IN THE SUPREME COURT OF THE STATE OF NEVADA

Case No. 84345
and
Case No. 84640

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May 02 2023 04:11 PM
Elizabeth A. Brown
Clerk of Supreme Court

CITY OF LAS VEGAS, a political subdivision of the State of Nevada,

Appellant

v.

180 LAND CO, LLC, a Nevada limited-liability company, FORE STARS LTD., a Nevada limited liability company,

Respondents

District Court Case No.: A-17-758528-J
Eighth Judicial District Court of Nevada

CITY OF LAS VEGAS' REPLY APPENDIX
VOLUME 7

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CHRONOLOGICAL INDEX TO CITY'S REPLY APPENDIX

DATE	DOCUMENT	VOLUME	PAGE RANGE
2022-09-13	Defendant City of Las Vegas' Second Supplemental Appendix of Exhibits in Support of City's Renewed Motion for Summary Judgment and Motions in Limine Volume 32, Case No. A-18-773268-C	2	REPLY APP 0396 - REPLY APP 0432
2022-11-23	Defendant City of Las Vegas' Supplemental Appendix of Exhibits in Support of City's Countermotion for Summary Judgment on Just Compensation Volume 34, Case No. A-18-773268-C	3	REPLY APP 0433 - REPLY APP 0652
2022-11-23	Defendant City of Las Vegas' Supplemental Appendix of Exhibits in Support of City's Countermotion for Summary Judgment on Just Compensation Volume 35, Case No. A-18-773268-C	4 5	REPLY APP 0653 - REPLY APP 0902 REPLY APP 0903 - REPLY APP 0907
2022-11-23	Defendant City of Las Vegas' Supplemental Appendix of Exhibits in Support of City's Countermotion for Summary Judgment on Just Compensation Volume 36, Case No. A-18-773268-C	5	REPLY APP 0908 - REPLY APP 1096
2022-11-23	Defendant City of Las Vegas' Supplemental Appendix of Exhibits in Support of City's Countermotion for Summary Judgment on Just Compensation Volume 37, Case No. A-18-773268-C	6	REPLY APP 1097 - REPLY APP 1240

DATE	DOCUMENT	VOLUME	PAGE RANGE
2022-11-23	Defendant City of Las Vegas' Supplemental Appendix of Exhibits in Support of City's Countermotion for Summary Judgment on Just Compensation Volume 38, Case No. A-18-773268-C	7	REPLY APP 1241 - REPLY APP 1406
2022-11-23	Defendant City of Las Vegas' Supplemental Appendix of Exhibits in Support of City's Countermotion for Summary Judgment on Just Compensation Volume 39, Case No. A-18-773268-C	7	REPLY APP 1407 - REPLY APP 1476
2023-01-23	Defendant City of Las Vegas' Appendix of Exhibits in Support of Motion to Retax Memorandum of Costs, Volume 1, Exhibits B - C, Case No. A-18-773268-C	8	REPLY APP 1477 - REPLY APP 1667
2022-09-12	Plaintiff Landowners Second Supplement to Appendix of Exhibits in Support of Motion to Determine Take and for Summary Judgment on the Third and Fifth Claims for Relief Volume 24, Excerpt from Exhibit 228, Case No. A-18-773268-C	9	REPLY APP 1668 - REPLY APP 1742

ALPHABETICAL INDEX TO CITY'S REPLY APPENDIX

DATE	DOCUMENT	VOLUME	PAGE RANGE
2022-11-23	Defendant City of Las Vegas' Supplemental Appendix of Exhibits in Support of City's Countermotion for Summary Judgment on Just Compensation Volume 36, Case No. A-18-773268-C	5	REPLY APP 0908 - REPLY APP 1096
2022-11-23	Defendant City of Las Vegas' Supplemental Appendix of Exhibits in Support of City's Countermotion for Summary Judgment on Just Compensation Volume 37, Case No. A-18-773268-C	6	REPLY APP 1097 - REPLY APP 1240
2022-11-23	Defendant City of Las Vegas' Supplemental Appendix of Exhibits in Support of City's Countermotion for Summary Judgment on Just Compensation Volume 38, Case No. A-18-773268-C	7	REPLY APP 1241 - REPLY APP 1406
2022-11-23	Defendant City of Las Vegas' Supplemental Appendix of Exhibits in Support of City's Countermotion for Summary Judgment on Just Compensation Volume 39, Case No. A-18-773268-C	7	REPLY APP 1407 - REPLY APP 1476
2022-09-12	Plaintiff Landowners Reply Re: Plaintiff Landowners' Motion to Determine Take and For Summary Judgment on the Third and Fifth Claims for Relief, Case No. A-18-773268-C	2	REPLY APP 0365 - REPLY APP 0395

DATE	DOCUMENT	VOLUME	PAGE RANGE
2022-09-12	Plaintiff Landowners Second Supplement to Appendix of Exhibits in Support of Motion to Determine Take and for Summary Judgment on the Third and Fifth Claims for Relief Volume 24, Excerpt from Exhibit 228, Case No. A-18-773268-C	9	REPLY APP 1668 - REPLY APP 1742
2022-08-11	Plaintiff Landowners' Appendix of Exhibits in Support of: Plaintiff Landowners' Motion to Determine Take and for Summary Judgment on the Third and Fifth Claims for Relief, Volume 22, Exhibit 214, Case No. A-18-773268-C	1	REPLY APP 0031 - REPLY APP 0227
2022-08-10	Plaintiff Landowners' Motion to Determine Take and for Summary Judgment on the Third and Fifth Claims for Relief, Case No. A-18-773268-C	1	REPLY APP 0001 - REPLY APP 0030

DATED this 2nd day of May, 2023.

BY: /s/ Debbie Leonard

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CERTIFICATE OF SERVICE

I HEREBY CERTIFY that I am an employee of Leonard Law, PC, and that on this date a copy of Appendix Volumes 2-9 were electronically filed with the Clerk of the Court for the Nevada Supreme Court by using the Nevada Supreme Court's E-Filing system (E-Flex). Participants in the case who are registered with E-Flex as users will be served by the E-Flex system. All others will be served by U.S. mail.

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Dated: May 2, 2023

/s/ Tricia Trevino

Tricia Trevino

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DISTRICT COURT

CLARK COUNTY, NEVADA

FORE STARS, LTD, SEVENTY ACRES, LLC, a Nevada limited liability company, DOE INDIVIDUALS I through X, DOE CORPORATIONS I through X, DOE LIMITED LIABILITY COMPANIES I through X,

Plaintiffs,

CITY OF LAS VEGAS, political subdivision of the State of Nevada, THE EIGHTH JUDICIAL DISTRICT COURT, County of Clark, State of Nevada, DEPARTMENT 24 (the HONORABLE JIM CROCKETT, DISTRICT COURT JUDGE, IN HIS OFFICIAL CAPACITY), ROE government entities I through X, ROE Corporations I through X, ROE INDIVIDUALS I through X, ROE LIMITED LIABILITY COMPANIES I through X, ROE quasi-governmental entities I through X,

Defendants.

Case No. A-18-773268-C
Dept. No. XXIX

SUPPLEMENTAL APPENDIX OF EXHIBITS IN SUPPORT OF CITY'S COUNTERMOTION FOR SUMMARY JUDGMENT ON JUST COMPENSATION

VOLUME 38

The City of Las Vegas ("City") submits this Supplemental Appendix of Exhibits in support of its Countermotion for Summary Judgment on Just Compensation. This appendix supplements the Appendix of Exhibits in Support of City's Renewed Motion for Summary Judgment and Motions in Limine filed August 11, 2022 (Volumes 1 through 25); the Supplemental Appendix of Exhibits in Support of City's Renewed Motion for Summary Judgment and Motions in Limine filed August 24, 2022 (Volumes 26 through 27); the Second Supplemental Appendix of Exhibits in Support of City's Renewed Motion for Summary Judgment and Motions in Limine filed September 12, 2022 (Volumes 28 through 32); and the Third Supplemental Appendix of Exhibits in Support of City's Renewed Motion for Summary Judgment and Motions in Limine filed September 14, 2022 (Volume 33).

Exhibit	Exhibit Description	Vol.	Bates No.
A	City records regarding William Peccole's Petition to Annex 2,246 acres to the City of Las Vegas	1	0001-0011
B	City records regarding the Peccole Land Use Plan and the Z-34-81 rezoning application	1	0012-0030
C	City records regarding the Venetian Foothills Master Plan and the Z-30-86 rezoning application	1	0031-0050
D	Excerpts of the 1985 City of Las Vegas General Plan	1	0051-0061
E	City records regarding Peccole Ranch Master Plan and phase I rezoning application (Z-139-88)	1	0062-0106
F	City records regarding Z-40-89 rezoning application	1	0107-0113
G	Ordinance No. 3472 (establishing the Gaming Enterprise District) and related records	1	0114-0137
H	City records regarding the Amended Peccole Ranch Master Plan and phase II rezoning application (Z-17-90)	1	0138-0194
I	Excerpts of 1992 City of Las Vegas General Plan	2	0195-0248
J	City records related to Badlands Golf Course expansion	2	0249-0254
K	Excerpt of land use case files for GPA-24-98 and GPA-6199	2	0255-0257
L	Ordinance No. 5250 and Excerpts of Las Vegas 2020 Master Plan	2	0258-0273
M	Miscellaneous Southwest Sector Land Use Maps from 2002-2005	2	0274-0277
N	Ordinance No. 5787 and Excerpts of 2005 Land Use Element	2	0278-0291
O	Ordinance No. 6056 and Excerpts of 2009 Land Use & Rural Neighborhoods Preservation Element	2	0292-0301
P	Ordinance No. 6152 and Excerpts of 2012 Land Use & Rural Neighborhoods Preservation Element	2	0302-0317
Q	Ordinance No. 6622 and Excerpts of 2018 Land Use & Rural Neighborhoods Preservation Element	2	0318-0332
R	Ordinance No. 1582	2	0333-0339
S	Ordinance No. 4073 and Excerpt of the 1997 City of Las Vegas Zoning Code	2	0340-0341

Exhibit	Exhibit Description	Vol.	Bates No.
T	Ordinance No. 5353	2	0342-0361
U	Ordinance No. 6135 and Excerpts of City of Las Vegas Unified Development Code adopted March 16, 2011	2	0362-0364
V	Deeds transferring ownership of the Badlands Golf Course	2	0365-0377
W	Third Revised Justification Letter regarding the Major Modification to the 1990 Conceptual Peccole Ranch Master Plan	2	0378-0381
X	Parcel maps recorded by the Developer subdividing the Badlands Golf Course	3	0382-0410
Y	EHB Companies promotional materials	3	0411-0445
Z	General Plan Amendment (GPA-62387), Rezoning (ZON-62392) and Site Development Plan Review (SDR-62393) applications	3	0446-0466
AA	Staff Report regarding 17-Acre Applications	3	0467-0482
BB	Major Modification (MOD-63600), Rezoning (ZON-63601), General Plan Amendment (GPA-63599), and Development Agreement (DIR-63602) applications	3	0483-0582
CC	Letter requesting withdrawal of MOD-63600, GPA-63599, ZON-63601, DIR-63602 applications	4	0583
DD	Transcript of February 15, 2017 City Council meeting	4	0584-0597
EE	Judge Crockett's March 5, 2018 order granting Queensridge homeowners' petition for judicial review, Case No. A-17-752344-J	4	0598-0611
FF	Docket for NSC Case No. 75481	4	0612-0623
GG	Complaint filed by Fore Stars Ltd. and Seventy Acres LLC, Case No. A-18-773268-C	4	0624-0643
HH	General Plan Amendment (GPA-68385), Site Development Plan Review (SDR-68481), Tentative Map (TMP-68482), and Waiver (68480) applications	4	0644-0671
II	June 21, 2017 City Council meeting minutes and transcript excerpt regarding GPA-68385, SDR-68481, TMP-68482, and 68480.	4	0672-0679
JJ	Docket for Case No. A-17-758528-J	4	0680-0768
KK	Judge Williams' Findings of Fact and Conclusions of Law, Case No. A-17-758528-J	5	0769-0793
LL	Development Agreement (DIR-70539) application	5	0794-0879
MM	August 2, 2017 City Council minutes regarding DIR-70539	5	0880-0882

Exhibit	Exhibit Description	Vol.	Bates No.
NN	Judge Sturman's February 15, 2019 minute order granting City's motion to dismiss, Case No. A-18-775804-J	5	0883
OO	Excerpts of August 2, 2017 City Council meeting transcript	5	0884-0932
PP	Final maps for Amended Peccole West and Peccole West Lot 10	5	0933-0941
QQ	Excerpt of the 1983 Edition of the Las Vegas Municipal Code	5	0942-0951
RR	Ordinance No. 2185	5	0952-0956
SS	1990 aerial photograph identifying Phase I and Phase II boundaries, produced by the City's Planning & Development Department, Office of Geographic Information Systems (GIS)	5	0957
TT	1996 aerial photograph identifying Phase I and Phase II boundaries, produced by the City's Planning & Development Department, Office of Geographic Information Systems (GIS)	5	0958
UU	1998 aerial photograph identifying Phase I and Phase II boundaries, produced by the City's Planning & Development Department, Office of Geographic Information Systems (GIS)	5	0959
VV	2015 aerial photograph identifying Phase I and Phase II boundaries, retail development, hotel/casino, and Developer projects, produced by the City's Planning & Development Department, Office of Geographic Information Systems (GIS)	5	0960
WW	2015 aerial photograph identifying Phase I and Phase II boundaries, produced by the City's Planning & Development Department, Office of Geographic Information Systems (GIS)	5	0961
XX	2019 aerial photograph identifying Phase I and Phase II boundaries, and current assessor parcel numbers for the Badlands property, produced by the City's Planning & Development Department, Office of Geographic Information Systems (GIS)	5	0962
YY	2019 aerial photograph identifying Phase I and Phase II boundaries, and areas subject to inverse condemnation litigation, produced by the City's Planning & Development Department, Office of Geographic Information Systems (GIS)	5	0963
ZZ	2019 aerial photograph identifying areas subject to proposed development agreement (DIR-70539), produced by the City's Planning & Development	5	0964

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	Department, Office of Geographic Information Systems (GIS)		
AAA	Membership Interest Purchase and Sale Agreement	6	0965-0981
BBB	Transcript of May 16, 2018 City Council meeting	6	0982-0998
CCC	City of Las Vegas' Amicus Curiae Brief, *Seventy Acres, LLC v. Binion*, Nevada Supreme Court Case No. 75481	6	0999-1009
DDD	Nevada Supreme Court March 5, 2020 Order of Reversal, *Seventy Acres, LLC v. Binion*, Nevada Supreme Court Case No. 75481	6	1010-1016
EEE	Nevada Supreme Court August 24, 2020 Remittitur, *Seventy Acres, LLC v. Binion*, Nevada Supreme Court Case No. 75481	6	1017-1018
FFF	March 26, 2020 Letter from City of Las Vegas Office of the City Attorney to Counsel for the Developer Re: Entitlements on 17 Acres	6	1019-1020
GGG	September 1, 2020 Letter from City of Las Vegas Office of the City Attorney to Counsel for the Developer Re: Final Entitlements for 435-Unit Housing Development Project in Badlands	6	1021-1026
HHH	Complaint Pursuant to 42 U.S.C. § 1983, *180 Land Co. LLC et al. v. City of Las Vegas, et al.*, 18-cv-00547 (2018)	6	1027-1122
III	9th Circuit Order in *180 Land Co. LLC; et al v. City of Las Vegas, et al.*, 18-cv-0547 (Oct. 19, 2020)	6	1123-1127
JJJ	Plaintiff Landowners' Second Supplement to Initial Disclosures Pursuant to NRCP 16.1 in 65-Acre case	6	1128-1137
LLL	Bill No. 2019-48: Ordinance No. 6720	7	1138-1142
MMM	Bill No. 2019-51: Ordinance No. 6722	7	1143-1150
NNN	March 26, 2020 Letter from City of Las Vegas Office of the City Attorney to Counsel for the Developer Re: Entitlement Requests for 65 Acres	7	1151-1152
OOO	March 26, 2020 Letter from City of Las Vegas Office of the City Attorney to Counsel for the Developer Re: Entitlement Requests for 133 Acres	7	1153-1155

Exhibit	Exhibit Description	Vol.	Bates No.
PPP	April 15, 2020 Letter from City of Las Vegas Office of the City Attorney to Counsel for the Developer Re: Entitlement Requests for 35 Acres	7	1156-1157
QQQ	Valbridge Property Advisors, Lubawy & Associates Inc., Appraisal Report (Aug. 26, 2015)	7	1158-1247
RRR	Notice of Entry of Order Adopting the Order of the Nevada Supreme Court and Denying Petition for Judicial Review	7	1248-1281
SSS	Letters from City of Las Vegas Approval Letters for 17-Acre Property (Feb. 16, 2017)	8	1282-1287
TTT	Reply Brief of Appellants 180 Land Co. LLC, Fore Stars, LTD,, Seventy Acres LLC, and Yohan Lowie in *180 Land Co LLC et al v. City of Las Vegas*, Court of Appeals for the Ninth Circuit Case No. 19-16114 (June 23, 2020)	8	1288-1294
UUU	Excerpt of Reporter's Transcript of Hearing on City of Las Vegas' Motion to Compel Discovery Responses, Documents and Damages Calculation and Related Documents on Order Shortening Time in *180 Land Co. LLC v. City of Las Vegas*, Eighth Judicial District Court Case No. A-17-758528-J (Nov. 17, 2020)	8	1295-1306
VVV	Plaintiff Landowners' Sixteenth Supplement to Initial Disclosures in *180 Land Co., LLC v. City of Las Vegas*, Eighth Judicial District Court Case No. A-17-758528-J (Nov. 10, 2020)	8	1307-1321
WWW	Excerpt of Transcript of Las Vegas City Council Meeting (Aug. 2, 2017)	8	1322-1371
XXX	Notice of Entry of Findings of Facts and Conclusions of Law on Petition for Judicial Review in *180 Land Co. LLC v. City of Las Vegas*, Eighth Judicial District Court Case No.A-17-758528-J (Nov. 26, 2018)	8	1372-1399
YYY	Notice of Entry of Order *Nunc Pro Tunc* Regarding Findings of Fact and Conclusion of Law Entered November 21, 2019 in *180 Land Co. LLC v. City of Las Vegas*, Eighth Judicial District Court Case No.A-17-758528 (Feb. 6, 2019)	8	1400-1405
ZZZ	City of Las Vegas Agenda Memo – Planning, for City Council Meeting June 21, 2017, Re: GPA-68385, WVR-68480, SDR-68481, and TMP-68482 [PRJ-67184]	8	1406-1432

Exhibit	Exhibit Description	Vol.	Bates No.
AAAA	Excerpts from the Land Use and Rural Neighborhoods Preservation Element of the City's 2020 Master Plan adopted by the City Council of the City on September 2, 2009	8	1433-1439
BBBB	Summons and Complaint for Declaratory Relief and Injunctive Relief, and Verified Claims in Inverse Condemnation in *180 Land Co. LLC v. City of Las Vegas*, Eighth Judicial District Court Case No.A-18-780184-C	8	1440-1477
CCCC	Notice of Entry of Findings of Fact and Conclusions of Law Granting City of Las Vegas' Motion for Summary Judgment in *180 Land Co. LLC v. City of Las Vegas*, Eighth Judicial District Court Case No.A-18-780184-C (Dec. 30, 2020)	8	1478-1515
DDDD	Peter Lowenstein Declaration	9	1516-1522
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DDDD-2	Exhibit 2 to Peter Lowenstein Declaration: July 5, 2017 Email from Mark Colloton	9	1527-1531
DDDD-3	Exhibit 3 to Peter Lowenstein Declaration: June 28, 2017 Permit application	9	1532-1533
DDDD-4	Exhibit 4 to Peter Lowenstein Declaration: June 29, 2017 Email from Mark Colloton re Rampart and Hualapai	9	1534-1536
DDDD-5	Exhibit 5 to Peter Lowenstein Declaration: August 24, 2017 Letter from City Department of Planning	9	1537
DDDD-6	Exhibit 6 to Peter Lowenstein Declaration: July 26, 2017 Email from Peter Lowenstein re Wall Fence	9	1538
DDDD-7	Exhibit 7 to Peter Lowenstein Declaration: August 10, 2017 Application for Walls, Fences, or Retaining Walls; related materials	9	1539-1546
DDDD-8	Exhibit 8 to Peter Lowenstein Declaration: August 24, 2017 Email from Steve Gebeke	9	1547-1553
DDDD-9	Exhibit 9 to Peter Lowenstein Declaration: Bill No. 2018-24	9	1554-1569
DDDD-10	Exhibit 10 to Peter Lowenstein Declaration: Las Vegas City Council Ordinance No. 6056 and excerpts from Land Use & Rural Neighborhoods Preservation Element	9	1570-1577

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FFFF	Chris Molina Declaration	9	1591-1605
FFFF-1	Fully Executed Copy of Membership Interest Purchase and Sale Agreement for Fore Stars Ltd.	9	1606-1622
FFFF-2	Summary of Communications between Developer and Peccole family regarding acquisition of Badlands Property	9	1623-1629
FFFF-3	Reference map of properties involved in transactions between Developer and Peccole family	9	1630
FFFF-4	Excerpt of appraisal for One Queensridge place dated October 13, 2005	9	1631-1632
FFFF-5	Site Plan Approval for One Queensridge Place (SDR-4206)	9	1633-1636
FFFF-6	Securities Redemption Agreement dated September 14, 2005	9	1637-1654
FFFF-7	Securities Purchase Agreement dated September 14, 2005	9	1655-1692
FFFF-8	Badlands Golf Course Clubhouse Improvement Agreement dated September 6, 2005	9	1693-1730
FFFF-9	Settlement Agreement and Mutual Release dated June 28, 2013	10	1731-1782
FFFF-10	June 12, 2014 emails and Letter of Intent regarding the Badlands Golf Course	10	1783-1786
FFFF-11	July 25, 2014 email and initial draft of Golf Course Purchase Agreement	10	1787-1813
FFFF-12	August 26, 2014 email from Todd Davis and revised purchase agreement	10	1814-1843
FFFF-13	August 27, 2014 email from Billy Bayne regarding purchase agreement	10	1844-1846
FFFF-14	September 15, 2014 email and draft letter to BGC Holdings LLC regarding right of first refusal	10	1847-1848

Exhibit	Exhibit Description	Vol.	Bates No.
FFFF-15	November 3, 2014 email regarding BGC Holdings LLC	10	1849-1851
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FFFF-19	December 23, 2014 emails regarding separation of Fore Stars Ltd. and WRL LLC acquisitions into separate agreements	10	1875-1876
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FFFF-21	February 26, 2015 email regarding revised purchase agreements for Fore Stars Ltd. and WRL LLC	10	1880
FFFF-22	February 27, 2015 emails regarding revised purchase agreements for Fore Stars Ltd. and WRL LLC	10	1881-1882
FFFF-23	Fully executed Membership Interest Purchase Agreement for WRL LLC	10	1883-1890
FFFF-24	June 12, 2015 email regarding clubhouse parcel and recorded parcel map	10	1891-1895
FFFF-25	Quitclaim deed for Clubhouse Parcel from Queensridge Towers LLC to Fore Stars Ltd.	10	1896-1900
FFFF-26	Record of Survey for Hualapai Commons Ltd.	10	1901
FFFF-27	Deed from Hualapai Commons Ltd. to EHC Hualapai LLC	10	1902-1914
FFFF-28	Purchase Agreement between Hualapai Commons Ltd. and EHC Hualapai LLC	10	1915-1931
FFFF-29	City of Las Vegas' First Set of Interrogatories to Plaintiff	10	1932-1945
FFFF-30	Plaintiff 180 Land Company LLC's Responses to City of Las Vegas' First Set of Interrogatories to Plaintiff, 3rd Supplement	10	1946-1973
FFFF-31	City of Las Vegas' Second Set of Requests for Production of Documents to Plaintiff	11	1974-1981

Exhibit	Exhibit Description	Vol.	Bates No.
FFFF-32	Plaintiff 180 Land Company LLC's Response to Defendant City of Las Vegas' Second Set of Requests for Production of Documents to Plaintiff	11	1982-1989
FFFF-33	September 14, 2020 Letter to Plaintiff regarding Response to Second Set of Requests for Production of Documents	11	1990-1994
FFFF-34	First Supplement to Plaintiff Landowners Response to Defendant City of Las Vegas' Second Set of Requests for Production of Documents to Plaintiff	11	1995-2002
FFFF-35	Motion to Compel Discovery Responses, Documents and Damages Calculation, and Related Documents on Order Shortening Time	11	2003-2032
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FFFF-37	February 24, 2021 Order Granting in Part and denying in part City's Motion to Compel Discovery Responses, Documents and Damages Calculation, and Related Documents on Order Shortening Time	11	2110-2118
FFFF-38	April 1, 2021 Letter to Plaintiff regarding February 24, 2021 Order	11	2119-2120
FFFF-39	April 6, 2021 email from Elizabeth Ghanem Ham regarding letter dated April 1, 2021	11	2121-2123
FFFF-40	Hydrologic Criteria and Drainage Design Manual, Section 200	11	2124-2142
FFFF-41	Hydrologic Criteria and Drainage Design Manual, Standard Form 1	11	2143
FFFF-42	Hydrologic Criteria and Drainage Design Manual, Standard Form 2	11	2144-2148
FFFF-43	Email correspondence regarding minutes of August 13, 2018 meeting with GCW regarding Technical Drainage Study	11	2149-2152
FFFF-44	Excerpts from Peccole Ranch Master Plan Phase II regarding drainage and open space	11	2153-2159
FFFF-45	Aerial photos and demonstrative aids showing Badlands open space and drainage system	11	2160-2163
FFFF-46	August 16, 2016 letter from City Streets & Sanitation Manager regarding Badlands Golf Course Drainage Maintenance	11	2164-2166

Exhibit	Exhibit Description	Vol.	Bates No.
FFFF-47	Excerpt from EHB Companies promotional materials regarding security concerns and drainage culverts	11	2167
GGGG	Landowners' Reply in Support of Countermotion for Judicial Determination of Liability on the Landowners' Inverse Condemnation Claims Etc. in *180 Land Co., LLC v. City of Las Vegas*, Eighth Judicial District Court Case No. A-17-758528-J (March 21, 2019)	11	2168-2178
HHHH	June 28, 2016 Letter from Mark Colloton re: Reasons for Access Points Off Hualapai Way and Rampart Blvd.	12	2179-2184
IIII	Transcript of City Council Meeting (May 16, 2018)	12	2185-2260
JJJJ	Excerpt of April 8, 2021 Transcript of Hearing re Plaintiffs' Motion for a New Trial and to Amend (March 11, 2021), Case No. A-18-780184-C	12	2261-2266
KKKK	Affidavit of Donald Richards and accompanying photographs submitted by the Developer on April 15, 2021 in Case No. A-18-780184-C	13	2267-2428
LLLL	Supplemental Declaration of Seth T. Floyd	14	2429-2432
LLLL-1	1981 Peccole Property Land Use Plan	14	2433-
LLLL-2	1985 Las Vegas General Plan	14	2434-2515
LLLL-3	1975 General Plan	14	2516-2611
LLLL-4	Planning Commission meeting records regarding 1985 General Plan	15	2612-2839
LLLL-5	1986 Venetian Foothills Master Plan	15	2840
LLLL-6	1989 Peccole Ranch Master Plan	15	2841
LLLL-7	1990 Master Development Plan Amendment	15	2842
LLLL-8	Citizen's Advisory Committee records regarding 1992 General Plan	15	2843-2860
LLLL-9	1992 Las Vegas General Plan	16-17	2861-3310
LLLL-10	1992 Southwest Sector Map	18	3311
LLLL-11	Ordinance No. 5250 (Adopting 2020 Master Plan)	18	3312-3319

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LLLL-12	Las Vegas 2020 Master Plan	18	3320-3402
LLLL-13	Ordinance No. 5787 (Adopting 2005 Land Use Element)	18	3403-3469
LLLL-14	2005 Land Use Element	18	3470-3527
LLLL-15	Ordinance No. 6056 (Adopting 2009 Land Use and Rural Neighborhoods Preservation Element)	18	3528-3532
LLLL-16	2009 Land Use and Rural Neighborhoods Preservation Element	19	3533-3632
LLLL-17	Ordinance No. 6152 (Adopting revisions to 2009 Land Use and Rural Neighborhoods Preservation Element)	19	3633-3642
LLLL-18	Ordinance No. 6622 (Adopting 2018 Land Use and Rural Neighborhoods Preservation Element)	19	3643-3653
LLLL-19	2018 Land Use & Rural Neighborhoods Preservation Element	19	3654-3753
MMMM	State of Nevada State Board of Equalization Notice of Decision, *In the Matter of Fore Star Ltd., et al.* (Nov. 30, 2017)	20	3754-3758
NNNN	Clark County Real Property Tax Values	20	3759-3774
OOOO	Clark County Tax Assessor's Property Account Inquiry - Summary Screen	20	3775-3776
PPPP	February 22, 2017 Clark County Assessor Letter to 180 Land Co. LLC, re Assessor's Golf Course Assessment	20	3777
QQQQ	Petitioner's Opening Brief, *In the matter of 180 Land Co. LLC* (Aug. 29, 2017), State Board of Equalization	20	3778-3815
RRRR	September 21, 2017 Clark County Assessor Stipulation for the State Board of Equalization	20	3816
SSSS	Excerpt of Reporter's Transcript of Hearing in *180 Land Co. v. City of Las Vegas*, Eighth Judicial District Court Case No. A-17-758528-J (Feb. 16, 2021)	20	3817-3868
TTTT	June 28, 2016 Letter from Mark Colloton re: Reasons for Access Points Off Hualapai Way and Rampart Blvd.	20	3869-3874

Exhibit	Exhibit Description	Vol.	Bates No.
UUUU	Transcript of City Council Meeting (May 16, 2018)	20	3875-3950
VVVV	Supplemental declaration of Seth Floyd	21	3951-3953
VVVV-1	Southwest Sector Land Use Map (1992)	21	3954
VVVV-2	10/10/1991 Planning Commission Minutes	21	3955-3957
VVVV-3	10/22/1991 Planning Commission Minutes	21	3958-3962
VVVV-4	11/14/1991 Planning Commission Minutes	21	3963-3965
VVVV-5	11/26/1991 Planning Commission Minutes	21	3966-3968
VVVV-6	12/12/1991 Planning Commission Minutes	21	3969-3976
VVVV-7	12/12/1991 Planning Commission Resolution adopting 1992 General Plan	21	3977-3978
VVVV-8	2/5/1992 City Council Meeting Minutes	21	3979
VVVV-9	2/18/1992 Recommending Committee Meeting Minutes	21	3980-4000
VVVV-10	2/19/1992 City Council Meeting Minutes	21	4001-4002
VVVV-11	3/12/1992 Planning Commission Meeting Minutes	21	4003-4004
VVVV-12	3/16/1992 Recommending Committee Meeting Minute	21	4005
VVVV-13	4/1/1992 City Council Meeting Minutes	21	4006-4008
VVVV-14	Ordinance No. 3636 (adopting new general plan)	21	4009-4011

Exhibit	**Exhibit Description**	**Vol.**	**Bates No.**
VVVV-15	2/13/1992 Citizens Advisory Committee Meeting Minutes	21	4012-4015
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WWWW	Excerpts of NRCP 30(b)(6) Designee of Peccole Nevada Corporation – William Bayne	21	4026-4039
XXXX	Findings of Facts, Conclusions of Law and Order Regarding Motion to Dismiss and Countermotion to Allow More Definite Statement if Necessary and Countermotion to Stay Litigation of Inverse Condemnation Claims Until Resolution of the Petition for Judicial Review and Countermotion for NRCP Rule 56(F) Continuance	21	4040-4051
YYYY	Declaration of Christopher Molina in Support of the City's Countermotion for Summary Judgment and Opposition to Motion to Determine Property Interest	21	4052-4053
ZZZZ	Declaration of Seth Floyd	21	4054-4055
ZZZZ -1	Master planned communities with R-PD zoning	21	4056-4061
ZZZZ -2	General Plan Maps for Master Planned Communities with R-PD zoning	21	4062-4067
AAAAA	Recorder's Amended Transcript of Pending Motions in *180 Land Company LLC, et al. vs. City of Las Vegas,* Eighth Judicial District Court Case No. A-18-775804 (September 17, 2021)	22	4068-4235
BBBBB	December 23, 2021 letter from Seth Floyd re Entitlements on 17-acre Property; Applications for development of other segments of former Badlands Golf Course	22	4236-4238
CCCCC	July 19, 2022 letter from Seth Floyd re Entitlements on 17-acre portion of Badlands	22	4239-4240
DDDDD	Appraisal of Real Property prepared by The DiFederico Group re the 17-Acre Property	23	4241-4394
EEEEE	Affidavit of Donald Richards (Ex. 50 to Plaintiff Landowners' Reply in Support of Countermotion for Discovery Pursuant to NRCP 56(d) filed 7/7/2021)	23	4395-4396
FFFFF	Bill No. 2018-5 (Ordinance No. 6617)	23	4397-4405

Exhibit	Exhibit Description	Vol.	Bates No.
GGGGG	Appraisal Consulting Report prepared by Charles E. Jack of Integra Realty Resources	24	4406-4586
HHHHH	Supplemental Declaration Peter Lowenstein	24	4587-4600
HHHHH-1	Email from Steve Swanton re PMP – 58526 and PMP-58527 (Queensridge/Badlands Golf Course)	24	4601-4602
HHHHH-2	June 8, 2015 letter to Angie Scott from Steve Swanton re PMP-59572	24	4603
HHHHH-3	Email from Stephanie Allen to Peter Lowenstein re Development Agreement	24	4604-4605
HHHHH-4	Email from Lucien Paet re New Badlands Parcel Map	24	4606
HHHHH-5	Approved Site Plan for SDR-62393	24	4607
IIIII	Declaration of Kevin McOsker	25	4608-4609
JJJJJ	Videotaped Deposition of Tio Stephan DiFederico, MAI	25	4610-4711
KKKKK	Appellant's Opening Brief filed 11/6/18 in Nevada Supreme Court Case No. 75481	26	4712-4791
LLLLL	Appellant's Amended Reply Brief filed 5/1/19 in Nevada Supreme Court Case No. 75481	26	4792-4829
MMMMM	City of Las Vegas's Motion for Summary Judgment filed 11/9/20 in the 65-Acre Case (No. A-18-780184-C)	26	4830-4862
NNNNN	Plaintiff Landowners' Opposition to the City's Motion for Summary Judgment Etc. filed 11/23/20 in the 65-Acre Case (No. A-18-780184-C)	26	4863-4950
OOOOO	City of Las Vegas' Motion to Remand 133-Acre Applications to the Las Vegas City Council filed 8/9/2021 in the 133-Acre Case (No. A-18-775804-J)	27	4951-4961
PPPPP	Notice of Entry of Findings of Fact, Conclusions of Law Regarding (1) Motion to Remand 133-Acre Applications to Las Vegas City Council and (2) Motion to Dismiss Civil Complaint Improperly Joined with Petition for Judicial Review	27	4962-4973

Exhibit	Exhibit Description	Vol.	Bates No.
QQQQQ	Deposition Transcript of Charles E. Jack, June 16, 2022	28	4974-5168
RRRRR	Deposition Transcript of NRCP 30(b)(6) Designee of Peccole Nevada Corporation – William Bayne	29	5169-5411
SSSSS	Order Granting the City of Las Vegas' Motion to Compel and for an Order to Show Cause in the 35-Acre Case (No. A-17-758528-J)	30	5412-5416
TTTTT	Order Granting the City of Las Vegas' Objection to the Discovery Commissioner's Report and Recommendation in the 35-Acre Case (No. A-17-758528-J)	30	5417-5422
UUUUU	Appraisal of Real Property prepared by The DiFederico Group re the 35-Acre Property	30	5423-5558
VVVVV	Excerpts of Deposition Transcript of Yohan Lowie	31	5559-5566
WWWWW	Declaration of Philip R. Byrnes in Support of City's Reply in Support of City's Renewed Motion for Summary Judgment and City's Motion to Strike Developer's Countermotion for Approval of Entitlements and to End Take	32	5567-5568
WWWWW-1	Agenda Summary Page for Item 28 of the August 3, 2022 Las Vegas City Council meeting	32	5569-5570
WWWWW-2	Settlement Proposal	32	5571-5583
XXXXX	Order Granting Stay	33	5584-5588
YYYYY	**Declaration of Oh-Sang Kwon**	**34**	**5589-5595**
YYYYY-1	**Technical Drainage Study for the Seventy 840-050 March 2016**	**34-35**	**5596-5982**
YYYYY-2	**Supplement to Technical Drainage Study for the Seventy 840-050 March 2016**	**35**	**5983-6024**
YYYYY-3	**March 24, 2016 City of Las Vegas Inter-Office Memorandum re Drainage Study for The Seventy**	**36**	**6025-6028**
YYYYY-4	**September 2017 Response to 1st CLV Comments on the Technical Drainage Study for the 435 (Formerly "The Seventy")**	**36**	**6029-6193**
YYYYY-5	**September 14, 2017 - Improvement Plans for the 435**	**37**	**6194-6210**
YYYYY-6	**March 24, 2016 City of Las Vegas Inter-Office Memorandum re Drainage Study for The Seventy**	**37**	**6211-6215**
YYYYY-7	**January 2018 Response to 2nd CLV Comments on the Technical Drainage Study for the 435 (Formerly "The Seventy")**	**37**	**6216-6292**

Exhibit	Exhibit Description	Vol.	Bates No.
YYYYY-8	January 10, 2018 - Improvement Plans for the 435	37	6293-6309
YYYYY-9	February 1, 2018 City of Las Vegas Inter-Office Memorandum re Drainage Study for the 435 formerly the SEVENTY	37	6310-6314
YYYYY-10	June 2018 Response to 3rd CLV Comments on the Technical Drainage Study for the 435 (Formerly "The Seventy")	38	6315-6461
YYYYY-11	Improvement Plans for the 435	39	6462-6483
YYYYY-12	July 26, 2018 City of Las Vegas Inter-Office Memorandum re Drainage Study for the 435 formerly the Seventy	39	6484-6489
YYYYY-13	August 13, 2016 GCW Engineers Meeting Minutes	39	6490-6495
YYYYY-14	Email re The 435 TD5 Comments Review Meeting	39	6496-6499
ZZZZZ	Declaration of Michael Cunningham	39	6500
ZZZZZ-1	Administrative Code, 2019 Edition	39	6501-6507

Dated this 23rd day of November, 2022.

McDONALD CARANO LLP

By: */s/ George F. Ogilvie III*

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Attorneys for City of Las Vegas

CERTIFICATE OF SERVICE

I HEREBY CERTIFY that I am an employee of McDonald Carano LLP, and that on the 23rd day of November, 2022, I caused a true and correct copy of the foregoing **FOURTH SUPPLEMENTAL APPENDIX OF EXHIBITS IN SUPPORT OF CITY'S COUNTERMOTION FOR SUMMARY JUDGMENT ON JUST COMPENSATION – VOLUME 38** to be electronically served with the Clerk of the Court via the Clark County District Court Electronic Filing Program which will provide copies to all counsel of record registered to receive such electronic notification.

<u>/s/ Jelena Jovanovic</u>
An employee of McDonald Carano LLP

EXHIBIT “YYYYY-10”

RESPONSE TO 3RD CLV COMMENTS
ON THE
TECHNICAL DRAINAGE STUDY FOR THE 435
(FORMERLY "THE SEVENTY")

840-050

June 2018

GCW
ENGINEERS \ SURVEYORS

Prepared for:

Seventy Acres LLC
9775 West Charleston Boulevard
Las Vegas, Nevada 89117
Phone: (702) 940-6930
Fax: (702) 940-6931

HYDROLOGIC CRITERIA AND DRAINAGE MANUAL

DRAINAGE STUDY INFORMATION FORM

Name of Development: The 435 (formerly known as The Seventy) Date: June 2018

Location of Development: a) Descriptive (Cross Streets) North/South: Hualapai Way

East/West: Rampart Boulevard

b) Section: 32,31 Township: 20S Range: 60E

c) APN : 138-32-301-005

Name of Owner: Seventy Acres LLC

Telephone No.: (702) 940-6930 Fax No.: (702) 940-6931 E-Mail Address: frank@EHBcompanies.com

Address: 9775 W. Charleston Blvd., Las Vegas, Nevada 89117

Contact Person-Name: Steve Jones, P.E. **Telephone No.:** (702) 804-2000

* **E-Mail Address:** SJones@gcwengineering.com **Fax No.:** (702) 804-2299

Firm: GCW, Inc.

Address: 1555 South Rainbow Blvd, Las Vegas, NV 89146

Type of Land Development/Land Disturbance Process:

	Rezoning		Subdivision Map		Clearing and Grading Only
	Parcel Map		Planned Unit Development	X	Other (Please specify below)
	Large Parcel Map		Building Permit	Conceptual Drianage, Rough Grade, SD	

1. Total Owned Land Area: At Site: +/- 70.52 acres Being Developed/Disturbed: +/- 17.5 acres
2. Is a portion or all of the subject property located in a designated 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.): Conceptual Drainage, Rough Grade, and Storm Drain Improvements
5. Approximate upstream land area which drains to the subject site: +/- 3.73 sq. mi.
6. Has the site drainage been evaluated in the past? ☒ YES ☐ NO If yes, please identify documentation: Peccole Ranch West Master Study, Queensridge LOMR, Queens Borough Culvert Study
7. If known, please briefly identify the proposed discharge point(s) of runoff from the site: Existing dual (2) - 12'X 12' RCB at northeast corner of site
8. Briefly describe your proposed schedule for the subject project: Phase 1 Infrastructure (This Study), Phase 1 Improvements (Future Study), Phase 2 - Remaining 52.1 acres (Future Studies)

PROFESSIONAL ENGINEER-STATE OF NEVADA
STEPHEN M. JONES
EXP. 6-30-19
CIVIL
No. 19638

6/28/2018

Engineer's Seal

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.

*New Required Field

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

Revision	Date

Local Entity File No.

REFERENCE: STANDARD FORM 1

T:\Flood_Control\ADMIN\Forms\SF-1.docx Updated 05/01/2008

RESPONSE TO 3RD CLV COMMENTS
ON THE
TECHNICAL DRAINAGE STUDY FOR THE 435
(FORMERLY "THE SEVENTY")

840-050

June 2018

Prepared for:

Seventy Acres LLC
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![GCW Engineers Surveyors]

840-050

June 28, 2018

Albert Sung, PE
City of Las Vegas – Department of Public Works
333 N. Rancho Drive – 7th Floor
Las Vegas, NV 89106

Re: 3rd Response to City of Las Vegas Comments on the Technical Drainage Study for "The 435" (DS4787C)

Dear Mr. Sung:

This letter addresses City of Las Vegas (CLV) second review comments dated February 1, 2018 and provides an update on design changes based off of a meeting held on February 21, 2018 between the City of Las Vegas (CLV) and GCW.

Levee
The previous design included an embankment that acted as a levee to direct flow to an open top RCB. The levee and open top RCB are no longer proposed, instead the mainline will be extended further upstream in a similar manner to the first submittal of the project during the interim condition to collect the majority of the flow, with laterals extending from the mainline in key locations to collect the remaining runoff. Note that the size of the proposed RCB for the extension is 10'X10' RCB which differs from the first submittal of the project. The WSPG model has been updated and is included in the appendix. Inlet control calculations for stubs collecting flow in the interim condition and normal depth calculations for all stubs based off of the worst case flow rate have also been included in the appendix.

Hydrology
An interim condition HEC-1 model was prepared to compare with flow rates from the ultimate conditions, MPU, and FEMA flow rates. The interim condition showed a flow rate downstream of the improvements that was higher than the previously modeled ultimate condition flow rate. A separate interim condition WSPG model was prepared to show the higher flow rate meets criteria.

Corrugated Wall Face
Per the aforementioned meeting between CLV and GCW, a corrugated wall face with a 1-inch deep pattern on both sides of the channel along with 3-inches of sacrificial concrete with a tined flow line on the bottom of the channel will be provided at sections to help prevent velocities from exceeding 35 ft/s. A combined Manning's value of 0.023 for mainline 1 and 0.024 for mainline 2 was calculated using a Manning's value of 0.020 for the tined sacrificial concrete bottom and 0.026 for the 1" deep pattern (0.026 Manning's duplicates a D50=1-Inch riprap). The sections with the sacrificial concrete and corrugated wall face include a 30-foot section in the transition before the existing dual 12-foot by 12-foot RCB in the mainline 1 model, a 251-foot section upstream of WSPG station -7825.45 in the mainline 1 model, and a 126-foot section upstream

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of WSPG station -2775.61 in the mainline 2 model. Note that velocities exceed 35 ft/s by 0.77 ft/s in the 30-foot transition section and by 0.2 ft/s at station 78+25.45 in the mainline 1 model. Since these sections are short and immediately return to below 35 ft/s, 3-inches of sacrificial concrete with corrugated wall facing is provided in the sections, and 35 ft/s is only exceeded by 0.77 ft/s in the worst location the design is considered to be adequate. The mainline 1 and 2 models have been updated and are included in the appendix.

The CLV comment letter has been included in Appendix A for reference. Below are individual responses to each comment included in the review letter.

Comment: "1. An effective HEC-RAS model to determine the existing water surface elevation within the FEMA Special Flood Hazard Area Zone A is required. This model will serve as the base model to develop the duplicate effective model, corrected effective model, pre-project condition model and post-project condition model."

Response: An effective HEC-RAS model has been provided. Figure 9 has been included in the appendix that shows the location of the sections and a summary table of the HEC-RAS model.

Comment: "2. Provide a comparison summary of the HEC-RAS results for the existing, interim, and proposed wash conditions."

Response: The wash is no longer proposed to weir into an open top RCB, therefore interim and proposed condition HEC-RAS models are no longer applicable.

Comment: "3. Extend the HEC-RAS model further upstream to analyze the effects of the sedimentation berms."

Response: The sedimentation berms are no longer proposed with the project.

Comment: "4. Additional HEC-RAS cross sections are required at the weir (upstream and downstream), at the sediment berms, and the turn within the open RCB. Update the model and exhibits accordingly."

Response: The open top RCB and weir are no longer proposed with this project per the upfront discussion.

Comment: "5. For the FEMA flood zone WSE evaluation, the computational flow regime should be "sub-critical flow" not "mix flow" to provide a conservative WSE for floodplain assessment."

Response: The interim and proposed condition HEC-RAS models are no longer applicable. The existing condition HEC-RAS model that is included uses a subcritical flow regime. The HEC-RAS model has been included in the appendix.

Comment: "6. The hydraulic models do not provide a relationship between Mainline 2 and Mainline 1 at the junction structure. The junction structure acts as a major point of confluence and is a critical section of the system. Revise the WSPG and HEC-RAS models to better demonstrate the interaction of the systems (Mainline 1, Mainline 2, and wash) at the junction."

Response: The open top RCB at the wash is no longer proposed. Mainline 2 utilizes the HGL at the junction structure from the Mainline 1 model.

Comment: "7. Based on the results of Comment 6, the computed flow depth at the end of the Mainline 2 system should be used as the initial flow condition at Mainline 1 Station -7536.97 and should be applied as the boundary condition for the HEC-RAS model when conducting the WSE evaluation."

Response: Comment no longer applicable due to design change.

Comment: "8. There is an existing hydraulic jump at the end of the Mainline 1 system per sheet C-6 of the referenced plan for "The Village at Queensridge Culvert". The WSE of 2635.91 should be used as the downstream boundary condition (SO) to incorporate the hydraulic jump impacting the overall storm drain hydraulic performance and avoid any negative impacts to the downstream condition; Or input parameters should be adjusted to reproduce the hydraulic jump as shown on sheet C-6 to evaluate the proposed storm drain system hydraulic performance."

Response: The hydraulic jump seen on sheet C-6 was caused by an embankment located downstream of the outlet. The embankment was removed per the 2nd Update to the Technical Drainage Study for Queens Borough Culvert (DS3674), however the improvement plans were not updated to accurately show the HGL. Refer to the referenced WSPG model and text excerpt from the 2nd update included in the appendix for the starting water surface elevation.

Comment: "9. The Mainline 1 system includes an existing 72-inch (Station -9391.3) with a WSE of 2669.252. Provide a comparison between the current design and the previously approved study/design to assess any negative impacts to the upstream and downstream facilities."

Response: The HGL proposed with this study is 0.48-ft higher during the interim condition and 0.19-ft higher in the ultimate condition compared to the previously approved study which had the HGL at the top of the 72" pipe. This difference is considered insignificant due to the depth of the pipe. An improvement plan sheet showing the culvert HGL has been included in the appendix.

Comment: "10. Include curvature information in the WSPG model for Mainline 2 to estimate super-elevation. Futhermore, with the high flow quantity over 2,000-cfs and a flow velocity of 38.04-fps, which is equal to 22.5-feet of velocity head and super-critical flow condition, roll wave in the straight reach, super- elevation and cross wave along a curve reach and a possible oblique jump should be considered. Ensure the proposed channel cross section provides a stabilized flow condition with sufficient freeboard."

Response: Comment no longer applicable due to design change.

Comment: "11. Provide headwater calculations at the RCB entrance from the open box section."

Response: The open top RCB is no longer proposed. An inlet control calculation has been provided for the entrance of the newly proposed RCB extension.

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Comment: "12. Provide updated weir calculations for the revised weir length of the open RCB."

Response: The open top RCB is no longer proposed.

Comment: "13. The future minimum finished floor elevations must be higher than the manholes/road grades of the future road. Revise accordingly."

Response: Plans have been revised so that future minimum finished floor elevations are higher than manholes/road grades of the future road.

Comment: "14. Show 16-foot min. width gates and provide details at maintenance access points from Alta Drive and Rampart Boulevard."

Response: A16-foot width gate has been provided and details at the maintenance access point from Alta Drive has been provided.

Comment: "15. Verify the existing golf course bridge has adequate capacity and clearance for maintenance vehicles and equipment."

Response: The access road from Rampart Boulevard and utilizing the golf cart bridge near the LVVWD facility is no longer proposed. The access road is now along the top of the RCB with a path down to the 20'X12' RCB opening.

Comment: "16. Show a maintenance access road down to the interim channel area."

Response: Maintenance access roads have been provided to the interim collection areas.

Comment: "17. Revise the post and cable details to reflect a 3-cable fence system."

Response: The post and cable details have been revised to reflect a 3-cable fence system.

Comment: "18. A levee is proposed along the northern side of the interim channel, adjacent to southwestern future development lots. Per Section 303.6.2 of the Manual, since the flood control levee is proposed within a FEMA SFHA and a map revision will be requested based on the levee providing protection against the 100-year flood, FEMA's levee criteria shall be used in order for FEMA to credit the levee. For FEMA to accredit a levee system with 1-percent-annual-chance flood hazard reduction capability on a FIRM, the community/levee owner must submit a package containing the required data and documentation to show that the levee system meets all design and operation requirements of 44 CFR 65.10."

Response: Per the upfront discussion a levee is no longer proposed.

Comment: "19. It is unclear on the profile on Sheet C5.03 where the bottom of the channel is located and how high the HGL is at this section. It appears that the upstream end of the open box is only 2-feet high which means the western wall of the RCB is not fully constructed. Clarify the design of open box section."

Response: Comment no longer applicable due to design change.

Comment: "20. Verify the stationing of SDMH #109 on the profile on Sheet C5.04."

Response: The stationing of SDMH #109 has been corrected.

Comment: "21. Revise the call outs on the lateral profile sheets to call out Construction Note 12 to install temporary plug and cap storm drain line."

Response: The call outs on the lateral profile sheets have been revised to call out construction note 12.

Comment: "22. Revise Sections 5 and 9 on Sheet C8.01 to show the same rip rap specifications for the bottom of the interim channel."

Response: Sections 5 and 9 are no longer proposed per the upfront discussion.

Comment: "23. Revise Sections 3 and 8 on Sheet C8.01 to specify the same scarification extents."

Response: The note has been removed from Section 3 since it is a drainage easement detail based on trench width for the proposed RCB.

Comment: "24. Provide details of the proposed walls at the entrance into the 20' x 12' RCB."

Response: Details for the proposed walls at the entrance into the 20' x 12' RCB have been provided.

The following comments are repeated to reflect routine items previously acknowledged by the Engineer.

Comment: "25. This site development is located within a FEMA SPECIAL FLOOD HAZARD AREA, Zone A. **No permits will be issued until a Conditional Letter of Map Revision (CLOMR/CLOMR-F) is received from FEMA. Permits may be issued upon the receipt of Conditional Letter of Map Revision (CLOMR or CLOMR-F) from FEMA**."

Response: The requirement for FEMA coordination to receive permits is acknowledged.

Comment: "26. A Letter of Map Revision (LOMR/LOMR-F) must be obtained from FEMA after the completion of any project within a FEMA Special Flood Hazard Area, Flood Zone "A". The bonded improvements shall include a line item of **$50,000.00** for the LOMR. The bonded improvements will not be released until the LOMR/LOMR-F is obtained from FEMA and filed with the City of Las Vegas."

Response: The requirement for an additional bond with regards to LOMR approval is acknowledged.

Comment: "27. The site is located within the Flood Zone A and is adjacent to an existing or proposed *Clark County Regional Flood Control District* (CCRFCD) master planned facility. Therefore, CCRFCD concurrence is required prior to final approval of the drainage study."

Response: The requirement of CCRFCD concurrence prior to final approval is acknowledged.

Comment: "28. Please obtain necessary 404 permits from US Army Corps of Engineers and provide a copy of the permit to City of Las Vegas Flood Control Section prior to issuance of the grading permit. Contact the St. George Field Office of the US Army Corps of Engineers for permit information."

Response: It is acknowledged that necessary 404 permits are required prior to issuance of the grading permit.

Comment: "29. Provide complete *Plans and Project Specifications* for approval by the *City of Las Vegas.* The Structural Plans and Details shall be a part of the Civil Improvement Plan set. This project is considered as a *Capital Improvement Project* (CIP) with developer funding."

Response: Complete Plans and Project Specifications will be provided to the City of Las Vegas for approval after the approval of the technical drainage study. It is acknowledged that the structural plans and details will be part of the Civil Improvement Plan set and that the project is considered a CIP project.

Comment: "30. Structural plans for the proposed storm drain improvements and pertinent flood control facilities must be submitted for review. Provide a soils report, structural calculations and specifications, two wet stamped structural sets, and a grading plan to the *Building Department* for processing. The engineer must provide a copy of *Building Department* approval of the structures to Regional Flood prior to their concurrence and to *Flood Control* prior to final acceptance of the drainage study."

Response: Structural plans for the proposed storm drain improvements and pertinent flood control facilities will be submitted for review after the approval of the technical drainage study. A soils report, structural calculations and specifications, two wet stamped structural sets, and a grading plan will be provided to the *Building Department* for processing. It is acknowledged that Building Department approval must be provided to Regional Flood for concurrence and to Flood Control prior to final acceptance.

Comment: "31. All proposed improvements associated with the Storm Drain facilities shall be bonded and inspected. This project shall require Special Inspection. Coordinate the requirements of and the Agreements needed for Special Inspection with the Building Department."

Response: It is acknowledged that the storm drain facilities must be bonded and inspected and that the project will require special inspection. The requirements and agreements needed for special inspection will be coordinated with the building department.

Comment: "32. The proposed improvements show drainage facilities of a size that must be reviewed for access and maintenance concerns. The engineer must submit an extra set of improvement plans to the *City Streets & Sanitation Department* for their review and comments. *Streets & Sanitation Department's* approval must be secured prior to the conditional drainage study approval."

Response: Updated plans will continue to be submitted to the City Street and Sanitation Department for their review and comments.

Comment: "33. Provide new public drainage easements for the area of the site impacted by the proposed MPU facility improvements. The easement shall note that the public drainage improvements (MPU facilities) are publicly maintained and all onsite storm drain and surface improvements are privately maintained and the easement must be dedicated and recorded by separate document prior to the final acceptance of the improvement plans. Provide legal description and an exhibit of the drainage easement to Flood Control and *Rae Heller* (702-229-2139) of *City of Las Vegas Right of Way Section* for the recordation process after the subject drainage study is conceptually approved. The existing drainage easements shall be vacated by separate action and the recording of the new easements shall be done consecutively."

Response: New public drainage easements with the note that the MPU facilities are publically maintained and onsite storm drain and surface improvements are privately maintained have been provided. It is acknowledged that the easement must be dedicated and recorded prior to final acceptance of the improvement plans. A legal description and exhibit will be provided to Flood Control and Mary Wulff for the recordation process after conceptual approval. It is acknowledged that the existing drainage easements shall be vacated by separate action and the recording of new easement will be done consecutively.

Comment: "34. Technical drainage studies are required for each of the future development super pads. The technical drainage studies for the developments may not be submitted until the conditional approval of this pertinent infrastructure drainage study is obtained. Final approval for the infrastructure study must be obtained prior to conditional approval of the impacted development super pad drainage studies."

Response: It is acknowledged that technical drainage studies are needed for future development of the super pads. It is also noted that conditional approval of this study is required before the submittal of the technical drainage studies for the future developments and that final approval of this study is required prior to conditional approval of the future development studies.

Comment: "35. This project currently has no Proposed Buildings or Structures. Should the project propose changes to this design assumption, then the Engineer is to update the drainage study detailing the flood zone impacts and provide addresses for each building in a FEMA Flood Hazard Zone prior to obtaining a grading permit. This information is necessary to insure that the elevation certificates are provided for each address prior to completion of construction. This information is required until such time as a LOMR is approved that removes the development from the SFHA."

Response: Comment acknowledged.

Comment: "36. Proposed storm drain laterals have been identified to collect flows from Peccole West Lot 9 and Queensridge Fairway Homes. Extend the storm drain system to collect the 100-year flows from these adjacent subdivisions."

Response: Comment will be addressed in future study.

Comment: "37. Continue to coordinate the MPU facility changes that are proposed with this development."

Response: MPU facility changes will continue to be coordinated.

Comment: "38. Storm drain facilities are located on cut/fill slopes. Revise the slopes and/or the storm drain alignment to maintain 12-foot access roads. Provide a cross section detail of the maintenance access."

Response: 12-foot access roads on top of storm drain to every manhole and inlet opening is maintained. Maintenance access details are included in the improvement plans.

Comment: "39. Provide a concrete pad and maintenance access to the inlet structures for the local storm drains. Show the needed drainage easements for these facilities."

Response: Maintenance access and drainage easements have been provided. Concrete pads have been provided at the inlet locations for the trunk RCBs for public maintenance. All other storm drains are to be privately maintained and do not require concrete pads.

Comment: "40. The existing and proposed utility crossings of the storm drain must be shown on the storm drain plan and profiles sheets and on the lateral profiles. Indicate the type of pipe material for water and sewer lines. Review separation requirements between utilities and show all of the utility crossings of the storm drains."

Response: Existing utilities that intersect the alignment of the proposed storm drain are shown in the storm drain profiles. Note the existing sewer at approximate Station 66+40 has adequate clearance.

If you have any questions or require additional information, please do not hesitate to contact me at 804-2130.

Respectfully,

GCW, INC.

Nelson Baggs, E.I.
Flood Control Division

Enclosures

c: Gia Nguyen, GCW
Steve Jones, GCW
Scott Plummer, GCW

THE 435 – 3rd CLV Response to Comments
APPENDIX LAYOUT

APPENDIX A

City of Las Vegas Comments

CITY OF LAS VEGAS INTER-OFFICE MEMORANDUM

DATE: **February 1, 2018**	
TO: **Land Development Services** Department of Building & Safety	**FROM:** Jennifer Shinn Flood Control Engr. Associate Department of Public Works
SUBJECT: Drainage Study for: **The 435 formerly The SEVENTY**	**COPIES TO:** GCW Engineers
Cross Streets: SWC of Rampart & Alta	Seventy Acres LLC
File Number: F:\Depot\DSMemos\DS4787C.ZNA.doc	Bart Anderson, P.E., DevCo
Parcel Number: 138-32-301-005, 006, 210-008	CCRFCD
Zoning Action: SDR-62393; GPA-62387; ZON-62392	
FEMA Flood Zone YES **X** NO	
Proposed Storm Drain YES **X** NO	

HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES	FEES PAID Payment Trn #
1st Submittal	3/3/2016 & 3/9/2016	3/23/2016	See Comments Below	$400.00	425231: $400
2nd Submittal	9/18/17	11/9/2017	See Comments Below	$400.00	490193: $400
3rd Submittal	1/11/18	2/1/2018	See Comments Below	$400.00	492825: $400
			TOTAL FEES (LDDRS):	**$1200.00**	----

REMARKS: This site development is within a FEMA SPECIAL FLOOD HAZARD AREA, Zone A. No permits of any kind will be issued for this project until a Conditional Letter of Map Revision (CLOMR/CLOMR-F) is received from FEMA.

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 NDOT concurrence.

1. An effective HEC-RAS model to determine the existing water surface elevation within the FEMA Special Flood Hazard Area Zone A is required. This model will serve as the base model to develop the duplicate effective model, corrected effective model, pre-project condition model and post-project condition model.

2. Provide a comparison summary of the HEC-RAS results for the existing, interim, and proposed wash conditions.

3. Extend the HEC-RAS model further upstream to analyze the effects of the sedimentation berms.

4. Additional HEC-RAS cross sections are required at the weir (upstream and downstream), at the sediment berms, and the turn within the open RCB. Update the model and exhibits accordingly.

5. For the FEMA flood zone WSE evaluation, the computational flow regime should be "sub-critical flow" not "mix flow" to provide a conservative WSE for floodplain assessment.

6. The hydraulic models do not provide a relationship between Mainline 2 and Mainline 1 at the junction structure. The junction structure acts as a major point of confluence and is a critical section of the system. Revise the WSPG and HEC-RAS models to better demonstrate the interaction of the systems (Mainline 1, Mainline 2, and wash) at the junction.

7. Based on the results of Comment 6, the computed flow depth at the end of the Mainline 2 system should be used as the initial flow condition at Mainline 1 Station -7536.97 and should be applied as the boundary condition for the HEC-RAS model when conducting the WSE evaluation.

8. There is an existing hydraulic jump at the end of the Mainline 1 system per sheet C-6 of the referenced plan for "The Village at Queensridge Culvert". The WSE of 2635.91 should be used as the downstream boundary condition (SO) to incorporate the hydraulic jump impacting the overall storm drain hydraulic performance and avoid any negative impacts to the downstream condition; Or input parameters should be adjusted to reproduce the hydraulic jump as shown on sheet C-6 to evaluate the proposed storm drain system hydraulic performance.

9. The Mainline 1 system includes an existing 72-inch (Station -9391.3) with a WSE of 2669.252. Provide a comparison between the current design and the previously approved study/design to assess any negative impacts to the upstream and downstream facilities.

10. Include curvature information in the WSPG model for Mainline 2 to estimate super-elevation. Futhermore, with the high flow quantity over 2,000-cfs and a flow velocity of 38.04-fps, which is equal to 22.5-feet of velocity head and super-critical flow condition, roll wave in the straight reach, super-elevation and cross wave along a curve reach and a possible oblique jump should be considered. Ensure the proposed channel cross section provides a stabilized flow condition with sufficient freeboard.

11. Provide headwater calculations at the RCB entrance from the open box section.

12. Provide updated weir calculations for the revised weir length of the open RCB.

13. The future minimum finished floor elevations must be higher than the manholes/road grades of the future road. Revise accordingly.

14. Show 16-foot min. width gates and provide details at maintenance access points from Alta Drive and Rampart Boulevard.

15. Verify the existing golf course bridge has adequate capacity and clearance for maintenance vehicles and equipment.

16. Show a maintenance access road down to the interim channel area.

17. Revise the post and cable details to reflect a 3-cable fence system.

18. A levee is proposed along the northern side of the interim channel, adjacent to southwestern future development lots. Per Section 303.6.2 of the Manual, since the flood control levee is proposed within a FEMA SFHA and a map revision will be requested based on the levee providing protection against the 100-year flood, FEMA's levee criteria shall be used in order for FEMA to credit the levee. For FEMA to accredit a levee system with 1-percent-annual-chance flood hazard reduction capability on a FIRM, the community/levee owner must submit a package containing the required data and documentation to show that the levee system meets all design and operation requirements of 44 CFR 65.10.

19. It is unclear on the profile on Sheet C5.03 where the bottom of the channel is located and how high the HGL is at this section. It appears that the upstream end of the open box is only 2-feet high which means the western wall of the RCB is not fully constructed. Clarify the design of open box section.

20. Verify the stationing of SDMH #109 on the profile on Sheet C5.04.

21. Revise the call outs on the lateral profile sheets to call out Construction Note 12 to install temporary plug and cap storm drain line.

22. Revise Sections 5 and 9 on Sheet C8.01 to show the same rip rap specifications for the bottom of the interim channel.

23. Revise Sections 3 and 8 on Sheet C8.01 to specify the same scarification extents.

24. Provide details of the proposed walls at the entrance into the 20' x 12' RCB.

The following comments are repeated to reflect routine items previously acknowledged by the Engineer.

25. This site development is located within a FEMA SPECIAL FLOOD HAZARD AREA, Zone A. **No permits will be issued until a Conditional Letter of Map Revision (CLOMR/CLOMR-F) is received from FEMA. Permits may be issued upon the receipt of Conditional Letter of Map Revision (CLOMR or CLOMR-F) from FEMA.**

26. A Letter of Map Revision (LOMR/LOMR-F) must be obtained from FEMA after the completion of any project within a FEMA Special Flood Hazard Area, Flood Zone "A". The bonded improvements shall include a line item of **$50,000.00** for the LOMR. The bonded improvements will not be released until the LOMR/LOMR-F is obtained from FEMA and filed with the City of Las Vegas.

27. The site is located within the Flood Zone A and is adjacent to an existing or proposed *Clark County Regional Flood Control District* (CCRFCD) master planned facility. Therefore, CCRFCD concurrence is required prior to final approval of the drainage study.

28. Please obtain necessary 404 permits from US Army Corps of Engineers and provide a copy of the permit to City of Las Vegas Flood Control Section prior to issuance of the grading permit. Contact the St. George Field Office of the US Army Corps of Engineers for permit information.

29. Provide complete *Plans and Project Specifications* for approval by the *City of Las Vegas*. The Structural Plans and Details shall be a part of the Civil Improvement Plan set. This project is considered as a *Capital Improvement Project* (CIP) with developer funding.

30. Structural plans for the proposed storm drain improvements and pertinent flood control facilities must be submitted for review. Provide a soils report, structural calculations and specifications, two wet stamped structural sets, and a grading plan to the *Building Department* for processing. The engineer must provide a copy of *Building Department* approval of the structures to Regional Flood prior to their concurrence and to *Flood Control* prior to final acceptance of the drainage study.

31. All proposed improvements associated with the Storm Drain facilities shall be bonded and inspected. This project shall require Special Inspection. Coordinate the requirements of and the Agreements needed for Special Inspection with the Building Department.

32. The proposed improvements show drainage facilities of a size that must be reviewed for access and maintenance concerns. The engineer must submit an extra set of improvement plans to the *City Streets & Sanitation Department* for their review and comments. *Streets & Sanitation Department's* approval must be secured prior to the conditional drainage study approval.

33. Provide new public drainage easements for the area of the site impacted by the proposed MPU facility improvements. The easement shall note that the public drainage improvements (MPU

facilities) are publicly maintained and all onsite storm drain and surface improvements are privately maintained and the easement must be dedicated and recorded by separate document prior to the final acceptance of the improvement plans. Provide legal description and an exhibit of the drainage easement to Flood Control and *Rae Heller* (702-229-2139) of *City of Las Vegas Right of Way Section* for the recordation process after the subject drainage study is conceptually approved. The existing drainage easements shall be vacated by separate action and the recording of the new easements shall be done consecutively.

34. Technical drainage studies are required for each of the future development super pads. The technical drainage studies for the developments may not be submitted until the conditional approval of this pertinent infrastructure drainage study is obtained. Final approval for the infrastructure study must be obtained prior to conditional approval of the impacted development super pad drainage studies.

35. This project currently has no Proposed Buildings or Structures. Should the project propose changes to this design assumption, then the Engineer is to update the drainage study detailing the flood zone impacts and provide addresses for each building in a FEMA Flood Hazard Zone prior to obtaining a grading permit. This information is necessary to insure that the elevation certificates are provided for each address prior to completion of construction. This information is required until such time as a LOMR is approved that removes the development from the SFHA.

Flood Control understands that this overall project will be developed in Phases. The following comments are repeated to reflect items that shall be addressed in future study updates as the Phases develop.

36. Proposed storm drain laterals have been identified to collect flows from Peccole West Lot 9 and Queensridge Fairway Homes. Extend the storm drain system to collect the 100-year flows from these adjacent subdivisions.

37. Continue to coordinate the MPU facility changes that are proposed with this development.

38. Storm drain facilities are located on cut/fill slopes. Revise the slopes and/or the storm drain alignment to maintain 12-foot access roads. Provide a cross section detail of the maintenance access.

39. Provide a concrete pad and maintenance access to the inlet structures for the local storm drains. Show the needed drainage easements for these facilities.

40. The existing and proposed utility crossings of the storm drain must be shown on the storm drain plan and profiles sheets and on the lateral profiles. Indicate the type of pipe material for water and sewer lines. Review separation requirements between utilities and show all of the utility crossings of the storm drains.

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.

NOTE: The engineer must submit the drainage study to FEMA for a Conditional Letter of Map Revision (CLOMR). A favorable CLOMR must be obtained prior to the issuance of any permits. This site is located in a **FEMA Zone A**. *Clark County Regional Flood Control District* (CCRFCD) review and approval is required prior to recordation of final map or issuance of building/grading permits. The Engineer must send a copy of the report to the CCRFCD for review. **The developer/engineer must also obtain a Letter of Map Revision (LOMR) using the approved drainage study as technical support to inform FEMA of the modifications within the flood zone. The approved LOMR must be submitted to the *City of Las Vegas* prior to the release of the bond.** FEMA Elevation Certificates, showing as-built finish floor elevations, must be completed for each building in the FEMA A Zone. The certificate must be submitted to the *City of Las Vegas Flood Control Section* prior to scheduling a framing inspection.

END OF REMARKS
JKS/PBJ

T/R/S: T20S/R60E/12
AREA L-32

APPENDIX B

Hydrologic Calculations

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1****************************************                                   ***************************************
 *                                       *                                  *                                     *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *                                  *   U.S. ARMY CORPS OF ENGINEERS      *
 *             JUN   1998                *                                  *   HYDROLOGIC ENGINEERING CENTER     *
 *          VERSION 4.1                  *                                  *         609 SECOND STREET           *
 *                                       *                                  *      DAVIS, CALIFORNIA 95616        *
 *  RUN DATE   21JUN18  TIME  08:10:45   *                                  *          (916) 756-1104             *
 *                                       *                                  *                                     *
 ****************************************                                   ***************************************



                    X     X  XXXXXXX   XXXXX          X
                    X     X  X        X     X        XX
                    X     X  X        X               X
                    XXXXXXX  XXXX     X       XXXXX   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

                      *DIAGRAM
 *** FREE ***
                      ID   ****************************************************************
                      ID   * ........................................................... *
                      ID   * :                                                         : *
                      ID   * :              THE 435                                    : *
                      ID   * :                                                         : *
                      ID   * :              INTERIM CONDITIONS                         : *
                      ID   * :.........................................................: *
                      ID   * :              RETURN PERIOD_ _ _ _100 & 10 -YEAR         : *
                      ID   * :              DISTRIBUTION_ _ _ _ 6-HOUR SDN3            : *
                      ID   * :              PROJECT NO_ _ _ _ _ 840.050                : *
                      ID   * :              FILENAME_ _ _ _ _ _ INT.H1                 : *
                      ID   * :              DATE MODELED_ _ _ _ 6/08/18                : *
                      ID   * :              MODELED BY_ _ _ _ _ NB                     : *
                      ID   * :.........................................................: *
                      ID   * :                                                         : *
                      ID   * :.........................................................: *
                      ID   ****************************************************************
                      ID
                      ID    REFERENCED HYDROLOGIC MODELS:
                      ID    2013 LAS VEGAS VALLEY FLOOD CONTROL MASTER PLAN UPDATE
                      ID    CITY OF LAS VEGAS CITY WIDE HYDROLOGY ANALYSIS (PBS&J 1997)
                      ID    CLARK COUNTY REGIONAL FLOOD CONTROL DISTRICT 2008 MASTER PLAN UPDATE
                      ID    GOWAN WATERSHED (ALL)
                      ID    RECOMMENDED DRAINAGE SYSTEM WITH ULTIMATE DEVELOPMENT
                      ID    INPUT FILE = ALLGOW3.DAT
                      ID    INPUT FILE DATE = MAY 5, 2008
                      ID    DESIGN STORM = 100-YEAR 6-HR STORM
                      ID    STORM DISTRIBUTION = SDN #3
                      ID    MODELED BY PBS&J (MICHELE L. D'ALESSANDRO, E.I., CFM)
                      ID    CHECKED BY PBS&J (HARSHAL B. DESAI, P.E., CFM)
                      ID    STORM CENTERING = FULL WATERSHED
                      ID    JR CARDS CONTAIN DARFS BASED ON THE FOLLOWING VALUES:
                      ID
                      ID                          AREA    DARF
                      ID                          SQ. MI.
                      ID                          0-0.5   0.99
                      ID                          0.5-1   0.975
                      ID                          1-2     0.95
                      ID                          2-3     0.925
                      ID                          3-4     0.915
                      ID                          4-5     0.908
                      ID                          5-6     0.903
                      ID                          6-7     0.895
                      ID                          10yr    0.570
                      ID
                      ID  JR CARD RATIOS REPRESENT DEPTH-AREA REDUCTION FACTORS (DARF'S)
                      ID
                      ID  100-YEAR,  6-HOUR STORM,  SDN3
                      ID
```

```
  50          IT      5      0      0    650
  51          IO      5      0      0
  52          IN      5      0      0
  53          JR   PREC   0.99  0.975   0.95  0.925  0.915  0.908  0.903  0.895  0.570
              *
1                                     HEC-1 INPUT                                      PAGE  2

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


  54          KK    ON5
  55          KM  OFFSITE BASIN ON5
  56          PB   3.05
  57          BA  0.0147
  58          PC      0   0.02  0.057   0.07  0.087  0.108  0.124   0.13   0.13   0.13
  59          PC   0.13   0.13   0.13  0.133   0.14  0.142  0.148  0.158  0.172  0.181
  60          PC   0.19  0.197  0.199    0.2  0.201  0.204  0.214  0.229  0.241  0.249
  61          PC  0.251  0.256   0.27  0.278  0.281  0.283  0.295  0.322  0.352  0.409
  62          PC  0.499   0.59   0.71  0.744  0.781  0.812  0.819  0.835  0.851  0.856
  63          PC   0.86  0.868  0.876  0.888   0.91  0.926  0.937   0.95   0.97  0.976
  64          PC  0.982  0.985  0.987  0.989   0.99  0.993  0.993  0.994  0.995  0.998
  65          PC  0.998  0.999      1
  66          LS      0     82
  67          UD   .105
              *

  68          KK  57B-3C
  69          KM  OFFSITE BASIN 57B-3C
  70          PB   3.05
  71          BA  0.0069
  72          LS      0     87
  73          UD   .118
              *

  74          KK    ON6
  75          KM  OFFSITE BASIN ON6
  76          PB   3.04
  77          BA  0.0035
  78          LS      0     93
  79          UD   .057
              *

  80          KK   CON6
  81          KM  COMBINE 57B-3C AND ON6
  82          HC      2
              *

  83          KK   CCON6
  84          KM  COMBINE ON5 AND CON6
  85          HC      2
              *

  86          KK  RCCON6
  87          KM  ROUTE CCON6 TO CON8
  88          KM   LENGTH  SLOPE   n-VALUE        SHAPE    WIDTH   S-SLOPE
  89          RD   2015    .037    .040      0    TRAP      20       2
              *

  90          KK    ON8
  91          KM  ONSITE BASIN ON8
  92          PB   2.99
  93          BA  0.0190
  94          LS      0     82
  95          UD   .073
              *
1                                     HEC-1 INPUT                                      PAGE  3

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


  96          KK   CON8
  97          KM  COMBINE CCON6 AND ON8
  98          HC      2
              *

  99          KK   SW11
 100          BA  0.589
 101          PB   3.34
 102          LS      0   87.8
 103          UD  0.311
              *

 104          KK   RSW11
 105          KM  ROUTE SW11 TO CSW17
 106          KM  FACILITY = ANGEL PARK - CHARLESTON BOULEVARD
 107          KM  FACILITY # = APCB 0064, 0080
 108          KM  LINING = RCB
 109          RD   2338  0.0167   0.015      0    TRAP       7       0
              *
```

```
 110           KK    SW17
 111           BA   0.356
 112           PB    3.30
 113           LS       0    87.8
 114           UD   0.271
               *

 115           KK   CSW17
 116           KM  COMBINE RSW11 AND SW17
 117           HC       2
               *

 118           KK  RCSW17
 119           KM  ROUTE CSW17 TO CSW18
 120           KM  FACILITY = ANGEL PARK - CHARLESTON BOULEVARD
 121           KM  FACILITY # = APCB 0000,0001,0019,0050
 122           KM  LINING = RCB
 123           RD    3600   0.014   0.015       0    TRAP      11       0
               *

 124           KK    SW18
 125           BA   0.405
 126           PB    3.27
 127           LS       0    86.8
 128           UD   0.271
               *

 129           KK   CSW18
 130           KM  COMBINE RCSW17 AND SW18
 131           HC       2
               *
1                                      HEC-1 INPUT                                              PAGE  4

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


 132           KK  RCSW18
 133           KM  ROUTE CSW18 TO C12A
 134           KM  FACILITY = ANGEL PARK SOUTH
 135           KM  FACILITY # = APSO 0254,0255,0258,0345,0346; APCB 0000
 136           KM  NATURAL WASH
 137           KM  LENGTH = 5,200
 138           KM  SLOPE = 1.4%
 139           KM  N = 0.040
 140           KM  HYDRAULIC RADIUS = 1.5
 141           KM  VELOCITY =  9.2
 142           RM       2   0.157    0.15
               *

 143           KK     12A
 144           BA   0.392
 145           PB    3.20
 146           LS       0    91.2
 147           UD   0.264
               *

 148           KK    C12A
 149           KM  COMBINE 12A AND RCSW18
 150           HC       2
               *

 151           KK   RC12A
 152           KM  ROUTE THRU 12B
 153           KM  FACILITY = ANGEL PARK SOUTH
 154           KM  FACILITY # = APSO 0204, 0205
 155           KM  NATURAL WASH
 156           KM  LENGTH = 2,600
 157           KM  SLOPE = 3.5%
 158           KM  N = 0.040
 159           KM  HYDRAULIC RADIUS = 1.5
 160           KM  VELOCITY = 14.5
 161           RM       1    0.05    0.15
               *

 162           KK     12B
 163           BA   0.260
 164           PB    3.13
 165           LS       0    91.0
 166           UD   0.233
               *

 167           KK    C12B
 168           KM  COMBINE 12B AND RC12A
 169           HC       2
               *
1                                      HEC-1 INPUT                                              PAGE  5

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

```
 170          KK  57B-2A
 171          KM  OFFSITE BASIN 57B-2A
 172          PB    3.05
 173          BA  0.0098
 174          LS       0      87
 175          UD    .159
              *

 176          KK  57B-3F
 177          KM  OFFSITE BASIN 57B-3F
 178          PB    3.05
 179          BA  0.0116
 180          LS       0      87
 181          UD    .142
              *

 182          KK  57B-3E
 183          KM  OFFSITE BASIN 57B-3E
 184          PB    3.06
 185          BA  0.0251
 186          LS       0      87
 187          UD    .214
              *

 188          KK     ON9
 189          KM  ONSITE BASIN ON9
 190          PB    3.06
 191          BA  0.0399
 192          LS       0      82
 193          UD    .232
              *

 194          KK    CON9
 195          KM  COMBINE C12B, 57B-2A, 57B-3F, 57B-3E AND ON9
 196          HC       5
              *

 197          KK   RCON9
 198          KM  ROUTE CON9 TO CON10
 199          KM   LENGTH  SLOPE   n-VALUE         SHAPE    WIDTH   S-SLOPE
 200          RD    1540    .030    .040       0    TRAP      50       2
              *

 201          KK  57B-3G
 202          KM  OFFSITE BASIN 57B-3G
 203          PB    2.99
 204          BA  0.0023
 205          LS       0      87
 206          UD    .072
              *
1                                    HEC-1 INPUT                                     PAGE  6

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


 207          KK  57B-2B
 208          KM  OFFSITE BASIN 57B-2B
 209          PB    2.99
 210          BA  0.0047
 211          LS       0      87
 212          UD    .089
              *

 213          KK  57B-2C
 214          KM  OFFSITE BASIN 57B-2C
 215          PB    2.96
 216          BA  0.0027
 217          LS       0      87
 218          UD    .069
              *

 219          KK    ON10
 220          KM  ONSITE BASIN ON10
 221          PB    2.98
 222          BA  0.0177
 223          LS       0      82
 224          UD    .079
              *

 225          KK   CON10
 226          KM  COMBINE C57B-2A, 57B-3G, 57B-2B, 57B-2C AND ON10
 227          HC       5
              *

 228          KK  CCON10
 229          KM  COMBINE CON8 AND CON10
 230          HC       2
```

```
               *

  231          KK RCCON10
  232          KM  ROUTE CCON10 TO CON11
  233          KM   LENGTH  SLOPE   n-VALUE         SHAPE    WIDTH   S-SLOPE
  234          RD     510    .014    .040       0    TRAP      20       2
               *

  235          KK    ON11
  236          KM  ONSITE BASIN ON11
  237          PB    2.95
  238          BA  0.0089
  239          LS       0      82
  240          UD    .082
               *

  241          KK   CON11
  242          KM  COMBINE CCON10 AND ON11
  243          HC       2
               *
1                                        HEC-1 INPUT                                        PAGE  7

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


  244          KK  57B-2D
  245          KM  OFFSITE BASIN 57B-2D
  246          PB    3.09
  247          BA  0.0088
  248          LS       0      91
  249          UD    .130
               *

  250          KK  57B-2E
  251          KM  OFFSITE BASIN 57B-2E
  252          PB    3.08
  253          BA  0.0227
  254          LS       0      91
  255          UD    .102
               *

  256          KK C57B-2E
  257          KM  COMBINE 57B-2D AND 57B-2E
  258          HC       2
               *

  259          KK 57B-2G1
  260          KM  OFFSITE BASIN 57B-2G1
  261          PB    3.08
  262          BA  0.0026
  263          LS       0      87
  264          UD    .052
               *

  265          KK    ON12
  266          KM  ONSITE BASIN ON12
  267          PB    3.08
  268          BA  0.0182
  269          LS       0      82
  270          UD    .121
               *

  271          KK   CON12
  272          KM  COMBINE C57B-2E, 57B-2G1 AND ON12
  273          HC       3
               *

  274          KK 57B-2G2
  275          KM  OFFSITE BASIN 57B-2G2
  276          PB    3.03
  277          BA  0.0073
  278          LS       0      87
  279          UD    .094
               *
1                                        HEC-1 INPUT                                        PAGE  8

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


  280          KK    ON13
  281          KM  ONSITE BASIN ON13
  282          PB    3.04
  283          BA  0.0187
  284          LS       0      82
  285          UD    .107
               *

  286          KK   CON13
  287          KM  COMBINE CON12, 57B-2G2 AND ON13
```

```
 288           HC       3
               *

 289           KK  57B-2F
 290           KM  OFFSITE BASIN 57B-2F
 291           PB    3.03
 292           BA  0.0902
 293           LS       0      91
 294           UD    .167
               *

 295           KK 57B-2H2
 296           KM  OFFSITE BASIN 57B-2H2
 297           PB    3.04
 298           BA  0.0156
 299           LS       0      87
 300           UD    .182
               *

 301           KK    ON14
 302           KM  ONSITE BASIN ON14
 303           PB    3.00
 304           BA  0.0054
 305           LS       0      82
 306           UD    .193
               *

 307           KK   CON14
 308           KM  COMBINE C57B-2F, 57B-2H2 AND ON14
 309           HC       3
               *

 310           KK  RCON14
 311           KM  ROUTE CON14 TO CON15
 312           KM   LENGTH  SLOPE   n-VALUE         SHAPE    WIDTH   S-SLOPE
 313           RD    2160    .032    .040       0    TRAP      20       2
               *

 314           KK  57B-2I
 315           KM  OFFSITE BASIN 57B-2I
 316           PB    2.99
 317           BA  0.0072
 318           LS       0      87
 319           UD    .090
               *
1                                    HEC-1 INPUT                                       PAGE  9

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


 320           KK 57B-2H1
 321           KM  OFFSITE BASIN 57B-2H1
 322           PB    3.01
 323           BA  0.0291
 324           LS       0      87
 325           UD    .296
               *

 326           KK    ON15
 327           KM  ONSITE BASIN ON15
 328           PB    2.98
 329           BA  0.0351
 330           LS       0      82
 331           UD    .114
               *

 332           KK   CON15
 333           KM  COMBINE CON13, CON14, 57B-21, 57B-2H1 AND ON15
 334           HC       5
               *

 335           KK    ON16
 336           KM  ONSITE BASIN ON16
 337           PB    2.97
 338           BA  0.0180
 339           LS       0      82
 340           UD    .088
               *

 341           KK   CON16
 342           KM  COMBINE CON15 AND ON16
 343           HC       2
               *

 344           KK  RCON16
 345           KM  ROUTE CON16 TO CON17
 346           KM   LENGTH  SLOPE   n-VALUE         SHAPE    WIDTH   S-SLOPE
 347           RD     705    .036    .040       0    TRAP      20       2
               *
```

```
 348           KK    ON17
 349           KM  ONSITE BASIN ON17
 350           PB    2.93
 351           BA  0.0069
 352           LS       0      82
 353           UD    .079
               *

 354           KK   CON17
 355           KM  COMBINE CON16 CON11 AND ON17
 356           HC       3
               *
1                                   HEC-1 INPUT                                            PAGE 10

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


 357           KK   13B-1
 358           BA   0.249
 359           PB    3.19
 360           LS       0    91.6
 361           UD   0.284
               *

 362           KK RC13B-1
 363           KM  ROUTE 13B-1 TO C13B-2
 364           KM  GRIFFITH PARK DRIVE AND HUALAPAI WAY
 365           RD    3000   0.018   0.016       0    TRAP       0      50
               *

 366           KK   13B-2
 367           BA   0.216
 368           PB    3.14
 369           LS       0    89.7
 370           UD   0.231
               *

 371           KK  C13B-2
 372           KM  COMBINE 13B-2 AND RC13B-1
 373           KM  HUALAPAI WAY AND LOCAL FACILITY
 374           HC       2
               *

 375           KK RC13B-2
 376           KM  ROUTE C13B-2 TO CCPIC-A
 377           KM  LINING = GRASS
 378           RD    4900   0.021    0.03       0    TRAP      40       6
               *

 379           KK     19A
 380           BA   0.253
 381           PB    3.25
 382           LS       0    89.9
 383           UD   0.351
               *

 384           KK    R19A
 385           KM  ROUTE 19A TO C13A-1
 386           KM  UNNAMED ROAD
 387           RD    4300   0.021   0.016       0    TRAP       0      50
               *

 388           KK   13A-1
 389           BA   0.224
 390           PB    3.19
 391           LS       0    91.4
 392           UD   0.302
               *
1                                   HEC-1 INPUT                                            PAGE 11

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


 393           KK  C13A-1
 394           KM  COMBINE 13A-1 AND R19A
 395           KM  TOWN CENTER DRIVE AND SWALE
 396           HC       2
               *

 397           KK RC13A-1
 398           KM  ROUTE C13A-1 TO C13A-2
 399           KM  NATURAL WASH
 400           KM  TRAVEL LENGTH = 2,800
 401           KM  SLOPE = 2.1%
 402           KM  N = 0.040
 403           KM  HYDRAULIC RADIUS = 1.5
 404           KM  VELOCITY = 11.4
 405           RM       1   0.068    0.15
```

```
               *

 406           KK   13A-2
 407           BA   0.188
 408           PB    3.15
 409           LS       0    90.0
 410           UD   0.236
               *

 411           KK  C13A-2
 412           KM  COMBINE 13A-2 AND RC13A-1
 413           HC       2
               *

 414           KK RC13A-2
 415           KM  ROUTE C13A-2 TO CPIC-C
 416           KM  LINING = GRASS
 417           RD    5200   0.015    0.03       0    TRAP      40       4
               *

 418           KK   PIC-C
 419           BA   0.243
 420           PB    3.08
 421           LS       0    90.4
 422           UD   0.373
               *

 423           KK  CPIC-C
 424           KM  COMBINE PIC-C AND RC13A-2
 425           HC       2
               *

 426           KK RCPIC-C
 427           KM  ROUTE CPIC-C TO CPIC-A
 428           KM  LINING = GRASS
 429           RD    2200   0.025    0.03       0    TRAP      40       4
               *
1                                    HEC-1 INPUT                                      PAGE 12

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


 430           KK   PIC-A
 431           BA   0.359
 432           PB    3.03
 433           LS       0    91.1
 434           UD   0.499
               *

 435           KK  CPIC-A
 436           KM  COMBINE RCPIC-C AND PIC-A
 437           HC       2
               *

 438           KK CCPIC-A
 439           KM  COMBINE CPIC-A AND RC13B-2
 440           HC       2
               *

 441           KK    ON18
 442           KM  ONSITE BASIN ON18
 443           PB    2.95
 444           BA  0.0317
 445           LS       0      82
 446           UD    .224
               *

 447           KK   CON18
 448           KM  COMBINE CCPIC-A AND ON18
 449           HC       2
               *

 450           KK  57B-1A
 451           KM  OFFSITE BASIN 57B-1A
 452           PB    2.96
 453           BA  0.0443
 454           LS       0      85
 455           UD    .179
               *

 456           KK  57B-1B
 457           KM  OFFSITE BASIN 57B-1B
 458           PB    2.91
 459           BA  0.0301
 460           LS       0      93
 461           UD    .150
               *

 462           KK    ON19
```

```
 463          KM  ONSITE BASIN ON19
 464          PB    2.92
 465          BA  0.0116
 466          LS       0      82
 467          UD    .090
              *
1                                      HEC-1 INPUT                                        PAGE 13

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


 468          KK   CON19
 469          KM  COMBINE CON18, 57B-1A, 57B-1B AND ON19
 470          HC       4
              *

 471          KK   CON20
 472          KM  COMBINE CON17 AND CON19
 473          HC       2
              *

 474          KK     ON1
 475          KM  OFFSITE BASIN ON1
 476          PB    3.08
 477          BA  0.0397
 478          LS       0      82
 479          UD    .131
              *

 480          KK  57B-3A
 481          KM  ONSITE BASIN 57B-3A
 482          PB    3.07
 483          BA  0.0259
 484          LS       0      85
 485          UD    .149
              *

 486          KK    CON1
 487          KM  COMBINE 57B-3A AND ON1
 488          HC       2
              *

 489          KK   RCON1
 490          KM  ROUTE CON1 TO CON2
 491          KM   LENGTH  SLOPE   n-VALUE         SHAPE    WIDTH   S-SLOPE
 492          RD    3020    .027    .040       0    TRAP      50       3
              *

 493          KK  57B-3B
 494          KM  OFFSITE BASIN 57B-3B
 495          PB    3.00
 496          BA  0.0513
 497          LS       0      85
 498          UD    .166
              *

 499          KK     ON2
 500          KM  OFFSITE BASIN ON2
 501          PB    3.00
 502          BA  0.0273
 503          LS       0      82
 504          UD    .159
              *
1                                      HEC-1 INPUT                                        PAGE 14

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


 505          KK    CON2
 506          KM  COMBINE CON1, 57B-3B AND ON2
 507          HC       3
              *

 508          KK  57B-3D
 509          KM  OFFSITE BASIN 57B-3D
 510          PB    2.99
 511          BA  0.0184
 512          LS       0      87
 513          UD    .160
              *

 514          KK     ON3
 515          KM  ONSITE BASIN ON3
 516          PB    2.96
 517          BA  0.0040
 518          LS       0      82
 519          UD    .056
              *
```

```
 520           KK    CON3
 521           KM  COMBINE CON2, 57B-3D AND ON3
 522           HC       3
               *

 523           KK     ON4
 524           KM  OFFSITE BASIN ON4
 525           PB    2.94
 526           BA  0.0073
 527           LS       0      82
 528           UD    .086
               *

 529           KK    CON4
 530           KM  COMBINE CON3 AND ON4
 531           HC       2
               *

 532           KK  57B-4A
 533           KM  OFFSITE BASIN 57B-4A
 534           PB    2.93
 535           BA  0.0070
 536           LS       0      82
 537           UD    .102
               *

 538           KK   CON21
 539           KM  COMBINE 57B-4A AND CON4
 540           HC       2
               *
1                                    HEC-1 INPUT                                    PAGE 15

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


 541           KK   ON11A
 542           KM  ONSITE BASIN ON11A
 543           PB    2.95
 544           BA  0.0141
 545           LS       0      82
 546           UD    .084
               *

 547           KK   CON21
 548           KM  COMBINE CON21 AND ON11A
 549           HC       2
               *

 550           KK    ON21
 551           KM  ONSITE BASIN ON21
 552           PB    2.91
 553           BA  0.0259
 554           LS       0      82
 555           UD    .146
               *

 556           KK   CON22
 557           KM  COMBINE CON21 AND ON21
 558           HC       2
               *

 559           KK  57B-1C
 560           KM  OFFSITE BASIN 57B-1C
 561           PB    2.89
 562           BA  0.0009
 563           LS       0      96
 564           UD    .065
               *

 565           KK    ON20
 566           KM  ONSITE BASIN ON20
 567           PB    2.89
 568           BA  0.0038
 569           LS       0      82
 570           UD    .054
               *

 571           KK   CON23
 572           KM  COMBINE CON20, CON22, 57B-1C AND ON20
 573           HC       4
               *

 574           KK  57B-4B
 575           KM  OFFSITE BASIN 57B-4B
 576           PB    2.91
 577           BA  0.0110
 578           LS       0      96
 579           UD    .071
               *
```

```
1                                           HEC-1 INPUT                                          PAGE 16

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


           580          KK  57B-4C
           581          KM  OFFSITE BASIN 57B-4C
           582          PB    2.90
           583          BA  0.0122
           584          LS       0      96
           585          UD    .118
                        *

           586          KK C57B-4C
           587          KM  COMBINE 57B-4B AND 57B-4C
           588          HC       2
                        *

           589          KK    DON4
           590          KM  ONSITE BASIN DON4
           591          PB    2.88
           592          BA  0.0272
           593          LS       0      95
           594          UD    .198
                        *

           595          KK   CON24
           596          KM  COMBINE CON23, C57B-4C AND DON4
           597          HC       3
                        *

           598          KK   57B-1
           599          KM  OFFSITE BASIN 57B-1
           600          BA  0.0485
           601          PB    2.89
           602          LS       0    93.7
           603          UD   0.173
                        *

           604          KK   57B-3
           605          KM  OFFSITE BASIN 57B-3
           606          BA  0.0481
           607          PB    3.06
           608          LS       0    89.3
           609          UD   0.256
                        *

           610          KK   57B-4
           611          KM  OFFSITE BASIN 57B-4
           612          BA  0.1293
           613          PB    2.91
           614          LS       0    93.8
           615          UD   0.202
                        *
1                                           HEC-1 INPUT                                          PAGE 17

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


           616          KK  C57B-4
           617          KM  COMBINE 57B-3 AND 57B-4
           618          HC       2
                        *

           619          KK   PIC-B
           620          BA   0.441
           621          PB    2.98
           622          LS       0    91.1
           623          UD   0.471
                        *

           624          KK  RPIC-B
           625          KM  ROUTE PIC-B TO CC57B-4
           626          KM  FACILITY = ANGEL PARK - PECCOLE 1
           627          KM  FACILITY # = APP1 0000
           628          KM  LINING = RCP
           629          RD    2982   0.024   0.013       0    CIRC       6
                        *

           630          KK CC57B-4
           631          KM  COMBINE CON24, C57B-1, C57B-4, PIC-B
           632          HC       4
                        *
           633          ZZ
1
                 SCHEMATIC DIAGRAM OF STREAM NETWORK
 INPUT
  LINE      (V) ROUTING         (--->) DIVERSION OR PUMP FLOW
```

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

 54         ON5
              .
              .
 68           .      57B-3C
              .           .
              .           .
 74           .           .         ON6
              .           .           .
              .           .           .
 80           .        CON6............
              .           .
              .           .
 83       CCON6............
              V
              V
 86      RCCON6
              .
              .
 90           .         ON8
              .           .
              .           .
 96        CON8............
              .
              .
 99           .        SW11
              .           V
              .           V
104           .       RSW11
              .           .
              .           .
110           .           .        SW17
              .           .           .
              .           .           .
115           .       CSW17............
              .           V
              .           V
118           .      RCSW17
              .           .
              .           .
124           .           .        SW18
              .           .           .
              .           .           .
129           .       CSW18............
              .           V
              .           V
132           .      RCSW18
              .           .
              .           .
143           .           .         12A
              .           .           .
              .           .           .
148           .        C12A............
              .           V
              .           V
151           .       RC12A
              .           .
              .           .
162           .           .         12B
              .           .           .
              .           .           .
167           .        C12B............
              .           .
              .           .
170           .           .      57B-2A
              .           .           .
              .           .           .
176           .           .           .      57B-3F
              .           .           .           .
              .           .           .           .
182           .           .           .           .      57B-3E
              .           .           .           .           .
              .           .           .           .           .
188           .           .           .           .           .         ON9
              .           .           .           .           .           .
              .           .           .           .           .           .
194           .        CON9................................................
              .           V
              .           V
197           .       RCON9
              .           .
              .           .
201           .           .      57B-3G
              .           .           .
              .           .           .
207           .           .           .      57B-2B
              .           .           .           .
              .           .           .           .
```

```
213           .           .           .           .      57B-2C
              .           .           .           .           .
              .           .           .           .           .
219           .           .           .           .           .        ON10
              .           .           .           .           .           .
              .           .           .           .           .           .
225           .       CON10................................................
              .           .
              .           .
228      CCON10............
              V
              V
231     RCCON10
              .
              .
235           .        ON11
              .           .
              .           .
241       CON11............
              .
              .
244           .      57B-2D
              .           .
              .           .
250           .           .      57B-2E
              .           .           .
              .           .           .
256           .     C57B-2E............
              .           .
              .           .
259           .           .     57B-2G1
              .           .           .
              .           .           .
265           .           .           .        ON12
              .           .           .           .
              .           .           .           .
271           .       CON12........................
              .           .
              .           .
274           .           .     57B-2G2
              .           .           .
              .           .           .
280           .           .           .        ON13
              .           .           .           .
              .           .           .           .
286           .       CON13........................
              .           .
              .           .
289           .           .      57B-2F
              .           .           .
              .           .           .
295           .           .           .     57B-2H2
              .           .           .           .
              .           .           .           .
301           .           .           .           .        ON14
              .           .           .           .           .
              .           .           .           .           .
307           .           .       CON14........................
              .           .           V
              .           .           V
310           .           .      RCON14
              .           .           .
              .           .           .
314           .           .           .      57B-2I
              .           .           .           .
              .           .           .           .
320           .           .           .           .     57B-2H1
              .           .           .           .           .
              .           .           .           .           .
326           .           .           .           .           .        ON15
              .           .           .           .           .           .
              .           .           .           .           .           .
332           .       CON15................................................
              .           .
              .           .
335           .           .        ON16
              .           .           .
              .           .           .
341           .       CON16............
              .           V
              .           V
344           .      RCON16
              .           .
              .           .
348           .           .        ON17
              .           .           .
              .           .           .
354       CON17........................
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357           .       13B-1
              .           V
              .           V
362           .     RC13B-1
              .           .
              .           .
366           .           .       13B-2
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              .           .           .
371           .      C13B-2............
              .           V
              .           V
375           .     RC13B-2
              .           .
              .           .
379           .           .         19A
              .           .           V
              .           .           V
384           .           .        R19A
              .           .           .
              .           .           .
388           .           .           .       13A-1
              .           .           .           .
              .           .           .           .
393           .           .      C13A-1............
              .           .           V
              .           .           V
397           .           .     RC13A-1
              .           .           .
              .           .           .
406           .           .           .       13A-2
              .           .           .           .
              .           .           .           .
411           .           .      C13A-2............
              .           .           V
              .           .           V
414           .           .     RC13A-2
              .           .           .
              .           .           .
418           .           .           .       PIC-C
              .           .           .           .
              .           .           .           .
423           .           .      CPIC-C............
              .           .           V
              .           .           V
426           .           .     RCPIC-C
              .           .           .
              .           .           .
430           .           .           .       PIC-A
              .           .           .           .
              .           .           .           .
435           .           .      CPIC-A............
              .           .           .
              .           .           .
438           .     CCPIC-A............
              .           .
              .           .
441           .           .        ON18
              .           .           .
              .           .           .
447           .       CON18............
              .           .
              .           .
450           .           .      57B-1A
              .           .           .
              .           .           .
456           .           .           .      57B-1B
              .           .           .           .
              .           .           .           .
462           .           .           .           .        ON19
              .           .           .           .           .
              .           .           .           .           .
468           .       CON19....................................
              .           .
              .           .
471       CON20............
              .
              .
474           .         ON1
              .           .
              .           .
480           .           .      57B-3A
              .           .           .
              .           .           .
486           .        CON1............
              .           V
              .           V
489           .       RCON1
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  493         .           .      57B-3B
              .           .           .
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  499         .           .           .       ON2
              .           .           .         .
              .           .           .         .
  505         .        CON2.......................
              .           .
              .           .
  508         .           .      57B-3D
              .           .           .
              .           .           .
  514         .           .           .       ON3
              .           .           .         .
              .           .           .         .
  520         .        CON3.......................
              .           .
              .           .
  523         .           .         ON4
              .           .           .
              .           .           .
  529         .        CON4...........
              .           .
              .           .
  532         .           .      57B-4A
              .           .           .
              .           .           .
  538         .       CON21...........
              .           .
              .           .
  541         .           .       ON11A
              .           .           .
              .           .           .
  547         .       CON21...........
              .           .
              .           .
  550         .           .        ON21
              .           .           .
              .           .           .
  556         .       CON22...........
              .           .
              .           .
  559         .           .      57B-1C
              .           .           .
              .           .           .
  565         .           .           .      ON20
              .           .           .         .
              .           .           .         .
  571      CON23..................................
              .
              .
  574         .      57B-4B
              .           .
              .           .
  580         .           .      57B-4C
              .           .           .
              .           .           .
  586         .     C57B-4C...........
              .           .
              .           .
  589         .           .        DON4
              .           .           .
              .           .           .
  595      CON24......................
              .
              .
  598         .       57B-1
              .           .
              .           .
  604         .           .       57B-3
              .           .           .
              .           .           .
  610         .           .           .     57B-4
              .           .           .         .
              .           .           .         .
  616         .           .      C57B-4...........
              .           .           .
              .           .           .
  619         .           .           .     PIC-B
              .           .           .         V
              .           .           .         V
  624         .           .           .    RPIC-B
              .           .           .         .
              .           .           .         .
  630    CC57B-4..................................
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(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

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1****************************************                                         ***************************************
 *                                       *                                         *                                     *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *                                         *   U.S. ARMY CORPS OF ENGINEERS      *
 *             JUN   1998                *                                         *   HYDROLOGIC ENGINEERING CENTER     *
 *            VERSION 4.1                *                                         *         609 SECOND STREET           *
 *                                       *                                         *       DAVIS, CALIFORNIA 95616       *
 *  RUN DATE   21JUN18  TIME  08:10:45   *                                         *           (916) 756-1104            *
 *                                       *                                         *                                     *
 *****************************************                                         ***************************************



                          ****************************************************************
                          * ........................................................... *
                          * :                                                         : *
                          * :              THE 435                                    : *
                          * :                                                         : *
                          * :              INTERIM CONDITIONS                         : *
                          * :.........................................................: *
                          * :              RETURN PERIOD_ _ _ _100 & 10 -YEAR         : *
                          * :              DISTRIBUTION_ _ _ _ 6-HOUR SDN3            : *
                          * :              PROJECT NO_ _ _ _ _ 840.050                : *
                          * :              FILENAME_ _ _ _ _ _ INT.H1                 : *
                          * :              DATE MODELED_ _ _ _ 6/08/18                : *
                          * :              MODELED BY_ _ _ _ _ NB                     : *
                          * :.........................................................: *
                          * :                                                         : *
                          * :.........................................................: *
                          ****************************************************************

                           REFERENCED HYDROLOGIC MODELS:
                           2013 LAS VEGAS VALLEY FLOOD CONTROL MASTER PLAN UPDATE
                           CITY OF LAS VEGAS CITY WIDE HYDROLOGY ANALYSIS (PBS&J 1997)
                           CLARK COUNTY REGIONAL FLOOD CONTROL DISTRICT 2008 MASTER PLAN UPDATE
                           GOWAN WATERSHED (ALL)
                           RECOMMENDED DRAINAGE SYSTEM WITH ULTIMATE DEVELOPMENT
                           INPUT FILE = ALLGOW3.DAT
                           INPUT FILE DATE = MAY 5, 2008
                           DESIGN STORM = 100-YEAR 6-HR STORM
                           STORM DISTRIBUTION = SDN #3
                           MODELED BY PBS&J (MICHELE L. D'ALESSANDRO, E.I., CFM)
                           CHECKED BY PBS&J (HARSHAL B. DESAI, P.E., CFM)
                           STORM CENTERING = FULL WATERSHED
                           JR CARDS CONTAIN DARFS BASED ON THE FOLLOWING VALUES:

                                                 AREA    DARF
                                                 SQ. MI.
                                                 0-0.5   0.99
                                                 0.5-1   0.975
                                                 1-2     0.95
                                                 2-3     0.925
                                                 3-4     0.915
                                                 4-5     0.908
                                                 5-6     0.903
                                                 6-7     0.895
                                                 10yr    0.570

                         JR CARD RATIOS REPRESENT DEPTH-AREA REDUCTION FACTORS (DARF'S)

                         100-YEAR,  6-HOUR STORM,  SDN3


   51 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         650  NUMBER OF HYDROGRAPH ORDINATES
                       NDDATE      3    0  ENDING DATE
                       NDTIME        0605  ENDING TIME
                        ICENT          19  CENTURY MARK

                    COMPUTATION INTERVAL     .08 HOURS
                         TOTAL TIME BASE   54.08 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
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     JP          MULTI-PLAN OPTION
                      NPLAN          1  NUMBER OF PLANS

     JR          MULTI-RATIO OPTION
                     RATIOS OF PRECIPITATION
                     .99      .98      .95      .93      .92      .91      .90      .89      .57
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
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OPERATION	STATION	AREA	PLAN		RATIO 1 .99	RATIO 2 .98	RATIO 3 .95	RATIO 4 .93	RATIO 5 .92	RATIO 6 .91	RATIO 7 .90	RATIO 8 .89	RATIO 9 .57
HYDROGRAPH AT +	ON5	.01	1	FLOW	18.	18.	17.	16.	16.	16.	16.	16.	7.
				TIME	3.50	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT +	57B-3C	.01	1	FLOW	11.	10.	10.	10.	9.	9.	9.	9.	4.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT +	ON6	.00	1	FLOW	8.	8.	8.	7.	7.	7.	7.	7.	4.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
2 COMBINED AT +	CON6	.01	1	FLOW	18.	18.	17.	16.	16.	16.	16.	16.	8.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
2 COMBINED AT +	CCON6	.03	1	FLOW	36.	36.	34.	33.	32.	32.	32.	31.	14.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
ROUTED TO +	RCCON6	.03	1	FLOW	34.	33.	32.	31.	30.	30.	30.	29.	14.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT +	ON8	.02	1	FLOW	27.	26.	25.	24.	23.	23.	23.	22.	9.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
2 COMBINED AT +	CON8	.04	1	FLOW	54.	53.	50.	48.	47.	47.	46.	46.	19.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.67
HYDROGRAPH AT +	SW11	.59	1	FLOW	759.	743.	717.	691.	680.	673.	668.	660.	330.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
ROUTED TO +	RSW11	.59	1	FLOW	754.	738.	712.	686.	676.	668.	663.	655.	325.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT +	SW17	.36	1	FLOW	479.	469.	452.	436.	429.	424.	421.	416.	205.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
2 COMBINED AT +	CSW17	.94	1	FLOW	1221.	1196.	1153.	1111.	1095.	1083.	1075.	1061.	530.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
ROUTED TO +	RCSW17	.94	1	FLOW	1211.	1186.	1143.	1101.	1083.	1073.	1063.	1051.	521.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT +	SW18	.41	1	FLOW	519.	507.	489.	470.	463.	457.	454.	448.	215.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.75
2 COMBINED AT +	CSW18	1.35	1	FLOW	1718.	1682.	1622.	1562.	1537.	1521.	1508.	1490.	736.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
ROUTED TO +	RCSW18	1.35	1	FLOW	1610.	1576.	1520.	1464.	1441.	1426.	1414.	1397.	690.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
HYDROGRAPH AT +	12A	.39	1	FLOW	576.	565.	547.	529.	521.	516.	513.	507.	272.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
2 COMBINED AT +	C12A	1.74	1	FLOW	2046.	2003.	1932.	1861.	1832.	1813.	1798.	1776.	881.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83

ROUTED TO	+	RC12A	1.74	1	FLOW	2025.	1983.	1913.	1843.	1815.	1796.	1782.	1760.	880.
					TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
HYDROGRAPH AT	+	12B	.26	1	FLOW	387.	380.	367.	355.	350.	347.	344.	340.	182.
					TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
2 COMBINED AT	+	C12B	2.00	1	FLOW	2259.	2212.	2134.	2056.	2024.	2002.	1987.	1962.	990.
					TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.92
HYDROGRAPH AT	+	57B-2A	.01	1	FLOW	14.	14.	13.	13.	13.	13.	12.	12.	6.
					TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT	+	57B-3F	.01	1	FLOW	17.	17.	16.	16.	15.	15.	15.	15.	7.
					TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT	+	57B-3E	.03	1	FLOW	32.	31.	30.	29.	29.	28.	28.	28.	13.
					TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT	+	ON9	.04	1	FLOW	41.	40.	38.	36.	36.	35.	35.	34.	14.
					TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
5 COMBINED AT	+	CON9	2.09	1	FLOW	2330.	2281.	2200.	2120.	2087.	2064.	2048.	2023.	1012.
					TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.92
ROUTED TO	+	RCON9	2.09	1	FLOW	2307.	2259.	2181.	2103.	2071.	2048.	2032.	2007.	1012.
					TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
HYDROGRAPH AT	+	57B-3G	.00	1	FLOW	4.	4.	4.	4.	4.	4.	3.	3.	2.
					TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT	+	57B-2B	.00	1	FLOW	8.	7.	7.	7.	7.	7.	7.	7.	3.
					TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT	+	57B-2C	.00	1	FLOW	5.	5.	4.	4.	4.	4.	4.	4.	2.
					TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT	+	ON10	.02	1	FLOW	24.	23.	22.	21.	21.	21.	21.	20.	8.
					TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
5 COMBINED AT	+	CON10	2.12	1	FLOW	2314.	2266.	2188.	2110.	2077.	2055.	2039.	2014.	1015.
					TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
2 COMBINED AT	+	CCON10	2.16	1	FLOW	2335.	2286.	2208.	2128.	2096.	2073.	2057.	2032.	1025.
					TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
ROUTED TO	+	RCCON10	2.16	1	FLOW	2333.	2285.	2205.	2126.	2094.	2070.	2055.	2030.	1020.
					TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
HYDROGRAPH AT	+	ON11	.01	1	FLOW	12.	11.	11.	10.	10.	10.	10.	10.	4.
					TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
2 COMBINED AT	+	CON11	2.17	1	FLOW	2335.	2287.	2208.	2128.	2096.	2072.	2057.	2032.	1021.
					TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
HYDROGRAPH AT	+	57B-2D	.01	1	FLOW	16.	15.	15.	14.	14.	14.	14.	14.	7.
					TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT	+	57B-2E	.02	1	FLOW	42.	41.	40.	38.	38.	37.	37.	37.	19.
					TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
2 COMBINED AT	+	C57B-2E	.03	1	FLOW	56.	55.	53.	52.	51.	50.	50.	49.	26.
					TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT	+	57B-2G1	.00	1	FLOW	5.	5.	5.	5.	5.	4.	4.	4.	2.
					TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50

HYDROGRAPH AT													
+	ON12	.02	1	FLOW	23.	23.	22.	21.	20.	20.	20.	20.	8.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
3 COMBINED AT													
+	CON12	.05	1	FLOW	83.	81.	78.	75.	74.	73.	73.	72.	36.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.58
HYDROGRAPH AT													
+	57B-2G2	.01	1	FLOW	12.	11.	11.	11.	10.	10.	10.	10.	5.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT													
+	ON13	.02	1	FLOW	23.	23.	22.	21.	21.	20.	20.	20.	8.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
3 COMBINED AT													
+	CON13	.08	1	FLOW	118.	115.	111.	107.	105.	104.	103.	101.	49.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.58
HYDROGRAPH AT													
+	57B-2F	.09	1	FLOW	147.	145.	140.	135.	133.	132.	131.	129.	69.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT													
+	57B-2H2	.02	1	FLOW	21.	21.	20.	19.	19.	19.	19.	18.	9.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT													
+	ON14	.01	1	FLOW	6.	5.	5.	5.	5.	5.	5.	5.	2.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.67
3 COMBINED AT													
+	CON14	.11	1	FLOW	174.	171.	165.	159.	157.	155.	154.	152.	79.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
ROUTED TO													
+	RCON14	.11	1	FLOW	166.	163.	158.	156.	153.	152.	151.	146.	79.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT													
+	57B-2I	.01	1	FLOW	12.	11.	11.	10.	10.	10.	10.	10.	5.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT													
+	57B-2H1	.03	1	FLOW	32.	31.	30.	29.	29.	28.	28.	28.	13.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT													
+	ON15	.04	1	FLOW	42.	41.	40.	38.	37.	37.	36.	36.	15.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
5 COMBINED AT													
+	CON15	.26	1	FLOW	346.	338.	326.	314.	309.	306.	303.	298.	142.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT													
+	ON16	.02	1	FLOW	23.	23.	22.	21.	20.	20.	20.	20.	8.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
2 COMBINED AT													
+	CON16	.28	1	FLOW	367.	359.	345.	333.	327.	324.	321.	316.	150.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
ROUTED TO													
+	RCON16	.28	1	FLOW	359.	351.	338.	326.	320.	316.	313.	309.	147.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.67
HYDROGRAPH AT													
+	ON17	.01	1	FLOW	9.	9.	8.	8.	8.	8.	8.	8.	3.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
3 COMBINED AT													
+	CON17	2.45	1	FLOW	2550.	2496.	2408.	2319.	2284.	2258.	2240.	2213.	1108.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.92
HYDROGRAPH AT													
+	13B-1	.25	1	FLOW	354.	347.	336.	325.	321.	318.	315.	312.	169.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.75
ROUTED TO													
+	RC13B-1	.25	1	FLOW	354.	347.	336.	324.	320.	317.	314.	311.	171.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.83	3.83	3.83
HYDROGRAPH AT													
+	13B-2	.22	1	FLOW	310.	304.	294.	283.	279.	277.	274.	271.	140.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
2 COMBINED AT													

+	C13B-2	.47	1	FLOW	634.	622.	602.	581.	573.	567.	563.	557.	294.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
ROUTED TO													
+	RC13B-2	.47	1	FLOW	641.	628.	607.	586.	578.	572.	568.	561.	295.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.92
HYDROGRAPH AT													
+	19A	.25	1	FLOW	318.	312.	301.	291.	287.	284.	282.	278.	144.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
ROUTED TO													
+	R19A	.25	1	FLOW	319.	313.	302.	292.	288.	285.	283.	280.	146.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
HYDROGRAPH AT													
+	13A-1	.22	1	FLOW	308.	303.	293.	283.	279.	277.	275.	272.	147.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
2 COMBINED AT													
+	C13A-1	.48	1	FLOW	595.	583.	564.	545.	537.	532.	528.	522.	273.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
ROUTED TO													
+	RC13A-1	.48	1	FLOW	581.	569.	551.	532.	524.	519.	515.	509.	268.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
HYDROGRAPH AT													
+	13A-2	.19	1	FLOW	272.	267.	258.	249.	246.	243.	241.	238.	124.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
2 COMBINED AT													
+	C13A-2	.66	1	FLOW	782.	766.	740.	715.	704.	697.	692.	684.	354.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
ROUTED TO													
+	RC13A-2	.66	1	FLOW	781.	765.	738.	712.	702.	694.	689.	681.	354.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	4.00
HYDROGRAPH AT													
+	PIC-C	.24	1	FLOW	280.	274.	265.	256.	252.	250.	248.	245.	129.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
2 COMBINED AT													
+	CPIC-C	.91	1	FLOW	1041.	1020.	985.	951.	937.	927.	920.	909.	462.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
ROUTED TO													
+	RCPIC-C	.91	1	FLOW	1030.	1009.	975.	940.	922.	915.	908.	896.	461.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	4.00
HYDROGRAPH AT													
+	PIC-A	.36	1	FLOW	356.	349.	338.	326.	322.	318.	316.	312.	165.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
2 COMBINED AT													
+	CPIC-A	1.27	1	FLOW	1386.	1359.	1313.	1266.	1243.	1233.	1224.	1208.	625.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	4.00
2 COMBINED AT													
+	CCPIC-A	1.73	1	FLOW	1997.	1959.	1895.	1830.	1800.	1785.	1772.	1750.	900.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	4.00
HYDROGRAPH AT													
+	ON18	.03	1	FLOW	31.	30.	29.	27.	27.	26.	26.	26.	10.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
2 COMBINED AT													
+	CON18	1.76	1	FLOW	2015.	1977.	1912.	1846.	1816.	1801.	1788.	1765.	906.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	4.00
HYDROGRAPH AT													
+	57B-1A	.04	1	FLOW	54.	53.	51.	48.	48.	47.	47.	46.	20.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT													
+	57B-1B	.03	1	FLOW	51.	50.	49.	47.	47.	46.	46.	45.	25.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT													
+	ON19	.01	1	FLOW	14.	14.	13.	13.	13.	12.	12.	12.	5.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
4 COMBINED AT													
+	CON19	1.85	1	FLOW	2060.	2020.	1954.	1887.	1856.	1840.	1827.	1804.	923.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
2 COMBINED AT													
+	CON20	4.30	1	FLOW	4576.	4485.	4334.	4182.	4116.	4076.	4045.	3995.	2032.

				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
HYDROGRAPH AT													
+	ON1	.04	1	FLOW	50.	49.	47.	45.	44.	43.	43.	42.	18.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT													
+	57B-3A	.03	1	FLOW	36.	35.	34.	32.	32.	31.	31.	31.	14.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT													
+	CON1	.07	1	FLOW	86.	84.	80.	77.	76.	75.	74.	73.	32.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
ROUTED TO													
+	RCON1	.07	1	FLOW	86.	84.	80.	77.	76.	75.	74.	73.	30.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.83
HYDROGRAPH AT													
+	57B-3B	.05	1	FLOW	66.	65.	62.	59.	58.	58.	57.	56.	25.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT													
+	ON2	.03	1	FLOW	31.	30.	29.	28.	27.	27.	27.	26.	11.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
3 COMBINED AT													
+	CON2	.14	1	FLOW	164.	160.	153.	145.	143.	141.	139.	137.	55.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.75
HYDROGRAPH AT													
+	57B-3D	.02	1	FLOW	26.	25.	24.	23.	23.	23.	23.	22.	11.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT													
+	ON3	.00	1	FLOW	6.	6.	6.	5.	5.	5.	5.	5.	2.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
3 COMBINED AT													
+	CON3	.17	1	FLOW	189.	185.	177.	169.	165.	163.	161.	159.	64.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.75
HYDROGRAPH AT													
+	ON4	.01	1	FLOW	9.	9.	9.	8.	8.	8.	8.	8.	3.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
2 COMBINED AT													
+	CON4	.17	1	FLOW	195.	190.	182.	173.	170.	168.	166.	164.	66.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.75
HYDROGRAPH AT													
+	57B-4A	.01	1	FLOW	8.	8.	8.	7.	7.	7.	7.	7.	3.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.58
2 COMBINED AT													
+	CON21	.18	1	FLOW	201.	196.	187.	179.	175.	173.	171.	168.	67.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.75
HYDROGRAPH AT													
+	ON11A	.01	1	FLOW	18.	18.	17.	16.	16.	16.	16.	15.	6.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
2 COMBINED AT													
+	CON21	.20	1	FLOW	211.	206.	197.	188.	185.	182.	180.	178.	71.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.75
HYDROGRAPH AT													
+	ON21	.03	1	FLOW	29.	28.	27.	26.	25.	25.	25.	24.	10.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT													
+	CON22	.22	1	FLOW	236.	230.	220.	210.	206.	204.	202.	199.	78.
				TIME	3.58	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.75
HYDROGRAPH AT													
+	57B-1C	.00	1	FLOW	2.	2.	2.	2.	2.	2.	2.	2.	1.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT													
+	ON20	.00	1	FLOW	6.	5.	5.	5.	5.	5.	5.	5.	2.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
4 COMBINED AT													
+	CON23	4.53	1	FLOW	4745.	4650.	4486.	4321.	4252.	4203.	4171.	4121.	2087.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.92
HYDROGRAPH AT													
+	57B-4B	.01	1	FLOW	24.	24.	23.	22.	22.	22.	22.	22.	13.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50

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 HYDROGRAPH AT
+               57B-4C       .01      1   FLOW          23.      22.      22.      21.      21.      21.      21.      20.      12.
                                          TIME         3.50     3.50     3.50     3.50     3.50     3.50     3.50     3.50     3.58

  2 COMBINED AT
+              C57B-4C       .02      1   FLOW          47.      46.      45.      43.      43.      43.      42.      42.      25.
                                          TIME         3.50     3.50     3.50     3.50     3.50     3.50     3.50     3.50     3.50

 HYDROGRAPH AT
+                 DON4       .03      1   FLOW          44.      43.      42.      41.      40.      40.      40.      39.      23.
                                          TIME         3.58     3.58     3.58     3.58     3.58     3.58     3.58     3.58     3.58

  3 COMBINED AT
+                CON24      4.58      1   FLOW        4787.    4690.    4525.    4359.    4290.    4241.    4208.    4158.    2103.
                                          TIME         3.83     3.83     3.83     3.83     3.83     3.83     3.83     3.83     3.92

 HYDROGRAPH AT
+                57B-1       .05      1   FLOW          80.      79.      76.      74.      73.      72.      72.      71.      40.
                                          TIME         3.58     3.58     3.58     3.58     3.58     3.58     3.58     3.58     3.58

 HYDROGRAPH AT
+                57B-3       .05      1   FLOW          63.      62.      60.      58.      57.      56.      56.      55.      28.
                                          TIME         3.67     3.67     3.67     3.67     3.67     3.67     3.67     3.67     3.67

 HYDROGRAPH AT
+                57B-4       .13      1   FLOW         202.     198.     192.     186.     184.     182.     181.     179.     101.
                                          TIME         3.58     3.58     3.58     3.58     3.58     3.58     3.58     3.58     3.58

  2 COMBINED AT
+               C57B-4       .18      1   FLOW         259.     254.     246.     238.     235.     233.     232.     229.     127.
                                          TIME         3.58     3.58     3.67     3.67     3.67     3.67     3.67     3.67     3.67

 HYDROGRAPH AT
+                PIC-B       .44      1   FLOW         442.     433.     419.     405.     399.     395.     392.     388.     205.
                                          TIME         3.92     3.92     3.92     3.92     3.92     3.92     3.92     3.92     3.92

 ROUTED TO
+               RPIC-B       .44      1   FLOW         439.     431.     416.     402.     396.     392.     390.     385.     202.
                                          TIME         3.92     3.92     3.92     3.92     3.92     3.92     3.92     3.92     3.92

  4 COMBINED AT
+              CC57B-4      5.25      1   FLOW        5433.    5325.    5139.    4953.    4875.    4820.    4784.    4727.    2392.
                                          TIME         3.83     3.83     3.83     3.83     3.83     3.83     3.83     3.83     3.92
1
                                          SUMMARY OF KINEMATIC WAVE - MUSKINGUM-CUNGE ROUTING
                                              (FLOW IS DIRECT RUNOFF WITHOUT BASE FLOW)
                                                                               INTERPOLATED TO
                                                                            COMPUTATION INTERVAL
            ISTAQ    ELEMENT      DT       PEAK    TIME TO     VOLUME      DT       PEAK    TIME TO      VOLUME
                                                     PEAK                                     PEAK

                                 (MIN)     (CFS)      (MIN)      (IN)     (MIN)     (CFS)     (MIN)       (IN)

           FOR PLAN = 1  RATIO=  .00
             RCCON6  MANE        4.25     34.85    216.75      1.61      5.00     33.88    220.00       1.61


 CONTINUITY SUMMARY (AC-FT) - INFLOW= .2157E+01 EXCESS= .0000E+00 OUTFLOW= .2162E+01 BASIN STORAGE= .2734E-02 PERCENT ERROR=   -.3


           FOR PLAN = 1  RATIO=  .00
             RCCON6  MANE        4.25     34.03    216.75      1.58      5.00     33.16    220.00       1.57


 CONTINUITY SUMMARY (AC-FT) - INFLOW= .2106E+01 EXCESS= .0000E+00 OUTFLOW= .2111E+01 BASIN STORAGE= .2708E-02 PERCENT ERROR=   -.3


           FOR PLAN = 1  RATIO=  .00
             RCCON6  MANE        4.25     32.67    216.75      1.51      5.00     31.96    220.00       1.51


 CONTINUITY SUMMARY (AC-FT) - INFLOW= .2022E+01 EXCESS= .0000E+00 OUTFLOW= .2026E+01 BASIN STORAGE= .2664E-02 PERCENT ERROR=   -.3


           FOR PLAN = 1  RATIO=  .00
             RCCON6  MANE        4.25     31.31    216.75      1.45      5.00     30.75    220.00       1.45


 CONTINUITY SUMMARY (AC-FT) - INFLOW= .1938E+01 EXCESS= .0000E+00 OUTFLOW= .1942E+01 BASIN STORAGE= .2619E-02 PERCENT ERROR=   -.4


           FOR PLAN = 1  RATIO=  .00
             RCCON6  MANE        4.25     30.77    216.75      1.43      5.00     30.27    220.00       1.42


 CONTINUITY SUMMARY (AC-FT) - INFLOW= .1905E+01 EXCESS= .0000E+00 OUTFLOW= .1909E+01 BASIN STORAGE= .2601E-02 PERCENT ERROR=   -.4
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          FOR PLAN = 1  RATIO=  .00
            RCCON6  MANE        4.25     30.39    216.75      1.41      5.00     29.93    220.00       1.41

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1881E+01 EXCESS= .0000E+00 OUTFLOW= .1886E+01 BASIN STORAGE= .2588E-02 PERCENT ERROR=   -.4

          FOR PLAN = 1  RATIO=  .00
            RCCON6  MANE        4.25     30.11    216.75      1.40      5.00     29.69    220.00       1.39

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1865E+01 EXCESS= .0000E+00 OUTFLOW= .1869E+01 BASIN STORAGE= .2579E-02 PERCENT ERROR=   -.4

          FOR PLAN = 1  RATIO=  .00
            RCCON6  MANE        4.25     29.68    216.75      1.38      5.00     29.30    220.00       1.37

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1838E+01 EXCESS= .0000E+00 OUTFLOW= .1842E+01 BASIN STORAGE= .2564E-02 PERCENT ERROR=   -.4

          FOR PLAN = 1  RATIO=  .00
            RCCON6  MANE        3.75     14.36    221.25       .63      5.00     14.02    220.00        .63

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8405E+00 EXCESS= .0000E+00 OUTFLOW= .8424E+00 BASIN STORAGE= .2039E-02 PERCENT ERROR=   -.5

          FOR PLAN = 1  RATIO=  .00
             RSW11  MANE        1.02    755.16    226.24      2.08      5.00    753.82    225.00       2.08

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6522E+02 EXCESS= .0000E+00 OUTFLOW= .6522E+02 BASIN STORAGE= .1654E-02 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .00
             RSW11  MANE        1.03    740.95    226.07      2.03      5.00    738.42    225.00       2.03

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6380E+02 EXCESS= .0000E+00 OUTFLOW= .6381E+02 BASIN STORAGE= .1696E-02 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .00
             RSW11  MANE        1.05    714.15    226.19      1.96      5.00    712.14    225.00       1.96

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6145E+02 EXCESS= .0000E+00 OUTFLOW= .6145E+02 BASIN STORAGE= .1622E-02 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .00
             RSW11  MANE        1.06    686.99    226.38      1.88      5.00    685.95    225.00       1.88

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5911E+02 EXCESS= .0000E+00 OUTFLOW= .5911E+02 BASIN STORAGE= .1763E-02 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .00
             RSW11  MANE        1.07    677.33    225.62      1.85      5.00    675.73    225.00       1.85

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5818E+02 EXCESS= .0000E+00 OUTFLOW= .5818E+02 BASIN STORAGE= .1832E-02 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .00
             RSW11  MANE        1.07    669.72    225.52      1.83      5.00    668.38    225.00       1.83

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5752E+02 EXCESS= .0000E+00 OUTFLOW= .5752E+02 BASIN STORAGE= .1613E-02 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .00
             RSW11  MANE        1.08    665.29    226.22      1.82      5.00    663.31    225.00       1.82

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5706E+02 EXCESS= .0000E+00 OUTFLOW= .5706E+02 BASIN STORAGE= .1791E-02 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .00
             RSW11  MANE        1.08    656.69    226.27      1.79      5.00    654.91    225.00       1.79

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5631E+02 EXCESS= .0000E+00 OUTFLOW= .5632E+02 BASIN STORAGE= .1761E-02 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .00
             RSW11  MANE        1.43    328.10    225.73       .88      5.00    324.89    225.00        .88

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2754E+02 EXCESS= .0000E+00 OUTFLOW= .2754E+02 BASIN STORAGE= .1787E-02 PERCENT ERROR=    .0
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          FOR PLAN = 1  RATIO=  .00
            RCSW17  MANE        1.65   1211.98    225.57      2.06      5.00   1210.68    225.00        2.06


 CONTINUITY SUMMARY (AC-FT) - INFLOW= .1040E+03 EXCESS= .0000E+00 OUTFLOW= .1040E+03 BASIN STORAGE= .3928E-02 PERCENT ERROR=    .0


          FOR PLAN = 1  RATIO=  .00
            RCSW17  MANE        1.66   1187.90    225.78      2.02      5.00   1185.71    225.00        2.02


 CONTINUITY SUMMARY (AC-FT) - INFLOW= .1018E+03 EXCESS= .0000E+00 OUTFLOW= .1018E+03 BASIN STORAGE= .3507E-02 PERCENT ERROR=    .0


          FOR PLAN = 1  RATIO=  .00
            RCSW17  MANE        1.68   1144.91    225.68      1.94      5.00   1143.40    225.00        1.94


 CONTINUITY SUMMARY (AC-FT) - INFLOW= .9799E+02 EXCESS= .0000E+00 OUTFLOW= .9800E+02 BASIN STORAGE= .3522E-02 PERCENT ERROR=    .0


          FOR PLAN = 1  RATIO=  .00
            RCSW17  MANE        1.71   1102.37    225.64      1.87      5.00   1101.22    225.00        1.87


 CONTINUITY SUMMARY (AC-FT) - INFLOW= .9424E+02 EXCESS= .0000E+00 OUTFLOW= .9424E+02 BASIN STORAGE= .3477E-02 PERCENT ERROR=    .0


          FOR PLAN = 1  RATIO=  .00
            RCSW17  MANE        1.72   1087.77    227.00      1.84      5.00   1083.30    225.00        1.84


 CONTINUITY SUMMARY (AC-FT) - INFLOW= .9278E+02 EXCESS= .0000E+00 OUTFLOW= .9279E+02 BASIN STORAGE= .3927E-02 PERCENT ERROR=    .0


          FOR PLAN = 1  RATIO=  .00
            RCSW17  MANE        1.73   1077.08    226.26      1.82      5.00   1072.79    225.00        1.82


 CONTINUITY SUMMARY (AC-FT) - INFLOW= .9172E+02 EXCESS= .0000E+00 OUTFLOW= .9173E+02 BASIN STORAGE= .3817E-02 PERCENT ERROR=    .0


          FOR PLAN = 1  RATIO=  .00
            RCSW17  MANE        1.73   1069.06    226.95      1.81      5.00   1062.80    225.00        1.81


 CONTINUITY SUMMARY (AC-FT) - INFLOW= .9100E+02 EXCESS= .0000E+00 OUTFLOW= .9101E+02 BASIN STORAGE= .3937E-02 PERCENT ERROR=    .0


          FOR PLAN = 1  RATIO=  .00
            RCSW17  MANE        1.74   1055.75    226.36      1.78      5.00   1050.97    225.00        1.78


 CONTINUITY SUMMARY (AC-FT) - INFLOW= .8979E+02 EXCESS= .0000E+00 OUTFLOW= .8980E+02 BASIN STORAGE= .3511E-02 PERCENT ERROR=    .0


          FOR PLAN = 1  RATIO=  .00
            RCSW17  MANE        2.30    524.06    227.64       .87      5.00    520.91    225.00         .87


 CONTINUITY SUMMARY (AC-FT) - INFLOW= .4386E+02 EXCESS= .0000E+00 OUTFLOW= .4387E+02 BASIN STORAGE= .3897E-02 PERCENT ERROR=    .0


          FOR PLAN = 1  RATIO=  .00
             RCON9  MANE        1.67   2325.51    231.44      2.07      5.00   2306.80    235.00        2.07


 CONTINUITY SUMMARY (AC-FT) - INFLOW= .2301E+03 EXCESS= .0000E+00 OUTFLOW= .2301E+03 BASIN STORAGE= .3123E-02 PERCENT ERROR=    .0


          FOR PLAN = 1  RATIO=  .00
             RCON9  MANE        1.68   2279.65    231.56      2.02      5.00   2258.94    235.00        2.02


 CONTINUITY SUMMARY (AC-FT) - INFLOW= .2252E+03 EXCESS= .0000E+00 OUTFLOW= .2252E+03 BASIN STORAGE= .2858E-02 PERCENT ERROR=    .0


          FOR PLAN = 1  RATIO=  .00
             RCON9  MANE        1.70   2197.90    232.94      1.95      5.00   2181.01    235.00        1.95


 CONTINUITY SUMMARY (AC-FT) - INFLOW= .2170E+03 EXCESS= .0000E+00 OUTFLOW= .2170E+03 BASIN STORAGE= .2984E-02 PERCENT ERROR=    .0


          FOR PLAN = 1  RATIO=  .00
             RCON9  MANE        1.72   2118.94    232.70      1.87      5.00   2102.63    235.00        1.88
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CONTINUITY SUMMARY (AC-FT) - INFLOW= .2088E+03 EXCESS= .0000E+00 OUTFLOW= .2088E+03 BASIN STORAGE= .3195E-02 PERCENT ERROR=    .0


          FOR PLAN = 1  RATIO=  .00
             RCON9  MANE        1.73   2088.03    232.28      1.85      5.00   2070.54    235.00       1.85


CONTINUITY SUMMARY (AC-FT) - INFLOW= .2056E+03 EXCESS= .0000E+00 OUTFLOW= .2056E+03 BASIN STORAGE= .2784E-02 PERCENT ERROR=    .0


          FOR PLAN = 1  RATIO=  .00
             RCON9  MANE        1.74   2062.77    233.22      1.83      5.00   2047.86    235.00       1.83


CONTINUITY SUMMARY (AC-FT) - INFLOW= .2033E+03 EXCESS= .0000E+00 OUTFLOW= .2033E+03 BASIN STORAGE= .2736E-02 PERCENT ERROR=    .0


          FOR PLAN = 1  RATIO=  .00
             RCON9  MANE        1.75   2050.03    232.14      1.81      5.00   2032.41    235.00       1.81


CONTINUITY SUMMARY (AC-FT) - INFLOW= .2017E+03 EXCESS= .0000E+00 OUTFLOW= .2017E+03 BASIN STORAGE= .2832E-02 PERCENT ERROR=    .0


          FOR PLAN = 1  RATIO=  .00
             RCON9  MANE        1.75   2021.32    233.22      1.79      5.00   2006.95    235.00       1.79


CONTINUITY SUMMARY (AC-FT) - INFLOW= .1991E+03 EXCESS= .0000E+00 OUTFLOW= .1991E+03 BASIN STORAGE= .2680E-02 PERCENT ERROR=    .0


          FOR PLAN = 1  RATIO=  .00
             RCON9  MANE        2.26   1012.15    235.03       .89      5.00   1012.06    235.00        .89


CONTINUITY SUMMARY (AC-FT) - INFLOW= .9869E+02 EXCESS= .0000E+00 OUTFLOW= .9869E+02 BASIN STORAGE= .3005E-02 PERCENT ERROR=    .0


          FOR PLAN = 1  RATIO=  .00
           RCCON10  MANE         .60   2333.28    234.63      2.05      5.00   2332.79    235.00       2.05


CONTINUITY SUMMARY (AC-FT) - INFLOW= .2358E+03 EXCESS= .0000E+00 OUTFLOW= .2358E+03 BASIN STORAGE= .6461E-03 PERCENT ERROR=    .0


          FOR PLAN = 1  RATIO=  .00
           RCCON10  MANE         .61   2285.03    235.07      2.00      5.00   2284.96    235.00       2.00


CONTINUITY SUMMARY (AC-FT) - INFLOW= .2307E+03 EXCESS= .0000E+00 OUTFLOW= .2307E+03 BASIN STORAGE= .6535E-03 PERCENT ERROR=    .0


          FOR PLAN = 1  RATIO=  .00
           RCCON10  MANE         .62   2205.87    234.78      1.93      5.00   2205.32    235.00       1.93


CONTINUITY SUMMARY (AC-FT) - INFLOW= .2223E+03 EXCESS= .0000E+00 OUTFLOW= .2223E+03 BASIN STORAGE= .6329E-03 PERCENT ERROR=    .0


          FOR PLAN = 1  RATIO=  .00
           RCCON10  MANE         .62   2126.09    235.18      1.86      5.00   2125.98    235.00       1.86


CONTINUITY SUMMARY (AC-FT) - INFLOW= .2139E+03 EXCESS= .0000E+00 OUTFLOW= .2139E+03 BASIN STORAGE= .6895E-03 PERCENT ERROR=    .0


          FOR PLAN = 1  RATIO=  .00
           RCCON10  MANE         .63   2093.78    235.14      1.83      5.00   2093.60    235.00       1.83


CONTINUITY SUMMARY (AC-FT) - INFLOW= .2106E+03 EXCESS= .0000E+00 OUTFLOW= .2106E+03 BASIN STORAGE= .6335E-03 PERCENT ERROR=    .0


          FOR PLAN = 1  RATIO=  .00
           RCCON10  MANE         .63   2070.79    234.75      1.81      5.00   2070.42    235.00       1.81


CONTINUITY SUMMARY (AC-FT) - INFLOW= .2082E+03 EXCESS= .0000E+00 OUTFLOW= .2082E+03 BASIN STORAGE= .6563E-03 PERCENT ERROR=    .0


          FOR PLAN = 1  RATIO=  .00
           RCCON10  MANE         .63   2054.84    234.72      1.79      5.00   2054.60    235.00       1.79


CONTINUITY SUMMARY (AC-FT) - INFLOW= .2065E+03 EXCESS= .0000E+00 OUTFLOW= .2065E+03 BASIN STORAGE= .6369E-03 PERCENT ERROR=    .0


          FOR PLAN = 1  RATIO=  .00
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     RCCON10  MANE          .63   2029.69    235.08      1.77      5.00   2029.52    235.00       1.77


CONTINUITY SUMMARY (AC-FT) - INFLOW= .2039E+03 EXCESS= .0000E+00 OUTFLOW= .2039E+03 BASIN STORAGE= .6497E-03 PERCENT ERROR=    .0


    FOR PLAN = 1  RATIO=  .00
     RCCON10  MANE          .80   1022.36    235.96       .87      5.00   1020.18    235.00        .88


CONTINUITY SUMMARY (AC-FT) - INFLOW= .1008E+03 EXCESS= .0000E+00 OUTFLOW= .1008E+03 BASIN STORAGE= .6474E-03 PERCENT ERROR=    .0


    FOR PLAN = 1  RATIO=  .00
      RCON14  MANE         4.25    167.38    221.00      1.99      5.00    166.33    220.00       1.99


CONTINUITY SUMMARY (AC-FT) - INFLOW= .1179E+02 EXCESS= .0000E+00 OUTFLOW= .1181E+02 BASIN STORAGE= .2635E-02 PERCENT ERROR=   -.1


    FOR PLAN = 1  RATIO=  .00
      RCON14  MANE         4.25    164.16    221.00      1.95      5.00    163.07    220.00       1.95


CONTINUITY SUMMARY (AC-FT) - INFLOW= .1155E+02 EXCESS= .0000E+00 OUTFLOW= .1156E+02 BASIN STORAGE= .2609E-02 PERCENT ERROR=   -.1


    FOR PLAN = 1  RATIO=  .00
      RCON14  MANE         4.25    158.77    221.00      1.88      5.00    157.63    220.00       1.88


CONTINUITY SUMMARY (AC-FT) - INFLOW= .1114E+02 EXCESS= .0000E+00 OUTFLOW= .1115E+02 BASIN STORAGE= .2565E-02 PERCENT ERROR=   -.1


    FOR PLAN = 1  RATIO=  .00
      RCON14  MANE         4.00    155.50    220.00      1.81      5.00    155.50    220.00       1.81


CONTINUITY SUMMARY (AC-FT) - INFLOW= .1074E+02 EXCESS= .0000E+00 OUTFLOW= .1075E+02 BASIN STORAGE= .2457E-02 PERCENT ERROR=   -.1


    FOR PLAN = 1  RATIO=  .00
      RCON14  MANE         4.00    153.27    220.00      1.78      5.00    153.27    220.00       1.79


CONTINUITY SUMMARY (AC-FT) - INFLOW= .1057E+02 EXCESS= .0000E+00 OUTFLOW= .1059E+02 BASIN STORAGE= .2440E-02 PERCENT ERROR=   -.1


    FOR PLAN = 1  RATIO=  .00
      RCON14  MANE         4.00    151.72    220.00      1.77      5.00    151.72    220.00       1.77


CONTINUITY SUMMARY (AC-FT) - INFLOW= .1046E+02 EXCESS= .0000E+00 OUTFLOW= .1047E+02 BASIN STORAGE= .2427E-02 PERCENT ERROR=   -.1


    FOR PLAN = 1  RATIO=  .00
      RCON14  MANE         4.00    150.60    220.00      1.75      5.00    150.60    220.00       1.75


CONTINUITY SUMMARY (AC-FT) - INFLOW= .1038E+02 EXCESS= .0000E+00 OUTFLOW= .1039E+02 BASIN STORAGE= .2418E-02 PERCENT ERROR=   -.1


    FOR PLAN = 1  RATIO=  .00
      RCON14  MANE         4.25    146.92    221.00      1.73      5.00    145.67    220.00       1.73


CONTINUITY SUMMARY (AC-FT) - INFLOW= .1024E+02 EXCESS= .0000E+00 OUTFLOW= .1025E+02 BASIN STORAGE= .2466E-02 PERCENT ERROR=   -.1


    FOR PLAN = 1  RATIO=  .00
      RCON14  MANE         5.00     78.65    220.00       .88      5.00     78.65    220.00        .88


CONTINUITY SUMMARY (AC-FT) - INFLOW= .5186E+01 EXCESS= .0000E+00 OUTFLOW= .5194E+01 BASIN STORAGE= .2404E-02 PERCENT ERROR=   -.2


    FOR PLAN = 1  RATIO=  .00
      RCON16  MANE         1.14    364.28    215.97      1.76      5.00    359.39    215.00       1.76


CONTINUITY SUMMARY (AC-FT) - INFLOW= .2616E+02 EXCESS= .0000E+00 OUTFLOW= .2616E+02 BASIN STORAGE= .6526E-03 PERCENT ERROR=    .0


    FOR PLAN = 1  RATIO=  .00
      RCON16  MANE         1.15    355.90    216.44      1.72      5.00    350.77    215.00       1.72


CONTINUITY SUMMARY (AC-FT) - INFLOW= .2557E+02 EXCESS= .0000E+00 OUTFLOW= .2557E+02 BASIN STORAGE= .6583E-03 PERCENT ERROR=    .0
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          FOR PLAN = 1  RATIO=  .00
            RCON16  MANE        1.16    341.56    215.75      1.65      5.00    337.55    215.00       1.66


CONTINUITY SUMMARY (AC-FT) - INFLOW= .2460E+02 EXCESS= .0000E+00 OUTFLOW= .2460E+02 BASIN STORAGE= .6620E-03 PERCENT ERROR=    .0


          FOR PLAN = 1  RATIO=  .00
            RCON16  MANE        1.17    331.02    216.11      1.59      5.00    325.60    215.00       1.59


CONTINUITY SUMMARY (AC-FT) - INFLOW= .2366E+02 EXCESS= .0000E+00 OUTFLOW= .2366E+02 BASIN STORAGE= .6418E-03 PERCENT ERROR=    .0


          FOR PLAN = 1  RATIO=  .00
            RCON16  MANE        1.18    325.64    216.11      1.56      5.00    320.26    215.00       1.57


CONTINUITY SUMMARY (AC-FT) - INFLOW= .2327E+02 EXCESS= .0000E+00 OUTFLOW= .2328E+02 BASIN STORAGE= .6381E-03 PERCENT ERROR=    .0


          FOR PLAN = 1  RATIO=  .00
            RCON16  MANE        1.19    320.08    215.76      1.55      5.00    315.72    215.00       1.55


CONTINUITY SUMMARY (AC-FT) - INFLOW= .2300E+02 EXCESS= .0000E+00 OUTFLOW= .2300E+02 BASIN STORAGE= .6932E-03 PERCENT ERROR=    .0


          FOR PLAN = 1  RATIO=  .00
            RCON16  MANE        1.19    319.08    216.37      1.53      5.00    313.36    215.00       1.54


CONTINUITY SUMMARY (AC-FT) - INFLOW= .2281E+02 EXCESS= .0000E+00 OUTFLOW= .2281E+02 BASIN STORAGE= .6902E-03 PERCENT ERROR=    .0


          FOR PLAN = 1  RATIO=  .00
            RCON16  MANE        1.20    314.09    216.32      1.51      5.00    308.69    215.00       1.51


CONTINUITY SUMMARY (AC-FT) - INFLOW= .2248E+02 EXCESS= .0000E+00 OUTFLOW= .2248E+02 BASIN STORAGE= .6429E-03 PERCENT ERROR=    .0


          FOR PLAN = 1  RATIO=  .00
            RCON16  MANE        1.53    149.77    217.94       .72      5.00    147.02    220.00        .72


CONTINUITY SUMMARY (AC-FT) - INFLOW= .1076E+02 EXCESS= .0000E+00 OUTFLOW= .1076E+02 BASIN STORAGE= .6687E-03 PERCENT ERROR=    .0


          FOR PLAN = 1  RATIO=  .00
           RC13B-1  MANE        5.00    353.60    225.00      2.27      5.00    353.60    225.00       2.27


CONTINUITY SUMMARY (AC-FT) - INFLOW= .3020E+02 EXCESS= .0000E+00 OUTFLOW= .3021E+02 BASIN STORAGE= .1566E-02 PERCENT ERROR=   -.1


          FOR PLAN = 1  RATIO=  .00
           RC13B-1  MANE        5.00    346.83    225.00      2.23      5.00    346.83    225.00       2.23


CONTINUITY SUMMARY (AC-FT) - INFLOW= .2960E+02 EXCESS= .0000E+00 OUTFLOW= .2961E+02 BASIN STORAGE= .1548E-02 PERCENT ERROR=   -.1


          FOR PLAN = 1  RATIO=  .00
           RC13B-1  MANE        5.00    335.54    225.00      2.15      5.00    335.54    225.00       2.15


CONTINUITY SUMMARY (AC-FT) - INFLOW= .2860E+02 EXCESS= .0000E+00 OUTFLOW= .2861E+02 BASIN STORAGE= .1518E-02 PERCENT ERROR=   -.1


          FOR PLAN = 1  RATIO=  .00
           RC13B-1  MANE        5.00    324.25    225.00      2.08      5.00    324.25    225.00       2.08


CONTINUITY SUMMARY (AC-FT) - INFLOW= .2760E+02 EXCESS= .0000E+00 OUTFLOW= .2762E+02 BASIN STORAGE= .1489E-02 PERCENT ERROR=   -.1


          FOR PLAN = 1  RATIO=  .00
           RC13B-1  MANE        5.00    319.73    225.00      2.05      5.00    319.73    225.00       2.05


CONTINUITY SUMMARY (AC-FT) - INFLOW= .2721E+02 EXCESS= .0000E+00 OUTFLOW= .2722E+02 BASIN STORAGE= .1476E-02 PERCENT ERROR=   -.1


          FOR PLAN = 1  RATIO=  .00
           RC13B-1  MANE        5.00    316.57    225.00      2.03      5.00    316.57    225.00       2.03
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CONTINUITY SUMMARY (AC-FT) - INFLOW= .2693E+02 EXCESS= .0000E+00 OUTFLOW= .2694E+02 BASIN STORAGE= .1468E-02 PERCENT ERROR=   -.1


          FOR PLAN = 1  RATIO=  .00
           RC13B-1  MANE        5.00    314.32    230.00      2.01      5.00    314.32    230.00        2.01


CONTINUITY SUMMARY (AC-FT) - INFLOW= .2673E+02 EXCESS= .0000E+00 OUTFLOW= .2675E+02 BASIN STORAGE= .1462E-02 PERCENT ERROR=   -.1


          FOR PLAN = 1  RATIO=  .00
           RC13B-1  MANE        5.00    310.89    230.00      1.99      5.00    310.89    230.00        1.99


CONTINUITY SUMMARY (AC-FT) - INFLOW= .2641E+02 EXCESS= .0000E+00 OUTFLOW= .2643E+02 BASIN STORAGE= .1452E-02 PERCENT ERROR=   -.1


          FOR PLAN = 1  RATIO=  .00
           RC13B-1  MANE        5.00    171.06    230.00      1.05      5.00    171.06    230.00        1.05


CONTINUITY SUMMARY (AC-FT) - INFLOW= .1391E+02 EXCESS= .0000E+00 OUTFLOW= .1392E+02 BASIN STORAGE= .1716E-02 PERCENT ERROR=   -.1


          FOR PLAN = 1  RATIO=  .00
           RC13B-2  MANE        5.00    640.80    230.00      2.18      5.00    640.80    230.00        2.18


CONTINUITY SUMMARY (AC-FT) - INFLOW= .5392E+02 EXCESS= .0000E+00 OUTFLOW= .5398E+02 BASIN STORAGE= .5817E-02 PERCENT ERROR=   -.1


          FOR PLAN = 1  RATIO=  .00
           RC13B-2  MANE        5.00    628.20    230.00      2.13      5.00    628.20    230.00        2.13


CONTINUITY SUMMARY (AC-FT) - INFLOW= .5282E+02 EXCESS= .0000E+00 OUTFLOW= .5288E+02 BASIN STORAGE= .5767E-02 PERCENT ERROR=   -.1


          FOR PLAN = 1  RATIO=  .00
           RC13B-2  MANE        5.00    607.17    230.00      2.06      5.00    607.17    230.00        2.06


CONTINUITY SUMMARY (AC-FT) - INFLOW= .5100E+02 EXCESS= .0000E+00 OUTFLOW= .5105E+02 BASIN STORAGE= .5683E-02 PERCENT ERROR=   -.1


          FOR PLAN = 1  RATIO=  .00
           RC13B-2  MANE        5.00    586.10    230.00      1.99      5.00    586.10    230.00        1.99


CONTINUITY SUMMARY (AC-FT) - INFLOW= .4918E+02 EXCESS= .0000E+00 OUTFLOW= .4923E+02 BASIN STORAGE= .5597E-02 PERCENT ERROR=   -.1


          FOR PLAN = 1  RATIO=  .00
           RC13B-2  MANE        5.00    578.31    230.00      1.96      5.00    578.31    230.00        1.96


CONTINUITY SUMMARY (AC-FT) - INFLOW= .4845E+02 EXCESS= .0000E+00 OUTFLOW= .4850E+02 BASIN STORAGE= .7165E-02 PERCENT ERROR=   -.1


          FOR PLAN = 1  RATIO=  .00
           RC13B-2  MANE        5.00    572.39    230.00      1.94      5.00    572.39    230.00        1.94


CONTINUITY SUMMARY (AC-FT) - INFLOW= .4794E+02 EXCESS= .0000E+00 OUTFLOW= .4799E+02 BASIN STORAGE= .7136E-02 PERCENT ERROR=   -.1


          FOR PLAN = 1  RATIO=  .00
           RC13B-2  MANE        5.00    568.15    230.00      1.92      5.00    568.15    230.00        1.92


CONTINUITY SUMMARY (AC-FT) - INFLOW= .4758E+02 EXCESS= .0000E+00 OUTFLOW= .4763E+02 BASIN STORAGE= .7115E-02 PERCENT ERROR=   -.1


          FOR PLAN = 1  RATIO=  .00
           RC13B-2  MANE        5.00    561.38    230.00      1.90      5.00    561.38    230.00        1.90


CONTINUITY SUMMARY (AC-FT) - INFLOW= .4700E+02 EXCESS= .0000E+00 OUTFLOW= .4705E+02 BASIN STORAGE= .6748E-02 PERCENT ERROR=   -.1


          FOR PLAN = 1  RATIO=  .00
           RC13B-2  MANE        5.00    295.27    235.00       .98      5.00    295.27    235.00         .98


CONTINUITY SUMMARY (AC-FT) - INFLOW= .2427E+02 EXCESS= .0000E+00 OUTFLOW= .2430E+02 BASIN STORAGE= .7210E-02 PERCENT ERROR=   -.1


          FOR PLAN = 1  RATIO=  .00
              R19A  MANE        5.00    318.89    235.00      2.18      5.00    318.89    235.00        2.18
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CONTINUITY SUMMARY (AC-FT) - INFLOW= .2936E+02 EXCESS= .0000E+00 OUTFLOW= .2938E+02 BASIN STORAGE= .2006E-02 PERCENT ERROR=   -.1

          FOR PLAN = 1  RATIO=  .00
              R19A  MANE        5.00    312.72    235.00      2.13      5.00    312.72    235.00       2.13

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2875E+02 EXCESS= .0000E+00 OUTFLOW= .2877E+02 BASIN STORAGE= .1983E-02 PERCENT ERROR=   -.1

          FOR PLAN = 1  RATIO=  .00
              R19A  MANE        5.00    302.45    235.00      2.06      5.00    302.45    235.00       2.06

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2774E+02 EXCESS= .0000E+00 OUTFLOW= .2776E+02 BASIN STORAGE= .1945E-02 PERCENT ERROR=   -.1

          FOR PLAN = 1  RATIO=  .00
              R19A  MANE        5.00    292.17    235.00      1.98      5.00    292.17    235.00       1.98

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2673E+02 EXCESS= .0000E+00 OUTFLOW= .2675E+02 BASIN STORAGE= .1906E-02 PERCENT ERROR=   -.1

          FOR PLAN = 1  RATIO=  .00
              R19A  MANE        5.00    288.05    235.00      1.95      5.00    288.05    235.00       1.95

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2633E+02 EXCESS= .0000E+00 OUTFLOW= .2635E+02 BASIN STORAGE= .1891E-02 PERCENT ERROR=   -.1

          FOR PLAN = 1  RATIO=  .00
              R19A  MANE        5.00    285.17    235.00      1.93      5.00    285.17    235.00       1.93

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2605E+02 EXCESS= .0000E+00 OUTFLOW= .2606E+02 BASIN STORAGE= .1880E-02 PERCENT ERROR=   -.1

          FOR PLAN = 1  RATIO=  .00
              R19A  MANE        5.00    283.11    235.00      1.92      5.00    283.11    235.00       1.92

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2585E+02 EXCESS= .0000E+00 OUTFLOW= .2586E+02 BASIN STORAGE= .1872E-02 PERCENT ERROR=   -.1

          FOR PLAN = 1  RATIO=  .00
              R19A  MANE        5.00    279.82    235.00      1.89      5.00    279.82    235.00       1.89

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2553E+02 EXCESS= .0000E+00 OUTFLOW= .2554E+02 BASIN STORAGE= .1860E-02 PERCENT ERROR=   -.1

          FOR PLAN = 1  RATIO=  .00
              R19A  MANE        5.00    146.43    235.00       .96      5.00    146.43    235.00        .96

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1300E+02 EXCESS= .0000E+00 OUTFLOW= .1300E+02 BASIN STORAGE= .2023E-02 PERCENT ERROR=   -.1

          FOR PLAN = 1  RATIO=  .00
           RC13A-2  MANE        5.00    780.51    235.00      2.18      5.00    780.51    235.00       2.18

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7731E+02 EXCESS= .0000E+00 OUTFLOW= .7736E+02 BASIN STORAGE= .8795E-02 PERCENT ERROR=   -.1

          FOR PLAN = 1  RATIO=  .00
           RC13A-2  MANE        5.00    764.75    235.00      2.14      5.00    764.75    235.00       2.14

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7572E+02 EXCESS= .0000E+00 OUTFLOW= .7577E+02 BASIN STORAGE= .8721E-02 PERCENT ERROR=   -.1

          FOR PLAN = 1  RATIO=  .00
           RC13A-2  MANE        5.00    738.48    235.00      2.06      5.00    738.48    235.00       2.06

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7309E+02 EXCESS= .0000E+00 OUTFLOW= .7314E+02 BASIN STORAGE= .8303E-02 PERCENT ERROR=   -.1

          FOR PLAN = 1  RATIO=  .00
           RC13A-2  MANE        5.00    712.20    235.00      1.99      5.00    712.20    235.00       1.99

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7047E+02 EXCESS= .0000E+00 OUTFLOW= .7051E+02 BASIN STORAGE= .8180E-02 PERCENT ERROR=   -.1
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          FOR PLAN = 1  RATIO=  .00
           RC13A-2  MANE        5.00    701.68    235.00      1.96      5.00    701.68    235.00       1.96

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6942E+02 EXCESS= .0000E+00 OUTFLOW= .6947E+02 BASIN STORAGE= .8130E-02 PERCENT ERROR=   -.1

          FOR PLAN = 1  RATIO=  .00
           RC13A-2  MANE        5.00    694.32    235.00      1.94      5.00    694.32    235.00       1.94

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6869E+02 EXCESS= .0000E+00 OUTFLOW= .6873E+02 BASIN STORAGE= .8095E-02 PERCENT ERROR=   -.1

          FOR PLAN = 1  RATIO=  .00
           RC13A-2  MANE        5.00    689.06    235.00      1.92      5.00    689.06    235.00       1.92

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6817E+02 EXCESS= .0000E+00 OUTFLOW= .6821E+02 BASIN STORAGE= .7878E-02 PERCENT ERROR=   -.1

          FOR PLAN = 1  RATIO=  .00
           RC13A-2  MANE        5.00    680.64    235.00      1.90      5.00    680.64    235.00       1.90

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6733E+02 EXCESS= .0000E+00 OUTFLOW= .6738E+02 BASIN STORAGE= .7838E-02 PERCENT ERROR=   -.1

          FOR PLAN = 1  RATIO=  .00
           RC13A-2  MANE        5.00    353.55    240.00       .98      5.00    353.55    240.00        .98

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3459E+02 EXCESS= .0000E+00 OUTFLOW= .3462E+02 BASIN STORAGE= .6811E-02 PERCENT ERROR=   -.1

          FOR PLAN = 1  RATIO=  .00
           RCPIC-C  MANE        2.90   1036.21    237.50      2.15      5.00   1029.58    235.00       2.15

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1041E+03 EXCESS= .0000E+00 OUTFLOW= .1041E+03 BASIN STORAGE= .2599E-02 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .00
           RCPIC-C  MANE        2.92   1018.48    236.21      2.11      5.00   1009.34    235.00       2.11

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1020E+03 EXCESS= .0000E+00 OUTFLOW= .1020E+03 BASIN STORAGE= .2441E-02 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .00
           RCPIC-C  MANE        2.95    983.10    236.05      2.03      5.00    975.10    235.00       2.03

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9842E+02 EXCESS= .0000E+00 OUTFLOW= .9843E+02 BASIN STORAGE= .3029E-02 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .00
           RCPIC-C  MANE        2.99    947.55    235.94      1.96      5.00    940.20    235.00       1.96

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9487E+02 EXCESS= .0000E+00 OUTFLOW= .9488E+02 BASIN STORAGE= .2774E-02 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .00
           RCPIC-C  MANE        3.00    935.30    237.12      1.93      5.00    921.65    235.00       1.93

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9346E+02 EXCESS= .0000E+00 OUTFLOW= .9347E+02 BASIN STORAGE= .2840E-02 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .00
           RCPIC-C  MANE        3.01    923.69    237.96      1.91      5.00    914.93    235.00       1.91

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9247E+02 EXCESS= .0000E+00 OUTFLOW= .9248E+02 BASIN STORAGE= .2450E-02 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .00
           RCPIC-C  MANE        3.02    912.75    235.55      1.90      5.00    907.94    235.00       1.89

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9176E+02 EXCESS= .0000E+00 OUTFLOW= .9177E+02 BASIN STORAGE= .2737E-02 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .00
           RCPIC-C  MANE        3.03    906.65    236.52      1.87      5.00    895.54    235.00       1.87

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9064E+02 EXCESS= .0000E+00 OUTFLOW= .9064E+02 BASIN STORAGE= .3045E-02 PERCENT ERROR=    .0
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          FOR PLAN = 1  RATIO=  .00
           RCPIC-C  MANE        3.82    462.80    240.43       .96      5.00    461.30    240.00         .96

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4647E+02 EXCESS= .0000E+00 OUTFLOW= .4648E+02 BASIN STORAGE= .2735E-02 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .00
             RCON1  MANE        5.00     85.62    225.00      1.50      5.00     85.62    225.00        1.50

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5242E+01 EXCESS= .0000E+00 OUTFLOW= .5262E+01 BASIN STORAGE= .6505E-02 PERCENT ERROR=   -.5

          FOR PLAN = 1  RATIO=  .00
             RCON1  MANE        5.00     83.65    225.00      1.47      5.00     83.65    225.00        1.47

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5111E+01 EXCESS= .0000E+00 OUTFLOW= .5131E+01 BASIN STORAGE= .6457E-02 PERCENT ERROR=   -.5

          FOR PLAN = 1  RATIO=  .00
             RCON1  MANE        5.00     80.35    225.00      1.40      5.00     80.35    225.00        1.40

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4894E+01 EXCESS= .0000E+00 OUTFLOW= .4914E+01 BASIN STORAGE= .6374E-02 PERCENT ERROR=   -.5

          FOR PLAN = 1  RATIO=  .00
             RCON1  MANE        5.00     77.02    225.00      1.34      5.00     77.02    225.00        1.34

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4680E+01 EXCESS= .0000E+00 OUTFLOW= .4699E+01 BASIN STORAGE= .6290E-02 PERCENT ERROR=   -.5

          FOR PLAN = 1  RATIO=  .00
             RCON1  MANE        5.00     75.69    225.00      1.32      5.00     75.69    225.00        1.32

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4594E+01 EXCESS= .0000E+00 OUTFLOW= .4613E+01 BASIN STORAGE= .6256E-02 PERCENT ERROR=   -.5

          FOR PLAN = 1  RATIO=  .00
             RCON1  MANE        5.00     74.75    225.00      1.30      5.00     74.75    225.00        1.30

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4535E+01 EXCESS= .0000E+00 OUTFLOW= .4553E+01 BASIN STORAGE= .6232E-02 PERCENT ERROR=   -.5

          FOR PLAN = 1  RATIO=  .00
             RCON1  MANE        5.00     74.08    225.00      1.29      5.00     74.08    225.00        1.29

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4492E+01 EXCESS= .0000E+00 OUTFLOW= .4511E+01 BASIN STORAGE= .6038E-02 PERCENT ERROR=   -.5

          FOR PLAN = 1  RATIO=  .00
             RCON1  MANE        5.00     73.00    225.00      1.27      5.00     73.00    225.00        1.27

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4425E+01 EXCESS= .0000E+00 OUTFLOW= .4442E+01 BASIN STORAGE= .6011E-02 PERCENT ERROR=   -.5

          FOR PLAN = 1  RATIO=  .00
             RCON1  MANE        4.00     31.17    228.00       .55      5.00     30.06    230.00         .54

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1896E+01 EXCESS= .0000E+00 OUTFLOW= .1909E+01 BASIN STORAGE= .5556E-02 PERCENT ERROR=  -1.0

          FOR PLAN = 1  RATIO=  .00
            RPIC-B  MANE        1.74    439.87    237.27      2.03      5.00    439.01    235.00        2.03

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4783E+02 EXCESS= .0000E+00 OUTFLOW= .4783E+02 BASIN STORAGE= .2578E-03 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .00
            RPIC-B  MANE        1.75    432.13    236.45      1.99      5.00    430.53    235.00        1.99

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4685E+02 EXCESS= .0000E+00 OUTFLOW= .4685E+02 BASIN STORAGE= .2499E-03 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .00
            RPIC-B  MANE        1.76    417.58    236.27      1.92      5.00    416.38    235.00        1.92
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CONTINUITY SUMMARY (AC-FT) - INFLOW= .4522E+02 EXCESS= .0000E+00 OUTFLOW= .4522E+02 BASIN STORAGE= .2493E-03 PERCENT ERROR=    .0


          FOR PLAN = 1  RATIO=  .00
            RPIC-B  MANE        1.78    403.10    236.14      1.85      5.00    402.16    235.00       1.85


CONTINUITY SUMMARY (AC-FT) - INFLOW= .4360E+02 EXCESS= .0000E+00 OUTFLOW= .4360E+02 BASIN STORAGE= .2464E-03 PERCENT ERROR=    .0


          FOR PLAN = 1  RATIO=  .00
            RPIC-B  MANE        1.78    398.34    236.81      1.83      5.00    396.16    235.00       1.83


CONTINUITY SUMMARY (AC-FT) - INFLOW= .4296E+02 EXCESS= .0000E+00 OUTFLOW= .4296E+02 BASIN STORAGE= .2533E-03 PERCENT ERROR=    .0


          FOR PLAN = 1  RATIO=  .00
            RPIC-B  MANE        1.78    393.51    237.29      1.81      5.00    392.22    235.00       1.81


CONTINUITY SUMMARY (AC-FT) - INFLOW= .4251E+02 EXCESS= .0000E+00 OUTFLOW= .4250E+02 BASIN STORAGE= .2248E-03 PERCENT ERROR=    .0


          FOR PLAN = 1  RATIO=  .00
            RPIC-B  MANE        1.79    390.10    235.85      1.79      5.00    389.58    235.00       1.79


CONTINUITY SUMMARY (AC-FT) - INFLOW= .4218E+02 EXCESS= .0000E+00 OUTFLOW= .4218E+02 BASIN STORAGE= .2523E-03 PERCENT ERROR=    .0


          FOR PLAN = 1  RATIO=  .00
            RPIC-B  MANE        1.79    386.39    236.40      1.77      5.00    385.05    235.00       1.77


CONTINUITY SUMMARY (AC-FT) - INFLOW= .4167E+02 EXCESS= .0000E+00 OUTFLOW= .4167E+02 BASIN STORAGE= .2662E-03 PERCENT ERROR=    .0


          FOR PLAN = 1  RATIO=  .00
            RPIC-B  MANE        2.03    203.87    238.08       .91      5.00    202.47    235.00        .91


CONTINUITY SUMMARY (AC-FT) - INFLOW= .2143E+02 EXCESS= .0000E+00 OUTFLOW= .2143E+02 BASIN STORAGE= .2507E-03 PERCENT ERROR=    .0



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

APPENDIX C

Hydraulic Calculations

```
[TITLE]
 GCW #840.050A (The 435 - CCRFCD STORM DRAIN)                               0
 MAIN1 TRUNK
 3rd RTC to TDS

[REPORT]
COMPOSITE_ONLY

[NETWORK]
**TYPE           NAME
**-----          -------
Outlet           "No 1"
Transition       "No 2"
Transition       "No 3"
Reach            "No 4"
Reach            "No 5"
Reach            "No 6"
Reach            "No 7"
Reach            "No 8"
Reach            "No 9"
Reach            "No 10"
Reach            "No 11"
Reach            "No 12"
Reach            "No 13"
Reach            "No 14"
Reach            "No 15"
Reach            "No 16"
Junction         "No 17"
Reach            "No 18"
Transition       "No 19"
Reach            "No 20"
Reach            "No 21"
Reach            "No 22"
Reach            "No 23"
Reach            "No 24"
Reach            "No 25"
Reach            "No 26"
Reach            "No 27"
Junction         "No 28"
Reach            "No 29"
Reach            "No 30"
Junction         "No 31"
Reach            "No 32"
Reach            "No 33"
Junction         "No 34"
Reach            "No 35"
Reach            "No 36"
Headwork         "No 37"

**BRANCH DEFINITIONS

[OUTLET]
**NAME              STATION    INVERT     GROUND     CHANNEL     WATER SURFACE
**                             ELEV       ELEV       ID          ELEV (opt.)
**------------      ---------  ---------- ---------- ----------  ----------
"No 1"              0          2621.3     0          "channel14" 0

[HEADWORK]
**NAME              INVERT     GROUND     CHANNEL     FLOW       WATER SURFACE
**                  ELEV       ELEV       ID                     ELEV (opt.)
**------------      ---------  ---------- ----------  ---------- ----------
"No 37"             2739.62    0          "channel 4" 2450       0

[WALLENTRANCE]
**NAME              INVERT     GROUND     CHANNEL     LOSS
**                  ELEV       ELEV       ID          COEFFICIENT(opt.)
**------------      ---------  ---------- ----------  --------------

[WALLEXIT]
**NAME              INVERT     GROUND     CHANNEL     LOSS
**                  ELEV       ELEV       ID          COEFFICIENT(opt.)
**------------      ---------  ---------- ----------  --------------

[BRIDGEENTRANCE]
**NAME              INVERT     GROUND     CHANNEL     REDUCTION
**                  ELEV       ELEV       ID          FACTOR(opt.)
**------------      ---------  ---------- ----------  --------------

[BRIDGEEXIT]
**NAME              INVERT     GROUND     CHANNEL     REDUCTION
**                  ELEV       ELEV       ID          FACTOR(opt.)
**------------      ---------  ---------- ----------  --------------

[JOIN]
**NAME              INVERT     GROUND     CHANNEL     LENGTH     MANNINGS n NUMBER OF  CONFLUENCE
**                  ELEV       ELEV       ID                                BRANCHES   ANGLE
**------------      ---------  ---------- ----------  ---------- ---------- ---------- ----------

[JUNCTION]
```

**Name	INVERT ELEV	GROUND ELEV	CHANNEL ID	LENGTH	MANNINGS n	NUMBER OF LATERALS	CONFLUENCE ANGLE	FLOW
"No 17"	2663.13	0	"channel10"	10	0.015	1		
"No 17_Lateral1"	2663.42		"channel6"				-60	188
"No 28"	2701.73	0	"channel 4"	36.66	0.015	1		
"No 28_Lateral1"	2701.73		"channel3"				-15	2008
"No 31"	2721.11	0	"channel 4"	26.53	0.015	2		
"No 31_Lateral1"	2721.13		"channel5"				-30	9
"No 31_Lateral2"	2721.13		"channel11"				58	17
"No 34"	2734.24	0	"channel 4"	8	0.015	2		
"No 34_Lateral1"	2734.52		"72 pipe"				30	8
"No 34_Lateral2"	2734.52		"72 pipe"				30	5

[TRANSITION]

**NAME	INVERT ELEV	GROUND ELEV	CHANNEL ID	LENGTH	MANNINGS n
"No 2"	2621.65	0	"channel15"	24.86	0.015
"No 3"	2621.81	0	"channel10"	10	0.015
"No 19"	2668.54	0	"channel2"	30	0.023

[REACH]

**NAME	INVERT ELEV	GROUND ELEV	CHANNEL ID	LENGTH	MANNINGS n	CURVE (opt)	ANGLE POINT(opt)	NUMBER MANHOLES(opt)
"No 4"	2623.18	0	"channel10"	90.31	0.015	0	0	0
"No 5"	2623	0	"Channel10"	2.32	0.015	0	0	0
"No 6"	2625	0	"Channel10"	70.62	0.015	-40.46	0	0
"No 7"	2625.48	0	"Channel10"	17.41	0.015	0	0	0
"No 8"	2627.86	0	"Channel10"	85.3	0.015	48.87	0	0
"No 9"	2631.86	0	"Channel10"	143.47	0.015	0	0	0
"No 10"	2645.03	0	"Channel10"	472.89	0.015	13.91	0	0
"No 11"	2648.24	0	"Channel10"	115.41	0.015	-66.13	0	0
"No 12"	2651.53	0	"Channel10"	118.22	0.015	0	0	0
"No 13"	2655.26	0	"Channel10"	466.14	0.015	0	0	0
"No 14"	2656.61	0	"Channel10"	168.86	0.015	90	0	0
"No 15"	2659.44	0	"Channel10"	565	0.015	0	0	0
"No 16"	2662.94	0	"channel10"	145.16	0.015	0	0	0
"No 18"	2666.75	0	"channel10"	194.84	0.015	0	0	0
"No 20"	2670.81	0	"channel2"	38.03	0.015	0	0	0
"No 21"	2671.71	0	"channel2"	90.08	0.015	34.41	0	0
"No 22"	2675.47	0	"channel2"	375.81	0.015	0	0	0
"No 23"	2676.57	0	"channel2"	109.42	0.015	12.54	0	0
"No 24"	2677.16	0	"channel2"	59.62	0.015	0	0	0
"No 25"	2677.68	0	"channel2"	52.03	0.015	-19.87	0	0
"No 26"	2686	0	"channel2"	616.02	0.015	0	0	0
"No 27"	2700.81	0	"channel2"	251.82	0.023	-20.04	0	0
"No 29"	2710.25	0	"channel 4"	338.86	0.015	-26.97	0	0
"No 30"	2720.45	0	"channel 4"	407.05	0.015	0	0	0
"No 32"	2732.17	0	"channel 4"	613.91	0.015	0	0	0
"No 33"	2734.1	0	"channel 4"	107.29	0.015	40.982	0	0
"No 35"	2738.05	0	"channel 4"	219.12	0.015	0	0	0
"No 36"	2739.62	0	"channel 4"	87.41	0.015	33.388	0	0

[CHANNEL]

**REGULAR TYPES 1-4

**ID	TYPE	HEIGHT	WIDTH	LEFT SLOPE	RIGHT SLOPE	NUMBER PIERS	AVG PIER WIDTH	INVERT CROSS FALL
"channel 4"	3	10	10	0	0	0	0	0
"channel10"	3	12	25	0	0	1	1	0
"channel6"	4	6	6					
"channel3"	3	8	10	0	0	0	0	0
"channel5"	4	4	4					
"channel11"	3	6	6	0	0	0	0	0
"72 pipe"	4	6	6					
"channel2"	3	12	14	0	0	0	0	0

**IRREGULAR TYPES 5-6

**ID	TYPE	NUMBER PIERS	AVG PIER WIDTH	PIER1 ELEV	PIER2 ELEV	PIER3 ELEV	PIER4 ELEV	PIER5 ELEV	PIER6 ELEV	PIER7 ELEV	PIER8 ELEV	PIER9 ELEV	PIER10 ELEV
"channel14"	5	0	0										
"channel15"	5	0	0										

[POINT]

**ID	XCOORD	YCOORD
"channel14"	0	2648
"channel14"	19.09	2648
"channel14"	50.85	2645
"channel14"	111.11	2621

"channel14"	159.24	2621
"channel14"	186.97	2635.98
"channel14"	248.78	2640

"channel15"	0	2648
"channel15"	11.03	2648
"channel15"	54.93	2638
"channel15"	84.46	2622
"channel15"	136.39	2622
"channel15"	173.21	2640

****
Water Surface Profile Gradient (WSPG)
XP WSPG
Engine Version 1.3   06/09/2010
XP Software   www.xpsoftware.com
****

INPUT FILE
****
C:\Program Files (x86)\CIVILD\main0626.wsx
Computed 06/28/18 08:35:43

TITLE INFORMATION
****
GCW #840.050A (The 435 - CCRFCD STORM DRAIN) 0
MAIN1 TRUNK
3rd RTC to TDS

WARNING SUMMARY
****
WARNING 47: Junction No 28 has a different channel than its direct downstream element.
WARNING 15: Invert elevation of element No 5 is not larger than invert elevation of the direct downstream element.
WARNING 25: Link type element No 16 has different invert elevation than its upstream node.
WARNING 25: Link type element No 27 has different invert elevation than its upstream node.
WARNING 25: Link type element No 30 has different invert elevation than its upstream node.
WARNING 25: Link type element No 33 has different invert elevation than its upstream node.
WARNING 36: D/S processing stopped in junction No 34 because critical momentum is greater than maximum momentum.
WARNING 36: D/S processing stopped in junction No 31 because critical momentum is greater than maximum momentum.
WARNING 36: D/S processing stopped in junction No 28 because critical momentum is greater than maximum momentum.

RESULTS
****

==
Main Line
==

Composite Profile:

ELEMENT NAME	TYPE	STATION	INVERT ELEV	GROUND ELEV	W.S. ELEV	DEPTH	Q	VELOC.	VELOC. HEAD	ENERGY GRADE LN	SUPER ELEV	CRITICAL DEPTH	FROUDE NUMBER	SLOPE	NORMAL DEPTH	CROSS SECTION
###																
"No 1"	Outlet	0.00	2621.30	0.00	*2623.864	2.564	4685.00	34.01	17.96	2641.83	0.000	6.041	0.000	0.00000	0.000	Irreg.open
"No 2"	Transition	24.86	2621.65	0.00	*2624.014	2.364	4685.00	35.06	19.09	2643.10	0.000	5.855	6.025	0.01408	0.000	Irreg.open
"No 3"	Transition	34.86	2621.81	0.00	*2627.920	6.110	4685.00	31.95	15.85	2643.77	0.000	10.580	2.278	0.01600	0.000	Tr./Rect.closed
"No 4"	Reach	125.17	2623.18	0.00	*2629.094	5.914	4685.00	33.01	16.92	2646.01	0.000	10.580	2.392	0.01517	7.244	Tr./Rect.closed
"No 5"	Reach	127.49	2623.00	0.00	*2628.864	5.864	4685.00	33.29	17.21	2646.07	0.000	10.580	2.423	-0.07759	12.000	Tr./Rect.closed
"No 6"	Reach	198.11	2625.00	0.00	*2630.893	5.893	4685.00	33.13	17.04	2647.93	0.000	10.580	2.405	0.02832	5.720	Tr./Rect.closed
"No 7"	Reach	215.52	2625.48	0.00	*2631.378	5.898	4685.00	33.10	17.01	2648.39	0.000	10.580	2.402	0.02757	5.778	Tr./Rect.closed
"No 8"	Reach	300.82	2627.86	0.00	*2633.794	5.934	4685.00	32.89	16.80	2650.60	0.000	10.580	2.380	0.02790	5.752	Tr./Rect.closed
"No 9"	Reach	444.29	2631.86	0.00	*2637.879	6.019	4685.00	32.43	16.33	2654.21	0.000	10.580	2.329	0.02788	5.754	Tr./Rect.closed
	"i.p."	649.70	2637.58	0.00	*2643.808	6.227	4685.00	31.35	15.26	2659.07	0.000	10.580	2.214	0.02785	5.756	Tr./Rect.closed
	"i.p."	813.77	2642.15	0.00	*2648.681	6.531	4685.00	29.89	13.87	2662.55	0.000	10.580	2.061	0.02785	5.756	Tr./Rect.closed
"No 10"	Reach	917.18	2645.03	0.00	*2651.879	6.849	4685.00	28.50	12.61	2664.49	0.000	10.580	1.919	0.02785	5.756	Tr./Rect.closed
	"i.p."	977.00	2646.69	0.00	*2653.811	7.117	4685.00	27.43	11.68	2665.49	0.000	10.580	1.812	0.02781	5.759	Tr./Rect.closed
"No 11"	Reach	1032.59	2648.24	0.00	*2655.705	7.465	4685.00	26.15	10.62	2666.32	0.000	10.580	1.687	0.02781	5.759	Tr./Rect.closed
	"i.p."	1059.03	2648.98	0.00	*2656.660	7.684	4685.00	25.40	10.02	2666.68	0.000	10.580	1.615	0.02783	5.758	Tr./Rect.closed
	"i.p."	1093.48	2649.93	0.00	*2657.993	8.059	4685.00	24.22	9.11	2667.10	0.000	10.580	1.504	0.02783	5.758	Tr./Rect.closed
	"i.p."	1119.09	2650.65	0.00	*2659.100	8.452	4685.00	23.09	8.28	2667.38	0.000	10.580	1.400	0.02783	5.758	Tr./Rect.closed
	"i.p."	1137.77	2651.17	0.00	*2660.032	8.865	4685.00	22.02	7.53	2667.56	0.000	10.580	1.303	0.02783	5.758	Tr./Rect.closed

```
"No 12"    Reach      1150.81    2651.53  0.00      *2660.828  9.298     4685.00  21.00     6.84    2667.67      0.000
  10.580    1.213    0.02783  5.758    Tr./Rect.closed
           "i.p."     1160.50    2651.61  0.00      *2660.905  9.298     4685.00  21.00     6.84    2667.75      0.000
  10.580    1.213    0.00800  9.298    Tr./Rect.closed
"No 13"    Reach      1616.95    2655.26  0.00      *2664.396  9.136     4685.00  21.37     7.09    2671.49      0.000
  10.580    1.246    0.00800  9.298    Tr./Rect.closed
"No 14"    Reach      1785.81    2656.61  0.00      *2665.586  8.976     4685.00  21.75     7.34    2672.93      0.000
  10.580    1.279    0.00799  9.301    Tr./Rect.closed
           "i.p."     1852.89    2656.95  0.00      *2665.540  8.594     4685.00  22.71     8.01    2673.55      0.000
  10.580    1.365    0.00501  11.219    Tr./Rect.closed
           "i.p."     1927.28    2657.32  0.00      *2665.513  8.194     4685.00  23.82     8.81    2674.33      0.000
  10.580    1.467    0.00501  11.219    Tr./Rect.closed
           "i.p."     2001.41    2657.69  0.00      *2665.503  7.813     4685.00  24.98     9.69    2675.20      0.000
  10.580    1.575    0.00501  11.219    Tr./Rect.closed
           "i.p."     2074.55    2658.06  0.00      *2665.506  7.449     4685.00  26.20     10.66   2676.17      0.000
  10.580    1.692    0.00501  11.219    Tr./Rect.closed
           "i.p."     2146.29    2658.42  0.00      *2665.518  7.103     4685.00  27.48     11.73   2677.25      0.000
  10.580    1.817    0.00501  11.219    Tr./Rect.closed
           "i.p."     2216.35    2658.77  0.00      *2665.539  6.772     4685.00  28.82     12.90   2678.44      0.000
  10.580    1.952    0.00501  11.219    Tr./Rect.closed
           "i.p."     2284.56    2659.11  0.00      *2665.565  6.457     4685.00  30.23     14.19   2679.76      0.000
  10.580    2.097    0.00501  11.219    Tr./Rect.closed
"No 15"    Reach      2350.81    2659.44  0.00      *2665.597  6.157     4685.00  31.71     15.61   2681.21      0.000
  10.580    2.252    0.00501  11.219    Tr./Rect.closed
"No 16"    Reach      2495.97    2662.94  0.00      *2669.133  6.193     4685.00  31.52     15.43   2684.56      0.000
  10.580    2.232    0.02411  6.075    Tr./Rect.closed
"No 17"    Junction   2505.97    2663.13  0.00      *2668.751  5.621     4497.00  33.33     17.25   2686.00      0.000
  10.295    0.000    0.01900  0.000    Tr./Rect.closed
           "i.p."     2576.90    2664.45  0.00      *2669.941  5.493     4497.00  34.11     18.07   2688.01      0.000
  10.295    2.565    0.01858  6.499    Tr./Rect.closed
"No 18"    Reach      2700.81    2666.75  0.00      *2671.988  5.238     4497.00  35.77     19.87   2691.86      0.000
  10.295    2.755    0.01858  6.499    Tr./Rect.closed
"No 19"    Transition 2730.81    2668.54  0.00      *2678.801  10.261    4497.00  31.31     15.22   2694.02      0.000
  12.000    1.722    0.05967  0.000    Tr./Rect.closed
           "i.p."     2735.77    2668.84  0.00      *2679.213  10.377    4497.00  30.95     14.88   2694.09      0.000
  12.000    1.693    0.05969  6.053    Tr./Rect.closed
           "i.p."     2754.16    2669.93  0.00      *2680.817  10.883    4497.00  29.51     13.53   2694.34      0.000
  12.000    1.577    0.05969  6.053    Tr./Rect.closed
"No 20"    Reach      2768.84    2670.81  0.00      *2682.225  11.415    4497.00  28.14     12.30   2694.52      0.000
  12.000    1.468    0.05969  6.053    Tr./Rect.closed
"No 21"    Reach      2858.92    2671.71  0.00      *2683.006  11.296    4497.00  28.44     12.56   2695.56      0.000
  12.000    1.491    0.00999  12.000    Tr./Rect.closed
           "i.p."     2968.92    2672.81  0.00      *2683.941  11.131    4497.00  28.86     12.93   2696.87      0.000
  12.000    1.524    0.01001  12.000    Tr./Rect.closed
"No 22"    Reach      3234.73    2675.47  0.00      *2686.083  10.613    4497.00  30.27     14.23   2700.31      0.000
  12.000    1.637    0.01001  12.000    Tr./Rect.closed
"No 23"    Reach      3344.15    2676.57  0.00      *2686.932  10.362    4497.00  31.00     14.92   2701.85      0.000
  12.000    1.697    0.01005  12.000    Tr./Rect.closed
"No 24"    Reach      3403.77    2677.16  0.00      *2687.371  10.211    4497.00  31.46     15.37   2702.74      0.000
  12.000    1.735    0.00990  12.000    Tr./Rect.closed
"No 25"    Reach      3455.80    2677.68  0.00      *2687.756  10.076    4497.00  31.88     15.78   2703.54      0.000
  12.000    1.770    0.00999  12.000    Tr./Rect.closed
           "i.p."     3492.25    2678.17  0.00      *2688.211  10.039    4497.00  32.00     15.90   2704.11      0.000
  12.000    1.780    0.01351  10.672    Tr./Rect.closed
           "i.p."     3833.60    2682.78  0.00      *2692.354  9.572     4497.00  33.56     17.49   2709.84      0.000
  12.000    1.912    0.01351  10.672    Tr./Rect.closed
"No 26"    Reach      4071.82    2686.00  0.00      *2695.126  9.126     4497.00  35.20     19.24   2714.36      0.000
  12.000    2.053    0.01351  10.672    Tr./Rect.closed
           "i.p."     4144.73    2690.29  0.00      *2699.743  9.455     4497.00  33.97     17.92   2717.66      0.000
  12.000    1.947    0.05881  8.394    Tr./Rect.closed
           "i.p."     4209.35    2694.09  0.00      *2704.005  9.917     4497.00  32.39     16.29   2720.30      0.000
  12.000    1.813    0.05881  8.394    Tr./Rect.closed
           "i.p."     4253.21    2696.67  0.00      *2707.069  10.401    4497.00  30.88     14.81   2721.88      0.000
  12.000    1.688    0.05881  8.394    Tr./Rect.closed
           "i.p."     4284.46    2698.51  0.00      *2709.414  10.908    4497.00  29.45     13.46   2722.88      0.000
  12.000    1.571    0.05881  8.394    Tr./Rect.closed
           "i.p."     4307.17    2699.84  0.00      *2711.282  11.441    4497.00  28.08     12.24   2723.52      0.000
  12.000    1.463    0.05881  8.394    Tr./Rect.closed
"No 27"    Reach      4323.64    2700.81  0.00      *2712.809  11.999    4497.00  26.77     11.13   2723.94      0.000
  12.000    1.362    0.05881  8.394    Tr./Rect.closed
"No 28"    Junction   4360.30    2701.73  0.00      *2715.667  13.937    2489.00  24.95     9.67    2725.34      0.000
  10.000    0.000    0.02510  0.000    Tr./Rect.closed
"No 29"    Reach      4699.16    2710.25  0.00      *2723.083  12.833    2489.00  24.95     9.67    2732.75      0.000
  10.000    1.392    0.02514  7.593    Tr./Rect.closed
"No 30"    Reach      5106.21    2720.45  0.00      *2730.719  10.269    2489.00  24.95     9.67    2740.39      0.000
  10.000    1.392    0.02506  7.603    Tr./Rect.closed
"No 31"    Junction   5132.74    2721.11  0.00      *2731.610  10.500    2463.00  24.69     9.47    2741.08      0.000
  10.000    0.000    0.02488  0.000    Tr./Rect.closed
"No 32"    Reach      5746.65    2732.17  0.00      *2742.888  10.718    2463.00  24.69     9.47    2752.35      0.000
  10.000    1.378    0.01802  8.599    Tr./Rect.closed
"No 33"    Reach      5853.94    2734.10  0.00      *2746.137  12.037    2463.00  24.69     9.47    2755.60      0.000
  10.000    1.378    0.01799  8.604    Tr./Rect.closed
"No 34"    Junction   5861.94    2734.24  0.00      *2746.481  12.241    2450.00  24.56     9.37    2755.85      0.000
  10.000    0.000    0.01750  0.000    Tr./Rect.closed
"No 35"    Reach      6081.06    2738.05  0.00      *2750.464  12.414    2450.00  24.56     9.37    2759.83      0.000
  10.000    1.370    0.01739  8.685    Tr./Rect.closed
"No 36"    Reach      6168.47    2739.62  0.00      *2753.194  13.574    2450.00  24.56     9.37    2762.56      0.000
```

10.000	1.370	0.01796	8.573	Tr./Rect.closed							
"No 37"	Headwrk	6168.47	2739.62	0.00	*2753.194	13.574	2450.00	24.56	9.37	2762.56	0.000
10.000	0.000	0.00000	0.000	Tr./Rect.closed							

*) in the W.S.ELEV column indicates flooding, it is set whenever W.S.ELEV > GROUND ELEV
i.p. = intermediate point processing results for reaches

```
[TITLE]
 GCW #840.050A (The 435 - CCRFCD STORM DRAIN)                                  0
 MAIN1 TRUNK INTERIM CONDITION
 3rd RTC to TDS

[REPORT]
COMPOSITE_ONLY

[NETWORK]
**TYPE          NAME
**-----         -------
Outlet          "No 1"
Transition      "No 2"
Transition      "No 3"
Reach           "No 4"
Reach           "No 5"
Reach           "No 6"
Reach           "No 7"
Reach           "No 8"
Reach           "No 9"
Reach           "No 10"
Reach           "No 11"
Reach           "No 12"
Reach           "No 13"
Reach           "No 14"
Reach           "No 15"
Reach           "No 16"
Junction        "No 17"
Reach           "No 18"
Transition      "No 19"
Reach           "No 20"
Reach           "No 21"
Reach           "No 22"
Reach           "No 23"
Reach           "No 24"
Reach           "No 25"
Reach           "No 26"
Reach           "No 27"
Junction        "No 28"
Reach           "No 29"
Reach           "No 30"
Junction        "No 31"
Reach           "No 32"
Reach           "No 33"
Junction        "No 34"
Reach           "No 35"
Reach           "No 36"
Headwork        "No 37"

**BRANCH DEFINITIONS

[OUTLET]
**NAME              STATION    INVERT     GROUND     CHANNEL     WATER SURFACE
**                             ELEV       ELEV       ID          ELEV (opt.)
**------------      ---------  ---------- ---------- ----------  ----------
"No 1"              0          2621.3     0          "channel14" 0

[HEADWORK]
**NAME              INVERT     GROUND     CHANNEL     FLOW       WATER SURFACE
**                  ELEV       ELEV       ID                     ELEV (opt.)
**------------      ---------  ---------- ----------  ---------- ----------
"No 37"             2739.62    0          "channel 4" 2450       0

[WALLENTRANCE]
**NAME              INVERT     GROUND     CHANNEL     LOSS
**                  ELEV       ELEV       ID          COEFFICIENT(opt.)
**------------      ---------  ---------- ----------  --------------

[WALLEXIT]
**NAME              INVERT     GROUND     CHANNEL     LOSS
**                  ELEV       ELEV       ID          COEFFICIENT(opt.)
**------------      ---------  ---------- ----------  --------------

[BRIDGEENTRANCE]
**NAME              INVERT     GROUND     CHANNEL     REDUCTION
**                  ELEV       ELEV       ID          FACTOR(opt.)
**------------      ---------  ---------- ----------  --------------

[BRIDGEEXIT]
**NAME              INVERT     GROUND     CHANNEL     REDUCTION
**                  ELEV       ELEV       ID          FACTOR(opt.)
**------------      ---------  ---------- ----------  --------------

[JOIN]
**NAME              INVERT     GROUND     CHANNEL     LENGTH     MANNINGS n NUMBER OF  CONFLUENCE
**                  ELEV       ELEV       ID                                BRANCHES   ANGLE
**------------      ---------  ---------- ----------  ---------- ---------- ---------- ----------

[JUNCTION]
```

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**Name              INVERT     GROUND     CHANNEL     LENGTH     MANNINGS n NUMBER OF  CONFLUENCE FLOW
**                  ELEV       ELEV       ID                                LATERALS   ANGLE
**------------      ---------  ---------- ----------  ---------- ---------- ---------- ---------- ----------
"No 17"             2663.13    0          "channel10" 10         0.015      1
"No 17_Lateral1"    2663.42               "channel6"                                   -60        287

"No 28"             2701.73    0          "channel 4" 36.66      0.015      1
"No 28_Lateral1"    2701.73               "channel3"                                   -15        2008

"No 31"             2721.11    0          "channel 4" 26.53      0.015      2
"No 31_Lateral1"    2721.13               "channel5"                                   -30        9
"No 31_Lateral2"    2721.13               "channel11"                                  58         17

"No 34"             2734.24    0          "channel 4" 8          0.015      2
"No 34_Lateral1"    2734.52               "72 pipe"                                    30         8
"No 34_Lateral2"    2734.52               "72 pipe"                                    30         5


[TRANSITION]
**NAME              INVERT     GROUND     CHANNEL     LENGTH     MANNINGS n
**                  ELEV       ELEV       ID
**------------      ---------  ---------- ----------  ---------- ----------
"No 2"              2621.65    0          "channel15" 24.86      0.015
"No 3"              2621.81    0          "channel10" 10         0.015
"No 19"             2668.54    0          "channel2"  30         0.023

[REACH]
**NAME              INVERT     GROUND     CHANNEL     LENGTH     MANNINGS n CURVE      ANGLE      NUMBER
**                  ELEV       ELEV       ID                                (opt)      POINT(opt) MANHOLES(opt)
**------------      ---------  ---------- ----------  ---------- ---------- ---------- ---------- ----------
"No 4"              2623.18    0          "channel10" 90.31      0.015      0          0          0
"No 5"              2623       0          "Channel10" 2.32       0.015      0          0          0
"No 6"              2625       0          "Channel10" 70.62      0.015      -40.46     0          0
"No 7"              2625.48    0          "Channel10" 17.41      0.015      0          0          0
"No 8"              2627.86    0          "Channel10" 85.3       0.015      48.87      0          0
"No 9"              2631.86    0          "Channel10" 143.47     0.015      0          0          0
"No 10"             2645.03    0          "Channel10" 472.89     0.015      13.91      0          0
"No 11"             2648.24    0          "Channel10" 115.41     0.015      -66.13     0          0
"No 12"             2651.53    0          "Channel10" 118.22     0.015      0          0          0
"No 13"             2655.26    0          "Channel10" 466.14     0.015      0          0          0
"No 14"             2656.61    0          "Channel10" 168.86     0.015      90         0          0
"No 15"             2659.44    0          "Channel10" 565        0.015      0          0          0
"No 16"             2662.94    0          "channel10" 145.16     0.015      0          0          0
"No 18"             2666.75    0          "channel10" 194.84     0.015      0          0          0
"No 20"             2670.81    0          "channel2"  38.03      0.015      0          0          0
"No 21"             2671.71    0          "channel2"  90.08      0.015      34.41      0          0
"No 22"             2675.47    0          "channel2"  375.81     0.015      0          0          0
"No 23"             2676.57    0          "channel2"  109.42     0.015      12.54      0          0
"No 24"             2677.16    0          "channel2"  59.62      0.015      0          0          0
"No 25"             2677.68    0          "channel2"  52.03      0.015      -19.87     0          0
"No 26"             2686       0          "channel2"  616.02     0.015      0          0          0
"No 27"             2700.81    0          "channel2"  251.82     0.023      -20.04     0          0
"No 29"             2710.25    0          "channel 4" 338.86     0.015      -26.97     0          0
"No 30"             2720.45    0          "channel 4" 407.05     0.015      0          0          0
"No 32"             2732.17    0          "channel 4" 613.91     0.015      0          0          0
"No 33"             2734.1     0          "channel 4" 107.29     0.015      40.982     0          0
"No 35"             2738.05    0          "channel 4" 219.12     0.015      0          0          0
"No 36"             2739.62    0          "channel 4" 87.41      0.015      33.388     0          0

[CHANNEL]
**REGULAR TYPES 1-4
**ID       TYPE HEIGHT     WIDTH      LEFT       RIGHT      NUMBER     AVG PIER   INVERT
**                                    SLOPE      SLOPE      PIERS      WIDTH      CROSS FALL
**------  ---- ---------- ---------- ---------- ---------- ---------- ---------- ----------
"channel 4"   3   10         10         0          0          0          0          0
"channel10"   3   12         25         0          0          1          1          0
"channel6"    4   6          6
"channel3"    3   8          10         0          0          0          0          0
"channel5"    4   4          4
"channel11"   3   6          6          0          0          0          0          0
"72 pipe"     4   6          6
"channel2"    3   12         14         0          0          0          0          0

**IRREGULAR TYPES 5-6
**ID       TYPE NUMBER     AVG PIER   PIER1      PIER2      PIER3      PIER4      PIER5      PIER6      PIER7      PIER8      PIER9      PIER10
**              PIERS      WIDTH      ELEV       ELEV       ELEV       ELEV       ELEV       ELEV       ELEV       ELEV       ELEV       ELEV
**------   ---- ---------- ---------- ---------- ---------- ---------- ---------- ---------- ---------- ---------- ---------- ---------- ----------
"channel14"5        0          0
"channel15"5        0          0


[POINT]
**ID          XCOORD     YCOORD
**----------- ---------- ----------
"channel14"   0          2648
"channel14"   19.09      2648
"channel14"   50.85      2645
"channel14"   111.11     2621
```

"channel14"	159.24	2621
"channel14"	186.97	2635.98
"channel14"	248.78	2640

"channel15"	0	2648
"channel15"	11.03	2648
"channel15"	54.93	2638
"channel15"	84.46	2622
"channel15"	136.39	2622
"channel15"	173.21	2640

```
*************************************
Water Surface Profile Gradient (WSPG)
XP WSPG
Engine Version 1.3        06/09/2010
XP Software        www.xpsoftware.com
*************************************

INPUT FILE
*************************************
C:\Program Files (x86)\CIVILD\main0626int.wsx
Computed  06/28/18  12:03:02

TITLE INFORMATION
*************************************
 GCW #840.050A (The 435 - CCRFCD STORM DRAIN)                          0
 MAIN1 TRUNK INTERIM CONDITION
 3rd RTC to TDS

WARNING SUMMARY
*************************************
 WARNING 47: Junction No 28 has a different channel than its direct downstream element.
 WARNING 15: Invert elevation of element No 5 is not larger than invert elevation of the direct downstream
element.
 WARNING 25: Link type element No 16 has different invert elevation than its upstream node.
 WARNING 25: Link type element No 27 has different invert elevation than its upstream node.
 WARNING 25: Link type element No 30 has different invert elevation than its upstream node.
 WARNING 25: Link type element No 33 has different invert elevation than its upstream node.
 WARNING 36: D/S processing stopped in junction No 34 because critical momentum is greater than maximum
momentum.
 WARNING 36: D/S processing stopped in junction No 31 because critical momentum is greater than maximum
momentum.
 WARNING 36: D/S processing stopped in junction No 28 because critical momentum is greater than maximum
momentum.

RESULTS
*************************************


==============================================================
   Main Line
==============================================================

 Composite Profile:

ELEMENT    TYPE       STATION    INVERT   GROUND   W.S.      DEPTH    Q        VELOC.  VELOC. ENERGY     SUPER
 CRITICAL FROUDE  SLOPE    NORMAL   CROSS
NAME                             ELEV     ELEV     ELEV                                 HEAD   GRADE LN   ELEV
 DEPTH    NUMBER           DEPTH    SECTION
---------- ---------- ---------- -------- -------- --------  -------- -------- ------- ------ ---------- ------
 -------- ------  -------  ------   ---------
###
"No 1"     Outlet     0.00       2621.30  0.00     *2623.898  2.598    4784.00  34.23   18.19  2642.09    0.000
  6.118    0.000  0.00000  0.000    Irreg.open
"No 2"     Transition 24.86      2621.65  0.00     *2624.047  2.397    4784.00  35.27   19.31  2643.36    0.000
  5.931    6.015  0.01408  0.000    Irreg.open
"No 3"     Transition 34.86      2621.81  0.00     *2628.017  6.207    4784.00  32.11   16.01  2644.03    0.000
  10.729    2.272  0.01600  0.000    Tr./Rect.closed
"No 4"     Reach      125.17     2623.18  0.00     *2629.190  6.010    4784.00  33.17   17.08  2646.27    0.000
  10.729    2.384  0.01517  7.362    Tr./Rect.closed
"No 5"     Reach      127.49     2623.00  0.00     *2628.959  5.959    4784.00  33.45   17.37  2646.33    0.000
  10.729    2.415  -0.07759  12.000   Tr./Rect.closed
"No 6"     Reach      198.11     2625.00  0.00     *2630.989  5.989    4784.00  33.28   17.20  2648.19    0.000
  10.729    2.397  0.02832  5.810    Tr./Rect.closed
"No 7"     Reach      215.52     2625.48  0.00     *2631.475  5.995    4784.00  33.25   17.17  2648.64    0.000
  10.729    2.393  0.02757  5.869    Tr./Rect.closed
"No 8"     Reach      300.82     2627.86  0.00     *2633.892  6.032    4784.00  33.04   16.96  2650.85    0.000
  10.729    2.371  0.02790  5.843    Tr./Rect.closed
"No 9"     Reach      444.29     2631.86  0.00     *2637.980  6.120    4784.00  32.57   16.48  2654.45    0.000
  10.729    2.320  0.02788  5.845    Tr./Rect.closed
           "i.p."     650.19     2637.59  0.00     *2643.927  6.333    4784.00  31.48   15.39  2659.31    0.000
  10.729    2.204  0.02785  5.847    Tr./Rect.closed
           "i.p."     813.76     2642.15  0.00     *2648.791  6.642    4784.00  30.01   13.99  2662.78    0.000
  10.729    2.052  0.02785  5.847    Tr./Rect.closed
"No 10"    Reach      917.18     2645.03  0.00     *2651.996  6.966    4784.00  28.62   12.72  2664.71    0.000
  10.729    1.911  0.02785  5.847    Tr./Rect.closed
           "i.p."     976.86     2646.69  0.00     *2653.927  7.237    4784.00  27.54   11.78  2665.71    0.000
  10.729    1.804  0.02781  5.850    Tr./Rect.closed
"No 11"    Reach      1032.59    2648.24  0.00     *2655.830  7.590    4784.00  26.26   10.71  2666.54    0.000
  10.729    1.680  0.02781  5.850    Tr./Rect.closed
           "i.p."     1059.02    2648.98  0.00     *2656.788  7.813    4784.00  25.51   10.11  2666.90    0.000
  10.729    1.609  0.02783  5.849    Tr./Rect.closed
           "i.p."     1093.54    2649.94  0.00     *2658.130  8.194    4784.00  24.33   9.19   2667.32    0.000
  10.729    1.498  0.02783  5.849    Tr./Rect.closed
           "i.p."     1119.18    2650.65  0.00     *2659.244  8.594    4784.00  23.19   8.35   2667.60    0.000
  10.729    1.394  0.02783  5.849    Tr./Rect.closed
           "i.p."     1137.84    2651.17  0.00     *2660.182  9.013    4784.00  22.12   7.59   2667.78    0.000
  10.729    1.298  0.02783  5.849    Tr./Rect.closed
```

```
"No 12"    Reach       1150.81    2651.53  0.00     *2660.983  9.453    4784.00  21.09    6.90   2667.89     0.000
  10.729    1.209    0.02783  5.849    Tr./Rect.closed
           "i.p."      1173.26    2651.71  0.00     *2661.163  9.453    4784.00  21.09    6.90   2668.07     0.000
  10.729    1.209    0.00800  9.453    Tr./Rect.closed
"No 13"    Reach       1616.95    2655.26  0.00     *2664.628  9.368    4784.00  21.28    7.03   2671.66     0.000
  10.729    1.225    0.00800  9.453    Tr./Rect.closed
"No 14"    Reach       1785.81    2656.61  0.00     *2665.882  9.272    4784.00  21.50    7.18   2673.06     0.000
  10.729    1.244    0.00799  9.457    Tr./Rect.closed
           "i.p."      1846.72    2656.92  0.00     *2665.824  8.909    4784.00  22.38    7.77   2673.60     0.000
  10.729    1.321    0.00501  11.412    Tr./Rect.closed
           "i.p."      1920.97    2657.29  0.00     *2665.781  8.494    4784.00  23.47    8.55   2674.33     0.000
  10.729    1.419    0.00501  11.412    Tr./Rect.closed
           "i.p."      1995.54    2657.66  0.00     *2665.759  8.099    4784.00  24.61    9.41   2675.17     0.000
  10.729    1.524    0.00501  11.412    Tr./Rect.closed
           "i.p."      2069.51    2658.03  0.00     *2665.753  7.722    4784.00  25.81    10.35  2676.10     0.000
  10.729    1.637    0.00501  11.412    Tr./Rect.closed
           "i.p."      2142.32    2658.40  0.00     *2665.758  7.363    4784.00  27.07    11.38  2677.14     0.000
  10.729    1.758    0.00501  11.412    Tr./Rect.closed
           "i.p."      2213.61    2658.75  0.00     *2665.773  7.020    4784.00  28.40    12.52  2678.29     0.000
  10.729    1.889    0.00501  11.412    Tr./Rect.closed
           "i.p."      2283.15    2659.10  0.00     *2665.794  6.693    4784.00  29.78    13.77  2679.57     0.000
  10.729    2.029    0.00501  11.412    Tr./Rect.closed
"No 15"    Reach       2350.81    2659.44  0.00     *2665.822  6.382    4784.00  31.23    15.15  2680.97     0.000
  10.729    2.179    0.00501  11.412    Tr./Rect.closed
"No 16"    Reach       2495.97    2662.94  0.00     *2669.421  6.481    4784.00  30.76    14.69  2684.11     0.000
  10.729    2.129    0.02411  6.172    Tr./Rect.closed
"No 17"    Junction    2505.97    2663.13  0.00     *2668.751  5.621    4497.00  33.33    17.25  2686.00     0.000
  10.295    0.000    0.01900  0.000    Tr./Rect.closed
           "i.p."      2576.90    2664.45  0.00     *2669.941  5.493    4497.00  34.11    18.07  2688.01     0.000
  10.295    2.565    0.01858  6.499    Tr./Rect.closed
"No 18"    Reach       2700.81    2666.75  0.00     *2671.988  5.238    4497.00  35.77    19.87  2691.86     0.000
  10.295    2.755    0.01858  6.499    Tr./Rect.closed
"No 19"    Transition  2730.81    2668.54  0.00     *2678.801  10.261   4497.00  31.31    15.22  2694.02     0.000
  12.000    1.722    0.05967  0.000    Tr./Rect.closed
           "i.p."      2735.77    2668.84  0.00     *2679.213  10.377   4497.00  30.95    14.88  2694.09     0.000
  12.000    1.693    0.05969  6.053    Tr./Rect.closed
           "i.p."      2754.16    2669.93  0.00     *2680.817  10.883   4497.00  29.51    13.53  2694.34     0.000
  12.000    1.577    0.05969  6.053    Tr./Rect.closed
"No 20"    Reach       2768.84    2670.81  0.00     *2682.225  11.415   4497.00  28.14    12.30  2694.52     0.000
  12.000    1.468    0.05969  6.053    Tr./Rect.closed
"No 21"    Reach       2858.92    2671.71  0.00     *2683.006  11.296   4497.00  28.44    12.56  2695.56     0.000
  12.000    1.491    0.00999  12.000    Tr./Rect.closed
           "i.p."      2968.92    2672.81  0.00     *2683.941  11.131   4497.00  28.86    12.93  2696.87     0.000
  12.000    1.524    0.01001  12.000    Tr./Rect.closed
"No 22"    Reach       3234.73    2675.47  0.00     *2686.083  10.613   4497.00  30.27    14.23  2700.31     0.000
  12.000    1.637    0.01001  12.000    Tr./Rect.closed
"No 23"    Reach       3344.15    2676.57  0.00     *2686.932  10.362   4497.00  31.00    14.92  2701.85     0.000
  12.000    1.697    0.01005  12.000    Tr./Rect.closed
"No 24"    Reach       3403.77    2677.16  0.00     *2687.371  10.211   4497.00  31.46    15.37  2702.74     0.000
  12.000    1.735    0.00990  12.000    Tr./Rect.closed
"No 25"    Reach       3455.80    2677.68  0.00     *2687.756  10.076   4497.00  31.88    15.78  2703.54     0.000
  12.000    1.770    0.00999  12.000    Tr./Rect.closed
           "i.p."      3492.25    2678.17  0.00     *2688.211  10.039   4497.00  32.00    15.90  2704.11     0.000
  12.000    1.780    0.01351  10.672    Tr./Rect.closed
           "i.p."      3833.60    2682.78  0.00     *2692.354  9.572    4497.00  33.56    17.49  2709.84     0.000
  12.000    1.912    0.01351  10.672    Tr./Rect.closed
"No 26"    Reach       4071.82    2686.00  0.00     *2695.126  9.126    4497.00  35.20    19.24  2714.36     0.000
  12.000    2.053    0.01351  10.672    Tr./Rect.closed
           "i.p."      4144.73    2690.29  0.00     *2699.743  9.455    4497.00  33.97    17.92  2717.66     0.000
  12.000    1.947    0.05881  8.394    Tr./Rect.closed
           "i.p."      4209.35    2694.09  0.00     *2704.005  9.917    4497.00  32.39    16.29  2720.30     0.000
  12.000    1.813    0.05881  8.394    Tr./Rect.closed
           "i.p."      4253.21    2696.67  0.00     *2707.069  10.401   4497.00  30.88    14.81  2721.88     0.000
  12.000    1.688    0.05881  8.394    Tr./Rect.closed
           "i.p."      4284.46    2698.51  0.00     *2709.414  10.908   4497.00  29.45    13.46  2722.88     0.000
  12.000    1.571    0.05881  8.394    Tr./Rect.closed
           "i.p."      4307.17    2699.84  0.00     *2711.282  11.441   4497.00  28.08    12.24  2723.52     0.000
  12.000    1.463    0.05881  8.394    Tr./Rect.closed
"No 27"    Reach       4323.64    2700.81  0.00     *2712.809  11.999   4497.00  26.77    11.13  2723.94     0.000
  12.000    1.362    0.05881  8.394    Tr./Rect.closed
"No 28"    Junction    4360.30    2701.73  0.00     *2715.667  13.937   2489.00  24.95    9.67   2725.34     0.000
  10.000    0.000    0.02510  0.000    Tr./Rect.closed
"No 29"    Reach       4699.16    2710.25  0.00     *2723.083  12.833   2489.00  24.95    9.67   2732.75     0.000
  10.000    1.392    0.02514  7.593    Tr./Rect.closed
"No 30"    Reach       5106.21    2720.45  0.00     *2730.719  10.269   2489.00  24.95    9.67   2740.39     0.000
  10.000    1.392    0.02506  7.603    Tr./Rect.closed
"No 31"    Junction    5132.74    2721.11  0.00     *2731.610  10.500   2463.00  24.69    9.47   2741.08     0.000
  10.000    0.000    0.02488  0.000    Tr./Rect.closed
"No 32"    Reach       5746.65    2732.17  0.00     *2742.888  10.718   2463.00  24.69    9.47   2752.35     0.000
  10.000    1.378    0.01802  8.599    Tr./Rect.closed
"No 33"    Reach       5853.94    2734.10  0.00     *2746.137  12.037   2463.00  24.69    9.47   2755.60     0.000
  10.000    1.378    0.01799  8.604    Tr./Rect.closed
"No 34"    Junction    5861.94    2734.24  0.00     *2746.481  12.241   2450.00  24.56    9.37   2755.85     0.000
  10.000    0.000    0.01750  0.000    Tr./Rect.closed
"No 35"    Reach       6081.06    2738.05  0.00     *2750.464  12.414   2450.00  24.56    9.37   2759.83     0.000
  10.000    1.370    0.01739  8.685    Tr./Rect.closed
"No 36"    Reach       6168.47    2739.62  0.00     *2753.194  13.574   2450.00  24.56    9.37   2762.56     0.000
```

10.000	1.370	0.01796	8.573	Tr./Rect.closed							
"No 37"	Headwrk	6168.47	2739.62	0.00	*2753.194	13.574	2450.00	24.56	9.37	2762.56	0.000
10.000	0.000	0.00000	0.000	Tr./Rect.closed							

*) in the W.S.ELEV column indicates flooding, it is set whenever W.S.ELEV > GROUND ELEV
i.p. = intermediate point processing results for reaches

BOX CULVERT

20'X14' RCB

INPUT

Width of Box	20.00	ft
Height of Box	14.00	ft
Number of Barrels	1	
Length	10.00	ft
Slope	1.10	%
Manning's 'n'	0.015	
Flow "Q"	2450	cfs
Entrance Coef.	0.35	
Tail Water	0	ft

Non Standard Box Span

INLET

45d WWall	12.40	ft
Sq. Edge	13.17	ft
Beveled	12.21	ft
Tapered	11.72	ft

OUTLET

Head Water	12.38	ft
Critical	7.75	ft
Velocity	8.75	ft/s

G. C. WALLACE COMPANIES
ENGINEERS | PLANNERS | SURVEYORS

13.2-ft below top of RCB, meets headwater criteria.

13.2-ft inlet control headwater is approximately outlet control WSPG WSE; therefore, size of RCB inlet OK.

Minimum Transition Length Calculation

706.1.1.2 Transition Length

The length of the transition section should be long enough to keep the streamlines smooth and nearly parallel throughout the expanding (contracting) section. Experimental data and performance of existing structures have to be used to estimate the minimum transition length necessary to maintain the stated flow conditions. Based on this information, the minimum length of the transition section shall be as follows:

$$L_t = \geq 0.5\, L_c\, (T_w) \quad \text{(739)}$$

0.5*4.5(10)= 22.5 ft

Where L_t = Minimum Transition Length (ft)

L_c = Length Coefficient

T_w = Difference in the Top Width of the Normal Water Surface Upstream and Downstream of the Transition

For an approach flow velocity less than 12 feet per second, $\boxed{L_c = 4.5.}$ This represents a 4.5 (length) to 1.0 (width) wall expansion or contraction with the angle of expansion or contraction of 12.5 degrees from the channel centerline. For an approach flow velocity equal to or greater than 12 feet per second, L_c = 10.0. This represents a 10.0 (length) to 1.0 (width) expansion or contraction with the angle of expansion or contraction of about 5.75 degrees from the channel centerline.

The transition length equation is not applicable to cylinder-quadrant or square-ended transitions.

706.1.2 Bends

The allowed radius of curvature in sub-critical channels is based on a theoretical maximum allowed rise in the super-elevated water surface of 0.5 feet. Therefore, the minimum allowed radius of curvature of the channel centerline shall be determined from the following equation:

$$r = C\,(V^2\, T_w) / S_e\, (g) \quad \text{(740)}$$

Where r = Radius of Curvature (ft)

C = Super-Elevation Coefficient (= 1 for Sub-Critical Flow)

```
T1 THE SEVENTY - THE 435 (PHASE 1), GCW JOB NO. 840-050                        0
T2 3RD RESPONSE TO CLV COMMENTS
T3 MAIN2 FACILITY (CCRFCD 'APP2' MPU FACILITY)
SO  -2775.6102701.730  1                         2715.667
R   -2648.9802712.970  1      .024                               64.780    .000 0
R   -2556.6802716.660  1      .015                                 .000    .000 0
R   -2435.6102721.500  1      .015                              -61.936    .000 0
R   -2218.9802726.000  1      .015                                 .000    .000 0
R   -2160.3602727.220  1      .015                               29.988    .000 0
R   -1847.1002733.740  1      .015                                 .000    .000 0
R   -1764.2102734.560  1      .015                              -42.404    .000 0
R   -1468.1802740.500  1      .015                                 .000    .000 0
SH  -1468.1802740.500  1                             .000
CD   1  3   0    .000   8.000   10.000  .000  .000   .00
Q          2004.000   .0
```

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 FILE: MAIN2024R.WSW                   W S P G W - CIVILDESIGN Version 14.08                            PAGE    1
                             Program Package Serial Number: 3074
                                         WATER SURFACE PROFILE LISTING                  Date: 6-25-2018  Time: 2:58:16
                         THE SEVENTY - THE 435 (PHASE 1), GCW JOB NO. 840-050
                           3RD RESPONSE TO CLV COMMENTS
                             MAIN2 FACILITY (CCRFCD 'APP2' MPU FACILITY)
************************************************************************************************************ ********
         | Invert  |  Depth  |  Water  |    Q    |  Vel     Vel   |  Energy  | Super |Critical|Flow Top|Height/|Base Wt|      |No Wth
 Station |  Elev   |  (FT)   |  Elev   |  (CFS)  | (FPS)    Head  | Grd.El.|  Elev | Depth  | Width  |Dia.-FT|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
*********|*********|********|*********|*********|*******|*******|*********|*******|********|********|*******|*******|*****|*******
         |         |        |         |         |       |       |         |       |        |        |       |       |     |
-2775.610  2701.730   13.937  2715.667   2004.00   25.05    9.74  2725.41     .00     8.00    10.00    8.000  10.000   .00  0   .0
        -|-       -|-       -|-       -|-       -|-      -|-      -|-       -|-      -|-      -|-      -|-      -|-     -|-     |-
  43.633    .0888                                        .0564     2.46     .00     1.56     5.66    .024      .00   .00  BOX
         |         |        |         |         |       |       |         |       |        |        |       |       |     |
-2731.977  2705.603   13.096  2718.699   2004.00   25.05    9.74  2728.44     .00     8.00    10.00    8.000  10.000   .00  0   .0
        -|-       -|-       -|-       -|-       -|-      -|-      -|-       -|-      -|-      -|-      -|-      -|-     -|-     |-
HYDRAULIC JUMP
         |         |        |         |         |       |       |         |       |        |        |       |       |     |
-2731.977  2705.603    5.904  2711.507   2004.00   33.94   17.89  2729.40    8.00     8.00    10.00    8.000  10.000   .00  0   .0
        -|-       -|-       -|-       -|-       -|-      -|-      -|-       -|-      -|-      -|-      -|-      -|-     -|-     |-
  82.997    .0888                                        .0766     6.36    8.00     2.46     5.66    .024      .00   .00  BOX
         |         |        |         |         |       |       |         |       |        |        |       |       |     |
-2648.980  2712.970    6.084  2719.054   2004.00   32.94   16.85  2735.90     .00     8.00    10.00    8.000  10.000   .00  0   .0
        -|-       -|-       -|-       -|-       -|-      -|-      -|-       -|-      -|-      -|-      -|-      -|-     -|-     |-
  92.300    .0400                                        .0272     2.51    6.08     2.35     5.37    .015      .00   .00  BOX
         |         |        |         |         |       |       |         |       |        |        |       |       |     |
-2556.680  2716.660    6.366  2723.026   2004.00   31.48   15.39  2738.41    8.00     8.00    10.00    8.000  10.000   .00  0   .0
        -|-       -|-       -|-       -|-       -|-      -|-      -|-       -|-      -|-      -|-      -|-      -|-     -|-     |-
   3.334    .0400                                        .0255      .09    8.00     2.20     5.37    .015      .00   .00  BOX
         |         |        |         |         |       |       |         |       |        |        |       |       |     |
-2553.345  2716.793    6.379  2723.172   2004.00   31.42   15.33  2738.50    8.00     8.00    10.00    8.000  10.000   .00  0   .0
        -|-       -|-       -|-       -|-       -|-      -|-      -|-       -|-      -|-      -|-      -|-      -|-     -|-     |-
  67.630    .0400                                        .0240     1.62    8.00     2.19     5.37    .015      .00   .00  BOX
         |         |        |         |         |       |       |         |       |        |        |       |       |     |
-2485.715  2719.497    6.690  2726.187   2004.00   29.96   13.93  2740.12    8.00     8.00    10.00    8.000  10.000   .00  0   .0
        -|-       -|-       -|-       -|-       -|-      -|-      -|-       -|-      -|-      -|-      -|-      -|-     -|-     |-
  50.105    .0400                                        .0212     1.06    8.00     2.04     5.37    .015      .00   .00  BOX
         |         |        |         |         |       |       |         |       |        |        |       |       |     |
-2435.610  2721.500    7.016  2728.516   2004.00   28.56   12.67  2741.18     .00     8.00    10.00    8.000  10.000   .00  0   .0
        -|-       -|-       -|-       -|-       -|-      -|-      -|-       -|-      -|-      -|-      -|-      -|-     -|-     |-
 216.630    .0208                                        .0196     4.24    7.02     1.90     6.90    .015      .00   .00  BOX
         |         |        |         |         |       |       |         |       |        |        |       |       |     |
-2218.980  2726.000    7.121  2733.121   2004.00   28.14   12.30  2745.42    8.00     8.00    10.00    8.000  10.000   .00  0   .0
        -|-       -|-       -|-       -|-       -|-      -|-      -|-       -|-      -|-      -|-      -|-      -|-     -|-     |-
  58.620    .0208                                        .0190     1.12    8.00     1.86     6.90    .015      .00   .00  BOX
 FILE: MAIN2024R.WSW                   W S P G W - CIVILDESIGN Version 14.08                            PAGE    2
                             Program Package Serial Number: 3074
                                         WATER SURFACE PROFILE LISTING                  Date: 6-25-2018  Time: 2:58:16
                         THE SEVENTY - THE 435 (PHASE 1), GCW JOB NO. 840-050
                           3RD RESPONSE TO CLV COMMENTS
                             MAIN2 FACILITY (CCRFCD 'APP2' MPU FACILITY)
************************************************************************************************************ ********
         | Invert  |  Depth  |  Water  |    Q    |  Vel     Vel   |  Energy  | Super |Critical|Flow Top|Height/|Base Wt|      |No Wth
 Station |  Elev   |  (FT)   |  Elev   |  (CFS)  | (FPS)    Head  | Grd.El.|  Elev | Depth  | Width  |Dia.-FT|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
*********|*********|********|*********|*********|*******|*******|*********|*******|********|********|*******|*******|*****|*******
         |         |        |         |         |       |       |         |       |        |        |       |       |     |
-2160.360  2727.220    7.164  2734.384   2004.00   27.97   12.15  2746.53    8.00     8.00    10.00    8.000  10.000   .00  0   .0
        -|-       -|-       -|-       -|-       -|-      -|-      -|-       -|-      -|-      -|-      -|-      -|-     -|-     |-
HYDRAULIC DROP
         |         |        |         |         |       |       |         |       |        |        |       |       |     |
-2160.360  2727.220   10.763  2737.983   2004.00   25.05    9.74  2747.73     .00     8.00    10.00    8.000  10.000   .00  0   .0
        -|-       -|-       -|-       -|-       -|-      -|-      -|-       -|-      -|-      -|-      -|-      -|-     -|-     |-
 313.260    .0208                                        .0220     6.91   10.76     1.56     6.90    .015      .00   .00  BOX
         |         |        |         |         |       |       |         |       |        |        |       |       |     |
-1847.100  2733.740   11.150  2744.890   2004.00   25.05    9.74  2754.63     .00     8.00    10.00    8.000  10.000   .00  0   .0
        -|-       -|-       -|-       -|-       -|-      -|-      -|-       -|-      -|-      -|-      -|-      -|-     -|-     |-
  82.890    .0099                                        .0220     1.83     .00     1.56     8.00    .015      .00   .00  BOX
         |         |        |         |         |       |       |         |       |        |        |       |       |     |
-1764.210  2734.560   13.495  2748.055   2004.00   25.05    9.74  2757.80     .00     8.00    10.00    8.000  10.000   .00  0   .0
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 296.030    .0201                                        .0220     6.53   13.50     1.56     7.00    .015      .00   .00  BOX
         |         |        |         |         |       |       |         |       |        |        |       |       |     |
-1468.180  2740.500   14.082  2754.582   2004.00   25.05    9.74  2764.33     .00     8.00    10.00    8.000  10.000   .00  0   .0
        -|-       -|-       -|-       -|-       -|-      -|-      -|-       -|-      -|-      -|-      -|-      -|-     -|-     |-
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                                   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      1    3     0     .000    8.000   10.000    .000   .000    .00
                                                 W S P G W                                                 PAGE NO   1
                            WATER SURFACE PROFILE - TITLE CARD LISTING
HEADING LINE NO 1 IS -
                              THE SEVENTY - THE 435 (PHASE 1), GCW JOB NO. 840-050
HEADING LINE NO 2 IS -
                              3RD RESPONSE TO CLV COMMENTS
HEADING LINE NO 3 IS -
                              MAIN2 FACILITY (CCRFCD 'APP2' MPU FACILITY)
                                                 W S P G W                                                 PAGE NO   2
                            WATER SURFACE PROFILE - ELEMENT CARD LISTING
 ELEMENT NO   1 IS A SYSTEM OUTLET     *         *     *
                     U/S DATA   STATION    INVERT  SECT                                   W S ELEV
                               -2775.610 2701.730    1                                     2715.667
 ELEMENT NO   2 IS A REACH             *         *     *
                     U/S DATA   STATION    INVERT  SECT             N                          RADIUS    ANGLE     ANG PT  MAN H
                               -2648.980 2712.970    1             .024                      112.000   64.780     .000     0
 ELEMENT NO   3 IS A REACH             *         *     *
                     U/S DATA   STATION    INVERT  SECT             N                          RADIUS    ANGLE     ANG PT  MAN H
                               -2556.680 2716.660    1             .015                         .000     .000     .000     0
 ELEMENT NO   4 IS A REACH             *         *     *
                     U/S DATA   STATION    INVERT  SECT             N                          RADIUS    ANGLE     ANG PT  MAN H
                               -2435.610 2721.500    1             .015                      111.999  -61.936     .000     0
 ELEMENT NO   5 IS A REACH             *         *     *
                     U/S DATA   STATION    INVERT  SECT             N                          RADIUS    ANGLE     ANG PT  MAN H
                               -2218.980 2726.000    1             .015                         .000     .000     .000     0
 ELEMENT NO   6 IS A REACH             *         *     *
                     U/S DATA   STATION    INVERT  SECT             N                          RADIUS    ANGLE     ANG PT  MAN H
                               -2160.360 2727.220    1             .015                      112.001   29.988     .000     0
 ELEMENT NO   7 IS A REACH             *         *     *
                     U/S DATA   STATION    INVERT  SECT             N                          RADIUS    ANGLE     ANG PT  MAN H
                               -1847.100 2733.740    1             .015                         .000     .000     .000     0
 ELEMENT NO   8 IS A REACH             *         *     *
                     U/S DATA   STATION    INVERT  SECT             N                          RADIUS    ANGLE     ANG PT  MAN H
                               -1764.210 2734.560    1             .015                      112.000  -42.404     .000     0
 ELEMENT NO   9 IS A REACH             *         *     *
                     U/S DATA   STATION    INVERT  SECT             N                          RADIUS    ANGLE     ANG PT  MAN H
                               -1468.180 2740.500    1             .015                         .000     .000     .000     0
 ELEMENT NO  10 IS A SYSTEM HEADWORKS                  *                       *
                     U/S DATA   STATION    INVERT  SECT                                   W S ELEV
                               -1468.180 2740.500    1                                        .000
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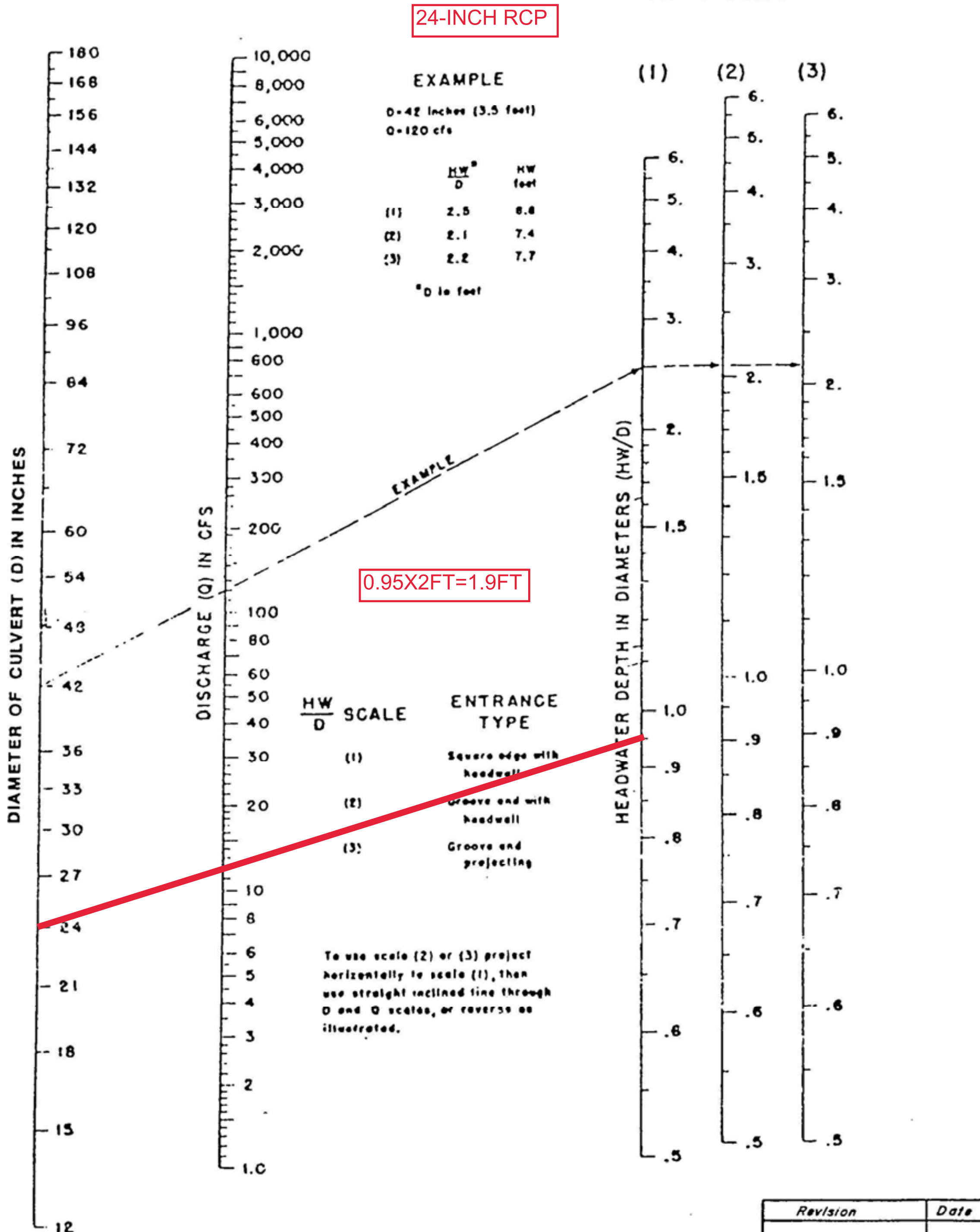
NOMOGRAPH – INLET CONTROL RCP



Revision	Date

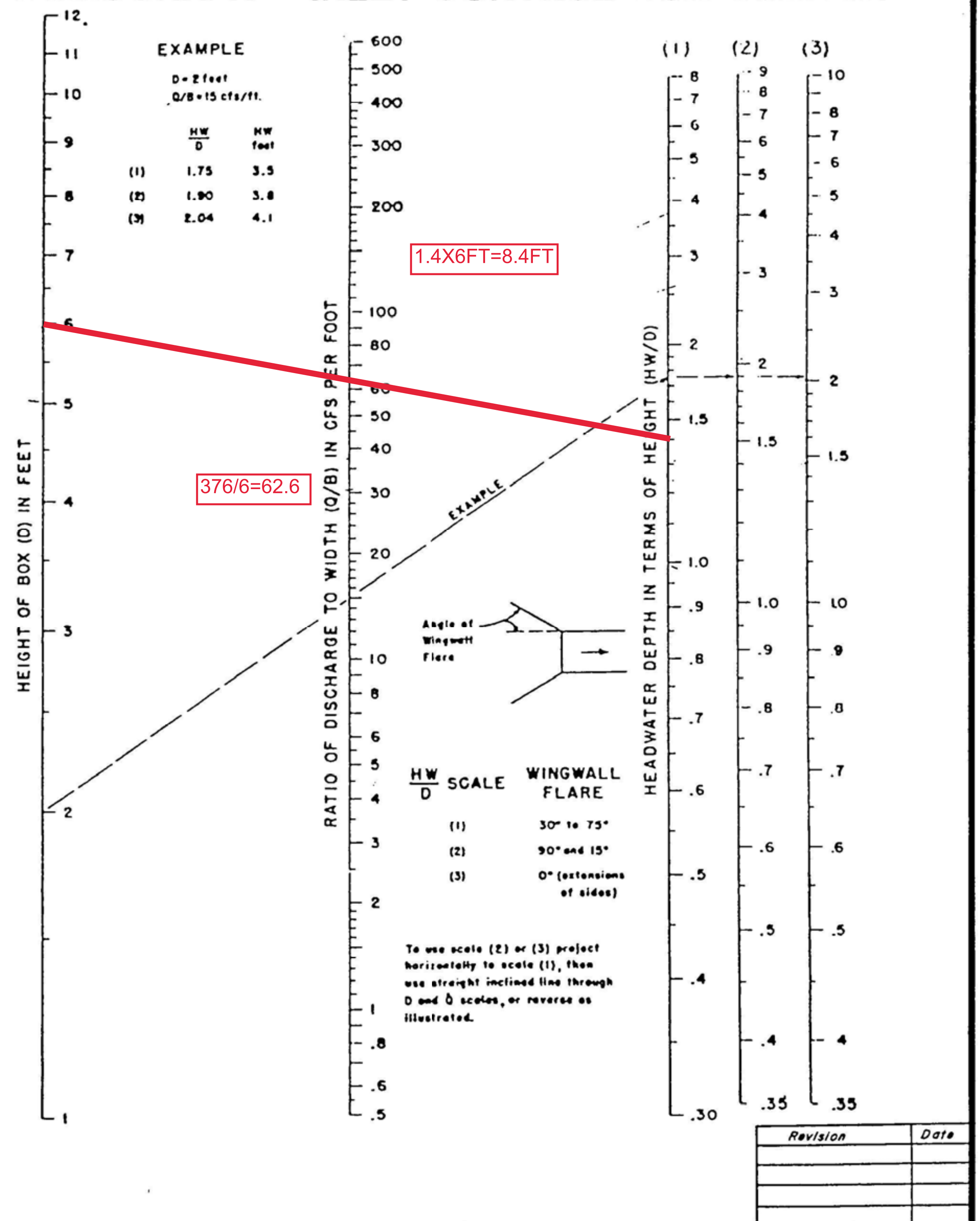
WRC ENGINEERING

REFERENCE:
USDOT, FHWA, HDS, No. 5, 1985

FIGURE 1005

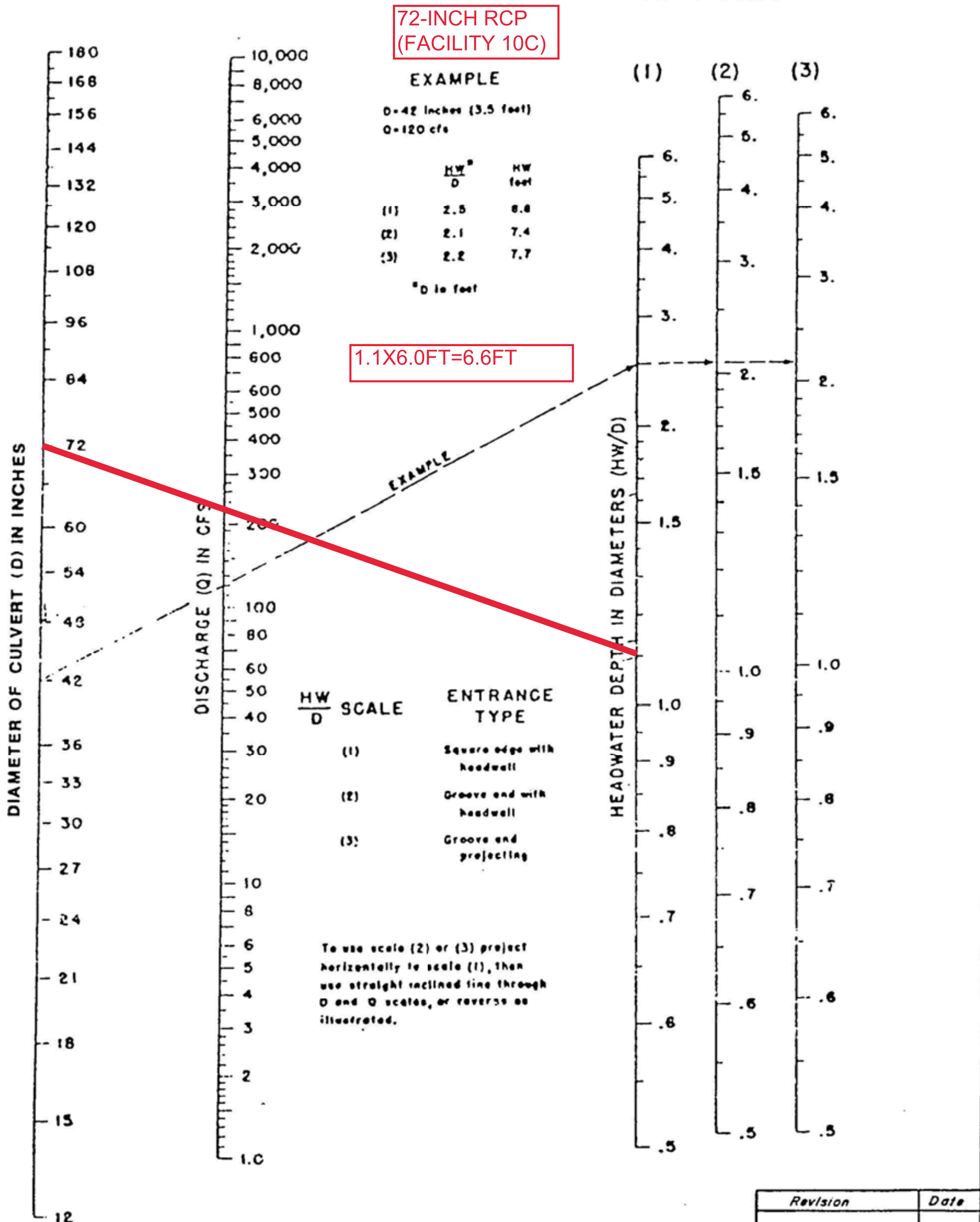
6'X6' RCB

NOMOGRAPH – INLET CONTROL BOX CULVERT



WRC ENGINEERING	REFERENCE: USDOT, FHWA, HDS No.5, 1985	FIGURE 1004

NOMOGRAPH – INLET CONTROL RCP



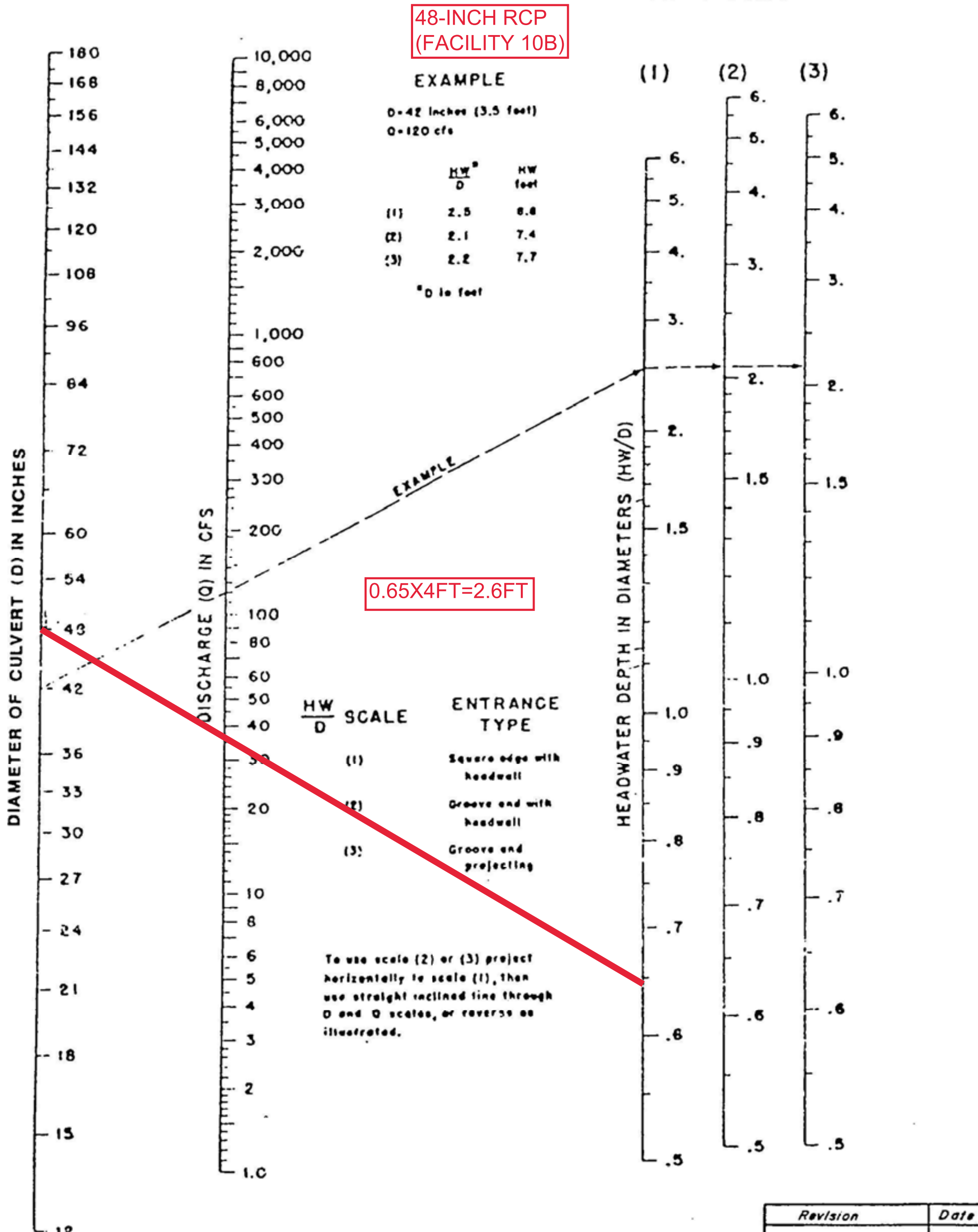
Revision	Date

WRC ENGINEERING

REFERENCE:
USDOT, FHWA, HDS, No. 5, 1985

FIGURE 1005

NOMOGRAPH – INLET CONTROL RCP



Revision	Date

WRC ENGINEERING	REFERENCE: USDOT, FHWA, HDS, No. 5, 1985	FIGURE 1005

Worksheet for 72-INCH RCP (FACILITY 5)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	17.09	%
Diameter	6.00	ft
Discharge	377.00	ft³/s

Results

Normal Depth	1.89	ft
Flow Area	7.64	ft²
Wetted Perimeter	7.15	ft
Hydraulic Radius	1.07	ft
Top Width	5.57	ft
Critical Depth	5.22	ft
Percent Full	31.5	%
Critical Slope	0.00723	ft/ft
Velocity	49.37	ft/s
Velocity Head	37.87	ft
Specific Energy	39.76	ft
Froude Number	7.44	
Maximum Discharge	1883.23	ft³/s
Discharge Full	1750.69	ft³/s
Slope Full	0.00793	ft/ft
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		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	31.51	%
Downstream Velocity	Infinity	ft/s

Worksheet for 72-INCH RCP (FACILITY 5)

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	1.89	ft
Critical Depth	5.22	ft
Channel Slope	17.09	%
Critical Slope	0.00723	ft/ft

Cross Section for 72-INCH RCP (FACILITY 5)

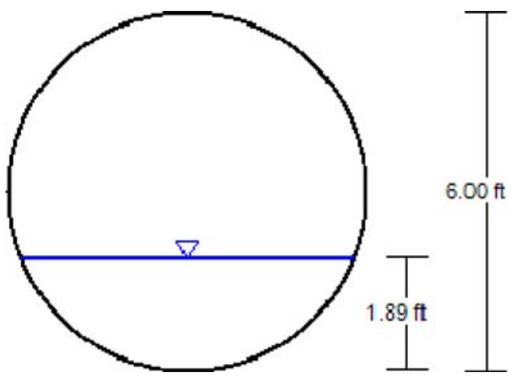
Project Description

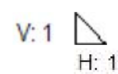
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	17.09	%
Normal Depth	1.89	ft
Diameter	6.00	ft
Discharge	377.00	ft³/s

Cross Section Image





Worksheet for 72-INCH RCP (FACILITY 6)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	11.65	%
Diameter	6.00	ft
Discharge	205.00	ft³/s

Results

Normal Depth	1.53	ft
Flow Area	5.67	ft²
Wetted Perimeter	6.34	ft
Hydraulic Radius	0.89	ft
Top Width	5.23	ft
Critical Depth	3.92	ft
Percent Full	25.4	%
Critical Slope	0.00405	ft/ft
Velocity	36.18	ft/s
Velocity Head	20.34	ft
Specific Energy	21.87	ft
Froude Number	6.13	
Maximum Discharge	1554.87	ft³/s
Discharge Full	1445.44	ft³/s
Slope Full	0.00234	ft/ft
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		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	25.44	%
Downstream Velocity	Infinity	ft/s

Worksheet for 72-INCH RCP (FACILITY 6)

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	1.53	ft
Critical Depth	3.92	ft
Channel Slope	11.65	%
Critical Slope	0.00405	ft/ft

Cross Section for 72-INCH RCP (FACILITY 6)

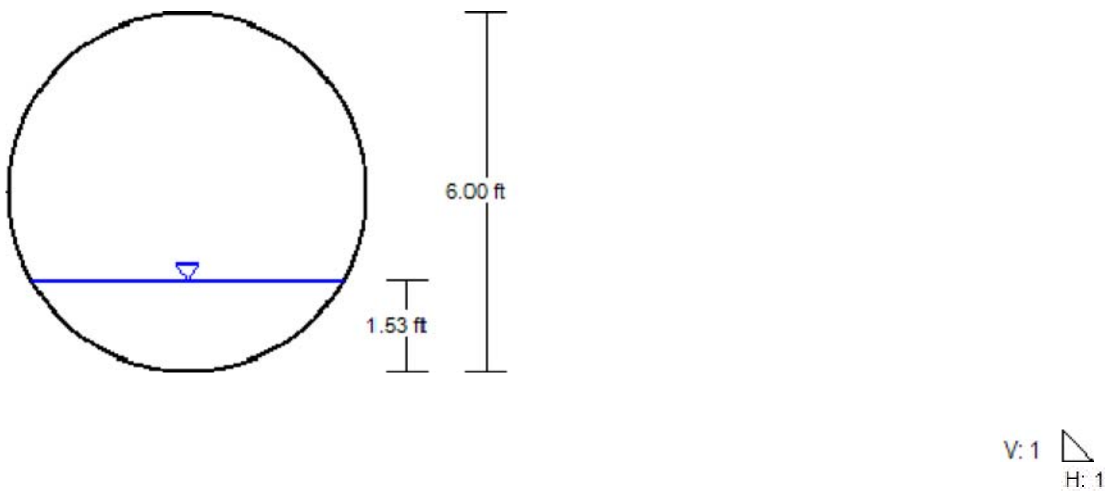
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	11.65	%
Normal Depth	1.53	ft
Diameter	6.00	ft
Discharge	205.00	ft^3/s

Cross Section Image



Worksheet for 24-INCH RCP (FACILITY 7A)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	11.54	%
Diameter	2.00	ft
Discharge	12.00	ft³/s

Results

Normal Depth	0.53	ft
Flow Area	0.67	ft²
Wetted Perimeter	2.17	ft
Hydraulic Radius	0.31	ft
Top Width	1.77	ft
Critical Depth	1.24	ft
Percent Full	26.7	%
Critical Slope	0.00558	ft/ft
Velocity	17.80	ft/s
Velocity Head	4.92	ft
Specific Energy	5.46	ft
Froude Number	5.08	
Maximum Discharge	82.66	ft³/s
Discharge Full	76.85	ft³/s
Slope Full	0.00281	ft/ft
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		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	26.71	%
Downstream Velocity	Infinity	ft/s

Worksheet for 24-INCH RCP (FACILITY 7A)

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	0.53	ft
Critical Depth	1.24	ft
Channel Slope	11.54	%
Critical Slope	0.00558	ft/ft

Cross Section for 24-INCH RCP (FACILITY 7A)

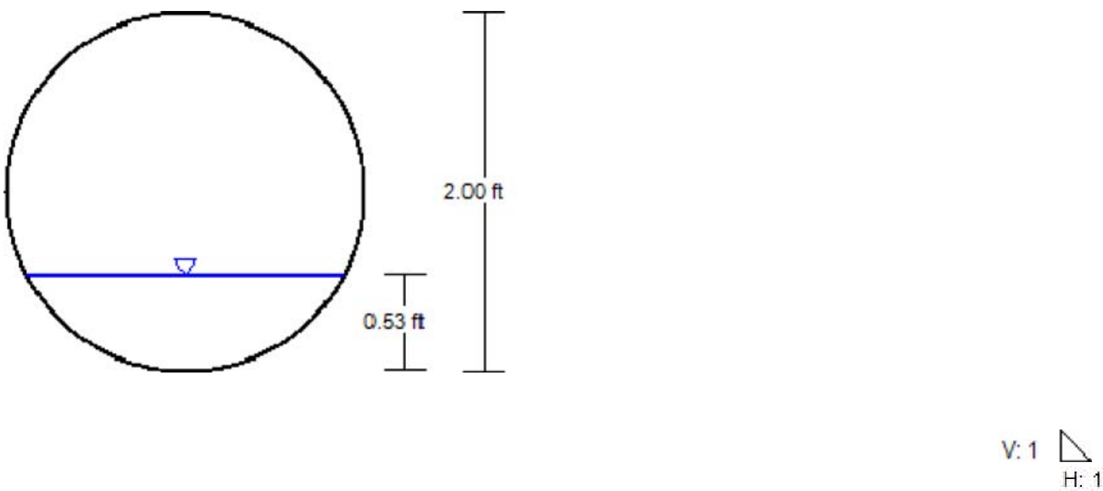
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	11.54	%
Normal Depth	0.53	ft
Diameter	2.00	ft
Discharge	12.00	ft³/s

Cross Section Image



Worksheet for 6'X6' RCB

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	20.81	%
Height	6.00	ft
Bottom Width	6.00	ft
Discharge	376.00	ft³/s

Results

Normal Depth	1.29	ft
Flow Area	7.73	ft²
Wetted Perimeter	8.58	ft
Hydraulic Radius	0.90	ft
Top Width	6.00	ft
Critical Depth	4.96	ft
Percent Full	21.5	%
Critical Slope	0.00530	ft/ft
Velocity	48.65	ft/s
Velocity Head	36.78	ft
Specific Energy	38.07	ft
Froude Number	7.56	
Discharge Full	2459.71	ft³/s
Slope Full	8.90563	ft/ft
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		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	21.47	%
Downstream Velocity	Infinity	ft/s

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	1.29	ft
Critical Depth	4.96	ft
Channel Slope	20.81	%
Critical Slope	0.00530	ft/ft

Cross Section for 6'X6' RCB

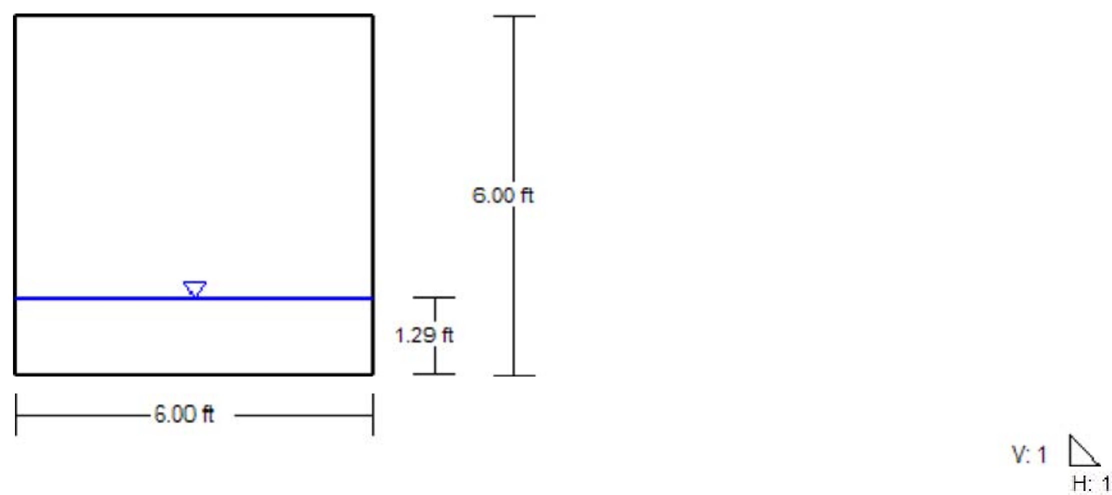
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	20.81	%
Normal Depth	1.29	ft
Height	6.00	ft
Bottom Width	6.00	ft
Discharge	376.00	ft^3/s

Cross Section Image



Worksheet for 48-INCH RCP (FACILITY 8A)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	12.79	%
Diameter	4.00	ft
Discharge	34.00	ft³/s

Results

Normal Depth	0.70	ft
Flow Area	1.47	ft²
Wetted Perimeter	3.45	ft
Hydraulic Radius	0.43	ft
Top Width	3.03	ft
Critical Depth	1.73	ft
Percent Full	17.4	%
Critical Slope	0.00369	ft/ft
Velocity	23.16	ft/s
Velocity Head	8.34	ft
Specific Energy	9.03	ft
Froude Number	5.87	
Maximum Discharge	552.57	ft³/s
Discharge Full	513.69	ft³/s
Slope Full	0.00056	ft/ft
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		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	17.43	%
Downstream Velocity	Infinity	ft/s

Worksheet for 48-INCH RCP (FACILITY 8A)

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	0.70	ft
Critical Depth	1.73	ft
Channel Slope	12.79	%
Critical Slope	0.00369	ft/ft

Cross Section for 48-INCH RCP (FACILITY 8A)

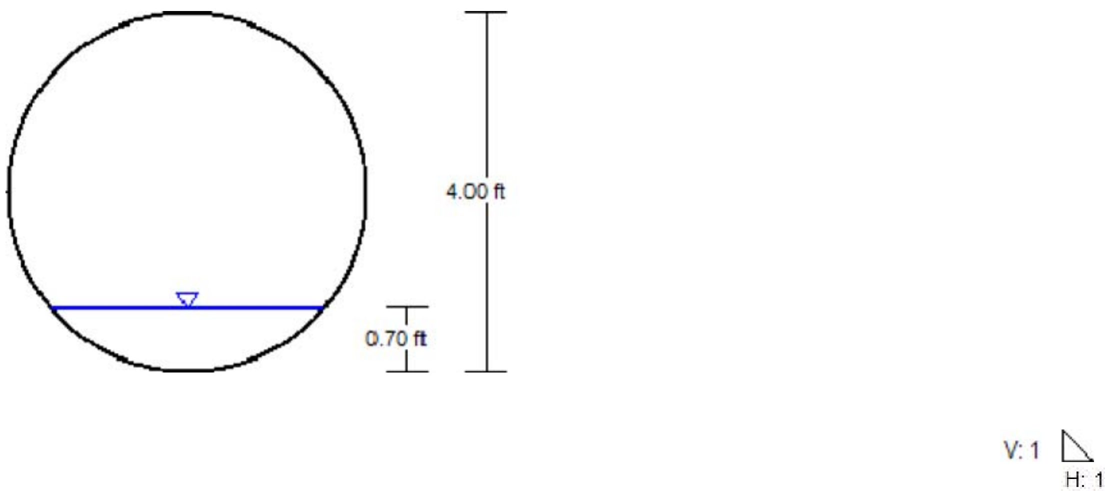
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	12.79	%
Normal Depth	0.70	ft
Diameter	4.00	ft
Discharge	34.00	ft³/s

Cross Section Image



Worksheet for 72-INCH RCP (FACILITY 10C)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	3.30	%
Diameter	6.00	ft
Discharge	236.00	ft³/s

Results

Normal Depth	2.28	ft
Flow Area	9.86	ft²
Wetted Perimeter	7.97	ft
Hydraulic Radius	1.24	ft
Top Width	5.82	ft
Critical Depth	4.21	ft
Percent Full	38.0	%
Critical Slope	0.00441	ft/ft
Velocity	23.93	ft/s
Velocity Head	8.90	ft
Specific Energy	11.18	ft
Froude Number	3.24	
Maximum Discharge	827.54	ft³/s
Discharge Full	769.30	ft³/s
Slope Full	0.00311	ft/ft
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		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	38.01	%
Downstream Velocity	Infinity	ft/s

Worksheet for 72-INCH RCP (FACILITY 10C)

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	2.28	ft
Critical Depth	4.21	ft
Channel Slope	3.30	%
Critical Slope	0.00441	ft/ft

Cross Section for 72-INCH RCP (FACILITY 10C)

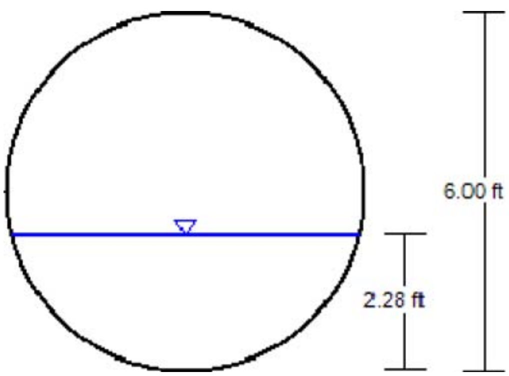
Project Description

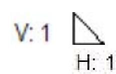
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	3.30	%
Normal Depth	2.28	ft
Diameter	6.00	ft
Discharge	236.00	ft^3/s

Cross Section Image





Worksheet for 48-INCH RCP (FACILITY 10B)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	8.19	%
Diameter	4.00	ft
Discharge	36.00	ft³/s

Results

Normal Depth	0.80	ft
Flow Area	1.79	ft²
Wetted Perimeter	3.71	ft
Hydraulic Radius	0.48	ft
Top Width	3.20	ft
Critical Depth	1.79	ft
Percent Full	20.0	%
Critical Slope	0.00372	ft/ft
Velocity	20.12	ft/s
Velocity Head	6.29	ft
Specific Energy	7.09	ft
Froude Number	4.74	
Maximum Discharge	442.18	ft³/s
Discharge Full	411.06	ft³/s
Slope Full	0.00063	ft/ft
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		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	20.00	%
Downstream Velocity	Infinity	ft/s

Worksheet for 48-INCH RCP (FACILITY 10B)

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	0.80	ft
Critical Depth	1.79	ft
Channel Slope	8.19	%
Critical Slope	0.00372	ft/ft

Cross Section for 48-INCH RCP (FACILITY 10B)

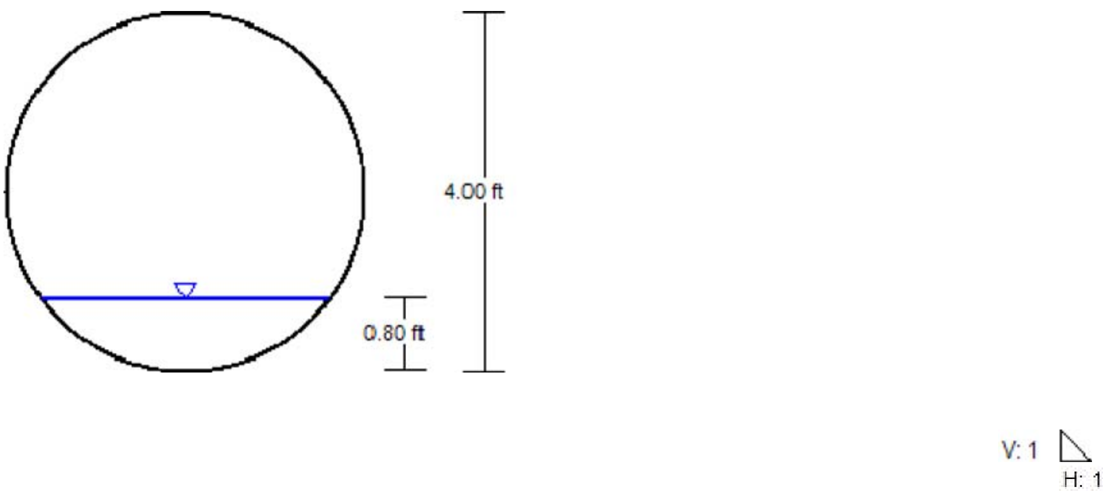
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	8.19	%
Normal Depth	0.80	ft
Diameter	4.00	ft
Discharge	36.00	ft³/s

Cross Section Image



Worksheet for 18-INCH RCP

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	13.51	%
Diameter	2.00	ft
Discharge	2.00	ft³/s

Results

Normal Depth	0.21	ft
Flow Area	0.18	ft²
Wetted Perimeter	1.33	ft
Hydraulic Radius	0.14	ft
Top Width	1.24	ft
Critical Depth	0.49	ft
Percent Full	10.7	%
Critical Slope	0.00448	ft/ft
Velocity	11.07	ft/s
Velocity Head	1.91	ft
Specific Energy	2.12	ft
Froude Number	5.11	
Maximum Discharge	89.44	ft³/s
Discharge Full	83.15	ft³/s
Slope Full	0.00008	ft/ft
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		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	10.70	%
Downstream Velocity	Infinity	ft/s

Worksheet for 18-INCH RCP

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	0.21	ft
Critical Depth	0.49	ft
Channel Slope	13.51	%
Critical Slope	0.00448	ft/ft

Cross Section for 18-INCH RCP

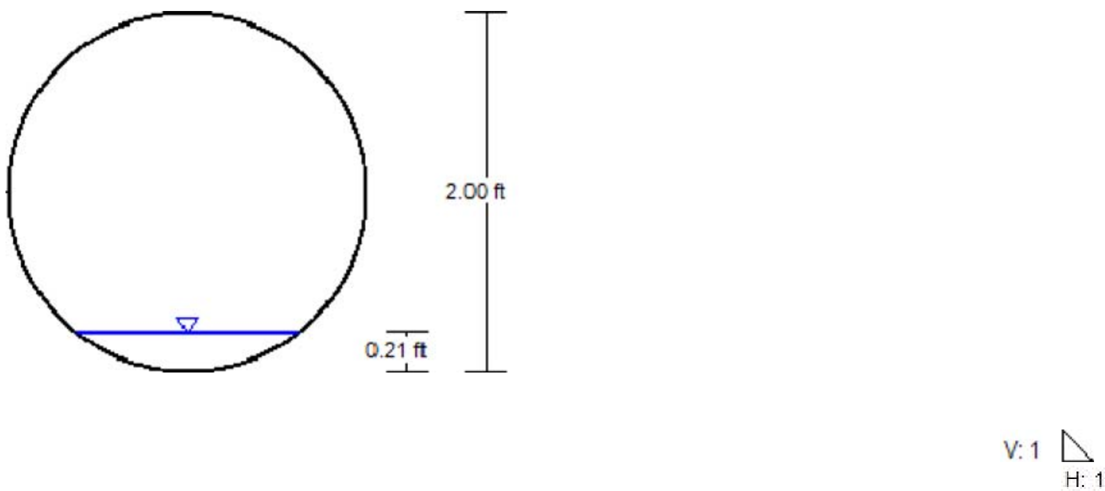
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

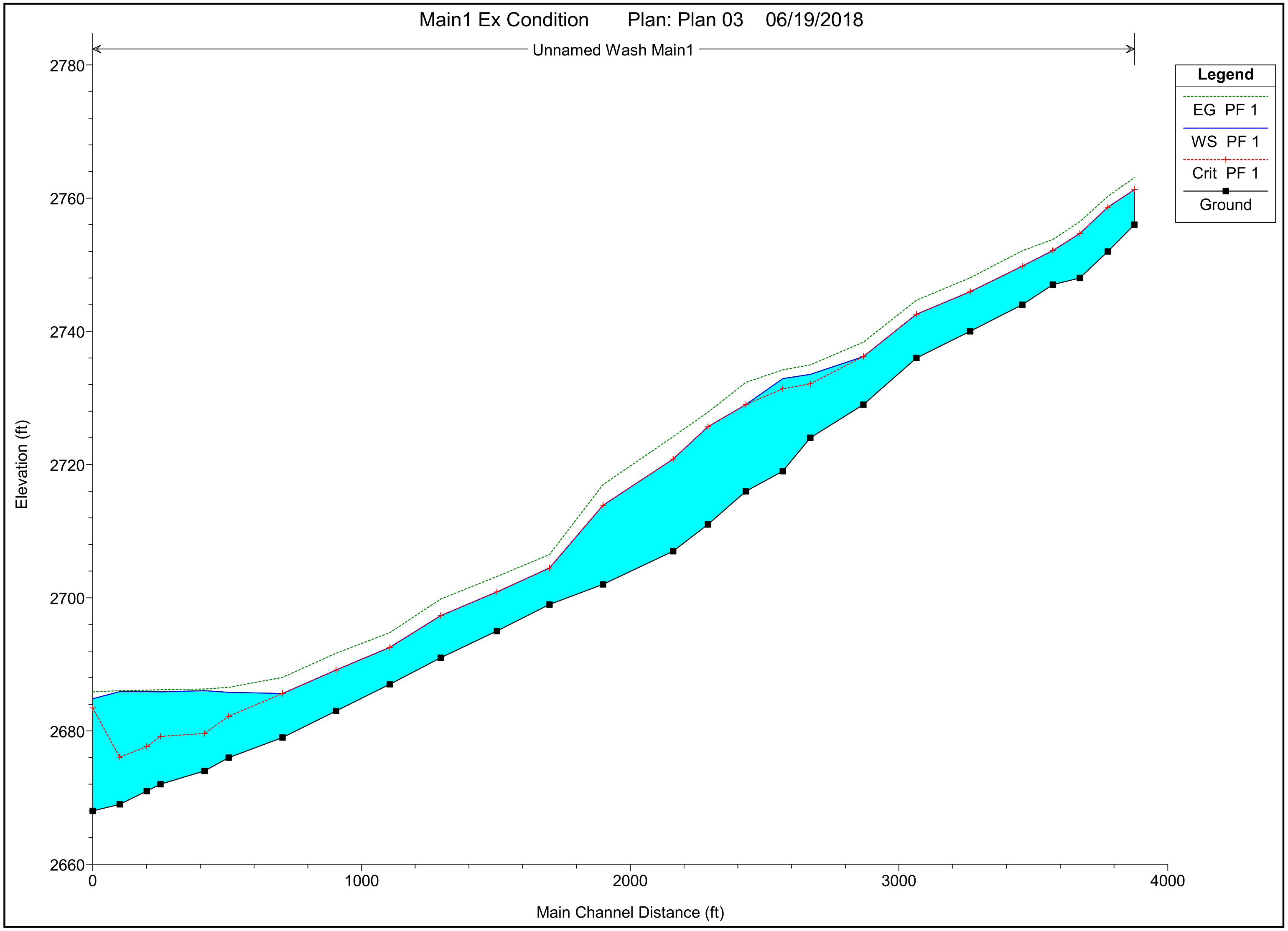
Roughness Coefficient	0.013	
Channel Slope	13.51	%
Normal Depth	0.21	ft
Diameter	2.00	ft
Discharge	2.00	ft³/s

Cross Section Image



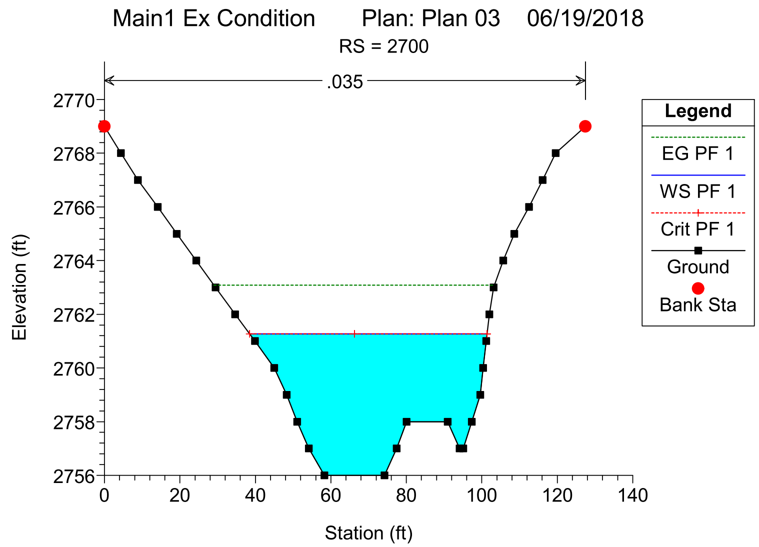
HEC-RAS Plan: Plan 03 River: Unnamed Wash Reach: Main1 Profile: PF 1

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Main1	2700	PF 1	2450.00	2756.00	2761.27	2761.27	2763.09	0.012477	10.82	226.36	62.92	1.01
Main1	2600	PF 1	2450.00	2752.00	2758.62	2758.62	2760.27	0.013351	10.31	237.64	72.53	1.00
Main1	2500	PF 1	2450.00	2748.00	2754.71	2754.71	2756.45	0.013086	10.60	231.12	67.98	1.01
Main1	2400	PF 1	2450.00	2747.00	2752.13	2752.13	2753.79	0.012416	10.35	236.63	71.11	1.00
Main1	2300	PF 1	2450.00	2744.00	2749.80	2749.80	2752.10	0.011946	12.15	201.63	44.68	1.01
Main1	2200	PF 1	2450.00	2740.00	2745.96	2745.96	2748.05	0.011983	11.60	211.22	51.01	1.00
Main1	2100	PF 1	2450.00	2736.00	2742.56	2742.56	2744.65	0.011963	11.61	211.10	50.49	1.00
Main1	2000	PF 1	2450.00	2729.00	2736.21	2736.21	2738.37	0.012530	11.81	207.49	48.41	1.01
Main1	1900	PF 1	2450.00	2724.00	2733.55	2732.13	2734.97	0.006206	9.58	255.84	44.35	0.70
Main1	1800	PF 1	2450.00	2719.00	2732.90	2731.38	2734.20	0.008452	9.16	267.48	58.50	0.76
Main1	1700	PF 1	2450.00	2716.00	2728.98	2728.98	2732.34	0.018525	14.71	166.57	24.98	1.00
Main1	1600	PF 1	2450.00	2711.00	2725.67	2725.67	2727.86	0.017884	11.87	206.39	47.95	1.01
Main1	1500	PF 1	2489.00	2707.00	2720.81	2720.81	2724.20	0.018477	14.77	168.48	25.05	1.00
Main1	1400	PF 1	2489.00	2702.00	2713.88	2713.88	2716.96	0.016221	14.09	176.69	28.90	1.00
Main1	1300	PF 1	2489.00	2699.00	2704.47	2704.47	2706.49	0.011922	11.40	218.43	54.21	1.00
Main1	1200	PF 1	2489.00	2695.00	2700.89	2700.89	2703.19	0.012029	12.16	204.67	44.53	1.00
Main1	1100	PF 1	2489.00	2691.00	2697.33	2697.33	2699.79	0.012207	12.59	197.73	40.63	1.01
Main1	1000	PF 1	2489.00	2687.00	2692.56	2692.56	2694.75	0.012148	11.86	209.87	48.09	1.00
Main1	900	PF 1	2489.00	2683.00	2689.16	2689.16	2691.66	0.012067	12.70	196.06	39.51	1.00
Main1	800	PF 1	2489.00	2679.00	2685.65	2685.65	2688.04	0.011842	12.42	200.44	41.87	1.00
Main1	700	PF 1	2489.00	2676.00	2685.81	2682.23	2686.54	0.002171	6.83	364.34	50.31	0.45
Main1	600	PF 1	2489.00	2674.00	2686.07	2679.62	2686.31	0.000531	3.92	634.70	133.80	0.23
Main1	500	PF 1	4497.00	2672.00	2685.87	2679.19	2686.19	0.000744	4.54	990.97	145.62	0.31
Main1	400	PF 1	4497.00	2671.00	2685.91	2677.65	2686.13	0.000570	3.71	1210.76	213.92	0.28
Main1	300	PF 1	4497.00	2669.00	2685.91	2676.07	2686.07	0.000323	3.20	1407.24	183.10	0.20
Main1	200	PF 1	4497.00	2668.00	2684.83	2683.47	2685.89	0.005239	8.27	543.77	110.66	0.66

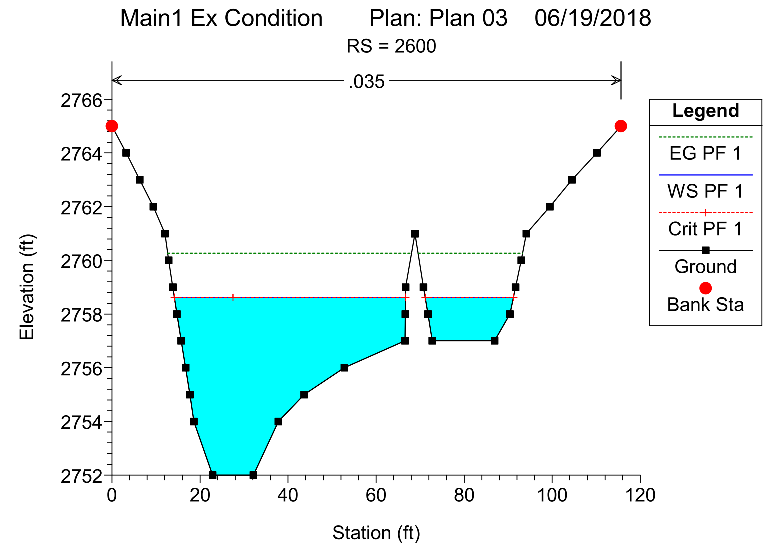


REPLY APP 1360

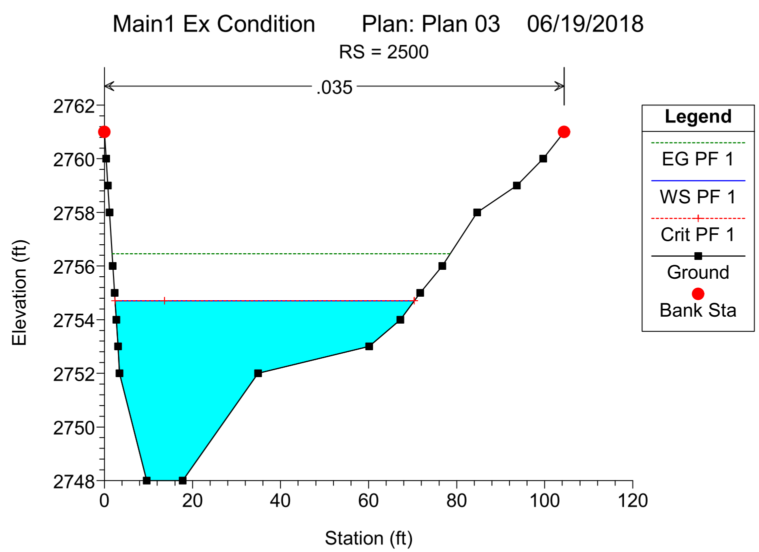
6415
CLV296028



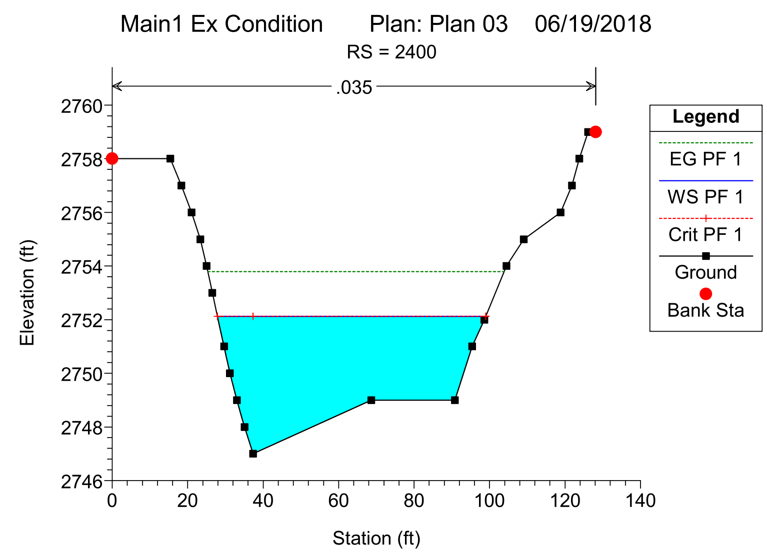
Main1 Ex Condition Plan: Plan 03 06/19/2018
RS = 2700
.035
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta



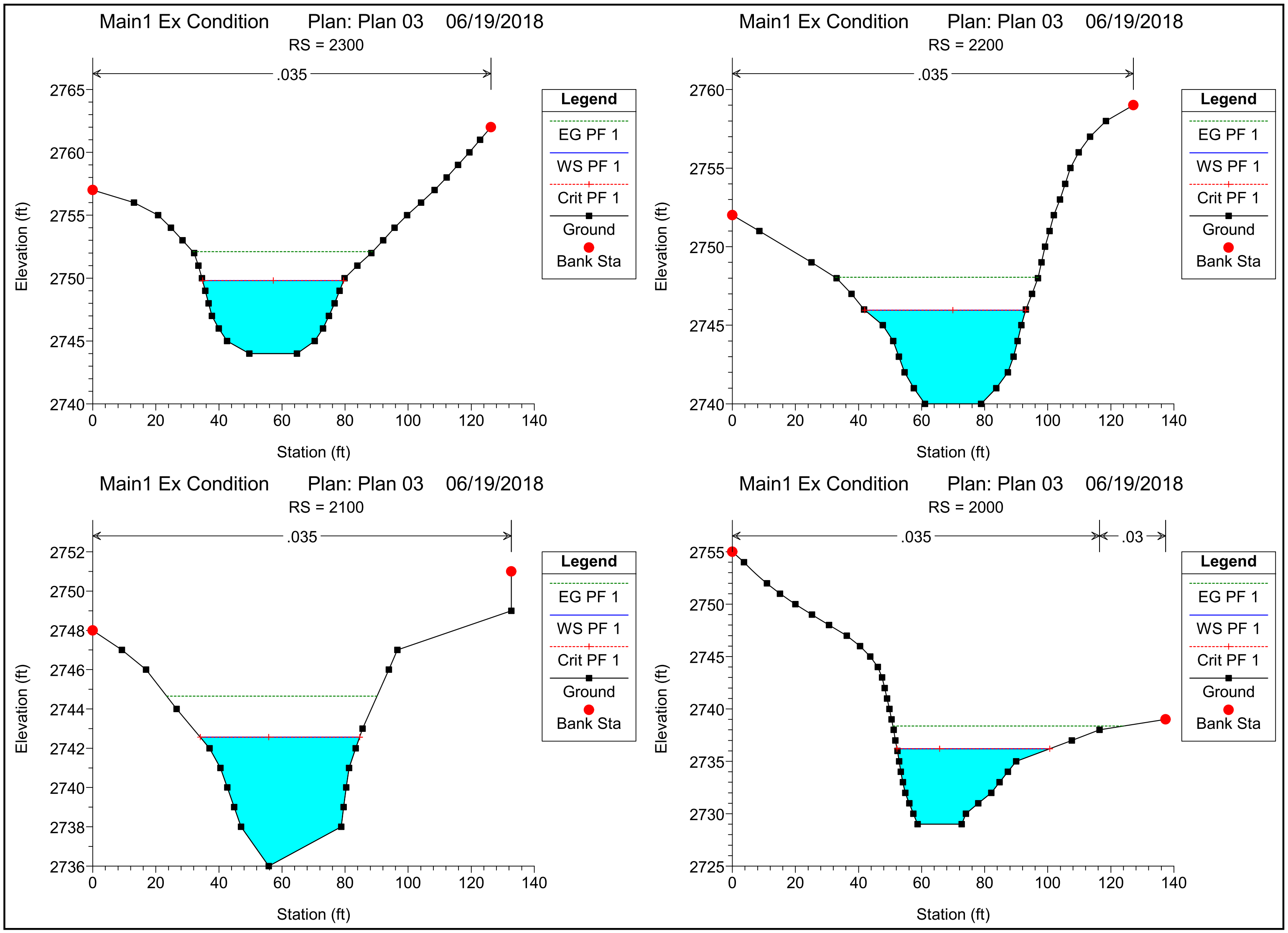
Main1 Ex Condition Plan: Plan 03 06/19/2018
RS = 2600
.035
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta



Main1 Ex Condition Plan: Plan 03 06/19/2018
RS = 2500
.035
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta

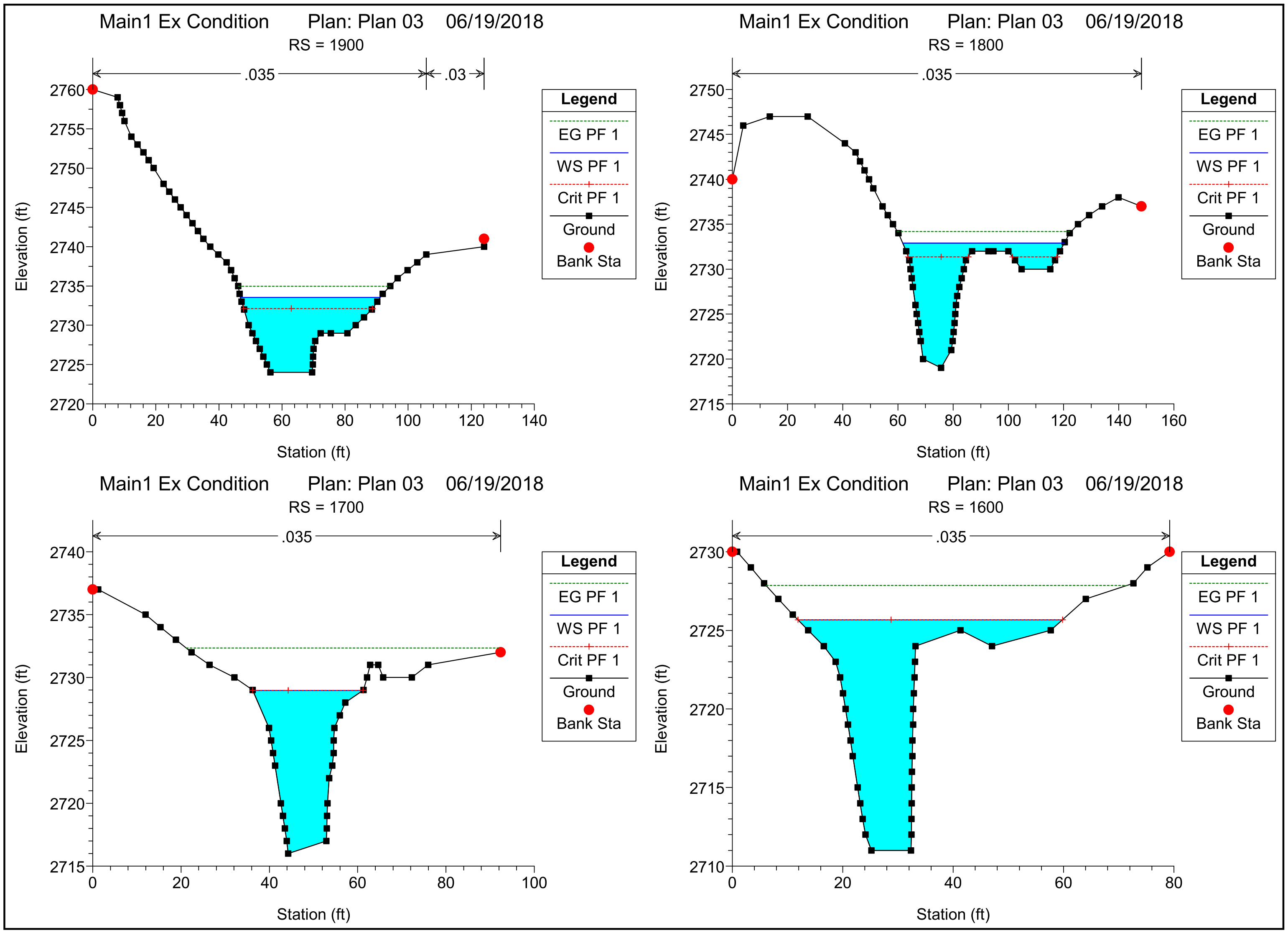


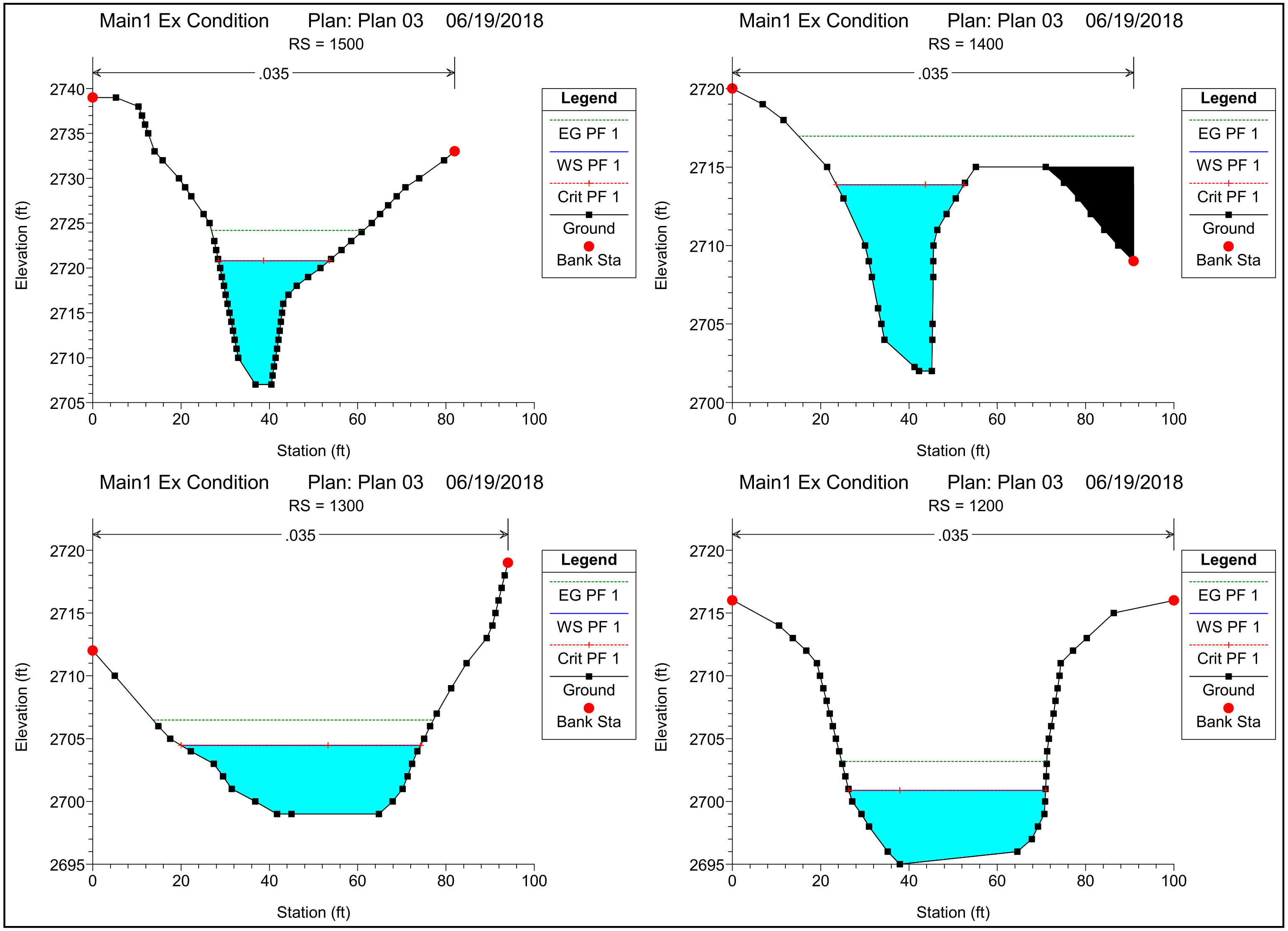
Main1 Ex Condition Plan: Plan 03 06/19/2018
RS = 2400
.035
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta

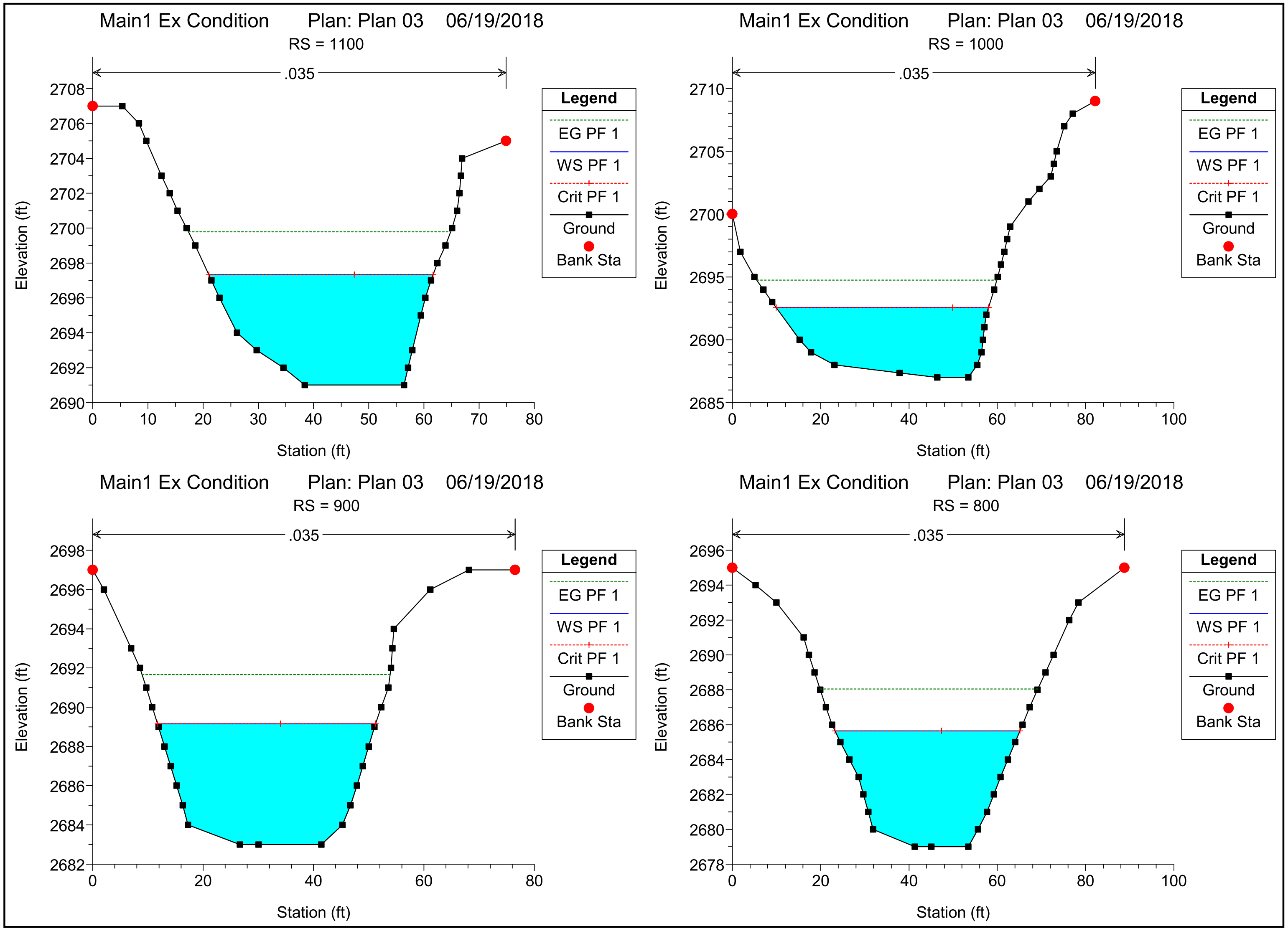


CLV296030
6417

REPLY APP 1362

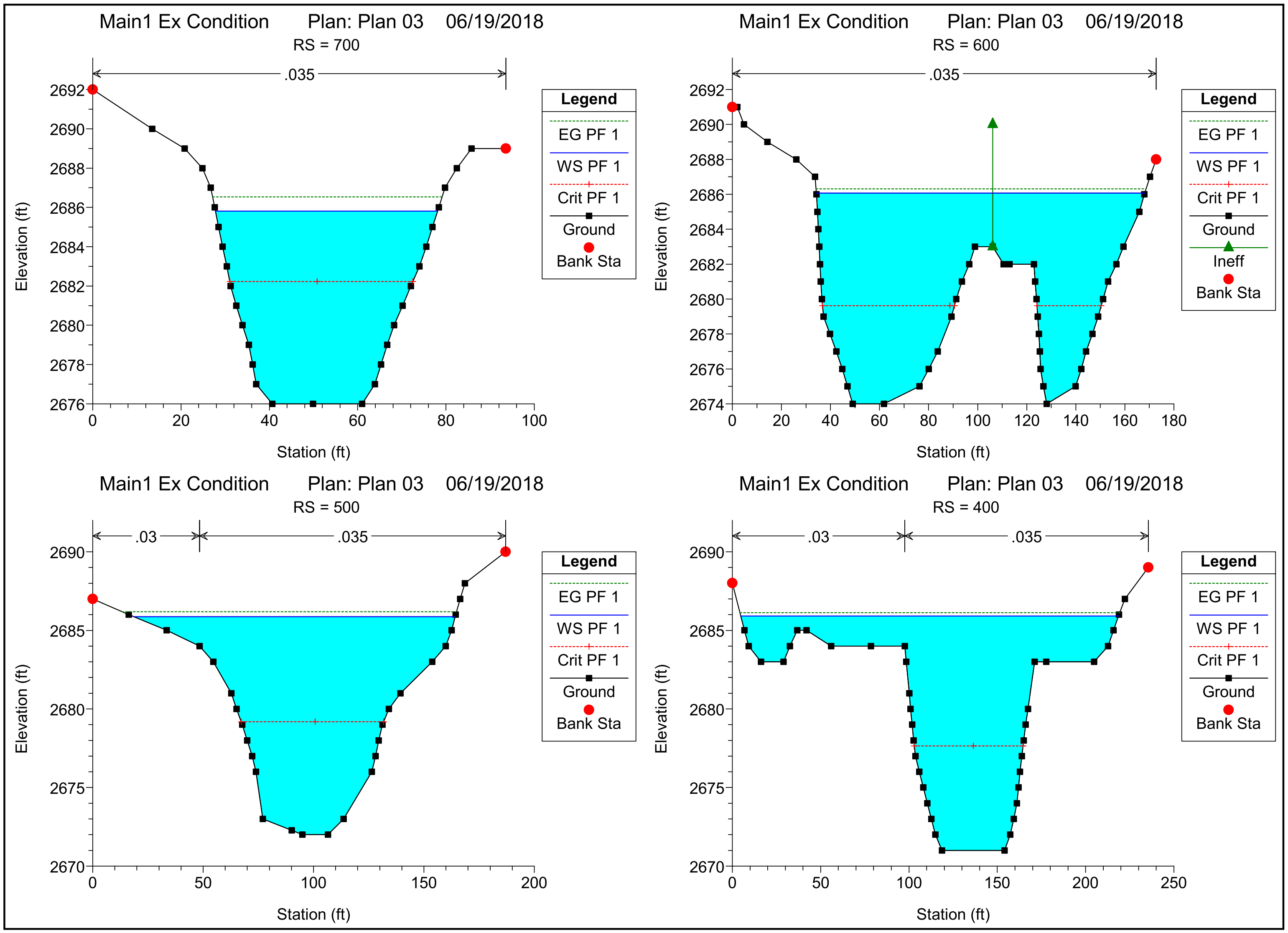

Main1 Ex Condition Plan: Plan 03 06/19/2018
RS = 1900
.035
.03
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Main1 Ex Condition Plan: Plan 03 06/19/2018
RS = 1800
.035
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Main1 Ex Condition Plan: Plan 03 06/19/2018
RS = 1700
.035
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Main1 Ex Condition Plan: Plan 03 06/19/2018
RS = 1600
.035
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta


Main1 Ex Condition Plan: Plan 03 06/19/2018
RS = 1500
.035
Elevation (ft)
2705
2710
2715
2720
2725
2730
2735
2740
Station (ft)
0
20
40
60
80
100
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Main1 Ex Condition Plan: Plan 03 06/19/2018
RS = 1400
.035
Elevation (ft)
2700
2705
2710
2715
2720
Station (ft)
0
20
40
60
80
100
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Main1 Ex Condition Plan: Plan 03 06/19/2018
RS = 1300
.035
Elevation (ft)
2695
2700
2705
2710
2715
2720
Station (ft)
0
20
40
60
80
100
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Main1 Ex Condition Plan: Plan 03 06/19/2018
RS = 1200
.035
Elevation (ft)
2695
2700
2705
2710
2715
2720
Station (ft)
0
20
40
60
80
100
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta



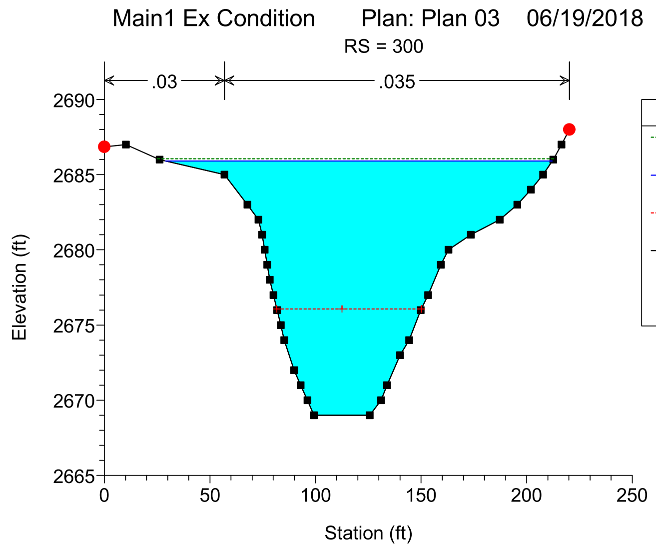
CLV296033
6420

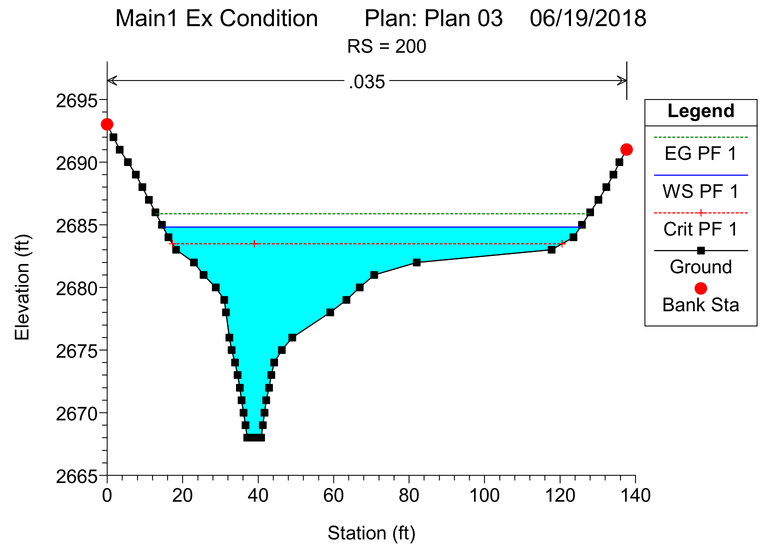
REPLY APP 1365



6421
CLV296034

REPLY APP 1366


Main1 Ex Condition Plan: Plan 03 06/19/2018
RS = 300
.03
.035
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta


Main1 Ex Condition Plan: Plan 03 06/19/2018
RS = 200
.035
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta

```
                     HEC-RAS HEC-RAS 5.0.3 September 2016
                       U.S. Army Corps of Engineers
                      Hydrologic Engineering Center
                            609 Second Street
                            Davis, California

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

PROJECT DATA
Project Title: Main1 Ex Condition
Project File : Main1ExCondition.prj
Run Date and Time: 06/19/2018 02:03:38 PM

Project in English units

PLAN DATA

Plan Title: Plan 03
Plan File : f:\Projects\800\840-050\Division\Fctl\Calcs\RTC3\Main1ExCondition.p03

Geometry Title: Main1
Geometry File : f:\Projects\800\840-050\Division\Fctl\Calcs\RTC3\Main1ExCondition.G01

Flow Title   : Main1REV
Flow File   : f:\Projects\800\840-050\Division\Fctl\Calcs\RTC3\Main1ExCondition.f01

Plan Summary Information:

Number of:	Cross Sections	= 26		Multiple Openings	=	0
	Culverts	= 0		Inline Structures	=	0
	Bridges	= 0		Lateral Structures	=	0

Computational Information
    Water surface calculation tolerance = 0.01
    Critical depth calculation tolerance = 0.01
    Maximum number of iterations   = 20
    Maximum difference tolerance   = 0.3
    Flow tolerance factor   = 0.001

Computation Options
    Critical depth computed at all cross sections
    Conveyance Calculation Method: At breaks in n values only
    Friction Slope Method: Average Conveyance
    Computational Flow Regime: Subcritical Flow

FLOW DATA

Flow Title: Main1REV
Flow File : f:\Projects\800\840-050\Division\Fctl\Calcs\RTC3\Main1ExCondition.f01

Flow Data (cfs)

River	Reach	RS	PF 1
Unnamed Wash	Main1	2700	2450
Unnamed Wash	Main1	1500	2489
Unnamed Wash	Main1	500	4497

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
Unnamed Wash	Main1	PF 1	Critical	Known WS = 2684.83

GEOMETRY DATA

Geometry Title: Main1
Geometry File : f:\Projects\800\840-050\Division\Fctl\Calcs\RTC3\Main1ExCondition.G01

CROSS SECTION

REPLY APP 1368 6423CLV296036

RIVER: Unnamed Wash
REACH: Main1 RS: 2700

INPUT
Description:
Station Elevation Data num= 32

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2769	4.32	2768	8.89	2767	14.12	2766	19.18	2765
24.32	2764	29.44	2763	34.62	2762	39.85	2761	45	2760
48.3	2759	51.08	2758	54.15	2757	58.29	2756	74.22	2756
77.45	2757	80.08	2758	90.95	2758	94.1	2757	95.07	2757
97.37	2758	99.58	2759	100.37	2760	101.18	2761	101.97	2762
103.09	2763	105.64	2764	108.63	2765	112.52	2766	116.09	2767
119.56	2768	127.49	2769						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	0	.035	127.49	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
0	127.49	95.75	98.69	107.97	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

		Element	Left OB	Channel	Right OB
E.G. Elev (ft)	2763.09	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.82	Wt. n-Val.		0.035	
W.S. Elev (ft)	2761.27	Reach Len. (ft)	95.75	98.69	107.97
Crit W.S. (ft)	2761.27	Flow Area (sq ft)		226.36	
E.G. Slope (ft/ft)	0.012477	Area (sq ft)		226.36	
Q Total (cfs)	2450.00	Flow (cfs)		2450.00	
Top Width (ft)	62.92	Top Width (ft)		62.92	
Vel Total (ft/s)	10.82	Avg. Vel. (ft/s)		10.82	
Max Chl Dpth (ft)	5.26	Hydr. Depth (ft)		3.60	
Conv. Total (cfs)	21934.0	Conv. (cfs)		21934.0	
Length Wtd. (ft)	98.69	Wetted Per. (ft)		65.65	
Min Ch El (ft)	2756.00	Shear (lb/sq ft)		2.69	
Alpha	1.00	Stream Power (lb/ft s)		29.07	
Frctn Loss (ft)	1.27	Cum Volume (acre-ft)		28.22	
C & E Loss (ft)	0.05	Cum SA (acres)		5.28	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: Unnamed Wash
REACH: Main1 RS: 2600

INPUT
Description:
Station Elevation Data num= 34

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2765	3.19	2764	6.31	2763	9.41	2762	12.03	2761
12.88	2760	13.83	2759	14.76	2758	15.74	2757	16.76	2756
17.69	2755	18.58	2754	22.83	2752	32.12	2752	37.82	2754
43.67	2755	52.8	2756	66.54	2757	66.62	2758	66.71	2759
68.82	2761	68.85	2761	70.78	2759	71.78	2758	72.75	2757
86.93	2757	90.38	2758	91.7	2759	92.96	2760	94.15	2761
99.48	2762	104.49	2763	110.14	2764	115.64	2765		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	0	.035	115.64	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
0	115.64	101.86	103.65	108.71	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

		Element	Left OB	Channel	Right OB
E.G. Elev (ft)	2760.27	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.65	Wt. n-Val.		0.035	
W.S. Elev (ft)	2758.62	Reach Len. (ft)	101.86	103.65	108.71
Crit W.S. (ft)	2758.62	Flow Area (sq ft)		237.64	
E.G. Slope (ft/ft)	0.013351	Area (sq ft)		237.64	
Q Total (cfs)	2450.00	Flow (cfs)		2450.00	
Top Width (ft)	72.53	Top Width (ft)		72.53	
Vel Total (ft/s)	10.31	Avg. Vel. (ft/s)		10.31	
Max Chl Dpth (ft)	6.62	Hydr. Depth (ft)		3.28	
Conv. Total (cfs)	21203.6	Conv. (cfs)		21203.6	
Length Wtd. (ft)	103.65	Wetted Per. (ft)		78.00	
Min Ch El (ft)	2752.00	Shear (lb/sq ft)		2.54	

```
  Alpha                      1.00    Stream Power (lb/ft s)            26.18
  Frctn Loss (ft)            1.37    Cum Volume (acre-ft)              27.69
  C & E Loss (ft)            0.01    Cum SA (acres)                     5.13
```

```
Warning: The energy equation could not be balanced within the specified number of iterations.  The program used critical
         depth for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
         the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
         water surface came back below critical depth.  This indicates that there is not a valid subcritical answer.  The
         program defaulted to critical depth.

CROSS SECTION


RIVER: Unnamed Wash
REACH: Main1             RS: 2500

INPUT
Description:
Station Elevation Data    num=      20
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0    2761     .38    2760     .75    2759    1.17    2758    1.89    2756
     2.3    2755    2.68    2754    3.06    2753    3.44    2752    9.58    2748
   17.77    2748   34.89    2752    60.1    2753   67.24    2754   71.71    2755
   76.74    2756   84.67    2758   93.68    2759   99.64    2760  104.45    2761

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0    .035       0    .035  104.45    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0  104.45          108.74  100.43   96.31             .1       .3

CROSS SECTION OUTPUT  Profile #PF 1

  E.G. Elev (ft)          2756.45    Element                   Left OB    Channel   Right OB
  Vel Head (ft)              1.75    Wt. n-Val.                           0.035
  W.S. Elev (ft)          2754.71    Reach Len. (ft)          108.74     100.43      96.31
  Crit W.S. (ft)          2754.71    Flow Area (sq ft)                   231.12
  E.G. Slope (ft/ft)     0.013086    Area (sq ft)                        231.12
  Q Total (cfs)           2450.00    Flow (cfs)                         2450.00
  Top Width (ft)            67.98    Top Width (ft)                       67.98
  Vel Total (ft/s)          10.60    Avg. Vel. (ft/s)                     10.60
  Max Chl Dpth (ft)          6.71    Hydr. Depth (ft)                      3.40
  Conv. Total (cfs)       21417.3    Conv. (cfs)                        21417.3
  Length Wtd. (ft)         100.43    Wetted Per. (ft)                     71.67
  Min Ch El (ft)          2748.00    Shear (lb/sq ft)                      2.63
  Alpha                      1.00    Stream Power (lb/ft s)               27.93
  Frctn Loss (ft)            1.28    Cum Volume (acre-ft)                 27.13
  C & E Loss (ft)            0.02    Cum SA (acres)                        4.96


Warning: The energy equation could not be balanced within the specified number of iterations.  The program used critical
         depth for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
         the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
         water surface came back below critical depth.  This indicates that there is not a valid subcritical answer.  The
         program defaulted to critical depth.

CROSS SECTION


RIVER: Unnamed Wash
REACH: Main1             RS: 2400

INPUT
Description:
Station Elevation Data    num=      23
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0    2758   15.42    2758   18.34    2757   21.01    2756   23.33    2755
   24.99    2754   26.51    2753   29.64    2751    31.2    2750   33.06    2749
   35.06    2748   37.36    2747   68.67    2749   90.83    2749    95.4    2751
   98.61    2752  104.46    2754  109.02    2755  118.84    2756  121.79    2757
  123.77    2758   126.1    2759  128.13    2759

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0    .035       0    .035  128.13    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0  128.13          109.52  114.22  121.17             .1       .3

CROSS SECTION OUTPUT  Profile #PF 1

  E.G. Elev (ft)          2753.79    Element                   Left OB    Channel   Right OB
```

			Left OB	Channel	Right OB
Vel Head (ft)	1.67	Wt. n-Val.		0.035	
W.S. Elev (ft)	2752.13	Reach Len. (ft)	109.52	114.22	121.17
Crit W.S. (ft)	2752.13	Flow Area (sq ft)		236.63	
E.G. Slope (ft/ft)	0.012416	Area (sq ft)		236.63	
Q Total (cfs)	2450.00	Flow (cfs)		2450.00	
Top Width (ft)	71.11	Top Width (ft)		71.11	
Vel Total (ft/s)	10.35	Avg. Vel. (ft/s)		10.35	
Max Chl Dpth (ft)	5.13	Hydr. Depth (ft)		3.33	
Conv. Total (cfs)	21987.2	Conv. (cfs)		21987.2	
Length Wtd. (ft)	114.22	Wetted Per. (ft)		73.08	
Min Ch El (ft)	2747.00	Shear (lb/sq ft)		2.51	
Alpha	1.00	Stream Power (lb/ft s)		25.99	
Frctn Loss (ft)	1.39	Cum Volume (acre-ft)		26.59	
C & E Loss (ft)	0.06	Cum SA (acres)		4.80	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: Unnamed Wash
REACH: Main1 RS: 2300

INPUT
Description:
Station Elevation Data num= 33

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2757	13.08	2756	20.71	2755	24.77	2754	28.47	2753
32.13	2752	33.53	2751	34.62	2750	35.7	2749	36.76	2748
37.76	2747	39.95	2746	42.62	2745	49.66	2744	64.78	2744
70.38	2745	73.02	2746	74.87	2747	76.67	2748	78.26	2749
79.83	2750	83.9	2751	88.3	2752	92.1	2753	95.71	2754
99.67	2755	104.09	2756	108.38	2757	112.21	2758	115.85	2759
119.41	2760	122.82	2761	126.24	2762				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	0	.035	126.24	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
0	126.24	191.53	193.81	198.19	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

		Element	Left OB	Channel	Right OB
E.G. Elev (ft)	2752.10				
Vel Head (ft)	2.29	Wt. n-Val.		0.035	
W.S. Elev (ft)	2749.80	Reach Len. (ft)	191.53	193.81	198.19
Crit W.S. (ft)	2749.80	Flow Area (sq ft)		201.63	
E.G. Slope (ft/ft)	0.011946	Area (sq ft)		201.63	
Q Total (cfs)	2450.00	Flow (cfs)		2450.00	
Top Width (ft)	44.68	Top Width (ft)		44.68	
Vel Total (ft/s)	12.15	Avg. Vel. (ft/s)		12.15	
Max Chl Dpth (ft)	5.80	Hydr. Depth (ft)		4.51	
Conv. Total (cfs)	22416.0	Conv. (cfs)		22416.0	
Length Wtd. (ft)	193.81	Wetted Per. (ft)		47.58	
Min Ch El (ft)	2744.00	Shear (lb/sq ft)		3.16	
Alpha	1.00	Stream Power (lb/ft s)		38.40	
Frctn Loss (ft)	2.32	Cum Volume (acre-ft)		26.02	
C & E Loss (ft)	0.06	Cum SA (acres)		4.65	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: Unnamed Wash
REACH: Main1 RS: 2200

INPUT
Description:
Station Elevation Data num= 32

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2752	8.53	2751	25.12	2749	33.08	2748	37.76	2747

41.77	2746	47.66	2745	50.99	2744	52.82	2743	54.58	2742
57.55	2741	61.05	2740	78.87	2740	83.65	2741	87.38	2742
89.14	2743	90.4	2744	91.6	2745	93.05	2746	95	2747
96.89	2748	98.01	2749	99.17	2750	100.55	2751	101.91	2752
103.89	2753	105.52	2754	107.21	2755	109.78	2756	113.41	2757
118.47	2758	127.18	2759						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	0	.035	127.18	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
0	127.18	113.96	200.13	254.43	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2748.05	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.09	Wt. n-Val.		0.035	
W.S. Elev (ft)	2745.96	Reach Len. (ft)	113.96	200.13	254.43
Crit W.S. (ft)	2745.96	Flow Area (sq ft)		211.22	
E.G. Slope (ft/ft)	0.011983	Area (sq ft)		211.22	
Q Total (cfs)	2450.00	Flow (cfs)		2450.00	
Top Width (ft)	51.01	Top Width (ft)		51.01	
Vel Total (ft/s)	11.60	Avg. Vel. (ft/s)		11.60	
Max Chl Dpth (ft)	5.96	Hydr. Depth (ft)		4.14	
Conv. Total (cfs)	22381.2	Conv. (cfs)		22381.2	
Length Wtd. (ft)	200.13	Wetted Per. (ft)		53.57	
Min Ch El (ft)	2740.00	Shear (lb/sq ft)		2.95	
Alpha	1.00	Stream Power (lb/ft s)		34.21	
Frctn Loss (ft)	2.40	Cum Volume (acre-ft)		25.10	
C & E Loss (ft)	0.00	Cum SA (acres)		4.44	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: Unnamed Wash
REACH: Main1 RS: 2100

INPUT
Description:
Station Elevation Data num= 20

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2748	9.24	2747	16.89	2746	26.59	2744	37.05	2742
40.48	2741	42.68	2740	44.83	2739	47.03	2738	55.78	2736
78.8	2738	79.56	2739	80.33	2740	81.25	2741	83.37	2742
85.58	2743	93.92	2746	96.58	2747	132.68	2749	132.68	2751

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	0	.035	132.68	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
0	132.68	231.94	197.1	162.04	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2744.65	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.09	Wt. n-Val.		0.035	
W.S. Elev (ft)	2742.56	Reach Len. (ft)	231.94	197.10	162.04
Crit W.S. (ft)	2742.56	Flow Area (sq ft)		211.10	
E.G. Slope (ft/ft)	0.011963	Area (sq ft)		211.10	
Q Total (cfs)	2450.00	Flow (cfs)		2450.00	
Top Width (ft)	50.49	Top Width (ft)		50.49	
Vel Total (ft/s)	11.61	Avg. Vel. (ft/s)		11.61	
Max Chl Dpth (ft)	6.56	Hydr. Depth (ft)		4.18	
Conv. Total (cfs)	22399.5	Conv. (cfs)		22399.5	
Length Wtd. (ft)	197.10	Wetted Per. (ft)		53.43	
Min Ch El (ft)	2736.00	Shear (lb/sq ft)		2.95	
Alpha	1.00	Stream Power (lb/ft s)		34.25	
Frctn Loss (ft)	2.41	Cum Volume (acre-ft)		24.13	
C & E Loss (ft)	0.01	Cum SA (acres)		4.20	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: Unnamed Wash
REACH: Main1 RS: 2000

INPUT
Description:
Station Elevation Data num= 36

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2755	3.69	2754	10.93	2752	15.12	2751	19.95	2750
25.24	2749	30.66	2748	36.25	2747	40.5	2746	43.7	2745
46.08	2744	47.48	2743	48.3	2742	49.03	2741	49.79	2740
50.49	2739	51.12	2738	51.7	2737	52.34	2736	52.87	2735
53.42	2734	54.05	2733	54.84	2732	56.08	2731	57.36	2730
58.7	2729	72.73	2729	74.05	2730	77.94	2731	82.11	2732
84.74	2733	87.34	2734	89.95	2735	107.65	2737	116.39	2738
137.36	2739								

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.035	116.39	.03

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
0	137.36	231.62	197.66	162.89	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

		Element	Left OB	Channel	Right OB
E.G. Elev (ft)	2738.37	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.17	Wt. n-Val.		0.035	
W.S. Elev (ft)	2736.21	Reach Len. (ft)	231.62	197.66	162.89
Crit W.S. (ft)	2736.21	Flow Area (sq ft)		207.49	
E.G. Slope (ft/ft)	0.012530	Area (sq ft)		207.49	
Q Total (cfs)	2450.00	Flow (cfs)		2450.00	
Top Width (ft)	48.41	Top Width (ft)		48.41	
Vel Total (ft/s)	11.81	Avg. Vel. (ft/s)		11.81	
Max Chl Dpth (ft)	7.21	Hydr. Depth (ft)		4.29	
Conv. Total (cfs)	21886.8	Conv. (cfs)		21886.8	
Length Wtd. (ft)	197.66	Wetted Per. (ft)		52.98	
Min Ch El (ft)	2729.00	Shear (lb/sq ft)		3.06	
Alpha	1.00	Stream Power (lb/ft s)		36.17	
Frctn Loss (ft)	1.69	Cum Volume (acre-ft)		23.18	
C & E Loss (ft)	0.22	Cum SA (acres)		3.98	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: Unnamed Wash
REACH: Main1 RS: 1900

INPUT
Description:
Station Elevation Data num= 54

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2760	7.86	2759	8.62	2758	9.33	2757	10.1	2756
12.21	2754	14.17	2753	16.04	2752	17.72	2751	19.29	2750
22.45	2748	24.24	2747	26.07	2746	27.89	2745	29.73	2744
31.59	2743	33.35	2742	35.09	2741	37.27	2740	39.81	2739
42.41	2738	43.87	2737	44.98	2736	46.08	2735	46.55	2734
47.14	2733	47.96	2732	49.45	2730	50.64	2729	51.77	2728
52.93	2727	54.04	2726	55.19	2725	56.32	2724	69.55	2724
69.74	2725	69.88	2726	70.03	2727	70.55	2728	72.22	2729
75.51	2729	80.71	2729	83.34	2730	86.02	2731	88.45	2732
90.22	2733	91.95	2734	94.33	2735	96.69	2736	99.84	2737
102.86	2738	105.74	2739	124.05	2740	124.05	2741		

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.035	105.74	.03

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
0	124.05	122.47	101.94	85.19	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

		Element	Left OB	Channel	Right OB
E.G. Elev (ft)	2734.97	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.43	Wt. n-Val.		0.035	

W.S. Elev (ft)	2733.55	Reach Len. (ft)	122.47	101.94	85.19
Crit W.S. (ft)	2732.13	Flow Area (sq ft)		255.84	
E.G. Slope (ft/ft)	0.006206	Area (sq ft)		255.84	
Q Total (cfs)	2450.00	Flow (cfs)		2450.00	
Top Width (ft)	44.35	Top Width (ft)		44.35	
Vel Total (ft/s)	9.58	Avg. Vel. (ft/s)		9.58	
Max Chl Dpth (ft)	9.55	Hydr. Depth (ft)		5.77	
Conv. Total (cfs)	31100.6	Conv. (cfs)		31100.6	
Length Wtd. (ft)	101.94	Wetted Per. (ft)		52.80	
Min Ch El (ft)	2724.00	Shear (lb/sq ft)		1.88	
Alpha	1.00	Stream Power (lb/ft s)		17.98	
Frctn Loss (ft)	0.73	Cum Volume (acre-ft)		22.13	
C & E Loss (ft)	0.04	Cum SA (acres)		3.77	

CROSS SECTION

RIVER: Unnamed Wash
REACH: Main1 RS: 1800

INPUT
Description:
Station Elevation Data num= 53

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2740	3.91	2746	13.58	2747	27.29	2747	40.79	2744
44.66	2743	46.27	2742	47.87	2741	49.53	2740	51.08	2739
54.43	2737	56.3	2736	58.22	2735	60.13	2734	63.04	2732
64.1	2731	64.52	2730	64.99	2729	65.44	2728	66.35	2726
66.79	2725	67.28	2724	67.73	2723	68.2	2722	69.12	2720
75.66	2719	79.29	2721	79.87	2722	80.21	2723	80.48	2724
80.76	2725	81.02	2726	81.44	2727	82.21	2728	83.08	2729
83.9	2730	84.67	2731	86.85	2732	92.81	2732	94.63	2732
100.04	2732	102.44	2731	104.77	2730	115.2	2730	116.94	2731
118.67	2732	120.41	2733	122.2	2734	125.27	2735	129.23	2736
133.96	2737	139.92	2738	148.25	2737				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	0	.035	148.25	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
0	148.25	140.2	137.49	140.54	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

		Element	Left OB	Channel	Right OB
E.G. Elev (ft)	2734.20	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.30	Wt. n-Val.		0.035	
W.S. Elev (ft)	2732.90	Reach Len. (ft)	140.20	137.49	140.54
Crit W.S. (ft)	2731.38	Flow Area (sq ft)		267.48	
E.G. Slope (ft/ft)	0.008452	Area (sq ft)		267.48	
Q Total (cfs)	2450.00	Flow (cfs)		2450.00	
Top Width (ft)	58.50	Top Width (ft)		58.50	
Vel Total (ft/s)	9.16	Avg. Vel. (ft/s)		9.16	
Max Chl Dpth (ft)	13.90	Hydr. Depth (ft)		4.57	
Conv. Total (cfs)	26649.1	Conv. (cfs)		26649.1	
Length Wtd. (ft)	137.49	Wetted Per. (ft)		74.40	
Min Ch El (ft)	2719.00	Shear (lb/sq ft)		1.90	
Alpha	1.00	Stream Power (lb/ft s)		17.38	
Frctn Loss (ft)	1.66	Cum Volume (acre-ft)		21.52	
C & E Loss (ft)	0.21	Cum SA (acres)		3.65	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Unnamed Wash
REACH: Main1 RS: 1700

INPUT
Description:
Station Elevation Data num= 37

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2737	1.25	2737	11.94	2735	15.37	2734	18.84	2733
22.36	2732	26.44	2731	32.09	2730	36.2	2729	39.93	2726
40.4	2725	40.83	2724	41.29	2723	42.62	2720	43.08	2719
43.53	2718	43.95	2717	44.26	2716	52.91	2717	52.98	2718
53.05	2719	53.18	2720	53.54	2722	54.25	2723	54.56	2724
54.58	2725	54.7	2726	55.93	2727	57.21	2728	61.3	2729
62.1	2730	62.82	2731	64.63	2731	65.76	2730	72.27	2730
75.99	2731	92.39	2732						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	0	.035	92.39	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
0	92.39	145.9	141.68	135.05	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

		Element	Left OB	Channel	Right OB
E.G. Elev (ft)	2732.34	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.36	Wt. n-Val.		0.035	
W.S. Elev (ft)	2728.98	Reach Len. (ft)	145.90	141.68	135.05
Crit W.S. (ft)	2728.98	Flow Area (sq ft)		166.57	
E.G. Slope (ft/ft)	0.018525	Area (sq ft)		166.57	
Q Total (cfs)	2450.00	Flow (cfs)		2450.00	
Top Width (ft)	24.98	Top Width (ft)		24.98	
Vel Total (ft/s)	14.71	Avg. Vel. (ft/s)		14.71	
Max Chl Dpth (ft)	12.98	Hydr. Depth (ft)		6.67	
Conv. Total (cfs)	18000.5	Conv. (cfs)		18000.5	
Length Wtd. (ft)	141.68	Wetted Per. (ft)		41.01	
Min Ch El (ft)	2716.00	Shear (lb/sq ft)		4.70	
Alpha	1.00	Stream Power (lb/ft s)		69.08	
Frctn Loss (ft)	2.58	Cum Volume (acre-ft)		20.84	
C & E Loss (ft)	0.35	Cum SA (acres)		3.52	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: Unnamed Wash
REACH: Main1 RS: 1600

INPUT
Description:
Station Elevation Data num= 41

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2730	.84	2730	3.34	2729	5.76	2728	8.34	2727
10.96	2726	13.73	2725	16.56	2724	18.7	2723	19.54	2722
20.05	2721	20.5	2720	20.95	2719	21.4	2718	21.81	2717
22.7	2715	23.18	2714	23.61	2713	24.1	2712	25.18	2711
32.35	2711	32.43	2712	32.46	2713	32.51	2714	32.51	2715
32.55	2716	32.61	2717	32.63	2718	32.73	2719	32.76	2720
32.87	2721	33	2722	33.08	2723	33.17	2724	41.32	2725
47.05	2724	57.68	2725	64.05	2727	72.68	2728	75.19	2729
79.21	2730								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	0	.035	79.21	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
0	79.21	132.22	129.11	128.4	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

		Element	Left OB	Channel	Right OB
E.G. Elev (ft)	2727.86	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.19	Wt. n-Val.		0.035	
W.S. Elev (ft)	2725.67	Reach Len. (ft)	132.22	129.11	128.40
Crit W.S. (ft)	2725.67	Flow Area (sq ft)		206.39	
E.G. Slope (ft/ft)	0.017884	Area (sq ft)		206.39	
Q Total (cfs)	2450.00	Flow (cfs)		2450.00	
Top Width (ft)	47.95	Top Width (ft)		47.95	
Vel Total (ft/s)	11.87	Avg. Vel. (ft/s)		11.87	
Max Chl Dpth (ft)	14.67	Hydr. Depth (ft)		4.30	
Conv. Total (cfs)	18320.3	Conv. (cfs)		18320.3	
Length Wtd. (ft)	129.11	Wetted Per. (ft)		68.27	
Min Ch El (ft)	2711.00	Shear (lb/sq ft)		3.38	
Alpha	1.00	Stream Power (lb/ft s)		40.07	
Frctn Loss (ft)	2.35	Cum Volume (acre-ft)		20.23	
C & E Loss (ft)	0.12	Cum SA (acres)		3.40	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated

water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: Unnamed Wash
REACH: Main1 RS: 1500

INPUT
Description:
Station Elevation Data num= 54

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2739	5.25	2739	10.38	2738	11.16	2737	11.88	2736
12.54	2735	13.99	2733	15.85	2732	19.53	2730	20.91	2729
22.3	2728	25.12	2726	26.47	2725	27.51	2723	27.95	2722
28.38	2721	28.86	2720	29.24	2719	29.73	2718	30.09	2717
30.55	2716	30.96	2715	31.37	2714	31.75	2713	32.14	2712
32.55	2711	32.96	2710	36.88	2707	40.43	2707	40.71	2708
41.04	2709	41.4	2710	41.76	2711	42.06	2712	42.35	2713
42.61	2714	42.89	2715	43.12	2716	44.34	2717	46.18	2718
48.75	2719	51.54	2720	53.99	2721	56.32	2722	58.52	2723
60.88	2724	63.2	2725	65.05	2726	66.91	2727	68.83	2728
70.84	2729	73.94	2730	79.58	2732	81.97	2733		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	0	.035	81.97	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
0	81.97	270.26	260.99	251.15	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

		Element	Left OB	Channel	Right OB
E.G. Elev (ft)	2724.20	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.39	Wt. n-Val.		0.035	
W.S. Elev (ft)	2720.81	Reach Len. (ft)	270.26	260.99	251.15
Crit W.S. (ft)	2720.81	Flow Area (sq ft)		168.48	
E.G. Slope (ft/ft)	0.018477	Area (sq ft)		168.48	
Q Total (cfs)	2489.00	Flow (cfs)		2489.00	
Top Width (ft)	25.05	Top Width (ft)		25.05	
Vel Total (ft/s)	14.77	Avg. Vel. (ft/s)		14.77	
Max Chl Dpth (ft)	13.81	Hydr. Depth (ft)		6.72	
Conv. Total (cfs)	18311.1	Conv. (cfs)		18311.1	
Length Wtd. (ft)	260.99	Wetted Per. (ft)		41.14	
Min Ch El (ft)	2707.00	Shear (lb/sq ft)		4.72	
Alpha	1.00	Stream Power (lb/ft s)		69.79	
Frctn Loss (ft)	4.51	Cum Volume (acre-ft)		19.67	
C & E Loss (ft)	0.09	Cum SA (acres)		3.29	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: Unnamed Wash
REACH: Main1 RS: 1400

INPUT
Description:
Station Elevation Data num= 31

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2720	6.86	2719	11.59	2718	21.44	2715	25.17	2713
30.02	2710	30.88	2709	31.6	2708	33	2706	33.73	2705
34.42	2704	41.24	2702.26	42.26	2702	45.17	2702	45.29	2704
45.32	2705	45.5	2708	45.52	2709	45.55	2710	46.41	2711
48.5	2712	50.57	2713	52.69	2714	55.15	2715	70.98	2715
75.09	2714	78.35	2713	81.16	2712	84.24	2711	87.41	2710
90.89	2709								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	0	.035	90.89	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
0	90.89	197.2	199.44	199.87	.1	.3

Blocked Obstructions num= 1

Sta L	Sta R	Elev
70.98	90.89	2715

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2716.96	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.08	Wt. n-Val.		0.035	
W.S. Elev (ft)	2713.88	Reach Len. (ft)	197.20	199.44	199.87
Crit W.S. (ft)	2713.88	Flow Area (sq ft)		176.69	
E.G. Slope (ft/ft)	0.016221	Area (sq ft)		176.69	
Q Total (cfs)	2489.00	Flow (cfs)		2489.00	
Top Width (ft)	28.90	Top Width (ft)		28.90	
Vel Total (ft/s)	14.09	Avg. Vel. (ft/s)		14.09	
Max Chl Dpth (ft)	11.88	Hydr. Depth (ft)		6.11	
Conv. Total (cfs)	19543.0	Conv. (cfs)		19543.0	
Length Wtd. (ft)	199.44	Wetted Per. (ft)		42.02	
Min Ch El (ft)	2702.00	Shear (lb/sq ft)		4.26	
Alpha	1.00	Stream Power (lb/ft s)		59.99	
Frctn Loss (ft)	2.76	Cum Volume (acre-ft)		18.64	
C & E Loss (ft)	0.32	Cum SA (acres)		3.13	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: Unnamed Wash
REACH: Main1 RS: 1300

INPUT
Description:
Station Elevation Data num= 29

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2712	4.99	2710	14.86	2706	17.55	2705	22.21	2704
27.42	2703	29.49	2702	31.48	2701	36.81	2700	41.74	2699
45.01	2699	64.83	2699	67.91	2700	70.18	2701	71.28	2702
72.3	2703	73.52	2704	75.03	2705	76.39	2706	77.9	2707
81.18	2709	84.68	2711	89.2	2713	90.51	2714	91.21	2715
91.91	2716	92.61	2717	93.31	2718	94.06	2719		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	0	.035	94.06	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
0	94.06	170	195.8	223.9	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2706.49	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.02	Wt. n-Val.		0.035	
W.S. Elev (ft)	2704.47	Reach Len. (ft)	170.00	195.80	223.90
Crit W.S. (ft)	2704.47	Flow Area (sq ft)		218.43	
E.G. Slope (ft/ft)	0.011922	Area (sq ft)		218.43	
Q Total (cfs)	2489.00	Flow (cfs)		2489.00	
Top Width (ft)	54.21	Top Width (ft)		54.21	
Vel Total (ft/s)	11.40	Avg. Vel. (ft/s)		11.40	
Max Chl Dpth (ft)	5.47	Hydr. Depth (ft)		4.03	
Conv. Total (cfs)	22795.8	Conv. (cfs)		22795.8	
Length Wtd. (ft)	195.80	Wetted Per. (ft)		56.67	
Min Ch El (ft)	2699.00	Shear (lb/sq ft)		2.87	
Alpha	1.00	Stream Power (lb/ft s)		32.69	
Frctn Loss (ft)	2.34	Cum Volume (acre-ft)		17.74	
C & E Loss (ft)	0.03	Cum SA (acres)		2.94	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: Unnamed Wash
REACH: Main1 RS: 1200

INPUT
Description:
Station Elevation Data num= 41

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2716	.24	2716	10.59	2714	13.66	2713	16.72	2712

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   19.16    2711   19.86    2710   20.62    2709   21.34    2708   22.05    2707
   22.77    2706   23.47    2705   24.18    2704    24.9    2703   25.61    2702
   26.28    2701   27.17    2700   29.23    2699   30.97    2698   35.17    2696
   37.91    2695   64.52    2696    67.8    2697   69.22    2698   70.64    2699
   70.83    2700   70.92    2701   71.09    2702    71.2    2703   71.31    2704
    71.7    2705   72.21    2706   72.72    2707   73.17    2708   73.65    2709
   74.08    2710   74.34    2711   77.17    2712   80.26    2713   86.35    2715
     100    2716

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0    .035       0    .035     100    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0     100          199.59  208.99  220.51             .1       .3

CROSS SECTION OUTPUT  Profile #PF 1

  E.G. Elev (ft)          2703.19    Element                  Left OB    Channel   Right OB
  Vel Head (ft)              2.30    Wt. n-Val.                            0.035
  W.S. Elev (ft)          2700.89    Reach Len. (ft)          199.59     208.99     220.51
  Crit W.S. (ft)          2700.89    Flow Area (sq ft)                    204.67
  E.G. Slope (ft/ft)     0.012029    Area (sq ft)                         204.67
  Q Total (cfs)           2489.00    Flow (cfs)                          2489.00
  Top Width (ft)            44.53    Top Width (ft)                        44.53
  Vel Total (ft/s)          12.16    Avg. Vel. (ft/s)                      12.16
  Max Chl Dpth (ft)          5.89    Hydr. Depth (ft)                       4.60
  Conv. Total (cfs)       22693.5    Conv. (cfs)                         22693.5
  Length Wtd. (ft)         208.99    Wetted Per. (ft)                      48.49
  Min Ch El (ft)          2695.00    Shear (lb/sq ft)                       3.17
  Alpha                      1.00    Stream Power (lb/ft s)                38.55
  Frctn Loss (ft)            2.53    Cum Volume (acre-ft)                  16.78
  C & E Loss (ft)            0.02    Cum SA (acres)                         2.72


Warning: The energy equation could not be balanced within the specified number of iterations.  The program used critical
         depth for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
         the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
         water surface came back below critical depth.  This indicates that there is not a valid subcritical answer.  The
         program defaulted to critical depth.

CROSS SECTION


RIVER: Unnamed Wash
REACH: Main1              RS: 1100

INPUT
Description:
Station Elevation Data    num=      29
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0    2707    5.35    2707    8.38    2706    9.68    2705   12.44    2703
   13.93    2702   15.38    2701   17.01    2700   18.58    2699   21.52    2697
   22.94    2696   26.14    2694   29.68    2693   34.53    2692    38.4    2691
   56.38    2691   57.13    2692    57.9    2693   59.43    2695   60.24    2696
   61.29    2697   62.43    2698    63.9    2699   65.12    2700   66.01    2701
   66.45    2702   66.68    2703   66.92    2704   74.91    2705

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0    .035       0    .035   74.91    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0   74.91          173.12  189.13   202.7             .1       .3

CROSS SECTION OUTPUT  Profile #PF 1

  E.G. Elev (ft)          2699.79    Element                  Left OB    Channel   Right OB
  Vel Head (ft)              2.46    Wt. n-Val.                            0.035
  W.S. Elev (ft)          2697.33    Reach Len. (ft)          173.12     189.13     202.70
  Crit W.S. (ft)          2697.33    Flow Area (sq ft)                    197.73
  E.G. Slope (ft/ft)     0.012207    Area (sq ft)                         197.73
  Q Total (cfs)           2489.00    Flow (cfs)                          2489.00
  Top Width (ft)            40.63    Top Width (ft)                        40.63
  Vel Total (ft/s)          12.59    Avg. Vel. (ft/s)                      12.59
  Max Chl Dpth (ft)          6.33    Hydr. Depth (ft)                       4.87
  Conv. Total (cfs)       22527.9    Conv. (cfs)                         22527.9
  Length Wtd. (ft)         189.13    Wetted Per. (ft)                      44.98
  Min Ch El (ft)          2691.00    Shear (lb/sq ft)                       3.35
  Alpha                      1.00    Stream Power (lb/ft s)                42.17
  Frctn Loss (ft)            2.30    Cum Volume (acre-ft)                  15.82
  C & E Loss (ft)            0.08    Cum SA (acres)                         2.51


Warning: The energy equation could not be balanced within the specified number of iterations.  The program used critical
         depth for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
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the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: Unnamed Wash
REACH: Main1 RS: 1000

INPUT
Description:
Station Elevation Data num= 30

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2700	1.85	2697	4.99	2695	7.03	2694	9.01	2693
15.23	2690	17.81	2689	23.14	2688	37.9	2687.36	46.38	2687
53.45	2687	55.47	2688	56.45	2689	56.76	2690	57.1	2691
57.5	2692	59.29	2694	60.1	2695	60.84	2696	61.57	2697
62.25	2698	62.94	2699	67.06	2701	69.55	2702	72.11	2703
72.82	2704	73.47	2705	75.18	2707	77.09	2708	82.18	2709

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	0	.035	82.18	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
0	82.18	200.05	199.88	200.05	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2694.75	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.19	Wt. n-Val.		0.035	
W.S. Elev (ft)	2692.56	Reach Len. (ft)	200.05	199.88	200.05
Crit W.S. (ft)	2692.56	Flow Area (sq ft)		209.87	
E.G. Slope (ft/ft)	0.012148	Area (sq ft)		209.87	
Q Total (cfs)	2489.00	Flow (cfs)		2489.00	
Top Width (ft)	48.09	Top Width (ft)		48.09	
Vel Total (ft/s)	11.86	Avg. Vel. (ft/s)		11.86	
Max Chl Dpth (ft)	5.56	Hydr. Depth (ft)		4.36	
Conv. Total (cfs)	22582.1	Conv. (cfs)		22582.1	
Length Wtd. (ft)	199.88	Wetted Per. (ft)		52.01	
Min Ch El (ft)	2687.00	Shear (lb/sq ft)		3.06	
Alpha	1.00	Stream Power (lb/ft s)		36.29	
Frctn Loss (ft)	2.42	Cum Volume (acre-ft)		14.93	
C & E Loss (ft)	0.03	Cum SA (acres)		2.32	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: Unnamed Wash
REACH: Main1 RS: 900

INPUT
Description:
Station Elevation Data num= 29

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2697	2.01	2696	6.96	2693	8.56	2692	9.68	2691
10.78	2690	11.92	2689	13	2688	14.12	2687	15.2	2686
16.3	2685	17.24	2684	26.67	2683	30.04	2683	41.4	2683
45.22	2684	46.68	2685	47.87	2686	48.94	2687	50.02	2688
51.05	2689	52.27	2690	53.58	2691	54.05	2692	54.3	2693
54.53	2694	61.14	2696	68.17	2697	76.52	2697		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	0	.035	76.52	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
0	76.52	200.06	199.87	200.06	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2691.66	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.50	Wt. n-Val.		0.035	
W.S. Elev (ft)	2689.16	Reach Len. (ft)	200.06	199.87	200.06
Crit W.S. (ft)	2689.16	Flow Area (sq ft)		196.06	
E.G. Slope (ft/ft)	0.012067	Area (sq ft)		196.06	
Q Total (cfs)	2489.00	Flow (cfs)		2489.00	
Top Width (ft)	39.51	Top Width (ft)		39.51	

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  Vel Total (ft/s)          12.70    Avg. Vel. (ft/s)                 12.70
  Max Chl Dpth (ft)          6.16    Hydr. Depth (ft)                  4.96
  Conv. Total (cfs)       22657.9    Conv. (cfs)                    22657.9
  Length Wtd. (ft)         199.87    Wetted Per. (ft)                 43.65
  Min Ch El (ft)          2683.00    Shear (lb/sq ft)                  3.38
  Alpha                      1.00    Stream Power (lb/ft s)           42.95
  Frctn Loss (ft)            2.39    Cum Volume (acre-ft)             14.00
  C & E Loss (ft)            0.03    Cum SA (acres)                    2.12


Warning: The energy equation could not be balanced within the specified number of iterations.  The program used critical
         depth for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
         the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
         water surface came back below critical depth.  This indicates that there is not a valid subcritical answer.  The
         program defaulted to critical depth.

CROSS SECTION


RIVER: Unnamed Wash
REACH: Main1              RS: 800

INPUT
Description:
Station Elevation Data    num=      32
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0    2695    5.28    2694    9.97    2693   16.15    2691   17.35    2690
   18.64    2689   19.91    2688   21.18    2687    22.6    2686   24.45    2685
   26.51    2684   28.59    2683   29.67    2682   30.77    2681   31.87    2680
   41.31    2679   45.06    2679   53.43    2679   55.64    2680   57.69    2681
   59.22    2682   60.74    2683   62.39    2684   64.07    2685    65.7    2686
   67.32    2687   69.12    2688   70.94    2689   72.73    2690    76.3    2692
   78.37    2693   88.81    2695

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0    .035       0    .035   88.81    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0   88.81             200  199.91     200             .1       .3

CROSS SECTION OUTPUT  Profile #PF 1

  E.G. Elev (ft)          2688.04    Element                  Left OB    Channel   Right OB
  Vel Head (ft)              2.40    Wt. n-Val.                            0.035
  W.S. Elev (ft)          2685.65    Reach Len. (ft)          200.00     199.91     200.00
  Crit W.S. (ft)          2685.65    Flow Area (sq ft)                    200.44
  E.G. Slope (ft/ft)     0.011842    Area (sq ft)                         200.44
  Q Total (cfs)           2489.00    Flow (cfs)                          2489.00
  Top Width (ft)            41.87    Top Width (ft)                        41.87
  Vel Total (ft/s)          12.42    Avg. Vel. (ft/s)                      12.42
  Max Chl Dpth (ft)          6.65    Hydr. Depth (ft)                       4.79
  Conv. Total (cfs)       22872.7    Conv. (cfs)                         22872.7
  Length Wtd. (ft)         199.91    Wetted Per. (ft)                      45.49
  Min Ch El (ft)          2679.00    Shear (lb/sq ft)                       3.26
  Alpha                      1.00    Stream Power (lb/ft s)                40.45
  Frctn Loss (ft)            0.85    Cum Volume (acre-ft)                  13.09
  C & E Loss (ft)            0.50    Cum SA (acres)                         1.93


Warning: The energy equation could not be balanced within the specified number of iterations.  The program used critical
         depth for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for additional cross
         sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
         1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
         the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
         water surface came back below critical depth.  This indicates that there is not a valid subcritical answer.  The
         program defaulted to critical depth.

CROSS SECTION


RIVER: Unnamed Wash
REACH: Main1              RS: 700

INPUT
Description:
Station Elevation Data    num=      32
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0    2692   13.46    2690   20.83    2689   24.82    2688   26.72    2687
   27.64    2686    28.5    2685    29.4    2684   30.34    2683   31.24    2682
    32.5    2681   33.91    2680   35.36    2679   36.22    2678      37    2677
   40.67    2676   49.89    2676   60.98    2676   63.89    2677   65.31    2678
    66.7    2679   68.22    2680   70.18    2681   72.05    2682   73.98    2683
```

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   75.51    2684   76.92    2685   78.38    2686   79.79    2687   82.47    2688
   85.76    2689   93.54    2689

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0    .035       0    .035   93.54    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0   93.54          105.58   90.05   91.05            .1       .3

CROSS SECTION OUTPUT  Profile #PF 1

  E.G. Elev (ft)           2686.54    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.73    Wt. n-Val.                           0.035
  W.S. Elev (ft)           2685.81    Reach Len. (ft)          105.58      90.05      91.05
  Crit W.S. (ft)           2682.23    Flow Area (sq ft)                   364.34
  E.G. Slope (ft/ft)      0.002171    Area (sq ft)                        364.34
  Q Total (cfs)            2489.00    Flow (cfs)                         2489.00
  Top Width (ft)             50.31    Top Width (ft)                       50.31
  Vel Total (ft/s)            6.83    Avg. Vel. (ft/s)                      6.83
  Max Chl Dpth (ft)           9.81    Hydr. Depth (ft)                      7.24
  Conv. Total (cfs)        53419.9    Conv. (cfs)                        53419.9
  Length Wtd. (ft)           90.05    Wetted Per. (ft)                     56.77
  Min Ch El (ft)           2676.00    Shear (lb/sq ft)                      0.87
  Alpha                       1.00    Stream Power (lb/ft s)                5.94
  Frctn Loss (ft)             0.09    Cum Volume (acre-ft)                 11.80
  C & E Loss (ft)             0.15    Cum SA (acres)                        1.72


Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
         1.4.  This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: Unnamed Wash
REACH: Main1              RS: 600

INPUT
Description:
Station Elevation Data    num=      53
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0    2691    2.03    2691    4.75    2690   14.29    2689   26.04    2688
   33.69    2687   34.32    2686   34.69    2685   35.04    2684    35.4    2683
   35.71    2682   36.05    2681   36.46    2680   37.14    2679   39.75    2678
   42.44    2677   44.85    2676   46.95    2675   49.06    2674    61.8    2674
   76.28    2675    80.1    2676   83.77    2677   89.32    2679   91.29    2680
   93.62    2681   96.54    2682   98.84    2683  106.09    2683  110.53    2682
  112.97    2682  122.92    2682  123.43    2681  124.01    2680  124.46    2679
  124.94    2678  125.31    2677  125.68    2676  126.77    2675  128.15    2674
  139.97    2675  142.29    2676  144.19    2677  146.82    2678  149.09    2679
  151.09    2680  153.17    2681  156.53    2682  159.47    2683  165.89    2685
  167.92    2686  170.23    2687  172.74    2688

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0    .035       0    .035  172.74    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0  172.74          165.96  163.56  169.79            .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
  106.09  172.74    2690       F

CROSS SECTION OUTPUT  Profile #PF 1

  E.G. Elev (ft)           2686.31    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.24    Wt. n-Val.                           0.035
  W.S. Elev (ft)           2686.07    Reach Len. (ft)          165.96     163.56     169.79
  Crit W.S. (ft)           2679.62    Flow Area (sq ft)                   634.70
  E.G. Slope (ft/ft)      0.000531    Area (sq ft)                       1031.37
  Q Total (cfs)            2489.00    Flow (cfs)                         2489.00
  Top Width (ft)            133.80    Top Width (ft)                      133.80
  Vel Total (ft/s)            3.92    Avg. Vel. (ft/s)                      3.92
  Max Chl Dpth (ft)          12.07    Hydr. Depth (ft)                      8.84
  Conv. Total (cfs)       108008.9    Conv. (cfs)                       108008.9
  Length Wtd. (ft)          163.56    Wetted Per. (ft)                     79.09
  Min Ch El (ft)           2674.00    Shear (lb/sq ft)                      0.27
  Alpha                       1.00    Stream Power (lb/ft s)                1.04
  Frctn Loss (ft)             0.11    Cum Volume (acre-ft)                 10.35
  C & E Loss (ft)             0.01    Cum SA (acres)                        1.53


Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
         1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION
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RIVER: Unnamed Wash
REACH: Main1 RS: 500

INPUT
Description:
Station Elevation Data num= 29

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2687	16.29	2686	33.47	2685	48.37	2684	54.57	2683
62.81	2681	65.1	2680	67.73	2679	70.01	2678	72.24	2677
73.94	2676	77.08	2673	90.18	2672.27	94.92	2672	106.5	2672
113.63	2673	126.37	2676	128.11	2677	129.52	2678	131.24	2679
134.08	2680	139.43	2681	153.77	2683	159.91	2684	162.55	2685
164.37	2686	166.37	2687	168.53	2688	187.05	2690		

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.03	48.37	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
0	187.05	58.23	51.31	62.51	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

		Element	Left OB	Channel	Right OB
E.G. Elev (ft)	2686.19	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.32	Wt. n-Val.		0.035	
W.S. Elev (ft)	2685.87	Reach Len. (ft)	58.23	51.31	62.51
Crit W.S. (ft)	2679.19	Flow Area (sq ft)		990.97	
E.G. Slope (ft/ft)	0.000744	Area (sq ft)		990.97	
Q Total (cfs)	4497.00	Flow (cfs)		4497.00	
Top Width (ft)	145.62	Top Width (ft)		145.62	
Vel Total (ft/s)	4.54	Avg. Vel. (ft/s)		4.54	
Max Chl Dpth (ft)	13.87	Hydr. Depth (ft)		6.81	
Conv. Total (cfs)	164900.3	Conv. (cfs)		164900.3	
Length Wtd. (ft)	51.31	Wetted Per. (ft)		150.48	
Min Ch El (ft)	2672.00	Shear (lb/sq ft)		0.31	
Alpha	1.00	Stream Power (lb/ft s)		1.39	
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)		6.56	
C & E Loss (ft)	0.03	Cum SA (acres)		1.01	

CROSS SECTION

RIVER: Unnamed Wash
REACH: Main1 RS: 400

INPUT
Description:
Station Elevation Data num= 41

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2688.01	6.8	2685	9.24	2684	16.28	2683	28.94	2683
32.59	2684	36.71	2685	41.98	2685	55.92	2684	78.44	2684
97.61	2684	98.46	2683	100.13	2681	100.9	2680	101.76	2679
102.54	2678	103.66	2677	105.88	2676	108.08	2675	110.35	2674
112.62	2673	114.93	2672	118.66	2671	154.09	2671	157.32	2672
159.33	2673	161.13	2674	161.97	2675	162.88	2676	163.89	2677
164.96	2678	166.09	2679	167.41	2680	171.11	2683	177.76	2683
204.74	2683	212.73	2684	215.85	2685	218.94	2686	222.3	2687
235.52	2689								

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.03	97.61	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
0	235.52	116.72	99.89	88.03	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2686.13	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.21	Wt. n-Val.		0.035	
W.S. Elev (ft)	2685.91	Reach Len. (ft)	116.72	99.89	88.03
Crit W.S. (ft)	2677.65	Flow Area (sq ft)		1210.76	
E.G. Slope (ft/ft)	0.000570	Area (sq ft)		1210.76	
Q Total (cfs)	4497.00	Flow (cfs)		4497.00	
Top Width (ft)	213.92	Top Width (ft)		213.92	
Vel Total (ft/s)	3.71	Avg. Vel. (ft/s)		3.71	
Max Chl Dpth (ft)	14.91	Hydr. Depth (ft)		5.66	
Conv. Total (cfs)	188290.2	Conv. (cfs)		188290.2	
Length Wtd. (ft)	99.89	Wetted Per. (ft)		223.58	
Min Ch El (ft)	2671.00	Shear (lb/sq ft)		0.19	
Alpha	1.00	Stream Power (lb/ft s)		0.72	
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)		5.26	
C & E Loss (ft)	0.02	Cum SA (acres)		0.80	

CROSS SECTION

RIVER: Unnamed Wash
REACH: Main1 RS: 300

INPUT
Description:
Station Elevation Data num= 35

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2686.85	10.18	2687	26.16	2686	56.92	2685	67.77	2683
72.93	2682	74.69	2681	75.93	2680	77.09	2679	78.28	2678
80.13	2677	81.83	2676	83.53	2675	85.1	2674	89.88	2672
92.95	2671	96.11	2670	99.27	2669	125.7	2669	131	2670
133.85	2671	140.06	2673	144.25	2674	149.79	2676	153.27	2677
159.33	2679	162.93	2680	173.51	2681	187.26	2682	195.52	2683
202	2684	207.73	2685	212.52	2686	216.49	2687	220.29	2688

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.03	56.92	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
0	220.29	145.1	100.88	52	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2686.07	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.16	Wt. n-Val.		0.035	
W.S. Elev (ft)	2685.91	Reach Len. (ft)	145.10	100.88	52.00
Crit W.S. (ft)	2676.07	Flow Area (sq ft)		1407.24	
E.G. Slope (ft/ft)	0.000323	Area (sq ft)		1407.24	
Q Total (cfs)	4497.00	Flow (cfs)		4497.00	
Top Width (ft)	183.10	Top Width (ft)		183.10	
Vel Total (ft/s)	3.20	Avg. Vel. (ft/s)		3.20	
Max Chl Dpth (ft)	16.91	Hydr. Depth (ft)		7.69	
Conv. Total (cfs)	250291.7	Conv. (cfs)		250291.7	
Length Wtd. (ft)	100.88	Wetted Per. (ft)		188.75	
Min Ch El (ft)	2669.00	Shear (lb/sq ft)		0.15	
Alpha	1.00	Stream Power (lb/ft s)		0.48	
Frctn Loss (ft)	0.08	Cum Volume (acre-ft)		2.26	
C & E Loss (ft)	0.09	Cum SA (acres)		0.34	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Unnamed Wash
REACH: Main1 RS: 200

INPUT
Description:
Station Elevation Data num= 49

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2693	1.64	2692	3.32	2691	5.46	2690	7.61	2689
9.35	2688	11.06	2687	12.77	2686	14.47	2685	16.25	2684
18.24	2683	23	2682	25.51	2681	28.74	2680	31.03	2679
31.44	2678	32.35	2676	33	2675	33.89	2674	34.55	2673
35.14	2672	35.58	2671	36.12	2670	36.63	2669	37.08	2668
38.91	2668	40.82	2668	41.23	2669	41.7	2670	42.11	2671
42.85	2672	43.48	2673	44.25	2674	46.26	2675	49.04	2676
59.12	2678	63.36	2679	66.9	2680	70.72	2681	82.01	2682
117.78	2683	123.57	2684	125.81	2685	127.96	2686	130.18	2687
132.3	2688	134.11	2689	135.75	2690	137.7	2691		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	0	.035	137.7	.035

Bank Sta: Left	Right	Coeff Contr.	Expan.
0	137.7	.3	.5

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2685.89	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.06	Wt. n-Val.		0.035	
W.S. Elev (ft)	2684.83	Reach Len. (ft)			
Crit W.S. (ft)	2683.47	Flow Area (sq ft)		543.77	
E.G. Slope (ft/ft)	0.005239	Area (sq ft)		543.77	
Q Total (cfs)	4497.00	Flow (cfs)		4497.00	
Top Width (ft)	110.66	Top Width (ft)		110.66	
Vel Total (ft/s)	8.27	Avg. Vel. (ft/s)		8.27	
Max Chl Dpth (ft)	16.83	Hydr. Depth (ft)		4.91	
Conv. Total (cfs)	62128.5	Conv. (cfs)		62128.5	
Length Wtd. (ft)		Wetted Per. (ft)		123.17	
Min Ch El (ft)	2668.00	Shear (lb/sq ft)		1.44	

Alpha	1.00	Stream Power (lb/ft s)	11.94
Frctn Loss (ft)		Cum Volume (acre-ft)	
C & E Loss (ft)		Cum SA (acres)	

SUMMARY OF MANNING'S N VALUES

River:Unnamed Wash

Reach	River Sta.	n1	n2	n3
Main1	2700	.035	.035	.035
Main1	2600	.035	.035	.035
Main1	2500	.035	.035	.035
Main1	2400	.035	.035	.035
Main1	2300	.035	.035	.035
Main1	2200	.035	.035	.035
Main1	2100	.035	.035	.035
Main1	2000	.035	.03	
Main1	1900	.035	.03	
Main1	1800	.035	.035	.035
Main1	1700	.035	.035	.035
Main1	1600	.035	.035	.035
Main1	1500	.035	.035	.035
Main1	1400	.035	.035	.035
Main1	1300	.035	.035	.035
Main1	1200	.035	.035	.035
Main1	1100	.035	.035	.035
Main1	1000	.035	.035	.035
Main1	900	.035	.035	.035
Main1	800	.035	.035	.035
Main1	700	.035	.035	.035
Main1	600	.035	.035	.035
Main1	500	.03	.035	
Main1	400	.03	.035	
Main1	300	.03	.035	
Main1	200	.035	.035	.035

SUMMARY OF REACH LENGTHS

River: Unnamed Wash

Reach	River Sta.	Left	Channel	Right
Main1	2700	95.75	98.69	107.97
Main1	2600	101.86	103.65	108.71
Main1	2500	108.74	100.43	96.31
Main1	2400	109.52	114.22	121.17
Main1	2300	191.53	193.81	198.19
Main1	2200	113.96	200.13	254.43
Main1	2100	231.94	197.1	162.04
Main1	2000	231.62	197.66	162.89
Main1	1900	122.47	101.94	85.19
Main1	1800	140.2	137.49	140.54
Main1	1700	145.9	141.68	135.05
Main1	1600	132.22	129.11	128.4
Main1	1500	270.26	260.99	251.15
Main1	1400	197.2	199.44	199.87
Main1	1300	170	195.8	223.9
Main1	1200	199.59	208.99	220.51
Main1	1100	173.12	189.13	202.7
Main1	1000	200.05	199.88	200.05
Main1	900	200.06	199.87	200.06
Main1	800	200	199.91	200
Main1	700	105.58	90.05	91.05
Main1	600	165.96	163.56	169.79
Main1	500	58.23	51.31	62.51
Main1	400	116.72	99.89	88.03
Main1	300	145.1	100.88	52
Main1	200			

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: Unnamed Wash

Reach	River Sta.	Contr.	Expan.
Main1	2700	.1	.3
Main1	2600	.1	.3
Main1	2500	.1	.3
Main1	2400	.1	.3

Main1	2300	.1	.3
Main1	2200	.1	.3
Main1	2100	.1	.3
Main1	2000	.1	.3
Main1	1900	.1	.3
Main1	1800	.1	.3
Main1	1700	.1	.3
Main1	1600	.1	.3
Main1	1500	.1	.3
Main1	1400	.1	.3
Main1	1300	.1	.3
Main1	1200	.1	.3
Main1	1100	.1	.3
Main1	1000	.1	.3
Main1	900	.1	.3
Main1	800	.1	.3
Main1	700	.1	.3
Main1	600	.1	.3
Main1	500	.1	.3
Main1	400	.1	.3
Main1	300	.1	.3
Main1	200	.3	.5

ERRORS WARNINGS AND NOTES
Errors Warnings and Notes for Plan : Plan 03

River: Unnamed Wash Reach: Main1 RS: 2700 Profile: PF 1
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
River: Unnamed Wash Reach: Main1 RS: 2600 Profile: PF 1
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:Divided flow computed for this cross-section.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
River: Unnamed Wash Reach: Main1 RS: 2500 Profile: PF 1
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
River: Unnamed Wash Reach: Main1 RS: 2400 Profile: PF 1
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
River: Unnamed Wash Reach: Main1 RS: 2300 Profile: PF 1
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
River: Unnamed Wash Reach: Main1 RS: 2200 Profile: PF 1
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
River: Unnamed Wash Reach: Main1 RS: 2100 Profile: PF 1
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
River: Unnamed Wash Reach: Main1 RS: 2000 Profile: PF 1
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth

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            for the water surface and continued on with the calculations.
     Warning:The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for additional cross sections.
     Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
            the need for additional cross sections.
     Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
            water surface came back below critical depth.  This indicates that there is not a valid subcritical answer.  The
            program defaulted to critical depth.
River: Unnamed Wash  Reach: Main1     RS: 1800     Profile: PF 1
     Warning:The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for additional cross sections.
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
            This may indicate the need for additional cross sections.
     Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
            the need for additional cross sections.
River: Unnamed Wash  Reach: Main1     RS: 1700     Profile: PF 1
     Warning:The energy equation could not be balanced within the specified number of iterations.  The program used critical depth
            for the water surface and continued on with the calculations.
     Warning:The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for additional cross sections.
     Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
            the need for additional cross sections.
     Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
            water surface came back below critical depth.  This indicates that there is not a valid subcritical answer.  The
            program defaulted to critical depth.
River: Unnamed Wash  Reach: Main1     RS: 1600     Profile: PF 1
     Warning:The energy equation could not be balanced within the specified number of iterations.  The program used critical depth
            for the water surface and continued on with the calculations.
     Warning:The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for additional cross sections.
     Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
            the need for additional cross sections.
     Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
            water surface came back below critical depth.  This indicates that there is not a valid subcritical answer.  The
            program defaulted to critical depth.
River: Unnamed Wash  Reach: Main1     RS: 1500     Profile: PF 1
     Warning:The energy equation could not be balanced within the specified number of iterations.  The program used critical depth
            for the water surface and continued on with the calculations.
     Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
            the need for additional cross sections.
     Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
            water surface came back below critical depth.  This indicates that there is not a valid subcritical answer.  The
            program defaulted to critical depth.
River: Unnamed Wash  Reach: Main1     RS: 1400     Profile: PF 1
     Warning:The energy equation could not be balanced within the specified number of iterations.  The program used critical depth
            for the water surface and continued on with the calculations.
     Warning:The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for additional cross sections.
     Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
            the need for additional cross sections.
     Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
            water surface came back below critical depth.  This indicates that there is not a valid subcritical answer.  The
            program defaulted to critical depth.
River: Unnamed Wash  Reach: Main1     RS: 1300     Profile: PF 1
     Warning:The energy equation could not be balanced within the specified number of iterations.  The program used critical depth
            for the water surface and continued on with the calculations.
     Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
            the need for additional cross sections.
     Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
            water surface came back below critical depth.  This indicates that there is not a valid subcritical answer.  The
            program defaulted to critical depth.
River: Unnamed Wash  Reach: Main1     RS: 1200     Profile: PF 1
     Warning:The energy equation could not be balanced within the specified number of iterations.  The program used critical depth
            for the water surface and continued on with the calculations.
     Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
            the need for additional cross sections.
     Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
            water surface came back below critical depth.  This indicates that there is not a valid subcritical answer.  The
            program defaulted to critical depth.
River: Unnamed Wash  Reach: Main1     RS: 1100     Profile: PF 1
     Warning:The energy equation could not be balanced within the specified number of iterations.  The program used critical depth
            for the water surface and continued on with the calculations.
     Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
            the need for additional cross sections.
     Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
            water surface came back below critical depth.  This indicates that there is not a valid subcritical answer.  The
            program defaulted to critical depth.
River: Unnamed Wash  Reach: Main1     RS: 1000     Profile: PF 1
     Warning:The energy equation could not be balanced within the specified number of iterations.  The program used critical depth
            for the water surface and continued on with the calculations.
     Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
            the need for additional cross sections.
     Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
            water surface came back below critical depth.  This indicates that there is not a valid subcritical answer.  The
            program defaulted to critical depth.
River: Unnamed Wash  Reach: Main1     RS: 900     Profile: PF 1
     Warning:The energy equation could not be balanced within the specified number of iterations.  The program used critical depth
            for the water surface and continued on with the calculations.
     Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
            the need for additional cross sections.
     Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
            water surface came back below critical depth.  This indicates that there is not a valid subcritical answer.  The
            program defaulted to critical depth.
River: Unnamed Wash  Reach: Main1     RS: 800     Profile: PF 1
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     Warning:The energy equation could not be balanced within the specified number of iterations.  The program used critical depth
             for the water surface and continued on with the calculations.
     Warning:The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for additional cross sections.
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
     Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
             the need for additional cross sections.
     Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
             water surface came back below critical depth.  This indicates that there is not a valid subcritical answer.  The
             program defaulted to critical depth.
River: Unnamed Wash  Reach: Main1     RS: 700     Profile: PF 1
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
River: Unnamed Wash  Reach: Main1     RS: 600     Profile: PF 1
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
     Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.
River: Unnamed Wash  Reach: Main1     RS: 300     Profile: PF 1
     Warning:The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for additional cross sections.
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
```

Worksheet for INTERIM DITCH SECTION 1

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	5.40	%
Discharge	6.00	ft³/s
Section Definitions		

Station (ft)	Elevation (ft)
0+00	2.00
0+06	0.00
0+12	2.00

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 2.00)	(0+12, 2.00)	0.037

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
Elevation Range	0.00 to 2.00 ft	
Flow Area	1.37	ft²
Wetted Perimeter	4.28	ft
Hydraulic Radius	0.32	ft
Top Width	4.06	ft
Normal Depth	0.68	ft
Critical Depth	0.76	ft
Critical Slope	0.02958	ft/ft
Velocity	4.37	ft/s

Worksheet for INTERIM DITCH SECTION 1

Results

Velocity Head		0.30	ft
Specific Energy		0.97	ft
Froude Number		1.33	
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		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.68	ft
Critical Depth	0.76	ft
Channel Slope	5.40	%
Critical Slope	0.02958	ft/ft

Cross Section for INTERIM DITCH SECTION 1

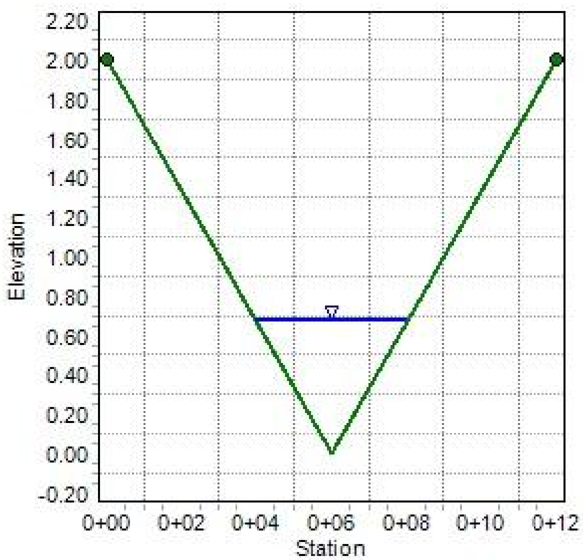
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

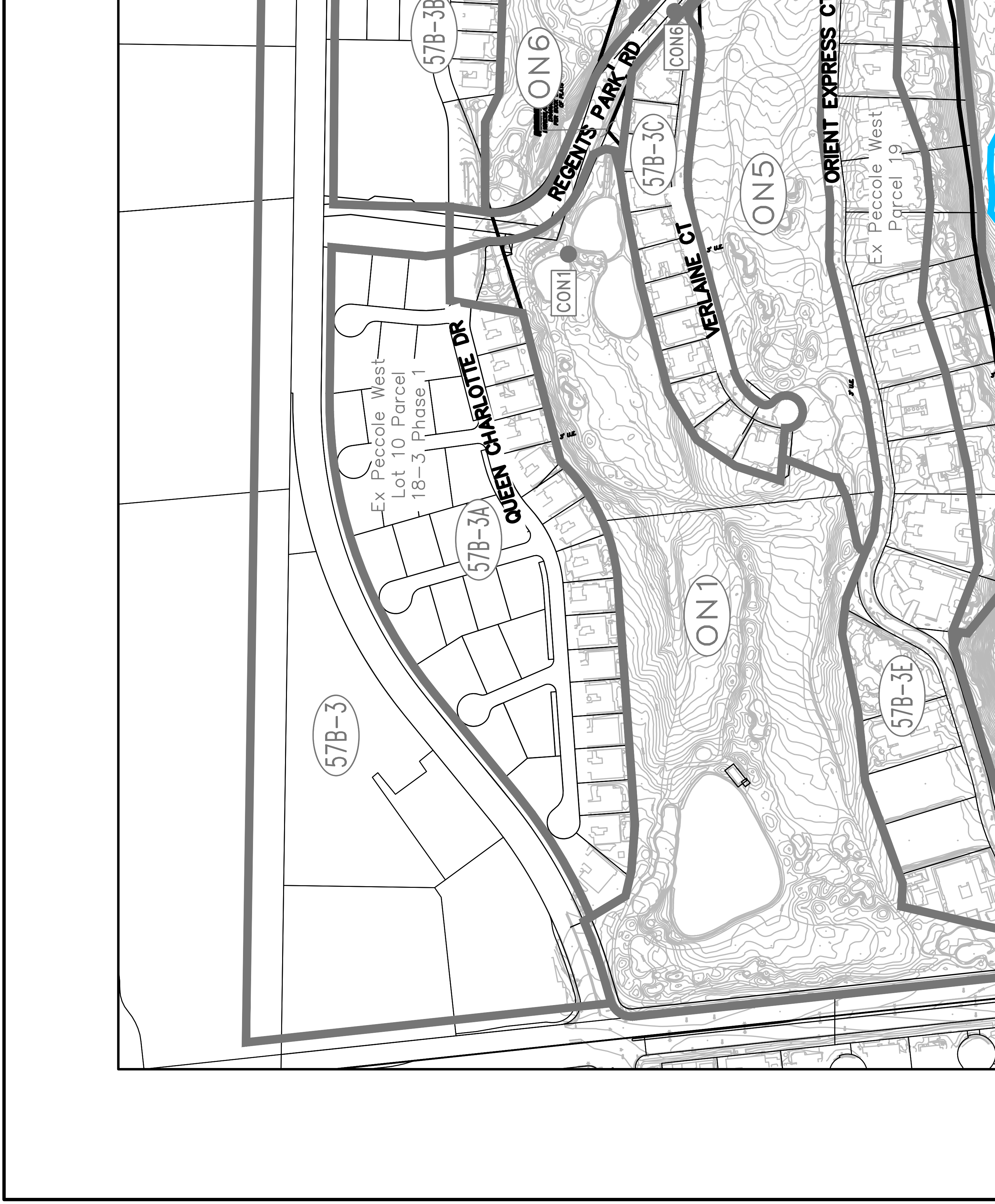
Channel Slope	5.40	%
Normal Depth	0.68	ft
Discharge	6.00	ft³/s

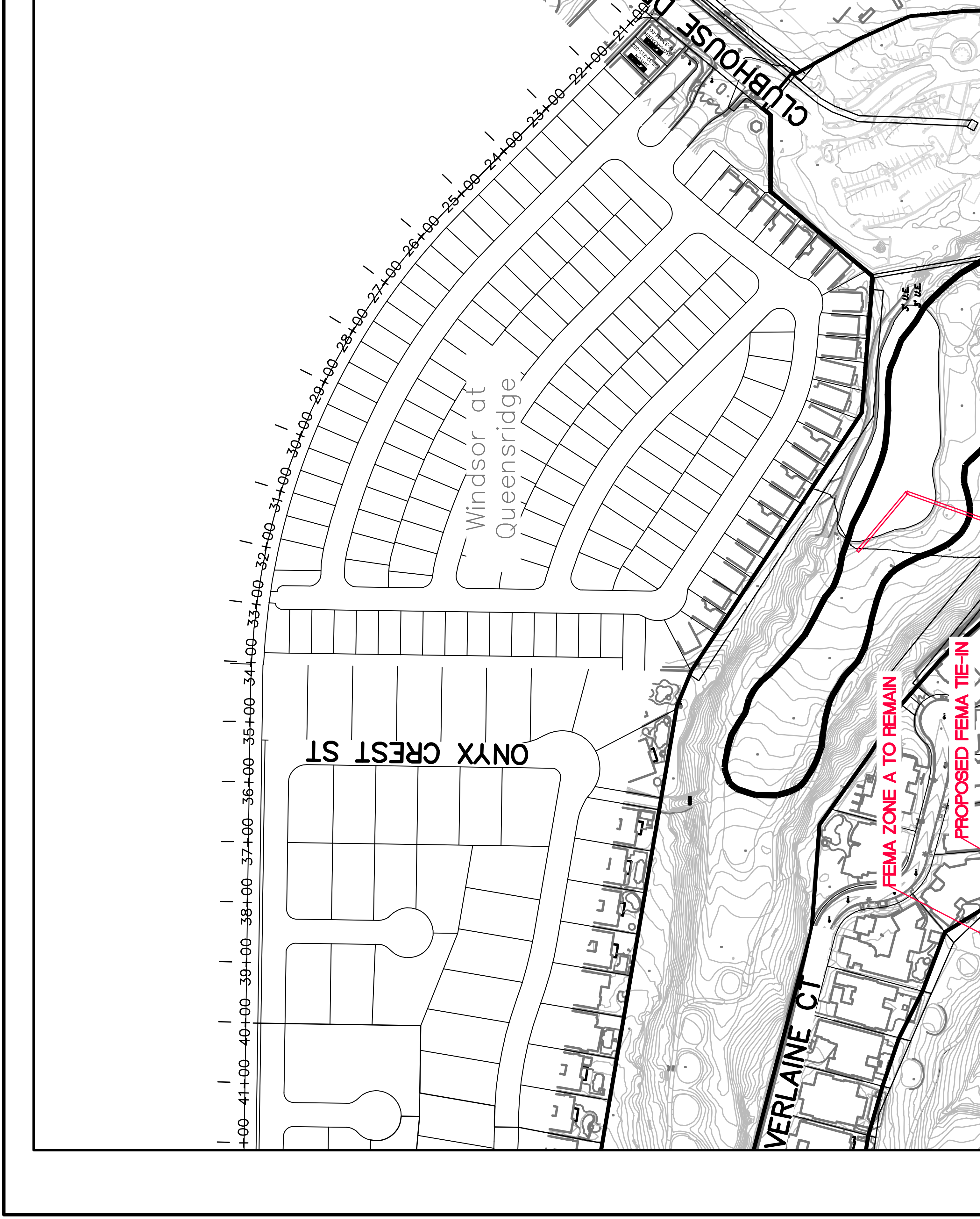
Cross Section Image



APPENDIX E

Reference Material


57B-3B
ON6
REGENTS PARK RD
CON6
57B-3C
ON5
ORIENT EXPRESS CT
Ex Peccole West
Parcel 19
VERLAINE CT
CON1
QUEEN CHARLOTTE DR
Ex Peccole West
Lot 10 Parcel
18-3 Phase 1
57B-3A
ON1
57B-3E
57B-3


CLUBHOUSE
Windsor at Queensridge
ONYX CREST ST
VERLAINE CT
FEMA ZONE A TO REMAIN
PROPOSED FEMA TIE-IN
21+00
22+00
23+00
24+00
25+00
26+00
27+00
28+00
29+00
30+00
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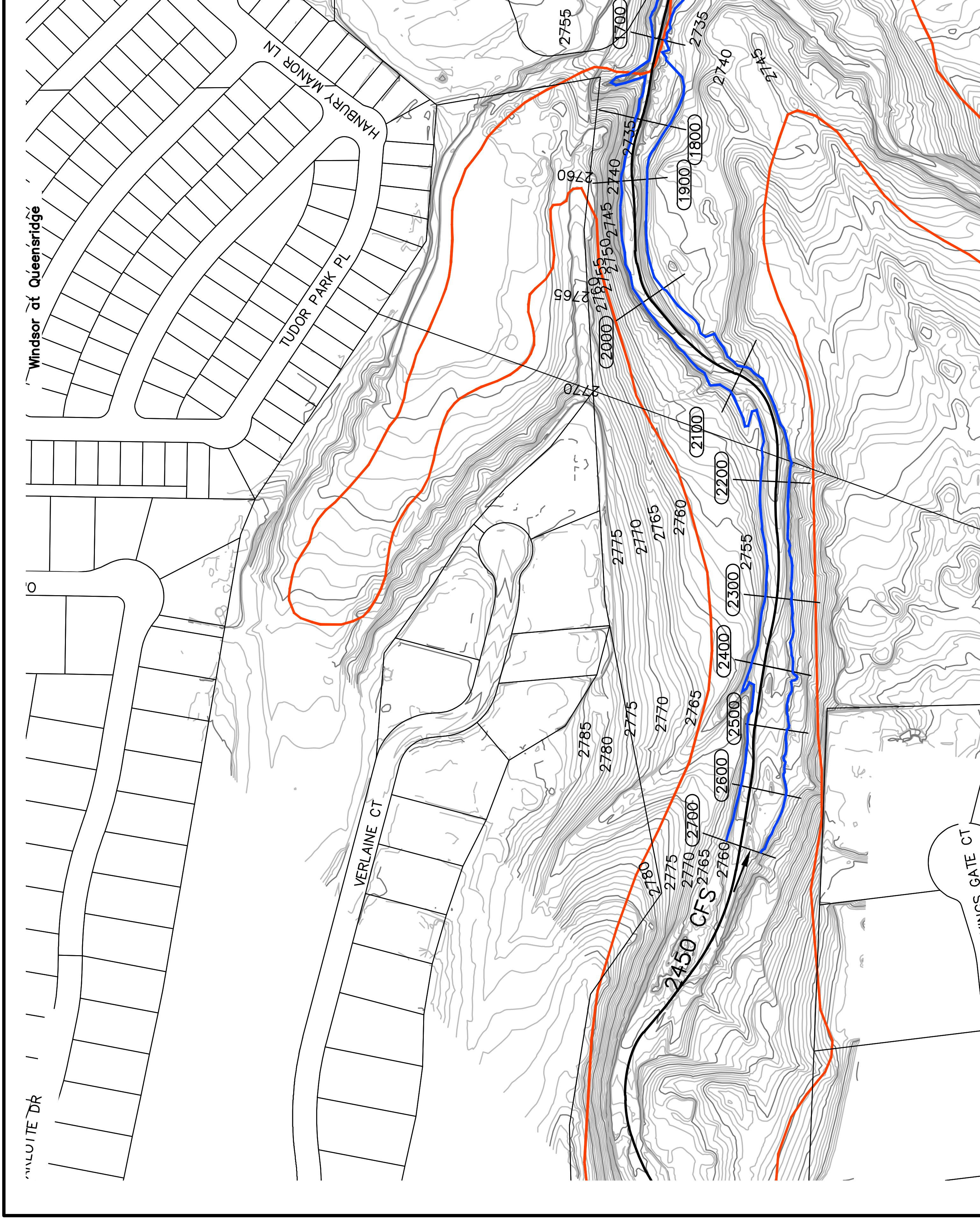
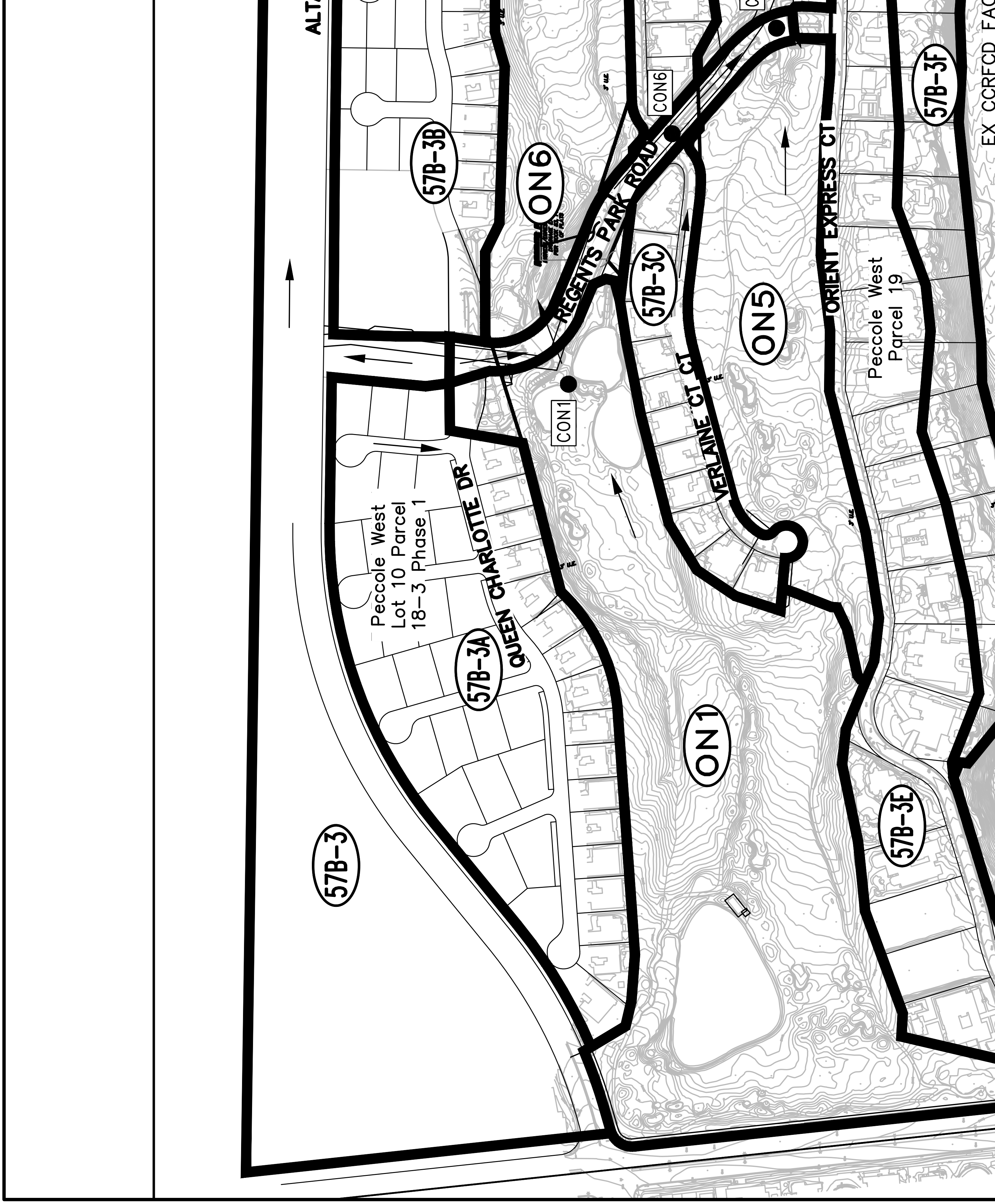
39+00
40+00
41+00


HANBURY MANOR LN
TUDOR PARK PL
Windsor at Queensridge
VERLAINE CT
2450 CFS
1700
1800
1900
2000
2100
2200
2300
2400
2500
2600
2700


57B-3B
ON6
REGENTS PARK ROAD
CON6
57B-3C
ORIENT EXPRESS CT
57B-3F
Peccole West
Parcel 19
ON5
VERLAINE CT CT
CON1
QUEEN CHARLOTTE DR
Peccole West
Lot 10 Parcel
18-3 Phase 1
57B-3A
ON1
57B-3E
57B-3

APPENDIX D

Drainage Exhibits

* 308.41

SUPPLEMENT NO. 1 TO THE 2nd UPDATE TO THE TECHNICAL DRAINAGE STUDY FOR QUEENS BOROUGH CULVERT

619.295

MARCH 2006

Prepared for:

JMA Architecture Studios
10150 Covington Cross Drive
Las Vegas, Nevada 89144
Phone: (702) 731-2033
Fax: (702) 731-2039

G. C. WALLACE COMPANIES
ENGINEERS | PLANNERS | SURVEYORS

619.295

RECEIVED

APR 26 2006

G.C. WALLACE

CITY OF LAS VEGAS INTER-OFFICE MEMORANDUM			DATE: April 21, 2006
TO: **Land Development Services** Department of Public Works			FROM: Albert Sung, P.E. Flood Control Project Engineer Department of Public Works
SUBJECT:	Technical Drainage Study for:		COPIES TO:
Queens Borrough Culvert (Plans AKA : The Village at Queensridge Culvert)			G. C. Wallace, Inc.
Cross Streets:	NEC of Alta Drive & Rampart Boulevard		JMA Architecture
File Number:	F:\Depot\DSMEMOS\DS3674F.ZNA.doc		Bart Anderson, P.E., DevCo
Parcel Number:	138-32-601-003		CCRFCD
FEMA Flood Zone	YES X	NO	
Proposed Storm Drain	YES X	NO	

HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES	FEES PAID Trn. No.
1st Submittal	10/25/2004	11/9/2004	Not Approved	$400.00	11413: $400
2nd Submittal	12/6/2004	12/20/2004	See Comments Below	$400.00	13199: $400
3rd Submittal	3/4/2005	3/18/2005	Conditionally Approved	N/C	--
4th Submittal	8/9/2005	8/23/2005	See Comments Below	$400.00	27281: $400
5th Submittal	12/15/2005	12/30/2005	See Comments Below	$400.00	35359: $400
6th Submittal	2/28/2006 3/30/2006 & 4/20/2006	4/21/2006	See Comments Below	N/C	N/C
			TOTAL FEES (LDDRS):	$1,600.00	----

REMARKS: 6th Submittal: Revised the on-site RCB alignment at the northeast corner of the site. Revised the RCB outfall structure, to include additional grading within Angel Park and the relocation of the concrete access road.

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

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

1. The existing 48'-public drainage easement (Doc # 20051129:04185) must be vacated and a new easement dedicated to reflect the revised storm drain location. Provide a new legal description and exhibit to the Right-of-Way Section with a copy to Flood Control for review and approval. The revised easement must record concurrently with the vacated easement. The new easement must record prior to the final approval of the future technical drainage study needed for onsite development or approval of any final maps. **It is noted that the public drainage easement must be privately maintained both on the surface and within the box culvert.**

2. The revised plans for the storm drain system (CLV # 107y4889-CUL) must be submitted to Land Development for approval of this proposed revision.

3. The engineer has provided a copy of the FEMA Conditional Letter of Map Revision (CLOMR), Case No. 05-09-0420R for the subject project. The engineer is advised that they are required to obtain FEMA approval for this revision as well as the completed "As-Built" condition in order to obtain the Letter of Map Revision (LOMR). **The approved LOMR must be submitted to the City of Las Vegas prior to the release of the bond.**

NOTE: The engineer must submit the drainage study to FEMA for a Conditional Letter of Map Revision (CLOMR). A favorable CLOMR must be obtained prior to the issuance of any permits. This site is located in a **FEMA Zone A**. Clark County Regional Flood Control District (CCRFCD) review and approval is required prior to recordation of final map or issuance of building/grading permits. The Engineer must send a copy of the report to the CCRFCD for review. **The developer/engineer must also obtain a Letter of Map Revision (LOMR) using the approved drainage study as technical support to inform FEMA of the modifications within the flood zone. The approved LOMR must be submitted to the City of Las Vegas prior to the release of the bond.** FEMA Elevation Certificates, showing as-built finish floor elevations, must be completed for each building in the FEMA A Zone. The certificate must be submitted to the City of Las Vegas Flood Control Section prior to scheduling a framing inspection.

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
B&H/ays/pbj

T/R/S: T20S/R60E/32
AREA L-32

ENGINEERS PLANNERS SURVEYORS

G. C. WALLACE, INC.

619.295

March 30, 2006

Writer's Contact Information:
804-2029

Albert Sung, PE
Flood Control Project Manager
City of Las Vegas Land Development Services
731 South Fourth Street
Las Vegas, Nevada 89101

Re: Supplement No. 1 to the 2nd Update to the Technical Drainage Study for Queens Borough Culvert (DS3674)

Dear Mr. Sung:

The purpose of this letter is to amend the design submitted within the 2nd *Update to the Technical Drainage Study for Queens Borough Culvert* (DS3674). The proposed amendments are at the City of Las Vegas' request and are as follows:

> The existing embankment, located approximately 180 feet east of the RCB headwall, will be removed. Since removal of this embankment section produces increased flow velocity within the channel, a 95-foot long riprap pad (d50 = 24-inches; thickness = 48-inches) is proposed at the RCB outlet. The WSPGW calculations have been revised to model the embankment removal.
>
> As a result of the proposed channel improvements, the RCB access road alignment has been shifted. The revised access road cross-section detail and profile are provided with the grading packet. The proposed revisions do not adversely impact the adjacent properties or downstream facilities and are in agreement with the City of Las Vegas' drainage criteria.

Copies of the water surface profile model, RCB outlet protection calculations, and proposed grading plans are provided in the Appendix.

If you have any questions or require additional information, please contact me at 804-2029.

Very truly yours,

G. C. WALLACE, INC.

Cindy Kinzer, EI
Designer

Christopher M. Luquette, PE, CFM
Project Manager
Flood Control Division

CML/CK/jj

Enc.

c: Roy Clark, GCW

G:\619-295\admin\ltr\clv-Suplmnt1-2UPDATE-QueensBoro-ck-cl-3-30-06.doc

FILE: QB12X12-U2.WSW

W S P G W - CIVILDESIGN Version 14.06
Program Package Serial Number: 1622
WATER SURFACE PROFILE LISTING
QUEENSBOROUGH CULVERT - JMA ARCH STUDIOS
GCWALLACE PROJECT # 619.295
FILENAME: QB12X12-U2.WSW CJK

PAGE 1

Date: 3-16-2006 Time:10: 6: 6

Station / L/Elem	Invert Elev / Ch Slope	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/ Dia.-FT / "N"	Base Wt or I.D. / X-Fall	ZL / ZR	No Wth Prs/Pip / Type Ch
-3625.000	14.000	7.834	21.834	4497.00	17.38	4.69	26.53	.00	9.28	62.96		1		0 .0
TRANS STR OPEN	.0400					.0187	1.41	7.83	1.51		.035			IR-
-3550.000	17.000	8.266	25.266	4497.00	13.55	2.85	28.12	.00	8.27	58.19		2		0 .0
TRANS STR OPEN	.0100					.0070	.35	8.27	1.00		.035			IR-
-3500.000	17.500	10.031	27.531	4497.00	8.46	1.11	28.64	.00	7.33	75.12		3		0 .0
TRANS STR OPEN	.0328							10.031	.561		.040			IR-
-3401.010	20.750	2.481	23.231	4497.00	31.66	15.56	38.79	.00	5.67	63.50		4		0 .0
TRANS STR OPEN	.0110					.0371	1.86	2.48	3.73		.015			IR-
-3350.810	21.300	2.522	23.822	4497.00	33.25	17.16	40.99	.00	5.89	59.13		5		0 .0
TRANS STR OPEN	.0141					.0413	1.03	2.52	3.87		.015			IR-
-3325.950	21.650	2.323	23.973	4497.00	34.29	18.26	42.23	.00	5.71	60.97		6		0 .0
TRANS STR OPEN	.0160					.0340	.34	2.32	4.12		.015			IR-
-3315.950	21.810	5.925	27.735	4497.00	31.62	15.53	43.26	.00	10.29	25.00	12.000	25.000	.00	1 1.0
90.310	.0152					.0249	2.24	5.93	2.34	7.02	.015	.00	.00	BOX
-3225.640	23.180	5.731	28.911	4497.00	32.69	16.60	45.51	.00	10.29	25.00	12.000	25.000	.00	1 1.0
2.320	-.0776					.0263	.06	5.73	2.46	.00	.015	.00	.00	BOX
-3223.320	23.000	5.682	28.682	4497.00	32.98	16.89	45.57	12.00	10.29	25.00	12.000	25.000	.00	1 1.0
70.620	.0283					.0264	1.86	12.00	2.49	5.55	.015	.00	.00	BOX

Starting WSE

Program Package Serial Number: 1622

WATER SURFACE PROFILE LISTING

Date: 3-16-2006 Time:10: 6: 6

QUEENSBOROUGH CULVERT - JMA ARCH STUDIOS

GCWALLACE PROJECT # 619.295

FILENAME: QB12X12-U2.WSW CJK

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
-3152.700	25.000	5.709	30.709	4497.00	32.82	16.73	47.44	.00	10.29	25.00	12.000	25.000	.00	1 1.0
17.410	.0276					.0262	.46	5.71	2.47	5.60	.015	.00	.00	BOX
-3135.290	25.480	5.714	31.194	4497.00	32.79	16.70	47.89	12.00	10.29	25.00	12.000	25.000	.00	1 1.0
85.300	.0279					.0260	2.21	12.00	2.47	5.58	.015	.00	.00	BOX
-3049.990	27.860	5.748	33.608	4497.00	32.60	16.50	50.11	.00	10.29	25.00	12.000	25.000	.00	1 1.0
143.470	.0279					.0253	3.63	5.75	2.45	5.58	.015	.00	.00	BOX
-2906.520	31.860	5.829	37.689	4497.00	32.15	16.05	53.73	.40	10.29	25.00	12.000	25.000	.00	1 1.0
203.401	.0278					.0238	4.83	6.22	2.39	5.58	.015	.00	.00	BOX
-2703.119	37.523	6.024	43.546	4497.00	31.11	15.02	58.57	.37	10.29	25.00	12.000	25.000	.00	1 1.0
165.794	.0278					.0214	3.54	6.39	2.28	5.58	.015	.00	.00	BOX
-2537.325	42.138	6.318	48.456	4497.00	29.66	13.66	62.11	.34	10.29	25.00	12.000	25.000	.00	1 1.0
103.695	.0278					.0188	1.95	6.65	2.12	5.58	.015	.00	.00	BOX
-2433.630	45.025	6.626	51.651	4497.00	28.28	12.42	64.07	12.00	10.29	25.00	12.000	25.000	.00	1 1.0
60.182	.0278					.0168	1.01	12.00	1.98	5.58	.015	.00	.00	BOX
-2373.448	46.700	6.888	53.588	4497.00	27.20	11.49	65.08	12.00	10.29	25.00	12.000	25.000	.00	1 1.0
55.228	.0278					.0150	.83	12.00	1.86	5.58	.015	.00	.00	BOX
-2318.220	48.238	7.224	55.462	4497.00	25.94	10.45	65.91	.00	10.29	25.00	12.000	25.000	.00	1 1.0
26.702	.0278					.0136	.36	7.22	1.74	5.58	.015	.00	.00	BOX

FILE: QB12X12-U2.WSW

W S P G W - CIVILDESIGN Version 14.06

Program Package Serial Number: 1622

WATER SURFACE PROFILE LISTING

Date: 3-16-2006 Time:10: 6: 6

QUEENSBOROUGH CULVERT - JMA ARCH STUDIOS

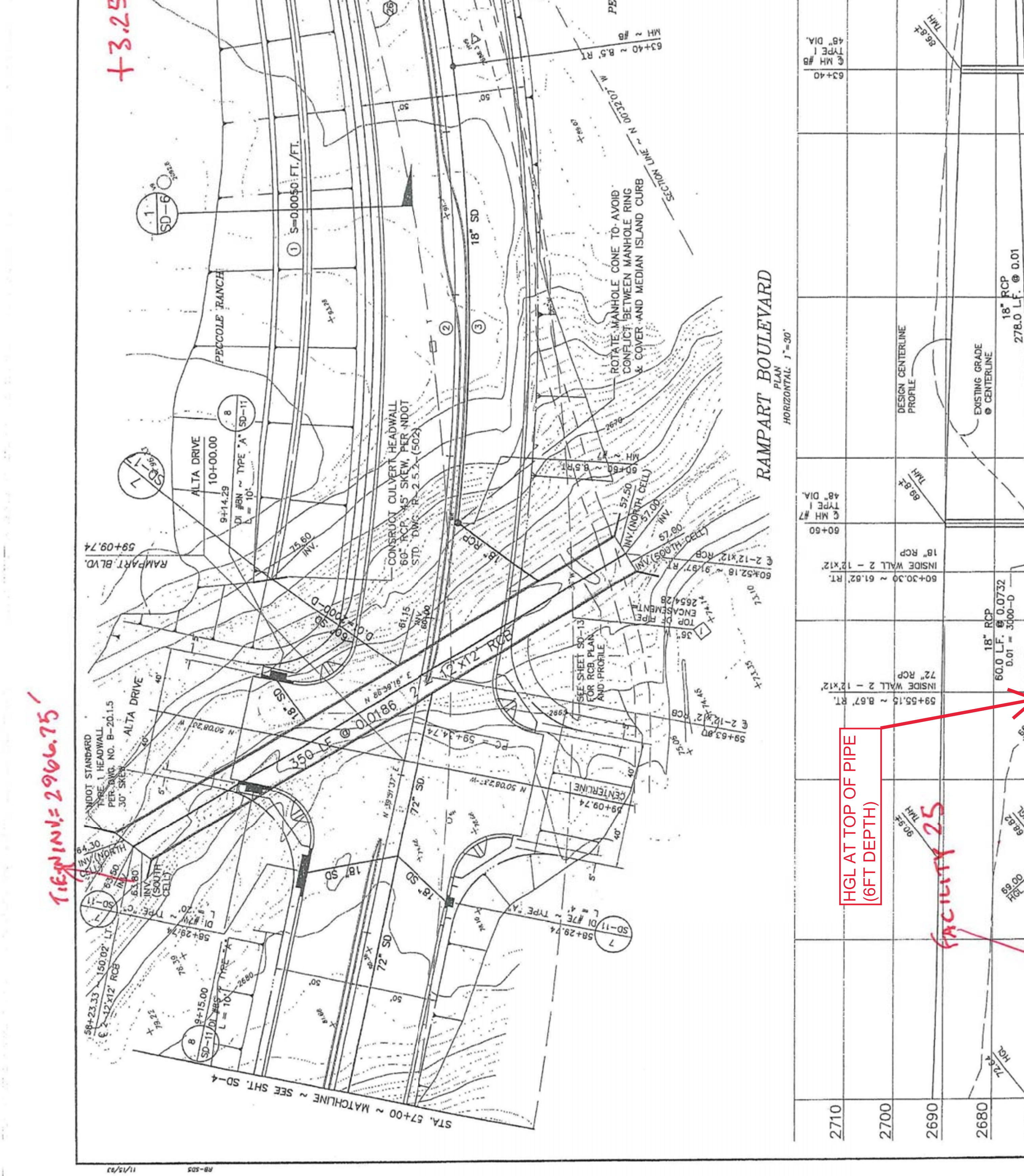
GCWALLACE PROJECT # 619.295

FILENAME: QB12X12-U2.WSW CJK

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
-2291.518	48.982	7.440	56.421	4497.00	25.19	9.85	66.27	.00	10.29	25.00	12.000	25.000	.00	1 1.0
34.206	.0278					.0123	.42	7.44	1.66	5.58	.015	.00	.00	BOX
-2257.313	49.934	7.803	57.737	4497.00	24.01	8.95	66.69	.00	10.29	25.00	12.000	25.000	.00	1 1.0
25.506	.0278					.0109	.28	7.80	1.55	5.58	.015	.00	.00	BOX
-2231.807	50.644	8.184	58.828	4497.00	22.90	8.14	66.97	.00	10.29	25.00	12.000	25.000	.00	1 1.0
18.679	.0278					.0096	.18	8.18	1.44	5.58	.015	.00	.00	BOX
-2213.128	51.164	8.583	59.748	4497.00	21.83	7.40	67.15	.00	10.29	25.00	12.000	25.000	.00	1 1.0
13.128	.0278					.0085	.11	8.58	1.34	5.58	.015	.00	.00	BOX
-2200.000	51.530	9.002	60.532	4497.00	20.81	6.73	67.26	.00	10.29	25.00	12.000	25.000	.00	1 1.0
60.785	.0080					.0080	.49	9.00	1.25	9.00	.015	.00	.00	BOX
-2139.215	52.016	9.002	61.018	4497.00	20.81	6.73	67.75	.00	10.29	25.00	12.000	25.000	.00	1 1.0
405.355	.0080					.0077	3.13	9.00	1.25	9.00	.015	.00	.00	BOX
-1733.860	55.259	9.255	64.514	4497.00	20.24	6.36	70.88	12.00	10.29	25.00	12.000	25.000	.00	1 1.0
54.700	.0080					.0074	.40	12.00	1.20	9.00	.015	.00	.00	BOX
-1679.160	55.697	9.355	65.051	4497.00	20.03	6.23	71.28	12.00	10.29	25.00	12.000	25.000	.00	1 1.0
95.423	.0080					.0069	.65	12.00	1.18	9.00	.015	.00	.00	BOX
-1583.737	56.460	9.811	66.271	4497.00	19.10	5.66	71.93	12.00	10.29	25.00	12.000	25.000	.00	1 1.0
18.737	.0080					.0061	.11	12.00	1.10	9.00	.015	.00	.00	BOX

QUEENSBOROUGH CULVERT - JMA ARCH STUDIOS
GCWALLACE PROJECT # 619.295
FILENAME: QB12X12-U2.WSW CJK

Station / L/Elem	Invert Elev / Ch Slope	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/ Dia.-FT / "N"	Base Wt or I.D. / X-Fall	ZL / ZR	No Wth Prs/Pip / Type Ch
-1565.000	56.610	10.291	66.901	4497.00	18.21	5.15	72.05	.00	10.29	25.00	12.000	25.000	.00	1 1.0
88.377	.0050					.0051	.45	10.29	1.02	10.85	.015	.00	.00	BOX
-1476.623	57.053	10.793	67.846	4497.00	17.36	4.68	72.53	.00	10.29	25.00	12.000	25.000	.00	1 1.0
257.531	.0050					.0050	1.29	10.79	.95	10.85	.015	.00	.00	BOX
-1219.092	58.343	10.853	69.196	4497.00	17.26	4.63	73.82	.00	10.29	25.00	12.000	25.000	.00	1 1.0
219.092	.0050					.0050	1.10	10.85	.94	10.85	.015	.00	.00	BOX
-------------------- WARNING - Flow depth near top of box conduit --------------------														
-1000.000	59.440	10.853	70.293	4497.00	17.26	4.63	74.92	.00	10.29	25.00	12.000	25.000	.00	1 1.0


RAMPART BOULEVARD
PLAN
HORIZONTAL: 1"=30'
ALTA DRIVE
PECCOLE RANCH
S=0.0050 FT./FT.
18" SD
72" SD
18" RCP
350 LF @ 0.0186
2 - 12'x12' RCB
CONSTRUCT CULVERT HEADWALL 60" RCP, 45° SKEW, PER NDOT STD. DWG. R-2.5.2 (502)
ROTATE MANHOLE CONE TO AVOID CONFLICT BETWEEN MANHOLE RING & COVER AND MEDIAN ISLAND CURB
SEE SHEET SD-13 FOR RCB PLAN AND PROFILE
NDOT STANDARD TYPE 1 HEADWALL PER DWG. NO. B-20.1.5 30° SKEW
STA. 57+00 ~ MATCHLINE ~ SEE SHT. SD-4
DESIGN CENTERLINE PROFILE
EXISTING GRADE @ CENTERLINE
HGL AT TOP OF PIPE (6FT DEPTH)
TIE IN INV.= 2966.75'
+3.25
FACILITY 25
2710
2700
2690
2680

APPENDIX F

Improvement Plans

Electronically Filed
11/23/2022 3:52 PM
Steven D. Grierson
CLERK OF THE COURT

APEN

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(Additional Counsel Identified on Signature Page)

Attorneys for Defendant City of Las Vegas

DISTRICT COURT

CLARK COUNTY, NEVADA

FORE STARS, LTD, SEVENTY ACRES, LLC, a Nevada limited liability company, DOE INDIVIDUALS I through X, DOE CORPORATIONS I through X, DOE LIMITED LIABILITY COMPANIES I through X,

Plaintiffs,

CITY OF LAS VEGAS, political subdivision of the State of Nevada, THE EIGHTH JUDICIAL DISTRICT COURT, County of Clark, State of Nevada, DEPARTMENT 24 (the HONORABLE JIM CROCKETT, DISTRICT COURT JUDGE, IN HIS OFFICIAL CAPACITY), ROE government entities I through X, ROE Corporations I through X, ROE INDIVIDUALS I through X, ROE LIMITED LIABILITY COMPANIES I through X, ROE quasi-governmental entities I through X,

Defendants.

Case No. A-18-773268-C
Dept. No. XXIX

SUPPLEMENTAL APPENDIX OF EXHIBITS IN SUPPORT OF CITY'S COUNTERMOTION FOR SUMMARY JUDGMENT ON JUST COMPENSATION

VOLUME 39

The City of Las Vegas ("City") submits this Supplemental Appendix of Exhibits in support of its Countermotion for Summary Judgment on Just Compensation. This appendix supplements the Appendix of Exhibits in Support of City's Renewed Motion for Summary Judgment and Motions in Limine filed August 11, 2022 (Volumes 1 through 25); the Supplemental Appendix of Exhibits in Support of City's Renewed Motion for Summary Judgment and Motions in Limine filed August 24, 2022 (Volumes 26 through 27); the Second Supplemental Appendix of Exhibits in Support of City's Renewed Motion for Summary Judgment and Motions in Limine filed September 12, 2022 (Volumes 28 through 32); and the Third Supplemental Appendix of Exhibits in Support of City's Renewed Motion for Summary Judgment and Motions in Limine filed September 14, 2022 (Volume 33).

Exhibit	Exhibit Description	Vol.	Bates No.
A	City records regarding William Peccole's Petition to Annex 2,246 acres to the City of Las Vegas	1	0001-0011
B	City records regarding the Peccole Land Use Plan and the Z-34-81 rezoning application	1	0012-0030
C	City records regarding the Venetian Foothills Master Plan and the Z-30-86 rezoning application	1	0031-0050
D	Excerpts of the 1985 City of Las Vegas General Plan	1	0051-0061
E	City records regarding Peccole Ranch Master Plan and phase I rezoning application (Z-139-88)	1	0062-0106
F	City records regarding Z-40-89 rezoning application	1	0107-0113
G	Ordinance No. 3472 (establishing the Gaming Enterprise District) and related records	1	0114-0137
H	City records regarding the Amended Peccole Ranch Master Plan and phase II rezoning application (Z-17-90)	1	0138-0194
I	Excerpts of 1992 City of Las Vegas General Plan	2	0195-0248
J	City records related to Badlands Golf Course expansion	2	0249-0254
K	Excerpt of land use case files for GPA-24-98 and GPA-6199	2	0255-0257
L	Ordinance No. 5250 and Excerpts of Las Vegas 2020 Master Plan	2	0258-0273
M	Miscellaneous Southwest Sector Land Use Maps from 2002-2005	2	0274-0277
N	Ordinance No. 5787 and Excerpts of 2005 Land Use Element	2	0278-0291
O	Ordinance No. 6056 and Excerpts of 2009 Land Use & Rural Neighborhoods Preservation Element	2	0292-0301
P	Ordinance No. 6152 and Excerpts of 2012 Land Use & Rural Neighborhoods Preservation Element	2	0302-0317
Q	Ordinance No. 6622 and Excerpts of 2018 Land Use & Rural Neighborhoods Preservation Element	2	0318-0332
R	Ordinance No. 1582	2	0333-0339
S	Ordinance No. 4073 and Excerpt of the 1997 City of Las Vegas Zoning Code	2	0340-0341

Exhibit	Exhibit Description	Vol.	Bates No.
T	Ordinance No. 5353	2	0342-0361
U	Ordinance No. 6135 and Excerpts of City of Las Vegas Unified Development Code adopted March 16, 2011	2	0362-0364
V	Deeds transferring ownership of the Badlands Golf Course	2	0365-0377
W	Third Revised Justification Letter regarding the Major Modification to the 1990 Conceptual Peccole Ranch Master Plan	2	0378-0381
X	Parcel maps recorded by the Developer subdividing the Badlands Golf Course	3	0382-0410
Y	EHB Companies promotional materials	3	0411-0445
Z	General Plan Amendment (GPA-62387), Rezoning (ZON-62392) and Site Development Plan Review (SDR-62393) applications	3	0446-0466
AA	Staff Report regarding 17-Acre Applications	3	0467-0482
BB	Major Modification (MOD-63600), Rezoning (ZON-63601), General Plan Amendment (GPA-63599), and Development Agreement (DIR-63602) applications	3	0483-0582
CC	Letter requesting withdrawal of MOD-63600, GPA-63599, ZON-63601, DIR-63602 applications	4	0583
DD	Transcript of February 15, 2017 City Council meeting	4	0584-0597
EE	Judge Crockett's March 5, 2018 order granting Queensridge homeowners' petition for judicial review, Case No. A-17-752344-J	4	0598-0611
FF	Docket for NSC Case No. 75481	4	0612-0623
GG	Complaint filed by Fore Stars Ltd. and Seventy Acres LLC, Case No. A-18-773268-C	4	0624-0643
HH	General Plan Amendment (GPA-68385), Site Development Plan Review (SDR-68481), Tentative Map (TMP-68482), and Waiver (68480) applications	4	0644-0671
II	June 21, 2017 City Council meeting minutes and transcript excerpt regarding GPA-68385, SDR-68481, TMP-68482, and 68480.	4	0672-0679
JJ	Docket for Case No. A-17-758528-J	4	0680-0768
KK	Judge Williams' Findings of Fact and Conclusions of Law, Case No. A-17-758528-J	5	0769-0793
LL	Development Agreement (DIR-70539) application	5	0794-0879
MM	August 2, 2017 City Council minutes regarding DIR-70539	5	0880-0882

Exhibit	Exhibit Description	Vol.	Bates No.
NN	Judge Sturman's February 15, 2019 minute order granting City's motion to dismiss, Case No. A-18-775804-J	5	0883
OO	Excerpts of August 2, 2017 City Council meeting transcript	5	0884-0932
PP	Final maps for Amended Peccole West and Peccole West Lot 10	5	0933-0941
QQ	Excerpt of the 1983 Edition of the Las Vegas Municipal Code	5	0942-0951
RR	Ordinance No. 2185	5	0952-0956
SS	1990 aerial photograph identifying Phase I and Phase II boundaries, produced by the City's Planning & Development Department, Office of Geographic Information Systems (GIS)	5	0957
TT	1996 aerial photograph identifying Phase I and Phase II boundaries, produced by the City's Planning & Development Department, Office of Geographic Information Systems (GIS)	5	0958
UU	1998 aerial photograph identifying Phase I and Phase II boundaries, produced by the City's Planning & Development Department, Office of Geographic Information Systems (GIS)	5	0959
VV	2015 aerial photograph identifying Phase I and Phase II boundaries, retail development, hotel/casino, and Developer projects, produced by the City's Planning & Development Department, Office of Geographic Information Systems (GIS)	5	0960
WW	2015 aerial photograph identifying Phase I and Phase II boundaries, produced by the City's Planning & Development Department, Office of Geographic Information Systems (GIS)	5	0961
XX	2019 aerial photograph identifying Phase I and Phase II boundaries, and current assessor parcel numbers for the Badlands property, produced by the City's Planning & Development Department, Office of Geographic Information Systems (GIS)	5	0962
YY	2019 aerial photograph identifying Phase I and Phase II boundaries, and areas subject to inverse condemnation litigation, produced by the City's Planning & Development Department, Office of Geographic Information Systems (GIS)	5	0963
ZZ	2019 aerial photograph identifying areas subject to proposed development agreement (DIR-70539), produced by the City's Planning & Development	5	0964

Exhibit	Exhibit Description	Vol.	Bates No.
	Department, Office of Geographic Information Systems (GIS)		
AAA	Membership Interest Purchase and Sale Agreement	6	0965-0981
BBB	Transcript of May 16, 2018 City Council meeting	6	0982-0998
CCC	City of Las Vegas' Amicus Curiae Brief, *Seventy Acres, LLC v. Binion*, Nevada Supreme Court Case No. 75481	6	0999-1009
DDD	Nevada Supreme Court March 5, 2020 Order of Reversal, *Seventy Acres, LLC v. Binion*, Nevada Supreme Court Case No. 75481	6	1010-1016
EEE	Nevada Supreme Court August 24, 2020 Remittitur, *Seventy Acres, LLC v. Binion*, Nevada Supreme Court Case No. 75481	6	1017-1018
FFF	March 26, 2020 Letter from City of Las Vegas Office of the City Attorney to Counsel for the Developer Re: Entitlements on 17 Acres	6	1019-1020
GGG	September 1, 2020 Letter from City of Las Vegas Office of the City Attorney to Counsel for the Developer Re: Final Entitlements for 435-Unit Housing Development Project in Badlands	6	1021-1026
HHH	Complaint Pursuant to 42 U.S.C. § 1983, *180 Land Co. LLC et al. v. City of Las Vegas, et al.*, 18-cv-00547 (2018)	6	1027-1122
III	9th Circuit Order in *180 Land Co. LLC; et al v. City of Las Vegas, et al.*, 18-cv-0547 (Oct. 19, 2020)	6	1123-1127
JJJ	Plaintiff Landowners' Second Supplement to Initial Disclosures Pursuant to NRCP 16.1 in 65-Acre case	6	1128-1137
LLL	Bill No. 2019-48: Ordinance No. 6720	7	1138-1142
MMM	Bill No. 2019-51: Ordinance No. 6722	7	1143-1150
NNN	March 26, 2020 Letter from City of Las Vegas Office of the City Attorney to Counsel for the Developer Re: Entitlement Requests for 65 Acres	7	1151-1152
OOO	March 26, 2020 Letter from City of Las Vegas Office of the City Attorney to Counsel for the Developer Re: Entitlement Requests for 133 Acres	7	1153-1155

Exhibit	Exhibit Description	Vol.	Bates No.
PPP	April 15, 2020 Letter from City of Las Vegas Office of the City Attorney to Counsel for the Developer Re: Entitlement Requests for 35 Acres	7	1156-1157
QQQ	Valbridge Property Advisors, Lubawy & Associates Inc., Appraisal Report (Aug. 26, 2015)	7	1158-1247
RRR	Notice of Entry of Order Adopting the Order of the Nevada Supreme Court and Denying Petition for Judicial Review	7	1248-1281
SSS	Letters from City of Las Vegas Approval Letters for 17-Acre Property (Feb. 16, 2017)	8	1282-1287
TTT	Reply Brief of Appellants 180 Land Co. LLC, Fore Stars, LTD,, Seventy Acres LLC, and Yohan Lowie in *180 Land Co LLC et al v. City of Las Vegas*, Court of Appeals for the Ninth Circuit Case No. 19-16114 (June 23, 2020)	8	1288-1294
UUU	Excerpt of Reporter's Transcript of Hearing on City of Las Vegas' Motion to Compel Discovery Responses, Documents and Damages Calculation and Related Documents on Order Shortening Time in *180 Land Co. LLC v. City of Las Vegas*, Eighth Judicial District Court Case No. A-17-758528-J (Nov. 17, 2020)	8	1295-1306
VVV	Plaintiff Landowners' Sixteenth Supplement to Initial Disclosures in *180 Land Co., LLC v. City of Las Vegas*, Eighth Judicial District Court Case No. A-17-758528-J (Nov. 10, 2020)	8	1307-1321
WWW	Excerpt of Transcript of Las Vegas City Council Meeting (Aug. 2, 2017)	8	1322-1371
XXX	Notice of Entry of Findings of Facts and Conclusions of Law on Petition for Judicial Review in *180 Land Co. LLC v. City of Las Vegas*, Eighth Judicial District Court Case No.A-17-758528-J (Nov. 26, 2018)	8	1372-1399
YYY	Notice of Entry of Order *Nunc Pro Tunc* Regarding Findings of Fact and Conclusion of Law Entered November 21, 2019 in *180 Land Co. LLC v. City of Las Vegas*, Eighth Judicial District Court Case No.A-17-758528 (Feb. 6, 2019)	8	1400-1405
ZZZ	City of Las Vegas Agenda Memo – Planning, for City Council Meeting June 21, 2017, Re: GPA-68385, WVR-68480, SDR-68481, and TMP-68482 [PRJ-67184]	8	1406-1432

Exhibit	Exhibit Description	Vol.	Bates No.
AAAA	Excerpts from the Land Use and Rural Neighborhoods Preservation Element of the City's 2020 Master Plan adopted by the City Council of the City on September 2, 2009	8	1433-1439
BBBB	Summons and Complaint for Declaratory Relief and Injunctive Relief, and Verified Claims in Inverse Condemnation in *180 Land Co. LLC v. City of Las Vegas*, Eighth Judicial District Court Case No.A-18-780184-C	8	1440-1477
CCCC	Notice of Entry of Findings of Fact and Conclusions of Law Granting City of Las Vegas' Motion for Summary Judgment in *180 Land Co. LLC v. City of Las Vegas*, Eighth Judicial District Court Case No.A-18-780184-C (Dec. 30, 2020)	8	1478-1515
DDDD	Peter Lowenstein Declaration	9	1516-1522
DDDD-1	Exhibit 1 to Peter Lowenstein Declaration: Diagram of Existing Access Points	9	1523-1526
DDDD-2	Exhibit 2 to Peter Lowenstein Declaration: July 5, 2017 Email from Mark Colloton	9	1527-1531
DDDD-3	Exhibit 3 to Peter Lowenstein Declaration: June 28, 2017 Permit application	9	1532-1533
DDDD-4	Exhibit 4 to Peter Lowenstein Declaration: June 29, 2017 Email from Mark Colloton re Rampart and Hualapai	9	1534-1536
DDDD-5	Exhibit 5 to Peter Lowenstein Declaration: August 24, 2017 Letter from City Department of Planning	9	1537
DDDD-6	Exhibit 6 to Peter Lowenstein Declaration: July 26, 2017 Email from Peter Lowenstein re Wall Fence	9	1538
DDDD-7	Exhibit 7 to Peter Lowenstein Declaration: August 10, 2017 Application for Walls, Fences, or Retaining Walls; related materials	9	1539-1546
DDDD-8	Exhibit 8 to Peter Lowenstein Declaration: August 24, 2017 Email from Steve Gebeke	9	1547-1553
DDDD-9	Exhibit 9 to Peter Lowenstein Declaration: Bill No. 2018-24	9	1554-1569
DDDD-10	Exhibit 10 to Peter Lowenstein Declaration: Las Vegas City Council Ordinance No. 6056 and excerpts from Land Use & Rural Neighborhoods Preservation Element	9	1570-1577

Exhibit	Exhibit Description	Vol.	Bates No.
DDDD-11	Exhibit 11 to Peter Lowenstein Declaration: documents submitted to Las Vegas Planning Commission by Jim Jimmerson at February 14, 2017 Planning Commission meeting	9	1578-1587
EEEE	GPA-72220 application form	9	1588-1590
FFFF	Chris Molina Declaration	9	1591-1605
FFFF-1	Fully Executed Copy of Membership Interest Purchase and Sale Agreement for Fore Stars Ltd.	9	1606-1622
FFFF-2	Summary of Communications between Developer and Peccole family regarding acquisition of Badlands Property	9	1623-1629
FFFF-3	Reference map of properties involved in transactions between Developer and Peccole family	9	1630
FFFF-4	Excerpt of appraisal for One Queensridge place dated October 13, 2005	9	1631-1632
FFFF-5	Site Plan Approval for One Queensridge Place (SDR-4206)	9	1633-1636
FFFF-6	Securities Redemption Agreement dated September 14, 2005	9	1637-1654
FFFF-7	Securities Purchase Agreement dated September 14, 2005	9	1655-1692
FFFF-8	Badlands Golf Course Clubhouse Improvement Agreement dated September 6, 2005	9	1693-1730
FFFF-9	Settlement Agreement and Mutual Release dated June 28, 2013	10	1731-1782
FFFF-10	June 12, 2014 emails and Letter of Intent regarding the Badlands Golf Course	10	1783-1786
FFFF-11	July 25, 2014 email and initial draft of Golf Course Purchase Agreement	10	1787-1813
FFFF-12	August 26, 2014 email from Todd Davis and revised purchase agreement	10	1814-1843
FFFF-13	August 27, 2014 email from Billy Bayne regarding purchase agreement	10	1844-1846
FFFF-14	September 15, 2014 email and draft letter to BGC Holdings LLC regarding right of first refusal	10	1847-1848

Exhibit	Exhibit Description	Vol.	Bates No.
FFFF-15	November 3, 2014 email regarding BGC Holdings LLC	10	1849-1851
FFFF-16	November 26, 2014 email and initial draft of stock purchase and sale agreement	10	1852-1870
FFFF-17	December 1, 2015 emails regarding stock purchase agreement	10	1871-1872
FFFF-18	December 1, 2015 email and fully executed signature page for stock purchase agreement	10	1873-1874
FFFF-19	December 23, 2014 emails regarding separation of Fore Stars Ltd. and WRL LLC acquisitions into separate agreements	10	1875-1876
FFFF-20	February 19, 2015 emails regarding notes and clarifications to purchase agreement	10	1877-1879
FFFF-21	February 26, 2015 email regarding revised purchase agreements for Fore Stars Ltd. and WRL LLC	10	1880
FFFF-22	February 27, 2015 emails regarding revised purchase agreements for Fore Stars Ltd. and WRL LLC	10	1881-1882
FFFF-23	Fully executed Membership Interest Purchase Agreement for WRL LLC	10	1883-1890
FFFF-24	June 12, 2015 email regarding clubhouse parcel and recorded parcel map	10	1891-1895
FFFF-25	Quitclaim deed for Clubhouse Parcel from Queensridge Towers LLC to Fore Stars Ltd.	10	1896-1900
FFFF-26	Record of Survey for Hualapai Commons Ltd.	10	1901
FFFF-27	Deed from Hualapai Commons Ltd. to EHC Hualapai LLC	10	1902-1914
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ZZZZ -1	Master planned communities with R-PD zoning	21	4056-4061
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DDDDD	Appraisal of Real Property prepared by The DiFederico Group re the 17-Acre Property	23	4241-4394
EEEEE	Affidavit of Donald Richards (Ex. 50 to Plaintiff Landowners' Reply in Support of Countermotion for Discovery Pursuant to NRCP 56(d) filed 7/7/2021)	23	4395-4396
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HHHHH-2	June 8, 2015 letter to Angie Scott from Steve Swanton re PMP-59572	24	4603
HHHHH-3	Email from Stephanie Allen to Peter Lowenstein re Development Agreement	24	4604-4605
HHHHH-4	Email from Lucien Paet re New Badlands Parcel Map	24	4606
HHHHH-5	Approved Site Plan for SDR-62393	24	4607
IIIII	Declaration of Kevin McOsker	25	4608-4609
JJJJJ	Videotaped Deposition of Tio Stephan DiFederico, MAI	25	4610-4711
KKKKK	Appellant's Opening Brief filed 11/6/18 in Nevada Supreme Court Case No. 75481	26	4712-4791
LLLLL	Appellant's Amended Reply Brief filed 5/1/19 in Nevada Supreme Court Case No. 75481	26	4792-4829
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PPPPP	Notice of Entry of Findings of Fact, Conclusions of Law Regarding (1) Motion to Remand 133-Acre Applications to Las Vegas City Council and (2) Motion to Dismiss Civil Complaint Improperly Joined with Petition for Judicial Review	27	4962-4973

Exhibit	Exhibit Description	Vol.	Bates No.
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TTTTT	Order Granting the City of Las Vegas' Objection to the Discovery Commissioner's Report and Recommendation in the 35-Acre Case (No. A-17-758528-J)	30	5417-5422
UUUUU	Appraisal of Real Property prepared by The DiFederico Group re the 35-Acre Property	30	5423-5558
VVVVV	Excerpts of Deposition Transcript of Yohan Lowie	31	5559-5566
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YYYYY-1	**Technical Drainage Study for the Seventy 840-050 March 2016**	**34-35**	**5596-5982**
YYYYY-2	**Supplement to Technical Drainage Study for the Seventy 840-050 March 2016**	**35**	**5983-6024**
YYYYY-3	**March 24, 2016 City of Las Vegas Inter-Office Memorandum re Drainage Study for The Seventy**	**36**	**6025-6028**
YYYYY-4	**September 2017 Response to 1st CLV Comments on the Technical Drainage Study for the 435 (Formerly "The Seventy")**	**36**	**6029-6193**
YYYYY-5	**September 14, 2017 - Improvement Plans for the 435**	**37**	**6194-6210**
YYYYY-6	**March 24, 2016 City of Las Vegas Inter-Office Memorandum re Drainage Study for The Seventy**	**37**	**6211-6215**
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Exhibit	Exhibit Description	Vol.	Bates No.
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YYYYY-9	February 1, 2018 City of Las Vegas Inter-Office Memorandum re Drainage Study for the 435 formerly the SEVENTY	37	6310-6314
YYYYY-10	June 2018 Response to 3rd CLV Comments on the Technical Drainage Study for the 435 (Formerly "The Seventy")	38	6315-6461
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YYYYY-13	August 13, 2016 GCW Engineers Meeting Minutes	39	6490-6495
YYYYY-14	Email re The 435 TD5 Comments Review Meeting	39	6496-6499
ZZZZZ	Declaration of Michael Cunningham	39	6500
ZZZZZ-1	Administrative Code, 2019 Edition	39	6501-6507

Dated this 23rd day of November, 2022.

McDONALD CARANO LLP

By: _/s/ George F. Ogilvie III_

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Attorneys for City of Las Vegas

CERTIFICATE OF SERVICE

I HEREBY CERTIFY that I am an employee of McDonald Carano LLP, and that on the 23rd day of November, 2022, I caused a true and correct copy of the foregoing **FOURTH SUPPLEMENTAL APPENDIX OF EXHIBITS IN SUPPORT OF CITY'S COUNTERMOTION FOR SUMMARY JUDGMENT ON JUST COMPENSATION – VOLUME 39** to be electronically served with the Clerk of the Court via the Clark County District Court Electronic Filing Program which will provide copies to all counsel of record registered to receive such electronic notification.

/s/ Jelena Jovanovic
An employee of McDonald Carano LLP

EXHIBIT “YYYYY-11”

IMPROVEMENT PLANS

FOR

SEVENTY ACRES LLC

THE 435

RAMPART BOULEVARD
LAS VEGAS, NEVADA 89145

APN: 138-32-301-005

INDEX OF DRAWINGS

APPROVALS

APPROVAL OF THESE PLANS IS LIMITED TO THOSE IMPROVEMENTS CONSTRUCTED IN THE DEDICATED RIGHTS-OF-WAY AND/OR DEDICATED EASEMENTS. THIS APPROVAL DOES NOT AUTHORIZE THE CONSTRUCTION OF ANY IMPROVEMENTS THAT DEVIATE FROM ADOPTED STANDARDS AND/OR SPECIFICATIONS, EXCEPT THOSE SPECIFICALLY LISTED UNDER "DEVIATIONS FROM STANDARDS". THE ENGINEER SHALL RESOLVE ANY DEVIATION OTHER THAN THOSE LISTED IN "DEVIATIONS FROM STANDARDS" IN FAVOR OF THE UNIFORM STANDARD DRAWINGS AND SPECIFICATIONS CLARK COUNTY AREA NEVADA.

ALLEN PAVELKA: PE # 9029 DATE
CITY ENGINEER

LAS VEGAS FIRE & RESCUE DATE

CHRIS KNIGHT, DIRECTOR, BUILDING AND SAFETY DATE

THIS PLAN CONFORMS TO THE APPLICABLE STANDARDS OF THE PLANNING DEPARTMENT.

UTILITY/AGENCY APPROVALS

COX COMMUNICATIONS LAS VEGAS, INC. DATE

THE AFFIXED CENTURYLINK APPROVAL DOES NOT ASSUME OR GUARANTEE LIABILITY FOR KNOWN OR UNKNOWN CONFLICTS WITH EXISTING OR PROPOSED IMPROVEMENTS. RESOLUTION OF ANY CONFLICT WILL BE ACCOMPLISHED PURSUANT TO LOCAL ORDINANCES, NEVADA REVISED STATUTES AND/OR PUBLIC UTILITY COMMISSION RULES AND REGULATIONS.

CENTRAL TELEPHONE CO., DBA CENTURYLINK DATE

NV ENERGY ACKNOWLEDGES THAT WE HAVE RECEIVED YOUR PLANS AND WILL PROVIDE SERVICE TO ALL ELECTRICAL NEEDS ASSOCIATED WITH THIS PROJECT. NV ENERGY RESERVES THE RIGHT TO ADDRESS ANY EXISTING OR FUTURE CONFLICTS ONCE THE FINAL DESIGN IS COMPLETED. THE NEW SERVICE AND THE RESOLUTION OF ANY CONFLICTS WILL BE ACCOMPLISHED PURSUANT TO THE NEVADA PUBLIC UTILITY COMMISSION'S RULES AND REGULATIONS.

NV ENERGY DATE

SOUTHWEST GAS CORP. DATE

LEGAL DESCRIPTION

LOTS 1 AND 2 AS SHOWN IN FILE 120, PAGE 91 OF PARCEL MAPS. AND LOT 2 AS SHOWN IN FILE 120, PAGE 44 OF PARCEL MAPS. AND LOT 1 AS SHOWN IN FILE 120, PAGE 49 OF PARCEL MAPS.

DRAINAGE CERTIFICATION

I CERTIFY THAT THE GRADING PLANS ARE IN CONFORMANCE WITH THE APPROVED DRAINAGE STUDY DS-XXXXX ON FILE AT THE CITY OF LAS VEGAS FOR THIS PROJECT.

MARK J. FAKLER P.E. 9911 DATE

OWNER/DEVELOPER

SEVENTY ACRES LLC AND
FORE STARS LTD
1215 S. FORT APACHE RD.
SUITE #120
LAS VEGAS NV. 89117

BENCHMARK

BM #	DESCRIPTION	NAVD 88	NAVD 88
SLV-106NW6	CITY OF LAS VEGAS VERTICAL CONTROL POINT 'SLV106NW6', BEING A RIVET & PLATE IN TOP OF CURB AT SW CORNER OF CHARLESTON & HUALAPAI IN PORK CHOP ISLAND	2914.54 (FEET)	888.355 (METERS)

NOTE

CITY OF LAS VEGAS VERTICAL CONTROL 2008 ADJUSTMENT (UPDATED 05/24/2010) BASED ON NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD'88).

BASIS OF BEARINGS

NORTH 89°40'03" EAST, BEING THE BEARING OF THE SOUTH LINE OF THE SOUTHEAST QUARTER (SE 1/4) OF SECTION 31, TOWNSHIP 20 SOUTH, RANGE 60 EAST, M.D.M., AS SHOWN IN FILE 120, PAGE 49 OF PARCEL MAPS ON FILE AT THE CLARK COUNTY, NEVADA RECORDER'S OFFICE.

REV	DATE	DESCRIPTION	DATE	AGEN APP	DATE	GCW APP
					DATE: 06/29/2018	

TDS SUBMITTAL

GA D. NGUYEN, CIVIL, No. 14918, STATE OF NEVADA, PROFESSIONAL ENGINEER

PROJECT NO. 840-050
DESIGN: TD
DRAWN: TD
CHECK: MF
PLOT DATE: 06-29-18
PLOT TIME: 17:45:35

GCW
ENGINEERS \ SURVEYORS
1555 S. RAINBOW BLVD.
LAS VEGAS, NV 89146
T: 702.804.2000
F: 702.804.2299
gcwengineering.com

F:\PROJECTS\800\840-050\DWG\PRODUCTION\PHASE-1AA\050-1AAC01_CV.DWG
QUANGVINH NGUYEN

SEVENTY ACRES, LLC

THE 435

COVER SHEET

DRAWING C1.01
1 OF 22 SHTS

ABBREVIATIONS

A	AIR, ANODE
A.E.	ACCESS EASEMENT
AASHTO	AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS
AB,AGG	AGGREGATE BASE
ABAN	ABANDON
AC	ASPHALT CONCRETE, ACRE
ACP	ASBESTOS CEMENT PIPE
ADD'L	ADDITIONAL
AIP	ABANDONINPLACE
ALT	ALTERNATE
AP	ANGLE POINT
APN	ASSESSOR'S PARCEL NUMBER
APPROX	APPROXIMATELY
APT	APARTMENT
ASTM	AMERICAN SOCIETY FOR TESTING AND MATERIALS
AVAR	AIR VALVE, AIR RELEASE ASSEMBLY
AVE	AVENUE
AWWA	AMERICAN WATERWORKS ASSOCIATION
BC	BACK OF CURB
BCR	BEGIN CURB RETURN, BACK OF CURB RADIUS
BDRY	BOUNDARY
BLDG	BUILDING
BLM	BUREAU OF LAND MANAGEMENT
BLVD	BOULEVARD
BM	BENCHMARK
BO	BLOW-OFF
BVCE	BEGIN VERTICAL CURVE ELEVATION
BVCS	BEGIN VERTICAL CURVE STATION
BW	BACK OF SIDEWALK
BWV	BACKWATER VALVE
C&G	CURB AND GUTTER
C/L	CENTERLINE
CATV	UNDERGROUND CABLE TV
CBC	CITY OF BOULDER CITY
CC	CLARK COUNTY
C-C	CENTER TO CENTER
CCBM	CLARK COUNTY BENCHMARK
CCPW	CLARK COUNTY PUBLIC WORKS
CCRFCD	CLARK COUNTY REGIONAL FLOOD CONTROL DISTRICT
CCTV	CLOSED-CIRCUIT TELEVISION
CCWRD	CLARK COUNTY WATER RECLAMATION DISTRICT
CE	COMMON ELEMENT
CF	CUBIC FEET, CURB FACE
CFS	CUBIC FEET PER SECOND
CIP	CAPITAL IMPROVEMENTS PROJECT, CORRUGATED IRON PIPE
CIPM	CURED-IN-PLACE MANHOLE
CIPP	CURED-IN-PLACE PIPE
CIR	CIRCLE
CL	CLASS
CLR	CLEAR OR CLEARANCE
CLSM	CONTROLLED LOW STRENGTH MATERIAL
CLV	CITY OF LAS VEGAS
CM	CITY OF MESQUITE
CMP	CORRUGATED METAL PIPE
CMU	CONCRETE MASONRY UNIT
CNLV	CITY OF NORTH LAS VEGAS
CO	CLEANOUT
COH	CITY OF HENDERSON
COL	COLUMN
COMM	COMMERCIAL
CONC,PCC	CONCRETE
COND	CONDUIT
CONST	CONSTRUCT OR CONSTRUCTION
COORD	COORDINATE
COR	CORNER
CPEP	CORRUGATED POLYETHELYNE PIPE
CPR	COPPER WATER LINE
CT	COURT
CULV	CULVERT
CY	CUBIC YARD(S)
D,Δ	DELTA
DBL	DOUBLE
DCS	DESIGN AND CONSTRUCTION STANDARDS FOR WASTEWATER COLLECTION SYSTEM (LATESTEDITION)
DE	DRAINAGE EASEMENT
DEFL	DEFLECTION
DEPT	DEPARTMENT
DG	DESIGN GRADE
DI	DROP INLET
DIA,#	DIAMETER
DIP	DUCTILE IRON PIPE
DIST	DISTANCE
DOM	DOMESTIC
DP	DUPLEX
DR	DRIVE
DS	DOWNSPOUT
DTL	DETAIL
DWG	DRAWING
DWY	DRIVEWAY
E	EAST, ELECTRIC
EAE	EMERGENCY ACCESS EASEMENT
EBS	CATHODIC PROTECTION BOND STATION
ECR	END CURB RETURN
ELE,ELEC	ELECTRICAL
ELEV	ELEVATION
EMBK	EMBANKMENT
EP,EOP	EDGE OF PAVEMENT
ESMT	EASEMENT
ETS	CATHODIC PROTECTION TEST STATION
EVCE	END VERTICAL CURVE ELEVATION
EVCS	END VETICAL CURVE STATION
EXIST,EX	EXISTING
EXP	EXPANSION JOINT
FA	FIRE ALARM
FC	FACE OF CURB
FF,FFE	FINISH FLOOR ELEVATION
FG	FINISH GRADE
FH	FIRE HYDRANT
FL	FLOWLINE
FLG	FLANGE
FO	FIBEROPTIC
FRP	FIBERGLASS REINFORCED PLASTIC
FS	FINISH SURFACE
FT	FOOT/FEET
FTG	FOOTING
FUT	FUTURE
G	GAS
GA	GAGE ,GUY ANCHOR
GB	GRADE BREAK
GFF	GARAGE FINISHED FLOOR
GND	GROUND
GRD	GRADE, GROUND
GUT	GUTTER
H,HGT	HEIGHT
HDWL	HEADWALL
HERCP	HORIZONTAL ELLIPTICAL REINFORCED CONCRETE PIPE
HGL	HYDRAULIC GRADELINE
HOA	HOMEOWNERS ASSOCIATION
HORIZ	HORIZONTAL
HP	HIGH POINT, HIGH PRESSURE
HPS	HIGH PRESSURE SODIUM
IBC	INTERNATIONAL BUILDING CODE
IN	INCH
INT	INTERSECTION, INTERIM
INV	INVERT
ISL	ISLAND
JB	JUCNTION BOX
JT	JOINT
L	LENGTH
L,LT	LEFT
LF	LINEAR FEET
LIP	LIP OF GUTTER
LN	LANE
LOC	LENGTH OF CURB
LP	LIGHT POLE
LS,LLSCP	LANDSCAPE
LVVWD	LAS VEGAS VALLEY WATER DISTRICT
MAX	MAXIMUM
ME	MATCH EXISTING
MH	MANHOLE
MIN	MINIMUM
MLCP	MORTAR LINED AND COATED PIPE
MOD	MODIFY/MODIFIED
MON	MONUMENT, MONOLITHIC
MP	MESAPARK
MPH	MILES PER HOUR
MSM	MINOR SUBDIVISION MAP
N	NORTH
NAP	NOT A PART
NDOT	NEVADA DEPARTMENT OF TRANSPORTATION
NO	NUMBER
NOSHA	STATE OF NEVADA OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION
NPC	NEVADA POWER COMPANY
NTS	NOT TO SCALE
NVE	NEVADA ENERGY
OB	OVERBUILD
OC	ON CENTER
OG	OPEN GRADE, ORIGINAL GROUND
OHC	OVERHEAD COX COMMUNICATION
OHP	OVERHEAD POWERLINE
P	POWER
PAE	PEDESTRIAN ACCESS EASEMENT
PB	PULL BOX
PBS	PLANTMIX BITUMINOUS SURFACE
PC	POINT OF CURVATURE, PRESSURE CLASS
PCC	POINT OF COMPOUND CURVE, PORTLAND CEMENT CONCRETE
PDE	PUBLIC DRAINAGE EASEMENT
PE	PROJECT ENGINEER OR POLYETHYLENE
PED	PEDESTRIAN
PGL	PROFILE GRADE LINE
PH	POTHOLE
PI	POINT OF INTERSECTION
PIP	PROTECT IN PLACE
PIV	POST INDICATOR VALVE
PL,P/L	PROPERTY LINE
PLCP	POLYURETHANE LINED AND COATED STEEL PIPE
PMF	PAVEMENT MARKING FILM
PO	PUSH-ON
POB	POINT OF BEGINNING
POC	POINT OF CONNECTION
POT	POINT ON TANGENT
PP	POWER POLE
PRC	POINT OF REVERSE CURVE
PROP	PROPOSED
PRVC	POINT OF REVERSE VERTICAL CURVE
PSE	PUBLIC SEWER EASEMENT TO BE PRIVATELY MAINTAINED BY HOA
PSI	POUNDS PER SQUARE INCH
PT	POINT OF TANGENCY
PUE	PUBLIC UTILITY EASEMENT
PVC	POLYVINYLCHLORIDE
PVI	POINT OF VERTICAL INTERSECTION
PVMT	PAVEMENT
PVT	PRIVATE
PW	PRODUCT WALL
PZ	PRESSURE ZONE
R,RAD	RADIAL, RADIUS
R,RT	RIGHT
RCB	REINFORCED CONCRETE BOX
RCP	REINFORCED CONCRETE PIPE
RD	ROAD
RDWY	ROADWAY
REC	RECTANGULAR
REF	REFERENCE
REINF	REINFORCED
RELOC	RELOCATE
REQD	REQUIRED
RET	RETAINING
RIM	TOP OF RIM ELEVATION
RND	ROUND
ROW,R/W	RIGHT OF WAY
RP	RADIUS POINT
RPM	RAISED PAVEMENT MARKERS
RPPA	REDUCED PRESSURE PRINCIPAL ASSEMBLY
RR	RAILROAD
RSGV	RESILIENT SEAT GATE VALVE
RTW	RETAINING WALL
RW	REUSE WATER
S	SEWER, SOUTH
SC	STAIRCASE
SCH	SCHEDULE
SD	STORM DRAIN
SDMH	STORM DRAIN MANHOLE
SECT	SECTION
SF	SQUARE FOOT/FEET
SHLDR	SHOULDER
SHT	SHEET
SIS	SUMMERLIN IMPROVEMENT STANDARDS
SL, STLT	STREET LIGHT
SP	SERVICE POINT
SQ	SQUARE
SS	SANITARY SEWER
SSMH	SANITARY SEWER MANHOLE
ST	STREET
STA	STATION
STD	STANDARD
STL	STEEL
STRUCT	STRUCTURE
SURV	SURVEY
SVZ	SIGHT VISIBILITY ZONE
SW	SIDEWALK
SWG	SOUTHWEST GAS
SY	SQUARE YARD
T	TELEPHONE OR TOP
TAN	TANGENT
TB	TOP OF BERM
TBA	TO BE ADJUSTED
TBR	TO BE REMOVED
TC	TOP OF CURB
TCD	TRAFFIC CONTROL DEVICE
TCE	TEMPORARY CONSTRUCTION ESMT
TEL,TELE	TELEPHONE
TEMP	TEMPORARY
TF	TOP OF FOOTING
TG	TOP OF GRATE
TMH	TOP OF MANHOLE
TOP	TOP OF PIPE
TP	TELEPHONE POLE, TOP OF PIPE
TRANS	TRANSITION
TRW	TOP OF RETAINING WALL
TS	TRAFFIC SIGNAL
TSI	TRAFFIC SIGNAL INTERCONNECT
TSW	TOP OF SIDEWALK
TW	TOP OF WALL
TYP,(TYP)	TYPICAL
UDACS	UNIFORM DESIGN AND CONSTRUCTION STANDARDS FOR WATER DISTRIBUTION SYSTEMS(LATESTEDITION)
UG	UNDERGROUND
ULT	ULTIMATE
UNO	UNLESS NOTED OTHERWISE
USDCCA	UNIFORM STANDARD DRAWINGS FOR PUBLIC WORKS' CONSTRUCTION OFF-SITE IMPROVEMENTS CLARK COUNTY AREA, NEVADA(LATESTEDITION)
UT	UNDERGROUND TELEPHONE
UTIL	UTILITY
VAR	VARIABLE/VARIES
VC	VERTICAL CURVE
VCP	VITRIFIED CLAY PIPE
VERT	VERTICAL
VG	VALLEY GUTTER
VOL	VOLUME
W	WATER, WEST, WATT
W/	WITH
WI	WROUGHT IRON
WM	WATER METER
WMH	WATER MANHOLE
WS	WATER SUPPLY
WT	WEIGHT
WTR	WATER
XING	CROSSING
YD	YARD, YARD DRAIN

LEGEND

- PROPOSED UTILITIES
- EXISTING UTILITIES
- FUTURE UTILITIES
- SECTION LINE
- EASEMENT LINE
- RIGHT-OF-WAY LINE
- PROPERTY LINE
- CENTERLINE
- 100 YR HYDRAULIC GRADE LINE
- EXISTING STORM DRAIN
- FUTURE STORM DRAIN
- PROPOSED SWALE
- VIEW FENCE
- NEW ABANDONED PIPE
- SAWCUT
- RETAINING WALL
- ROUGH GRADE PAD LIMITS
- FLOOD ZONE "A" LIMITS
- LIMITS OF CONSTUCTION
- LIMITS OF GRADED ACCESS WAY
- EXISTING DRAINAGE EASEMENT
- PROPOSED DRAINAGE EASEMENT
- EXISTING REAINING WALL

- 1 / CD1 — DRAWING NUMBER FOR DETAIL W/ REF. TO THE SHEET WHERE IT IS SHOWN
- EXISTING DROP INLET
- PROPOSED DROP INLET
- EXISTING GATE VALVE
- EXISTING POWER POLE
- EXISTING ELEC MARKER
- EXISTING TRAFFIC SIGNAL
- EXISTING FIRE HYDRANT
- EXISTING UTILITY BOX
- EXISTING METER BOX
- 3005 — PROPOSED CONTOUR
- (3005) — EXISTING CONTOUR
- 80.50 TC — SPOT ELEVATION
- (80.50) TC — EXISTING SPOT ELEVATION
- 1.00% — SLOPE
- EXISTING STREET LIGHT (STLT)
- TOP SLOPE / TOE SLOPE — 3:1 SLOPE UNLESS OTHERWISE NOTED ON PLAN

ESTIMATE OF QUANTITIES

NOTE: CONTRACTOR TO VERIFY QUANTITIES FOR BIDDING PURPOSES

STORM DRAIN QUANTITIES

DESCRIPTION	UNIT	TOTAL
48" TYPE 1-A SDMH PER USDCCA 401 & 404.1	EA	15
48" TYPE 2 SD DROP INLET PER NDOT DWG NO. R-4.2.1	EA	2
24" RCP STORM DRAIN	LF	100
36" RCP STORM DRAIN	LF	56
48" RCP STORM DRAIN	LF	74
72" RCP STORM DRAIN	LF	195
10'X8' RCB STORM DRAIN	LF	340
10'X10' RCB STORM DRAIN	LF	1,800
20'X12' RCB STORM DRAIN	LF	10
20'14' RCB STORM DRAIN	LF	10
6'X8' RCB STORM DRAIN	LF	41
TRANSITION STRUCTURES	EA	3

DATE: 06/29/2018

TDS SUBMITTAL

REV	DATE	DESCRIPTION	DATE	AGEN APP	DATE	GCW APP

PROJECT NO. 840-050

DESIGN: TD
DRAWN: TD
CHECK: MF
PLOT DATE: 06-29-18
PLOT TIME: 17:46:00

GCW ENGINEERS \ SURVEYORS
1555 S. RAINBOW BLVD.
LAS VEGAS, NV 89146
T: 702.804.2000
F: 702.804.2299
gcwengineering.com

QUANGVINH NGUYEN

SEVENTY ACRES, LLC

THE 435

PROJECT DATA

DRAWING C1.02
2 OF 22 SHTS

CLV296076

6463

REPLY APP 1427

CITY OF LAS VEGAS GENERAL NOTES

1. ALL CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH THE "UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION OFF-SITE IMPROVEMENTS, CLARK COUNTY AREA NEVADA", LATEST ISSUE; THE "UNIFORM STANDARD DRAWINGS FOR PUBLIC WORKS CONSTRUCTION, CLARK COUNTY AREA NEVADA", LATEST REVISED EDITION; THE "SUMMERLIN IMPROVEMENT STANDARDS" FOR WORK IN THE SUMMERLIN AREA, AND OTHER APPLICABLE APPROVED STANDARDS ISSUED BY THE CONTROLLING AGENCY; THE UNIFORM BUILDING CODE; AND ALL LOCAL CITY CODES AND ORDINANCES APPLICABLE, EXCEPT AS NOTED ON THIS SHEET AS "DEVIATIONS FROM STANDARDS".
2. THE EXISTENCE AND LOCATION OF ANY OVERHEAD OR UNDERGROUND UTILITY LINES, PIPES, OR STRUCTURES SHOWN ON THESE PLANS ARE OBTAINED BY A RESEARCH OF THE AVAILABLE RECORDS. EXISTING UTILITIES AS SHOWN FROM CLV PLANS LIBRARY ARE APPROXIMATE AND FOR RECORD PURPOSES. EXISTING UTILITIES ARE LOCATED ON PLANS ONLY FOR THE CONVENIENCE OF THE CONTRACTOR. EXISTING UTILITY SERVICE LATERALS MAY NOT BE SHOWN ON THE PLANS. THE CONTRACTOR SHALL, AT HIS OWN EXPENSE, LOCATE ALL UNDERGROUND AND OVERHEAD INTERFERENCES WHICH MAY AFFECT HIS OPERATION DURING CONSTRUCTION AND SHALL TAKE ALL NECESSARY PRECAUTIONS TO AVOID DAMAGE TO SAME. THE CONTRACTOR SHALL USE EXTREME CAUTION WHEN WORKING NEAR OVERHEAD UTILITIES SO AS TO SAFELY PROTECT ALL PERSONNEL AND EQUIPMENT, AND SHALL BE RESPONSIBLE FOR ALL COST AND LIABILITY IN CONNECTION THEREWITH.
3. THE CONTRACTOR SHALL TAKE ALL PRECAUTIONARY MEASURES NECESSARY TO PROTECT EXISTING UTILITY LINES, STRUCTURES AND STREET IMPROVEMENTS WHICH ARE TO REMAIN IN PLACE, FROM DAMAGE, AND ALL SUCH IMPROVEMENTS OR STRUCTURES DAMAGED BY THE CONTRACTOR'S OPERATIONS SHALL BE REPAIRED OR REPLACED SATISFACTORY TO THE CITY ENGINEER AND OWNING UTILITY COMPANY AT THE EXPENSE OF THE CONTRACTOR.
4. ALL CONSTRUCTION SHALL BE AS SHOWN ON THESE PLANS. ANY REVISIONS SHALL HAVE THE PRIOR WRITTEN APPROVAL OF THE CITY ENGINEER.
5. TYPE V CEMENT SHALL BE USED IN ALL OFF-SITE CONCRETE WORK. CONCRETE TO BE 3000 P.S.I. MINIMUM @ 28 DAYS. MIX DESIGNS TO BE APPROVED BY THE CITY, PRIOR TO THE USE ON THE PROJECT.
6. PERMITS ARE REQUIRED FOR ANY WORK IN THE PUBLIC RIGHT-OF-WAY. THE CONTRACTOR SHALL SECURE ALL PERMITS AND INSPECTIONS REQUIRED FOR THIS CONSTRUCTION.
7. EXPANSION JOINTS REQUIRED, MAXIMUM EVERY 300' IN EXTRUDED-TYPE CURB.
8. AC PAVEMENT TO BE ONE-HALF INCH (½") ABOVE LIP OF ALL GUTTERS AFTER COMPACTION, EXCEPT AT SIDEWALK RAMPS AND CROSS GUTTERS.
9. CURB AND GUTTER FOUND TO BE UNACCEPTABLE TO THE CITY OF LAS VEGAS SHALL BE REMOVED AND REPLACED PER STANDARD DRAWING 218.
10. SIDEWALK RAMPS SHALL BE CONSTRUCTED IN EACH QUADRANT OF AN INTERSECTION PER STANDARD DRAWING 235. EXACT LOCATION OF RAMPS MAY BE ADJUSTED IN THE FIELD BY A CITY INSPECTOR.
11. CONTRACTOR SHALL PROVIDE ALL NECESSARY HORIZONTAL AND VERTICAL TRANSITIONS BETWEEN NEW CONSTRUCTION AND EXISTING SURFACES TO PROVIDE FOR PROPER DRAINAGE AND FOR INGRESS AND EGRESS TO NEW CONSTRUCTION. THE EXTENT OF THE TRANSITIONS TO BE AS SHOWN ON PLANS.
12. ALL GRADING WORK SHALL CONFORM TO THE SOILS REPORT AS PREPARED BY THE COMPANY ____ REPORT # ____ DATE ____ APPROVED BY THE CITY ENGINEER, AND AS SHOWN ON THESE PLANS.
13. EXACT LOCATION OF ALL SAWCUT LINES MAY BE ADJUSTED OR DETERMINED IN THE FIELD BY A CITY OF LAS VEGAS ENGINEER IF LOCATION ON PLANS IS NOT CLEARLY SHOWN, OR EXISTING PAVEMENT CONDITION REQUIRES RELOCATIONS.
14. THE CONTRACTOR SHALL TAKE ALL PRECAUTIONS NECESSARY TO PROTECT EXISTING PERMANENT SURVEY MONUMENTS. ANY MONUMENTS DISTURBED SHALL BE REPLACED AND ADJUSTED PER AVAILABLE RECORDS IN ACCORDANCE WITH N.R.S. STATUTE NO. 625.380 & CITY OF LAS VEGAS TITLE 18, APPENDIX D.
15. UTILITY COMPANY METER BOXES, MANHOLE LIDS, VALVE COVERS, ETC. SHALL BE LOCATED OUT OF DRIVEWAYS, DRIVEWAY APRONS, FLOWLINES, AND CROSS GUTTERS UNLESS WRITTEN APPROVAL IS GRANTED BY THE UTILITY COMPANY AND THE CITY ENGINEER.

WALL NOTES:

16. ALL WALLS, NEW OR EXISTING, ARE ONLY SHOWN ON CIVIL PLANS FOR THE PURPOSE OF REVIEWING GRADING RELATIONSHIPS, FLOOD CONTROL AND SIGHT DISTANCE AT INTERSECTIONS. NEW WALLS REQUIRE A SEPARATE PERMIT AND INSPECTION BY THE BUILDING DEPARTMENT.
17. ASPHALT MIX DESIGN MUST BE SUBMITTED AND APPROVED BY THE CITY ENGINEER PRIOR TO THE PLACEMENT OF ASPHALT WITHIN CITY RIGHT OF WAY.
18. CONTRACTOR SHALL ADJUST ALL NEW AND EXISTING INLETS, VALVE BOXES, MANHOLE RIMS, AND SEWER CLEAN OUTS, ETC. TO FINISH GRADE AS APPLICABLE WHETHER OR NOT THEY ARE SHOWN ON THE PLANS.
19. MATERIALS, HANDLING AND PLACEMENT OF PORTLAND CEMENT CONCRETE SHALL BE IN ACCORDANCE WITH APPLICABLE SECTIONS OF NDOT OR THE CLARK COUNTY AREA SPECIFICATIONS (AS APPLICABLE) AND THE PLANS AND DETAILS SHOWN HEREON.
20. WHEN INSTALLING UNDERGROUND FACILITIES THAT REQUIRE UNDERGROUND LOCATING DEVICES SUCH AS MARKER BALLS, LOCATING RIBBON, ETC. THE CONTRACTOR SHALL PROVIDE WRITTEN DOCUMENTATION TO THE CITY'S INSPECTION AND TESTING CERTIFYING THAT ALL DEVICES HAVE BEEN PLACED AND VERIFIED TO BE IN GOOD WORKING CONDITION PRIOR TO THE CONSTRUCTION OF ANY ROAD BASE.
21. SANITARY SEWER AND STORM DRAIN FINAL LOCATION MAP(S) SHALL BE PROVIDED TO THE CITY AND APPROVED PRIOR TO ACCEPTANCE OF FACILITY VIDEO INSPECTION. THE MAP(S) SHALL INCLUDE THE HORIZONTAL AND VERTICAL (INVERT) LOCATION OF PUBLIC SEWER MANHOLES, STORM DRAIN MANHOLES AND TRANSITION STRUCTURES, STORM DRAIN LATERALS AT THE CONNECTION TO THE STORM DRAIN MAIN AND AT THE CONNECTION TO A DROP INLET, THE CONNECTION OF SEWER SERVICE LATERALS TO THE SEWER MAIN AND WHERE THE SEWER SERVICE LATERALS EXIT THE PUBLIC RIGHT-OF-WAY, AND STORM DRAIN MAIN ALIGNMENT, INCLUDING DEFLECTION POINTS. THE LOCATION SHALL BE DESCRIBED BY COORDINATES WHICH SHALL BE BASED ON THE OFFICIAL HORIZONTAL AND VERTICAL CONTROL NETWORKS OF THE CITY OF LAS VEGAS. FINAL LOCATION MAPS MUST BE SEALED AND CERTIFIED BY A NEVADA PROFESSIONAL LAND SURVEYOR TO HAVE POSITIONAL CERTAINTIES OF ± 0.09 METERS (± 0.3 FEET) HORIZONTALLY AND VERTICALLY. A SEPARATE ELECTRONIC COMMA DELIMITED FILE FOR THE SANITARY SEWER AND STORM DRAIN COORDINATES SHALL ALSO ACCOMPANY THE SANITARY SEWER AND STORM DRAIN FINAL LOCATION MAP(S).

OR

* SANITARY SEWER AND STORM DRAIN FACILITIES SHOWN ON THESE PLANS SHALL BE USED TO MEET THE REQUIREMENTS ON NRS 455 AND SHALL SHOW AT A MINIMUM THE HORIZONTAL AND VERTICAL (INVERT) LOCATION OF PUBLIC SEWER MANHOLES, STORM DRAIN MANHOLES, STORM DRAIN LATERALS AT THE CONNECTION TO THE STORM DRAIN MAIN AND AT THE CONNECTION TO A DROP INLET, AND THE CONNECTION OF SEWER SERVICE LATERALS TO THE SEWER MAIN AND WHERE THE SEWER SERVICE LATERALS EXIT THE PUBLIC RIGHT-OF-WAY. ANY DEVIATIONS FROM THE INFORMATION SHOWN SHALL BE NOTED AND SUBMITTED AS A REVISION TO THE PLANS AND APPROVED PRIOR TO ACCEPTANCE OF FACILITY VIDEO INSPECTION.

22. CCTV VIDEO INSPECTION IS REQUIRED FOR ALL SEWER AND STORM DRAINS. THE CCTV VIDEO INSPECTIONS NEED TO BE PERFORMED PER THE DESIGN AND CONSTRUCTION STANDARDS FOR WASTEWATER COLLECTION SYSTEMS LATEST EDITION.
23. A SEPARATE BORING PERMIT IS REQUIRED FOR ALL BORING ACTIVITIES.

REVISED 02/03/15

DEVIATION FROM STANDARDS

NONE

CITY OF LAS VEGAS GRADING NOTES

1. IN THE EVENT THAT ANY UNFORESEEN CONDITIONS NOT COVERED BY THESE NOTES ARE ENCOUNTERED DURING GRADING OPERATIONS, THE OWNER/ENGINEER SHALL BE IMMEDIATELY NOTIFIED FOR DIRECTION.
2. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO PERFORM ALL NECESSARY CUTS AND FILLS WITHIN THE LIMITS OF THIS PROJECT AND THE RELATED OFF-SITE WORK, SO AS TO GENERATE THE DESIRED SUBGRADE, FINISH GRADES AND SLOPES SHOWN.
3. CONTRACTOR SHALL TAKE FULL RESPONSIBILITY FOR ALL EXCAVATION. ADEQUATE SHORING SHALL BE DESIGNED AND PROVIDED BY THE CONTRACTOR TO PREVENT UNDERMINING OF ANY ADJACENT FEATURES OR FACILITIES AND/OR CAVING OF THE EXCAVATION.
4. THE CONTRACTOR IS WARNED THAT AN EARTHWORK BALANCE WAS NOT NECESSARILY THE INTENT OF THIS PROJECT. ANY ADDITIONAL MATERIAL REQUIRED OR LEFTOVER MATERIAL FOLLOWING EARTHWORK OPERATIONS BECOMES THE RESPONSIBILITY OF THE CONTRACTOR.
5. THE GRADING CONTRACTOR IS RESPONSIBLE TO COORDINATE WITH THE OWNER TO PROVIDE FOR THE REQUIREMENTS OF THE PROJECT STORM WATER POLLUTION PREVENTION PLAN (SWPPP) AND ASSOCIATED PERMIT.
6. CONTRACTOR SHALL GRADE TO THE LINES AND ELEVATIONS SHOWN ON THE PLANS WITHIN THE FOLLOWING HORIZONTAL AND VERTICAL TOLERANCES AND DEGREES OF COMPACTION, IN THE AREAS INDICATED:

	HORIZONTAL/VERTICAL		COMPACTION
A. PAVEMENT AREA SUBGRADE	0.1'±	+0.0' TO -0.1'	SEE SOILS REPORT
B. ENGINEERED FILL	0.5'±	+0.1' TO -0.1'	SEE SOILS REPORT

* REPORT COMPACTION TESTING WILL BE PERFORMED BY THE OWNER OR HIS REPRESENTATIVE.

7. ALL CUT AND FILL SLOPES SHALL BE PROTECTED UNTIL EFFECTIVE EROSION CONTROL HAS BEEN ESTABLISHED.
8. THE USE OF POTABLE WATER WITHOUT A SPECIAL PERMIT FOR BUILDING OR CONSTRUCTION PURPOSES INCLUDING CONSOLIDATION OF BACKFILL OR DUST CONTROL IS PROHIBITED. THE CONTRACTOR SHALL OBTAIN ALL NECESSARY PERMITS FOR CONSTRUCTION WATER.
9. THE CONTRACTOR SHALL MAINTAIN THE STREETS, SIDEWALKS AND ALL OTHER PUBLIC RIGHT-OF-WAY IN A CLEAN, SAFE AND USABLE CONDITION. ALL SPILLS OF SOIL, ROCK OR CONSTRUCTION DEBRIS SHALL BE PROMPTLY REMOVED FROM THE PUBLICLY OWNED PROPERTY DURING CONSTRUCTION AND UPON COMPLETION OF THE PROJECT. ALL ADJACENT PROPERTY, PRIVATE OR PUBLIC SHALL BE MAINTAINED IN A CLEAN, SAFE AND USABLE CONDITION.
10. IN THE EVENT THAT ANY TEMPORARY CONSTRUCTION ITEM IS REQUIRED THAT IS NOT SHOWN ON THESE DRAWINGS, THE OWNER AGREES TO PROVIDE AND INSTALL SUCH ITEM AT HIS OWN EXPENSE AND AT THE DIRECTION OF THE CITY ENGINEER. TEMPORARY CONSTRUCTION INCLUDES DITCHES, BERMS, ROAD SIGNS AND BARRICADES, ETC.

REVISED 4/15/10

LAS VEGAS VALLEY WATER DISTRICT
LVVWD PROJECT # 124110

1. NO WORK SHALL BEGIN UNTIL THE WATER PLANS HAVE BEEN APPROVED FOR CONSTRUCTION BY THE LVVWD. FOLLOWING WATER PLAN APPROVAL, NOTICE SHALL BE GIVEN TO THE LVVWD COMMUNICATION SUPPORT CENTER (258-7171) TWO (2) WORKING DAYS PRIOR TO THE START OF CONSTRUCTION. FOR FUTURE INSPECTIONS, NOTICE MUST BE GIVEN BY 2:00 P.M. THE BUSINESS DAY PRIOR TO THE REQUESTED LVVWD INSPECTION. WHEN REQUESTING INSPECTIONS, PLEASE REFER TO THE PROJECT # IDENTIFIED ABOVE.
2. ALL WORK SHALL CONFORM TO LVVWD STANDARD PLATES, DRAWINGS, AND SPECIFICATIONS, AND TO THE 2010 EDITION OF THE UNIFORM DESIGN AND CONSTRUCTION STANDARDS FOR POTABLE WATER SYSTEMS (UDACS). THE LATEST EDITION OF UDACS SHALL SUPERSEDE ANY CONFLICTS CONTAINED IN THE APPROVED DRAWINGS AND/OR SPECIFICATIONS.
3. ALL WORK, EXCEPT AS MODIFIED BY THESE PLANS OR BY NOTE 2 ABOVE, SHALL BE DONE IN ACCORDANCE WITH THE MOST RECENT DRAFT OR EDITION OF THE UNIFORM SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION OFFSITE IMPROVEMENT, CLARK COUNTY AREA.
4. A SINGLE PIPE MATERIAL SHALL BE USED THROUGHOUT THE PROJECT UNLESS OTHERWISE APPROVED BY THE LVVWD.
5. ALL SERVICE LATERALS TWO (2) INCHES IN DIAMETER AND SMALLER SHALL BE TYPE K COPPER TUBING WITH LVVWD APPROVED SERVICE SADDLES.
6. ALL WATER METER BOXES SHALL BE LOCATED OUTSIDE OF DRIVEWAY AREAS.
7. ALL VALVES SHALL BE LOCATED OUTSIDE OF DRIVEWAYS, VALLEY AND CURB GUTTERS.
8. ALL WATER AND STORM DRAIN OR SANITARY SEWER CROSSINGS SHALL CONFORM TO SECTION 2.22 OF THE 2010 EDITION OF THE UDACS.
9. ALL WATER FACILITIES SHALL BE FILLED, DISINFECTED, PRESSURE TESTED, FLUSHED, FILLED, AND AN ACCEPTABLE WATER SAMPLE OBTAINED, PRIOR TO CONNECTION TO THE LVVWD DISTRIBUTION SYSTEM.
10. THE CONTRACTOR MUST OBTAIN ALL METERS TWO (2) INCHES AND SMALLER FROM LVVWD CENTRAL STORES, TELEPHONE 258-3152 OR 258-3802, TWO (2) WORKING DAYS PRIOR TO METER PICKUP.
11. ANY INTERRUPTION OF SERVICE MUST BE PERFORMED IN ACCORDANCE WITH UDACS SECTION 3.14.01, AND APPROVED BY THE LVVWD INSPECTION DIVISION PRIOR TO SHUTDOWN. PROPER WRITTEN NOTIFICATION MUST BE GIVEN TO ALL AFFECTED CUSTOMERS.
12. ALL WATER FACILITY CONSTRUCTION MATERIALS USED MUST BE LISTED ON THE LVVWD PRE-APPROVED MATERIALS AND MANUFACTURER'S LISTING FOR NEW FACILITIES, LATEST REVISION, OR SPECIFICALLY APPROVED ON THESE PLANS.
13. TELEPHONE "CALL BEFORE YOU DIG" AT 811 OR 1-800-227-2600
14. THE INSTALLATION OF LAS VEGAS VALLEY WATER DISTRICT (LVVWD) MUNICIPAL WATER FACILITIES WITHIN ALL STREETS IS ASSUMED TO BE IN COMPLIANCE WITH THE UNIFORMED STANDARDS, INCLUDING THE PLACEMENT OF ASPHALT PAVING STREET SURFACES. ANY REPAIR WORK DONE BY THE LVVWD TO THE MUNICIPAL WATER FACILITIES WILL INCLUDE THE PLACEMENT OF AN APPROPRIATELY SIZED ASPHALT REPAIR ON THE STREET SURFACE.

ANY DECORATIVE PAVING SURFACE WITHIN THE STREET IS THE RESPONSIBILITY OF THE OWNER'S ASSOCIATION, OR THE INDIVIDUAL PROPERTY OWNERS IF NO OWNER'S ASSOCIATION IS IN EXISTENCE, OR THE AGENCY HAVING JURISDICTION. DECORATIVE SURFACE MATERIALS PLACED WITHIN THE TEN FOOT EASEMENT ABUTTING A PUBLIC OR PRIVATE STREET, IF DISTURBED BY THE LVVWD DURING THE REPAIR OR OPERATION OF ITS FACILITIES, WILL BE REPLACED BY LVVWD WITH AN APPROPRIATELY SIZED PLAIN FINISH CONCRETE PATCH. THE LVVWD WILL NOT RESTORE, AND WILL NOT BE RESPONSIBLE FOR THE RESTORATION OF, ANY DECORATIVE PAVING SURFACE WITHIN THE STREET. THE LVVWD WILL NOT ATTEMPT TO MATCH COLOR OR FINISH OF ANY ADJACENT MATERIALS.

15. NO LEAD COMPLIANCE NOTE: TO COMPLY WITH THE FEDERAL SAFE DRINKING WATER ACT, ALL WATER WORK (PARTS) PREVIOUSLY PURPOSED TO BE RELOCATED, OR INSTALLED AS NEW MUST BE INSTALLED WITH THE LEAD FREE APPROVED PRODUCT. THE OLD LEADED PRODUCT MAY NOT BE REUSED.

FLOOD ZONE NOTE

NO PORTION OF THE SITE FALLS WITHIN A FEMA DESIGNATED SPECIAL FLOOD HAZARD AREA. SITE LOCATED ON PANEL 32003C2150E, DATED SEPTEMBER 27, 2002, AND PANEL 32003C2145F, DATED NOVEMBER 16, 2011. THIS PANEL SHOWS THAT THE PROJECT IS LOCATED WITHIN A ZONE X AND NOT LOCATED WITHIN A FEMA DESIGNATED 100-YEAR ZONE A OR SPECIAL FLOOD HAZARD AREA.

CITY OF LAS VEGAS SEWER NOTES

1. ALL CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE DESIGN AND CONSTRUCTION STANDARDS FOR WASTEWATER COLLECTION SYSTEMS AND THE UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS' CONSTRUCTION OFF-SITE IMPROVEMENTS, CLARK COUNTY AREA, NEVADA, AS AMENDED. IT WILL BE THE RESPONSIBILITY OF THE CONTRACTOR TO BE AWARE OF THE CONTENTS OF THE ABOVE SPECIFICATIONS.
2. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO PERFORM CONSTRUCTION AS PER PLANS. ANY ADDITIONS, DELETIONS, OR CHANGES SHALL FIRST MEET WITH THE APPROVAL OF THE CITY ENGINEER.
3. CHISEL "S" OR "G" IN CURBS WHERE SEWER OR GAS LATERALS PASS UNDER THE CURB.
4. POLYVINYL (PVC) SEWER PIPE SHALL MEET ASTM D-3034 SDR 35 SPECIFICATIONS, INSTALLED WITH SAND BEDDING AND BACKFILL OF TYPE II AGGREGATE BASE.
5. ALL MANHOLES PAVED IN STREETS EIGHTY (80') FOOT R/W AND LARGER SHALL HAVE CONCRETE COLLARS. STREETS LESS THAN EIGHTY (80') FOOT R/W WILL REQUIRE RETROFIT IF PAVING DOES NOT CONFORM TO CITY STANDARDS AT THE MANHOLE.
6. TEE SADDLES SHALL BE USED TO CONNECT SEWER LATERALS TO EXISTING MAIN LINES UP TO TWELVE INCH (12") DIAMETER. CONNECTIONS TO FIFTEEN INCH (15") OR LARGER MAINS SHALL REQUIRE SPECIAL PROCEDURES. IN LINE "Y" 'S SHALL BE USED ON LINES TWELVE INCHES (12") OR ABOVE.
7. WATER MAINS SHALL BE PROTECTED IN ACCORDANCE WITH LVVWD STANDARDS WHENEVER A SEWER MAIN CROSSES OVER A WATER MAIN OR THE SEWER IS LESS THAN EIGHTEEN INCH (18") UNDER A WATER MAIN.
8. ALL CONTRACTORS INSTALLING SEWER MAINS THAT WILL BE UNDER THE JURISDICTION OF THE CITY OF LAS VEGAS MUST BE STATE OF NEVADA CLASS "A" CONTRACTORS.
9. THE CITY OF LAS VEGAS WILL NOT ACCEPT ANY SEWER MAINS WHICH HAVE A VERTICAL DEFLECTION OF MORE THAN ONE TENTH (0.1) OF A FOOT FROM THE APPROVED CONSTRUCTION PLANS AT ANY LOCATION. SEWER MAINS FOUND TO EXCEED THIS TOLERANCE WILL HAVE TO BE REPAIRED OR REMOVED OR REPLACED TO THE SATISFACTION OF THE CITY ENGINEER PRIOR TO ACCEPTANCE BY THE CITY OF LAS VEGAS.
10. INSTALLATION OF CURVED SEWER REQUIRES THE USE OF C-900 PIPE WHICH ALLOWS FOR PIPE DEFLECTION AT THE JOINTS.

REVISED 04/15/10

STORMWATER RUNOFF MANAGEMENT

1. THE OWNER, SITE DEVELOPER, CONTRACTOR AND/OR THEIR AUTHORIZED AGENTS SHALL EACH DAY REMOVE ALL SEDIMENT, MUD, CONSTRUCTION DEBRIS, OR OTHER POTENTIAL POLLUTANTS THAT MAY HAVE BEEN DISCHARGED TO, OR ACCUMULATE IN, THE PUBLIC RIGHTS OF WAYS OF THE CITY OF LAS VEGAS AS A RESULT OF CONSTRUCTION ACTIVITIES ASSOCIATED WITH THIS SITE DEVELOPMENT OR CONSTRUCTION PROJECT. SUCH MATERIALS SHALL BE PREVENTED FROM ENTERING THE STORM SEWER SYSTEM.
2. ADDITIONAL CONSTRUCTION SITE DISCHARGE BEST MANAGEMENT PRACTICES MAY BE REQUIRED OF THE OWNER AND HIS OR HER AGENTS DUE TO UNFORESEEN EROSION PROBLEMS OR IF THE SUBMITTED PLAN DOES NOT MEET THE PERFORMANCE STANDARDS SPECIFIED IN THE CITY OF LAS VEGAS AND THE LAS VEGAS VALLEY CONSTRUCTION SITE BEST MANAGEMENT PRACTICES MANUAL.
3. TEMPORARY OR PERMANENT STABILIZATION PRACTICES WILL BE INSTALLED ON DISTURBED AREAS AS SOON AS PRACTICABLE AND NO LATER THAN 14 DAYS AFTER THE CONSTRUCTION ACTIVITY IN THAT PORTION OF THE SITE HAS TEMPORARILY OR PERMANENTLY CEASED. SOME EXCEPTIONS MAY APPLY; REFER TO NEVADA STORMWATER GENERAL PERMIT FOR CONSTRUCTION ACTIVITY NVR100000, SECTION III.A.5.
4. AT A MINIMUM, THE CONTRACTOR OR HIS AGENT SHALL INSPECT ALL DISTURBED AREAS, AREAS USED FOR STORAGE OF MATERIALS AND EQUIPMENT THAT ARE EXPOSED TO PRECIPITATION, VEHICLE ENTRANCE AND EXIT LOCATIONS, AND ALL BMPS WEEKLY, AND WITHIN 24 HOURS AFTER ANY RAIN EVENT OF 0.5 INCHES OR MORE. THE CONTRACTOR OR HIS AGENT SHALL UPDATE OR MODIFY THE STORMWATER POLLUTION PREVENTION PLAN AS NECESSARY. SOME EXCEPTIONS TO WEEKLY INSPECTIONS MAY APPLY, SUCH AS SUSPENSION OF LAND DISTURBANCE ACTIVITIES. REFER TO NEVADA STORMWATER GENERAL PERMIT FOR CONSTRUCTION ACTIVITY NVR100000, SECTION III.A.12.
5. ACCUMULATED SEDIMENT IN BMPS SHALL BE REMOVED WITHIN SEVEN DAYS AFTER A STORMWATER RUNOFF EVENT OR PRIOR TO THE NEXT ANTICIPATED STORM EVENT, WHICHEVER IS EARLIER. SEDIMENT MUST BE REMOVED WHEN BMP DESIGN CAPACITY HAS BEEN REDUCED BY 50 PERCENT OR MORE.

CITY OF LAS VEGAS STREETLIGHT NOTES

1. ALL STREET LIGHTING INSTALLATIONS SHALL BE IN ACCORDANCE WITH THE STREET LIGHTING PLANS, THE "UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION OFF-SITE IMPROVEMENTS, CLARK COUNTY AREA, NEVADA", LATEST REVISION (USS), AND THE "UNIFORM STANDARD DRAWINGS FOR PUBLIC WORKS CONSTRUCTION OFF-SITE IMPROVEMENTS, CLARK COUNTY AREA, NEVADA" (USD), LATEST REVISION.
2. NO DEVIATION OF STREET LIGHT, PULL BOX, CONDUITS, ETC., LOCATIONS SHALL BE PERMITTED WITHOUT WRITTEN APPROVAL OF THE TRAFFIC ENGINEER AND THE CITY ENGINEER. ANY DEVIATION FROM THE PLAN LOCATION WILL REQUIRE COMPLIANCE WITH SECTION 623 OF THE USS.
3. ALL EXISTING STREET LIGHTING SHALL REMAIN OPERATIONAL DURING CONSTRUCTION IN ACCORDANCE WITH SECTION 623 0.03.01 OF THE USS.
4. ALL EMPTY CONDUIT SHALL HAVE AT LEAST ONE GREEN NO. #8 AWG WIRE INSTALLED AS TRACER WIRE IN ACCORDANCE WITH SECTION 623 0.02.01 OF THE USS PRIOR TO BACKFILLING AND FINAL INSPECTION.
5. ANY STRUCTURE SUCH AS BLOCK WALLS, CHAIN LINK FENCES, RETAINING WALLS, ETC., SHALL LEAVE A MINIMUM CLEARANCE IN COMPLIANCE WITH USD NO. 320A WHEN POLE IS INSTALLED BEHIND SIDEWALK, AND SHALL AT NO TIME COMPLETELY ENCLOSE THE STREET LIGHTING POLE.
6. AS-BUILT DRAWINGS SHALL BE SUPPLIED TO THE TRAFFIC ENGINEERING DIVISION PRIOR TO ANY PRE-FINAL INSPECTION. THE AS-BUILT DRAWING NEEDS TO BE STAMPED AS-BUILT AND SIGNED BY THE PREPARER.
7. SERVICE POINT SHALL BE COORDINATED WITH NV ENERGY, AND WHEREVER POSSIBLE, BE LOCATED NEAR THE CENTER OF THE CIRCUIT. SERVICE POINTS SHALL BE SHOWN ON THE PLANS.
8. WHEREVER THERE IS AN OVERHEAD UTILITY THAT MAY CONFLICT WITH THE INSTALLATION OF STREET LIGHTING CIRCUITS AND/OR POLES, THESE CONFLICTS MUST BE RESOLVED BETWEEN THE DEVELOPER AND THE UTILITIES INVOLVED BEFORE STREETLIGHT BASES ARE INSTALLED AT NO EXPENSE TO THE CITY OF LAS VEGAS.
9. THE CONTRACTOR SHALL FURNISH COMPLETE CONDUIT, WIRE, ETC. FROM SERVICE TO TRANSFORMERS AND CONTROL SYSTEMS IF REQUIRED ON THE PLANS.

REVISED 06/28/16 (LD VERSION)

CITY OF LAS VEGAS FIRE AND RESCUE
GENERAL NOTES

1. ALL WORK SHALL BE DONE IN STRICT ACCORDANCE WITH THE LAS VEGAS FIRE AND RESCUE ADOPTED FIRE CODE ORDINANCE #6325 FOR HYDRANT SPECIFICATIONS AND HYDRANT INSTALLATION SPECIFICATIONS.
2. ONLY FIRE HYDRANTS THAT ARE ON THE LAS VEGAS VALLEY WATER DISTRICT'S – APPROVED PRODUCTS LIST ARE ALLOWED TO BE INSTALLED.
3. A PERMIT IS REQUIRED FROM LAS VEGAS FIRE AND RESCUE FOR THE INSTALLATION OF ON-SITE WATER LINES AND FIRE HYDRANTS. THE PERMIT AND CONTRACTORS MATERIAL TEST CERTIFICATE FOR UNDERGROUND PIPING FORM SHALL BE OBTAINED FROM THE FIRE PROTECTION ENGINEER BEFORE COMMENCEMENT OF WORK. [IFC SECTION 105.7.12]
4. ON ANY RESIDENTIAL OR COMMERCIAL INSTALLATIONS, FIRE HYDRANTS SHALL BE INSTALLED AND FIRE APPARATUS ACCESS ROADS SHALL BE MAINTAINED BEFORE COMMENCEMENT OF ANY COMBUSTIBLE CONSTRUCTION. ALL FIRE HYDRANTS SHALL BE IN GOOD WORKING ORDER AND SHALL BE CAPABLE OF DELIVERING THE REQUIRED FIRE FLOW. [IFC SECTION 3310, SECTION 3312]
5. TO IDENTIFY FIRE HYDRANT LOCATIONS, CONTRACTOR SHALL PLACE A BLUE REFLECTIVE MARKER AT THE CENTER LINE OF STREET ADJACENT TO THE FIRE HYDRANTS. [IFC SECTION 507.5.7.3]
6. ALL UNDERGROUND INSPECTIONS, PRESSURE AND FLUSH VERIFICATIONS OF ALL FIRE HYDRANTS AND FIRE LINES, SHALL BE CONDUCTED BEFORE COVERING THE LINES. CENTER LOADING IS ACCEPTABLE FOR THE HYDRO TESTS WITH PRIOR FIRE PREVENTION APPROVAL. [IFC SECTION 106.3]
7. ALL ON-SITE UNDERGROUND WATER MAINS AND MATERIALS SHALL BE U.L. LISTED, A.W.W.A. APPROVED AND SHALL BE RATED FOR THE APPROPRIATE WORKING PRESSURE. [IFC SECTION 507.2.1, NFPA 24]
8. PAINTING OF CURBS, FIRE HYDRANTS, PADS, PROTECTION OF FIRE HYDRANTS FROM PHYSICAL DAMAGE, AND ALL OTHER WORK NECESSARY PER PLANS SHALL BE COMPLETED BEFORE APPROVAL BY LAS VEGAS FIRE AND RESCUE, FIRE PREVENTION DIVISION. [IFC SECTION 507]
9. PRIVATE FIRE HYDRANTS SHALL BE PAINTED RED. [IFC SECTION 507.5.7.1]
10. PRIOR TO THE FINAL OCCUPANCY, A FIRE FLOW TEST SHALL BE WITNESSED BY LAS VEGAS FIRE AND RESCUE, FIRE PREVENTION DIVISION TO VERIFY AVAILABILITY OF THE REQUIRED FIRE FLOW. [IFC SECTION 507]
11. FIRE HYDRANTS SPACING SHALL BE AS FOLLOWS: [IFC SECTION C102]
RESIDENTIAL – 500 FT UNSPRINKLERED; 600 FT SPRINKLERED.
COMMERCIAL – 300 FT UNSPRINKLERED; 400 FT SPRINKLERED.
12. WHERE NEW WATER MAINS ARE EXTENDED ALONG STREETS OR NEW STREETS ARE INSTALLED WHERE FIRE HYDRANTS ARE NOT NEEDED FOR PROTECTION OF THE STRUCTURES, FIRE HYDRANTS SHALL BE INSTALLED AT A MAXIMUM OF 1,000 FT SPACING, TO PROVIDE FOR TRANSPORTATION HAZARDS. WHERE STREETS ARE PROVIDED WITH MEDIAN DIVIDERS OR HAVE FOUR (4) OR MORE TRAFFIC LANES AND HAVE A TRAFFIC COUNT OF MORE THAN 30,000 PER DAY, HYDRANTS ARE REQUIRED ON EACH SIDE OF THE STREET SPACED AT 500 FT ON AN ALTERNATING BASIS. [IFC SECTION C102.8]
13. NO FIRE HYDRANTS SHALL BE LOCATED WITHIN THE RADIUS OF A CUL-DE-SAC OR WITHIN 20 FT OF THE PERIMETER OF THE RADIUS OF THE CUL-DE-SAC.
14. NO FIRE HYDRANTS SHALL BE LOCATED WITHIN 6 FT OF ANY CURB RETURN, DRIVEWAY, POWER POLE, STREETLIGHT OR ANY OTHER OBSTRUCTION. [IFC SECTION C102.12]
15. A MAXIMUM DISTANCE FROM A FIRE HYDRANT TO A ONE-TWO FAMILY DWELLING SHALL NOT EXCEED 300 FT, AS MEASURED BY AN APPROVED ROUTE. [IFC SECTION C102.4]
16. THE MAXIMUM DISTANCE FROM A FIRE HYDRANT TO A FIRE DEPARTMENT CONNECTION (FDC) SHALL NOT EXCEED 100 FT, AS MEASURED BY AN APPROVED ROUTE. [IFC SECTION C102.7]
17. THE MAXIMUM DISTANCE FROM A FIRE HYDRANT TO THE END OF A DEAD-END STREET SHALL NOT EXCEED 200 FT. [IFC SECTION C102.6]
18. TWO (2) SOURCES OF SUPPLY ARE REQUIRED WHENEVER THERE IS 4 OR MORE FIRE HYDRANTS/SPRINKLER LEAD-INS ARE INSTALLED ON A SINGLE SYSTEM. SECTIONAL CONTROL VALVES SHALL BE INSTALLED SO THAT NO MORE THAN 2 FIRE HYDRANTS CAN BE OUT OF SERVICE DUE TO A BREAK IN A WATER MAIN. [IFC SECTION C104]
19. ALL FIRE APPARATUS ACCESS ROADS SHALL BE PAVED TO PROVIDE ALL-WEATHER DRIVING CAPABILITIES, AND SHALL BE DESIGNED AND MAINTAINED TO SUPPORT THE IMPOSED LOADS OF THE FIRE APPARATUS. [IFC SECTION 503.2.3]
20. THE GRADIENT FOR THE FIRE APPARATUS ACCESS ROADS SHALL NOT EXCEED 12%. ANGLES OF APPROACH AND ANGLES OF DEPARTURE SHALL NOT EXCEED 6% FOR 25 FT PRIOR TO OR AFTER THE GRADE CHANGE. ADJACENT TO THE STRUCTURES GRADIENT SHALL NOT EXCEED 6%. [IFC SECTION 503.2.7, 503.2.8]
21. THE TURNING RADIUS OF THE FIRE APPARATUS ACCESS ROADS SHALL BE NO LESS THAN 52 FT OUTSIDE AND 28 FT INSIDE TURNING RADIUS. [IFC 503.2.4]
22. VERTICAL CLEARANCE OF ALL FIRE APPARATUS ACCESS ROADS SHALL NOT BE LESS THAN 13 FT 6 IN. [IFC SECTION 503.2.1]
23. FIRE DEPARTMENT ACCESS ROADS SHALL HAVE A MINIMUM UNOBSTRUCTED WIDTH OF NOT LESS THAN 40 FT FLOW-LINE TO FLOW-LINE WITH PARALLEL PARKING PERMITTED ON BOTH SIDES. NOT LESS THAN 32 FT WIDE, FLOW-LINE TO FLOW -LINE, WHERE PARKING IS PERMITTED ONLY ON ONE SIDE OF THE FIRE APPARATUS ACCESS ROAD. NOT LESS THAN 24 FT WIDE, FLOW-LINE TO FLOW-LINE, WHERE NO PARKING IS PERMITTED ON EITHER SIDE. FIRE LANES THROUGH PARKING LOTS SHALL NOT BE LESS THAN 24 FT. [IFC SECTION 503.2.1.1]
24. A FIRE APPARATUS ACCESS ROAD SHALL BE REQUIRED WHEN ANY PORTION OF AN EXTERIOR WALL FO THE FIRST STORY IS LOCATED MORE THAN 150 FT FROM A FIRE DEPARTMENT VEHICLE ACCESS. THIS DISTANCE COULD BE INCREASED TO 250 FT IF THE BUILDING IS SPRINKLERED. [IFC SECTION 503.1.1]
25. APPROVED SECONDARY FIRE APPARATUS ACCESS SHALL BE PROVIDED FOR 100 OR MORE DWELLING UNITS, ROAD(S) WITH DEAD-ENDS OR WITH A SINGLE POINT OF ACCESS IN EXCESS OF 600 FT. COMMERCIAL AND INDUSTRIAL DEVELOPMENTS WHERE BUILDINGS EXCEED 2 STORIES OR 30 FEET IN HEIGHT, OR EXCEEDING 62,000 SQUARE FEET IN AREA. [IFC SECTION 503.1.2]
26. ALL DEAD-END FIRE APPARATUS ROADS AND/OR FIRE LANES, PUBLIC OR PRIVATE, IN EXCESS OF 150 FT IN LENGTH SHALL BE PROVIDED WITH AN APPROVED TURN AROUND HAVING A MINIMUM DIAMETER OF 81 FT. [IFC SECTION 503.2.5]
27. ALL FIRE APPARATUS ACCESS ROADS SHALL BE MARKED BY PLACING APPROVED SIGNS AT THE START OF THE DESIGNATED FIRE LANE, ONE SIGN AT THE END OF THE FIRE LANE AND WITH SIGNS AT INTERVALS OF 100 FT ALONG THE DESIGNATED FIRE LANES. SIGNS TO BE PLACED ON BOTH SIDES OF AN ACCESS ROADWAY IF NEEDED TO PREVENT PARKING ON EITHER SIDE. SIGNS TO BE INSTALLED NO HIGHER THAN 10 FT OR LESS THAN 8 FT FROM THE ROADWAY LEVEL. THE CURB ALONG OR ON THE PAVEMENT OR CEMENT (IF NO CURB IS PROVIDED) SHALL BE PAINTED WITH A RED WEATHER RESISTANT PAINT IN ADDITION TO THE SIGNS. [IFC SECTION 503.3]
28. ELECTRICALLY CONTROLLED ACCESS GATES SHALL BE PROVIDED WITH AN APPROVED EMERGENCY VEHICLE DETECTOR/RECEIVER SYSTEM. SAID SYSTEM SHALL BE INSTALLED IN ACCORDANCE WITH THE IFC SECTION 503.6 AND IFC APPENDIX M.

REVISED MARCH 1, 2016

CITY OF LAS VEGAS TRAFFIC NOTES

1. ALL CONSTRUCTION SIGNING, BARRICADING, AND TRAFFIC DELINEATION SHALL CONFORM TO THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES", LATEST EDITION.
2. THE STREET SIGN CONTRACTOR SHALL OBTAIN STREET NAMES AND BLOCK NUMBERING FROM THE PLANNING DEPARTMENT PRIOR TO CONSTRUCTION.
3. BEFORE ANY WORK IS STARTED IN THE RIGHT-OF-WAY, THE CONTRACTOR SHALL INSTALL ALL ADVANCED WARNING SIGNS FOR THE CONSTRUCTION ZONE. THE CONTRACTOR SHALL INSTALL TEMPORARY STOP SIGNS AT ALL NEW STREET ENCROACHMENTS INTO EXISTING CITY STREETS WHERE WARRANTED IMMEDIATELY AFTER FIRST GRADING WORK IS ACCOMPLISHED, AND SHALL MAINTAIN SAID SIGNS UNTIL PERMANENT SIGNS ARE INSTALLED.
4. WHEN A DESIGNATED "SUGGESTED ROUTE TO SCHOOL" IS ENCROACHED UPON BY A CONSTRUCTION WORK ZONE AND PUBLIC WORKS STAFF IDENTIFIES A NEED FOR STUDENTS TO BE ASSISTED IN THE SAFE CROSSING THROUGH THAT WORK ZONE, THE CONTRACTOR SHALL BE REQUIRED TO PROVIDE A QUALIFIED "CROSSING GUARD". THE GUARD SHALL BE PRESENT FOR THE FULL DURATION OF TIME THAT CHILDREN ARE LIKELY TO BE PRESENT.
5. IF THE IMPROVEMENTS NECESSITATE THE OBLITERATION, TEMPORARY OBSTRUCTION, TEMPORARY REMOVAL OR RELOCATION OF ANY EXISTING TRAFFIC PAVEMENT MARKING, SUCH PAVEMENT MARKING SHALL BE RESTORED OR REPLACED WITH LIKE MATERIALS TO THE SATISFACTION OF THE CITY TRAFFIC ENGINEER.
6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING AND INSTALLING ALL PERMANENT SIGNS SHOWN ON THE PLANS. ALL NEW SIGNS SHALL UTILIZE TYPE XI RETROREFLECTIVE SHEETING IN ACCORDANCE WITH CCAUSS 627 AND 716 AND SHALL HAVE AN ANTI-GRAFFITI PROTECTIVE OVERLAY FILM THAT IS A MATCHING COMPONENT, TO, AND OF THE SAME MANUFACTURER AS THE RETROREFLECTIVE SHEETING TO WHICH IT IS APPLIED. STREET NAME SIGNS SHALL CONFORM IN THEIR ENTIRETY TO CURRENT CITY STANDARDS. ALL OTHER SIGNS SHALL BE STANDARD SIZE UNLESS OTHERWISE SPECIFIED ON THE PLANS. ALL SIGN POSTS SHALL BE INSTALLED IN ACCORDANCE WITH THE CURRENT CITY STANDARDS.
7. WHEN A PROPOSED STREET LIGHT STANDARD IS LOCATED WITHIN FIVE (5') FEET OF ANY PROPOSED SIGN SHOWN ON THE PLANS TO BE MOUNTED ON A SIGNPOST, THE SIGN SHALL BE MOUNTED ON THE STREET LIGHT STANDARD AND THE SIGNPOST SHALL BE ELIMINATED.
8. ALL PERMANENT TRAFFIC CONTROL DEVICES CALLED FOR HEREON SHALL BE IN PLACE AND IN FINAL POSITION PRIOR TO ALLOWING ANY PUBLIC TRAFFIC ONTO THE PORTIONS OF THE ROAD(S) BEING IMPROVED HERE UNDER, REGARDLESS OF THE STATUS OF COMPLETION OF PAVING OR OTHER OFF-SITE IMPROVEMENTS CALLED FOR BY THESE PLANS.
9. STREET SIGNS AND STOP SIGNS SHALL BE INSTALLED PER CITY STANDARD SPECIFICATIONS FOR PLACEMENT OF STREET NAME SIGNS.
10. THE CONTRACTOR SHALL PROVIDE ALL NECESSARY TRAFFIC CONTROL DEVICES AND FLAGGERS TO INSURE THE SAFETY OF THE PUBLIC IN OR AROUND THE WORK AREA. THE CONTRACTOR SHALL HAVE A CERTIFIED ATSSA TRAFFIC CONTROL TECHNICIAN OR IMSA WORK ZONE SAFETY SPECIALIST SET UP, MAINTAIN AND/OR REMOVE ALL TRAFFIC CONTROL DEVICES IN THE CITY OF LAS VEGAS RIGHT-OF-WAY.
11. WORK IN PUBLIC STREETS, ONCE BEGUN, SHALL BE EXPEDITED TO COMPLETION SO AS TO PROVIDE MINIMUM INCONVENIENCE TO ADJACENT PROPERTY OWNERS AND TO THE TRAVELING PUBLIC.
12. THE CONTRACTOR SHALL BE RESPONSIBLE FOR NOTIFYING CITIZENS AREA TRANSIT (C.A.T.) IF THE CONSTRUCTION INTERRUPTS OR RELOCATES A BUS STOP OR HAS AN ADVERSE EFFECT ON BUS SERVICE ON THAT STREET TO ARRANGE FOR TEMPORARY RELOCATION OF STOP.
13. GUARDS SHALL BE OBTAINED BY CONTACTING THE METROPOLITAN POLICE DEPARTMENT SPECIAL EVENTS UNIT (PHONE #828-3442) WHO WILL PROVIDE OFFICERS PROPERLY TRAINED IN TRAFFIC CONTROL. FEES FOR THE USE OF THESE OFFICERS SHALL BE SET BY METRO AND WILL BE PAID BY THE CONTRACTOR. THE CONTRACTOR IS RESPONSIBLE FOR ALL ARRANGEMENTS WITH METRO.
14. ANY WORK WITHIN 300' OF A SIGNALIZED INTERSECTION WILL BE NIGHT WORK, UNLESS OTHERWISE DIRECTED BY THE CITY OF LAS VEGAS TRAFFIC ENGINEER.
15. CONTRACTOR SHALL CONTACT THE TRAFFIC ENGINEERING DIVISION (TRANSPORTATION SECTION) THROUGH THE PROJECT'S OFFSITE INSPECTOR PRIOR TO INITIATING PAVING TO RECEIVE DIRECTION FOR ANY PERMANENT OR TEMPORARY MODIFICATIONS TO THE APPROVED DRAWINGS REGARDING FINAL PAVEMENT TRANSITIONS, MARKINGS AND SIGNING THAT ARE REQUIRED TO MATCH ADJACENT ROADWAY SEGMENTS. THE CONTRACTOR SHALL PROVIDE A DRAWING FOR APPROVAL BY THE TRAFFIC ENGINEERING DIVISION DEPICTING ANY ADJUSTMENTS TO THE FINAL PAVEMENT MARKINGS AND SIGNAGE, WHICH MAY INCLUDE OMITTING, ADDING OR MODIFYING PAVEMENT MARKINGS AND TRAFFIC CONTROL SIGNS SUCH THAT ADEQUATE TRANSITIONS AND LANE TERMINATIONS BETWEEN ADJACENT ROADWAY SEGMENTS ARE CONSTRUCTED.

REVISED 7/3/13

TDS SUBMITTAL

DATE: 06/29/2018

PROJECT NO. 840-050

GCW 1555 S. RAINBOW BLVD. LAS VEGAS, NV 89146 T: 702.804.2000 F: 702.804.2299 gcwengineering.com

ENGINEERS \ SURVEYORS

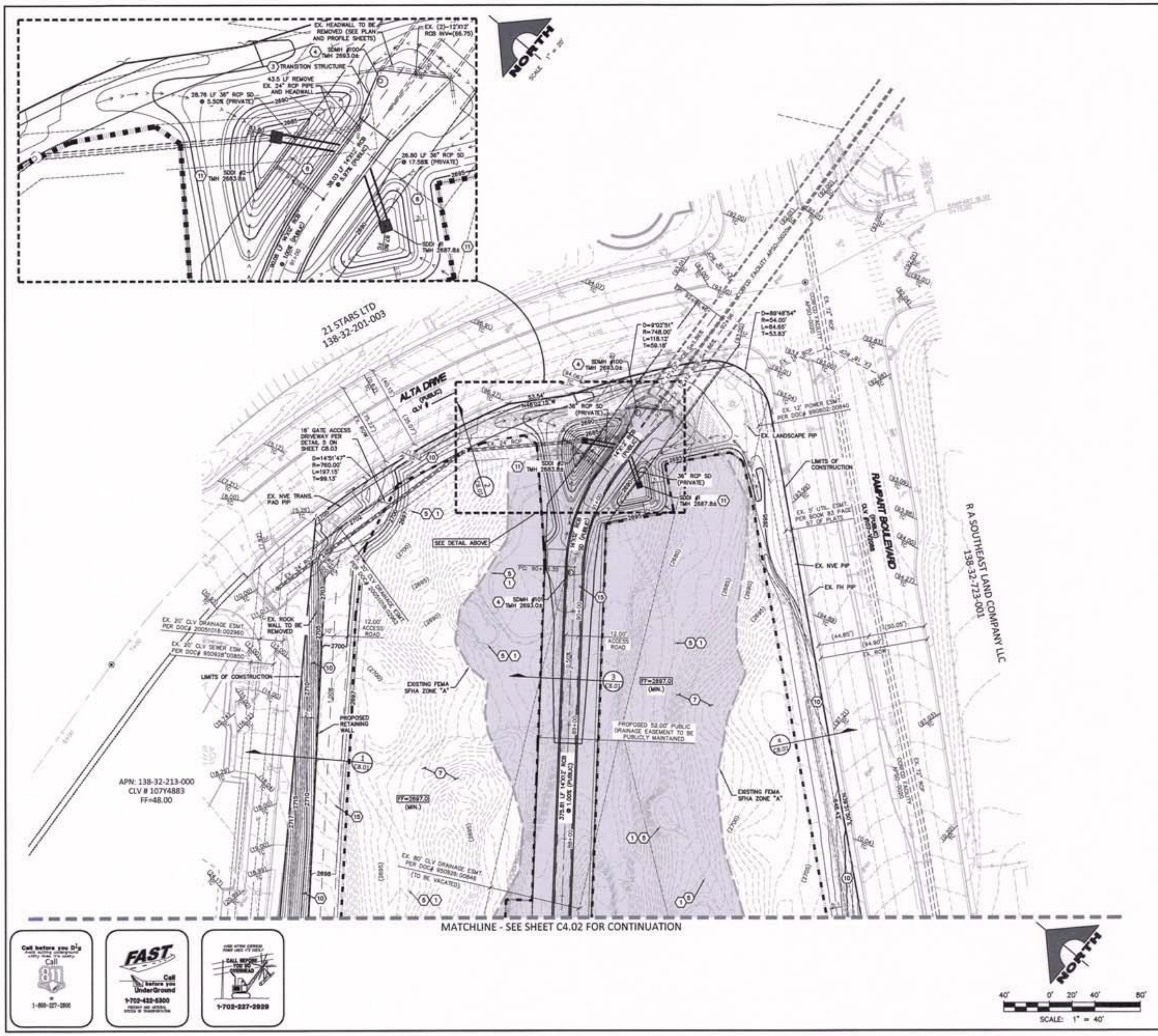
SEVENTY ACRES, LLC

THE 435

GENERAL NOTES

DRAWING C1.03

3 OF 22 SHTS



KEY MAP

BENCHMARK

BM #	DESCRIPTION	NAVD 88	NAVD 88
BLV-106NW6	CITY OF LAS VEGAS VERTICAL CONTROL POINT 'BLV106NW6', BEING A RIVET & PLATE IN TOP OF CURB AT SW CORNER OF CHARLESTON & HUALAPAI IN PORK CHOP ISLAND.	2914.54 (FEET)	888.355 (METERS)

DATUM NOTE

CITY OF LAS VEGAS VERTICAL CONTROL 2008 ADJUSTMENT (UPDATED 06/24/2010) BASED ON NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD'88).

BASIS OF BEARINGS

NORTH 89°40'03" EAST, BEING THE BEARING OF THE SOUTH LINE OF THE SOUTHEAST QUARTER (SE 1/4) OF SECTION 31, TOWNSHIP 20 SOUTH, RANGE 60 EAST, M.D.M., AS SHOWN IN FILE 120, PAGE 49 OF PARCEL MAPS ON FILE AT THE CLARK COUNTY, NEVADA RECORDER'S OFFICE.

CONSTRUCTION NOTES

1. GOLF COURSE IRRIGATION FACILITIES TO BE REMOVED BY OWNER.
2. OPEN TOP RCB WEIR SECTION PER DETAIL 3 SHEET C8.02
3. DRAINAGE TRANSITION STRUCTURE, SEE STRUCTURAL PLANS FOR DETAIL.
4. TYPE 1-A 48" MANHOLE PER USCCCA DWG NO. 401 AND 404.1
5. EXISTING GOLF COURSE FACILITIES TO BE DEMOLISHED, CLEAR AND GRUB PER SPECIFICATIONS, AND SOILS REPORT.
6. CREATE GRADED SUMP SLOPE AT 2:1 MAX. FINISH GRADE OF SUMP AT INVERT OF STORM DRAIN PIPE AND SEE PLANS FOR MINIMUM DEPTH AND FINISH GRADE.
7. ENGINEERED ROUGH GRADE TO PAD ELEVATION.
9. INSTALL RIP-RAP, SEE DETAIL 6 ON SHEET C8.01 FOR DETAIL.
10. PROVIDE 2:1 MAXIMUM ENGINEERED SLOPE.
11. INSTALL TYPE 2 DROP INLET PER NDOT DWG NO. R-4.2.1 & DETAIL 6 ON SHEET C8.02
12. INSTALL TEMPORARY PLUG AND CAP STORM DRAIN LINE
13. DEMOLISH AND REMOVE EXISTING GOLF CART BRIDGE.
14. INSTALL SEDIMENT BERM PER DETAIL 3 ON SHEET C8.03
15. ACCESS ROAD, SEE DETAIL 8 ON SHEET C8.01 FOR TYPICAL SECTION
16. INSTALL PIPE PENETRATION PER DETAIL 5 ON SHEET C8.02
17. INSTALL HEADWALL PER DETAIL 8 ON SHEET C8.01

DRAINAGE CONSTRUCTION NOTES

1. 3" CLEARANCE FROM REBAR AT BASE OF RCB (SEE DETAIL 1 SHEET C8.02)
2. 5" CLEARANCE W/FORM LINER FROM REBAR AT BASE OF RCB (SEE DETAIL 2 SHEET C8.02)

VERIFY LOCATION AND ELEVATION OF EXISTING IMPROVEMENTS. MATCH EXISTING AND PROTECT IN PLACE. NOTIFY ENGINEER OF ANY DISCREPANCIES PRIOR TO INSTALLATION OF ONSITE FACILITIES.

FLOOD ZONE NOTE:

THE SITE IS LOCATED ON FEDERAL EMERGENCY AGENCY (FEMA) FLOOD INSURANCE RATE MAP (FIRM) CONTAINING COMMUNITY PANEL 32003C 2145F, DATED NOVEMBER 16, 2011, SPECIAL FLOOD HAZARD AREA SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANGE FLOOD. THIS PANEL SHOWS THAT THE PROJECT IS LOCATED WITHIN ZONE "A".

NOTES:

1. ALL PROPOSED ONSITE STORM DRAIN LATERALS ARE PRIVATE-TO BE PRIVATELY MAINTAINED. ALL ON-SITE SURFACE DRAINAGE FACILITIES ARE TO BE PRIVATELY MAINTAINED.
2. PROPERTY OWNER IS RESPONSIBLE TO MAINTAIN THE BEST MANAGEMENT PRACTICES SUCH AS BUT NOT LIMITED TO THE REMOVAL OF ACCUMULATED SEDIMENT AND DEBRIS AND CARE OF THE VEGETATION.

GEOTECHNICAL REPORT

ALL GRADING WORK WILL BE IN STRICT ACCORDANCE WITH THE SOILS REPORT FOR THE SITE ENTITLED "EHB COMPANIES (THE SEVENTY)" LOCATED AT RAMPART BOULEVARD, AND ALTA DRIVE.

PROJECT NO.: J5707, DATED JUNE 05, 2017
PREPARED BY:
CONTRUCTION TESTING SERVICES, LLC
3842 EAST POST ROAD
LAS VEGAS, NV 89120
PHONE NO. (702) 257-4747

ALL WORK SHALL BE PERFORMED UNDER THE DIRECTION OF A REGISTERED PROFESSIONAL SOILS ENGINEER.

DRAINAGE CERTIFICATION

I CERTIFY THAT THE GRADING PLANS ARE IN CONFORMANCE WITH THE APPROVED DRAINAGE STUDY DS-4787 ON FILE AT THE CITY OF LAS VEGAS FOR THIS PROJECT.

GIA D. NGUYEN P.E. 14918 DATE

TDS SUBMITTAL

DATE: 06/29/2018

STATE OF NEVADA PROFESSIONAL ENGINEER GIA D. NGUYEN No. 14918 CIVIL

PROJECT NO. 840-050

DESIGN: TD
DRAWN: TD
CHECK: MF
PLOT DATE: 06-29-18

GCW ENGINEERS \ SURVEYORS
1555 S. RAINBOW BLVD.
LAS VEGAS, NV 89146
T: 702.804.2000
F: 702.804.2299
gcwengineering.com

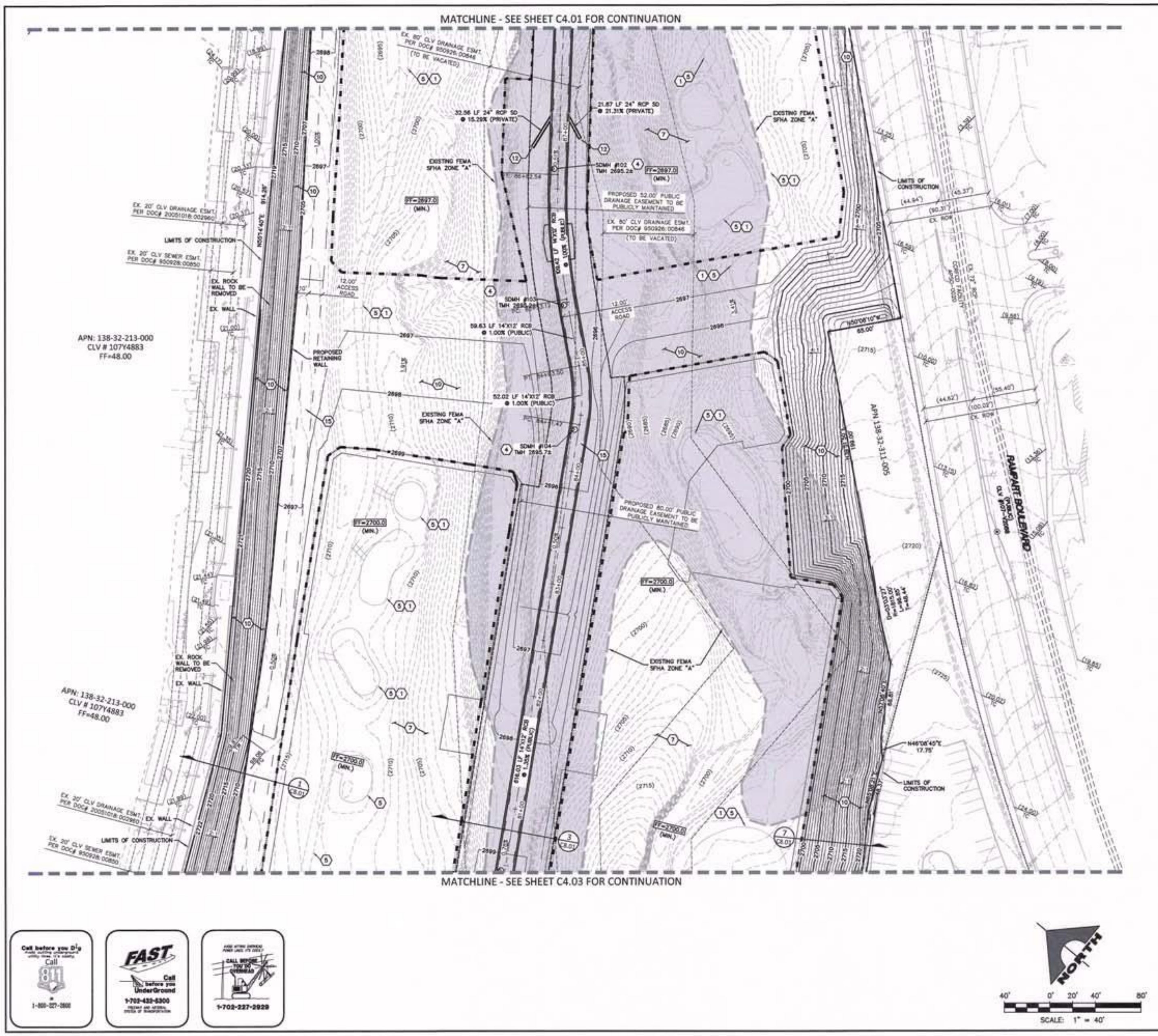
SEVENTY ACRES, LLC

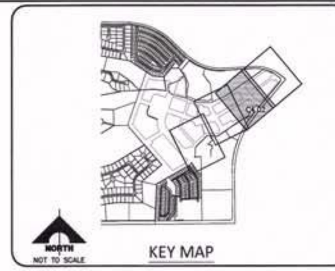
THE 435

GRADING PLAN 1

DRAWING C4.01
4 OF 22 SHTS

6465





KEY MAP

BENCHMARK

BM #	DESCRIPTION	NAVD 88	NAVD 88
9LV-106NW6	CITY OF LAS VEGAS VERTICAL CONTROL POINT '9LV106NW6', BEING A RIVET & PLATE IN TOP OF CURB AT SW CORNER OF CHARLESTON & HUALAPAI IN PORK CHOP ISLAND.	2914.54 (FEET)	888.355 (METERS)

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2. OPEN TOP RCB WEIR SECTION PER DETAIL 3 SHEET C8.02
3. DRAINAGE TRANSITION STRUCTURE, SEE STRUCTURAL PLANS FOR DETAIL.
4. TYPE 1-A 48" MANHOLE PER USCCCA DWG NO. 401 AND 404.1
5. EXISTING GOLF COURSE FACILITIES TO BE DEMOLISHED, CLEAR AND GRUB PER SPECIFICATIONS, AND SOILS REPORT.
6. CREATE GRADED SUMP SLOPE AT 2:1 MAX. FINISH GRADE OF SUMP AT INVERT OF STORM DRAIN PIPE AND SEE PLANS FOR MINIMUM DEPTH AND FINISH GRADE.
7. ENGINEERED ROUGH GRADE TO PAD ELEVATION.
9. INSTALL RIP-RAP, SEE DETAIL 6 ON SHEET C8.01 FOR DETAIL.
10. PROVIDE 2:1 MAXIMUM ENGINEERED SLOPE.
11. INSTALL TYPE 2 DROP INLET PER NDOT DWG NO. R-4.2.1 & DETAIL 6 ON SHEET C8.02
12. INSTALL TEMPORARY PLUG AND CAP STORM DRAIN LINE
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FLOOD ZONE NOTE:

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NOTES:

1. ALL PROPOSED ONSITE STORM DRAIN LATERALS ARE PRIVATE-TO BE PRIVATELY MAINTAINED. ALL ON-SITE SURFACE DRAINAGE FACILITIES ARE TO BE PRIVATELY MAINTAINED.
2. PROPERTY OWNER IS RESPONSIBLE TO MAINTAIN THE BEST MANAGEMENT PRACTICES SUCH AS BUT NOT LIMITED TO THE REMOVAL OF ACCUMULATED SEDIMENT AND DEBRIS AND CARE OF THE VEGETATION.

GEOTECHNICAL REPORT

ALL GRADING WORK WILL BE IN STRICT ACCORDANCE WITH THE SOILS REPORT FOR THE SITE ENTITLED "EHB COMPANIES (THE SEVENTY)" LOCATED AT RAMPART BOULEVARD, AND ALTA DRIVE.

PROJECT NO.: J5707, DATED JUNE 05, 2017
PREPARED BY:
CONTRUCTION TESTING SERVICES, LLC
3842 EAST POST ROAD
LAS VEGAS, NV 89120
PHONE NO. (702) 257-4747

ALL WORK SHALL BE PERFORMED UNDER THE DIRECTION OF A REGISTERED PROFESSIONAL SOILS ENGINEER.

DRAINAGE CERTIFICATION

I CERTIFY THAT THE GRADING PLANS ARE IN CONFORMANCE WITH THE APPROVED DRAINAGE STUDY DS-4787 ON FILE AT THE CITY OF LAS VEGAS FOR THIS PROJECT.

GIA D. NGUYEN P.E. 14918 DATE

GCW ENGINEERS \ SURVEYORS
1555 S. RAINBOW BLVD.
LAS VEGAS, NV 89146
T: 702.804.2000
F: 702.804.2299
gcwengineering.com

PROJECT NO. 840-050
DESIGN: TD
DRAWN: TD
CHECK: MF
PLOT DATE: 06-29-18
PLOT TIME: 17:55:16

F:\PROJECTS\800\840-050\DWG\PRODUCTION\PHASE-1AA\050-1AAC04_C02.DWG
QUANGVINH NGUYEN

REV	DATE	DESCRIPTION	DATE	AGEN APP	DATE	GCW APP

STATE OF NEVADA PROFESSIONAL ENGINEER GIA D. NGUYEN No. 14918 CIVIL

DATE: 06/29/2018

TDS SUBMITTAL

SEVENTY ACRES, LLC

THE 435

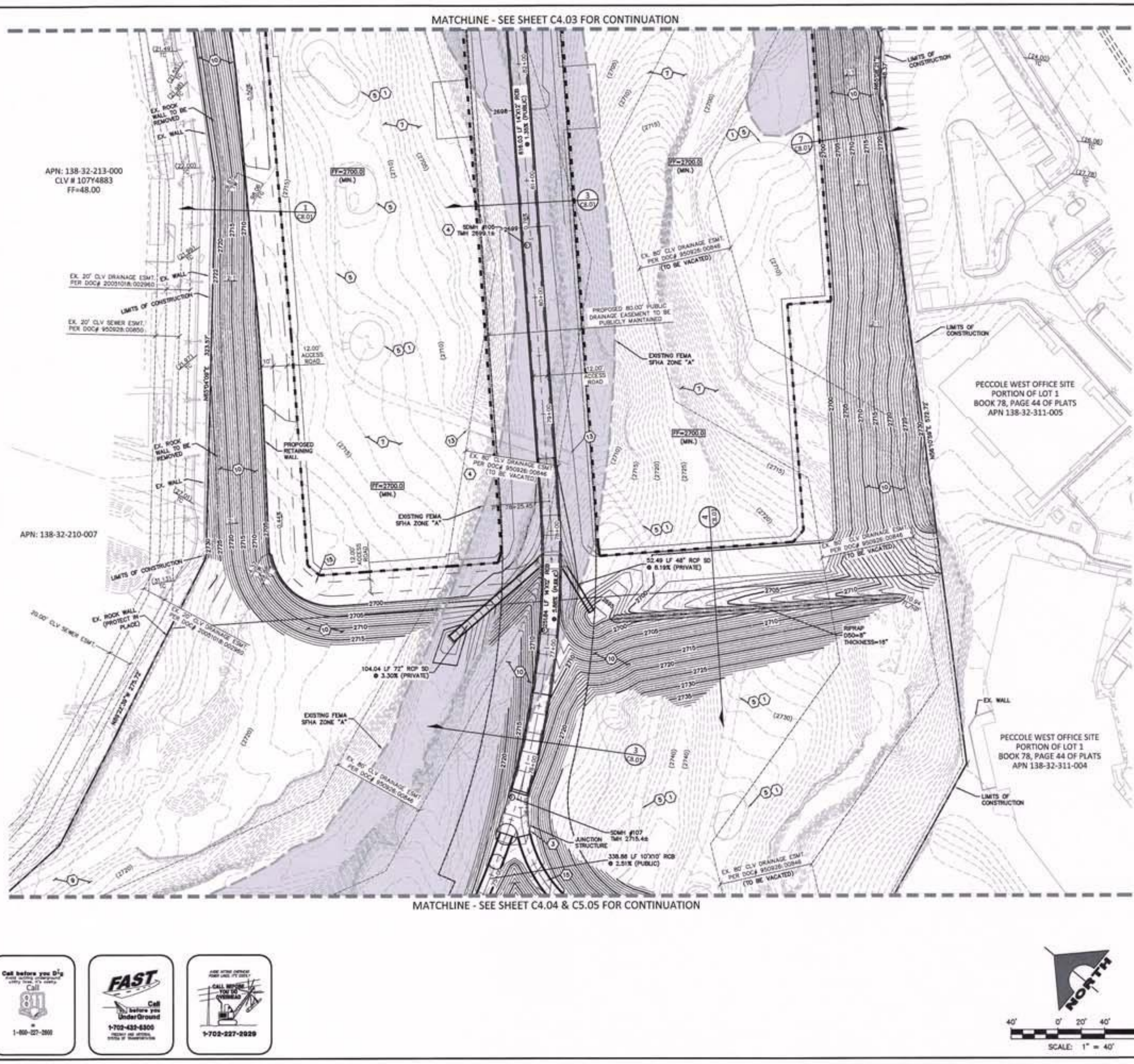
GRADING PLAN 2

DRAWING C4.02
5 OF 22 SHTS

REPLY APP 1430

CLV296079

6466



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Call 811
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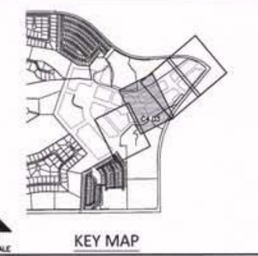
FAST
Call before you Dig Underground
1-702-432-6300

1-702-227-2929



NORTH
NOT TO SCALE

KEY MAP

BENCHMARK

BM #	DESCRIPTION	NAVD 88	NAVD 88
SLV-106NWS	CITY OF LAS VEGAS VERTICAL CONTROL POINT 'SLV106NWS'. BEING A RIVET & PLATE IN TOP OF CURB AT SW CORNER OF CHARLESTON & HUALAPAI IN PORK CHOP ISLAND.	2914.54 (FEET)	888.355 (METERS)

DATUM NOTE

CITY OF LAS VEGAS VERTICAL CONTROL 2008 ADJUSTMENT (UPDATED 05/24/2010) BASED ON NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD'88).

BASIS OF BEARINGS

NORTH 89°40'03" EAST, BEING THE BEARING OF THE SOUTH LINE OF THE SOUTHEAST QUARTER (SE 1/4) OF SECTION 31, TOWNSHIP 20 SOUTH, RANGE 60 EAST, M.D.M., AS SHOWN IN FILE 120, PAGE 49 OF PARCEL MAPS ON FILE AT THE CLARK COUNTY, NEVADA RECORDER'S OFFICE.

CONSTRUCTION NOTES

1. GOLF COURSE IRRIGATION FACILITIES TO BE REMOVED BY OWNER.
2. OPEN TOP RCB WEIR SECTION PER DETAIL 3 SHEET C8.02
3. DRAINAGE TRANSITION STRUCTURE, SEE STRUCTURAL PLANS FOR DETAIL.
4. TYPE 1-A 48" MANHOLE PER USCCCA DWG NO. 401 AND 404.1
5. EXISTING GOLF COURSE FACILITIES TO BE DEMOLISHED, CLEAR AND GRUB PER SPECIFICATIONS, AND SOILS REPORT.
6. CREATE GRADED SUMP SLOPE AT 2:1 MAX. FINISH GRADE OF SUMP AT INVERT OF STORM DRAIN PIPE AND SEE PLANS FOR MINIMUM DEPTH AND FINISH GRADE.
7. ENGINEERED ROUGH GRADE TO PAD ELEVATION.
9. INSTALL RIP-RAP, SEE DETAIL 6 ON SHEET C8.01 FOR DETAIL.
10. PROVIDE 2:1 MAXIMUM ENGINEERED SLOPE.
11. INSTALL TYPE 2 DROP INLET PER NDOT DWG NO. R-4.2.1 & DETAIL 6 ON SHEET C8.02
12. INSTALL TEMPORARY PLUG AND CAP STORM DRAIN LINE
13. DEMOLISH AND REMOVE EXISTING GOLF CART BRIDGE.
14. INSTALL SEDIMENT BERM PER DETAIL 3 ON SHEET C8.03
15. ACCESS ROAD, SEE DETAIL 8 ON SHEET C8.01 FOR TYPICAL SECTION
16. INSTALL PIPE PENETRATION PER DETAIL 5 ON SHEET C8.02
17. INSTALL HEADWALL PER DETAIL 9 ON SHEET C8.01

DRAINAGE CONSTRUCTION NOTES

1. 3" CLEARANCE FROM REBAR AT BASE OF RCB (SEE DETAIL 1 SHEET C8.02)
2. 5" CLEARANCE W/FORM LINER FROM REBAR AT BASE OF RCB (SEE DETAIL 2 SHEET C8.02)

VERIFY LOCATION AND ELEVATION OF EXISTING IMPROVEMENTS. MATCH EXISTING AND PROTECT IN PLACE. NOTIFY ENGINEER OF ANY DISCREPANCIES PRIOR TO INSTALLATION OF ONSITE FACILITIES.

FLOOD ZONE NOTE:

THE SITE IS LOCATED ON FEDERAL EMERGENCY AGENCY (FEMA) FLOOD INSURANCE RATE MAP (FIRM) CONTAINING COMMUNITY PANEL 32003C 2145F, DATED NOVEMBER 16, 2011, SPECIAL FLOOD HAZARD AREA SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANGE FLOOD. THIS PANEL SHOWS THAT THE PROJECT IS LOCATED WITHIN ZONE "A".

NOTES:

1. ALL PROPOSED ONSITE STORM DRAIN LATERALS ARE PRIVATE-TO BE PRIVATELY MAINTAINED. ALL ON-SITE SURFACE DRAINAGE FACILITIES ARE TO BE PRIVATELY MAINTAINED.
2. PROPERTY OWNER IS RESPONSIBLE TO MAINTAIN THE BEST MANAGEMENT PRACTICES SUCH AS BUT NOT LIMITED TO THE REMOVAL OF ACCUMULATED SEDIMENT AND DEBRIS AND CARE OF THE VEGETATION.

GEOTECHNICAL REPORT

ALL GRADING WORK WILL BE IN STRICT ACCORDANCE WITH THE SOILS REPORT FOR THE SITE ENTITLED "EHB COMPANIES (THE SEVENTY)" LOCATED AT RAMPART BOULEVARD, AND ALTA DRIVE.

PROJECT NO.: J5707, DATED JUNE 05, 2017
PREPARED BY:
CONTRUCTION TESTING SERVICES, LLC
3842 EAST POST ROAD.
LAS VEGAS, NV 89120
PHONE NO. (702) 257-4747

ALL WORK SHALL BE PERFORMED UNDER THE DIRECTION OF A REGISTERED PROFESSIONAL SOILS ENGINEER.

DRAINAGE CERTIFICATION

I CERTIFY THAT THE GRADING PLANS ARE IN CONFORMANCE WITH THE APPROVED DRAINAGE STUDY DS-4787 ON FILE AT THE CITY OF LAS VEGAS FOR THIS PROJECT.

GIA D. NGUYEN P.E. 14918 DATE

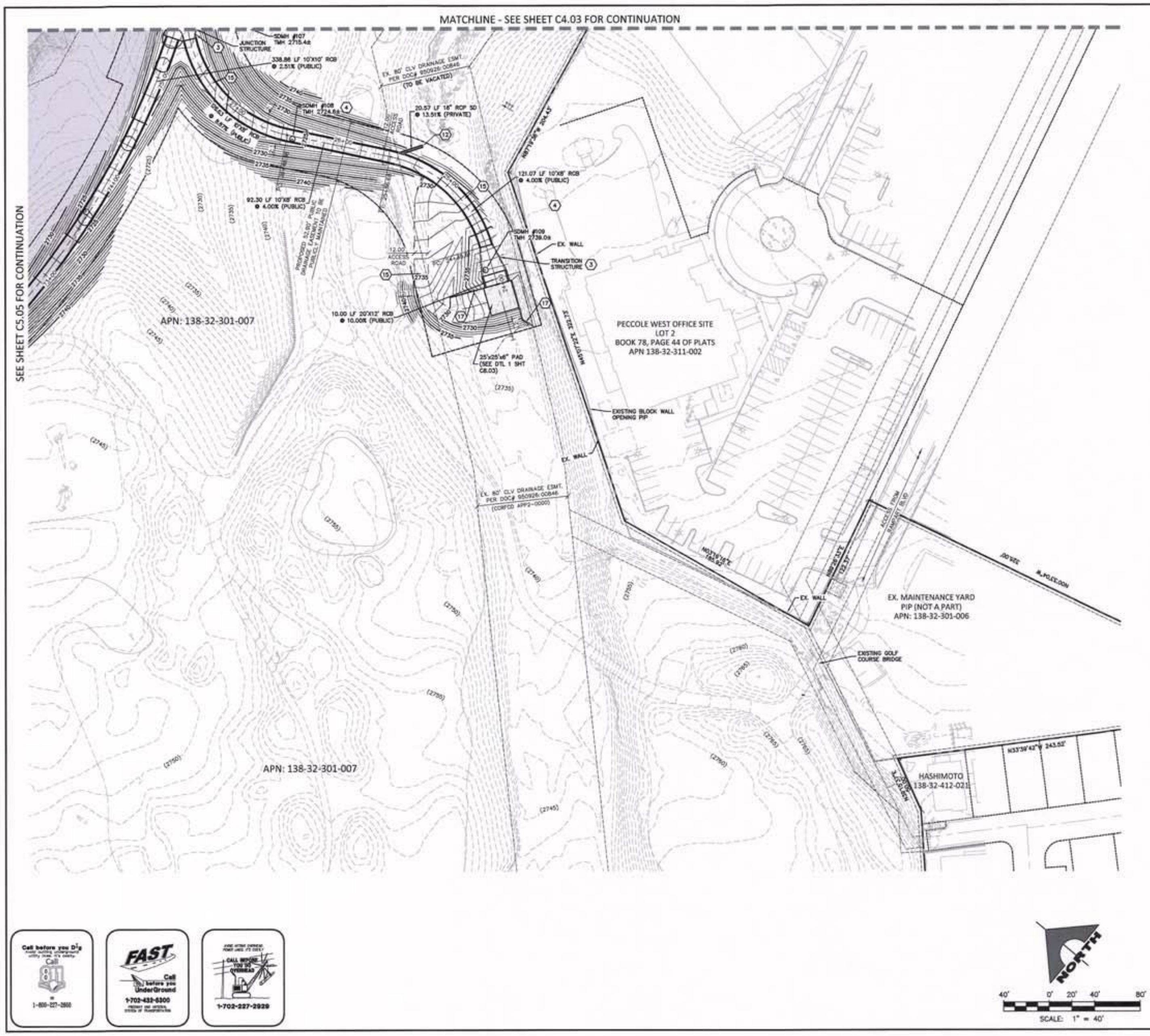
PROJECT NO. 840-050
DESIGN: TD
DRAWN: TD
CHECK: MF
PLOT DATE: 07-02-18

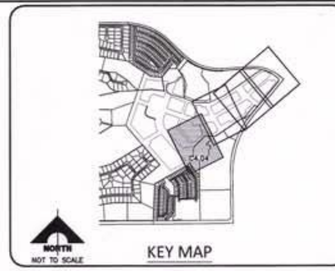
GCW ENGINEERS \ SURVEYORS
1555 S. RAINBOW BLVD.
LAS VEGAS, NV 89146
T: 702.804.2000
F: 702.804.2299
gcwengineering.com

SEVENTY ACRES, LLC
THE 435
GRADING PLAN 3

DRAWING C4.03
6 OF 22 SHTS

STATE OF NEVADA PROFESSIONAL ENGINEER GIA D. NGUYEN No. 14918 CIVIL
DATE: 07/02/2018
TDS SUBMITTAL





KEY MAP

BENCHMARK

BM #	DESCRIPTION	NAVD 88	NAVD 88
9LV-106NW8	CITY OF LAS VEGAS VERTICAL CONTROL POINT '9LV106NW8', BEING A RIVET & PLATE IN TOP OF CURB AT SW CORNER OF CHARLESTON & HUALAPAI IN PORK CHOP ISLAND.	2914.54 (FEET)	888.355 (METERS)

DATUM NOTE

CITY OF LAS VEGAS VERTICAL CONTROL 2008 ADJUSTMENT (UPDATED 05/24/2010) BASED ON NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD'88).

BASIS OF BEARINGS

NORTH 89°40'03" EAST, BEING THE BEARING OF THE SOUTH LINE OF THE SOUTHEAST QUARTER (SE 1/4) OF SECTION 31, TOWNSHIP 20 SOUTH, RANGE 60 EAST, M.D.M., AS SHOWN IN FILE 120, PAGE 49 OF PARCEL MAPS ON FILE AT THE CLARK COUNTY, NEVADA RECORDER'S OFFICE.

CONSTRUCTION NOTES

1. GOLF COURSE IRRIGATION FACILITIES TO BE REMOVED BY OWNER.
2. OPEN TOP RCB WEIR SECTION PER DETAIL 3 SHEET C8.02
3. DRAINAGE TRANSITION STRUCTURE, SEE STRUCTURAL PLANS FOR DETAIL.
4. TYPE 1-A 48" MANHOLE PER USCCCA DWG NO. 401 AND 404.1
5. EXISTING GOLF COURSE FACILITIES TO BE DEMOLISHED, CLEAR AND GRUB PER SPECIFICATIONS, AND SOILS REPORT.
6. CREATE GRADED SUMP SLOPE AT 2:1 MAX. FINISH GRADE OF SUMP AT INVERT OF STORM DRAIN PIPE AND SEE PLANS FOR MINIMUM DEPTH AND FINISH GRADE.
7. ENGINEERED ROUGH GRADE TO PAD ELEVATION.
9. INSTALL RIP-RAP, SEE DETAIL 6 ON SHEET C8.01 FOR DETAIL.
10. PROVIDE 2:1 MAXIMUM ENGINEERED SLOPE.
11. INSTALL TYPE 2 DROP INLET PER NDOT DWG NO. R-4.2.1 & DETAIL 6 ON SHEET C8.02
12. INSTALL TEMPORARY PLUG AND CAP STORM DRAIN LINE
13. DEMOLISH AND REMOVE EXISTING GOLF CART BRIDGE.
14. INSTALL SEDIMENT BERM PER DETAIL 3 ON SHEET C8.03
15. ACCESS ROAD, SEE DETAIL 8 ON SHEET C8.01 FOR TYPICAL SECTION
16. INSTALL PIPE PENETRATION PER DETAIL 5 ON SHEET C8.02
17. INSTALL HEADWALL PER DETAIL 9 ON SHEET C8.01

DRAINAGE CONSTRUCTION NOTES

1. 3" CLEARANCE FROM REBAR AT BASE OF RCB (SEE DETAIL 1 SHEET C8.02)
2. 5" CLEARANCE W/FORM LINER FROM REBAR AT BASE OF RCB (SEE DETAIL 2 SHEET C8.02)

VERIFY LOCATION AND ELEVATION OF EXISTING IMPROVEMENTS. MATCH EXISTING AND PROTECT IN PLACE. NOTIFY ENGINEER OF ANY DISCREPANCIES PRIOR TO INSTALLATION OF ONSITE FACILITIES.

FLOOD ZONE NOTE:

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GEOTECHNICAL REPORT

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PROJECT NO.: J5707, DATED JUNE 05, 2017
PREPARED BY:
CONTRUCTION TESTING SERVICES, LLC
3842 EAST POST ROAD.
LAS VEGAS, NV 89120
PHONE NO. (702) 257-4747

ALL WORK SHALL BE PERFORMED UNDER THE DIRECTION OF A REGISTERED PROFESSIONAL SOILS ENGINEER.

DRAINAGE CERTIFICATION

I CERTIFY THAT THE GRADING PLANS ARE IN CONFORMANCE WITH THE APPROVED DRAINAGE STUDY DS-4787 ON FILE AT THE CITY OF LAS VEGAS FOR THIS PROJECT.

GIA D. NGUYEN P.E. 14918 DATE

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FAST
Call before you UnderGround
1-702-432-5300

1-702-227-2929

PROJECT NO. 840-050
DESIGN: TD
DRAWN: TD
CHECK: MF
PLOT DATE: 07-02-18

GCW ENGINEERS \ SURVEYORS
1555 S. RAINBOW BLVD.
LAS VEGAS, NV 89146
T: 702.804.2000
F: 702.804.2299
gcwengineering.com

QUANGVINH NGUYEN

SEVENTY ACRES, LLC
THE 435
GRADING PLAN 4

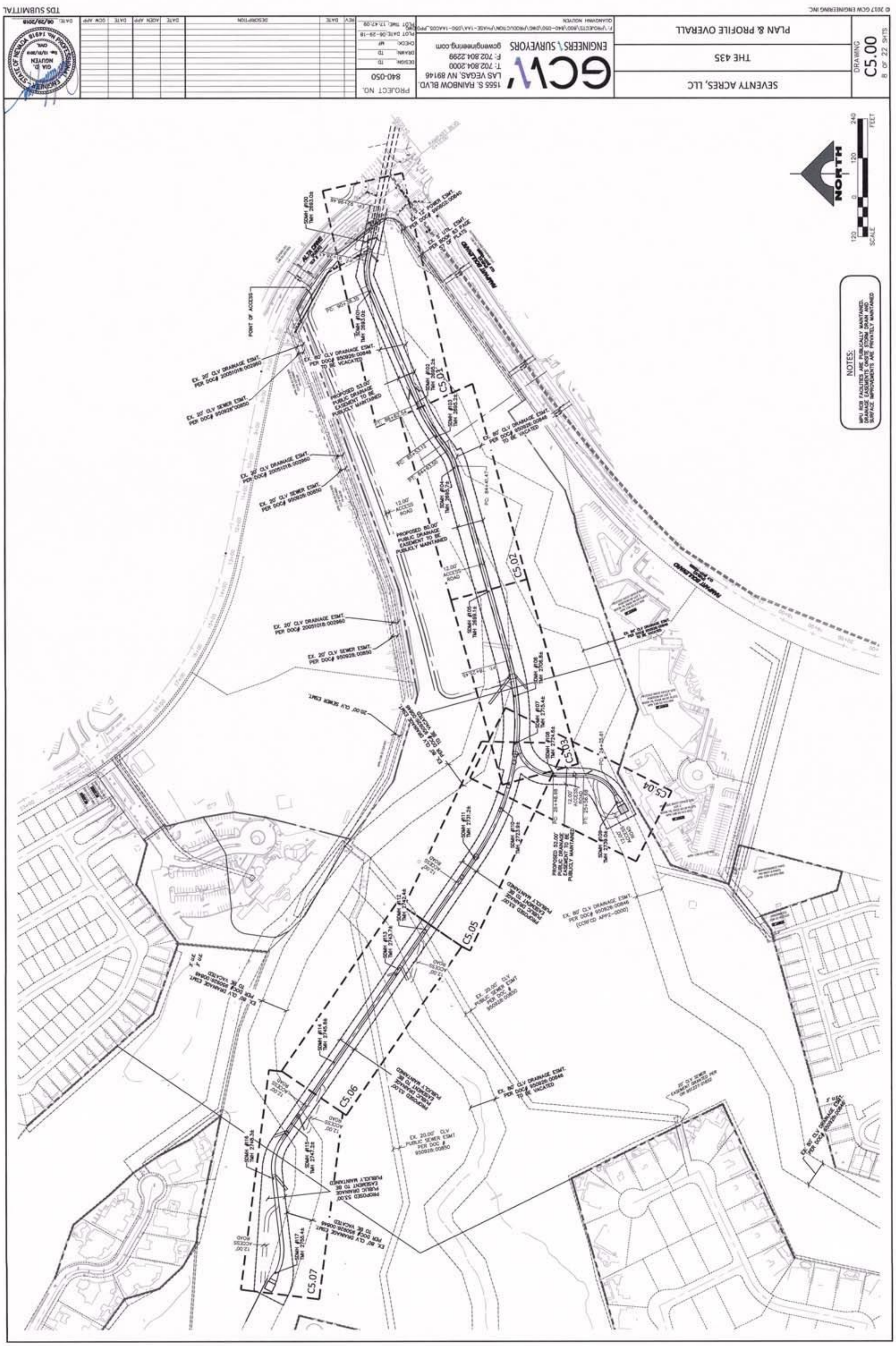
DRAWING C4.04
7 OF 22 SHTS

TDS SUBMITTAL

DATE: 07/02/2018

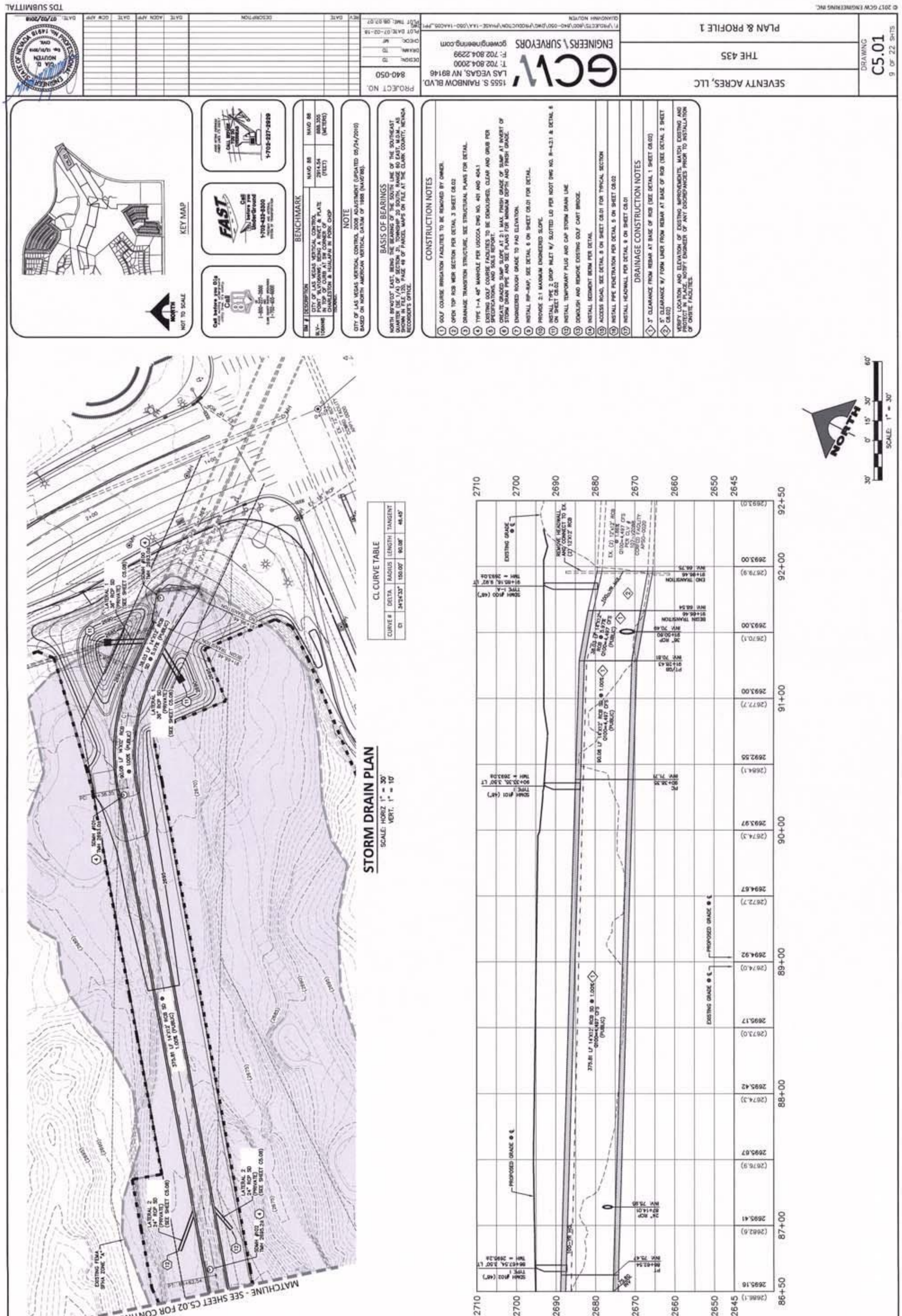
GIA D. NGUYEN
CIVIL
No. 14918

CLV296081

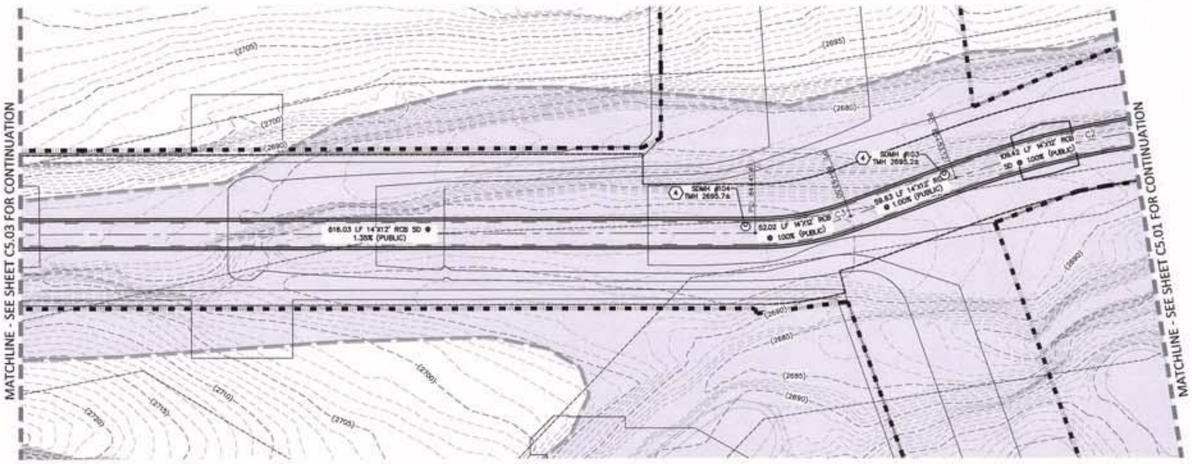

SEVENTY ACRES, LLC
THE 435
PLAN & PROFILE OVERALL
C5.00
GCW ENGINEERS \ SURVEYORS
1555 S. RAINBOW BLVD.
LAS VEGAS, NV 89146
T: 702.804.2000
F: 702.804.2299
gcwengineering.com
PROJECT NO.
840-050
TDS SUBMITTAL
NORTH
NOTES:
C5.01
C5.02
C5.03
C5.04
C5.05
C5.06
C5.07

CLV296082

CLV296083
6470



REPLY APP 1434

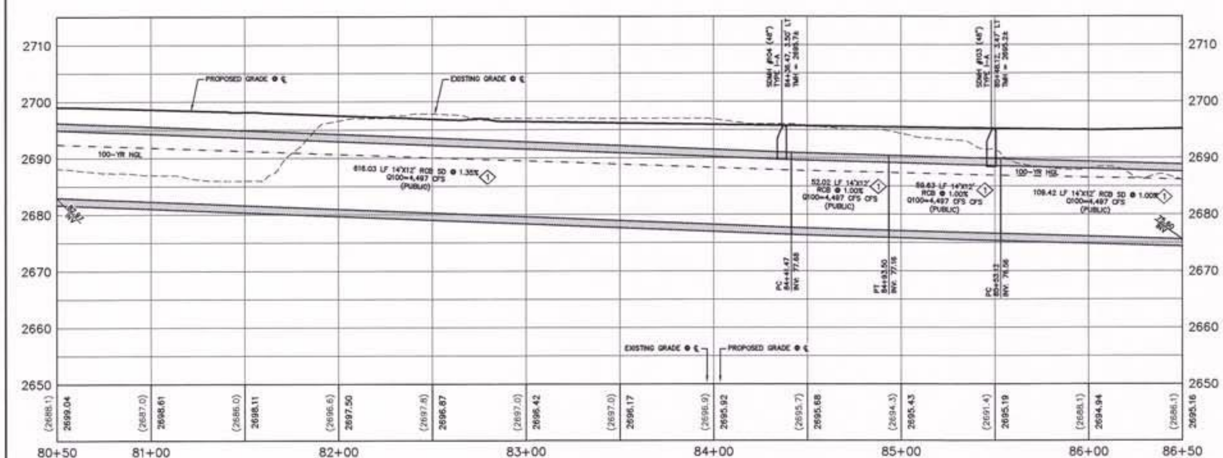


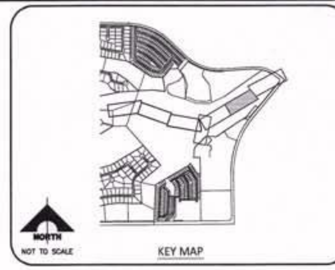
STORM DRAIN PLAN

SCALE: HORIZ 1" = 30'
VERT. 1" = 10'

CL CURVE TABLE

CURVE #	DELTA	RADIUS	LENGTH	TANGENT
C2	12°32'19"	500.00'	109.42'	54.93'
C3	19°52'14"	150.00'	52.02'	26.27'





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FAST — Call before you UnderGround — 1-702-432-5300

1-702-227-2929

BENCHMARK

BM #	DESCRIPTION	NAVD 88	NAVD 88
BLV-106NW6	CITY OF LAS VEGAS VERTICAL CONTROL POINT 'BLV106NW6', BEING A RIVET & PLATE IN TOP OF CURB AT SW CORNER OF CHARLESTON & HUALAPAI IN PORK CHOP ISLAND.	2914.54 (FEET)	888.355 (METERS)

NOTE

CITY OF LAS VEGAS VERTICAL CONTROL 2008 ADJUSTMENT (UPDATED 05/24/2010) BASED ON NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD'88).

BASIS OF BEARINGS

NORTH 89°40'03" EAST, BEING THE BEARING OF THE SOUTH LINE OF THE SOUTHEAST QUARTER (SE 1/4) OF SECTION 31, TOWNSHIP 20 SOUTH, RANGE 60 EAST, M.D.M., AS SHOWN IN FILE 120, PAGE 49 OF PARCEL MAPS ON FILE AT THE CLARK COUNTY, NEVADA RECORDER'S OFFICE.

CONSTRUCTION NOTES

1. GOLF COURSE IRRIGATION FACILITIES TO BE REMOVED BY OWNER.
2. OPEN TOP RCB WEIR SECTION PER DETAIL 3 SHEET C8.02
3. DRAINAGE TRANSITION STRUCTURE, SEE STRUCTURAL PLANS FOR DETAIL.
4. TYPE 1-A 48" MANHOLE PER USCCCA DWG NO. 401 AND 404.1
5. EXISTING GOLF COURSE FACILITIES TO BE DEMOLISHED, CLEAR AND GRUB PER SPECIFICATIONS, AND SOILS REPORT.
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14. INSTALL SEDIMENT BERM PER DETAIL
15. ACCESS ROAD, SEE DETAIL 8 ON SHEET C8.01 FOR TYPICAL SECTION
16. INSTALL PIPE PENETRATION PER DETAIL 5 ON SHEET C8.02
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1. 3" CLEARANCE FROM REBAR AT BASE OF RCB (SEE DETAIL 1 SHEET C8.02)
2. 5" CLEARANCE W/ FORM LINER FROM REBAR AT BASE OF RCB (SEE DETAIL 2 SHEET C8.02)

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NORTH

SCALE: 1" = 30'

GCW ENGINEERS \ SURVEYORS
1555 S. RAINBOW BLVD.
LAS VEGAS, NV 89146
T: 702.804.2000
F: 702.804.2299
gcwengineering.com

PROJECT NO. 840-050

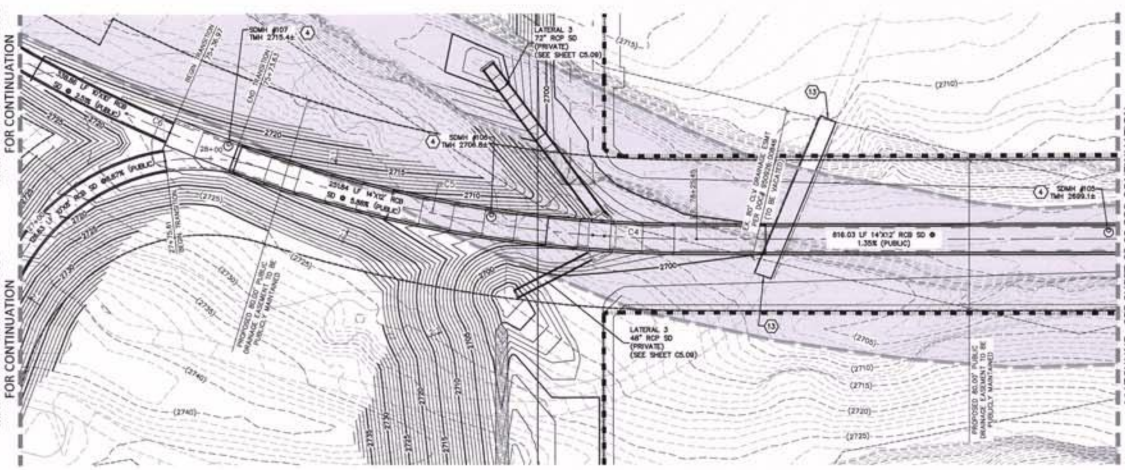
SEVENTY ACRES, LLC

THE 435

PLAN & PROFILE 2

DRAWING C5.02
10 OF 22 SHTS

TDS SUBMITTAL

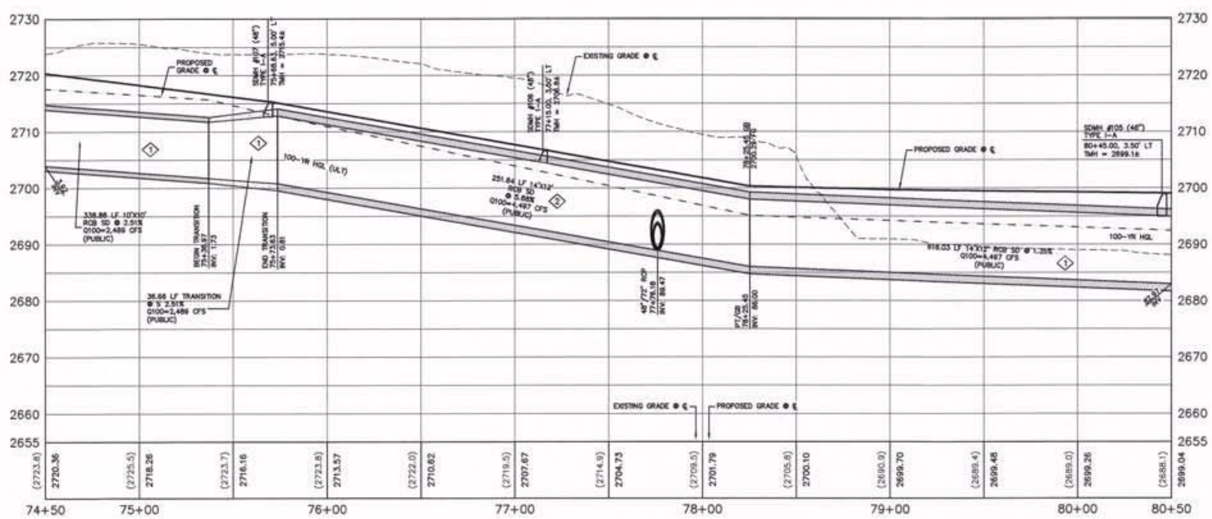


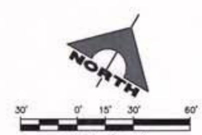
STORM DRAIN PLAN

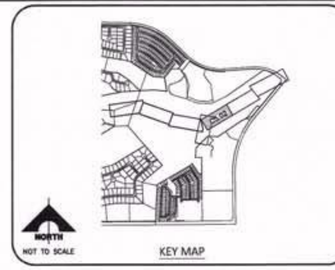
SCALE: HORIZ 1" = 30'
VERT. 1" = 10'

CL CURVE TABLE

CURVE #	DELTA	RADIUS	LENGTH	TANGENT
C4	49°55'20"	720.00'	627.34'	335.15'
C5	49°55'20"	720.00'	627.34'	335.15'
C6	49°55'20"	720.00'	627.34'	335.15'







KEY MAP

1-702-432-5300

1-702-227-2929

BENCHMARK

BM #	DESCRIPTION	NAVD 88	NAVD 88
BLV-106NW6	CITY OF LAS VEGAS VERTICAL CONTROL POINT 'BLV106NW6', BEING A RIVET & PLATE IN TOP OF CURB AT SW CORNER OF CHARLESTON & HUALAPAI IN PORK CHOP ISLAND.	2914.54 (FEET)	888.355 (METERS)

NOTE

CITY OF LAS VEGAS VERTICAL CONTROL 2008 ADJUSTMENT (UPDATED 05/24/2010) BASED ON NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD'88).

BASIS OF BEARINGS

NORTH 89°40'03" EAST, BEING THE BEARING OF THE SOUTH LINE OF THE SOUTHEAST QUARTER (SE 1/4) OF SECTION 31, TOWNSHIP 20 SOUTH, RANGE 60 EAST, M.D.M., AS SHOWN IN FILE 120, PAGE 49 OF PARCEL MAPS ON FILE AT THE CLARK COUNTY, NEVADA RECORDER'S OFFICE.

CONSTRUCTION NOTES

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14. INSTALL SEDIMENT BERM PER DETAIL
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16. INSTALL PIPE PENETRATION PER DETAIL 5 ON SHEET C8.02
17. INSTALL HEADWALL PER DETAIL 9 ON SHEET C8.01

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1. 3" CLEARANCE FROM REBAR AT BASE OF RCB (SEE DETAIL 1 SHEET C8.02)
2. 5" CLEARANCE W/ FORM LINER FROM REBAR AT BASE OF RCB (SEE DETAIL 2 SHEET C8.02)

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PROJECT NO. 840-050

GCW ENGINEERS \ SURVEYORS
1555 S. RAINBOW BLVD.
LAS VEGAS, NV 89146
T: 702.804.2000
F: 702.804.2299
gcwengineering.com

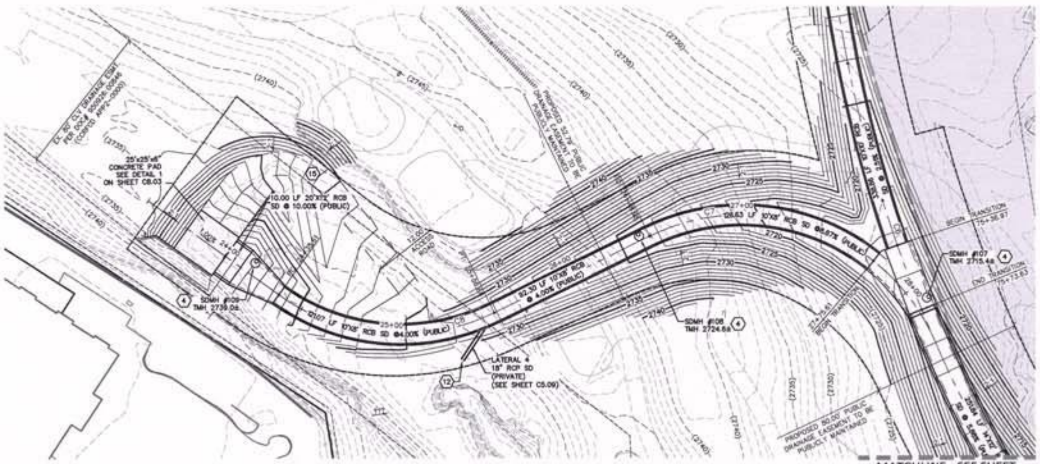
SEVENTY ACRES, LLC

THE 435

PLAN & PROFILE 3

DRAWING C5.03
11 OF 22 SHTS

TDS SUBMITTAL

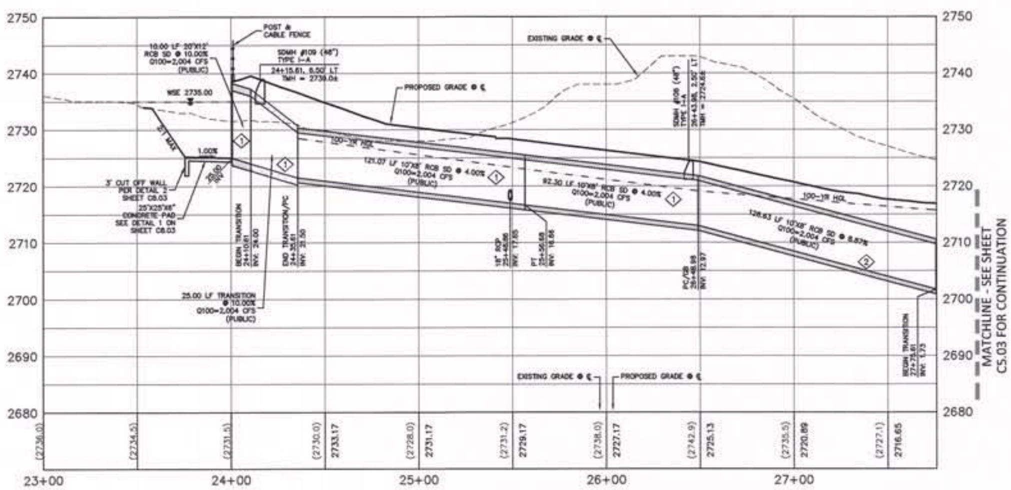


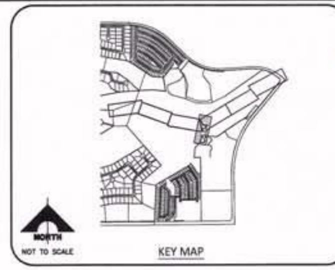
STORM DRAIN PLAN

SCALE: HORIZ 1" = 30'
VERT. 1" = 10'

CL CURVE TABLE

CURVE #	DELTA	RADIUS	LENGTH	TANGENT
C7	92°31'33"	112.00'	180.87'	117.05'
C8	61°56'14"	112.00'	121.07'	67.21'





KEY MAP

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FAST
Call before you UnderGround
1-702-432-5300
1-702-227-2929

BENCHMARK

BM #	DESCRIPTION	NAVD 88	NAVD 88
SLV-106NW6	CITY OF LAS VEGAS VERTICAL CONTROL POINT 'SLV106NW6', BEING A RIVET & PLATE IN TOP OF CURB AT SW CORNER OF CHARLESTON & HUALAPAI IN PORK CHOP ISLAND.	2914.54 (FEET)	888.355 (METERS)

NOTE

CITY OF LAS VEGAS VERTICAL CONTROL 2008 ADJUSTMENT (UPDATED 05/24/2010) BASED ON NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD'88).

BASIS OF BEARINGS

NORTH 89°40'03" EAST, BEING THE BEARING OF THE SOUTH LINE OF THE SOUTHEAST QUARTER (SE 1/4) OF SECTION 31, TOWNSHIP 20 SOUTH, RANGE 60 EAST, M.D.M., AS SHOWN IN FILE 120, PAGE 49 OF PARCEL MAPS ON FILE AT THE CLARK COUNTY, NEVADA RECORDER'S OFFICE.

CONSTRUCTION NOTES

1. GOLF COURSE IRRIGATION FACILITIES TO BE REMOVED BY OWNER.
2. OPEN TOP RCB WEIR SECTION PER DETAIL 3 SHEET C8.02
3. DRAINAGE TRANSITION STRUCTURE, SEE STRUCTURAL PLANS FOR DETAIL.
4. TYPE 1-A 48" MANHOLE PER USCOCA DWG NO. 401 AND 404.1
5. EXISTING GOLF COURSE FACILITIES TO BE DEMOLISHED, CLEAR AND GRUB PER SPECIFICATIONS, AND SOILS REPORT.
6. CREATE GRADED SUMP SLOPE AT 2:1 MAX. FINISH GRADE OF SUMP AT INVERT OF STORM DRAIN PIPE AND SEE PLANS FOR MINIMUM DEPTH AND FINISH GRADE.
7. ENGINEERED ROUGH GRADE TO PAD ELEVATION.
9. INSTALL RIP-RAP, SEE DETAIL 6 ON SHEET C8.01 FOR DETAIL.
10. PROVIDE 2:1 MAXIMUM ENGINEERED SLOPE.
11. INSTALL TYPE 2 DROP INLET W/ SLOTTED LID PER NDOT DWG NO. R-4.2.1 & DETAIL 6 ON SHEET C8.02
12. INSTALL TEMPORARY PLUG AND CAP STORM DRAIN LINE
13. DEMOLISH AND REMOVE EXISTING GOLF CART BRIDGE.
14. INSTALL SEDIMENT BERM PER DETAIL
15. ACCESS ROAD, SEE DETAIL 8 ON SHEET C8.01 FOR TYPICAL SECTION
16. INSTALL PIPE PENETRATION PER DETAIL 5 ON SHEET C8.02
17. INSTALL HEADWALL PER DETAIL 9 ON SHEET C8.01

DRAINAGE CONSTRUCTION NOTES

1. 3" CLEARANCE FROM REBAR AT BASE OF RCB (SEE DETAIL 1 SHEET C8.02)
2. 5" CLEARANCE W/ FORM LINER FROM REBAR AT BASE OF RCB (SEE DETAIL 2 SHEET C8.02)

VERIFY LOCATION AND ELEVATION OF EXISTING IMPROVEMENTS. MATCH EXISTING AND PROTECT IN PLACE. NOTIFY ENGINEER OF ANY DISCREPANCIES PRIOR TO INSTALLATION OF ONSITE FACILITIES.

SCALE: 1" = 30'

TDS SUBMITTAL

DATE: 07/02/2018

PROJECT NO. 840-050
DESIGN: TD
DRAWN: TD
CHECK: MF
PLOT DATE: 07-02-18

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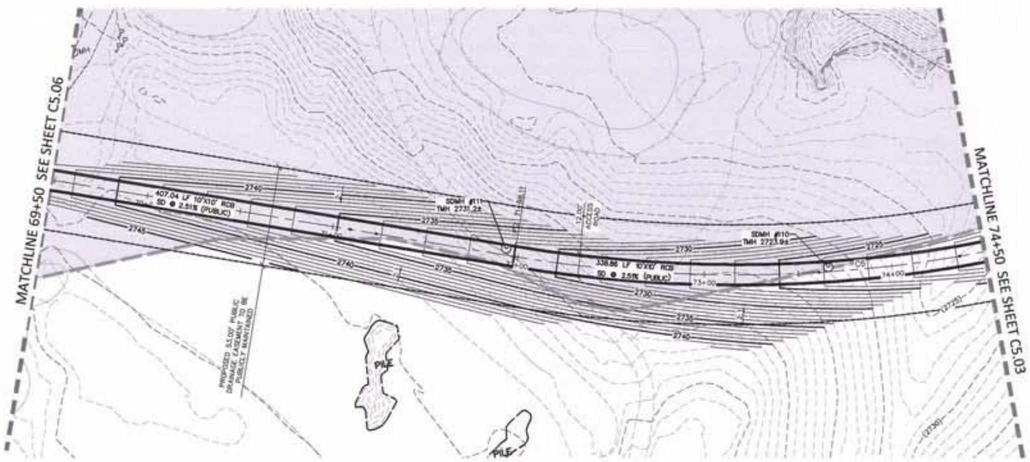
SEVENTY ACRES, LLC

THE 435

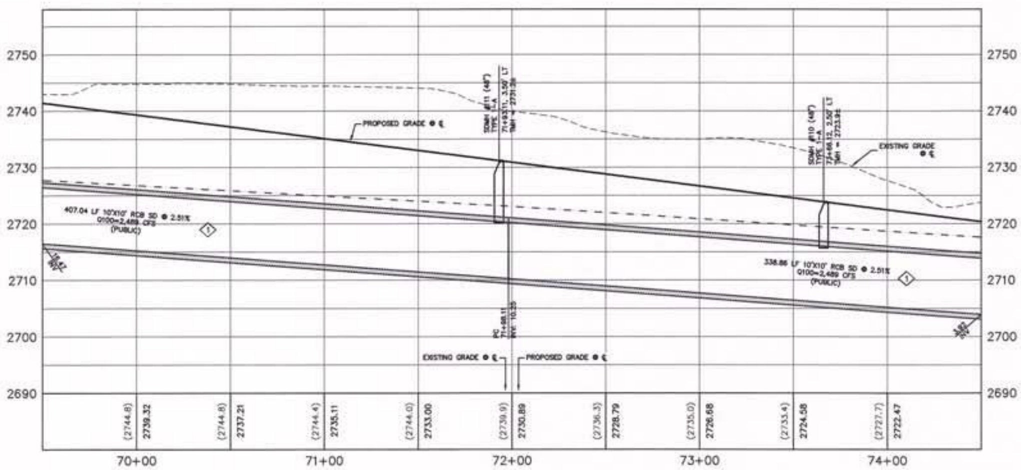
PLAN & PROFILE 4

DRAWING C5.04
12 OF 22 SHTS



STORM DRAIN PLAN

SCALE: HORIZ 1" = 30'
VERT. 1" = 10'

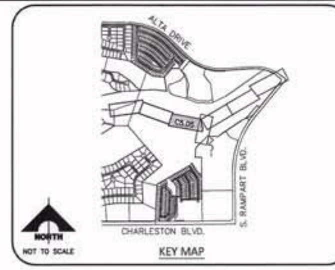


CL CURVE TABLE				
CURVE #	DELTA	RADIUS	LENGTH	TANGENT
C6	49°55'20"	720.00'	627.34'	335.15'

NORTH

30' 0' 15' 30' 60'

SCALE: 1" = 30'



NOT TO SCALE

KEY MAP

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BENCHMARK

BM #	DESCRIPTION	NAVD 88	NAVD 88
BLV-106NW6	CITY OF LAS VEGAS VERTICAL CONTROL POINT 'BLV106NW6', BEING A RIVET & PLATE IN TOP OF CURB AT SW CORNER OF CHARLESTON & HUALAPAI IN PORK CHOP ISLAND.	2914.54 (FEET)	888.355 (METERS)

NOTE

CITY OF LAS VEGAS VERTICAL CONTROL 2008 ADJUSTMENT (UPDATED 05/24/2010) BASED ON NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD'88).

BASIS OF BEARINGS

NORTH 89°40'03" EAST, BEING THE BEARING OF THE SOUTH LINE OF THE SOUTHEAST QUARTER (SE 1/4) OF SECTION 31, TOWNSHIP 20 SOUTH, RANGE 60 EAST, M.D.M., AS SHOWN IN FILE 120, PAGE 49 OF PARCEL MAPS ON FILE AT THE CLARK COUNTY, NEVADA RECORDER'S OFFICE.

CONSTRUCTION NOTES

1. GOLF COURSE IRRIGATION FACILITIES TO BE REMOVED BY OWNER.
2. OPEN TOP RCB WEIR SECTION PER DETAIL 3 SHEET C8.02
3. DRAINAGE TRANSITION STRUCTURE, SEE STRUCTURAL PLANS FOR DETAIL.
4. TYPE 1-A 48" MANHOLE PER USDCCA DWG NO. 401 AND 404.1
5. EXISTING GOLF COURSE FACILITIES TO BE DEMOLISHED, CLEAR AND GRUB PER SPECIFICATIONS, AND SOILS REPORT.
6. CREATE GRADED SUMP SLOPE AT 2:1 MAX. FINISH GRADE OF SUMP AT INVERT OF STORM DRAIN PIPE AND SEE PLANS FOR MINIMUM DEPTH AND FINISH GRADE.
7. ENGINEERED ROUGH GRADE TO PAD ELEVATION.
9. INSTALL RIP-RAP, SEE DETAIL 6 ON SHEET C8.01 FOR DETAIL.
10. PROVIDE 2:1 MAXIMUM ENGINEERED SLOPE.
11. INSTALL TYPE 2 DROP INLET W/ SLOTTED LID PER NDOT DWG NO. R-4.2.1 & DETAIL 6 ON SHEET C8.02
12. INSTALL TEMPORARY PLUG AND CAP STORM DRAIN LINE
13. DEMOLISH AND REMOVE EXISTING GOLF CART BRIDGE.
14. INSTALL SEDIMENT BERM PER DETAIL
15. ACCESS ROAD, SEE DETAIL 8 ON SHEET C8.01 FOR TYPICAL SECTION
16. INSTALL PIPE PENETRATION PER DETAIL 5 ON SHEET C8.02
17. INSTALL HEADWALL PER DETAIL 9 ON SHEET C8.01

DRAINAGE CONSTRUCTION NOTES

1. 3" CLEARANCE FROM REBAR AT BASE OF RCB (SEE DETAIL 1 SHEET C8.02)
2. 5" CLEARANCE W/ FORM LINER FROM REBAR AT BASE OF RCB (SEE DETAIL 2 SHEET C8.02)

VERIFY LOCATION AND ELEVATION OF EXISTING IMPROVEMENTS. MATCH EXISTING AND PROTECT IN PLACE. NOTIFY ENGINEER OF ANY DISCREPANCIES PRIOR TO INSTALLATION OF ONSITE FACILITIES.

PROJECT NO. 840-050

DESIGN: TD
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CHECK: MF
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PLOT TIME: 08:28:04

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QUANGVINH NGUYEN

SEVENTY ACRES, LLC

THE 435

PLAN & PROFILE 5

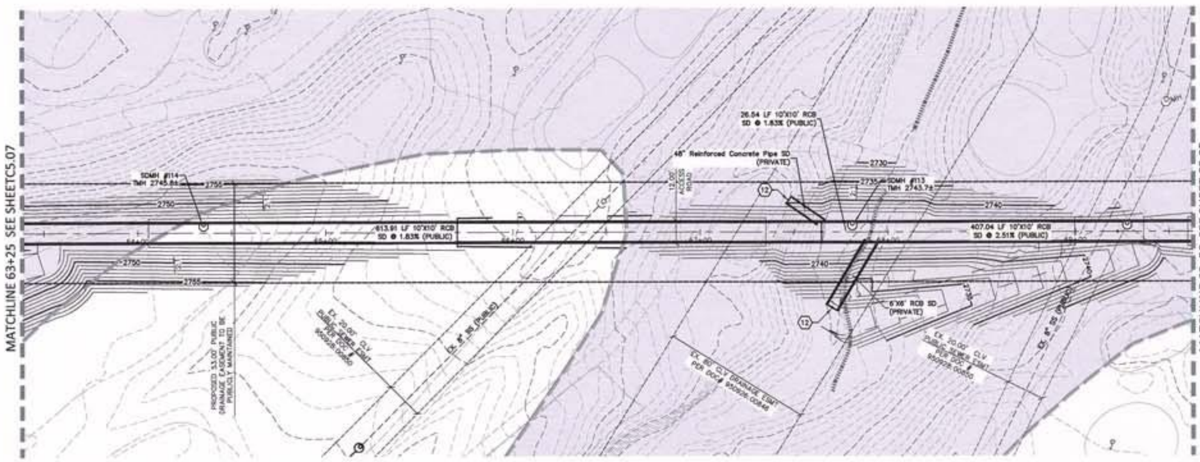
DRAWING
C5.05
13 OF 22 SHTS

GIA D. NGUYEN No. 14918 CIVIL
STATE OF NEVADA PROFESSIONAL ENGINEER

DATE: 07/02/2018

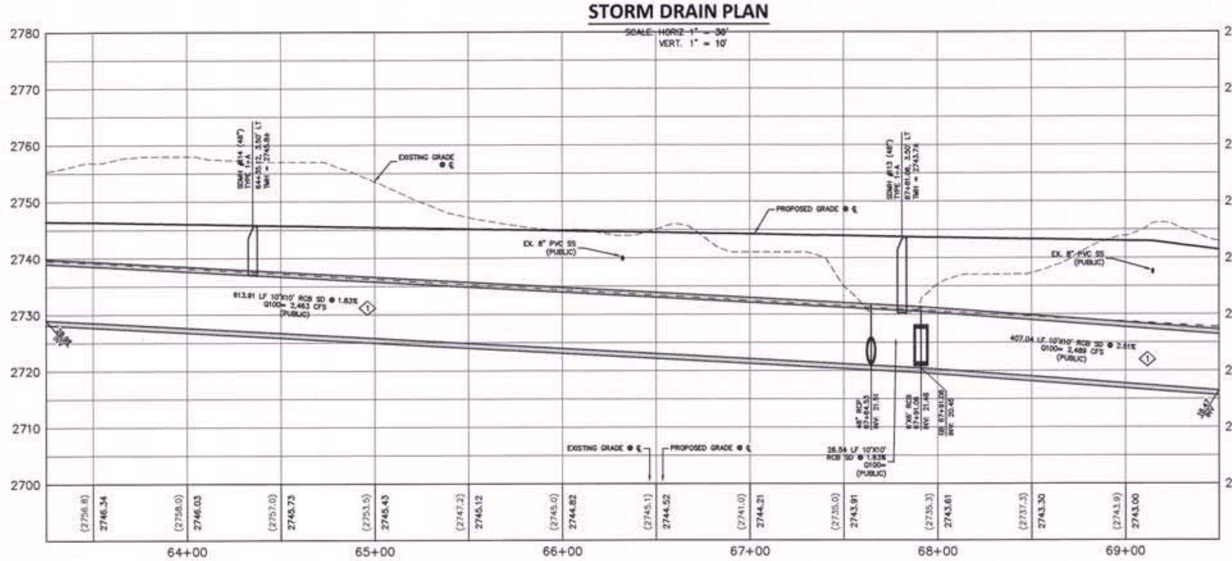
REV	DATE	DESCRIPTION	DATE	ACCN APP	DATE	GCW APP	DATE

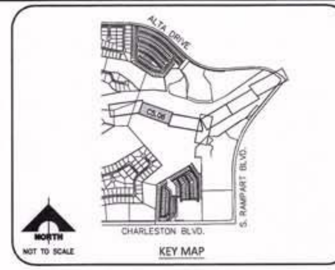
TDS SUBMITTAL



STORM DRAIN PLAN

SCALE: HORIZ 1" = 30'
VERT. 1" = 10'





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FAST — Call before you UnderGround — 1-702-432-5300

1-702-227-2929

BENCHMARK

BM #	DESCRIPTION	NAVD 88	NAVD 88
BLV-106NW8	CITY OF LAS VEGAS VERTICAL CONTROL POINT 'BLV106NW8', BEING A RIVET & PLATE IN TOP OF CURB AT SW CORNER OF CHARLESTON & HUALAPAI IN PORK CHOP ISLAND.	2914.54 (FEET)	888.355 (METERS)

NOTE

CITY OF LAS VEGAS VERTICAL CONTROL 2008 ADJUSTMENT (UPDATED 05/24/2010) BASED ON NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD'88).

BASIS OF BEARINGS

NORTH 89°40'03" EAST, BEING THE BEARING OF THE SOUTH LINE OF THE SOUTHEAST QUARTER (SE 1/4) OF SECTION 31, TOWNSHIP 20 SOUTH, RANGE 60 EAST, M.D.M., AS SHOWN IN FILE 120, PAGE 49 OF PARCEL MAPS ON FILE AT THE CLARK COUNTY, NEVADA RECORDER'S OFFICE.

CONSTRUCTION NOTES

1. GOLF COURSE IRRIGATION FACILITIES TO BE REMOVED BY OWNER.
2. OPEN TOP RCB WEIR SECTION PER DETAIL 3 SHEET C8.02
3. DRAINAGE TRANSITION STRUCTURE, SEE STRUCTURAL PLANS FOR DETAIL.
4. TYPE I-A 48" MANHOLE PER USDCCA DWG NO. 401 AND 404.1
5. EXISTING GOLF COURSE FACILITIES TO BE DEMOLISHED, CLEAR AND GRUB PER SPECIFICATIONS, AND SOILS REPORT.
6. CREATE GRADED SUMP SLOPE AT 2:1 MAX. FINISH GRADE OF SUMP AT INVERT OF STORM DRAIN PIPE AND SEE PLANS FOR MINIMUM DEPTH AND FINISH GRADE.
7. ENGINEERED ROUGH GRADE TO PAD ELEVATION.
9. INSTALL RIP-RAP, SEE DETAIL 6 ON SHEET C8.01 FOR DETAIL.
10. PROVIDE 2:1 MAXIMUM ENGINEERED SLOPE.
11. INSTALL TYPE 2 DROP INLET W/ SLOTTED LID PER NDOT DWG NO. R-4.3.1 & DETAIL 6 ON SHEET C8.02
12. INSTALL TEMPORARY PLUG AND CAP STORM DRAIN LINE.
13. DEMOLISH AND REMOVE EXISTING GOLF CART BRIDGE.
14. INSTALL SEDIMENT BERM PER DETAIL
15. ACCESS ROAD, SEE DETAIL 8 ON SHEET C8.01 FOR TYPICAL SECTION
16. INSTALL PIPE PENETRATION PER DETAIL 5 ON SHEET C8.02
17. INSTALL HEADWALL PER DETAIL 9 ON SHEET C8.01

DRAINAGE CONSTRUCTION NOTES

1. 3" CLEARANCE FROM REBAR AT BASE OF RCB (SEE DETAIL 1 SHEET C8.02)
2. 5" CLEARANCE W/ FORM LINER FROM REBAR AT BASE OF RCB (SEE DETAIL 2 SHEET C8.02)

VERIFY LOCATION AND ELEVATION OF EXISTING IMPROVEMENTS. MATCH EXISTING AND PROTECT IN PLACE. NOTIFY ENGINEER OF ANY DISCREPANCIES PRIOR TO INSTALLATION OF ONSITE FACILITIES.

TDS SUBMITTAL

PROJECT NO. 840-050

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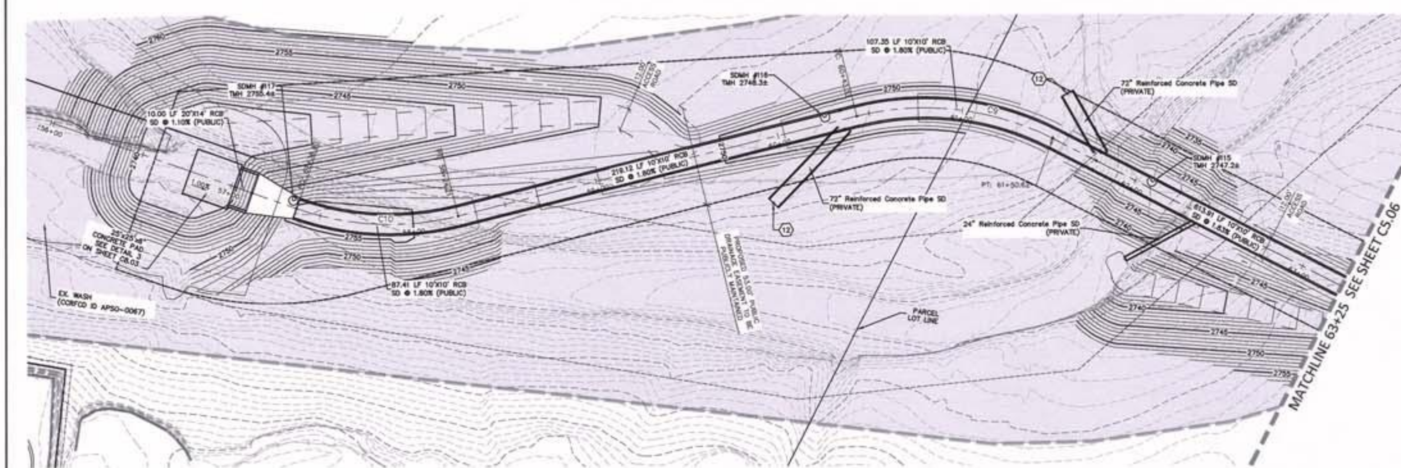
gcwengineering.com

SEVENTY ACRES, LLC

THE 435

PLAN & PROFILE 6

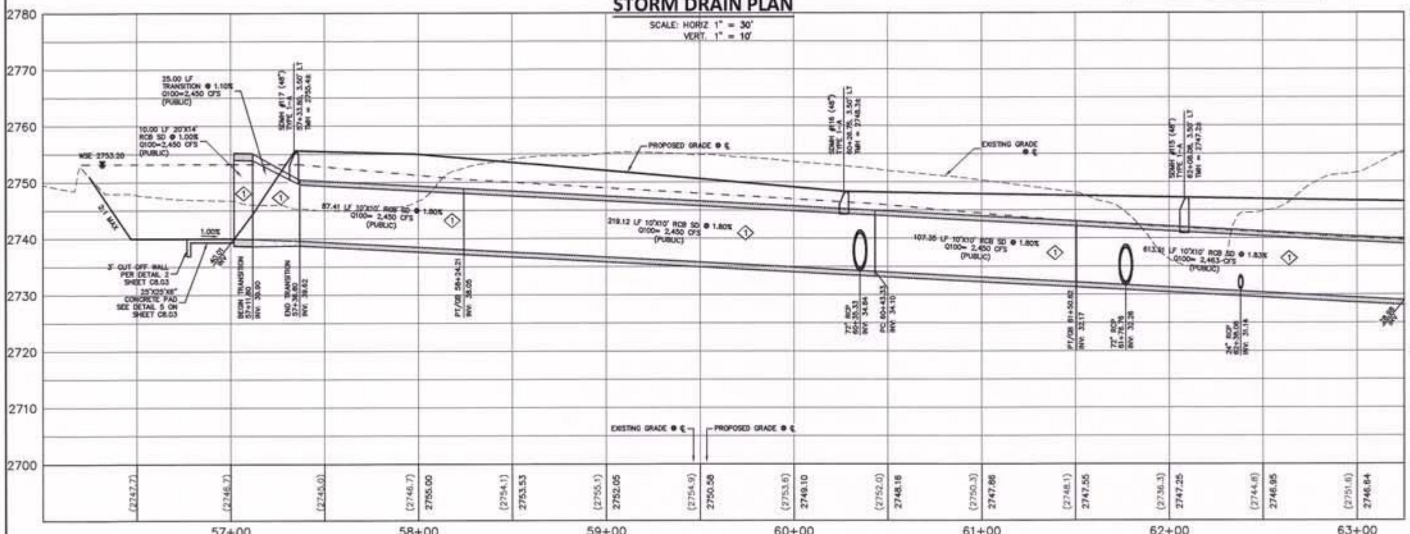
DRAWING C5.06
14 OF 22 SHTS

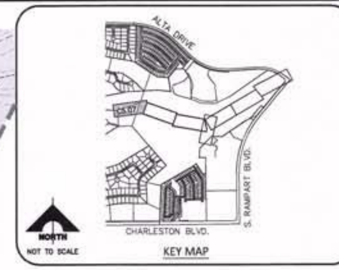


CL CURVE TABLE				
CURVE #	DELTA	RADIUS	LENGTH	TANGENT
C9	40°58'54"	150.00'	107.29'	56.06'
C10	33°23'24"	150.00'	87.41'	44.89'

STORM DRAIN PLAN

SCALE: HORIZ 1" = 30'
VERT. 1" = 10'





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BENCHMARK

BM #	DESCRIPTION	NAVD 88	NAVD 88
BLV-106NW6	CITY OF LAS VEGAS VERTICAL CONTROL POINT 'BLV106NW6', BEING A RIVET & PLATE IN TOP OF CURB AT SW CORNER OF CHARLESTON & HUALAPAI IN PORK CHOP ISLAND.	2914.54 (FEET)	888.355 (METERS)

NOTE

CITY OF LAS VEGAS VERTICAL CONTROL 2008 ADJUSTMENT (UPDATED 05/24/2010) BASED ON NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD'88).

BASIS OF BEARINGS

NORTH 89°40'03" EAST, BEING THE BEARING OF THE SOUTH LINE OF THE SOUTHEAST QUARTER (SE 1/4) OF SECTION 31, TOWNSHIP 20 SOUTH, RANGE 60 EAST, M.D.M., AS SHOWN IN FILE 120, PAGE 49 OF PARCEL MAPS ON FILE AT THE CLARK COUNTY, NEVADA RECORDER'S OFFICE.

CONSTRUCTION NOTES

1. GOLF COURSE IRRIGATION FACILITIES TO BE REMOVED BY OWNER.
2. OPEN TOP RCB WEIR SECTION PER DETAIL 3 SHEET C8.02
3. DRAINAGE TRANSITION STRUCTURE, SEE STRUCTURAL PLANS FOR DETAIL.
4. TYPE 1-A 48" MANHOLE PER USCCCA DWG NO. 401 AND 404.1
5. EXISTING GOLF COURSE FACILITIES TO BE DEMOLISHED, CLEAR AND GRUB PER SPECIFICATIONS, AND SOILS REPORT.
6. CREATE GRADED SUMP SLOPE AT 2:1 MAX. FINISH GRADE OF SUMP AT INVERT OF STORM DRAIN PIPE AND SEE PLANS FOR MINIMUM DEPTH AND FINISH GRADE.
7. ENGINEERED ROUGH GRADE TO PAD ELEVATION.
9. INSTALL RIP-RAP, SEE DETAIL 6 ON SHEET C8.01 FOR DETAIL.
10. PROVIDE 2:1 MAXIMUM ENGINEERED SLOPE.
11. INSTALL TYPE 2 DROP INLET W/ SLOTTED LID PER NDOT DWG NO. R-4.2.1 & DETAIL 6 ON SHEET C8.02
12. INSTALL TEMPORARY PLUG AND CAP STORM DRAIN LINE
13. DEMOLISH AND REMOVE EXISTING GOLF CART BRIDGE.
14. INSTALL SEDIMENT BERM PER DETAIL
15. ACCESS ROAD, SEE DETAIL 8 ON SHEET C8.01 FOR TYPICAL SECTION
16. INSTALL PIPE PENETRATION PER DETAIL 5 ON SHEET C8.02
17. INSTALL HEADWALL PER DETAIL 9 ON SHEET C8.01

DRAINAGE CONSTRUCTION NOTES

1. 3" CLEARANCE FROM REBAR AT BASE OF RCB (SEE DETAIL 1 SHEET C8.02)
2. 5" CLEARANCE W/ FORM LINER FROM REBAR AT BASE OF RCB (SEE DETAIL 2 SHEET C8.02)

VERIFY LOCATION AND ELEVATION OF EXISTING IMPROVEMENTS. MATCH EXISTING AND PROTECT IN PLACE. NOTIFY ENGINEER OF ANY DISCREPANCIES PRIOR TO INSTALLATION OF ONSITE FACILITIES.

SCALE: 1" = 30'

REV	DATE	DESCRIPTION	DATE	AGEN APP	DATE	GCW APP	DATE: 07/02/2018

TDS SUBMITTAL

GIA D. NGUYEN, CIVIL, No. 14918, PROFESSIONAL ENGINEER, STATE OF NEVADA

PROJECT NO. 840-050

DESIGN: TD
DRAWN: TD
CHECK: MF
PLOT DATE: 07-02-18
PLOT TIME: 08:33:15

GCW ENGINEERS \ SURVEYORS
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LAS VEGAS, NV 89146
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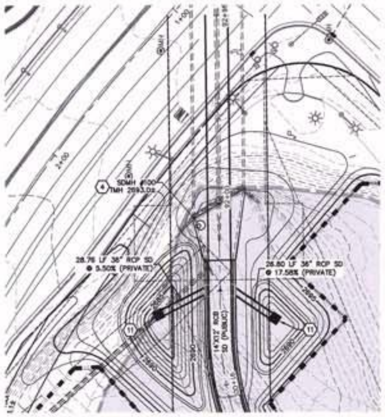
gcwengineering.com

SEVENTY ACRES, LLC

THE 435

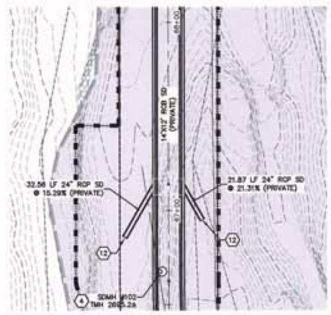
PLAN & PROFILE 7

DRAWING C5.07
15 OF 22 SHTS



STORM DRAIN - LATERAL 1

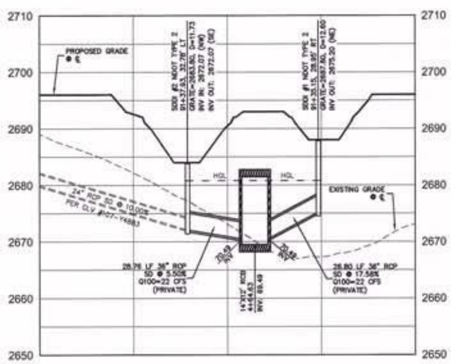
SCALE: HORIZ 1" = 30'
VERT. 1" = 10'

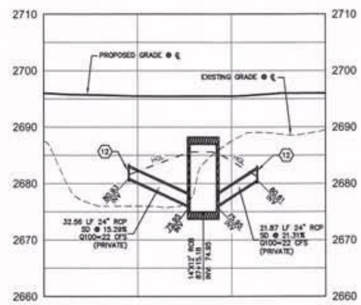


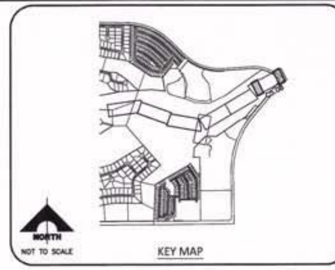
STORM DRAIN - LATERAL 2

SCALE: HORIZ 1" = 30'
VERT. 1" = 10'

30' 0' 15' 30' 60'
SCALE: 1" = 30'







KEY MAP

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BENCHMARK

BM #	DESCRIPTION	NAVD 88	NAVD 88
SLV-106NW6	CITY OF LAS VEGAS VERTICAL CONTROL POINT 'SLV106NW6', BEING A RIVET & PLATE IN TOP OF CURB AT SW CORNER OF CHARLESTON & HUALAPAI IN PORK CHOP ISLAND.	2914.54 (FEET)	888.355 (METERS)

NOTE

CITY OF LAS VEGAS VERTICAL CONTROL 2008 ADJUSTMENT (UPDATED 05/24/2010) BASED ON NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD'88).

BASIS OF BEARINGS

NORTH 89°40'03" EAST, BEING THE BEARING OF THE SOUTH LINE OF THE SOUTHEAST QUARTER (SE 1/4) OF SECTION 31, TOWNSHIP 20 SOUTH, RANGE 60 EAST, M.D.M., AS SHOWN IN FILE 120, PAGE 49 OF PARCEL MAPS ON FILE AT THE CLARK COUNTY, NEVADA RECORDER'S OFFICE.

CONSTRUCTION NOTES

1. GOLF COURSE IRRIGATION FACILITIES TO BE REMOVED BY OWNER.
2. OPEN TOP RCB WEIR SECTION PER DETAIL 3 SHEET C8.02
3. DRAINAGE TRANSITION STRUCTURE, SEE STRUCTURAL PLANS FOR DETAIL.
4. TYPE 1-A 48" MANHOLE PER USCCCA DWG NO. 401 AND 404.1
5. EXISTING GOLF COURSE FACILITIES TO BE DEMOLISHED, CLEAR AND GRUB PER SPECIFICATIONS, AND SOILS REPORT.
6. CREATE GRADED SUMP SLOPE AT 2:1 MAX. FINISH GRADE OF SUMP AT INVERT OF STORM DRAIN PIPE AND SEE PLANS FOR MINIMUM DEPTH AND FINISH GRADE.
7. ENGINEERED ROUGH GRADE TO PAD ELEVATION.
9. INSTALL RIP-RAP, SEE DETAIL 6 ON SHEET C8.01 FOR DETAIL.
10. PROVIDE 2:1 MAXIMUM ENGINEERED SLOPE.
11. INSTALL TYPE 2 DROP INLET W/ SLOTTED LID PER NDOT DWG NO. R-4.2.1 & DETAIL 6 ON SHEET C8.02
12. INSTALL TEMPORARY PLUG AND CAP STORM DRAIN LINE
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14. INSTALL SEDIMENT BERM PER DETAIL
15. ACCESS ROAD, SEE DETAIL 8 ON SHEET C8.01 FOR TYPICAL SECTION
16. INSTALL PIPE PENETRATION PER DETAIL 5 ON SHEET C8.02
17. INSTALL HEADWALL PER DETAIL 9 ON SHEET C8.01

DRAINAGE CONSTRUCTION NOTES

1. 3" CLEARANCE FROM REBAR AT BASE OF RCB (SEE DETAIL 1 SHEET C8.02)
2. 5" CLEARANCE W/ FORM LINER FROM REBAR AT BASE OF RCB (SEE DETAIL 2 SHEET C8.02)

VERIFY LOCATION AND ELEVATION OF EXISTING IMPROVEMENTS. MATCH EXISTING AND PROTECT IN PLACE. NOTIFY ENGINEER OF ANY DISCREPANCIES PRIOR TO INSTALLATION OF ONSITE FACILITIES.

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PROJECT NO. 840-050

TDS SUBMITTAL
DATE: 07/02/2018

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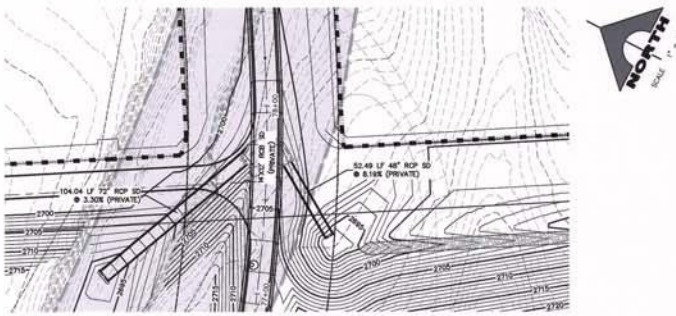
THE 435

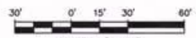
LATERAL PROFILE 1

DRAWING
C5.08
16 OF 22 SHTS
HTE: 00-00000

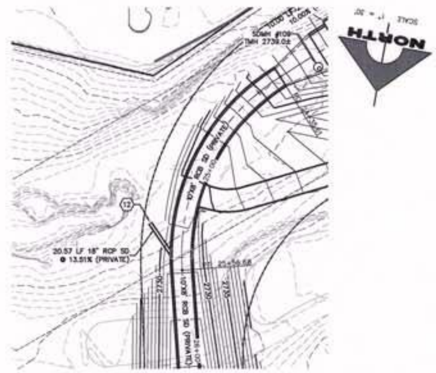


STORM DRAIN - LATERAL 3

SCALE: HORIZ 1" = 30'
VERT. 1" = 10'

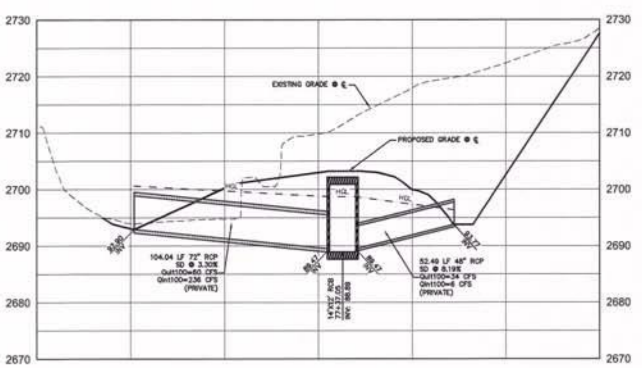


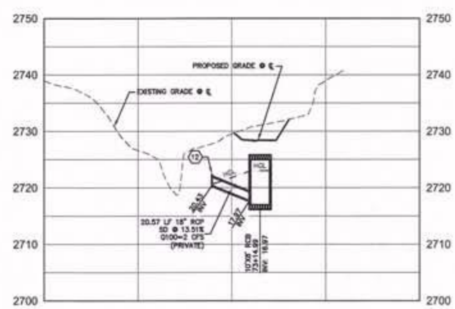
SCALE: 1" = 30'

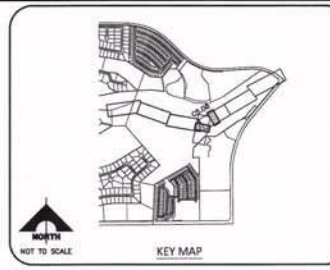


STORM DRAIN - LATERAL 4

SCALE: HORIZ 1" = 30'
VERT. 1" = 10'







KEY MAP

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CALL BEFORE YOU DIG
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BENCHMARK

BM #	DESCRIPTION	NAVD 88	NAVD 88
SLV-106NW6	CITY OF LAS VEGAS VERTICAL CONTROL POINT 'SLV106NW6'; BEING A RIVET & PLATE IN TOP OF CURB AT SW CORNER OF CHARLESTON & HUALAPAI IN PORK CHOP ISLAND.	2914.54 (FEET)	888.355 (METERS)

NOTE

CITY OF LAS VEGAS VERTICAL CONTROL 2008 ADJUSTMENT (UPDATED 05/24/2010) BASED ON NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD'88).

BASIS OF BEARINGS

NORTH 89°40'03" EAST, BEING THE BEARING OF THE SOUTH LINE OF THE SOUTHEAST QUARTER (SE 1/4) OF SECTION 31, TOWNSHIP 20 SOUTH, RANGE 60 EAST, M.D.M., AS SHOWN IN FILE 120, PAGE 49 OF PARCEL MAPS ON FILE AT THE CLARK COUNTY, NEVADA RECORDER'S OFFICE.

CONSTRUCTION NOTES

1. GOLF COURSE IRRIGATION FACILITIES TO BE REMOVED BY OWNER.
2. OPEN TOP RCB WEIR SECTION PER DETAIL 3 SHEET C8.02
3. DRAINAGE TRANSITION STRUCTURE, SEE STRUCTURAL PLANS FOR DETAIL.
4. TYPE 1-A 48" MANHOLE PER USCCCA DWG NO. 401 AND 404.1
5. EXISTING GOLF COURSE FACILITIES TO BE DEMOLISHED, CLEAR AND GRUB PER SPECIFICATIONS, AND SOILS REPORT.
6. CREATE GRADED SUMP SLOPE AT 2:1 MAX. FINISH GRADE OF SUMP AT INVERT OF STORM DRAIN PIPE AND SEE PLANS FOR MINIMUM DEPTH AND FINISH GRADE.
7. ENGINEERED ROUGH GRADE TO PAD ELEVATION.
9. INSTALL RIP-RAP, SEE DETAIL 6 ON SHEET C8.01 FOR DETAIL.
10. PROVIDE 2:1 MAXIMUM ENGINEERED SLOPE.
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12. INSTALL TEMPORARY PLUG AND CAP STORM DRAIN LINE
13. DEMOLISH AND REMOVE EXISTING GOLF CART BRIDGE.
14. INSTALL SEDIMENT BERM PER DETAIL
15. ACCESS ROAD, SEE DETAIL 8 ON SHEET C8.01 FOR TYPICAL SECTION
16. INSTALL PIPE PENETRATION PER DETAIL 5 ON SHEET C8.02
17. INSTALL HEADWALL PER DETAIL 9 ON SHEET C8.01

DRAINAGE CONSTRUCTION NOTES

1. 3" CLEARANCE FROM REBAR AT BASE OF RCB (SEE DETAIL 1 SHEET C8.02)
2. 5" CLEARANCE W/ FORM LINER FROM REBAR AT BASE OF RCB (SEE DETAIL 2 SHEET C8.02)

VERIFY LOCATION AND ELEVATION OF EXISTING IMPROVEMENTS. MATCH EXISTING AND PROTECT IN PLACE. NOTIFY ENGINEER OF ANY DISCREPANCIES PRIOR TO INSTALLATION OF ONSITE FACILITIES.

TDS SUBMITTAL

DATE: 07/02/2018

PROJECT NO. 840-050

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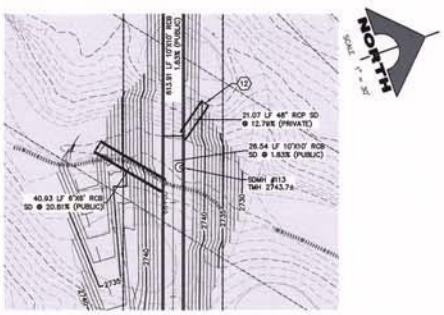
SEVENTY ACRES, LLC

THE 435

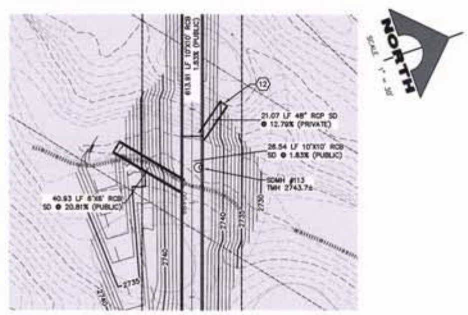
LATERAL PROFILE 2

DRAWING C5.09
17 OF 22 SHTS
HTE: 00-00000



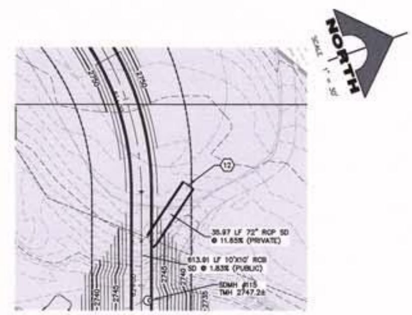
STORM DRAIN - LATERAL 5

SCALE: HORIZ 1" = 30'
VERT. 1" = 10'



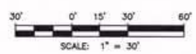
STORM DRAIN - LATERAL 6

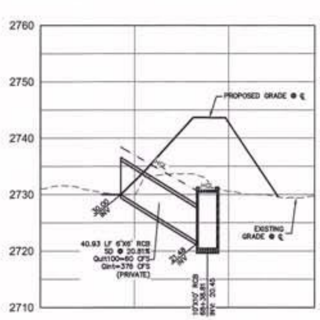
SCALE: HORIZ 1" = 30'
VERT. 1" = 10'

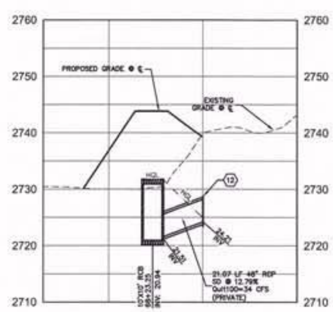


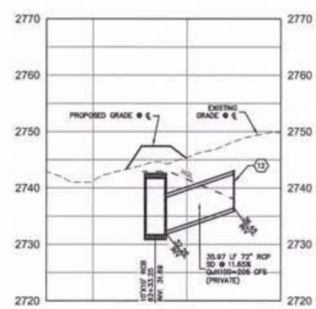
STORM DRAIN - LATERAL 7

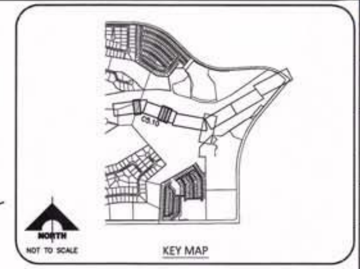
SCALE: HORIZ 1" = 30'
VERT. 1" = 10'











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BENCHMARK

BM #	DESCRIPTION	NAVD 88	NAVD 88
BLV-106NW6	CITY OF LAS VEGAS VERTICAL CONTROL POINT 'BLV106NW6', BEING A RIVET & PLATE IN TOP OF CURB AT SW CORNER OF CHARLESTON & HUALAPAI IN PORK CHOP ISLAND.	2914.54 (FEET)	888.355 (METERS)

NOTE

CITY OF LAS VEGAS VERTICAL CONTROL 2008 ADJUSTMENT (UPDATED 05/24/2010) BASED ON NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD'88).

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VERIFY LOCATION AND ELEVATION OF EXISTING IMPROVEMENTS. MATCH EXISTING AND PROTECT IN PLACE. NOTIFY ENGINEER OF ANY DISCREPANCIES PRIOR TO INSTALLATION OF ONSITE FACILITIES.

REV	DATE	DESCRIPTION	DATE	AGEN. APP	DATE	GCW APP	DATE
							07/02/2018

TDS SUBMITTAL

PROJECT NO. 840-050
DESIGN: TD
DRAWN: TD
CHECK: MF
PLOT DATE: 07-02-18
PLOT TIME: 08:40:37

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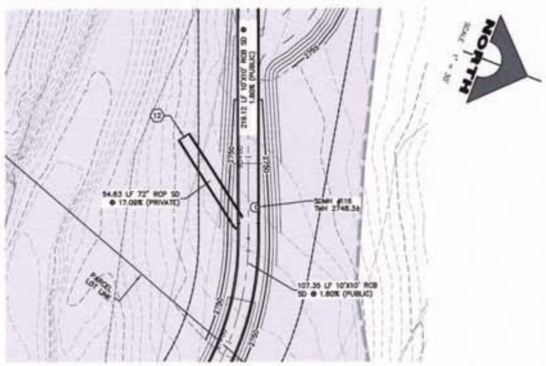
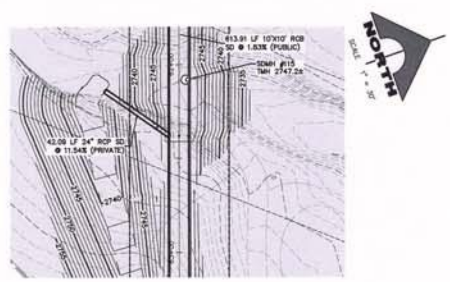
SEVENTY ACRES, LLC
THE 435
LATERAL PROFILE 3

DRAWING C5.10
18 OF 22 SHTS
HTE: 00-00000



STORM DRAIN - LATERAL 8

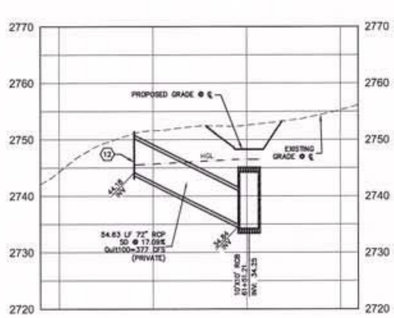
SCALE: HORIZ 1" = 30'
VERT. 1" = 10'

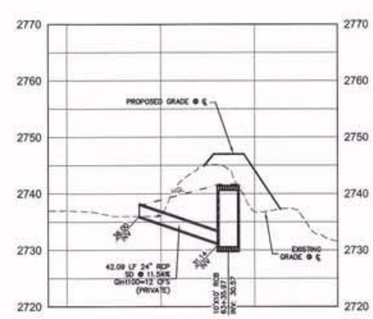


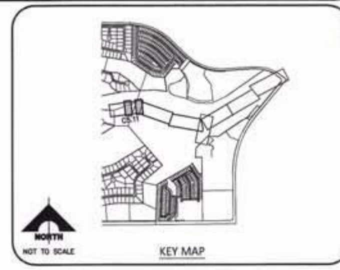
STORM DRAIN - LATERAL 9

SCALE: HORIZ 1" = 30'
VERT. 1" = 10'

30' 0' 15' 30' 60'
SCALE: 1" = 30'







KEY MAP

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REV	DATE	DESCRIPTION	DATE	AGEN APP	DATE	GCW APP	DATE
							07/02/2018

TDS SUBMITTAL

PROFESSIONAL ENGINEER, STATE OF NEVADA, QUA D. NGUYEN, No. 14918, CIVIL

PROJECT NO. 840-050
DESIGN: TD
DRAWN: TD
CHECK: MF
PLOT DATE: 07-02-18
PLOT TIME: 08:43:37

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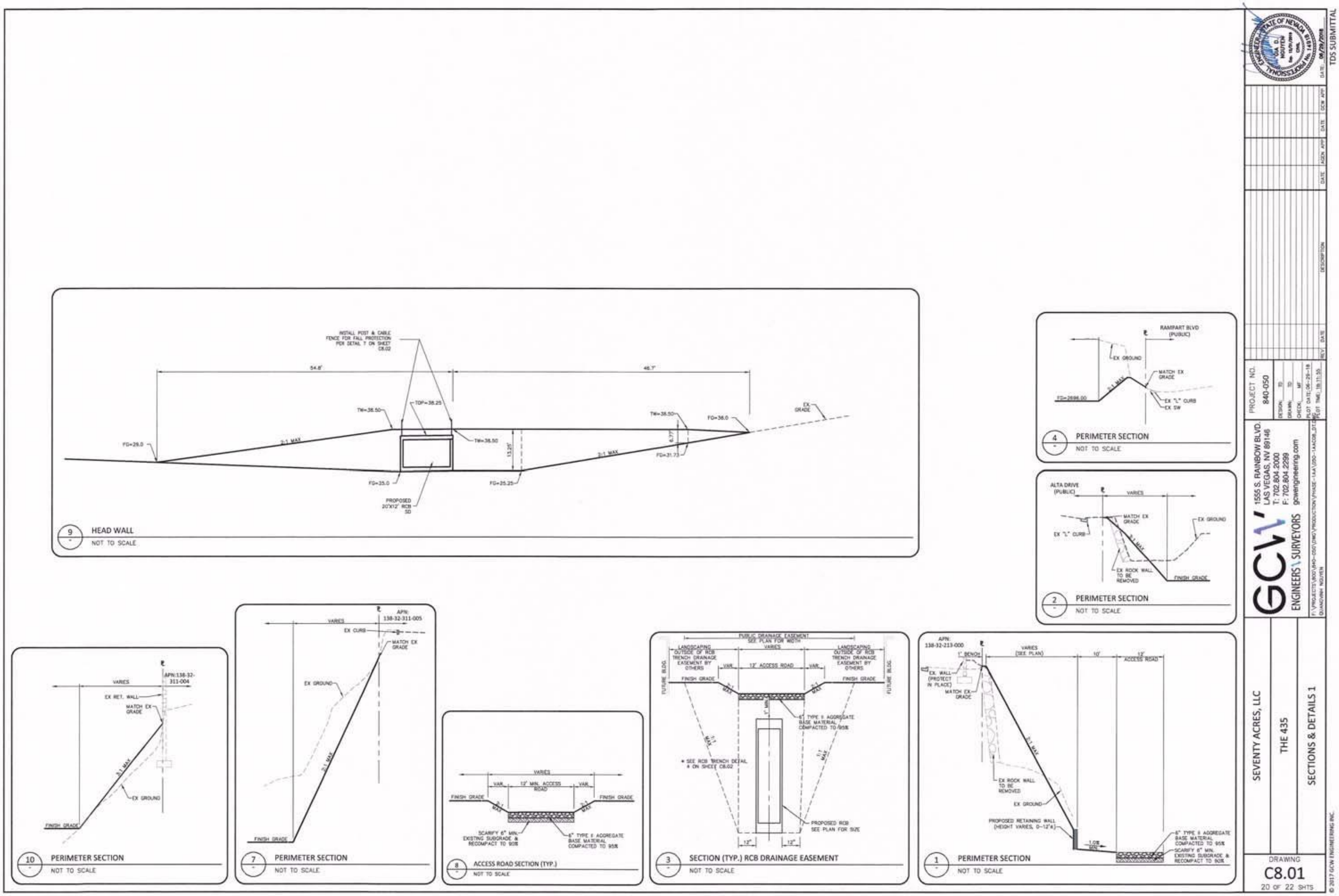
QUANGVINH NGUYEN

SEVENTY ACRES, LLC

THE 435

LATERAL PROFILE 4

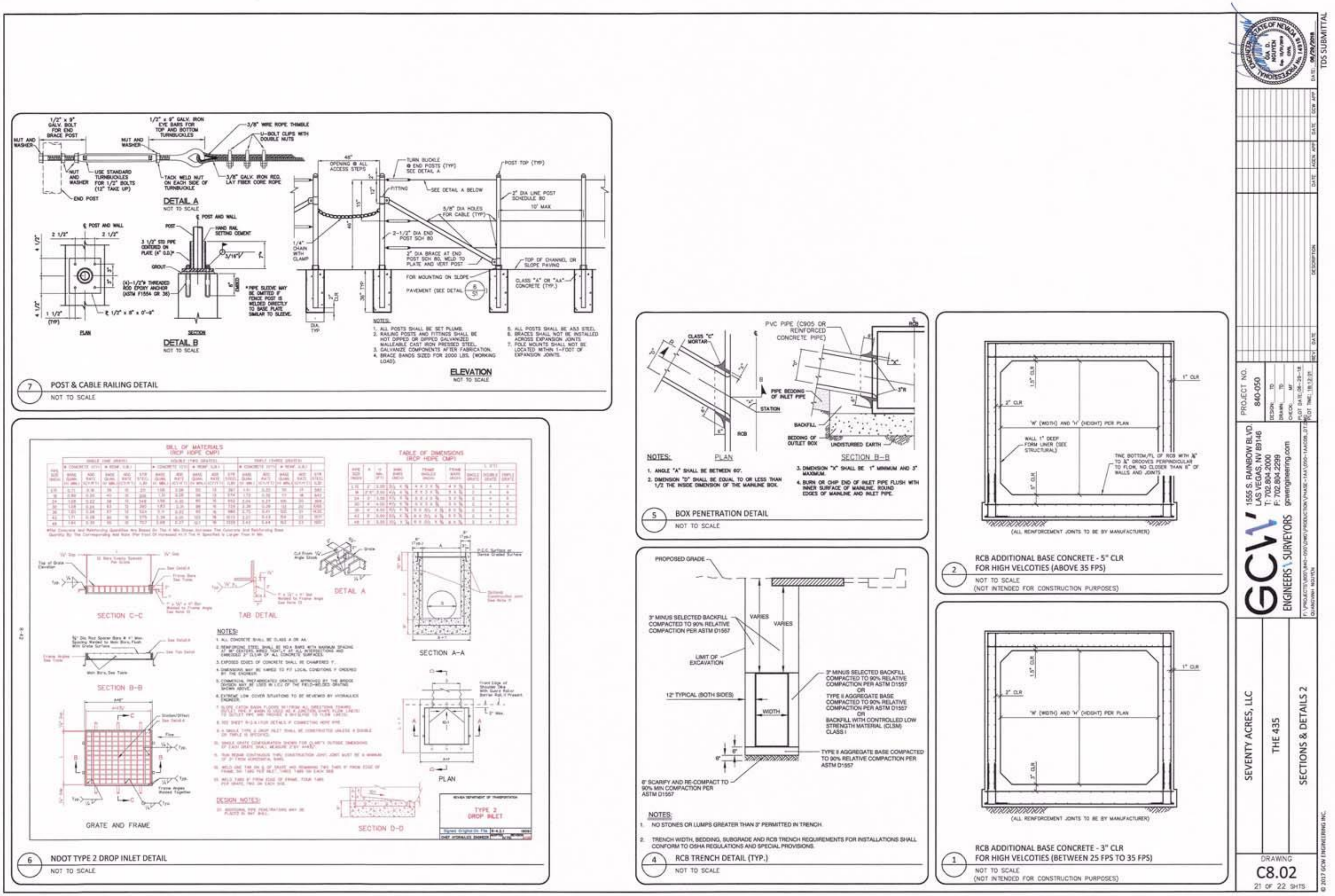
DRAWING
C5.11
19 OF 22 SHTS
HTE: 00-00000



CLV296094

6481

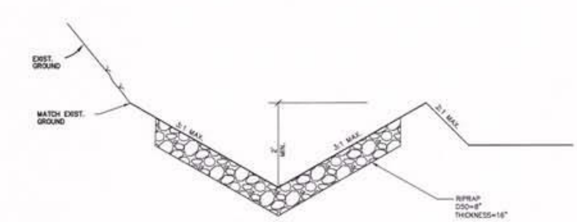
REPLY APP 1445



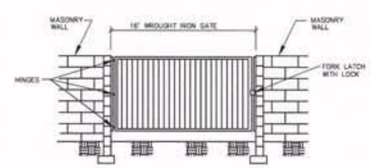
REPLY APP 1446

CLV296095

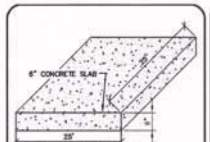
6482



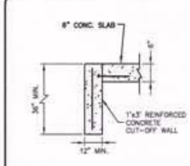
(4) V-DITCH
NOT TO SCALE



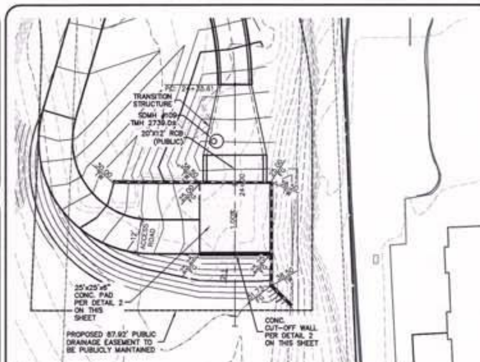
(5) WROUGHT IRON GATE
NOT TO SCALE



(3) CONCRETE PAD
NOT TO SCALE



(2) CUT-OFF WALL
NOT TO SCALE



(1) CONCRETE PAD DETAIL
NOT TO SCALE

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PROJECT NO. 840-050

DESIGN:	TD
DRAWN:	TD
CHECK:	MF
PLOT DATE:	06-29-18
PLOT TIME:	18:19:34

QUANGVINH NGUYEN

SEVENTY ACRES, LLC

THE 435

SECTIONS & DETAILS 3

DRAWING
C8.03
22 OF 22 SHTS

REV	DATE	DESCRIPTION	DATE	AGEN APP	DATE	GCW APP	DATE: 06/29/2018

TDS SUBMITTAL

GIA D. NGUYEN CIVIL No. 14918 — PROFESSIONAL ENGINEER — STATE OF NEVADA

EXHIBIT "YYYYY-12"

CITY OF LAS VEGAS
INTER-OFFICE MEMORANDUM

DATE:	**July 26, 2018**
TO: **Land Development Services** Department of Building & Safety	**FROM:** Jennifer Shinn, P.E. Flood Control Engr. Associate Department of Public Works
SUBJECT: Drainage Study for: **The 435 formerly The SEVENTY**	**COPIES TO:** GCW Engineers
Cross Streets: SWC of Rampart & Alta	Seventy Acres LLC
File Number: F:\Depot\DSMemos\DS4787D.ZNA.doc	Bart Anderson, P.E., DevCo
Parcel Number: 138-32-301-005, 006, 210-008	CCRFCD
Zoning Action: SDR-62393; GPA-62387; ZON-62392	
FEMA Flood Zone YES **X** NO	
Proposed Storm Drain YES **X** NO	

HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES	FEES PAID Payment Trn #
1st Submittal	3/3/2016 & 3/9/2016	3/23/2016	See Comments Below	$400.00	425231: $400
2nd Submittal	9/18/17	11/9/2017	See Comments Below	$400.00	490193: $400
3rd Submittal	1/11/18	2/1/2018	See Comments Below	$400.00	492825: $400
4th Submittal	7/2/2018	7/26/2018	See Comments Below	$400.00	497041: $400
			TOTAL FEES (LDDRS):	**$1600.00**	**----**

REMARKS: This site development is within a FEMA SPECIAL FLOOD HAZARD AREA, Zone A. No permits of any kind will be issued for this project until a Conditional Letter of Map Revision (CLOMR/CLOMR-F) is received from FEMA.

4th Submittal: Redesign and evaluation of proposed storm drain system design.

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 NDOT concurrence.

1. Based on the WSPG models, the velocity head and super elevation depth in Mainline 1 and Mainline 2 result in additional hydraulic pressure in the system that is not accounted for in the current design. Provide conceptual structural details of the storm drain improvements (Mainline, manholes, etc.) to address the hydraulic pressures and high velocities. CLV Flood Control review of the conceptual structural details is required prior to conditional approval of the drainage study.

2. Horizontal curvature information has been included in the WSPG model for Mainline 1, but no super elevation is shown in the results. The super elevation depth and velocity head results are needed to estimate the additional hydraulic pressure in the system and is to be incorporated in the storm drain system structural design.

3. The design of the storm drain system shall include the impacts of super elevation to the established HGL. As an example, the WSPG model for Mainline 2 shows an 8 foot super elevation depth that needs to be added to the HGL shown.

4. Transition No 19 presented in the WSPG model shows a transition structure length of 30 feet. The model of this transition does not adequately reflect the proposed design per C5.01 since this is not a symmetrical transition structure. Provide calculations to evaluate the hydraulic performance of this transition structure as well as its impact to the water surface elevation.

5. A post-project condition HEC-RAS model is required to show how the proposed, new SFHA Zone A ties into the existing SFHA Zone A areas. Provide an exhibit to reflect the post-project condition model and include a summary table. Clearly indicate the SFHA Zone A areas to remain, proposed SFHA Zone A tie-in, and SFHA Zone A to be removed.

6. Provide calculations to support the water surface elevation shown on C5.04 and C5.07 at the entrances of Mainline 1 and Mainline 2. It appears that the water surface elevations shown were obtained directly from the WSPG model outputs. Supporting calculations need to be provided to verify the water surface elevations presented adequately represent the flow entering the proposed improvement from the natural channels.

7. Due the extension of the storm drain system, provide a grated access structure along Mainline 1 upstream of the junction structure. Revise the drainage easement to include this area and provide a maintenance road to access structure.

8. Provide WSPG models for the newly proposed storm drain system using a Manning's n-value of 0.013 in order to identify critical sections of storm drain with high velocities. Once these areas have been identified, utilize the combined n-values as discussed in the response letter to reflect erosion mitigation measures. The models with the combined n-values shall also utilize an n-value of 0.015 for the rest of the storm drain that does not require erosion mitigation for sensitivity analysis.

9. The .WSX file for "Main0626" (Mainline 1) WSPG models have been provided with this submittal. Provide the typical input and output files for the "Main0626" WSPG models for the interim and ultimate conditions in order to verify input and output information.

10. Provide WSPG models of the interim condition reflecting the 20'x14' RCB entrance and transition to 10'x10' RCB for Mainline 1 and the 20'x12' RCB entrance and transition to 10'x8' RCB for Mainline 2.

11. Provide a Standard Form 4 for the basis of the HEC-1 model for the interim condition.

12. Revise FIG8R to match the WSPG model for Mainline 1 reflecting the combined n-value of 0.023 for WSPG stations -7825.45 and -7573.63.

13. It is noted that Mainline 2 was modeled as the system extended for future conditions. Discuss/provide the future design parameters the model was based upon.

14. Provide calculations to support the design of the 2:1 slope and verify that the ground cover material is sufficient for conveying the flows entering the Mainline 1 and 2 systems. Provide erosion protection based upon velocities.

15. Verify the velocities at all sumps of the lateral facilities to ensure erosion is mitigated and provide Best Management Practices accordingly.

16. Provide sediment control at inlet structures of Mainline 1 and Mainline 2.

17. It is noted that maintenance access has been provided for Lateral 5 (6'x6' RCB) and Lateral 9 (24" RCP) but not for Lateral 3 facilities. Review and revise accordingly.

18. Show the location of Section 1 on FIG15.

19. Update the inlet calculations to include the corresponding Facility numbers (e.g. 24 inch RCP – Facility 7A).

20. Laterals 5, 7, and 8 have velocities that exceed the maximum allowable velocity of 25 feet per second based on design slopes. Revise the lateral slopes accordingly to meet criteria.

21. The future minimum finished floor elevations of the southern portion of the proposed lots must be higher than the road grades of the future road. Future road grades (CL and TC elevations) are not apparent, therefore the minimum finished floor elevations cannot be verified to meet criteria.

22. Show future road grades on profiles.

23. Remove the note for temporary plug and cap for the 6' x 6' RCB as it appears it is proposed to convey interim flows.

24. Label Laterals 5 through 9 on the plan and profile to correspond to the lateral profiles on Sheets C5.010 and C5.11.

25. Provide stationing on all lateral profiles. Lateral profiles shall be based on the mainline stationing with corresponding offsets and angles.

26. SDMH #101 and #102 are called out as Type I manholes on the profile but the plan references Construction Note 4 which calls out Type I-A. Review and revise accordingly.

27. Revise the Construction Notes to remove any notes that are no longer applicable to the current proposed design (e.g. notes 2 and 14) and provide Construction Note labels on the plans (e.g. notes 3, 16, and 17)

28. Provide structural details for the RCB construction including the sections of the tined invert and corrugated wall faces.

29. Provide structural details for shallow manholes.

30. Provide structural details for all transition structures.

31. Provide structural details for connection into existing dual 12'x12' RCBs.

32. Provide structural details for the proposed headwall at the 20' x 12' RCB storm drain.

33. Provide a note on the structural details that specifies 6000-psi strength concrete for all segments of storm drain where velocities exceed 25 feet per second based on the n-value of 0.013.

34. It appears that the HGL is within 1 foot of the proposed grade at the transition structure for the confluence of Mainline 1 and Mainline 2. Review and revise accordingly.

35. Verify that the minimum allowable cover over the storm drain is 1 foot or greater at any point along the system, specifically between stations 75+50 to 79+00.

36. The engineer must review the pipe hydraulics to verify system design to keep the HGL 18 inches below finished grade. Where the HGL is less than 18 inches, the manholes shall have hinged and grated lids with extended concrete collars tied to the box.

37. Provide fall protection at the Mainline 1 inlet structure as well as the bigger interim facilities.

38. Provide access to all storm drain manholes from the main access path along the system. Include turnaround areas where the access road dead-ends.

39. It appears there is a storm drain manhole shown on the plans at approximate station 69+28 but not labeled or shown in the profile. If no manhole is proposed at this location, revise the location of storm drain access manhole SDMH #111 to be spaced a maximum of 400 feet from SDMH #113.

40. Revise CLV General Note 21 (effective June 4, 2018) to reference the applicable Final Location Map option for this project.

41. All manholes in unimproved/rough graded areas shall include a locking lid with extended concrete collar, set above grade.

42. Waterproofing of the RCB is required where future landscaping is anticipated and outside of future roadway improvements.

The following comments are repeated to reflect routine items previously acknowledged by the Engineer.

43. This site development is located within a FEMA SPECIAL FLOOD HAZARD AREA, Zone A. **No permits will be issued until a Conditional Letter of Map Revision (CLOMR/CLOMR-F) is received from FEMA. Permits may be issued upon the receipt of Conditional Letter of Map Revision (CLOMR or CLOMR-F) from FEMA.**

44. A Letter of Map Revision (LOMR/LOMR-F) must be obtained from FEMA after the completion of any project within a FEMA Special Flood Hazard Area, Flood Zone “A”. The bonded improvements shall include a line item of **$50,000.00** for the LOMR. The bonded improvements will not be released until the LOMR/LOMR-F is obtained from FEMA and filed with the City of Las Vegas.

45. The site is located within the Flood Zone A and is adjacent to an existing or proposed *Clark County Regional Flood Control District* (CCRFCD) master planned facility. Therefore, CCRFCD concurrence is required prior to final approval of the drainage study.

    Structural calculations of facilities must be approved by the *City* prior to submittal to *Clark County Regional Flood Control District* for their review and concurrence.

46. Please obtain necessary 404 permits from US Army Corps of Engineers and provide a copy of the permit to City of Las Vegas Flood Control Section prior to issuance of the grading permit. Contact the St. George Field Office of the US Army Corps of Engineers for permit information.

47. Provide complete *Plans and Project Specifications* for approval by the *City of Las Vegas*. The Structural Plans and Details shall be a part of the Civil Improvement Plan set. This project is considered as a *Capital Improvement Project* (CIP) with developer funding.

48. Structural plans for the proposed storm drain improvements and pertinent flood control facilities must be submitted for review. Provide a soils report, structural calculations and specifications, two wet stamped structural sets, and a grading plan to the *Building Department* for processing. The engineer must provide a copy of *Building Department* approval of the structures to Regional Flood prior to their concurrence and to *Flood Control* prior to final acceptance of the drainage study.

49. All proposed improvements associated with the Storm Drain facilities shall be bonded and inspected. This project shall require Special Inspection. Coordinate the requirements of and the Agreements needed for Special Inspection with the Building Department.

50. The proposed improvements show drainage facilities of a size that must be reviewed for access and maintenance concerns. The engineer must submit an extra set of improvement plans to the *City*

Streets & Sanitation Department for their review and comments. *Streets & Sanitation Department's* approval must be secured prior to the conditional drainage study approval.

51. Provide new public drainage easements for the area of the site impacted by the proposed MPU facility improvements. The easement shall note that the public drainage improvements (MPU facilities) are publicly maintained and all onsite storm drain and surface improvements are privately maintained and the easement must be dedicated and recorded by separate document prior to the final acceptance of the improvement plans. Provide legal description and an exhibit of the drainage easement to Flood Control and *Rae Heller* (702-229-2139) of *City of Las Vegas Right of Way Section* for the recordation process after the subject drainage study is conceptually approved. The existing drainage easements shall be vacated by separate action and the recording of the new easements shall be done consecutively.

52. Technical drainage studies are required for each of the future development super pads. The technical drainage studies for the developments may not be submitted until the conditional approval of this pertinent infrastructure drainage study is obtained. Final approval for the infrastructure study must be obtained prior to conditional approval of the impacted development super pad drainage studies.

53. This project currently has no Proposed Buildings or Structures. Should the project propose changes to this design assumption, then the Engineer is to update the drainage study detailing the flood zone impacts and provide addresses for each building in a FEMA Flood Hazard Zone prior to obtaining a grading permit. This information is necessary to insure that the elevation certificates are provided for each address prior to completion of construction. This information is required until such time as a LOMR is approved that removes the development from the SFHA.

Flood Control understands that this overall project will be developed in Phases. The following comments are repeated to reflect items that shall be addressed in future study updates as the Phases develop.

54. Proposed storm drain laterals have been identified to collect flows from Peccole West Lot 9 and Queensridge Fairway Homes. Extend the storm drain system to collect the 100-year flows from these adjacent subdivisions.

55. Continue to coordinate the MPU facility changes that are proposed with this development.

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.

NOTE: The engineer must submit the drainage study to FEMA for a Conditional Letter of Map Revision (CLOMR). A favorable CLOMR must be obtained prior to the issuance of any permits. This site is located in a **FEMA Zone A**. *Clark County Regional Flood Control District* (CCRFCD) review and approval is required prior to recordation of final map or issuance of building/grading permits. The Engineer must send a copy of the report to the CCRFCD for review. **The developer/engineer must also obtain a Letter of Map Revision (LOMR) using the approved drainage study as technical support to inform FEMA of the modifications within the flood zone. The approved LOMR must be submitted to the *City of Las Vegas* prior to the release of the bond.** FEMA Elevation Certificates, showing as-built finish floor elevations, must be completed for each building in the FEMA A Zone. The certificate must be submitted to the *City of Las Vegas Flood Control Section* prior to scheduling a framing inspection.

END OF REMARKS
JKS/PBJ

T/R/S: T20S/R60E/12
AREA L-32

EXHIBIT "YYYYY-13"

840-050

ENGINEERS \ SURVEYORS

MEETING MINUTES

Prepared By:	Steve Jones		702-804-2130 sjones@gcwengineering.com
Re:	**The 435 TDS** **Design Workshop on 435 TDS 7/26/2018 Comments**		
Place:	City of Las Vegas Public Works – Opal Conference Room (7th Floor)		
Date:	August 13, 2018	Time:	9:00 am to 10:30am

Attendees: Peter Jackson, CLV
Jennifer Shinn, CLV
Mark Sorensen, CLV
Steve Jones, GCW
Scott Plummer, GCW

General Discussion Items:

- Rules state when processing a Technical Drainage Study (TDS) through the CLV, that zoning/planning approval of the entitlements on a property are required to be approved prior to conditional approval can be given on a TDS. CLV staff discussed that due to the ongoing litigation standing on the entitlements for the property, that direction from the City Manager's office was that City staff is not authorized to provide conditional approval on this TDS. CLV also discussed that review of any addendums or responses to comments can proceed; however, until litigation on the entitlements is resolved, conditional approval can't be issued on this TDS.

- This project is required to submit and receive approval on a CLOMR thru FEMA. Typically on a project like this where improvements are the reason for the map revision request, the City has authorization to sign off on the community acknowledgement block on the FEMA forms with a conditional drainage study approval. If the TDS is not able to receive conditional approval per above discussion, CLV staff will have to review if it has the authority to sign the community acknowledgement block on the FEMA forms required for CLOMR submittal.

    - CLV staff did note that if the owner wanted to complete a LOMR application based on existing condition hydraulics thru the property, an approved TDS may not be necessary.

- GCW inquired why this comment letter produced so many comments on the storm drain design that they saw the design similarly presented in the previous submittals, and very few comments were regarding the storm drain extended through the site. CLV clarified that the previous 2 submittals were addressing a proposed interim collector design near the boundary of the 17.5 acres known as The 435 and the storm drain was only presented as a concept for the engineer's use to ensure proper design of the storm drain through the The 435 property. Now that the design is shown proposed, and the engineer had changed design parameters with a smaller size RCB and had addressed other commented concerns, CLV staff communicated that this was considered a fresh review of the storm drain in the July 2018 comment letter. CLV staff iterated that the design as presented is an approvable design, much preferred over the last 2 submittals with the interim open channel collector concept and also the design presented in the 1st submittal from 2016 because the high velocities are managed more effectively. The CLV staff also discussed that the comments at this stage are more for clarification, in which GCW noted this meeting is intended as a design workshop to ensure any clarification needed is provided to the CLV staff in an effort to receive conditional approval on the TDS.

Comment No.	Comment	Discussion/Response
1	Based on the WSPG models, the velocity head and super elevation depth in Mainline 1 and Mainline 2 result in additional hydraulic pressure in the system that is not accounted for in the current design. Provide conceptual structural details of the storm drain improvements (Mainline, manholes, etc.) to address the hydraulic pressures and high velocities. CLV Flood Control review of the conceptual structural details is required prior to conditional approval of the drainage study.	CLV noted that since the RCBs are minimally covered, extra RCB design such as strengthening manhole designs on top of the RCB, or stronger concrete is required to protect against high HGLs and velocities in the RCB. Therefore, CLV is requiring some further structural information such as concept details to show adequate design parameters. It was agreed that GCW would provide 30% level structural details for this project in the next submittal.
2	Horizontal curvature information has been included in the WSPG model for Mainline 1, but no super elevation is shown in the results. The super elevation depth and velocity head results are needed to estimate the additional hydraulic pressure in the system and is to be incorporated in the storm drain system structural design	GCW concurred that although the WSPG program is supposed to compute additional bend/super-elevation losses in a closed storm drain, it was observed thru internal calculation that this additional loss is negated. Therefore, it was agreed that GCW will perform an additional CCRFCD Manual super-elevation calculation at bends and arithmetically add it to the HGL currently shown on the plans. GCW would ensure that in the next submittal the FG over the RCB would be minimum 18-inches above the new HGL accounting for super-elevation in order to protect the structural integrity of the RCB including manhole risers and pipe penetration collars. Additionally, GCW would account for the velocity head by using the energy grade line thru the confluence structure of the two main trunks as the design HGL in the structure.
3	The design of the storm drain system shall include the impacts of super elevation to the established HGL. As an example, the WSPG model for Mainline 2 shows an 8 foot super elevation depth that needs to be added to the HGL shown	GCW agreed to adjust the plans to show the HGL as the WSPG water depth plus additional CCRFCD Manual super-elevation depth. GCW also discussed that all bends in the design meet CCRFCD Manual super-elevation criteria.
4	Transition No 19 presented in the WSPG model shows a transition structure length of 30 feet. The model of this transition does not adequately reflect the proposed design per C5.01 since this is not a symmetrical transition structure. Provide calculations to evaluate the hydraulic performance of this transition structure as well as its impact to the water surface elevation	After discussion, CLV understood that the project proposes to connect directly into the existing headwall of the dual 12'x12' RCBs and not reconstruct any portion of the skewed existing dual RCBs. GCW will clarify design in the conceptual structural detail of the connection structure, and no additional hydraulic calculations are necessary.
5	A post-project condition HEC-RAS model is required to show how the proposed, new SFHA Zone A ties into the existing SFHA Zone A areas. Provide an exhibit to reflect the post-project condition model and include a	GCW agreed to provide a post-project HEC-RAS thru the existing condition sections previously provided upstream of the project to the proposed sump prior to flow entering the storm drain. The downstream boundary condition in the sump will be established as

Comment No.	Comment	Discussion/Response
	summary table. Clearly indicate the SFHA Zone A areas to remain, proposed SFHA Zone A tie-in, and SFHA Zone A to be removed	the improved inlet WSE. GCW discussed and will summarize in the next submittal that the FEMA mapping tie-in will begin where the difference in WSE between existing and proposed conditions is 1-ft or less, per FEMA criteria. The Figure 8R previously submitted showing the mapping tie-ins will be blown up to better show the proposed FEMA mapping.
6	Provide calculations to support the water surface elevation shown on C5.04 and C5.07 at the entrances of Mainline 1 and Mainline 2. It appears that the water surface elevations shown were obtained directly from the WSPG model outputs. Supporting calculations need to be provided to verify the water surface elevations presented adequately represent the flow entering the proposed improvement from the natural channels	GCW discussed its method for computing WSE and determining improved inlet design was by inlet/outlet control with minimum computed CCRFCD Manual transition length to the larger RCB opening, because extending the WSPG model to the upstream terminus of the improved inlet resulted in unreasonable results such as a larger size inlet than the inlet existing at Alta for almost twice the amount of flow. Now that the methodology is understood, CLV staff agreed to re-review these areas after GCW sends the unreasonable hydraulic model.
7	Due the extension of the storm drain system, provide a grated access structure along Mainline 1 upstream of the junction structure. Revise the drainage easement to include this area and provide a maintenance road to access structure	GCW noted that this request was identified in previous meetings, and the next submittal will provide accordingly. The grate elevation shall be minimum 18-inches above the HGL with super-elevation.
8	Provide WSPG models for the newly proposed storm drain system using a Manning's n-value of 0.013 in order to identify critical sections of storm drain with high velocities. Once these areas have been identified, utilize the combined n-values as discussed in the response letter to reflect erosion mitigation measures. The models with the combined n-values shall also utilize an n-value of 0.015 for the rest of the storm drain that does not require erosion mitigation for sensitivity analysis	CLV clarified that it agrees the design presented in the last submittal is acceptable with 0.015 roughness and rougher 0.023 where corrugated sides is proposed. CLV only requests the 0.013 manning's roughness model as a side model for adhering to CCRFCD criteria that RCBs are to be analyzed with 0.013 roughness. The results of the 0.013 roughness model is to be used only for informational purposes to protect against potential abnormalities such as unusual hydraulic jumps, etc. If GCW finds any abnormalities, re-consultation with CLV may be required.
9	The .WSX file for "Main0626" (Mainline 1) WSPG models have been provided with this submittal. Provide the typical input and output files for the "Main0626" WSPG models for the interim and ultimate conditions in order to verify input and output information	The type of modeling program was clarified with CLV staff as an acceptable resource, which was agreed to. GCW volunteered to create a summary table that will help the CLV staff more easily review its results
10	Provide WSPG models of the interim condition reflecting the 20'x14' RCB entrance and transition to 10'x10' RCB for Mainline 1 and the 20'x12' RCB entrance and transition to 10'x8' RCB for Mainline 2	CLV staff will re-review GCW methodology per discussion included in response to Comment #6.
11	Provide a Standard Form 4 for the basis of the HEC-1 model for the interim condition	GCW acknowledged the City's request, and will provide accordingly.
12	Revise FIG8R to match the WSPG model for Mainline 1 reflecting the combined n-value of 0.023 for WSPG stations -7825.45 and -7573.63	GCW acknowledged the City's request, and will provide accordingly.

Comment No.	Comment	Discussion/Response
13	It is noted that Mainline 2 was modeled as the system extended for future conditions. Discuss/provide the future design parameters the model was based upon	GCW discussed that its assumptions for the Mainline 2 hydraulic model extension was discussed and included in the 1st response to comments from September 2017. CLV concurred and determined the comment to be voided.
14	Provide calculations to support the design of the 2:1 slope and verify that the ground cover material is sufficient for conveying the flows entering the Mainline 1 and 2 systems. Provide erosion protection based upon velocities	Both CLV and GCW agreed for the potential of erosion or head-cutting down the 2:1 slope to the improved inlet. GCW agreed to extend the concrete with cut-off wall at its 2 major improved inlets up the 2:1 slope to the existing wash for erosion protection.
15	Verify the velocities at all sumps of the lateral facilities to ensure erosion is mitigated and provide Best Management Practices accordingly	CLV agreed that GCW could place riprap pads in the sumps to protect against erosion upstream of the lateral drains. Additionally, GCW will re-evaluate slopes of the lateral storm drains to eliminate high velocities (over 25-fps) in the storm drain to protect the pipe itself from erosion.
16	Provide sediment control at inlet structures of Mainline 1 and Mainline 2	GCW showed a similar means for sediment control at the improved inlet structures accepted on a similar project. CLV agreed that GCW could stage the bottom of the sump below the invert of the RCB opening by 2-ft, with a low flow DI and drain pipe for positive drainage.
17	It is noted that maintenance access has been provided for Lateral 5 (6'x6' RCB) and Lateral 9 (24" RCP) but not for Lateral 3 facilities. Review and revise accordingly	After review, GCW agreed to provide according to the CLV comment.
18	Show the location of Section 1 on FIG15	GCW acknowledged the City's request, and will provide accordingly.
19	Update the inlet calculations to include the corresponding Facility numbers (e.g. 24 inch RCP – Facility 7A).	GCW acknowledged the City's request, and will provide accordingly.
20	Laterals 5, 7, and 8 have velocities that exceed the maximum allowable velocity of 25 feet per second based on design slopes. Revise the lateral slopes accordingly to meet criteria	GCW acknowledged the City's request, and will provide accordingly. Additionally, CLV agreed that if the slope in the pipe was reduced to minimum (0.5%) and high velocities still result, GCW could utilize 1-inch sacrificial concrete as a means for protection of the pipe. CLV requests that 6,000 psi concrete also be specified in these areas.
21	The future minimum finished floor elevations of the southern portion of the proposed lots must be higher than the road grades of the future road. Future road grades (CL and TC elevations) are not apparent, therefore the minimum finished floor elevations cannot be verified to meet criteria	CLV and GCW agreed that future studies will address minimum finished floor elevations on the site. Additionally, it was also discussed that future finished floor elevations do not need to be higher than the future road as the comment suggests; however, the engineer will be required to mitigate for these areas where the road is higher by other improvements such as floodwalls, waterproofing, etc. that will be reviewed in the future studies.

Comment No.	Comment	Discussion/Response
22	Show future road grades on profiles	CLV staff clarified that the intent of showing the future road grades is to make sure that the manholes are constructed in a manner that minimizes re-construction of the entire cone/collar when they are adjusted in the future. GCW agreed to show the manholes an adequate height above the proposed rough grade and show a conceptual road profile to enough accuracy to design manholes with some permanence. CLV will allow stipulations on the plans by GCW to ensure that roadway design on the site could change in the future when the buildings are detailed graded.
23	Remove the note for temporary plug and cap for the 6' x 6' RCB as it appears it is proposed to convey interim flows	GCW acknowledged the City's request, and will provide accordingly.
24	Label Laterals 5 through 9 on the plan and profile to correspond to the lateral profiles on Sheets C5.010 and C5.11	GCW acknowledged the City's request, and will provide accordingly.
25	Provide stationing on all lateral profiles. Lateral profiles shall be based on the mainline stationing with corresponding offsets and angles	GCW acknowledged the City's request, and will provide accordingly.
26	SDMH #101 and #102 are called out as Type I manholes on the profile but the plan references Construction Note 4 which calls out Type I-A. Review and revise accordingly	GCW acknowledged the City's request, and will provide accordingly.
27	Revise the Construction Notes to remove any notes that are no longer applicable to the current proposed design (e.g. notes 2 and 14) and provide Construction Note labels on the plans (e.g. notes 3, 16, and 17).	GCW acknowledged the City's request, and will provide accordingly.
28	Provide structural details for the RCB construction including the sections of the tined invert and corrugated wall faces	CLV staff agrees that the structural details required for next submittal are conceptual in nature, similar to 30% design plans on a CIP. GCW will comply.
29	Provide structural details for shallow manholes	CLV staff agrees that the structural details required for next submittal are conceptual in nature, similar to 30% design plans on a CIP. GCW will comply.
30	Provide structural details for all transition structures	CLV staff agrees that the structural details required for next submittal are conceptual in nature, similar to 30% design plans on a CIP. GCW will comply.
31	Provide structural details for connection into existing dual 12'x12' RCBs	CLV staff agrees that the structural details required for next submittal are conceptual in nature, similar to 30% design plans on a CIP. GCW will comply.
32	Provide structural details for the proposed headwall at the 20' x 12' RCB storm drain	CLV staff agrees that the structural details required for next submittal are conceptual in nature, similar to 30% design plans on a CIP. GCW will comply.
33	Provide a note on the structural details that specifies 6000-psi strength concrete for all segments of storm drain where velocities exceed 25 feet per second based on the n-value of 0.013	GCW acknowledged the City's request, and will provide accordingly. Note that the comment was corrected by CLV staff to provide 6,000-psi note on the areas with high velocities determined in the 0.015 roughness model.

Comment No.	Comment	Discussion/Response
34	It appears that the HGL is within 1 foot of the proposed grade at the transition structure for the confluence of Mainline 1 and Mainline 2. Review and revise accordingly	GCW will be adjusting all FG on the project to be minimum 18-inches above the design HGL (adjusted per discussions in Response to Comment #2). Therefore, no additional structural design is required.
35	Verify that the minimum allowable cover over the storm drain is 1 foot or greater at any point along the system, specifically between stations 75+50 to 79+00	GCW will be adjusting all FG on the project to be minimum 18-inches above the design HGL (adjusted per discussions in Response to Comment #2). Therefore, no additional structural design is required.
36	The engineer must review the pipe hydraulics to verify system design to keep the HGL 18 inches below finished grade. Where the HGL is less than 18 inches, the manholes shall have hinged and grated lids with extended concrete collars tied to the box	GCW will be adjusting all FG on the project to be minimum 18-inches above the design HGL (adjusted per discussions in Response to Comment #2). Therefore, no additional structural design is required.
37	Provide fall protection at the Mainline 1 inlet structure as well as the bigger interim facilities	CLV and GCW agreed that post and cable railing will be provided anywhere there is a vertical drop from the top of the 2 main trunk storm drains.
38	Provide access to all storm drain manholes from the main access path along the system. Include turnaround areas where the access road dead-ends	Larger areas for turnaround will be provided at the storm drain manholes on the transition structures, and access grate.
39	It appears there is a storm drain manhole shown on the plans at approximate station 69+28 but not labeled or shown in the profile. If no manhole is proposed at this location, revise the location of storm drain access manhole SDMH #111 to be spaced a maximum of 400 feet from SDMH #113	GCW acknowledged the City's request, and will provide accordingly.
40	Revise CLV General Note 21 (effective June 4, 2018) to reference the applicable Final Location Map option for this project	CLV staff provided GCW the applicable note to add onto the plans to satisfy comment.
41	All manholes in unimproved/rough graded areas shall include a locking lid with extended concrete collar, set above grade	CLV staff is requesting crossbar locking lid, similar to the sewer locking manhole detail, and GCW agreed to provide.
42	Waterproofing of the RCB is required where future landscaping is anticipated and outside of future roadway improvements	To further landscaping restrictions within public drainage easements, GCW agreed to add notes to the RCB trench detail that no deep rooted trees or 3-ft plus high trees are allowed directly over the RCB.
50	The proposed improvements show drainage facilities of a size that must be reviewed for access and maintenance concerns. The engineer must submit an extra set of improvement plans to the City Streets & Sanitation Department for their review and comments. Streets & Sanitation Department's approval must be secured prior to the conditional drainage study approval	Since there has been no response to review on the plans by Streets & Sanitation Department which is required for conditional approval of the TDS, GCW was tasked to schedule a meeting with Matthew Meyer to discuss the project prior to resubmittal.

EXHIBIT “YYYYY-14”

From: Todd Davis (EHB Companies)
To: SJones@gcwengineering.com; SPlummer@gcwengineering.com
Cc: msorensen@LasVegasNevada.GOV; okwon@LasVegasNevada.GOV; jshinn@LasVegasNevada.GOV; pjackson@LasVegasNevada.GOV; Yohan Lowie (EHB Companies); Frank Pankratz (EHB Companies); bjerbic@lasvegasnevada.gov
Subject: FW: The 435 TDS Comments Review Meeting
Date: Thursday, September 13, 2018 11:43:59 AM
Attachments: image002.png
image003.png
image004.png
image006.png
image007.png
image002.png
image003.png
image004.png
image006.png
image008.png
image011.png

Scott/Steve,

Seventy Acres LLC is OK with attaching both Peter's 8/21/18 email and Mark's 9/12/18 email to the August 13 dated GCW meeting minutes as CLV's comments to the minutes.

Thx, td

Todd D. Davis
General Counsel
EHB Companies LLC
1215 South Fort Apache, Suite 120
Las Vegas, NV 89117
702.940.6930 office
702.940.6931 fax
702.940.6938 direct
TDavis@EHBCompanies.com
www.EHBCompanies.com

Begin forwarded message:

From: Mark Sorensen <msorensen@LasVegasNevada.GOV>
Date: September 12, 2018 at 6:02:17 PM PDT
To: Steve Jones <SJones@gcwengineering.com>, Scott Plummer <SPlummer@gcwengineering.com>
Cc: Oh-Sang Kwon <okwon@LasVegasNevada.GOV>, Jennifer Shinn <jshinn@LasVegasNevada.GOV>, "Frank Pankratz (frank@EHBCompanies.com)" <frank@EHBCompanies.com>, "Yohan Lowie (EHB Companies)" <yohan@EHBCompanies.com>, Peter Jackson <pjackson@LasVegasNevada.GOV>
Subject: RE: The 435 TDS Comments Review Meeting

Hi Scott and Steve, we have been checking our e-mails over here in Flood Control Planning and it does not look like we have received the corrected minutes from the subject meeting yet addressing Peter's comments below (sent on August 21st).

Please send them at your earliest convenience.

Also, could you please let the minutes reflect that I had to leave the meeting in the first 5 minutes or so to attend another meeting?

And, in case there was any confusion, the first bullet would need to be *replaced in its entirety* with Peter's applicable paragraph below to accurately reflect the discussion as recollected by the CLV staff present.

Mark A. Sorensen, PE
Engineering Program Manager
Department of Public Works | City Engineering Division
Phone: 702-229-2203 | **Cell 702-286-6954**
333 N. Rancho, floor | Las Vegas, NV 89106

lasvegasnevada.gov

Your opinion is important! Click here to take a short survey

From: Peter Jackson
Sent: Tuesday, August 21, 2018 12:08 PM
To: Steve Jones <SJones@gcwengineering.com>; Scott Plummer <SPlummer@gcwengineering.com>
Cc: Mark Sorensen <msorensen@LasVegasNevada.GOV>; Oh-Sang Kwon <okwon@LasVegasNevada.GOV>; Jennifer Shinn <jshinn@LasVegasNevada.GOV>; Frank Pankratz (frank@EHBCompanies.com) <frank@EHBCompanies.com>; Yohan Lowie (EHB Companies) <yohan@EHBCompanies.com>
Subject: RE: The 435 TDS Comments Review Meeting

Steve and Scott;

Flood Control has reviewed the notes and has some concerns. Please revise the notes to reflect our understanding.

First bullet point

Revise the bullet point
Conditional Approval of a Technical Drainage Study (TDS) requires zoning/planning approval of the entitlements before CLV Flood Control can issue Conditional Approval of the TDS.
Flood Control advised that the 435 site entitlements are not currently approved based upon ongoing litigation, therefore Flood Control cannot grant conditional approval until the entitlements are approved.
Flood Control will continue to review TDS submittals based upon the engineer's submitted Addendum, however we will not conditionally approve the study until we have approved

entitlements.

Second Bullet Point

Revise the third sentence…

Flood Control cannot sign a CLOMR Community Acknowledgement without conditional approval of the TDS as the City is stating in the acknowledgement *“we find the completed or proposed project meets or is designed to meet all of the community floodplain management requirements..”*

Flood Control can review a CLOMR application with the supporting technical information, however the TDS that is used as the basis for the CLOMR shall be conditionally approved.

Revise the subset bullet point

CLV staff advised that the owner could apply for a LOMR of the site to accurately delineate the Special Flood Hazard Area from the current Zone A (without an established Base Flood Elevation (BFE)) to a Zone AE (with BFE’s). This process, the City believes, would reduce the mapped flood zone and accurately map the risk associated based upon detailed information.

Comments

Add note before the comments.

The response to comments discussed are general in nature and any Addendum will provide detailed response with supporting information and technical data.

Comment #21 add note: That these plans are rough grade for future building areas in support of the master drainage facilities and any Finish Floor Elevations shall be established with the future TDS.

Thanks,

Peter Jackson, CFM
Senior Engineering Associate
City of Las Vegas | Dept. of Public Works
City Engineering Division, Flood Control Section
Development Service Center (DSC) 7th Floor
333 North Rancho Drive | Las Vegas, Nevada 89106

Work: 702-229-5266 Link: www.lasvegasnevada.gov pjackson@lasvegasnevada.gov

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From: Steve Jones [mailto:SJones@gcwengineering.com]
Sent: Thursday, August 16, 2018 5:06 PM
To: Peter Jackson; Jennifer Shinn; Scott Plummer; Mark Sorensen
Cc: Frank Pankratz (frank@EHBCompanies.com); Yohan Lowie (EHB Companies); Oh-Sang Kwon
Subject: The 435 TDS Comments Review Meeting

GCW has constructed the attached meeting notes have been to summarize the meeting between GCW and CLV Flood Control on August 13, 2018 regarding the TDS for The 435 Storm Drain project addressing the comments received from CLV staff dated July 26, 2018.

Please review and inform me of any comments or questions.

Thanks,

GCW ENGINEERS \ SURVEYORS

Steve Jones, P.E.
Vice President
Flood Control Division Manager

O 702.804.2000 **D** 702.804.2130
F 702.804.2299 **C** 702.545.5034
1555 South Rainbow Boulevard
Las Vegas, Nevada 89146

EXHIBIT “ZZZZZ”

DECLARATION OF MICHAEL CUNNINGHAM

I, Michael Cunningham, declare as follows:

1. I am the Building Official in the Community Development Department for the City of Las Vegas. I have held this position since September of 2022. I am one of the custodians of records for the Community Development Department. I have personal knowledge of the facts set forth herein, except as to those stated on information and belief and, as to those, I am informed and believe them to be true. If called as a witness, I could and would competently testify to the matters stated herein.

2. The City of Las Vegas has adopted an Administrative Code to provide for the administration and enforcement of technical building codes adopted by the City.

3. Section 301.1 of the Administrative Code states the general rule that no owner shall cause any building, structure, or improvements to be constructed unless an appropriate permit for each building, structure, or improvement has first been obtained from the Building Official.

4. Section 301.4 of the Administrative Code identifies several exemptions to the general rule stated in Section 301.1.

5. Temporary construction fences erected for the duration of construction or demolition activities are exempt from building permit requirements under Administrative Code Section 301.4.1, item 32. Accordingly, a property owner in possession of a building permit does not require the Building Department's permission to erect a construction fence around the construction site. The majority of construction projects in Las Vegas erect such construction fences to control access to the construction site.

6. True and correct copies of sections 301.1 and 301.4 of the Administrative Code are attached hereto as Exhibit ZZZZZ-1.

I declare under the penalty of perjury of the laws of the State of Nevada that the foregoing is true and correct.

Executed this 22nd day of November 2022.

Michael Cunningham

EXHIBIT “ZZZZZ-1”

CITY OF LAS VEGAS

ADMINISTRATIVE CODE, 2019 EDITION

unlawful occupancy of the building or structure in violation of the provisions of this Code or the adopted technical or of the order or direction made pursuant thereto.

205.4 VIOLATION PENALTIES. Any person who violates a provision or fails to comply with any of the requirements of this Code or the adopted technical codes or who erects, constructs, alters, demolishes, alters or repairs a building or structure in violation of the approved construction or demolition documents or directive of the Building Official or of a permit or certificate issued under the provisions of this Code shall be subject to the penalties as prescribed by law.

Chapter 3

PERMITS AND INSPECTIONS

SECTION 301 – PERMITS

301.1 Permits Required. Except as otherwise specified in this section, no owner or authorized agent shall cause any new building, structure, building service equipment or onsite improvement regulated by this Code or any of the technical codes to be erected, constructed, enlarged, altered, repaired, moved, improved, removed, converted, demolished, change the occupancy of any existing building or structure or erect, install, enlarge, alter, repair remove, convert or replace any existing electrical, gas, mechanical, or plumbing system, which the installation of is regulated by this Code or cause any such work described above to be done unless a separate, appropriate permit for each building, structure, building service equipment or onsite improvement has first been obtained from the Building Official.

> **Exception:** Emergency repairs of building service equipment may be repaired or replaced without a permit which is serving an occupied portion of the building and may be operated temporarily if a request for a permit and an inspection of that replacement equipment has been filed with the Building Official not more than 1 business day after such replacement work was completed and before any portion of the building service equipment is concealed.

Required permits and permit exemptions applicable to special events shall be as specified in the policy document titled “Special Events Permits” developed and administered by the Building Official and the Fire Marshall.

If work is commenced before a necessary and appropriate permit for the work has been obtained, the Building Official is authorized to charge an additional fee in the amount of the building permit fee on a graduated scale with double fees as a minimum depending on the number of offenses. If technical officer(s) is(are) required to inspect a site, an investigation fee shall be charged in addition to the additional graduated permit fees. Additional fees for compliance or investigations by other departments or agencies may apply. The graduated scale shall be as follows:

> 1st offense – Double Permit Fees plus an Investigation Fee
>
> 2nd offense – Up to Triple Permit Fees plus an Investigation Fee, the department may send a notice of complaint to Nevada State Contractor's board
>
> 3rd and subsequent offenses – Up to Quadruple Permit Fees plus an Investigation fee, the department may send notice of complaint to Nevada State Contractor's Board and refer the work without permit violation to Code Enforcement for citation for further remedy.

301.2 Licensing and Contractor Requirements. Building permits shall not be issued for building work required to be performed by a licensed contractor under NRS Chapter 624 unless the general contractor or applicant is appropriately licensed by the State of Nevada and has the appropriate business license issued or recognized by the City. A general contractor or design professional licensed by the State of Nevada to whom a permit is issued shall be responsible for all work authorized for the project and shall post at the job site a list of all subcontractors doing work on the job with their names, their State subcontractor's license numbers and classifications and their business license numbers. Mechanical, electrical and plumbing subcontractors shall register with the Department when all permits have been obtained by the general contractor prior to scheduling of inspections. Contractor and subcontractors shall meet all applicable qualifications and requirements described in the technical codes. Applications for all building permits shall include the design professional's and/or contractor's license number, monetary limits, and licensed subcontractors and monetary limits.

> **NOTE:** Additional licensing requirements concerning plumbing work are contained in this chapter. Additional licensing requirements concerning mechanical work are contained in this chapter.

301.4 Work Exempt from Permit. Permits shall not be required for the following:

301.4.1 Building Permits Exemptions:

1. Construction work on property owned by the United States or on property owned by any other governmental entity, to the extent exempted by State law.

2. Amusement devices and structures, including merry-go-rounds, Ferris wheels, rotating conveyances, slides and similar devices, and any other accessory structure consisting of a cover or roof whose use is necessary for the operation of any such device or structure when such device or

structure is used for less than 30 days. A storage building or detached structure that is not an integral part of an amusement device or structure does not qualify as an exempt accessory structure for purposes of this paragraph. The exemption contained in this paragraph does not apply to any electrical, mechanical or plumbing work that is to be done in connection with amusement devices or structures that are to be used on a site.

3. Oil derricks.

4. Cases, counters, and partitions that do not exceed 5 feet 9 inches in height and not containing electrical branch circuits.

5. Privately owned water tanks supported directly upon grade if the capacity does not exceed 5,000 gallons and the ratio of height to diameter or width does not exceed two to one.

6. Platforms, walks, driveways, and similar exterior flatwork not more than 30 inches above grade and not over any basement or story below, and are not part of an accessible route.

7. Painting, papering, cabinets, countertops, and similar finish work, floor covering, except for trim and decorative work.

8. Temporary motion picture, television and theater stage sets and scenery.

9. Window awnings supported by an exterior wall of a one-family or two-family dwelling, or an accessory structure, when projecting not more than 54 inches.

10. Residential television or radio antennas whose height design does not exceed 10 feet above the height of the tallest structure on the property, and so located that the distance to the nearest property line is equal to or greater than the total height of the antenna mast.

11. Construction directly relating to the delivery of a utility service, built by a public utility company operating under the control of the Public Utilities Commission. This exemption applies only to buildings, structures, or service equipment that is directly used in utility generation or distribution and is installed on properly registered easements belonging to water, gas, power, telephone, or other utility companies governed under the State of Nevada Public Utilities Commission, another State agency, or a public franchise. This exemption does not apply to office buildings, grading, occupied support buildings and general site development.

12. Any portable unit refrigerating system (cooling only) as defined in the Mechanical Code.

13. Any wall, including a retaining wall, that is not over 30 inches in height, measured from the low finished grade to the grade on the opposite side. This exemption does not apply to:

    a. Any wall that supports a surcharge;

    b. Any wall that retains flammable liquids; or

    c. Any wall of combined materials that exceeds 30 inches in height.

14. One-story detached single family residential accessory buildings used as tool and storage sheds, playhouses, and similar uses, provided the floor area does not exceed 200 square feet This exemption does not eliminate applicable zoning codes requirements.

15. Temporary grandstands, bleachers, viewing platforms, and similar uses mounted on, or attached to, motor vehicles or trailers (including stairs, ramps and similar access features serving such motor vehicles or trainers) used in conjunction with special events. Where deemed appropriate by the Building Official, reference shall be made to the policy document titled "Special Events Permits" developed by the Building Official.

16. Tents and canopies erected for a period of 180 days or less.

    NOTE: This exemption does not eliminate applicable fire codes requirements.

17. Temporary fences erected for a period of time as approved by the Building Official or 180 days as directed.

18. On-ground storable pool as defined in the International Swimming Pool and Spa Code which is accessory to a single family dwelling and in which the pool walls are entirely above the adjacent grade.

19. Portable spas, accessory to a single family residence with all heating and circulating equipment integral to the manufacturing product and entirely above the adjacent grade.

20. Project offices including construction trailers and related storage sheds used for the purpose of the construction on an active construction project.

21. Travel trailers and recreational vehicles, or other axled vehicles as permitted or licensed by the State of Nevada.

22. Livestock shade structures open on a minimum of three sides and not more

than 1,500 square feet in area.

23. Non-motorized outdoor playground equipment.

24. Storage racks and/or shelving less than or equal to 8 feet in height.

25. Minor repair of interior or exterior stucco/lath/drywall, provided:

    a. No framing needs replacement or repair; and

    b. For stucco, the repaired area not exceed 32 square feet in area; and

    c. The area of repair is not a fire-resistance rated assembly comprised of more than one layer of drywall on each side or any special material(s) necessary to maintain the required fire-resistance rating of the assembly (i.e. fire-stopping of penetrations.)

26. Replacement of roof covering materials, other than tile roofing, provided no structural components are repaired or replaced and provided no more than 64 square feet of roof sheathing is replaced.

27. Repair or replacement of components of listed appliances.

28. Replacement of exterior or interior doors, hinges, hardware and decorative trim related to such doors, provided the following conditions are met:

    a. The replacement door is of the same size and type.

    b. The replacement door does not require any modification to existing wall framing.

    c. The existing door is not a component of a fire-resistive rated construction element.

29. Replacement of exterior or interior window glazing, provided the following conditions are met:

    a. The replacement window glazing is of the same size and type and thickness.

    b. The replacement window does not require any modification to existing wall framing.

    c. The existing glazing is not a component of a fire-resistive rated construction element.

30. Installation of insulation on existing single-family residences where other permits are not required;

31. Fencing not over 7 feet high except for those fences within the front setback of a single family dwelling and those that are not a part of a pool or spa barrier;

32. Temporary construction fences erected for the duration of the construction or demolition activity. Such fences shall be removed upon completion of the activity.

33. Minor demolition of unpermitted work when the work is restored to the previously permitted condition.

34. Repair of less than 32 square feet of stone or brick veneer when the damage is less than 6 feet above adjacent grade.

35. Repair of block walls 6 feet in height or less and the repair is no greater in length than 20 linear feet, provided there is no damage to existing footing.

36. Work required to render a building or structure stable following damage from fire, wind, water, vehicle impact, or other causes and to clear the site of damaged materials to allow inspection to ascertain the scope of required repairs, when authorized by the *Building Official*.

301.4.2 Grading Permit Exemptions:

1. Grading associated with agriculture within districts approved for agriculture.

2. Excavation for construction of a structure permitted under this code.

3. Excavation for Cemetery graves.

4. Earthwork or grading for refuse disposal sites controlled by other regulations.

5. Excavations for wells, septic systems, or trenches for utilities.

6. Mining, quarrying, excavation, processing or stockpiling rock, sand, gravel, aggregate or clay controlled by other regulatory agencies provided such operations do not affect the lateral support of, or significantly increase stresses in soil on adjoining properties.

7. Exploratory excavations performed under the direction of a registered design professional.