OK	OK	
23	E1 (Interim)	2873.12	2872.74	0.63	2874.00	2873.62	2874.7	OK	OK	
24	E1 (Interim)	2872.80	2872.42	0.63	2873.68	2873.30	2874.4	OK	OK	
25	E2 (Interim)	2876.65	2876.27	0.51	2877.29	2877.15	2878.2	OK	OK	
26	E2 (Interim)	2878.33	2877.95	0.51	2878.97	2878.83	2879.8	OK	OK	
27	E2 (Interim)	2880.44	2880.06	0.51	2881.08	2880.94	2881.9	OK	OK	
28	E2 (Interim)	2882.58	2882.20	0.51	2883.22	2883.08	2884.1	OK	OK	
29	E2 (Interim)	2884.72	2884.34	0.51	2885.36	2885.22	2886.2	OK	OK	
30	E2 (Interim)	2886.86	2886.48	0.51	2887.50	2887.36	2888.4	OK	OK	
31	E2 (Interim)	2889.00	2888.62	0.51	2889.64	2889.50	2890.5	OK	OK	

TRI2101 Iron Mountain - TDS ADD#2 FINISHED FLOOR - CITY OF LAS VEGAS JURISDICTION										
INPUT INFORMATION				FINISHED FLOORS					NOTES	
Lot Number	Hydraulic Section Utilized	T/C ¹ (ft)	F/L ² (ft)	D ₁₀₀ (ft)	Flowline F.F. _{min} ³ (ft)	T/C + 6" F.F. _{min} ⁴ (ft)	F.F. _{Design} (ft)	Flowline Check	T/C + 6" Check	See References on Last Sheet
32	E2 (Interim)	2891.14	2890.76	0.51	2891.78	2891.64	2892.6	OK	OK	
33	E2 (Interim)	2893.28	2892.90	0.51	2893.92	2893.78	2894.8	OK	OK	
34	E2 (Interim)	2895.42	2895.04	0.51	2896.06	2895.92	2896.9	OK	OK	
35	E2 (Interim)	2897.55	2897.17	0.51	2898.19	2898.05	2899.1	OK	OK	
36	D2	2899.50	2899.12	0.33	2899.78	2900.00	2901.0	OK	OK	
37	D2	2901.16	2900.78	0.33	2901.44	2901.66	2902.7	OK	OK	
38	D2	2902.88	2902.50	0.33	2903.16	2903.38	2904.4	OK	OK	
39	C	2874.67	2874.29	0.57	2875.43	2875.17	2876.3	OK	OK	
40	C	2875.04	2874.66	0.57	2875.80	2875.54	2876.7	OK	OK	
41	C	2875.40	2875.02	0.57	2876.16	2875.90	2877.1	OK	OK	
42	C	2875.77	2875.39	0.57	2876.53	2876.27	2877.5	OK	OK	
43	C	2876.13	2875.75	0.57	2876.89	2876.63	2877.9	OK	OK	
44	C	2876.52	2876.14	0.57	2877.28	2877.02	2878.4	OK	OK	
45	G2	2882.75	2882.37	0.4	2883.17	2883.25	2884.4	OK	OK	
46	G2	2882.27	2881.89	0.4	2882.69	2882.77	2883.9	OK	OK	
47	G2	2881.88	2881.50	0.4	2882.30	2882.38	2883.5	OK	OK	
48	G2	2881.48	2881.10	0.4	2881.90	2881.98	2883.1	OK	OK	
49	G2	2881.09	2880.71	0.4	2881.51	2881.59	2882.6	OK	OK	
50	G2	2880.29	2879.91	0.4	2880.71	2880.79	2881.8	OK	OK	
51	G3	2881.52	2881.14	0.36	2881.86	2882.02	2883.1	OK	OK	
52	G3	2881.81	2881.43	0.36	2882.15	2882.31	2883.5	OK	OK	
53	G3	2882.20	2881.82	0.36	2882.54	2882.70	2883.9	OK	OK	
54	G3	2882.60	2882.22	0.36	2882.94	2883.10	2884.3	OK	OK	
55	G3	2883.00	2882.62	0.36	2883.34	2883.50	2884.7	OK	OK	
56	G3	2883.42	2883.04	0.36	2883.76	2883.92	2885.1	OK	OK	
57	G1	2893.30	2892.92	0.36	2893.64	2893.80	2894.8	OK	OK	
58	G1	2892.54	2892.16	0.36	2892.88	2893.04	2894.0	OK	OK	
59	G1	2891.90	2891.52	0.36	2892.24	2892.40	2893.4	OK	OK	
60	G1	2891.27	2890.89	0.36	2891.61	2891.77	2892.8	OK	OK	
61	G1	2890.63	2890.25	0.36	2890.97	2891.13	2892.1	OK	OK	
62	G1	2889.42	2889.04	0.36	2889.76	2889.92	2890.9	OK	OK	
63	G1	2890.17	2889.79	0.36	2890.51	2890.67	2891.8	OK	OK	
64	G1	2890.76	2890.38	0.36	2891.10	2891.26	2892.4	OK	OK	

TRI2101 Iron Mountain - TDS ADD#2
FINISHED FLOOR - CITY OF LAS VEGAS JURISDICTION

INPUT INFORMATION					FINISHED FLOORS					NOTES
Lot Number	Hydraulic Section Utilized	T/C ¹ (ft)	F/L ² (ft)	D ₁₀₀ (ft)	Flowline F.F. _{min} ³ (ft)	T/C + 6" F.F. _{min} ⁴ (ft)	F.F. _{Design} (ft)	Flowline Check	T/C + 6" Check	
65	G1	2891.40	2891.02	0.36	2891.74	2891.90	2893.0	OK	OK	See References on Last Sheet
66	G1	2892.03	2891.65	0.36	2892.37	2892.53	2893.6	OK	OK	
67	G1	2892.67	2892.29	0.36	2893.01	2893.17	2894.3	OK	OK	
68	G1	2893.34	2892.96	0.36	2893.68	2893.84	2894.9	OK	OK	
69	G1	2902.22	2901.84	0.36	2902.56	2902.72	2903.7	OK	OK	
70	G1	2901.40	2901.02	0.36	2901.74	2901.90	2902.9	OK	OK	
71	G1	2900.72	2900.34	0.36	2901.06	2901.22	2902.2	OK	OK	
72	G1	2900.04	2899.66	0.36	2900.38	2900.54	2901.5	OK	OK	
73	G1	2899.36	2898.98	0.36	2899.70	2899.86	2900.9	OK	OK	
74	G1	2898.11	2897.73	0.36	2898.45	2898.61	2899.6	OK	OK	
75	G1	2898.82	2898.44	0.36	2899.16	2899.32	2900.5	OK	OK	
76	G1	2899.50	2899.12	0.36	2899.84	2900.00	2901.1	OK	OK	
77	G1	2900.18	2899.80	0.36	2900.52	2900.68	2901.8	OK	OK	
78	G1	2900.86	2900.48	0.36	2901.20	2901.36	2902.5	OK	OK	
79	G1	2906.48	2906.10	0.36	2906.82	2906.98	2908.0	OK	OK	
80	G1	2905.93	2905.55	0.36	2906.27	2906.43	2907.4	OK	OK	
81	G1	2905.37	2904.99	0.36	2905.71	2905.87	2906.9	OK	OK	
82	G1	2904.82	2904.44	0.36	2905.16	2905.32	2906.3	OK	OK	
TOWNHOME LOTS										
83	G1	2908.93	2908.55	0.36	2909.27	2909.43	2911.0	OK	OK	
84	G1	2909.35	2908.97	0.36	2909.69	2909.85	2911.3	OK	OK	
85	G1	2909.67	2909.29	0.36	2910.01	2910.17	2911.6	OK	OK	
86	G1	2910.04	2909.66	0.36	2910.38	2910.54	2911.5	OK	OK	
87	G1	2910.21	2909.83	0.36	2910.55	2910.71	2911.8	OK	OK	
88	G1	2910.35	2909.97	0.36	2910.69	2910.85	2912.1	OK	OK	
89	G1	2910.61	2910.23	0.36	2910.95	2911.11	2912.2	OK	OK	
90	G1	2910.78	2910.40	0.36	2911.12	2911.28	2912.4	OK	OK	
91	G1	2910.95	2910.57	0.36	2911.29	2911.45	2912.7	OK	OK	
92	G1	2911.09	2910.71	0.36	2911.43	2911.59	2913.0	OK	OK	
93	G1	2911.14	2910.76	0.36	2911.48	2911.64	2913.1	OK	OK	
94	G1	2911.00	2910.62	0.36	2911.34	2911.50	2912.8	OK	OK	
95	G1	2910.81	2910.43	0.36	2911.15	2911.31	2912.5	OK	OK	
96	G1	2910.66	2910.28	0.36	2911.00	2911.16	2912.3	OK	OK	

TRI2101 Iron Mountain - TDS ADD#2 FINISHED FLOOR - CITY OF LAS VEGAS JURISDICTION											
INPUT INFORMATION				FINISHED FLOORS					NOTES		
Lot Number	Hydraulic Section Utilized	T/C ¹ (ft)	F/L ² (ft)	D ₁₀₀ (ft)	Flowline F.F. _{min} ³ (ft)	T/C + 6" F.F. _{min} ⁴ (ft)	F.F. _{Design} (ft)	Flowline Check	T/C + 6" Check	See References on Last Sheet	
97	G1	2910.40	2910.02	0.36	2910.74	2910.90	2912.4	OK	OK		
98	G1	2910.26	2909.88	0.36	2910.60	2910.76	2912.1	OK	OK		
99	G1	2910.08	2909.70	0.36	2910.42	2910.58	2911.8	OK	OK		
100	G1	2909.92	2909.54	0.36	2910.26	2910.42	2911.6	OK	OK		
101	G1	2909.59	2909.21	0.36	2909.93	2910.09	2911.6	OK	OK		
102	G1	2909.42	2909.04	0.36	2909.76	2909.92	2911.3	OK	OK		
103	G1	2909.19	2908.81	0.36	2909.53	2909.69	2911.0	OK	OK		
104	G1	2908.98	2908.60	0.36	2909.32	2909.48	2910.8	OK	OK		
105	G1	2914.05	2913.67	0.36	2914.39	2914.55	2916.5	OK	OK		
106	G1	2914.64	2914.26	0.36	2914.98	2915.14	2916.7	OK	OK		
107	G1	2915.17	2914.79	0.36	2915.51	2915.67	2917.0	OK	OK		
108	G1	2915.43	2915.05	0.36	2915.77	2915.93	2917.3	OK	OK		
109	G1	2915.69	2915.31	0.36	2916.03	2916.19	2917.2	OK	OK		
110	G1	2915.85	2915.47	0.36	2916.19	2916.35	2917.4	OK	OK		
111	G1	2916.01	2915.63	0.36	2916.35	2916.51	2917.7	OK	OK		
112	G1	2916.14	2915.76	0.36	2916.48	2916.64	2918.0	OK	OK		
113	G1	2916.39	2916.01	0.36	2916.73	2916.89	2917.9	OK	OK		
114	G1	2916.54	2916.16	0.36	2916.88	2917.04	2918.1	OK	OK		
115	G1	2916.71	2916.33	0.36	2917.05	2917.21	2918.4	OK	OK		
116	G1	2916.84	2916.46	0.36	2917.18	2917.34	2918.7	OK	OK		
117	G1	2916.98	2916.60	0.36	2917.32	2917.48	2918.9	OK	OK		
118	G1	2916.85	2916.47	0.36	2917.19	2917.35	2918.6	OK	OK		
119	G1	2916.69	2916.31	0.36	2917.03	2917.19	2918.3	OK	OK		
120	G1	2916.53	2916.15	0.36	2916.87	2917.03	2918.1	OK	OK		
121	G1	2916.29	2915.91	0.36	2916.63	2916.79	2918.3	OK	OK		
122	G1	2916.16	2915.78	0.36	2916.50	2916.66	2918.0	OK	OK		
123	G1	2915.99	2915.61	0.36	2916.33	2916.49	2917.7	OK	OK		
124	G1	2915.84	2915.46	0.36	2916.18	2916.34	2917.5	OK	OK		
125	G1	2915.59	2915.21	0.36	2915.93	2916.09	2917.6	OK	OK		
126	G1	2915.45	2915.07	0.36	2915.79	2915.95	2917.3	OK	OK		
127	G1	2915.11	2914.73	0.36	2915.45	2915.61	2917.0	OK	OK		
128	G1	2914.73	2914.35	0.36	2915.07	2915.23	2916.8	OK	OK		
129	G2	2919.82	2919.44	0.4	2920.24	2920.32	2922.3	OK	OK		

TRI2101 Iron Mountain - TDS ADD#2 FINISHED FLOOR - CITY OF LAS VEGAS JURISDICTION											
INPUT INFORMATION				FINISHED FLOORS						NOTES	
Lot Number	Hydraulic Section Utilized	T/C ¹ (ft)	F/L ² (ft)	D ₁₀₀ (ft)	Flowline F.F. _{min} ³ (ft)	T/C + 6" F.F. _{min} ⁴ (ft)	F.F. _{Design} (ft)	Flowline Check	T/C + 6" Check	See References on Last Sheet	
130	G2	2920.39	2920.01	0.4	2920.81	2920.89	2922.5	OK	OK		
131	G2	2920.86	2920.48	0.4	2921.28	2921.36	2922.8	OK	OK		
132	G2	2921.14	2920.76	0.4	2921.56	2921.64	2923.1	OK	OK		
133	G2	2921.45	2921.07	0.4	2921.87	2921.95	2923.0	OK	OK		
134	G2	2921.61	2921.23	0.4	2922.03	2922.11	2923.2	OK	OK		
135	G2	2921.77	2921.39	0.4	2922.19	2922.27	2923.5	OK	OK		
136	G2	2921.90	2921.52	0.4	2922.32	2922.40	2923.8	OK	OK		
137	G2	2922.15	2921.77	0.4	2922.57	2922.65	2923.8	OK	OK		
138	G2	2922.30	2921.92	0.4	2922.72	2922.80	2924.0	OK	OK		
139	G2	2922.47	2922.09	0.4	2922.89	2922.97	2924.3	OK	OK		
140	G2	2922.60	2922.22	0.4	2923.02	2923.10	2924.6	OK	OK		
141	G3	2923.16	2922.78	0.36	2923.50	2923.66	2925.1	OK	OK		
142	G3	2923.03	2922.65	0.36	2923.37	2923.53	2924.8	OK	OK		
143	G3	2922.87	2922.49	0.36	2923.21	2923.37	2924.5	OK	OK		
144	G3	2922.71	2922.33	0.36	2923.05	2923.21	2924.3	OK	OK		
145	G3	2922.47	2922.09	0.36	2922.81	2922.97	2924.4	OK	OK		
146	G3	2922.34	2921.96	0.36	2922.68	2922.84	2924.1	OK	OK		
147	G3	2922.17	2921.79	0.36	2922.51	2922.67	2923.8	OK	OK		
148	G3	2922.02	2921.64	0.36	2922.36	2922.52	2923.6	OK	OK		
149	G3	2921.63	2921.25	0.36	2921.97	2922.13	2923.7	OK	OK		
150	G3	2921.30	2920.92	0.36	2921.64	2921.80	2923.4	OK	OK		
151	G3	2920.77	2920.39	0.36	2921.11	2921.27	2923.1	OK	OK		
152	G3	2920.44	2920.06	0.36	2920.78	2920.94	2922.9	OK	OK		
153	G3	2925.36	2924.98	0.36	2925.70	2925.86	2927.3	OK	OK		
154	G3	2925.62	2925.24	0.36	2925.96	2926.12	2927.5	OK	OK		
155	G3	2925.90	2925.52	0.36	2926.24	2926.40	2927.8	OK	OK		
156	G3	2926.11	2925.73	0.36	2926.45	2926.61	2928.1	OK	OK		
157	G3	2926.52	2926.14	0.36	2926.86	2927.02	2928.5	OK	OK		
158	G3	2926.78	2926.40	0.36	2927.12	2927.28	2928.7	OK	OK		
159	G3	2927.05	2926.67	0.36	2927.39	2927.55	2929.0	OK	OK		
160	G3	2927.27	2926.89	0.36	2927.61	2927.77	2929.3	OK	OK		
161	G3	2927.68	2927.30	0.36	2928.02	2928.18	2929.7	OK	OK		
162	G3	2927.94	2927.56	0.36	2928.28	2928.44	2929.9	OK	OK		

TRI2101 Iron Mountain - TDS ADD#2 FINISHED FLOOR - CITY OF LAS VEGAS JURISDICTION										
INPUT INFORMATION				FINISHED FLOORS					NOTES	
Lot Number	Hydraulic Section Utilized	T/C ¹ (ft)	F/L ² (ft)	D ₁₀₀ (ft)	Flowline F.F. _{min} ³ (ft)	T/C + 6" F.F. _{min} ⁴ (ft)	F.F. _{Design} (ft)	Flowline Check	T/C + 6" Check	See References on Last Sheet
163	G3	2928.21	2927.83	0.36	2928.55	2928.71	2930.2	OK	OK	
164	G3	2928.43	2928.05	0.36	2928.77	2928.93	2930.5	OK	OK	
165	D2	2903.87	2903.49	0.33	2904.15	2904.37	2906.2	OK	OK	
166	D2	2904.79	2904.41	0.33	2905.07	2905.29	2906.9	OK	OK	
167	D2	2905.71	2905.33	0.33	2905.99	2906.21	2907.6	OK	OK	
168	D2	2906.33	2905.95	0.33	2906.61	2906.83	2908.2	OK	OK	
169	D2	2907.58	2907.20	0.33	2907.86	2908.08	2909.7	OK	OK	
170	D2	2908.41	2908.03	0.33	2908.69	2908.91	2910.4	OK	OK	
171	D2	2909.29	2908.91	0.33	2909.57	2909.79	2911.1	OK	OK	
172	D2	2909.97	2909.59	0.33	2910.25	2910.47	2911.7	OK	OK	
173	D1	2911.92	2911.54	0.32	2912.18	2912.42	2914.1	OK	OK	
174	D1	2912.75	2912.37	0.32	2913.01	2913.25	2914.8	OK	OK	
175	D1	2913.63	2913.25	0.32	2913.89	2914.13	2915.5	OK	OK	
176	D1	2914.31	2913.93	0.32	2914.57	2914.81	2916.1	OK	OK	
177	D1	2915.62	2915.24	0.32	2915.88	2916.12	2917.8	OK	OK	
178	D1	2916.46	2916.08	0.32	2916.72	2916.96	2918.5	OK	OK	
179	D1	2917.33	2916.95	0.32	2917.59	2917.83	2919.2	OK	OK	
180	D1	2918.01	2917.63	0.32	2918.27	2918.51	2919.8	OK	OK	
181	D1	2919.32	2918.94	0.32	2919.58	2919.82	2921.5	OK	OK	
182	D1	2920.16	2919.78	0.32	2920.42	2920.66	2922.2	OK	OK	
183	D1	2921.04	2920.66	0.32	2921.30	2921.54	2922.9	OK	OK	
184	D1	2921.72	2921.34	0.32	2921.98	2922.22	2923.5	OK	OK	
185	F1	2925.08	2924.70	0.4	2925.50	2925.58	2926.9	OK	OK	
186	F1	2925.34	2924.96	0.4	2925.76	2925.84	2927.1	OK	OK	
187	F1	2925.62	2925.24	0.4	2926.04	2926.12	2927.4	OK	OK	
188	F1	2925.83	2925.45	0.4	2926.25	2926.33	2927.7	OK	OK	
189	F1	2926.24	2925.86	0.4	2926.66	2926.74	2928.1	OK	OK	
190	F1	2926.50	2926.12	0.4	2926.92	2927.00	2928.3	OK	OK	
191	F1	2926.78	2926.40	0.4	2927.20	2927.28	2928.6	OK	OK	
192	F1	2926.99	2926.61	0.4	2927.41	2927.49	2928.9	OK	OK	
193	F1	2927.40	2927.02	0.4	2927.82	2927.90	2929.3	OK	OK	
194	F1	2927.66	2927.28	0.4	2928.08	2928.16	2929.5	OK	OK	
195	F1	2927.93	2927.55	0.4	2928.35	2928.43	2929.8	OK	OK	

TRI2101 Iron Mountain - TDS ADD#2 FINISHED FLOOR - CITY OF LAS VEGAS JURISDICTION										
INPUT INFORMATION				FINISHED FLOORS					NOTES	
Lot Number	Hydraulic Section Utilized	T/C ¹ (ft)	F/L ² (ft)	D ₁₀₀ (ft)	Flowline F.F. _{min} ³ (ft)	T/C + 6" F.F. _{min} ⁴ (ft)	F.F. Design (ft)	Flowline Check	T/C + 6" Check	See References on Last Sheet
196	F1	2928.15	2927.77	0.4	2928.57	2928.65	2930.1	OK	OK	
197	F1	2928.54	2928.16	0.4	2928.96	2929.04	2930.4	OK	OK	
198	F1	2928.75	2928.37	0.4	2929.17	2929.25	2930.6	OK	OK	
199	F1	2929.03	2928.65	0.4	2929.45	2929.53	2930.9	OK	OK	
200	F1	2929.29	2928.91	0.4	2929.71	2929.79	2931.2	OK	OK	
201	A3	2931.39	2931.01	0.32	2931.65	2931.89	2933.2	OK	OK	
202	A3	2930.67	2930.29	0.32	2930.93	2931.17	2932.6	OK	OK	
203	A3	2929.73	2929.35	0.32	2929.99	2930.23	2931.9	OK	OK	
204	A3	2928.35	2927.97	0.32	2928.61	2928.85	2930.1	OK	OK	
205	A3	2927.63	2927.25	0.32	2927.89	2928.13	2929.5	OK	OK	
206	A3	2926.69	2926.31	0.32	2926.95	2927.19	2928.8	OK	OK	
207	A3	2925.31	2924.93	0.32	2925.57	2925.81	2927.1	OK	OK	
208	A3	2924.59	2924.21	0.32	2924.85	2925.09	2926.5	OK	OK	
209	A3	2923.65	2923.27	0.32	2923.91	2924.15	2925.8	OK	OK	
210	A3	2922.77	2922.39	0.32	2923.03	2923.27	2925.1	OK	OK	
211	A3	2921.38	2921.00	0.32	2921.64	2921.88	2923.2	OK	OK	
212	A3	2920.66	2920.28	0.32	2920.92	2921.16	2922.6	OK	OK	
213	A3	2919.73	2919.35	0.32	2919.99	2920.23	2921.9	OK	OK	
214	A3	2918.84	2918.46	0.32	2919.10	2919.34	2921.2	OK	OK	
215	A2	2917.45	2917.07	0.38	2917.83	2917.95	2919.3	OK	OK	
216	A2	2916.73	2916.35	0.38	2917.11	2917.23	2918.7	OK	OK	
217	A2	2915.80	2915.42	0.38	2916.18	2916.30	2918.0	OK	OK	
218	A2	2914.91	2914.53	0.38	2915.29	2915.41	2917.3	OK	OK	
219	A2	2913.53	2913.15	0.38	2913.91	2914.03	2915.6	OK	OK	

TRI2101 Iron Mountain - TDS ADD#2
FINISHED FLOOR - CITY OF LAS VEGAS JURISDICTION

INPUT INFORMATION					FINISHED FLOORS					NOTES
Lot Number	Hydraulic Section Utilized	T/C ¹ (ft)	F/L ² (ft)	D ₁₀₀ (ft)	Flowline F.F. _{min} ³ (ft)	T/C + 6" F.F. _{min} ⁴ (ft)	F.F. ^{Design} (ft)	Flowline Check	T/C + 6" Check	See References on Last Sheet
220	A2	2912.81	2912.43	0.38	2913.19	2913.31	2915.0	OK	OK	
221	A2	2912.04	2911.66	0.38	2912.42	2912.54	2914.3	OK	OK	
222	A2	2911.39	2911.01	0.38	2911.77	2911.89	2913.6	OK	OK	
223	A2	2910.35	2909.97	0.38	2910.73	2910.85	2912.4	OK	OK	
224	A2	2909.73	2909.35	0.38	2910.11	2910.23	2911.8	OK	OK	
225	A2	2908.90	2908.52	0.38	2909.28	2909.40	2911.1	OK	OK	
226	A2	2908.12	2907.74	0.38	2908.50	2908.62	2910.4	OK	OK	

Where:

- 1: Top of Curb at High Side of Lot, or for townhomes at top of driveway TC.
- 2: TC-0.38 (For Roll Curb), TC-0.5 (For L Curb)
- 3: Minimum Allowable Finished Floor Elevation above flowline elevation @ high side of lot = (2 x D₁₀₀) + F/L
- 4: City of Las Vegas minimum allowable finished floor elevation = T.C. @ high side of lot + 6-inches
- 5: These lots have an adjacent solid grouted wall that protects the FF.

City of Las Vegas Finished Floor Criteria:

- The finished floor shall be set a vertical distance above the gutter flowline of at least twice the depth of flow in the gutter flowline up to a maximum of 18 inches above the WSEL in the street. Per HCDDM, Section 304.4.
- The finished floor shall be set a vertical distance of at least 6-inches above the highest adjacent top of curb. Per HCDDM, Section 1602.

TRI2101 Iron Mountain - TDS GARAGE FINISHED FLOOR - CITY OF LAS VEGAS JURISDICTION										
INPUT INFORMATION				FINISHED FLOORS					NOTES	
Lot Number	Hydraulic Section Utilized	Driveway T/C ¹ (ft)	F/L ² (ft)	D ₁₀₀ (ft)	Flowline G.F.F. ³ _{min} (ft)	T/C + 6" G.F.F. ⁴ _{min} (ft)	G.F.F. _{Design} (ft)	Flowline Check	T/C + 6" Check	See References on Last Sheet
83	F3	2908.93	2908.55	0.37	2909.29	2909.43	2909.5	OK	OK	
84	F3	2909.35	2908.97	0.37	2909.71	2909.85	2910.0	OK	OK	
85	F3	2909.67	2909.29	0.37	2910.03	2910.17	2910.1	OK	CHECK	
86	F3	2910.04	2909.66	0.37	2910.40	2910.54	2910.4	OK	CHECK	
87	F3	2910.21	2909.83	0.37	2910.57	2910.71	2910.7	OK	CHECK	
88	F3-2	2910.35	2909.97	0.31	2910.59	2910.85	2910.6	OK	CHECK	
89	F3	2910.61	2910.23	0.37	2910.97	2911.11	2911.1	OK	CHECK	
90	F3	2910.78	2910.40	0.37	2911.14	2911.28	2911.3	OK	OK	
91	F3	2910.95	2910.57	0.37	2911.31	2911.45	2911.6	OK	OK	
92	F3	2911.09	2910.71	0.37	2911.45	2911.59	2911.5	OK	CHECK	
93	F3	2911.14	2910.76	0.37	2911.50	2911.64	2911.6	OK	CHECK	
94	F3	2911.00	2910.62	0.37	2911.36	2911.50	2911.7	OK	OK	
95	F3	2910.81	2910.43	0.37	2911.17	2911.31	2911.4	OK	OK	
96	F3	2910.66	2910.28	0.37	2911.02	2911.16	2911.2	OK	OK	
97	F3	2910.40	2910.02	0.37	2910.76	2910.90	2910.9	OK	OK	
98	F3	2910.26	2909.88	0.37	2910.62	2910.76	2911.0	OK	OK	
99	F3	2910.08	2909.70	0.37	2910.44	2910.58	2910.7	OK	OK	
100	F3	2909.92	2909.54	0.37	2910.28	2910.42	2910.5	OK	OK	
101	F3	2909.59	2909.21	0.37	2909.95	2910.09	2910.1	OK	OK	
102	F3	2909.42	2909.04	0.37	2909.78	2909.92	2910.2	OK	OK	
103	F3	2909.19	2908.81	0.37	2909.55	2909.69	2909.9	OK	OK	
104	F3	2908.98	2908.60	0.37	2909.34	2909.48	2909.7	OK	OK	
105	F3	2914.05	2913.67	0.37	2914.41	2914.55	2914.5	OK	CHECK	
106	F3	2914.64	2914.26	0.37	2915.00	2915.14	2915.1	OK	CHECK	
107	F3	2915.17	2914.79	0.37	2915.53	2915.67	2915.7	OK	OK	
108	F3	2915.43	2915.05	0.37	2915.79	2915.93	2915.8	OK	CHECK	
109	F3	2915.69	2915.31	0.37	2916.05	2916.19	2916.1	OK	CHECK	
110	F3	2915.85	2915.47	0.37	2916.21	2916.35	2916.3	OK	CHECK	
111	F3	2916.01	2915.63	0.37	2916.37	2916.51	2916.6	OK	OK	
112	F3	2916.14	2915.76	0.37	2916.50	2916.64	2916.5	OK	CHECK	
113	F3	2916.39	2916.01	0.37	2916.75	2916.89	2916.8	OK	CHECK	
114	F3	2916.54	2916.16	0.37	2916.90	2917.04	2917.0	OK	CHECK	

TRI2101 Iron Mountain - TDS GARAGE FINISHED FLOOR - CITY OF LAS VEGAS JURISDICTION										
INPUT INFORMATION					FINISHED FLOORS					NOTES
Lot Number	Hydraulic Section Utilized	Driveway T/C ¹ (ft)	F/L ² (ft)	D ₁₀₀ (ft)	Flowline G.F.F. ³ (ft)	T/C + 6" G.F.F. ⁴ (ft)	G.F.F. - Design (ft)	Flowline Check	T/C + 6" Check	See References on Last Sheet
115	F3	2916.71	2916.33	0.37	2917.07	2917.21	2917.3	OK	OK	
116	F3	2916.84	2916.46	0.37	2917.20	2917.34	2917.2	OK	CHECK	
117	F3	2916.98	2916.60	0.37	2917.34	2917.48	2917.4	OK	CHECK	
118	F3	2916.85	2916.47	0.37	2917.21	2917.35	2917.5	OK	OK	
119	F3	2916.69	2916.31	0.37	2917.05	2917.19	2917.2	OK	OK	
120	F3	2916.53	2916.15	0.37	2916.89	2917.03	2917.0	OK	CHECK	
121	F3	2916.29	2915.91	0.37	2916.65	2916.79	2916.8	OK	OK	
122	F3	2916.16	2915.78	0.37	2916.52	2916.66	2916.9	OK	OK	
123	F3	2915.99	2915.61	0.37	2916.35	2916.49	2916.6	OK	OK	
124	F3	2915.84	2915.46	0.37	2916.20	2916.34	2916.4	OK	OK	
125	F3	2915.59	2915.21	0.37	2915.95	2916.09	2916.1	OK	OK	
126	F3	2915.45	2915.07	0.37	2915.81	2915.95	2916.1	OK	OK	
127	F3	2915.11	2914.73	0.37	2915.47	2915.61	2915.7	OK	OK	
128	F3	2914.73	2914.35	0.37	2915.09	2915.23	2915.5	OK	OK	
129	F2	2919.82	2919.44	0.39	2920.22	2920.32	2920.4	OK	OK	
130	F2	2920.39	2920.01	0.39	2920.79	2920.89	2920.9	OK	OK	
131	F2	2920.86	2920.48	0.39	2921.26	2921.36	2921.5	OK	OK	
132	F2	2921.14	2920.76	0.39	2921.54	2921.64	2921.6	OK	CHECK	
133	F2	2921.45	2921.07	0.39	2921.85	2921.95	2921.9	OK	CHECK	
134	F2	2921.61	2921.23	0.39	2922.01	2922.11	2922.1	OK	CHECK	
135	F2	2921.77	2921.39	0.39	2922.17	2922.27	2922.4	OK	OK	
136	F2-2	2921.90	2921.52	0.32	2922.16	2922.40	2922.3	OK	CHECK	
137	F2	2922.15	2921.77	0.39	2922.55	2922.65	2922.7	OK	OK	
138	F2	2922.30	2921.92	0.39	2922.70	2922.80	2922.9	OK	OK	
139	F2	2922.47	2922.09	0.39	2922.87	2922.97	2923.2	OK	OK	
140	F2	2922.60	2922.22	0.39	2923.00	2923.10	2923.1	OK	OK	Lot is located at high point and flow depth considered negligible. Therefore, finished floor is considered adequately elevated.
141	F1	2923.16	2922.78	0.40	2923.58	2923.66	2923.6	OK	CHECK	

TR12101 Iron Mountain - TDS GARAGE FINISHED FLOOR - CITY OF LAS VEGAS JURISDICTION											
INPUT INFORMATION				FINISHED FLOORS					NOTES		
Lot Number	Hydraulic Section Utilized	Driveway T/C ¹ (ft)	F/L ² (ft)	D ₁₀₀ (ft)	Flowline G.F.F. ³ ·min (ft)	T/C + 6" G.F.F. ⁴ ·min (ft)	G.F.F. ⁵ ·Design (ft)	Flowline Check	T/C + 6" Check	See References on Last Sheet	
142	F1	2923.03	2922.65	0.40	2923.45	2923.53	2923.7	OK	OK		
143	F1	2922.87	2922.49	0.40	2923.29	2923.37	2923.4	OK	OK		
144	F1	2922.71	2922.33	0.40	2923.13	2923.21	2923.2	OK	CHECK		
145	F1	2922.47	2922.09	0.40	2922.89	2922.97	2922.9	OK	CHECK		
146	F1	2922.34	2921.96	0.40	2922.76	2922.84	2923.0	OK	OK		
147	F1	2922.17	2921.79	0.40	2922.59	2922.67	2922.7	OK	OK		
148	F1	2922.02	2921.64	0.40	2922.44	2922.52	2922.5	OK	CHECK		
149	F1	2921.63	2921.25	0.40	2922.05	2922.13	2922.2	OK	OK		
150	F1	2921.30	2920.92	0.40	2921.72	2921.80	2921.9	OK	OK		
151	F1	2920.77	2920.39	0.40	2921.19	2921.27	2921.4	OK	OK		
152	F1	2920.44	2920.06	0.40	2920.86	2920.94	2921.1	OK	OK		
153	F1	2925.36	2924.98	0.40	2925.78	2925.86	2926.2	OK	OK		
154	F1	2925.62	2925.24	0.40	2926.04	2926.12	2926.4	OK	OK		
155	F1	2925.90	2925.52	0.40	2926.32	2926.40	2926.7	OK	OK		
156	F1	2926.11	2925.73	0.40	2926.53	2926.61	2926.6	OK	CHECK		
157	F1	2926.52	2926.14	0.40	2926.94	2927.02	2927.4	OK	OK		
158	F1	2926.78	2926.40	0.40	2927.20	2927.28	2927.6	OK	OK		
159	F1	2927.05	2926.67	0.40	2927.47	2927.55	2927.9	OK	OK		
160	F1	2927.27	2926.89	0.40	2927.69	2927.77	2927.8	OK	OK		
161	F1	2927.68	2927.30	0.40	2928.10	2928.18	2928.6	OK	OK		
162	F1	2927.94	2927.56	0.40	2928.36	2928.44	2928.8	OK	OK		
163	F1	2928.21	2927.83	0.40	2928.63	2928.71	2929.1	OK	OK		
164	F1	2928.43	2928.05	0.40	2928.85	2928.93	2929.0	OK	OK		
165	D2-2	2903.87	2903.49	0.30	2904.09	2904.37	2904.3	OK	CHECK		
166	D2-2	2904.79	2904.41	0.30	2905.01	2905.29	2905.2	OK	CHECK		
167	D2-2	2905.71	2905.33	0.30	2905.93	2906.21	2906.0	OK	CHECK		
168	D2-2	2906.33	2905.95	0.30	2906.55	2906.83	2906.7	OK	CHECK		
169	D2-2	2907.58	2907.20	0.30	2907.80	2908.08	2907.8	OK	CHECK		
170	D2-2	2908.41	2908.03	0.30	2908.63	2908.91	2908.7	OK	CHECK		
171	D2-3	2909.29	2908.91	0.27	2909.45	2909.79	2909.5	OK	CHECK		
172	D2-3	2909.97	2909.59	0.27	2910.13	2910.47	2910.2	OK	CHECK		
173	D1	2911.92	2911.54	0.32	2912.18	2912.42	2912.2	OK	CHECK		

TRI2101 Iron Mountain - TDS GARAGE FINISHED FLOOR - CITY OF LAS VEGAS JURISDICTION										
INPUT INFORMATION				FINISHED FLOORS					NOTES	
Lot Number	Hydraulic Section Utilized	Driveway T/C ¹ (ft)	F/L ² (ft)	D ₁₀₀ (ft)	Flowline G.F.F. ³ min (ft)	T/C + 6" G.F.F. ⁴ min (ft)	G.F.F. ⁵ Design (ft)	Flowline Check	T/C + 6" Check	See References on Last Sheet
174	D1	2912.75	2912.37	0.32	2913.01	2913.25	2913.1	OK	CHECK	
175	D1	2913.63	2913.25	0.32	2913.89	2914.13	2913.9	OK	CHECK	
176	D1	2914.31	2913.93	0.32	2914.57	2914.81	2914.6	OK	CHECK	
177	D1	2915.62	2915.24	0.32	2915.88	2916.12	2915.9	OK	CHECK	
178	D1	2916.46	2916.08	0.32	2916.72	2916.96	2916.8	OK	CHECK	
179	D1	2917.33	2916.95	0.32	2917.59	2917.83	2917.6	OK	CHECK	
180	D1	2918.01	2917.63	0.32	2918.27	2918.51	2918.3	OK	CHECK	
181	D1	2919.32	2918.94	0.32	2919.58	2919.82	2919.6	OK	CHECK	
182	D1	2920.16	2919.78	0.32	2920.42	2920.66	2920.5	OK	CHECK	
183	D1	2921.04	2920.66	0.32	2921.30	2921.54	2921.3	OK	CHECK	
184	D1	2921.72	2921.34	0.32	2921.98	2922.22	2922.0	OK	CHECK	
185	F1	2925.08	2924.70	0.40	2925.50	2925.58	2925.8	OK	OK	
186	F1	2925.34	2924.96	0.40	2925.76	2925.84	2926.0	OK	OK	
187	F1	2925.62	2925.24	0.40	2926.04	2926.12	2926.3	OK	OK	
188	F1-3	2925.82	2925.44	0.38	2926.20	2926.32	2926.2	OK	CHECK	
189	F1	2926.24	2925.86	0.40	2926.66	2926.74	2927.0	OK	OK	
190	F1	2926.50	2926.12	0.40	2926.92	2927.00	2927.2	OK	OK	
191	F1	2926.78	2926.40	0.40	2927.20	2927.28	2927.5	OK	OK	
192	F1-2	2926.99	2926.61	0.35	2927.31	2927.49	2927.4	OK	CHECK	
193	F1-2	2927.40	2927.02	0.35	2927.72	2927.90	2928.2	OK	OK	
194	F1	2927.66	2927.28	0.40	2928.08	2928.16	2928.4	OK	OK	
195	F1	2927.93	2927.55	0.40	2928.35	2928.43	2928.7	OK	OK	
196	F1	2928.15	2927.77	0.40	2928.57	2928.65	2928.6	OK	CHECK	
197	F1	2928.54	2928.16	0.40	2928.96	2929.04	2929.3	OK	OK	
198	F1	2928.75	2928.37	0.40	2929.17	2929.25	2929.5	OK	OK	
199	F1	2929.03	2928.65	0.40	2929.45	2929.53	2929.8	OK	OK	
200	F1	2929.29	2928.91	0.40	2929.71	2929.79	2929.7	CHECK	CHECK	Lot is located near a high point and flow depth considered negligible. Therefore, finished floor is considered adequately elevated.

TRI2101 Iron Mountain - TDS GARAGE FINISHED FLOOR - CITY OF LAS VEGAS JURISDICTION										
INPUT INFORMATION				FINISHED FLOORS				NOTES		
Lot Number	Hydraulic Section Utilized	Driveway T/C ¹ (ft)	F/L ² (ft)	D ₁₀₀ (ft)	Flowline G.F.F. ³ .min (ft)	T/C + 6" G.F.F. ⁴ .min (ft)	G.F.F. ⁵ .Design (ft)	Flowline Check	T/C + 6" Check	See References on Last Sheet
201	A3	2931.39	2931.01	0.32	2931.65	2931.89	2931.7	OK	CHECK	
202	A3	2930.67	2930.29	0.32	2930.93	2931.17	2931.0	OK	CHECK	
203	A3	2929.73	2929.35	0.32	2929.99	2930.23	2930.2	OK	CHECK	
204	A3-2	2928.35	2927.97	0.24	2928.45	2928.85	2928.6	OK	CHECK	
205	A3	2927.63	2927.25	0.32	2927.89	2928.13	2927.9	OK	CHECK	
206	A3	2926.69	2926.31	0.32	2926.95	2927.19	2927.1	OK	CHECK	
207	A3	2925.31	2924.93	0.32	2925.57	2925.81	2925.6	OK	CHECK	
208	A3	2924.59	2924.21	0.32	2924.85	2925.09	2924.9	OK	CHECK	
209	A3	2923.65	2923.27	0.32	2923.91	2924.15	2924.1	OK	CHECK	
210	A3	2922.77	2922.39	0.32	2923.03	2923.27	2923.2	OK	CHECK	
211	A3	2921.38	2921.00	0.32	2921.64	2921.88	2921.7	OK	CHECK	
212	A3	2920.66	2920.28	0.32	2920.92	2921.16	2921.0	OK	CHECK	
213	A3	2919.73	2919.35	0.32	2919.99	2920.23	2920.2	OK	CHECK	
214	A3	2918.84	2918.46	0.32	2919.10	2919.34	2919.3	OK	CHECK	
215	A2-2 (3.39%)	2917.45	2917.07	0.35	2917.77	2917.95	2917.8	OK	CHECK	
216	A2-2 (3.39%)	2916.73	2916.35	0.35	2917.05	2917.23	2917.1	OK	CHECK	
217	A2-2 (3.39%)	2915.80	2915.42	0.35	2916.12	2916.30	2916.3	OK	OK	
218	A2-2 (3.39%)	2914.91	2914.53	0.35	2915.23	2915.41	2915.4	OK	CHECK	
219	A2-2 (3.39%)	2913.53	2913.15	0.35	2913.85	2914.03	2914.1	OK	OK	

TRI2101 Iron Mountain - TDS										
GARAGE FINISHED FLOOR - CITY OF LAS VEGAS JURISDICTION										
INPUT INFORMATION				FINISHED FLOORS					NOTES	
Lot Number	Hydraulic Section Utilized	Driveway T/C ¹ (ft)	F/L ² (ft)	D ₁₀₀ (ft)	Flowline G.F.F. ³ min (ft)	T/C + 6" G.F.F. ⁴ min (ft)	G.F.F. Design (ft)	Flowline Check	T/C + 6" Check	See References on Last Sheet
220	A2-2 (2.70%)	2912.81	2912.43	0.36	2913.15	2913.31	2913.4	OK	OK	
221	A2-2 (2.70%)	2912.04	2911.66	0.36	2912.38	2912.54	2912.6	OK	OK	
222	A2-2 (2.70%)	2911.39	2911.01	0.36	2911.73	2911.89	2911.8	OK	CHECK	
223	A2-2 (2.70%)	2910.35	2909.97	0.36	2910.69	2910.85	2910.9	OK	OK	
224	A2	2909.73	2909.35	0.38	2910.11	2910.23	2910.2	OK	CHECK	
225	A2	2908.90	2908.52	0.38	2909.28	2909.40	2909.4	OK	OK	
226	A2	2908.12	2907.74	0.38	2908.50	2908.62	2908.5	OK	CHECK	
Where:										
1: Top of Curb at High Side of Driveway										
2: TC-0.38 (For Roll Curb), TC-0.5 (For L Curb)										
3: Minimum Allowable Finished Floor Elevation above flowline elevation @ high side of lot = (2 x D ₁₀₀) + F/L										
4: City of Las Vegas minimum allowable finished floor elevation = T.C. @ high side of lot + 6-inches										
5: These lots have an adjacent solid grouted wall that protects the FF.										
City of Las Vegas Finished Floor Criteria:										
-The finished floor shall be set a vertical distance above the gutter flowline of at least twice the depth of flow in the gutter flowline up to a maximum of 18 inches above the WSEL in the street. Per HCDDM, Section 304.4.										
-The finished floor shall be set a vertical distance of at least 6-inches above the highest adjacent top of curb. Per HCDDM, Section 1602.										

Supplemental Finish Floor Checks

Adjacent/Perimeter Street Check										
Lot Number	Street	High TC ¹	High FL ²	Section	Flow Depth ³	Min FF ⁴	Design FF	Check	Solid Grout	Notes
1	Iron Mountain Rd	2903.44	2902.94	4	0.37	2903.68	2906.7	OK	No	
2	Iron Mountain Rd	2900.61	2900.11	4	0.37	2900.85	2905.1	OK	No	
3	Iron Mountain Rd	2898.61	2898.11	4	0.37	2898.85	2903.6	OK	No	
4	Iron Mountain Rd	2898.60	2898.10	4	0.37	2898.84	2902.0	OK	No	
5	Iron Mountain Rd	2894.60	2894.10	4	0.37	2894.84	2899.6	OK	No	
6	Iron Mountain Rd	2892.60	2892.10	4	0.37	2892.84	2896.8	OK	No	
7	Iron Mountain Rd	2890.60	2890.10	4	0.37	2890.84	2894.2	OK	No	
8	Iron Mountain Rd	2888.60	2888.10	4	0.37	2888.84	2891.7	OK	No	
9	Iron Mountain Rd	2886.59	2886.09	4	0.37	2886.83	2889.1	OK	No	
10	Iron Mountain Rd	2884.62	2884.12	4	0.37	2884.86	2886.6	OK	No	
11	Iron Mountain Rd	2882.59	2882.09	4	0.37	2882.83	2884.0	OK	No	
12	Iron Mountain Rd	2880.59	2880.09	4	0.37	2880.83	2881.6	OK	No	
13	Iron Mountain Rd	2878.59	2878.09	4	0.37	2878.83	2879.6	OK	No	
24	Radley St	2872.17	2871.67	R1	0.61	2872.89	2874.4	OK	No	
25	Radley St	2876.01	2875.51	R1	0.61	2876.73	2878.2	OK	No	
26	Radley St	2876.01	2875.51	R1	0.61	2876.73	2879.8	OK	No	
27	Radley St	2878.30	2877.80	R1	0.61	2879.02	2881.9	OK	No	
28	Radley St	2880.24	2879.74	R1	0.61	2880.96	2884.1	OK	No	
29	Radley St	2882.18	2881.68	R1	0.61	2882.90	2886.2	OK	No	
30	Radley St	2884.12	2883.62	R1	0.61	2884.84	2888.4	OK	No	
31	Radley St	2886.06	2885.56	R1	0.61	2886.78	2890.5	OK	No	
32	Radley St	2888.00	2887.50	R1	0.61	2888.72	2892.6	OK	No	
33	Radley St	2889.94	2889.44	R1	0.61	2890.66	2894.8	OK	No	
34	Radley St	2891.88	2891.38	R1	0.61	2892.60	2896.9	OK	No	
35	Radley St	2893.82	2893.32	R1	0.61	2894.54	2899.1	OK	No	
36	Radley St	2895.76	2895.26	R1	0.61	2896.48	2901.0	OK	No	
37	Radley St	2897.69	2897.19	R1	0.61	2898.41	2902.7	OK	No	
38	Radley St	2899.70	2899.20	R1	0.61	2900.42	2904.4	OK	No	
39	Vonbulin Ave	2875.83	2875.45	E2 (Interim)	0.51	2876.47	2876.3	CHECK	Yes	See Note 5
44	Havertz Ave	2879.39	2879.01	A1	0.45	2879.91	2878.4	CHECK	Yes	
45	Havertz Ave	2881.61	2881.23	A1	0.45	2882.13	2884.4	OK	No	
50	Vonbulin Ave	2878.44	2878.06	E2 (Interim)	0.51	2879.08	2881.8	OK	No	
51	Vonbulin Ave	2884.39	2884.01	E2 (Interim)	0.51	2885.03	2883.1	CHECK	Yes	
56	Havertz Ave	2888.72	2888.34	A1	0.45	2889.24	2885.1	CHECK	Yes	See Note 5

Supplemental Finish Floor Checks										
Lot Number	Street	High TC ¹	High FL ²	Section	Flow Depth ³	Min FF ⁴	Design FF	Check	Solid Grout	Notes
62	Vonbulin Ave	2887.09	2886.71	E2 (Interim)	0.51	2887.73	2890.9	OK	No	
63	Vonbulin Ave	2893.07	2892.69	E2 (Interim)	0.51	2893.71	2891.8	CHECK	Yes	
68	Havertz Ave	2898.91	2898.53	A1	0.45	2899.43	2894.9	CHECK	Yes	See Note 5
69	Havertz Ave	2901.75	2901.37	A1	0.45	2902.27	2903.7	OK	No	
74	Vonbulin Ave	2895.73	2895.35	E2 (Interim)	0.51	2896.37	2899.6	OK	No	
75	Vonbulin Ave	2901.05	2900.67	E3 (Interim)	0.45	2901.57	2900.5	CHECK	Yes	
82	Vonbulin Ave	2903.14	2902.64	D4	0.48	2903.60	2906.3	OK	No	
83 (GFF)	Landin St	2905.66	2905.28	G2	0.40	2906.08	2909.5	OK	No	
84 (GFF)	Landin St	2905.89	2905.51	G2	0.40	2906.31	2910.0	OK	No	
85 (GFF)	Landin St	2906.28	2905.90	G2	0.40	2906.70	2910.1	OK	No	
86 (GFF)	Landin St	2906.62	2906.24	G2	0.40	2907.04	2910.4	OK	No	
87 (GFF)	Landin St	2906.85	2906.47	G2	0.40	2907.27	2910.7	OK	No	
88 (GFF)	Landin St	2907.24	2906.86	G2	0.40	2907.66	2910.6	OK	No	
89 (GFF)	Landin St	2907.58	2907.20	G2	0.40	2908.00	2911.1	OK	No	
90 (GFF)	Landin St	2907.86	2907.48	G2	0.40	2908.28	2911.3	OK	No	
91 (GFF)	Landin St	2908.09	2907.71	G2	0.40	2908.51	2911.6	OK	No	
92 (GFF)	Landin St	2908.37	2907.99	G2	0.40	2908.79	2911.5	OK	No	
104 (GFF)	Vonbulin Ave	2910.88	2910.38	D4	0.48	2911.34	2909.7	CHECK	Yes	
105 (GFF)	Vonbulin Ave	2912.43	2911.93	D4	0.48	2912.89	2914.5	OK	No	
117 (GFF)	Havertz Ave	2920.46	2920.08	A1	0.45	2920.98	2917.4	CHECK	Yes	See Note 5
140 (GFF)	Havertz Ave	2922.05	2921.67	A1	0.45	2922.57	2923.1	OK	No	
152 (GFF)	Vonbulin Ave	2922.13	2921.63	D4	0.48	2922.59	2921.1	CHECK	Yes	See Note 5
153 (GFF)	Vonbulin Ave	2923.84	2923.34	D4	0.48	2924.30	2926.2	OK	No	
165 (GFF)	Radley St	2900.90	2900.40	R1	0.61	2901.62	2904.3	OK	No	
166 (GFF)	Radley St	2902.07	2901.57	R1	0.61	2902.79	2905.2	OK	No	
167 (GFF)	Radley St	2902.66	2902.16	R1	0.61	2903.38	2906.0	OK	No	
168 (GFF)	Radley St	2904.02	2903.52	R1	0.61	2904.74	2906.7	OK	No	
169 (GFF)	Radley St	2905.22	2904.72	R1	0.61	2905.94	2907.8	OK	No	

Supplemental Finish Floor Checks									
Lot Number	Street	High TC ¹	High FL ²	Section	Flow Depth ³	Min FF ⁴	Design FF	Check	Notes
170 (GFF)	Radley St	2906.19	2905.69	R1	0.61	2906.91	2908.7	OK	No
171 (GFF)	Radley St	2906.98	2906.48	R1	0.61	2907.70	2909.5	OK	No
172 (GFF)	Radley St	2908.34	2907.84	R1	0.61	2909.06	2910.2	OK	No
173 (GFF)	Radley St	2910.28	2909.78	R1	0.61	2911.00	2912.2	OK	No
174 (GFF)	Radley St	2911.26	2910.76	R1	0.61	2911.98	2913.1	OK	No
175 (GFF)	Radley St	2912.05	2911.55	R1	0.61	2912.77	2913.9	OK	No
176 (GFF)	Radley St	2913.26	2912.76	R1	0.61	2913.98	2914.6	OK	No
177 (GFF)	Radley St	2914.60	2914.10	R1	0.61	2915.32	2915.9	OK	No
178 (GFF)	Radley St	2915.58	2915.08	R1	0.61	2916.30	2916.8	OK	No
179 (GFF)	Radley St	2916.37	2915.87	R1	0.61	2917.09	2917.6	OK	No
180 (GFF)	Radley St	2917.73	2917.23	R1	0.61	2918.45	2918.3	CHECK	Top of retaining wall = 2919.1, therefore no additional solid grouting required.
181 (GFF)	Radley St	2918.98	2918.48	R1	0.61	2919.70	2919.6	CHECK	Top of retaining wall = 2920.9, therefore no additional solid grouting required.
182 (GFF)	Radley St	2920.17	2919.67	R1	0.61	2920.89	2920.5	CHECK	Top of retaining wall = 2921.6, therefore no additional solid grouting required.
183 (GFF)	Radley St	2921.17	2920.67	R1	0.61	2921.89	2921.3	CHECK	Top of retaining wall = 2922.3, therefore no additional solid grouting required.
184 (GFF)	Radley St	2922.79	2922.29	R1	0.61	2923.51	2922.0	CHECK	Top of retaining wall = 2923.6, therefore no additional solid grouting required.
185 (GFF)	Alpine Ridge	2931.91	2931.41	AW1	0.71	2932.83	2925.8	CHECK	Yes
186 (GFF)	Alpine Ridge	2932.41	2931.91	AW1	0.71	2933.33	2926.0	CHECK	Yes
187 (GFF)	Alpine Ridge	2932.41	2931.91	AW1	0.71	2933.33	2926.3	CHECK	Yes
188 (GFF)	Alpine Ridge	2932.41	2931.91	AW1	0.71	2933.33	2926.2	CHECK	Yes
189 (GFF)	Alpine Ridge	2932.91	2932.41	AW1	0.71	2933.83	2927.0	CHECK	Yes
190 (GFF)	Alpine Ridge	2932.91	2932.41	AW1	0.71	2933.83	2927.2	CHECK	Yes
191 (GFF)	Alpine Ridge	2932.91	2932.41	AW1	0.71	2933.83	2927.5	CHECK	Yes
192 (GFF)	Alpine Ridge	2932.91	2932.41	AW1	0.71	2933.83	2927.4	CHECK	Yes
193 (GFF)	Alpine Ridge	2933.42	2932.92	AW1	0.71	2934.34	2928.2	CHECK	Yes
194 (GFF)	Alpine Ridge	2933.42	2932.92	AW1	0.71	2934.34	2928.4	CHECK	Yes
195 (GFF)	Alpine Ridge	2933.42	2932.92	AW1	0.71	2934.34	2928.7	CHECK	Yes

Supplemental Finish Floor Checks										
Lot Number	Street	High TC ¹	High FL ²	Section	Flow Depth ³	Min FF ⁴	Design FF	Check	Solid Grout	Notes
196 (GFF)	Alpine Ridge	2933.52	2933.02	AW1	0.71	2934.44	2928.6	CHECK	Yes	
197 (GFF)	Alpine Ridge	2933.90	2933.40	AW1	0.71	2934.82	2929.3	CHECK	Yes	
198 (GFF)	Alpine Ridge	2934.72	2934.22	AW1	0.71	2935.64	2929.5	CHECK	Yes	
199 (GFF)	Alpine Ridge	2934.72	2934.22	AW1	0.71	2935.64	2929.8	CHECK	Yes	
200 (GFF)	Alpine Ridge	2935.22	2934.72	4	0.37	2935.46	2929.7	CHECK	Yes	
201 (GFF)	Alpine Ridge	2934.68	2934.18	4	0.37	2934.92	2931.7	CHECK	Yes	
201 (GFF)	Iron Mountain Rd	2934.24	2933.74	4	0.37	2934.48	2931.7	CHECK	Yes	
202 (GFF)	Iron Mountain Rd	2933.64	2933.14	4	0.37	2933.88	2931.0	CHECK	Yes	
203 (GFF)	Iron Mountain Rd	2932.56	2932.06	4	0.37	2932.80	2930.2	CHECK	Yes	
204 (GFF)	Iron Mountain Rd	2932.56	2932.06	4	0.37	2932.80	2928.6	CHECK	Yes	
205 (GFF)	Iron Mountain Rd	2931.31	2930.81	4	0.37	2931.55	2927.9	CHECK	Yes	
206 (GFF)	Iron Mountain Rd	2931.31	2930.81	4	0.37	2931.55	2927.1	CHECK	Yes	
207 (GFF)	Iron Mountain Rd	2929.89	2929.39	4	0.37	2930.13	2925.6	CHECK	Yes	
208 (GFF)	Iron Mountain Rd	2928.30	2927.80	4	0.37	2928.54	2924.9	CHECK	Yes	
209 (GFF)	Iron Mountain Rd	2928.30	2927.80	4	0.37	2928.54	2924.1	CHECK	Yes	
210 (GFF)	Iron Mountain Rd	2926.55	2926.05	4	0.37	2926.79	2923.2	CHECK	Yes	
211 (GFF)	Iron Mountain Rd	2926.55	2926.05	4	0.37	2926.79	2921.7	CHECK	Yes	
212 (GFF)	Iron Mountain Rd	2924.63	2924.13	4	0.37	2924.87	2921.0	CHECK	Yes	
213 (GFF)	Iron Mountain Rd	2922.66	2922.16	4	0.37	2922.90	2920.2	CHECK	Yes	
214 (GFF)	Iron Mountain Rd	2922.63	2922.13	4	0.37	2922.87	2919.3	CHECK	Yes	
215 (GFF)	Iron Mountain Rd	2920.63	2920.13	4	0.37	2920.87	2917.8	CHECK	Yes	
216 (GFF)	Iron Mountain Rd	2920.63	2920.13	4	0.37	2920.87	2917.1	CHECK	Yes	
217 (GFF)	Iron Mountain Rd	2918.63	2918.13	4	0.37	2918.87	2916.3	CHECK	Yes	
218 (GFF)	Iron Mountain Rd	2918.63	2918.13	4	0.37	2918.87	2915.4	CHECK	Yes	
219 (GFF)	Iron Mountain Rd	2916.63	2916.13	4	0.37	2916.87	2914.1	CHECK	Yes	
220 (GFF)	Iron Mountain Rd	2914.62	2914.12	4	0.37	2914.86	2913.4	CHECK	Yes	
221 (GFF)	Iron Mountain Rd	2914.62	2914.12	4	0.37	2914.86	2912.6	CHECK	Yes	
222 (GFF)	Iron Mountain Rd	2912.62	2912.12	4	0.37	2912.86	2911.8	CHECK	Yes	
223 (GFF)	Iron Mountain Rd	2912.62	2912.12	4	0.37	2912.86	2910.9	CHECK	Yes	
224 (GFF)	Iron Mountain Rd	2910.62	2910.12	4	0.37	2910.86	2910.2	CHECK	Yes	
225 (GFF)	Iron Mountain Rd	2910.62	2910.12	4	0.37	2910.86	2909.4	CHECK	Yes	
226 (GFF)	Iron Mountain Rd	2908.62	2908.12	4	0.37	2908.86	2908.5	CHECK	Yes	

1: High TC is the elevation at the high side of the adjacent perimeter street

2: 0.5-ft is subtracted from the High TC to obtain the High FL elevation

3: Flow depth is the normal depth in adjacent perimeter street

4: Min FF is the High FL plus twice the depth of flow.

5: Lot located near high point and flow depth considered negligible. Therefore, lot is adequately flood protected and solid grouting not necessary.

Supplemental Finish Floor Checks

Specific Energy Check							
Lot Number	High TC ¹	High FL ²	Section	Specific Energy ³	Min FF ⁴	Design FF	Check
15	2876.35	2875.97	A1	0.94	2876.91	2878.00	OK
16	2875.99	2875.61	A1	0.94	2876.55	2877.60	OK
22	2873.12	2872.74	E2 (Interim)	1.13	2873.87	2875.30	OK
23	2873.12	2872.74	E2 (Interim)	1.13	2873.87	2874.70	OK
27	2880.44	2880.06	G3	0.42	2880.48	2881.90	OK
28	2880.44	2880.06	G2	0.48	2880.54	2884.10	OK
31	2889.00	2888.62	G1	0.43	2889.05	2890.50	OK
32	2889.00	2888.62	G1	0.43	2889.05	2892.60	OK
35	2897.55	2897.17	G1	0.43	2897.60	2899.10	OK
36	2897.55	2897.17	G1	0.43	2897.60	2901.00	OK
165	2903.96	2903.58	G3	0.42	2904.00	2906.20	OK
166	2904.88	2904.50	G3	0.42	2904.92	2906.90	OK
167	2904.88	2904.50	G2	0.48	2904.98	2907.60	OK
169	2907.66	2907.28	G1	0.43	2907.71	2909.70	OK
170	2908.50	2908.12	G1	0.43	2908.55	2910.40	OK
171	2908.50	2908.12	G1	0.43	2908.55	2911.10	OK
175	2913.72	2913.34	G1	0.43	2913.77	2915.50	OK
176	2913.72	2913.34	G1	0.43	2913.77	2916.10	OK
181	2919.40	2919.02	G3	0.42	2919.44	2921.50	OK
182	2919.40	2919.02	G2	0.48	2919.50	2922.20	OK

1: High TC is the elevation at the high side of the adjacent perimeter street

2: 0.38-ft is subtracted from the High TC to obtain the High FL elevation

3: Specific energy depth is taken from FlowMaster calculation for street directing flow toward lot.

4: Min FF is the High FL plus the specific energy depth.

Emergency Overflow Finish Floor Checks

Drainage Easements Check - Emergency Overflow						
Lot Number	High TC/FL ¹	Section	Flow Depth ²	Min FF ³	Design FF	Solid Grout
24	2872.39	EO1	0.64	2873.03	2874.40	No
25	2872.39	EO1	0.64	2873.03	2878.20	No
184	2823.70	EO2	0.15	2823.85	2923.50	No
185	2823.70	EO2	0.15	2823.85	2926.90	No

1: High TC/FL is at the high side of the drainage easement flowline or the highest TC adjacent to the easement if flow is weiring over the curb.

2: Flow depth is either normal depth or weir depth (whichever is higher) of the emergency overflow.

3: Min FF is the High TC/FL plus the emergency overflow depth.

Emergency Overflow Finish Floor Checks

Specific Energy Check - Emergency Overflow							
Lot Number	High TC ¹	High FL ²	Section	Specific Energy ³	Min FF ⁴	Design FF	Check
22	2873.12	2872.74	E2 (Em. Ov.)	1.13	2873.87	2875.30	OK
23	2873.12	2872.74	E2 (Em. Ov.)	1.13	2873.87	2874.70	OK

1: High TC is the elevation at the high side of the adjacent perimeter street

2: 0.38-ft is subtracted from the High TC to obtain the High FL elevation

3: Specific energy depth is taken from FlowMaster calculation for street directing flow toward lot.

4: Min FF is the High FL plus the emergency overflow specific energy depth.

Finished Floor Check - Emergency Overflow							
Lot Number	High TC ¹	High FL ²	Section	Flow Depth ³	Min FF ⁴	Design FF	Check
23	2873.12	2872.74	E1 (Em. Ov.)	0.64	2873.38	2874.70	OK
24	2872.80	2872.42	E1 (Em. Ov.)	0.64	2873.06	2874.40	OK
25	2876.65	2876.27	E2 (Em. Ov.)	0.51	2876.78	2878.20	OK
26	2878.33	2877.95	E2 (Em. Ov.)	0.51	2878.46	2879.80	OK
27	2880.44	2880.06	E2 (Em. Ov.)	0.51	2880.57	2881.90	OK
28	2882.58	2882.20	E2 (Em. Ov.)	0.51	2882.71	2884.10	OK
29	2884.72	2884.34	E2 (Em. Ov.)	0.51	2884.85	2886.20	OK
30	2886.86	2886.48	E2 (Em. Ov.)	0.51	2886.99	2888.40	OK
31	2889.00	2888.62	E2 (Em. Ov.)	0.51	2889.13	2890.50	OK
32	2891.14	2890.76	E2 (Em. Ov.)	0.51	2891.27	2892.60	OK
33	2893.28	2892.90	E2 (Em. Ov.)	0.51	2893.41	2894.80	OK
34	2895.42	2895.04	E2 (Em. Ov.)	0.51	2895.55	2896.90	OK
35	2897.55	2897.17	E2 (Em. Ov.)	0.51	2897.68	2899.10	OK
36	2899.50	2899.12	D2 (Em. Ov.)	0.37	2899.49	2901.00	OK
37	2901.16	2900.78	D2 (Em. Ov.)	0.37	2901.15	2902.70	OK
38	2902.88	2902.50	D2 (Em. Ov.)	0.37	2902.87	2904.40	OK
165	2903.96	2903.58	D2 (Em. Ov.)	0.37	2903.95	2906.20	OK
166	2904.88	2904.50	D2 (Em. Ov.)	0.37	2904.87	2906.90	OK
167	2905.79	2905.41	D2 (Em. Ov.)	0.37	2905.78	2907.60	OK
168	2906.67	2906.29	D2 (Em. Ov.)	0.37	2906.66	2908.20	OK
169	2907.66	2907.28	D2 (Em. Ov.)	0.37	2907.65	2909.70	OK

Emergency Overflow Finish Floor Checks

Lot Number	High TC ¹	High FL ²	Section	Flow Depth ³	Min FF ⁴	Design FF	Check
170	2908.50	2908.12	D2 (Em. Ov.)	0.37	2908.49	2910.40	OK
171	2909.38	2909.00	D2 (Em. Ov.)	0.37	2909.37	2911.10	OK
172	2910.34	2909.96	D2 (Em. Ov.)	0.37	2910.33	2911.70	OK
173	2912.00	2911.62	D1 (Em. Ov.)	0.38	2912.00	2914.10	OK
174	2912.84	2912.46	D1 (Em. Ov.)	0.38	2912.84	2914.80	OK
175	2913.72	2913.34	D1 (Em. Ov.)	0.38	2913.72	2915.50	OK
176	2914.68	2914.30	D1 (Em. Ov.)	0.38	2914.68	2916.10	OK
177	2915.70	2915.32	D1 (Em. Ov.)	0.38	2915.70	2917.80	OK
178	2916.54	2916.16	D1 (Em. Ov.)	0.38	2916.54	2918.50	OK
179	2917.42	2917.04	D1 (Em. Ov.)	0.38	2917.42	2919.20	OK
180	2918.38	2918.00	D1 (Em. Ov.)	0.38	2918.38	2919.80	OK
181	2919.40	2919.02	D1 (Em. Ov.)	0.38	2919.40	2921.50	OK
182	2920.24	2919.86	D1 (Em. Ov.)	0.38	2920.24	2922.20	OK
183	2921.12	2920.74	D1 (Em. Ov.)	0.38	2921.12	2922.90	OK
184	2922.08	2921.70	D1 (Em. Ov.)	0.38	2922.08	2923.50	OK

1: High TC is the elevation at the high side of the lot

2: 0.38-ft is subtracted from the High TC to obtain the High FL elevation

3: Flow depth is the normal depth of the emergency overflow in adjacent street.

4: Min FF is the High FL plus the depth of emergency overflow.

APPENDIX G

Zoning & Planning Conditions



**LAS VEGAS
CITY COUNCIL**

CAROLYN G. GOODMAN
Mayor

STAVROS S. ANTHONY
Mayor Pro-Tem

MICHELE FIORE
CEDRIC CREAR
BRIAN KNUDSEN
VICTORIA SEAMAN
OLIVIA DIAZ

JORGE CERVANTES
City Manager

PUBLIC WORKS
MIKE JANSSEN, P.E., PTOE
EXECUTIVE DIRECTOR OF
INFRASTRUCTURE

CITY HALL
495 S. MAIN ST.
LAS VEGAS, NV 89101
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cityoflasvegas
lasvegasnevada.gov

October 14, 2021

Paul Villaluz, P.E., PTOE
Westwood Professional Services
5725 W. Badura Avenue, Suite 100
Las Vegas, NV 89118

RE: Traffic Impact Study for Iron Mountain, 21-0315-TMP1, TIA76138

Dear Mr. Villaluz:

The Traffic Engineering Division of the City of Las Vegas has reviewed the amended traffic impact study for Iron Mountain, to be located on the northeast corner of Iron Mountain Road and Alpine Ridge Way/Shamburger Road. This subdivision is planned to contain 82 single family detached dwelling units and 144 single family attached dwelling units. The study is accepted, with the following conditions:

1. Additional rights of way in accordance with Clark County Area Standard Drawings #201.1, 234.1, 234.2 or 234.4 are not required at this time.
2. Access to the development will be provided by a private street on Iron Mountain Road roughly 700' east of Alpine Ridge Way. This street is to be gated. The entrance must provide separate visitor and resident lanes, with a minimum storage of 75' from lip of gutter to the callbox.
3. In addition to the vehicular entrance, pedestrian access will be provided near the southeast and northwest corners of the site.
4. Provide pedestrian ramps (on both sides of Iron Mountain Road) and underground improvements for a future pedestrian crossing beacon at the east end of the site, for a crossing of Iron Mountain Road. Alternatively, provide a temporary sidewalk on the north side of Iron Mountain Road from the east edge of the site to Skye Village Road.

This acceptance does not supersede or eliminate conditions of approval imposed by the Planning Commission and/or the City Council. An addendum to this traffic study may be required if the development of the site occurs in a manner not in keeping with the land use assumptions contained in the report. Please contact me at 229-2452 if you have any questions.

Sincerely,

Rick Schroder, P.E.
Transportation Planning

RES

cc: Joey Paskey, P.E.
Christina Karanikolas, P.E.
Bart Anderson, P.E.
Lucien Paet, P.E.
Victor Bolanos
file

Daniel Poll

From: Rick Schroder <rschroder@LasVegasNevada.GOV>
Sent: Thursday, October 14, 2021 12:09 PM
To: Daniel Poll; Paul Villaluz
Cc: Joey Paskey; Christina Karanikolas; Bart Anderson; Lucien Paet; Victor Bolanos
Subject: RE: Iron Mountain TIA acceptance letter

Dan -

Correct. The projected volumes for that movement are pretty low, and looking at the road network, it's hard to picture that movement getting very large.

New address: 495 S. Main Street, Las Vegas, NV 89101

Rick Schroder | Project Engineer
Department of Public Works
Transportation Engineering Division
City Hall 1st Floor
495 S Main St. Las Vegas, Nevada 89101
702 229-2452



lasvegasnevada.gov



Your opinion is important! Click [here](#) to take a short survey.

From: Daniel Poll <Daniel.Poll@westwoodps.com>
Sent: Thursday, October 14, 2021 11:59 AM
To: Rick Schroder <rschroder@LasVegasNevada.GOV>; Paul Villaluz <Paul.Villaluz@westwoodps.com>
Cc: Joey Paskey <jpaskey@LasVegasNevada.GOV>; Christina Karanikolas <ckaranikolas@LasVegasNevada.GOV>; Bart Anderson <banderson@LasVegasNevada.GOV>; Lucien Paet <lpaet@LasVegasNevada.GOV>; Victor Bolanos <vbolanos@LasVegasNevada.GOV>
Subject: RE: Iron Mountain TIA acceptance letter

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I meant northbound Alpine Ridge Way... Thanks!

Dan Poll
PROJECT MANAGER
daniel.poll@westwoodps.com

Direct (702) 284-5330
Main (702) 284-5300

Westwood Multi-Disciplined Surveying & Engineering
Our Las Vegas office has moved! Note our new address below.
5725 W. Badura Ave, Suite 100
Las Vegas, NV 89118

westwoodps.com
(888) 937-5150

Main (702) 284-5300

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5725 W. Badura Ave, Suite 100

Las Vegas, NV 89118

westwoodps.com

(888) 937-5150

From: Rick Schroder <rschroder@LasVegasNevada.GOV>

Sent: Thursday, October 14, 2021 11:41 AM

To: Paul Villaluz <Paul.Villaluz@westwoodps.com>

Cc: Joey Paskey <jpaskey@LasVegasNevada.GOV>; Christina Karanikolas <ckaranikolas@LasVegasNevada.GOV>; Bart Anderson <banderson@LasVegasNevada.GOV>; Lucien Paet <lpayet@LasVegasNevada.GOV>; Victor Bolanos <vbolanos@LasVegasNevada.GOV>; Daniel Poll <Daniel.Poll@westwoodps.com>

Subject: Iron Mountain TIA acceptance letter

Dan – I saw from an autoresponse earlier today that Paul is out. I'm leaving for vacation mid-afternoon, and will mostly be in meetings until then. If your client needs more that I have in this letter regarding the bus turnout on Alpine Ridge, it's probably best to contact Bart and Lucien.

New address: 495 S. Main Street, Las Vegas, NV 89101

Rick Schroder | Project Engineer
Department of Public Works
Transportation Engineering Division
City Hall 1st Floor
495 S Main St. Las Vegas, Nevada 89101
702 229-2452



lasvegasnevada.gov



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APPENDIX H

Revised Improvement Plans