IN THE SUPREME COURT OF THE STATE OF NEVADA

Case No. 84345
and
Case No. 84640

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 3

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CHRONOLOGICAL INDEX TO CITY'S REPLY APPENDIX

DATE	DOCUMENT	VOLUME	PAGE RANGE
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
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
2022-08-24	Defendant City of Las Vegas' Supplemental Appendix of Exhibits in Support of City's Renewed Motion for Summary Judgment and Motions in Limine Volume 26, Exhibits KKKKK - LLLLL, Case No. A-18-773268-C	2	REPLY APP 0228 - REPLY APP 0364
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
2022-09-13	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
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
2022-09-13	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
2022-08-24	Defendant City of Las Vegas' Supplemental Appendix of Exhibits in Support of City's Renewed Motion for Summary Judgment and Motions in Limine Volume 26, Exhibits KKKKK - LLLLL, Case No. A-18-773268-C	2	REPLY APP 0228 - REPLY APP 0364
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

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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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Attorneys for City of Las Vegas

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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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 34

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
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
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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
FFFF-36	Transcript of November 17, 2020 hearing regarding City's Motion to Compel Discovery Responses, Documents and Damages Calculation, and Related Documents on Order Shortening Time	11	2033-2109
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
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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
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LLLL-8	Citizen's Advisory Committee records regarding 1992 General Plan	15	2843-2860
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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
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NNNN	Clark County Real Property Tax Values	20	3759-3774
OOOO	Clark County Tax Assessor's Property Account Inquiry - Summary Screen	20	3775-3776
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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
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UUUU	Transcript of City Council Meeting (May 16, 2018)	20	3875-3950
VVVV	Supplemental declaration of Seth Floyd	21	3951-3953
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VVVV-2	10/10/1991 Planning Commission Minutes	21	3955-3957
VVVV-3	10/22/1991 Planning Commission Minutes	21	3958-3962
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VVVV-10	2/19/1992 City Council Meeting Minutes	21	4001-4002
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VVVV-12	3/16/1992 Recommending Committee Meeting Minute	21	4005
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VVVV-16	3/27/1991 Citizens Advisory Committee Mailout	21	4016-4025
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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

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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 34** 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”

DECLARATION OF OH-SANG KWON

I, Oh-Sang Kwon, declare as follows:

1. I am the Engineering Project Manager of the Flood Control Section of the Department of Public Works for the City of Las Vegas ("DPW"). I have held this position since November 13, 2011. I am a Licensed Professional Engineer by the State of Nevada. I am responsible for overseeing all technical drainage studies for any development over 2 acres and any development located in the FEMA designated special hazard area in the City. I am also responsible for overseeing all review and approval of all improvements plans related to drainage in the City. I was responsible for overseeing technical drainage studies for proposed redevelopment of the Badlands for housing by subsidiaries of EHG Companies ("Developer"). I am one of the custodians of records for DPW. 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. I understand that the Developer contends that it would be impossible to obtain a building permit for construction of 435 luxury housing units on a 17-Acre Segment of the Badlands approved by the City Council on February 16, 2017 ("435-Unit Project"). I understand that the Developer contends that it would be impossible to obtain a building permit because DPW would not approve a drainage study for the 435-Unit Project that would satisfy Condition 21 of its Site Development Permit for the 435-Unit Project unless the Developer obtained a building permit to build housing and drainage improvements on the 65 and 133-Acre Segments of the Badlands. Finally, I understand that the Developer contends that the City will not permit construction of housing or drainage improvements on the 65 and 133-Acre Segments. The Developer's contentions are incorrect. DPW would not require that the Developer construct drainage improvements on the 65 or 133-Acre Segments as a condition of approval of a technical drainage study for the 435-Unit Project on the 17-Acre Segment. Moreover, after the Nevada Supreme Court reinstated the Developer's approvals for the 435-Unit Project in August 2020, the Developer failed to submit a drainage study to DPW for approval or, to my recollection, communicate with DPW.

3. DPW processes two types of drainage studies for construction: conceptual and technical. A conceptual drainage study recommends the preliminary size of the storm drain facilities required to handle the volume of flow impacting the proposed project site.. An approved conceptual drainage study is not sufficient for issuance of a building permit for construction of improvements because conceptual only addresses offsite and onsite flows and preliminary storm drain sizes. Before the City's Building Department can issue a building permit, DPW must approve a technical drainage study to determine the detailed plan of the storm drain system, proposed finished grades and any details needed to construct specific improvements. The technical drainage study and improvement plans must be approved by DPW. Additionally, all other city departments must review and approved the improvement plan prior to issuance of building permits by the City's Building Department..

4. On March 3, 2016, the Developer submitted to DPW submitted a *Technical Drainage Study for 70* ("70-Acre Drainage Study") using DPW's standard form. A true and correct copy of the 70-Acre Drainage Study is attached as Exhibit YYYYY-1. The Developer submitted this document to the Court as Exhibit 228. The 70-Acre Drainage Study states that the Developer intends to construct 3,020 housing units in the 250-acre Badlands in three phases, which project the Developer entitled "The Two Fifty." The first and second phases of The Two Fifty would be grading and installation of drainage improvements and construction of multi-family housing on a 70-acre portion of the Badlands, which the Developer entitled "The Seventy." The third phase would be construction of estate homes on a 180-acre portion of the Badlands, which the Developer entitled "The One Eighty." *Id.* at 16. The 70-Acre Drainage Study contains a diagram showing conceptual drainage improvements on the portion of the Badlands identified as The Seventy. *Id.* at 38, 40. The 70-Acre Drainage Study is a conceptual study. It is not a technical study and could not be the basis for granting a building permit.

5. On March 9, 2016, the Developer submitted to DPW a Supplement to the *Technical Drainage Study for 70*. A true and correct copy of the 70-Acre Drainage Study is attached as Exhibit YYYYY-2. The Supplement modified hydraulic models used in the 70-Acre Drainage Study. The Supplement remained a conceptual study of drainage for the property identified as The Seventy. It was not a technical study.

6. On March 24, 2016, DPW submitted its comments on the 70-Acre Drainage Study to the Developer. A true and correct copy of the 70-Acre Drainage Study is attached as Exhibit YYYYY-3. DPW required the Developer to respond to the comments in a modified drainage study and resubmit the study to DPW. *Id.* at 1. Comment 35 stated: "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." *Id.* at 4.

7. On September 12, 2017, the Developer submitted to DPW at *Response to 1st CLV Comments on the Technical Drainage Study for The 435 (Formerly "The Seventy")* ("First Draft Technical Drainage Study for The 435"). A true and correct copy of the First Drainage Study for The 435 is attached as Exhibit YYYYY-4. The First Draft Technical Drainage Study for The 435 stated: "**Phase 1:** Installation of required trunk drainage infrastructure and mass grading proposed for future development on the 17.5 acre parcel." *Id* at 3."This project is now identified as *The 435*, which is the number of units approved for the 17.5 acre parcel described as Phase 1 above. *The Seventy* remains only identified to describe the remaining 52.1 acres on the property totaling approximately 70 acres." *Id.* It further stated: "**Phase 2:** The remaining 52.1 acres formerly included in this drainage study will remain primarily undisturbed, to be improved upon at a later date. The developer does not have entitlements on the parcels that make up the 52.1 acres; therefore, cannot construct improvements intended for future development. However, per coordination with the City, it was agreed that storm drain may be installed if it is required to adequately flood protect Phase 1." *Id.* Meeting Minutes for a meeting on July 24, 2017 prepared by the Developer's engineer GCW and attached to The 435 Drainage Study state: "CLV knowing that this storm drain will be extended in the future and understanding comments generated during the first review of the study, will require GCW to extend its hydraulic model through the entire 70 acres in order to prove that the 1st phase of storm drain is adequate for future connection." *Id.* at 30.

8. On or about September 14, 2017, the Developer submitted to DPW *Improvement Plans for Seventy Acres LLC Fore Stars Ltd The 435* showing conceptual drainage improvements for the 435-Unit Project. A true and correct copy of the September 14, 2017 Improvement Plans for The 435 is attached as Exhibit YYYYY-5. The Plans show drainage improvements offsite. *Id.* at 8-12. The offsite

drainage improvements were proposed by the Developer. DPW did not suggest or require any offsite drainage improvements for the 435-Unit Project.

9. On November 9, 2017, DPW submitted its comments on the First Draft Technical Drainage Study for The 435 to the Developer. A true and correct copy of the DPW's comments is attached as Exhibit YYYYY-6. DPW required the Developer to respond to the comments in a modified drainage study and resubmit the study to DPW. *Id.* at 1. Comment 25 states: "Technical drainage studies are required for each of the future development super pads." *Id.* at 3.

10. On January 5, 2018, the Developer submitted to DPW *Response to 2nd CLV Comments on the Technical Drainage Study for The 435 (Formerly "The Seventy")* for the 435-Unit Project ("Second Draft Drainage Study for The 435"). A true and correct copy of the Second Technical Drainage Study for The 435 is attached as Exhibit YYYYY-7.

11. On or about January 10, 2018, the Developer submitted to DPW revised *Improvement Plans for Seventy Acres LLC Fore Stars Ltd The 435* showing conceptual drainage improvements for the 435-Unit Project. A true and correct copy of the January 10, 2018 Improvement Plans for The 435 is attached as Exhibit YYYYY-8. The Plans show drainage improvements offsite. *Id.* at 8-12. The offsite drainage improvements were proposed by the Developer. DPW did not suggest or require any offsite drainage improvements for the 435-Unit Project.

12. On February 1, 2018, DPW submitted its comments on the Second Draft Technical 1 Drainage Study for The 435 to the Developer. A true and correct copy of DPW's comments is attached as Exhibit YYYYY-9. DPW required the Developer to respond to the comments in a modified drainage study and resubmit the study to DPW. *Id.* at 1. Comment 34 stated: "Technical drainage studies are required for each of the future development super pads." *Id.* at 4.

13. On June 28, 2018, the Developer submitted to DPW *Response to 3rd CLV Comments on the Technical Drainage Study for The 435 (Formerly "The Seventy")* for the 435-Unit Project ("Third Draft Technical Drainage Study for The 435"). A true and correct copy of the Third Draft Drainage Study for The 435 is attached as Exhibit YYYYY-10.

14. On or about June 29, 2018, the Developer submitted to DPW revised *Improvement Plans for Seventy Acres LLC Fore Stars Ltd The 435* showing conceptual drainage improvements for the 435-

Unit Project. A true and correct copy of the June 29, 2018 Improvement Plans for The 435 is attached as Exhibit YYYYY-11. The Plans show drainage improvements offsite. *Id.* at 8-12. The offsite drainage improvements were proposed by the Developer. DPW did not suggest or require any offsite drainage improvements for the 435-Unit Project.

15. On July 26, 2018, DPW submitted 55 comments on the Third Draft Technical Drainage Study for The 435 to the Developer. A true and correct copy of DPW's comments is attached as Exhibit YYYYY-12. DPW required the Developer to respond to the comments in a modified drainage study and resubmit the study to DPW. *Id.* at 1. Comment 52 stated: "Technical drainage studies are required for each of the future development super pads." *Id.* at 4.

16. The Developer's engineer drafted Meeting Minutes dated August 13, 2018, for a meeting between DPW and the Developer's engineers regarding "The 435 TDS" (August 13, 2018 Minutes"). A true and correct copy of the August 13, 2018 Minutes is attached as Exhibit YYYYY-13. They state:

> 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.

Id. at 1.

17. In an email dated August 21, 2018, as part of an email chain, DPW requested that the Developer's engineer correct the above statement. A true and correct copy of the email chain is attached as Exhibit YYYYY-14. DPW's August 21, 2018 email states:

> 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.

Id. at 2. In an email to the Developer's engineers dated September 13, 2018, the Developer declined to correct the August 13, 2018 Minutes, but did agree to attach DPW's requested corrections to the August 13, 2018 Minutes. *Id.* at 1.

18. It is my understanding that the Developer contends that DPW informed the Developer at the August 13, 2018 meeting that DPW would not approve a drainage study for the 435-Unit Project unless the Developer obtained City approvals for housing developments and related drainage improvements on the 65 and 133-Acre Segments of the Badlands. DPW did not make that statement at the August 13, 2018 meeting and has never imposed that requirement on the Developer. At the August 13 meeting, DPW was aware that a court had invalidated the approvals for the 435-Unit Project and that the courts had not reached a final decision as to whether the approvals were valid. DPW informed the Developer that it cannot approve a drainage study for the 435-Unit Project if the Project has no City entitlement/zoning approvals. The development project may be disapproved or modified from the design submitted to the City for approval. Approval of drainage improvements for a project that has yet to obtain entitlements would, therefore, be premature. DPW informed the Developer, however, that it would continue reviewing and commenting on draft drainage studies until the validity of the entitlements for the 435-Unit Project had been finally resolved in the litigation. DPW did not inform the Developer that it would not approve a drainage study for the 435-Unit Project unless the Developer obtained discretionary entitlements for offsite development, such as the 65 and 133-Acre Segments of the Badlands. Nor did DPW inform the Developer that it would be required to construct drainage improvements offsite as a condition of approval of a drainage study for the 435-Unit Project. All drainage improvements required for construction of the 435-Unit Project could be constructed on the

17-Acre Segment. Construction of offsite drainage improvements in addition to the onsite drainage improvements would be at the election of the Developer. DPW would have no objection to construction of those off-site improvements if they complied with DPW's technical/municipal code requirements, but never required them for the 435-Unit Project.

19. Following the August 13, 2018 meeting, the Developer submitted no further drainage studies or improvements plans or responded to any of DPW's 55 comments on the Third Draft Technical Drainage Study. The September 13, 2018 email from the Developer to its engineers refusing to amend the August 13, 2018 Minutes is the last communication in DPW's files and that I can recall regarding drainage for the 435-Unit Project.

20. The Third Draft Technical Drainage Study failed to address the matters raised in DPW's 55 comments and was not remotely close to the form that could be approved by DPW. For example, DPW notified the Developer that DPW would need to review and approve technical drainage studies for specific buildings proposed for construction for the 435-Unit Project. The Developer never submitted improvement plans for any specific buildings or the technical drainage studies for those buildings. DPW never stated to the Developer that DPW would not approve a technical drainage study that met DPW's technical/municipal code requirements.

21. Although storm water from the Badlands drains into the property on which the Developer constructed Tivoli Village, DPW did not require the Developer to build related drainage improvements in the Badlands as a condition of approval of a drainage study for Tivoli Village. DPW did not require the Developer to build any off-site drainage improvements as a condition of approval of a drainage study for Tivoli Village. It's up to the Developer to provide flood protection to their proposed development as long as the proposed development/drainage improvement protects public health, public safety, and does not adversely impact surrounding adjacent properties within reason.

I declare under the penalty of perjury of the laws of the State of Nevada that the foregoing is true and correct.

Executed this 23rd day of November 2022.

Oh-Sang Kwon

EXHIBIT “YYYYY-1”

TECHNICAL DRAINAGE STUDY
FOR
THE SEVENTY

840-050

March 2016

Prepared For:

Seventy Acres LLC, Fore Stars LTD, and 180 Land Co LLC
9775 West Charleston Boulevard
Las Vegas, NV 89117
Phone: (702) 940-6930
Fax: (702) 940-6931

GCW
ENGINEERS \ SURVEYORS

840-050

HYDROLOGIC CRITERIA AND DRAINAGE MANUAL

DRAINAGE STUDY INFORMATION FORM

Name of Development: The Seventy Date: March 2016

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

East/West: Rampart Boulevard

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

c) APN: 138-32-301-005, 138-32-301-006 138-32-210-008, 138-32-202-001, 138-31-702-002 and 138-31-801-002

Name of Owner: Seventy Acres LLC, Fore Stars LTD, and 180 Land Co LLC

Telephone No.: 702-940-6930 Fax No.702-940-6931 E-Mail Address: Not available

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

Contact Person-Name: Ryan R. Belsick, PE **Telephone No.:** (702) 804-2000

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

Firm: GCW, Inc

Address: 1555 S. Rainbow Blvd; Las Vegas, NV 89146

Type of Land Development/Land Disturbance

☐	Rezoning	☐	Subdivision Map	☐	Clearing and Grading Only
☐	Parcel Map	☐	Planned Unit Development	☒	Other (Please specify below)
☐	Large Parcel Map	☐	Building Permit	Conceptual Drainage, Rough Grade and Storm Drain	

1. Total Owned Land Area: At Site: +/- 70.52 acres Being Developed/Disturbed: +/- 70.52 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'x12' RCB at northeast corner of site
8. Briefly describe your proposed schedule for the subject project: ASAP

PROFESSIONAL ENGINEER-STATE OF NEVADA
RYAN R. BELSICK
EXP: 12/31/16
CIVIL
No. 14697
3/3/16

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.

Local Entity File No.

Revision	Date

REFERENCE:

STANDARD FORM 1

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE SUBMITTAL CHECKLIST

Project Name: The Seventy	Map ID:	
Firm Name: GCW, Inc.	Engineer: Ryan R. Belsick	
Address: 1555 S Rainbow Blvd City: Las Vegas	State: NV	Zip: 89146
Phone Number: (702) 804-2000	Fax Number: (702) 804-2299	
Property Owner: Seventy Acres LLC, Fore Stars LTD, and 180 Land Co LLC		
Address: 9755 W. Charleston Blvd City: Las Vegas	State: NV	Zip: 89177
Reviewed By:	Date Received:	Date Accepted for Review:

The following checklist is intended as a guide for the engineer preparing a Technical Drainage Study to submit to the local entity and Clark County Regional Flood Control District (if necessary). The listed items are the minimum information required prior to the entity performing a review. The engineer will remain responsible to ensure the Technical Drainage Study is prepared within the guidelines as set forth in the Clark County Regional Flood Control District (CCRFCD) Hydrologic Criteria and Drainage Design Manual (MANUAL).

This document is intended as an aid in preparing Technical Drainage Studies. Each study submitted is reviewed for compliance with local and regional criteria. This form is not intended to be all inclusive and does not limit the extent of the information, calculations or exhibits which may be necessary to properly evaluate the intended land use.

If items are not applicable for the subject site, provide N/A.

I. GENERAL REQUIREMENT

Yes	No	
X	____	Design Manual **Standard Form 1** with the engineer's seal and signature.
X	____	Design Manual **Standard Form 4**.
X	____	2 copies of the 24" x 36" Drainage Plan.
____	N/A	A notarized letter from the adjacent property owner(s) allowing off-site grading or discharge.

II. MAPS AND EXHIBITS

Yes	No	
X	____	A copy of a current Flood Insurance Rate Map (FIRM) with the site delineated.
X	____	A copy of the current CCRFCD Master Plan Update Figure, (F-x), for Flood Control Facilities and Environmental areas with the site delineated.

REFERENCE:	STANDARD FORM 2

DRAINAGE SUBMITTAL CHECKLIST

II. MAPS AND EXHIBITS (Continued)

Yes	No	
X		Off-site drainage basin maps for existing, interim and future conditions showing the existing topography, basin boundaries, concentration points, and flows in cfs.
X		On-site drainage basin maps for existing and proposed conditions showing the existing topography, basin boundaries, concentration points, and on-site and off-site flows in cfs.
X		Vicinity Map with local and major cross streets identified and a north arrow.

III. DRAINAGE PLAN

Yes	No	
X		Sheet size: 24" x 36" sealed by a registered engineer in the State of Nevada.
X		Minimum scale: 1" = 60'.
X		Project name.
X		Vicinity Map with local and major cross streets.
X		Revision box.
X		North arrow and bar scale.
X		Engineer's/consultant's address and phone number.
X		Elevation datum and benchmark.
X		Legend for symbols and abbreviations.
X		Cut/fill scarps, where applicable.
X		Street names, grades, widths.
X		Proposed future and existing spot grades for top of curbs and street crowns at lot lines, grade breaks, and along curb returns on both sides of the street.
X		Existing contours encompassing the site and 100 feet beyond with spot elevations for important locations, where appropriate.
	N/A	Minimum finish floor elevations with top-of-curb elevations at upstream end of lot.
	N/A	Proposed typical street sections.

REFERENCE:	STANDARD FORM 2

DRAINAGE SUBMITTAL CHECKLIST

III. DRAINAGE PLAN (Continued)

Yes	No	
____	N/A	Streets with off-set crowns.
X	____	Proposed contours or spot elevations in sufficient detail to exhibit intended drainage patterns and slopes.
X	____	Property lines.
X	____	Right-of-way lines and widths, existing and proposed.
X	____	Existing improvements and their elevations.
X	____	Delineation of proposed on-site drainage basins indicating area and 10-year and 100-year storm peak flows at basin concentration points.
____	N/A	Concentration points and drainage flow direction with Q100 and V100 and D100 in streets.
X	____	Cumulative flows, velocity, and direction of flow at upstream and downstream ends of site for the 10-year and 100-year flows.
____	N/A	Location and cross-section of street capacity calculations.
X	____	Cross-sectional detail for channels, including cutoff wall locations.
X	____	Existing and proposed drainage facilities, appurtenances, and connections (i.e., sidewalk, ditches, swales, storm drain systems, unimproved and improved channels, and culverts, etc.) stating size, material, shape, and slope with plan and profile and HGL calculations.
X	____	Existing and proposed drainage easements and widths shown with sufficient detail. A cross sectional detail must be provided that shows appropriate lining and reinforcement.
X	____	Location and detail of existing, proposed, and future block wall openings. Minimum size is 16" x 48". Wrought iron gate is required for flows > 10 cfs.
X	____	Location and detail of flood walls illustrating depth of flow, proposed grouting height, etc.
____	N/A	Perimeter retaining wall locations. All existing and proposed walls (retaining screen and flood) must be shown with adjacent ground elevations. Flood walls with 8-inch concrete masonry unit.
____	N/A	Building and/or lot numbers.
X	____	Alignment of all existing, proposed, or future Regional Facilities adjacent to the site.
X	____	Limits of existing floodplain based on current FIRM or best available information; limits of proposed floodplains based on best available information.

REFERENCE:	STANDARD FORM 2

DRAINAGE SUBMITTAL CHECKLIST

III. DRAINAGE PLAN (Continued)

Yes	No	
X		For areas in Zone A, AE, AH, and AO, base flood elevations (BFEs) must be shown for each lot; BFEs may be listed on each lot, or in a table. Finish floor elevations must be a minimum of 18 inches above BFE.
	N/A	Appropriately elevated "humps" 6 inches above the 100 year water surface elevation at site accesses where the intent is to protect the site from the Q100 flows.
	N/A	Street slopes for perimeter and interior streets. The minimum slope is 0.4 percent.
	N/A	Location and detail of best management practice (BMP) for parking lots and low impact development (LID) (if required).

IV. HYDROLOGIC ANALYSIS

Yes	No	
X		Appropriate soil information and Soils Map for existing and future conditions with subbasins and property delineated.
X		Input and output information for existing conditions from computer models (HEC-1 or TR-55). The flow routing diagram must be provided with HEC-1 models.
X		Input and output information for future conditions from computer models (HEC-1 or TR-55). The flow routing diagram must be provided with HEC-1 models.
X		Use of correct precipitation values in and around the McCarran Airport rainfall area.
X		A discussion in the text of the hydrologic analysis justifying subbasin boundaries and cutoffs, supporting assumptions, and calculations.
X		A summary table of stormwater flows showing basin area, Q10 and Q100 for both individual basins and combined basin flows, where applicable.
X		Copies of supporting technical information referenced from a previously approved study and a statement accepting these results.
X		On-site facilities must perpetuate flows through or around the site without significantly impacting adjacent property owners in accordance with current Nevada Drainage Law.
	N/A	Calculation for impervious area for parking lots and LIDs (if required).

REFERENCE:	STANDARD FORM 2

DRAINAGE SUBMITTAL CHECKLIST

V. HYDRAULIC ANALYSIS

Yes	No	
____	N/A	Flow split calculations and supporting documentation or reference for the method of flow split calculations used.
____	N/A	Normal depth street flow calculations and cross section diagrams for all interior and perimeter streets. Provide "d x v" products for the Q100 and Q10 flows representing the worst case for interior and all perimeter streets. Q100 d x v < 8. Q10 d x v < 6 and 12 foot dry lane for rights-of-way > 80 feet. Calculations must be labeled by street name as indicated on the Grading Plan.
____	N/A	A summary table of interior and exterior street capacity calculations showing the street name, Q100 flow, slope, depth of flow, velocity and depth times velocity product and streets needing to meet 12 foot dry lane criteria.
____	N/A	Appropriate hydraulic calculations for block wall openings assuming a 50 percent vertical clogging factor. (Assume the lower half of the opening is plugged.)
X	____	Appropriate hydraulic calculations at drainage easement entrance and discharge locations to set finish floor elevations. Hydraulic calculations must include submerged weir, superelevation and tee intersection losses, where appropriate.
X	____	Provide necessary freeboard requirements to set the finished floor elevations of all proposed buildings, 2 x depth of flow or depth of flow plus 18 inches of freeboard, whichever is less. The minimum requirement is 6 inches above adjacent upstream top of curb. Buildings adjacent to drainage easements must always be provided with 18 inches of freeboard above the Q100 weir height or flow depth, whichever is greater.
X	____	A complete water surface profile analysis (HEC-2, HEC-RAS, etc.) for channel flows and FEMA Zone A flood zones. • Field survey data. • Input and output information. • Plotted cross-sections based on survey with proper encroachments. • A map showing the location of the cross-sections. • Analysis of both sub and super-critical flow segments. • A summary table and a discussion of the results in the text of the report.
X	____	Provide a 50 percent clogging factor in the capacity calculation for drop inlets.
X	____	Hydraulic calculations for culverts and storm drains. D-Load calculations must be provided for storm drain pipes in public rights-of-way, including headwater pool inundation.
X	____	The mitigation of nuisance water, both during construction and in the fully developed condition, must be addressed.
____	N/A	Provide BMP type, size and supporting calculations for parking lots and LIDs (if required).

REFERENCE: | **STANDARD FORM 2**

CITY OF LAS VEGAS

MINIMUM DRAINAGE STUDY CRITERIA
STANDARD FORM 2 CHECKLIST SUPPLEMENT

(Revised 5/18/11)

The following checklist is intended as a supplemental guide for the engineer preparing a Technical Drainage Study submittal to the City of Las Vegas. This supplement focuses on requirements specific to the City of Las Vegas. The requirements presented are in addition to the Clark County Regional Flood Control District (CCRFCD) Manual Standard Form 2. The listed items are the minimum information required prior to the City performing a review. The engineer will remain responsible to ensure the Technical Drainage Study is prepared within the guidelines as set forth in the CCRFCD Hydrologic Criteria and Drainage Design Manual (Design Manual).

An appointment must be made to preview this checklist in conjunction with CCRFCD Standard Form 2 prior to the City accepting a new drainage study for review. The engineer must contact the Flood Control Section at (702) 229-6541 to schedule a submittal appointment.

If items are not applicable for the subject site, provide N/A.

I. GENERAL REQUIREMENT		
Yes	No	
	N/A	A notarized letter from the adjacent property owner(s) allowing off-site grading. (A copy of the letter must be received prior to final acceptance of the drainage study.)
X		Copies of all conditions of approval for development related to this property. (e.g. zoning, use permit, tentative map, etc.) Verify compliance with conditions.
X		An electronic copy of the complete submittal is required to be submitted with one original hard copy of the study. Electronic documents should be on a universal computer-readable digital output device replicating your submittal. An Indexed Portable Document Format (PDF) or Print Ready CAD file formats with a minimum of 300dpi are the desired formats. If figures are in color, they must be scanned in color and saved as a separate file. ____ by initial here, the engineer on record acknowledges that the electronic copy is an identical replicate of the original hard copy submitted to the City of Las Vegas.

II. GRADING PLAN INFORMATION		
Yes	No	
X		(1) 24" X 36" copy of the Grading Plan, (including all Detail Sheets) sealed by the engineer.
X		Proposed future and existing spot grades for top of curbs and street crowns at lot lines, grade breaks, and along curb returns on both sides of the street. Note: Proposed top of curb elevations must be provided for both sides of roadways even if only half street construction is required.
X		Label existing topography at a minimum 5 foot elevation interval including adjacent developments, finished floor elevations of existing buildings and top of existing curbs extending 100 feet* around the perimeter of the site. (*Measured from the centerline of the adjacent roadway.)

II. GRADING PLAN INFORMATION		
Yes	No	
X		Proposed on-site and off-site storm drains and other flood control facilities with plan and profile sheets for public storm drains showing the class of pipe, (Class III, IV, V, etc.), design hydraulic grade line, (HGL) and 100 year storm flow. A public drainage easement must be provided over on-site storm drains conveying off-site flows. An overflow path must be provided over all storm drains.
X		All existing and "to be constructed" walls with cross-sections showing wall type, (e.g. block wall, retaining wall, flood wall, etc.), with limits clearly defined, adjacent ground elevations. Wall heights must meet current ordinances and in no case exceed 14 feet above the adjacent property.
	N/A	Street slopes for both interior and perimeter streets. Note: The minimum slope for a roadway is 0.4 percent, a minimum 18-inch storm drain must be provided where minimum slopes cannot be met.
	N/A	Back of lot elevations and lot drainage pattern for all lots including common lots.
X		Sites with a grade difference two feet above or below existing ground are required to have approval from City of Las Vegas Current Planning. Current Planning approval is required prior to final approval of the drainage study.
X		On-site facilities must perpetuate flows through or around the site without significantly impacting adjacent property owners. (The project must pass flows through the site every 600 feet where the project is blocking flow paths.)
	N/A	This project uses a solid grouted stem wall (or approved alternate) at the back of sidewalk to provide erosion protection for landscaped areas where the depth of flow in the roadway exceeds the back of walk elevation. A corresponding cross-section detail is included.
	N/A	Commercial and Common Lot Landscape areas are not allowed to drain over the sidewalk. The grading plans show flow lines with grades and sidewalk under drains for all landscape areas draining to the public ROW.

III. Local Entity Criteria - City of Las Vegas – Manual Section 1600		
Yes	No	
	N/A	Concrete valley gutters are required in parking lots with slopes less than 1 percent. Slopes through cul-de-sac must be at a 1 percent minimum where flow is drained through the cul-de-sac.
X		Ten-foot wide public drainage easements to be privately maintained are allowed for flow less than 20 cfs. The depth of flow entering the easement must be checked using the submerged weir calculation.
X		The limits of the flood zones and the base flood elevations (BFE) must be shown on all grading plans for all developments within a Special Flood Hazard Zone A, AO, AE, etc.
X		Minimum finish floor elevation is 6 inches above highest adjacent top of curb. Finish floor calculations must include allowances for super elevations on curves and velocity head for tee intersections.
X		Finished floor elevations for buildings adjacent to public drainage easements must be a minimum of 18 inches above the Q100 weir of submerged weir elevation, whichever is greater.

III. Local Entity Criteria - City of Las Vegas – Manual Section 1600		
Yes	No	
	N/A	Lots with "B and C Type Drainage" that drain from one lot to another through a drainage easement shall be required to install an underground nuisance drainage system or a 2-foot valley gutter. 16" x 24" minimum block wall openings are required for both options.
	N/A	Bubblers are required across 80 foot and greater ROW streets. When flows exceed 10 cfs, bubblers larger than 18 inches will be required up to a maximum of 36". Inlets must be sized to match the pipe size provided.

- Contact the Flood Control Section regarding the drainage study review fee. These fees are payable at the time of submittal.
- The Drainage Study must be conditionally approved prior to submitting improvement plans to the Civil and Planning Development of the Department of Building and Safety for review.

This document is intended as an **aid** in preparing Technical Drainage Studies for the City of Las Vegas. Each study submitted is reviewed for compliance with local and regional criteria. This form is not intended to be all-inclusive and does not limit the extent of the information, calculations or exhibits which may be necessary to properly evaluate the intended land use.

TECHNICAL DRAINAGE STUDY
FOR
THE SEVENTY

840-050

March 2016

Prepared For:

Seventy Acres LLC, Fore Stars LTD, and 180 Land Co LLC
9775 West Charleston Boulevard
Las Vegas, NV 89117
Phone: (702) 940-6930
Fax: (702) 940-6931

TECHNICAL DRAINAGE STUDY
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Prepared By:

GCW, Inc.
1555 South Rainbow Boulevard
Las Vegas, Nevada 89146
Phone: (702) 804-2000
Fax: (702) 804-2299

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I. INTRODUCTION

Seventy Acres LLC, Fore Stars LTD, and 180 Land Co LLC are proposing to construct The Two Fifty, a multi-family residential and single-family residential development consisting of luxury multi-family and estate lots upon the land currently operated as the Badlands golf course located south of Alta Drive, north of Charleston Road, east of Hualapai Way and west of Rampart Boulevard, in Las Vegas, Nevada. A land use exhibit provided in Appendix A shows the proposed site layout. The project improvements include: 3,020 luxury multi-family units and minimum 1 acre to 5 acre estate lots on the 253 acres of APNs 138-32-301-005 (17.49 acres), 138-32-301-006 (53.03 acres), 138-32-210-008 (2.37 acres), 138-32-202-001 (2.13 acres) 138-31-702-002 (166.99 acres) and 138-31-801-002 (11.28 acres). Onsite storm drain facilities are proposed to convey the offsite flows from the existing storm drain facilities in Hualapai Way and Charleston Boulevard to the existing dual (2) - 12-foot wide by 12-foot high reinforced concrete box culverts (RCBC) in Rampart Boulevard at the Rampart Boulevard and Alta Drive intersection. The Two Fifty development will be constructed in three phases. The 1st phase of development consists of mass grading and storm drain improvements for approximately 70 acres of APNs 138-32-301-005, 138-32-301-006, 138-32-210-008, and 138-32-202-001 (hereafter referred to as The Seventy). The 2nd phase of development includes construction of the luxury multi-family units within The Seventy. The 3rd phase of development includes construction of the estate lots within approximately 180 acres of APNs 138-31-702-002 and 138-31-801-002 (hereafter referred to as The One Eighty). The purpose of this report is to provide a conceptual drainage analysis for The Two Fifty and serve as a technical drainage study for The Seventy to determine the impacts to downstream developments and facilities to establish allowable flow rates and drainage patterns for interior development, and to recommend storm drain facilities to convey storm flow through the project site. This study also addresses the 1st phase of development which includes The Seventy mass grading and onsite storm drain improvements. The 2nd phase of development will be addressed in a future technical drainage study updates and the 3rd phase of development will be addressed in a future technical drainage study for The One Eighty. The following tasks were performed in the preparation of this report:

- Identify and review previous drainage studies for the project site and areas adjacent to the project.
- Identify the existing FEMA floodplain designation for the project site.
- Determine recommended proposed FEMA floodplain designations within the project limits.

- Identify existing and proposed regional drainage facilities within and adjacent to the project site.
- Identify existing drainage areas and storm drain facilities that affect the site.
- Perform field investigation.
- Estimate peak runoff impacting the proposed grading and storm drain improvements during the 10-year and 100-year return period storms for existing and proposed conditions.
- Recommend conceptual drainage facilities for The One Eighty to protect the proposed project and downstream properties from storm runoff.
- Prepare hydraulic analyses for The Seventy storm drain and proposed channel improvements.
- Recommend drainage facilities to protect the proposed project from storm runoff.

GCW has obtained and reviewed technical drainage studies and grading plans from the City of Las Vegas (CLV) for the site and offsite properties adjacent to the site to determine existing conditions offsite and onsite drainage patterns and discharge flows into the site. The studies reviewed include:

1. *Technical Drainage Study for Peccole Ranch Golf Course (Phase II)* (DS 1347)
2. *Technical Drainage Study for Peccole West Commercial Center* (DS 2364)
3. *Technical Drainage Study for Rampart Boulevard* (DS 2696)
4. *Technical Drainage Study Update for Peccole Ranch Golf Course Maintenance Yard* (DS 1626)
5. *Hydrology Study Update for Queensridge Fairway Homes* (DS 2307)
6. *Technical Drainage Study Peccole West Lot 9 (Phase II)* (DS 1630)
7. *Technical Drainage Study for Peccole West Lot 12* (DS 1650)
8. *Technical Drainage Study for Village 12 Hualapai Way Improvements* (DS 1853)
9. *Technical Drainage Study for Hualapai Way Rough Grading, Alta Drive to Charleston Boulevard* (DS 1758)
10. *Technical Drainage Study for Peccole West Lot 11* (DS 1753)
11. *Technical Drainage Study for Peccole Ranch Parcel 19 & 20* (DS 2172)
12. *Technical Drainage Study for San Michelle West* (DS 2226)
13. *Technical Drainage Study for Peccole – Lot 10 Parcel 18* (DS 2203)
14. *Technical Drainage Study for Windsor at Queensridge* (DS 3279)

15. *Technical Drainage Study for Club House* (DS 1555)
16. *Technical Drainage Study for the Versailles* (DS 2236)
17. *Master Drainage Study for Peccole Ranch – Phase II* (DS 1140)
18. *Technical Drainage Study for Badlands Hole 9* (DS 1974)
19. *Technical Drainage Study for Peccole West Business Center* (DS 1856)
20. *Technical Drainage Study for Peccole West Lot 12 (Park Area)* (DS 1929)
21. *Technical Drainage Study for One Queensridge Place (Condo Towers) – Update 2* (DS 3746)
22. *Technical Drainage Study for Apple Drive at Peccole Ranch* (DS 1576)
23. *Technical Drainage Study for Alta Drive at Peccole Ranch* (DS 1588)
24. *Technical Drainage Study for Peccole Ranch Phase II Master Plan* (DS 273)
25. *Conceptual Drainage Study for Peccole Ranch Phase II Master Plan* (DS 1273)

An exhibit showing the name and general location of the adjacent developed areas and referenced studies listed above has been included in Appendix A. In order to identify offsite drainage patterns impacting the proposed site, a field visit was performed to confirm overall existing conditions drainage patterns for the site and offsite adjacent parcels.

Hydraulic information from the following study has been referenced for the purposes of this report:

The Technical Drainage Study for Queens Borough Culvert (Reference 1, hereinafter referred to as the Queens Borough Culvert Study) was approved by the CLV on August 30, 2005. The Queens Borough Culvert Study designed the existing approximately 2,000 linear foot dual (2) - 12-foot wide by 12-foot high RCB storm drain system (CCRFCD Facility APSO 0000) downstream of the existing dual (2) - 12-foot wide by 12-foot-high RCB at the Rampart Boulevard and Alta Drive intersection. Proposed flows discharged from the site will be conveyed by the Queens Borough Culvert Study storm drain north to the Angel Park Detention Basin (CCRFCD Facility APNO 0001). Pertinent referenced material from the Queens Borough Culvert Study has been included in Appendix C. Updates to the Queens Borough Culvert Study included the following:

- *Update to the Technical Drainage Study for Queens Borough Culvert (Reference 2)* – Approved by CLV on December 30, 2005.

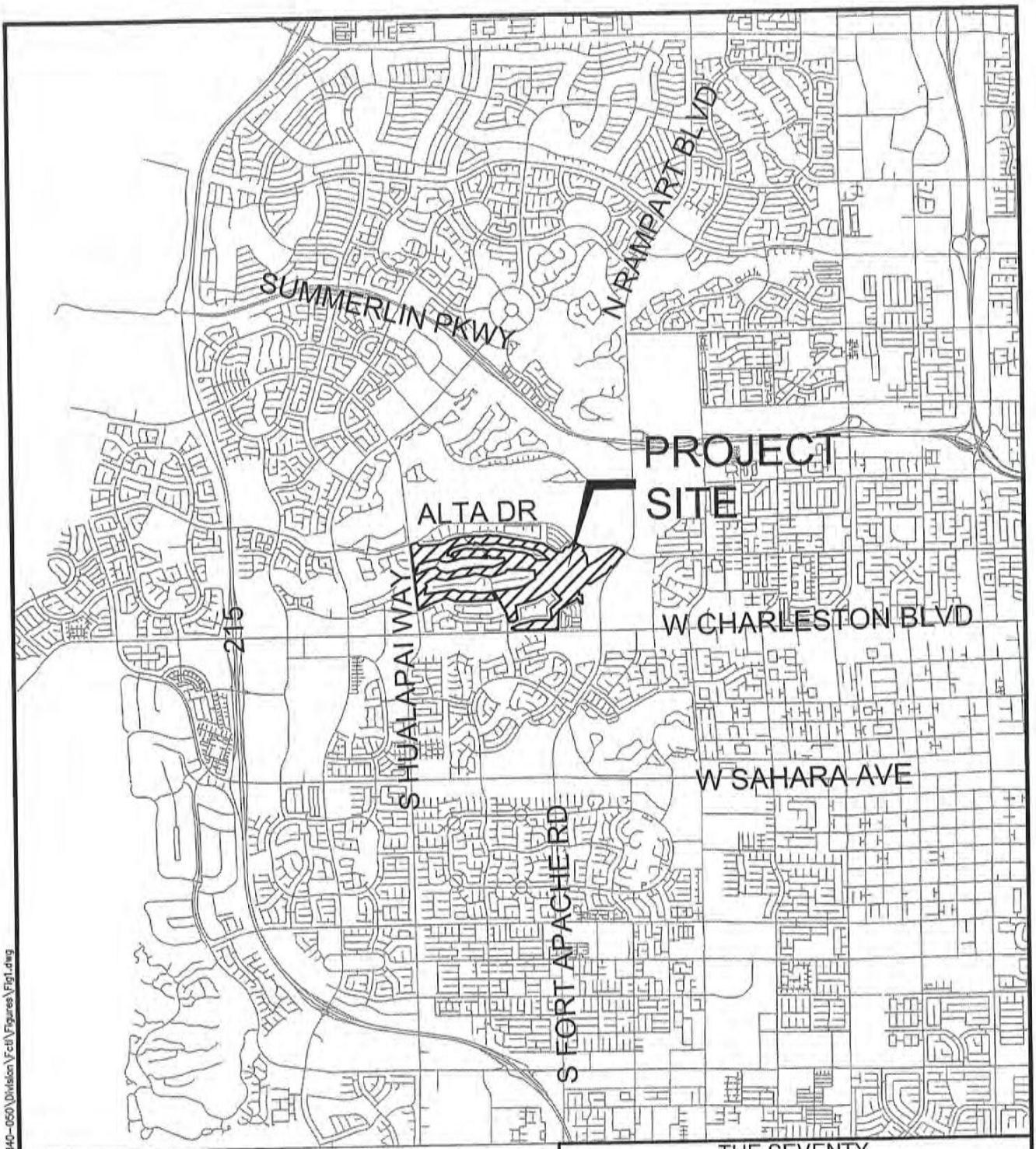
- *Update #2 to the Technical Drainage Study for Queens Borough Culvert (Reference 3*, hereinafter referred to as the Queens Borough Culvert Study Update #2 Study*)* – Approved by CLV on April 21, 2006.

II. LOCATION AND DESCRIPTION

The Seventy is located on approximately 70 acres in Sections 31 and 32, Township 20 South, Range 60 East, M.D.M., in the City of Las Vegas, Nevada. Please refer to Figures 1 and 2 for the vicinity and location of the project site. The site is presently developed as a golf course with existing washes traversing the project site conveying flows from west to east. Offsite flows are conveyed to the site from the west and south through existing reinforced concrete box culverts under Hualapai Way and Charleston Boulevard. Offsite flows from residential subdivisions and commercial development adjacent to the golf course are discharged to the existing golf course as surface flow through existing storm drain and/or drainage easements. The full street improvements are in place for Alta Drive, Charleston Road, Hualapai Way and Rampart Boulevard. For this study, the proposed improvements include mass grading and onsite storm drain facilities. Grading and development of the future onsite development will include multi-family and associated open space and parking area development and will be addressed in a future technical drainage study updates.

III. FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA) FLOOD HAZARD ANALYSIS

Based on the Flood Insurance Rate Map (FIRM) Community Panel 32003C 2145 F dated November 16, 2011, and FIRM Panel 32003 C 2150 E dated September 27, 2002, and revised to reflect the Letter of Map Revision (LOMR) Case No. 06-09-B483P dated September 21, 2006, and LOMR Case No. 06-09-B486P dated October 19, 2006, the project site is crossed by a FEMA-designated Special Flood Hazard Area (SFHA). The proposed improvements will construct closed conduit facilities that will contain and convey the 100-year flow (1% annual chance flood discharge) through The Seventy. Figure 3 shows the site denoted on a portion of the aforementioned FIRM panels. A Conditional Letter of Map Revision (CLOMR) will be obtained from FEMA prior to construction of this project. A LOMR will be obtained from FEMA once construction of the onsite RCB storm drain system is substantially completed and functional.



THE SEVENTY
SEVENTY ACRES LLC, FORE STARS LTD, AND 180 LAND CO LLC

FIGURE 1

VICINITY MAP

GRAPHIC SCALE

5000 0 2500 5000

(IN FEET)

1 inch = 5000 ft.

NORTH

GCW ENGINEERS \ SURVEYORS
1555 S. RAINBOW BLVD.
LAS VEGAS, NV 89146
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gcwengineering.com

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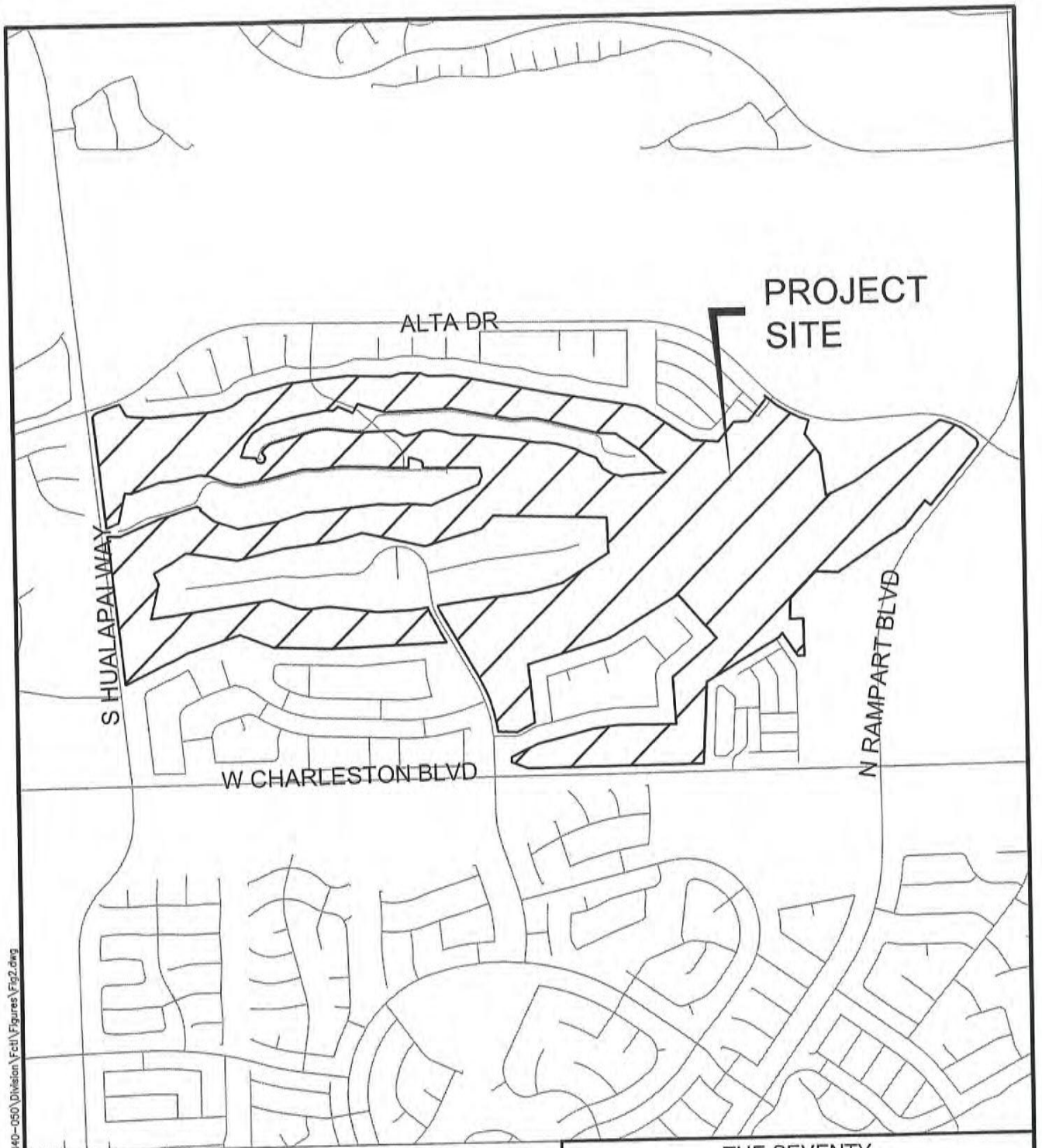

THE SEVENTY
SEVENTY ACRES LLC, FORE STARS LTD, AND 180 LAND CO LLC

FIGURE 2

LOCATION MAP

GRAPHIC SCALE

1200 0 600 1200

(IN FEET)

1 inch = 1200 ft.

NORTH

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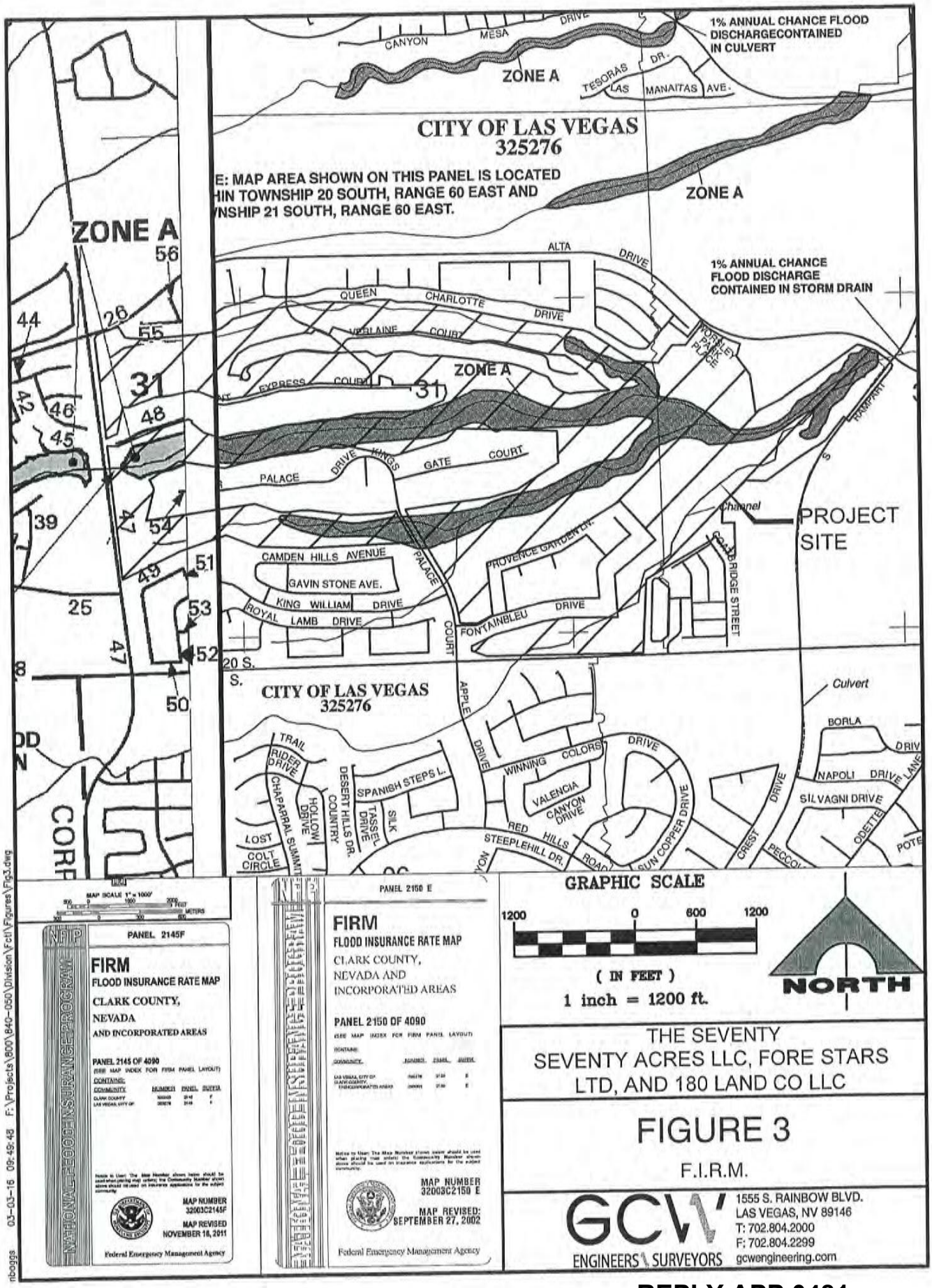
03-03-16 09:48:36 F:\Projects\800\840-050\Division\Fctl\Figures\Fig2.dwg nboggs


1% ANNUAL CHANCE FLOOD DISCHARGECONTAINED IN CULVERT
ZONE A
CANYON
MESA
DRIVE
TESORAS
DR.
LAS MANAITAS AVE.
CITY OF LAS VEGAS
325276
E: MAP AREA SHOWN ON THIS PANEL IS LOCATED
HIN TOWNSHIP 20 SOUTH, RANGE 60 EAST AND
VNSHIP 21 SOUTH, RANGE 60 EAST.
ZONE A
ZONE A
ALTA
DRIVE
1% ANNUAL CHANCE FLOOD DISCHARGE CONTAINED IN STORM DRAIN
QUEEN
CHARLOTTE
DRIVE
COURT
EXPRESS
COURT
ZONE A
PALACE
DRIVE
KINGS
GATE
COURT
Channel
PROJECT SITE
CAMDEN HILLS AVENUE
GAVIN STONE AVE.
KING WILLIAM
DRIVE
ROYAL LAMB DRIVE
PALACE
COURT
PROVENCE GARDEN LN.
FONTAINBLEU
DRIVE
RIDGE STREET
CITY OF LAS VEGAS
325276
APPLE
DRIVE
Culvert
TRAIL
RIDER DRIVE
CHAPARRAL SUMMIT
HOLLOW DRIVE
COUNTRY
DESERT HILLS DR.
SPANISH STEPS L.
TASSEL DRIVE
SILK
LOST
COLT CIRCLE
WINNING COLORS
DRIVE
VALENCIA
CANYON DRIVE
RED HILLS
STEEPLEHILL DR.
SUN COPPER DRIVE
CREST
DRIVE
BORLA
NAPOLI
DRIVE
SILVAGNI DRIVE
ODETTE
CORR
MAP SCALE 1" = 1000'
PANEL 2145F
FIRM
FLOOD INSURANCE RATE MAP
CLARK COUNTY, NEVADA
AND INCORPORATED AREAS
PANEL 2145 OF 4090
MAP NUMBER 32003C2145F
MAP REVISED NOVEMBER 16, 2011
Federal Emergency Management Agency
PANEL 2150 E
FIRM
FLOOD INSURANCE RATE MAP
CLARK COUNTY, NEVADA AND INCORPORATED AREAS
PANEL 2150 OF 4090
MAP NUMBER 32003C2150 E
MAP REVISED: SEPTEMBER 27, 2002
Federal Emergency Management Agency
GRAPHIC SCALE
1200 0 600 1200
(IN FEET)
1 inch = 1200 ft.
NORTH
THE SEVENTY
SEVENTY ACRES LLC, FORE STARS LTD, AND 180 LAND CO LLC
FIGURE 3
F.I.R.M.
GCW
ENGINEERS \ SURVEYORS
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LAS VEGAS, NV 89146
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gcwengineering.com
nboggs 03-03-16 09:49:48 F:\Projects\800\840-060\Division\Fct\Figures\Fig3.dwg

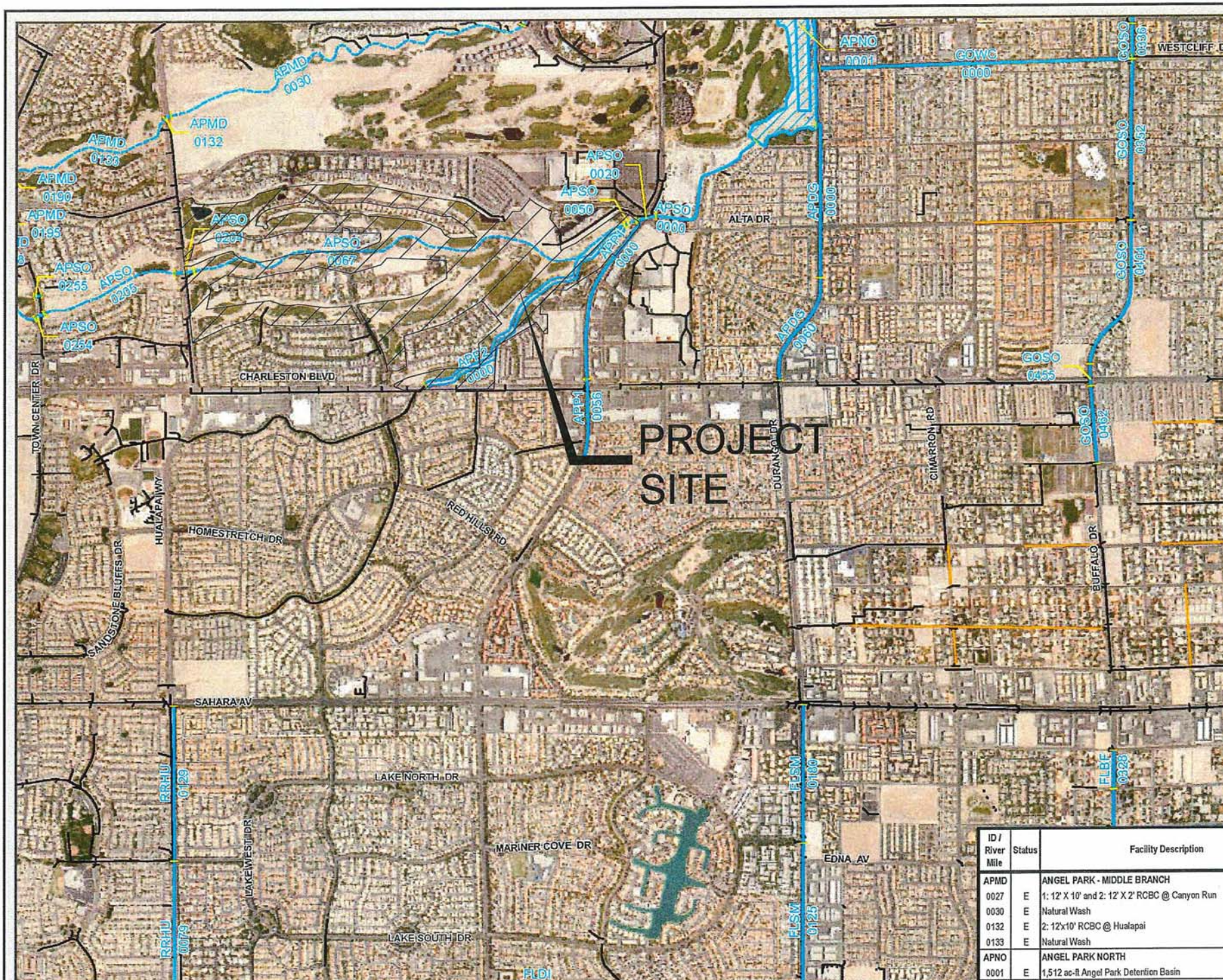
IV. CLARK COUNTY REGIONAL FLOOD CONTROL DISTRICT (CCRFCD) FACILITIES

Figure 4 is reproduced from Figures F-12 from the *2013 Las Vegas Valley Flood Control Master Plan Update* (Reference 4, hereinafter referred to as the 2013 MPU). The figure depicts the project site in relation to existing and proposed regional facilities. As shown on Figure 4, the following facilities are within or adjacent to the project site:

- Angel Park – South Branch (APSO 0000-0204)
- Angel Park – Peccole 1 (APP1 0000)
- Angel Park – Peccole 2 (APP2 0000)

The Two Fifty project site contains existing CCRFCD Facilities APSO 0050, APSO 0067, and APP2 0000. The existing CCRFCD Facilities within The Two Fifty project site are labeled as natural washes in the 2013 MPU. The One Eighty proposes approximately 4,700 linear feet of CCRFCD Facility APSO 0067 and approximately 2,300 linear feet of CCRFCD Facility APP2 0000 as future RCB storm drain. The Seventy proposes to construct CCRFCD Facility APSO 0050 and approximately 1,900 linear feet of CCRFCD Facility APSO 0067 and approximately 1,485 linear feet of CCRFCD Facility APP2 0000 as RCB storm drain.

The 2013 MPU flow rates for the proposed CCRFCD Facilities will be superseded by the project specific hydrology presented in this report. Flows conveyed through the site are discharged northeast to existing CCRFCD Facility APSO 0020 located at the Rampart Boulevard and Alta Drive intersection. CCRFCD Facility APSO 0020 is labeled as a dual (2) - 12-foot wide by 12-foot high RCB in the 2013 MPU. CCRFCD Facility APSO 0020 discharges flow east to existing CCRFCD Facility APSO 0000. CCRFCD Facility APSO 0000 is labeled as a dual (2) - 12-foot wide by 12-foot high RCB in the 2013 MPU. CCRFCD Facility APSO 0000 conveys flow northeast to the existing Angel Park Detention Basin. The hydraulic design for CCRFCD Facility APSO 0000 was presented in the Queens Borough Culvert Study. The Angel Park Detention Basin is labeled as CCRFCD Facility APNO 0001.



ID / River Mile	Status	Facility Description
APMD		ANGEL PARK - MIDDLE BRANCH
0027	E	1: 12' X 10' and 2: 12' X 2' RCBC @ Canyon Run
0030	E	Natural Wash
0132	E	2: 12'x10' RCBC @ Hualapai
0133	E	Natural Wash
APNO		ANGEL PARK NORTH
0001	E	1,512 ac-ft Angel Park Detention Basin

V. HYDROLOGY

The methodology presented in this study is in compliance with the *CCRFCD Hydrologic Criteria and Drainage Design Manual* (Reference 5, hereinafter referred to as the Manual).

Model Description - The drainage subbasins were modeled using the SCS Unit Hydrograph method within the U.S. Army Corps of Engineers *HEC-1 Flood Hydrograph Package* (Reference 6). Since the drainage area for each watershed within the project is less than 8 square miles, an SDN 3 design storm was selected for use in the HEC-1 computer model. The 2013 MPU ALLGOW3.dat HEC-1 model has been referenced and revised for the purposes of this report.

Precipitation – The project site and tributary drainage areas lie outside of the McCarran Rainfall Area as identified in the Manual. Rainfall depths for the project site were calculated utilizing GIS data distributed by the Clark County GISMO (Geographic Information Systems Management Office). The GIS rainfall depths were extracted from the NOAA Rainfall Atlas and have been adjusted according to the approach outlined in Section 500 of the Manual. The adjusted point precipitation values for the onsite drainage subbasins range from 2.88 inches to 3.08 inches for the 100-year storm event and 1.64 inches to 1.76 inches for the 10-year storm events. The rainfall exhibit has been included in Appendix A.

Curve Numbers (CN) – The soils information for the project watershed was referenced from the *Soil Survey of Las Vegas Valley Area, Nevada, Part of Clark County* (Reference 7). This survey delineates families of soil types and the Hydrologic Soil Group (HSG) of each family. A soils map containing the project site is included in Appendix A. The soil classification for the site has been revised since the 2013 MPU was prepared and the soil classification used for the onsite portion of the model has been revised accordingly. A copy of the *Custom Soil Resource Report for the Soil Survey of the Las Vegas Valley Area, Nevada, Part of Clark County* from the U.S. Department of Agriculture and Natural Resource Conservation Service (Reference 7) have been included in Appendix A. The report shows that the project area and offsite subbasins consist of Soil Type 152 (Cave). Soil Type 152 is classified as 100 percent Hydrologic Soil Group (HSG) Type "D". Note that the 2013 MPU hydrology shows Soil Type 152 classified as 5 percent HSG Type "A", 10 percent HSG Type "B", and 85 percent HSG Type "D". As a result of the revisions, CNs for the offsite and onsite

existing conditions subbasins are slightly higher than the CNs presented in the 2013 MPU.

The land uses or land covers used for the subbasins shown for the adjacent parcels and The One Eighty portions of the site are referenced from the 2013 MPU. Due to the size of the future estate lots (minimum 1 to 5± acres), curve numbers for the future The One Eighty subbasins will be less than or equal to the curve numbers presented in this report for existing and proposed conditions.

The land uses or land covers used for the developed The Seventy portion of the site consist of "commercial and business." Weighted curve numbers for the subbasins were calculated using GIS. The land covers used for the mass graded portion of the site in the proposed conditions model conservatively assumes "commercial and business" in lieu of "newly graded areas" since the difference in the calculated curve numbers are comparable (commercial CN 95 vs. newly graded CN 94).

Curve numbers for existing and developed conditions basins, as well as a curve number matrix of the soil type and for each land use, are included in Appendix A.

For the given soils, CN values were determined from appropriate columns of Table 602 and 602A of the Manual. Composite CN values of 82 to 95 were determined for the existing and developed conditions onsite subbasins, respectively.

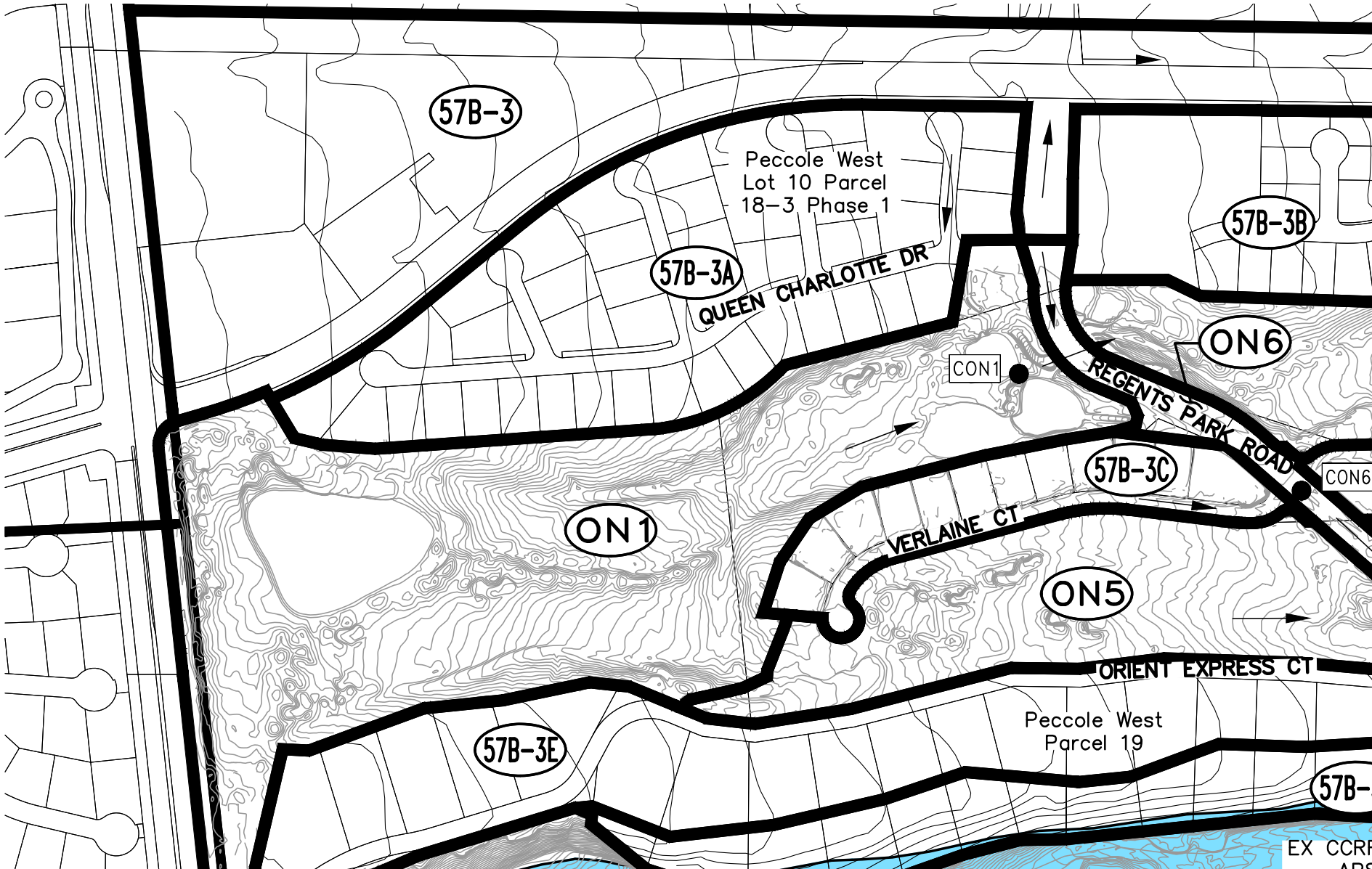
Drainage Areas and Flow Patterns - The subbasins and flow patterns used for the hydrologic modeling were determined from elevations established for the project site in a master grading digital file. Offsite hydrology was determined from research of existing drainage studies for adjacent developments.

Lag Time - The lag time (TLAG) is described as the time between the center of mass of rainfall and the time of peak discharge from a basin. Lag time can be related to time of concentration (T_c) by the following relationship: TLAG = 0.6 (T_c). The time of concentration (T_c) is defined as the time required for runoff to flow from the most hydraulically distant area of the basin to the outlet of the basin or a design point. The procedure for calculating T_c is outlined in Section 602 of the Manual. Lag time calculations for the drainage subbasins have been included in Appendix A on Standard Form 4.

VI. EXISTING CONDITIONS

The site is presently developed as a golf course with existing washes traversing the project site conveying flows from west to east. A site visit was performed to confirm drainage patterns within the site and for parcels adjacent to the site. Offsite flows impact the site from the west and south. Offsite flows are conveyed to the site from the west via an existing dual (2) 8-foot wide by 8-foot high RCBC (CCRFCD Facility APSO 0204) under Hualapai Way. Additionally, offsite flows are conveyed to the site from the south via an existing RCBC under Charleston Boulevard. Offsite flows from residential subdivisions and commercial development adjacent to the golf course are discharged to the existing golf course as surface flow through existing storm drain and/or drainage easements. Flows conveyed through the site are discharged northeast to existing CCRFCD Facility APSO 0020 a dual (2) - 12-foot wide by 12-foot high RCB located at the Rampart Boulevard and Alta Drive intersection.

Figure 5 depicts the subbasins and drainage patterns used in the existing conditions hydrologic analysis. Offsite subbasins west of Hualapai Way and south of Charleston Boulevard are referenced from the 2013 MPU ALLGOW3 HEC-1 Model. The portion of the 2013 MPU tributary to 2013 MPU Concentration Point CC57B-4 located at the intersection of Alta and Rampart has been revised with this report. The model has been revised to determine onsite project specific flow rates and existing conditions flow rates discharged to CCRFCD Facilities APSO 0020 and APSO 0000. Copies of Figures H-29 and H-30 from the 2013 MPU have been included in Appendix C. The results of the Existing Conditions HEC-1 model are summarized in Table 1. A copy of the Existing Conditions HEC-1 model output is included in Appendix A.



REPLY APP 0487

TABLE 1
SUMMARY OF EXISTING CONDITIONS HEC-1 MODEL

SB OR CP*	AREA (AC)	100 YR (CFS)	10 YR (CFS)
57B-1	31.1	80	40
57B-1A	28.4	54	20
57B-1B	19.3	51	25
57B-1C	0.6	2	1
57B-2A	6.3	14	6
57B-2B	3.0	8	3
57B-2C	1.7	5	2
57B-2D	5.7	16	7
57B-2E	14.5	42	19
57B-2F	57.8	147	69
57B-2G1	1.6	5	2
57B-2G2	4.6	12	5
57B-2H1	18.6	32	13
57B-2H2	10.0	21	9
57B-2I	4.6	12	5
57B-3	30.8	44	28
57B-3A	16.6	36	14
57B-3B	32.8	66	25
57B-3C	4.4	11	4
57B-3D	11.8	26	11
57B-3E	16.0	32	13
57B-3F	7.4	17	7
57B-3G	1.5	4	2
57B-4	82.7	202	101
57B-4A	4.5	8	3
57B-4B	7.1	24	13
57B-4C	7.8	23	12
C12B*	-	2134	990
C57B-2E	-	56	26
C57B-4	-	259	127
C57B-4C	-	47	25
CC57B-4	-	4720	2354
CCON6	-	36	14
CCON10	-	2128	1025
CCON11	-	2227	1065
CCON17	-	2472	1171
CCPIC-A*	-	1895	900
CON1	-	86	32
CON2	-	164	55
CON3	-	189	64
CON4	-	195	66
CON6	-	18	8
CON8	-	54	19
CON9	-	2120	1012
CON10	-	2120**	1015
CON11	-	2128	1017

TABLE 1
SUMMARY OF EXISTING CONDITIONS HEC-1 MODEL

SB OR CP*	AREA (AC)	100 YR (CFS)	10 YR (CFS)
CON12	-	83	36
CON13	-	118	49
CON14	-	174	79
CON15	-	346	142
CON16	-	367	150
CON17	-	368	153
CON18	-	1912	906
CON19	-	1954	923
CON20	-	1944	923
CON21	-	2493	1177
CON22	-	4209	2065
ON1	25.4	50	18
ON2	17.5	31	11
ON3	2.5	6	2
ON4	4.7	9	3
ON5	9.4	18	7
ON6	2.3	8	4
ON8	12.2	27	9
ON9	25.5	41	14
ON10	11.4	24	8
ON11	10.0	19	7
ON12	11.6	23	8
ON13	12.0	23	8
ON14	3.5	6	2
ON15	22.5	42	15
ON16	11.5	23	8
ON17	9.1	20	7
ON18	20.3	31	10
ON19	6.4	12	4
ON20	6.6	12	4
ON21	22.3	34	12
ON22	8.5	18	6
PIC-B*	282.2	442	205

*See Figure 5

**The HEC-1 node shown identifies the controlling concentration point for the associated facility and is located upstream of this facility due to decreasing peak flow with increasing tributary area caused by storm distribution transitions, depth area reduction factors, or attenuation of flow for routing.

The existing conditions flow rate of 4,720 cfs (Concentration Point CC57B-4) conveyed to the CCRFCD Facilities APSO 0020 and APSO 0000 is slightly greater (<2%) than the 2013 MPU flow rate of 4,628 cfs shown at this location. The increase in flow rate is due to the increase in the CN values as a result of the updated soils classification for the site, and project specific hydrology revisions within the area bounded by Alta Drive, Rampart Boulevard, Charleston Boulevard and Hualapai Way.

VII. PROPOSED CONDITIONS

The Seventy will be mass graded and the proposed onsite storm drain improvements will be constructed during proposed conditions. Proposed conditions drainage patterns are similar to existing conditions. Figure 6A depicts the subbasins and drainage patterns used in the proposed conditions hydrologic analysis. The results of the Proposed Conditions HEC-1 model are summarized in Table 2. A copy of the Proposed Conditions HEC-1 model output is included in Appendix A.

TABLE 2
SUMMARY OF PROPOSED CONDITIONS HEC-1 MODEL

SB OR CP[1]	AREA (AC)	100 YR (CFS)	10 YR (CFS)
57B-1	31.1	80	40
57B-1A	28.4	54	20
57B-1B	19.3	51	25
57B-1C	0.6	2	1
57B-2A	6.3	14	6
57B-2B	3.0	8	3
57B-2C	1.7	5	2
57B-2D	5.7	16	7
57B-2E	14.5	42	19
57B-2F	57.8	147	69
57B-2G1	1.6	5	2
57B-2G2	4.6	12	5
57B-2H1	18.6	32	13
57B-2H2	10.0	21	9
57B-2I	4.6	12	5
57B-3	30.8	63	28
57B-3A	16.6	36	14
57B-3B	32.8	66	25
57B-3C	4.4	11	4
57B-3D	11.8	26	11
57B-3E	16.0	32	13
57B-3F	7.4	17	7
57B-3G	1.5	4	2
57B-4	82.7	202	101
57B-4B	7.1	24	13

TABLE 2
SUMMARY OF PROPOSED CONDITIONS HEC-1 MODEL

SB OR CP[1]	AREA (AC)	100 YR (CFS)	10 YR (CFS)
57B-4C	7.8	23	12
C12B*	-	2134	990
C57B-2E	-	56	26
C57B-4	-	259	127
C57B-4C	-	47	25
CC57B-4	-	4673	2326
CCON10	-	2128	1025
CCON6	-	36	14
CCON18R	-	1933	913
CCPIC-A*	-	1895	900
CDON2	-	2476	1169
CDON3	-	4177	2058
CDON4	-	4177**	2059
CON1	-	86	32
CON2	-	164	55
CON3R	-	191	65
CON6	-	18	8
CON8	-	54	19
CON9	-	2120	1012
CON10	-	2120**	1015
CON11R	-	2130	1026
CON12	-	83	36
CON13	-	118	49
CON14	-	174	79
CON15R	-	344	142
CON16R	-	364	149
CON18R	-	1910	905
CP19	-	1933**	920
CP20	-	1933**	920
CPPH1	-	2450	1153
DON1	10.8	34	18
DON2	19.5	60	31
DON3	21.1	65	34
DON4	17.4	44	23
ON1	25.4	50	18
ON2	17.5	31	11
ON3R	4.1	9	3
ON5	9.4	18	7
ON6	2.3	8	4
ON8	12.2	27	9
ON9	25.5	41	14
ON10	11.4	24	8
ON11R	5.1	11	4
ON12	11.6	23	8
ON13	12.0	23	8
ON14	3.5	6	2
ON15R	21.5	41	14

TABLE 2
SUMMARY OF PROPOSED CONDITIONS HEC-1 MODEL

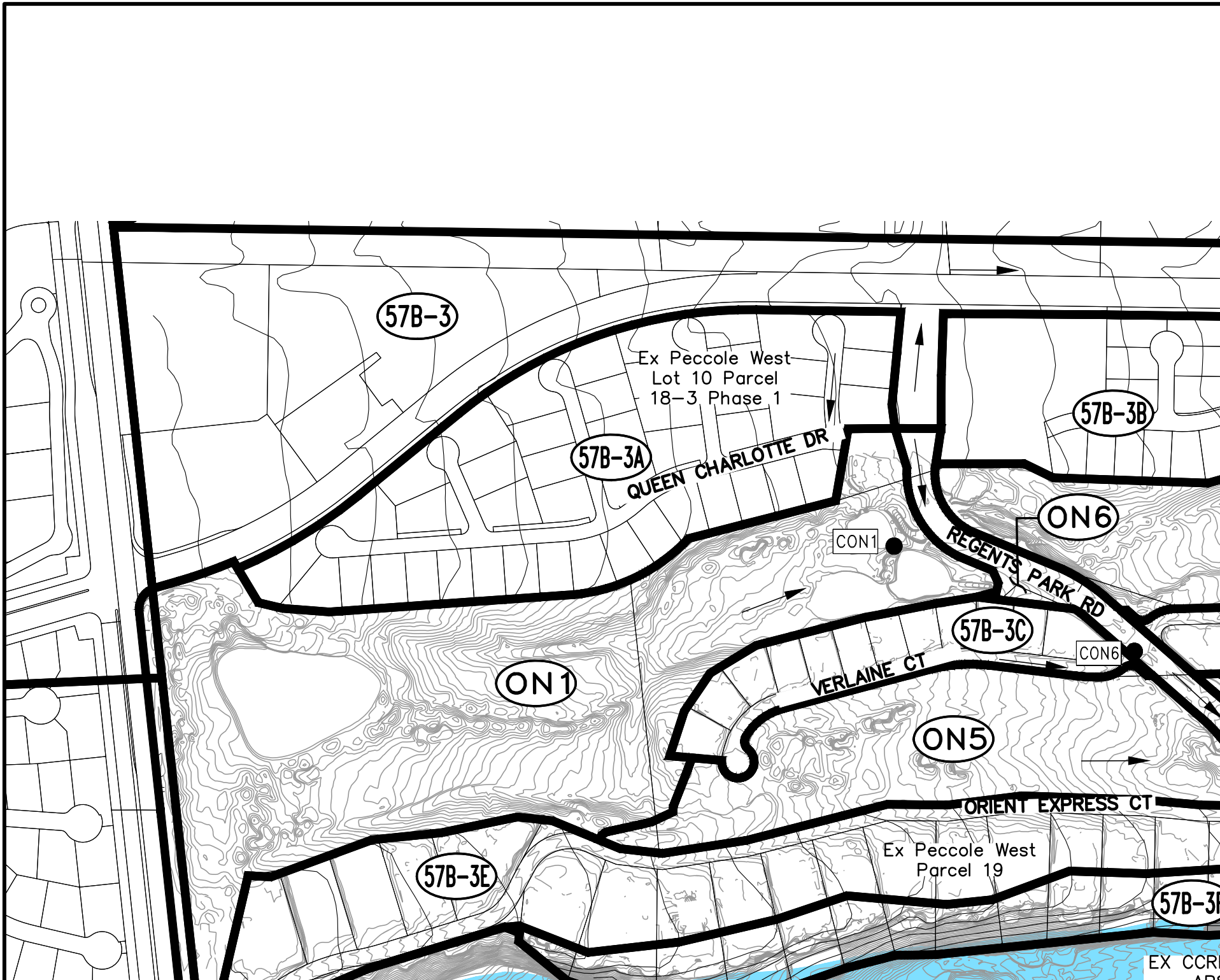
SB OR CP[1]	AREA (AC)	100 YR (CFS)	10 YR (CFS)
ON16R	10.9	23	8
ON18R	18.5	28	10
PIC-B*	282.2	442	205

[1]See Figure 6A

*Referenced Subbasin/Concentration Point from 2013 MPU

**The HEC-1 node shown identifies the controlling concentration point for the associated facility and is located upstream of this facility due to decreasing peak flow with increasing tributary area caused by storm distribution transitions, depth area reduction factors, or attenuation of flow for routing.

The proposed conditions flow rate of 4,673 cfs (Concentration Point CC57B-4) conveyed to the CCRFCD Facilities APSO 0020 and APSO 0000 is slightly lower than the existing conditions flow rate of 4,720 cfs. Additionally, the proposed conditions flow rate of 4,673 cfs is slightly greater (<1%) than the 2013 MPU flow rate of 4,628 cfs shown at this location. The increase in flow rate is due to the increase in the CN values for onsite subbasins as a result of the updated soils classification for the site and reducing the size of the onsite subbasins for project specific hydrology. The existing CCRFCD Facilities have adequate hydraulic capacity to convey proposed conditions flow rates from the site to the existing Angel Park Detention Basin.



REPLY APP 0493

Onsite Mass Grading

Proposed onsite drainage patterns and rough grading are depicted on Figure 6B. Subbasins impacting the proposed rough graded channels have been prorated to determine the specific flow rates to the proposed rough graded channel sections. The prorated flows are based on the total cfs per acre of tributary area. Prorated flows are summarized on Table 3.

TABLE 3
PROPOSED CONDITIONS
PRORATED FLOW SUMMARY

Proposed Onsite Subbasins			
Subbasin[1]	Q_{100} (cfs)	Area (acres)	cfs/acre
DON3	65	21.1	3.08
Proposed Onsite Prorated Subbasins			
Subbasin*	Q_{100} (cfs)	Area (acres)	cfs/acre
DON3A	6	1.9	3.08
DON3B	23	7.4	3.08
DON3C	36	11.8	3.08
TOTAL	65	21.1	NA

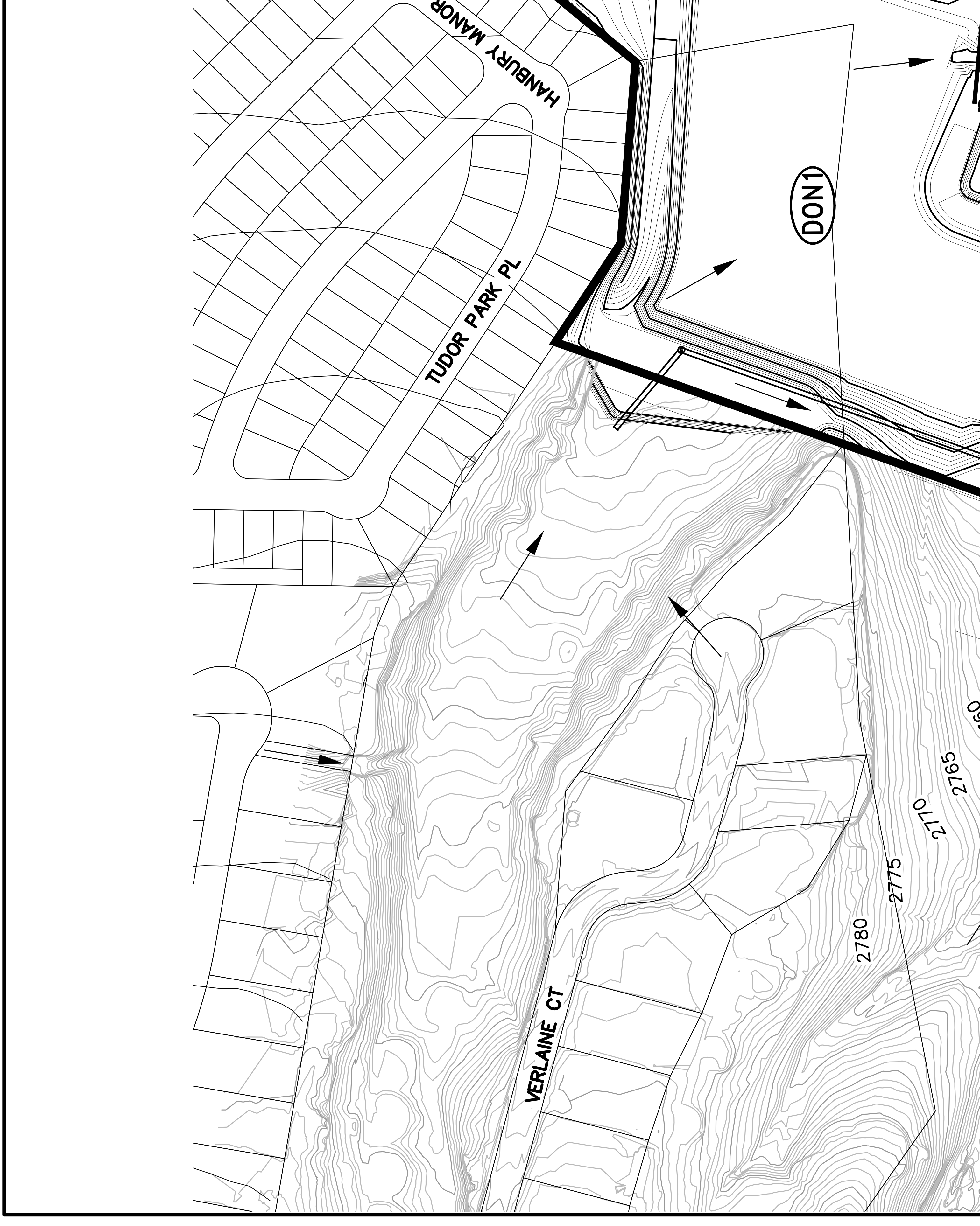
[1]See Figures 6A and 6B.

The onsite rough graded ditches are summarized in Table 4. Ditch calculations have been included in Appendix B.

TABLE 4
100-YEAR ROUGH GRADING DITCH CHARACTERISTICS

Ditch[1]	Min Slope (%)	Q_{100} (cfs)	Depth of flow (ft)	Velocity (ft/s)	Bottom Width (ft)	Type	Side Slopes	Lining D50 (in)	Min Depth (ft)	Tributary
Section A	0.65	44	0.54	2.91	24	Trap	9.5:1/5:1	N/A	1.50	DON4
Section B	1.20	44	0.33	2.97	42	Trap	9:1/9:1	N/A	1.50	DON4
Section C	5.85	59	0.33	4.21	42	Trap	3:1/2:1	12	1.50	DON3B + DON3C
Section D	4.28	59	0.36	3.81	42	Trap	3:1/3:1	12	1.50	DON3B + DON3C
Section E	0.50	60	1.08	3.60	10	Trap	8:1/2:1	N/A	2.00	DON2
Section F	0.73	60	1.07	4.64	10	Trap	2:1/2:1	N/A	2.50	DON2
Section G	0.61	34	0.80	3.55	10	Trap	3:1/2:1	N/A	2.00	DON1
Section H (north)	6.15	33	0.56	3.95	0	V-ditch	3:1/50:1	12	2.00	1/2 DON2
Section H (south)	6.15	33	0.57	3.97	0	V-ditch	2:1/50:1	12	2.00	1/2 DON2

[1]See Figures 6A and 6B.


HANBURY MANOR
TUDOR PARK PL
DON1
VERLAINE CT
2765
2770
2775
2780

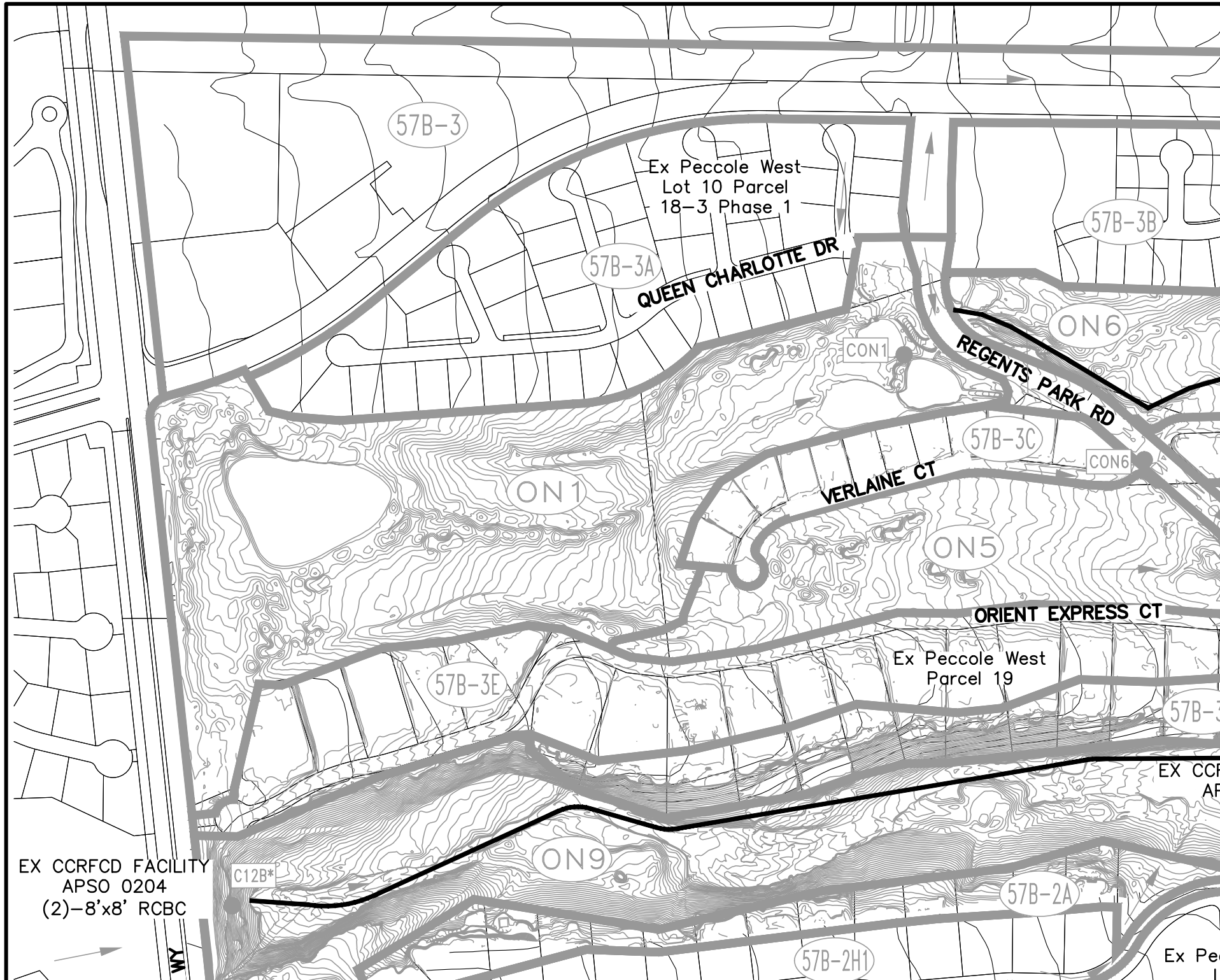
A site visit was performed to determine drainage patterns within APNs 138-32-311-002, 138-32-311-004, and 138-32-311-005. The total area tributary to site from these parcels was determined to be approximately 0.6 acres. The tributary area from these parcels is shown as Subbasin 57B-1C in the existing and proposed conditions hydrologic analyses. Subbasin 57B-1C generates 2 cfs during the 100-year storm event. The total flow is discharged at three locations along the boundary of the site. The discharge from the offsite parcel includes flow from an existing block wall opening, sheet flow from the site, and discharge from a curb opening. An NDOT Type 2 Drop Inlet and stub is proposed to intercept flow from the block wall opening. Two additional 18-inch RCP capped storm drain stubs are provided to intercept flows from these areas in the future. The future improvements for the site will safely convey flows from these adjacent parcels to the onsite storm drain system.

VIII. ULTIMATE CONDITIONS

The Two Fifty and all offsite areas are fully developed during ultimate conditions. Due to the size of the future estate lots (minimum 1 to 5± acres), curve numbers for the future One Eighty subbasins will be less than or equal to the curve numbers presented in this report for existing and proposed conditions. A separate analysis for ultimate conditions was not warranted since all offsite areas tributary to the site upstream of the overall Two Fifty development at Hualapai Way and Charleston Boulevard are already developed in proposed conditions. The proposed conditions flow rate of 4,673 cfs at CC57B-4 is considered to be the ultimate conditions flow rate conveyed to the dual (2) - 12-foot wide by 12-foot high RCB located at the Rampart Boulevard and Alta Drive intersection for the purposes of this report.

IX. STORM DRAIN FACILITIES AND PROTECTION

All proposed flood control facilities have been shown on Figure 7 and the plans included herewith. The design for the proposed facilities has been based on proposed conditions flow rates. Design of the storm drain facilities within the future One Eighty development have been based on normal depth calculations. Proposed mainline and lateral pipe sizes within the future One Eighty development were calculated using normal depth and have been upsized by 6 inches in diameter to provide for losses and future design flexibility. Proposed mainline and lateral RCB sizes include 1 foot of freeboard to account for storm



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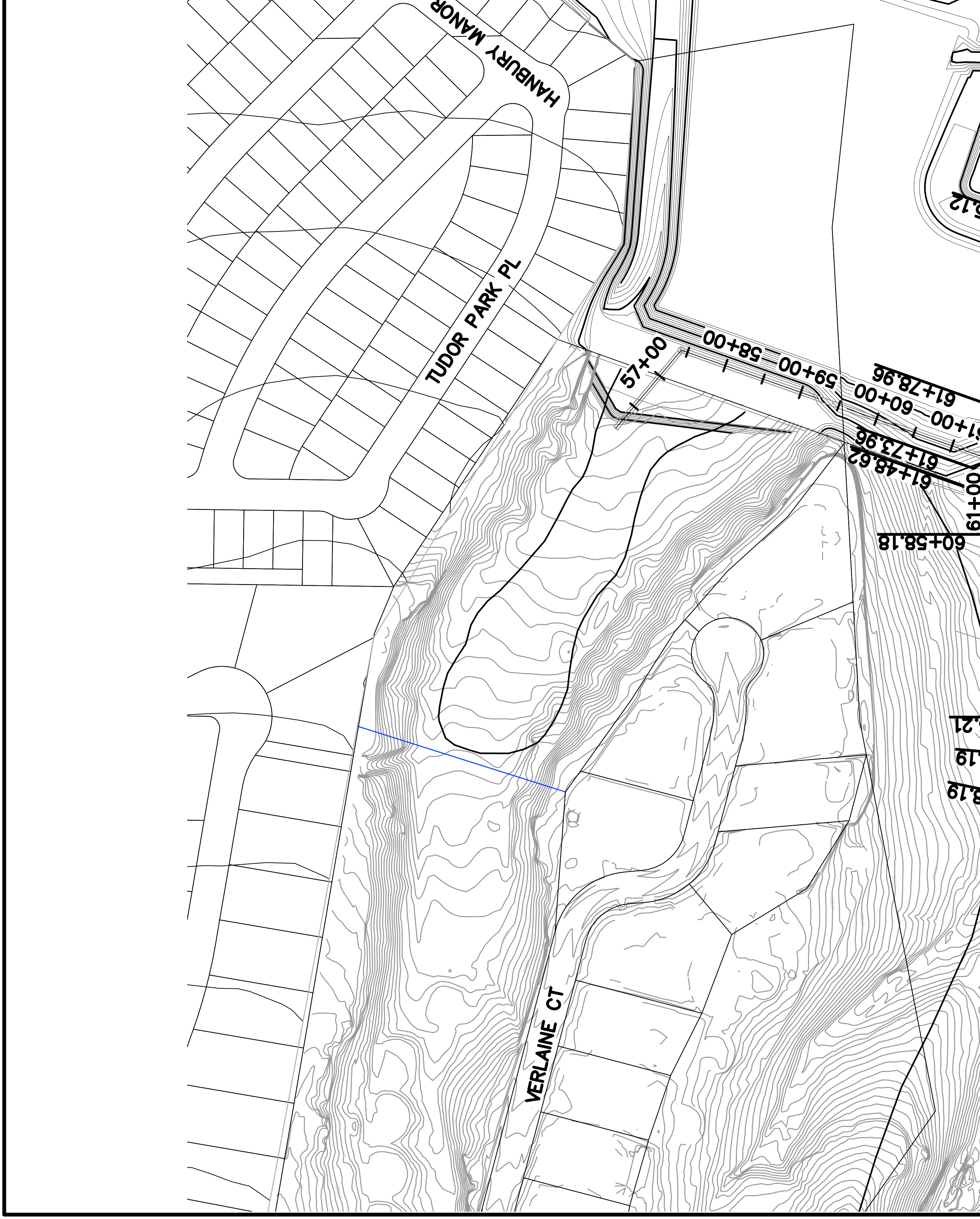
drain losses. Normal depth calculations with proposed future slopes for The One Eighty recommended facilities have been included in Appendix B. Note that detailed hydraulic analysis for The One Eighty proposed facilities will be required in future technical drainage study submittals for this project. Hydraulic calculations for the recommended facilities have been included in Appendix B.

The Seventy proposed Mainline 1 RCB extends the existing CCRFCD Facility APSO 0020 dual (2) - 12-foot wide by 12-foot high RCB's in Rampart Boulevard approximately 3,500 linear feet west through the proposed site. Mainline 1 consists of an approximately 30 linear feet junction structure; 1,560 linear feet of 14-foot wide by 12-foot high RCB; an 87 linear feet junction structure; 1,345 linear feet of 14-foot wide by 9-foot high RCB; 415 linear feet of 15-foot wide by 9-foot high RCB; a 12 linear feet transition structure; and 49 linear feet of 20-foot wide by 9-foot high RCB improved inlet. Mainline 1 will collect and convey offsite flows generated west and south of the project site northeast to the existing dual (2) - 12-foot wide by 12-foot high RCB located at the Rampart Boulevard and Alta Drive intersection.

Mainline 2 consists of approximately 1,425 linear feet of 10-foot wide by 8-foot high RCB; a 12 linear feet transition structure; and 49 linear feet of 20-foot wide by 9-foot high RCB improved inlet. Mainline 2 will collect and convey offsite flows generated south of the project site north to Mainline 1.

Hydraulic modeling for the proposed RCB storm drain mainlines and RCP laterals were performed with the CIVILDESIGN Corp. WSPGW Water Surface Pressure Gradient Package (Reference 8, hereinafter referred to as WSPGW). Copies of the WSPGW models for the proposed storm drain facilities have been included in Appendix B. Electronic copies of the models have been included on CD in the Appendix. Note that the flows at the concentration points nodes from the proposed conditions HEC-1 Model were used to model the proposed storm drain mainlines. Lateral storm flows in the mainline WSPGW models were adjusted, so the 100-year storm flows in downstream reaches match the concentration point peak flows along the mainline. The WSPGW models labeled ""MAIN1" and "MAIN2" are for the proposed conditions Mainline 1 and Mainline 2 storm drain mainlines, respectively. A summary of the WSPGW results have been shown on Figure 8. The results of the WSPGW Mainline 1 and 2 models are summarized in Tables 5A and 5B, respectively.



HANBURY MANOR
TUDOR PARK PL
VERLAINE CT
57+00
58+00
59+00
60+00
61+78.96
61+73.96
61+48.62
60+58.18

TABLE 5A WSPGW MODEL MAINLINE 1 SUMMARY - MAIN1.WSW							
Station*	Invert (ft)	Depth (ft)	WSE (ft)	Q Total (cfs)	Velocity (fps)	Froude	Facility
-9195.67	2666.750	4.619	2671.37	4177	36.17	2.97	EXISTING (2) – 12'X12'RCB
-9165.73	2668.537	9.477	2678.01	4177	31.48	1.80	TRANSITION STRUCTURE
-9119.17	2671.317	10.738	2682.06	4177	27.78	1.49	14'X12' RCB
-9030.84	2672.200	10.624	2682.82	4177	28.08	1.52	14'X12' RCB
-8709.64	2675.412	10.063	2685.48	4177	29.65	1.65	14'X12' RCB
-8668.38	2675.825	9.977	2685.80	4177	29.91	1.67	14'X12' RCB
-8634.80	2676.161	9.904	2686.06	4177	30.13	1.69	14'X12' RCB
-8544.46	2677.064	9.694	2686.76	4177	30.78	1.74	14'X12' RCB
-8492.25	2677.586	9.566	2687.15	4177	31.19	1.78	14'X12' RCB
-7909.64	2683.412	7.828	2691.24	4177	38.11	2.40	14'X12' RCB
-7776.91	2684.766	7.381	2692.15	4177	40.42	2.62	14'X12' RCB
-7745.02	2686.243	7.473	2693.72	4177	39.93	2.57	14'X12' RCB
-7605.95	2692.682	8.017	2700.70	4177	37.22	2.32	14'X12' RCB
-7519.01	2698.724	4.391	2703.12	2476	40.27	3.39	TRANSITION STRUCTURE
-7361.10	2710.678	5.164	2715.84	2476	34.25	2.66	14'X9' RCB
-7235.12	2715.415	5.421	2720.84	2476	32.62	2.47	14'X9' RCB
-7123.51	2719.611	5.794	2725.41	2476	30.52	2.23	14'X9' RCB
-6922.57	2727.166	7.785	2734.95	2476	22.72	1.43	14'X9' RCB
-6835.12	2728.041	7.860	2735.90	2476	22.50	1.41	14'X9' RCB

TABLE 5A
WSPGW MODEL MAINLINE 1 SUMMARY - MAIN1.WSW

Station*	Invert (ft)	Depth (ft)	WSE (ft)	Q Total (cfs)	Velocity (fps)	Froude	Facility
-6748.98	2728.902	7.961	2736.86	2476	22.22	1.39	14'X9' RCB
-6743.98	2728.952	7.647	2736.60	2450	22.88	1.46	14'X9' RCB
-6435.12	2732.041	7.948	2739.99	2450	22.02	1.38	14'X9' RCB
-6191.62	2734.476	8.862	2743.34	2450	19.75	1.17	14'X9' RCB
-6178.96	2734.602	9.000	2743.60	2450	19.44	1.14	14'X9' RCB
-6173.96	2734.651	11.911	2746.56	2130	15.78	0.93	JUNCTION STRUCTURE
-6148.62	2734.902	11.822	2746.72	2130	15.78	0.93	15'x9' RCB
-6138.29	2735.004	11.786	2746.79	2130	15.78	0.93	15'x9' RCB
-6058.18	2735.797	12.026	2747.82	2130	15.78	0.93	15'x9' RCB
-5813.21	2738.222	11.166	2749.39	2130	15.78	0.93	15'x9' RCB
-5759.19	2738.757	11.408	2750.17	2130	15.78	0.93	15'x9' RCB
-5747.19	2738.876	13.460	2752.34	2130	11.83	0.70	TRANSITION STRUCTURE
-5698.19	2739.361	13.129	2752.49	2130	11.83	0.70	20'x9' RCB

*See Figure 8.

TABLE 5B
WSPGW MODEL MAINLINE 2 SUMMARY - MAIN2.WSW

Station*	Invert (ft)	Depth (ft)	WSE (ft)	Q Total (cfs)	Velocity (fps)	Froude	Facility
-7519.01	2698.462	4.749	2703.210	1933	40.71	3.29	10'x8' RCB
-7413.73	2706.021	5.029	2711.050	1933	38.44	3.02	10'x8' RCB
-7319.42	2712.792	5.450	2718.242	1933	35.47	2.68	10'x8' RCB

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TABLE 5B
WSPGW MODEL MAINLINE 2 SUMMARY - MAIN2.WSW

Station*	Invert (ft)	Depth (ft)	WSE (ft)	Q Total (cfs)	Velocity (fps)	Froude	Facility
-7198.35	2721.485	6.644	2728.129	1933	29.10	1.99	10'x8' RCB
-7059.47	2724.374	6.614	2730.988	1933	29.23	2.00	10'x8' RCB
-6981.72	2725.991	6.591	2732.582	1933	29.33	2.01	10'x8' RCB
-6923.10	2727.210	6.571	2733.781	1933	29.42	2.02	10'x8' RCB
-6798.35	2729.805	6.517	2736.322	1933	29.66	2.05	10'x8' RCB
-6749.99	2730.821	6.494	2737.315	1933	29.77	2.06	10'x8' RCB
-6739.89	2731.030	6.488	2737.518	1933	29.79	2.06	10'x8' RCB
-6609.84	2733.736	6.400	2740.136	1933	30.20	2.10	10'x8' RCB
-6526.95	2734.565	6.068	2740.633	1933	31.86	2.28	10'x8' RCB
-6230.91	2740.485	5.194	2745.679	1910	36.77	2.84	10'x8' RCB
-6143.49	2748.869	6.290	2755.159	1910	30.37	2.13	10'x8' RCB
-6094.81	2753.537	8.000	2761.537	1910	23.88	1.49	10'x8' RCB
-6083.24	2754.647	15.899	2770.546	1910	10.61	0.62	TRANSITION STRUCTURE
-6052.25	2757.619	13.190	2770.809	1910	10.61	0.62	20'x9' RCB
-6034.02	2759.370	11.723	2771.094	1910	10.61	0.62	20'x9' RCB

*See Figure 8.

Mainline 1

The approved WSPGW model for the existing dual (2) - 12-foot wide by 12-foot high RCBC (CCRFCD Facility APSO 0000) storm drain downstream of the existing dual (2) - 12-foot wide by 12-foot high RCBC (CCRFCD Facility APSO 0020) at the Rampart Boulevard and Alta Drive intersection has been referenced from the Queens Borough Culvert Study. Please note that the approved Queens Borough Culvert Study referenced a design flow rate of 4,497 cfs from the 2002 MPU. As previously stated, the 2013 MPU shows a flow rate of 4,628 cfs and the proposed conditions HEC-1 model presented in this report shows a proposed 100-year flow rate of 4,672 cfs. The approved Queens Borough Culvert Study WSPGW model has been extended south with this report to include the existing CCRFCD Facility APSO 0020 and the proposed Mainline 1 storm drain. The model also includes the junction where an existing 60-inch RCP and 72-inch RCP connect to APSO 0020 in Rampart Boulevard and the proposed condition flow rates at pertinent HEC-1 nodes. Inverts used in the hydraulic calculations for the existing dual (2) - 12-foot wide by 12-foot high RCBC are based on survey and as-built information. The WSPGW Model Stations from the Queens Borough Culvert Study have been included in the Mainline 1 Model and converted to match the proposed Mainline 1 Stationing. The WSPGW Model Station Conversion has been summarized in Table 6. Pertinent referenced material from the Queens Borough Culvert Study has been included in Appendix C.

TABLE 6
WSPGW MODEL STATION CONVERSION SUMMARY – MAIN1.WSW

WSPGW Stations Referenced from Queens Borough Culvert Study	MAIN 1 WSPGW Stations*
-3625.00	-12270.67
-3550.00	-12195.67
-3500.00	-12145.67
-3401.01	-12046.68
-3350.81	-11996.48
-3325.95	-11971.62
-3315.95	-11961.62
-3225.64	-11871.31
-3223.32	-11868.99
-3152.70	-11798.37
-3135.29	-11780.96

TABLE 6 WSPGW MODEL STATION CONVERSION SUMMARY – MAIN1.WSW	
WSPGW Stations Referenced from Queens Borough Culvert Study	**MAIN 1 WSPGW Stations***
-3049.99	-11695.66
-2906.52	-11552.19
-2433.63	-11079.30
-2318.22	-10963.89
-2200.00	-10845.67
-1733.86	-10379.53
-1565.00	-10210.67
-1000.00	-9645.67

*See Figure 8.

The Mainline 1 model shows the existing CCRFCD Facility APSO 0000 has adequate capacity to convey proposed conditions 100-year storm event flow rates to the existing Angel Park Detention Basin. Proposed flow depths and flow velocities within the existing dual (2) - 12-foot wide by 12-foot high RCB are comparable to the approved Queens Borough Culvert Study Design. Approximately 2,819 linear feet of the proposed Mainline 1 RCB storm drain hydraulic grade line will be more than 1-foot below the RCB soffit between the connection to the dual (2) - 12-foot wide by 12-foot high RCB and approximately 197 linear feet downstream of the junction structure with the two 72-inch RCP laterals that connect to the mainline at WSPGW Station -6176.46. The hydraulic grade line is 2.4 feet to 2.9 feet above the 15-foot wide by 9-foot high RCB mainline for approximately 417 linear feet south of the junction with the two 72-inch RCP laterals that connect to Mainline 1 at WSPGW Station -6176.46. However, the hydraulic grade line will be more than 1-foot below finished grade elevation along the storm drain mainline. The maximum flow velocity of 41.04 feet per second occurs in Mainline 1 at WSPGW Station -7519.00.

Per Section 705.7.1.2 in the Manual, all concrete lining shall have a minimum thickness of 7 inches for flow velocities 30 feet per second and greater. Additionally, the pre-cast RCB will have an additional 1-inch of cover over the rebar and a 6,000 psi concrete strength where velocities exceed 25 feet per second.

Mainline 2

Approximately 1,400 linear feet of the proposed Mainline 2 RCB hydraulic grade line will be more than 1-foot below the RCB soffit.

The maximum flow velocity of 40.71 feet per second occurs in Mainline 2 just upstream of the connection to the Mainline 1 junction structure. Per Section 705.7.1.2 in the Manual, all concrete lining shall have a minimum thickness of 7 inches for flow velocities 30 feet per second and greater. Additionally, the pre-cast RCB will have an additional 1-inch of cover over the rebar and a 6,000 psi concrete strength where velocities exceed 25 feet per second.

WSPGW models have been included for proposed laterals extending to collect flows from future onsite development and existing offsite developments. Please refer to tables on Figure 7 for facility flows and sizes.

The proposed onsite ditches will convey the existing flows with a minimum of 1-foot of freeboard. Maximum slope was selected to verify velocity. Flows from the proposed ditches will be conveyed into the proposed Mainline 1 and 2 storm drain systems. Riprap (Minimum: d_{50} = 12 inches, Thickness = 24 inches) has been provided at the lateral sump locations up to the ponding depth, determined by an inlet control calculation. The inlet control calculations have been provided in Appendix B.

Area drains have been provided to collect flows at some of the sump locations. Calculations for the area drains have been included in Appendix B.

X. FEMA CONDITIONAL LETTER OF MAP REVISION (CLOMR)

Hydrologic Summary

As a part of this project development, a CLOMR and Letter of Map Revision (LOMR) will be processed with FEMA to remap the Special Flood Hazard Area (SFHA) that currently routes through the site.

Since this project re-evaluates the existing hydrologic analysis for the subject wash, the project specific existing and proposed condition hydrologic analysis was used as the

effective hydrologic model to determine peak flow rates for use in establishing the limits of the revised SFHA.

Existing Condition

See Figure 9 - Existing Conditions HEC-RAS X-Section Map. The main wash through the site labeled Main 1 represents the major conveyance corridor for the mapped Zone A SFHA overlaying the site. Several fingers of the SFHA extend out from Main 1, and will be removed from the SFHA with the CLOMR submittal connected with this study since they are either remnant washes cut-off by upstream improvements or ineffective flow areas inundated by flows in the Main 1. Please note that the existing SFHA does not impact existing development.

Main 1

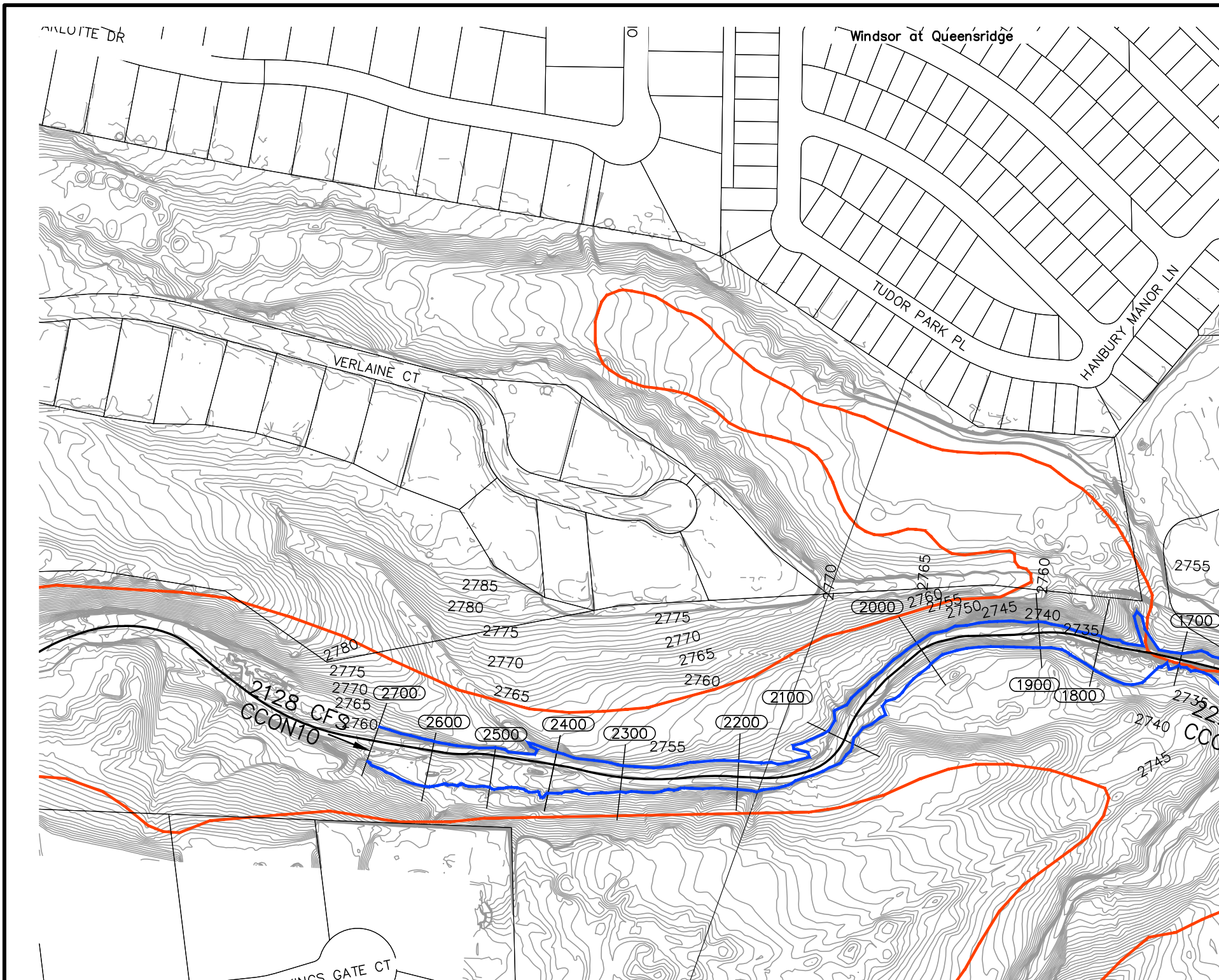
100-Year Flow at Upstream End = 2,128 cfs (Concentration Point CCON10)
This reach will be the remaining conveyance corridor of the mapped SFHA upon completion of the LOMR remapping.

North Finger

100-Year Flow = 195 cfs (Concentration Point CON4)
A finger of SFHA extends up an existing wash north of Main 1 for approximately 1,000 linear feet. Since this wash is a remnant wash, cut off by Hualapai Way and no longer conveying the historical flows originating from west of Hualapai Way, this finger will be removed from the SFHA. The wash located within an existing golf course conveys local drainage areas, and does not impact existing development.

South Finger

100-Year Flow = 368 cfs (Concentration Point CON17)
Similar to the North Finger, a finger of SFHA extends up an existing wash south of Main 1 for approximately 4,000 linear feet. This wash is also a remnant wash, cut off by Hualapai Way and no longer conveying the historical flows originating from west of Hualapai Way, and will be removed from the SFHA. The wash located within an existing golf course conveys local drainage areas, and does not impact existing development.



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Main 2 Finger

100-Year Flow = 1,944 cfs (Concentration Point CON20)

A short finger extends south near the downstream end of the project at Rampart Boulevard for approximately 300 linear feet. This finger is located completely with the developed portion of the site and will be removed from the SFHA. The flows in this wash will be conveyed and contained in the Mainline 2 underground storm drain to Rampart Boulevard.

Several flow changes occur in the Main 1 wash as the above mentioned fingers combine with Main 1. Table 7 summarizes the effective flow rates used through the Main 1 wash to establish the effective water surface elevations through the Main 1 SFHA used to compare with the proposed condition water surface elevations.

TABLE 7
EFFECTIVE FLOW RATES – MAIN 1 WASH

HEC-RAS River Station*	Effective Flow Rate (cfs)
2700	2,128
1700	2,227
1500	2,472
800	2,493
500	4,209

*See Figure 9.

Proposed Condition

See Figure 10 - Proposed Conditions HEC-RAS X-Section Map and Figure 11 - CLOMR Workmap. In the proposed condition, the portion within the project site will be contained within underground storm drain. The proposed floodplain will tie into the existing floodplain approximately 700 linear feet west of the project site as shown on the CLOMR Workmap. Table 8 summarizes the effective flow rates used through the Main 1 wash to establish the effective water surface elevations through the Main 1 SFHA used to compare to proposed condition water surface elevations.

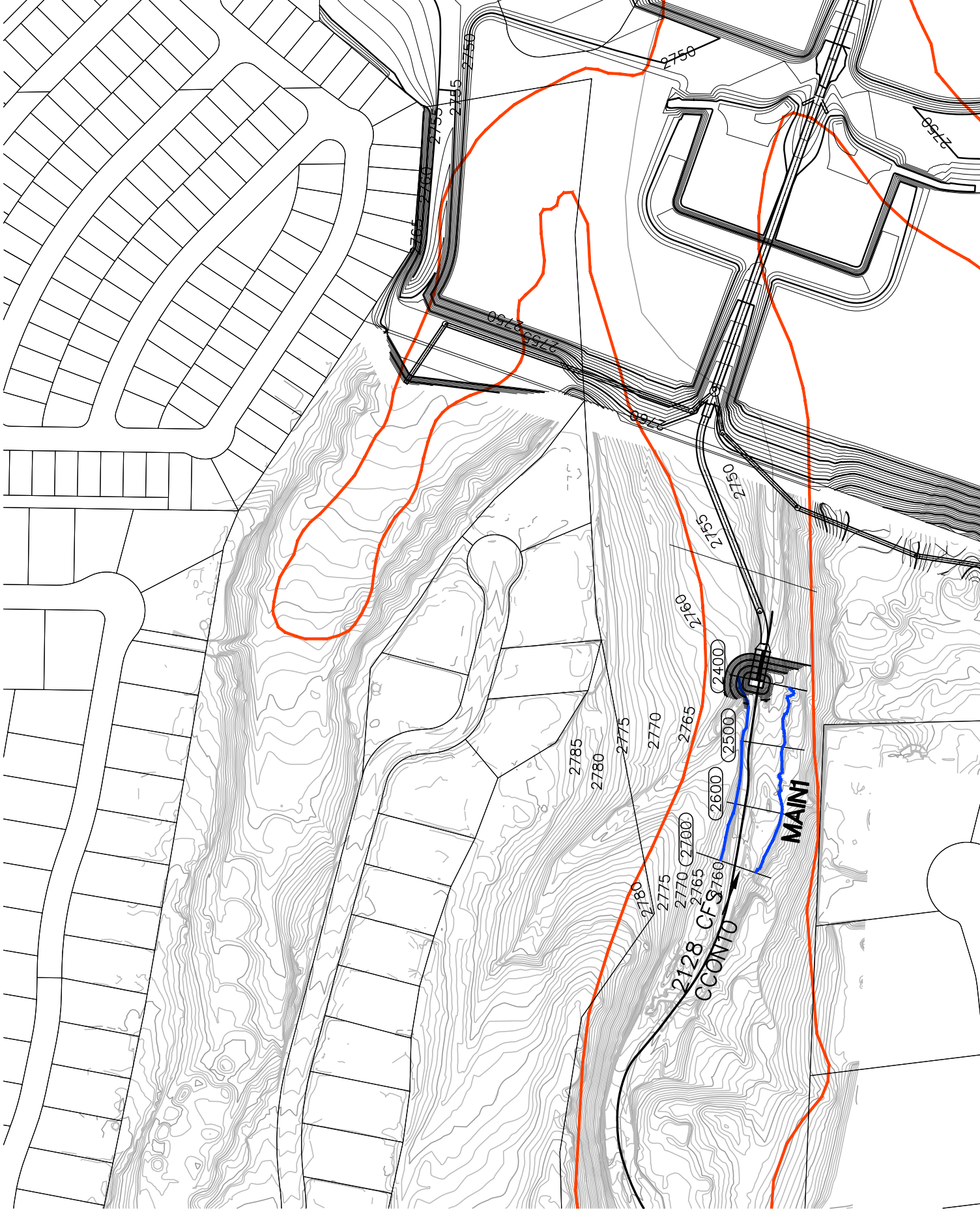

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TABLE 8 EFFECTIVE FLOW RATES – MAIN 1 WASH AND RCB		
HEC-RAS River Station*	**WSPGW Station****	**Effective Flow Rate (cfs)**
2700	-	2,128
-	-5698.19	2,132
-	-6194.12	2,452
-	-6702.00	2,478
-	-7588.63	4,179

*See Figure 10.
**See Figure 11.

Hydraulic Modeling

Hydraulic modeling for the proposed channel improvements were performed within the U.S. Army Corps of Engineers HEC-RAS River Analysis System computer program version 4.1.0 (Reference 9). The HEC-RAS model outputs have been provided in Appendix B. Electronic copies of the models have been included on CD.

Existing Condition

The limits of the hydraulic modeling of Main 1 begins approximately 700 feet upstream of the western property line at Station 2700 and extend approximately 3,900 linear feet, east through an unnamed wash through an existing golf course, and terminating at the existing dual (2) - 12-foot wide by 12-foot high RCBCs at the intersection of Rampart Boulevard and Alta Drive at Station 200. This project re-evaluates the existing hydraulic analysis of the unnamed wash. The base cross section geometry used in the hydraulic modeling was determined from existing topography with 1-foot contour intervals. A "sub-critical" flow regime was analyzed for the wash. The starting water surface elevation of 2684.83 feet at Station 200 was determined based on a culvert inlet control calculation at the existing dual (2) - 12-foot wide by 12-foot high RCBCs at the intersection of Rampart Boulevard and Alta Drive (WSE = Invert of pipe + headwater depth = 2666.75 feet + 18.08 feet = 2684.83 feet). A copy of the inlet control calculation has been included in Appendix B.

Proposed Condition

The proposed improvements along the unnamed wash extend between Main 1 Stations 200 and 2400. The improvements consist of reinforced concrete box storm drain through the length of the project and tie into the existing dual (2) - 12-foot wide by 12-foot high RCB at the intersection of Rampart Boulevard and Alta Drive.

HEC-RAS was utilized for open channel and wash portions of the analysis. WSPGW was utilized to evaluate the water surface profile through proposed storm drain. The WSPGW computer program was selected to evaluate the storm sewer system in lieu of HEC-RAS due to its more relevant modeling approach for storm drain systems. Supporting WSPGW hydraulic models are included in Appendix B.

The resulting comparison between existing and proposed condition water surface elevations through the project are summarized in Table 9.

TABLE 9
MAIN 1 WASH - WATER SURFACE ELEVATION COMPARISON TABLE

Existing Condition				Proposed Condition			
Sta*	Q (cfs)	FL Elevation (ft)	W.S. Elevation (ft)	Q (cfs)	FL Elevation (ft)	W.S. Elevation (ft)	Rise in Water Surface Elevation Due to Development (ft)
2700	2,128	2756.00	2760.89	2,128	2756.00	2760.90	0.01
2600	2,128	2752.00	2758.31	2,128	2752.00	2758.31	0.00
2500	2,128	2748.00	2754.37	2,128	2748.00	2754.39	0.02
2400	2,128	2747.00	2751.80	2,128	2739.36	2752.49	0.69
2300	2,128	2744.00	2749.36				
2200	2,128	2740.00	2745.49				
2100	2,128	2736.00	2742.08				
2000	2,128	2729.00	2735.65				
1900	2,128	2724.00	2733.14				
1800	2,128	2719.00	2732.45				
1700	2,227	2716.00	2728.08				
1600	2,227	2711.00	2725.34				
1500	2,472	2707.00	2720.77	1% Annual Chance Flood Discharge Contained in Storm Drain			
1400	2,472	2702.00	2713.84				
1300	2,472	2699.00	2704.43				
1200	2,472	2695.00	2700.84				
1100	2,472	2691.00	2697.30				
1000	2,472	2687.00	2692.52				
900	2,472	2683.00	2689.15				
800	2,493	2679.00	2685.65				
700	2,493	2676.00	2685.62				
600	2,493	2674.00	2685.89				

TABLE 9
MAIN 1 WASH - WATER SURFACE ELEVATION COMPARISON TABLE

Existing Condition				Proposed Condition			
Sta*	Q (cfs)	FL Elevation (ft)	W.S. Elevation (ft)	Q (cfs)	FL Elevation (ft)	W.S. Elevation (ft)	Rise in Water Surface Elevation Due to Development (ft)
500	4,209	2672.00	2685.74				
400	4,209	2671.00	2685.77				
300	4,209	2669.00	2685.77				
200	4,209	2668.00	2684.83				

*See Figures 9 and 10.

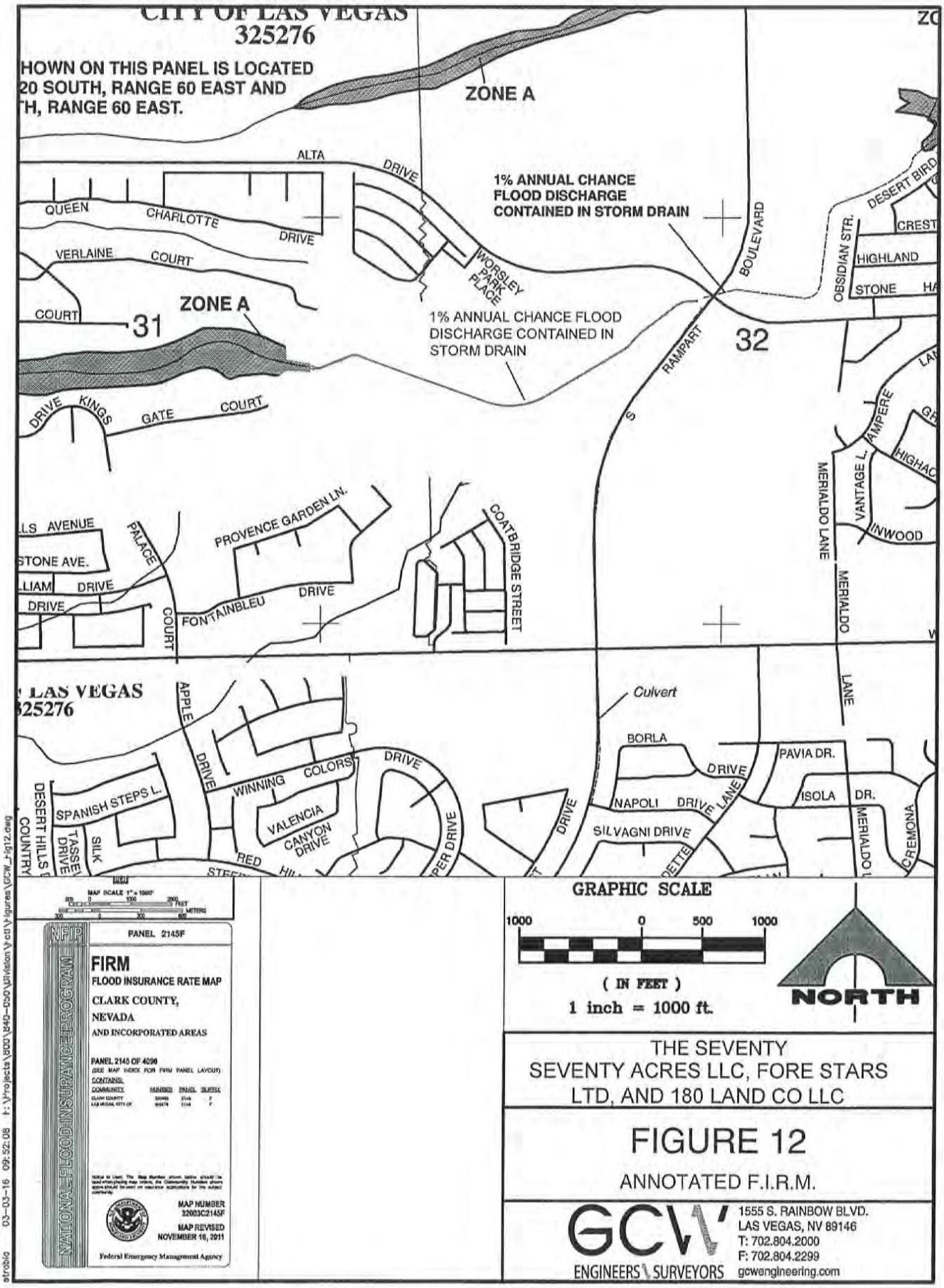
As shown in the table, the proposed improvements tie into the existing water surface elevation at the upstream end and tie into the existing storm drain facility at the downstream end that contains the 1% chance annual flood. The proposed water surface elevations do not exceed the existing water surface elevations by more than 1-foot, or are entirely contained within the proposed storm drain facility.

Mapping

The Effective FIRM is shown on Figure 3. The proposed revisions to the Effective FIRM take into account the proposed improvements along the unnamed wash and within the project. The improvements affect the Zone A area.

The upstream tie-in to the Effective FIRM Zone A is located at Station 2700. The upstream tie-in was based on a smooth transition from the proposed floodplain width to the effective floodplain width. The downstream tie-in to the Effective FIRM Zone A is located at the existing dual (2) - 12-foot wide by 12-foot high RCBCs at the intersection of Rampart Boulevard and Alta Drive at Station 200 where the 1% annual chance flood discharge is contained in storm drain downstream of the project site. The proposed FIRM revisions and tie-in locations are shown on Figure 11 - CLOMR Workmap and Figure 12 - Annotated FIRM.

In general, the proposed site grading and storm drain improvements are in conformance with existing drainage patterns and flow values presented in the 2013 MPU and Queens Borough Culvert Study. Therefore, the proposed project will not adversely impact any downstream properties or facilities.



THE SEVENTY
SEVENTY ACRES LLC, FORE STARS
LTD, AND 180 LAND CO LLC

FIGURE 12

ANNUAL F.I.R.M.

GCW ENGINEERS \ SURVEYORS
1555 S. RAINBOW BLVD.
LAS VEGAS, NV 89146
T: 702.804.2000
F: 702.804.2299
gcwengineering.com

atrobio 03-03-16 09:52:08 I:\Projects\BDD\1340-050\Division V\ctl V-figures\GCW_Fig12.dwg

XI. CONCLUSIONS AND RECOMMENDATIONS

1. Methodology used in this report is in compliance with Clark County Regional Flood Control District (CCRFCD) criteria.

2. The project site is located within a FEMA-designated Special Flood Hazard Area (SFHA) Zone A. However, the 100-year flow (1% annual chance flood discharge) is contained within the proposed RCBs (Mainline 1 and Mainline 2) that transverse the site. Since the flows will be contained within the proposed RCBs, a CLOMR will be obtained from FEMA and a LOMR will be obtained from FEMA once construction of the facilities are substantially complete and functional.

3. CCRFCD Facilities to be constructed with this project include: APSO 0050, APSO 0067 and APP2 0000.

4. The proposed improvements connect to existing CCRFCD Facility APSO 0020.

5. Recommended storm drain facilities proposed with the project are shown on the attached grading plans.

6. The proposed storm drain will vary in size ranging from 18-inch RCP to 72-inch RCP and 10-foot wide by 8-foot high RCB to 14-foot wide by 12-foot high RCB connecting to the existing Rampart Boulevard dual (2) – 12-foot wide by 12-foot high RCB culverts.

7. Methods used to calculate storm runoff and size facilities are in compliance with the Manual.

8. Proposed facilities have been sized based on proposed conditions flow rates.

9. Detailed hydraulic modeling of the proposed Mainline 1 and Mainline 2 from the western boundary of the project site to the existing culverts in Rampart Boulevard shows that the design flows will be contained within the proposed RCBs. The design flows are based on the Proposed Conditions HEC-1 Model flow of 4,673 cfs. The proposed RCB will convey the Proposed Conditions flow with freeboard.

10. Flows conveyed within the onsite Mainline 1 RCB will be discharged into the existing dual (2) – 12-foot wide by 12-foot high RCBs in Rampart Boulevard located at the northeast corner of the project site.

11. Onsite storm drain laterals have been provided as part of this package to provide for future development of The Seventy and The Two Fifty.

12. Proposed onsite ditches/berms will convey onsite flows to be collected and conveyed by the proposed storm drain laterals.

13. Onsite area drains will be connected to the proposed onsite storm drain system that connects into the dual (2) - 12-foot wide by 12-foot high RCBCs.

14. All future onsite finished floors will be designed as required by CLV Criteria.

15. The emergency overflow path for the project will be Rampart Boulevard.

16. The general drainage patterns and flow rates are in general agreement with those specified in the 2013 MPU and the previous Queens Borough Culvert Study.

17. Runoff generated from, or conveyed by, the project will not adversely impact any downstream properties and facilities.

XII. REFERENCES

1. G. C. Wallace, *Technical Drainage Study for Queens Borough Culvert,* August 2005.

2. G. C. Wallace, *Update to the Technical Drainage Study for Queens Borough Culvert,* December 2005.

3. G. C. Wallace, *Update #2 to the Technical Drainage Study for Queens Borough Culvert,* April 2006.

4. *CCRFCD 2013 Las Vegas Valley Flood Control Master Plan Update*, 2013.

5. Clark County Regional Flood Control District (CCRFCD) *Hydrologic Criteria and Drainage Design Manual.* August 1999.

6. U.S. Army Corps of Engineers, *HEC-1 Flood Hydrograph Package.* June 1998.

7. U. S. Department of Agriculture & National Resource Conservation Service, *Soil Survey of Las Vegas Valley Area, Nevada, Part of Clark County.* August 2014. Version 10.

8. U. S. Army Corps of Engineers, WSPGW *Water Surface Pressure Gradient Package.* Version 12.99. 1991-2000.

9. U.S. Army Corps of Engineers, *HEC-RAS River Analysis System.* January 2010. Version 4.1.0.

THE SEVENTY
APPENDIX LAYOUT

Appendix A. Hydrologic Calculations and Information

1. Figure 513 – McCarran Airport Rainfall Area
2. Figure 506 – Rainfall Depth-Duration-Frequency 100-Year, 6-Hour
3. Figure 503 – Rainfall Depth-Duration-Frequency 10-Year, 6-Hour
4. Table 501 – Precipitation Adjustment Ratios
5. Rainfall Exhibits
6. Custom Soils Resource Report
7. Table 602 – 1 of 4 from the CCRFCD Manual
8. Table 602A
9. Revised 2013 MPU Curve Number Matrix
10. Composite Curve Number Calculations
11. Land Plan Exhibit
12. Existing Conditions Standard Form 4
13. Existing Conditions HEC-1 Model
14. Proposed Conditions Standard Form 4
15. Proposed Conditions HEC-1 Model
16. Exhibit A

Appendix B. Hydraulic Calculations and Information

1. Rough Grade Ditch Calculations
2. Conceptual Storm Drain Normal Depth Calculations
3. WSPGW
   a. Queens Borough Culvert to Main 1 WSPGW Station Conversion
   b. Mainline 1
   c. Mainline 1 Laterals
   d. Mainline 2
   e. Mainline 2 Laterals
4. HEC-RAS
   a. Existing Conditions
      i. Main 1
      ii. Main 2
   b. Proposed Conditions
      i. Main 1
      ii. Main 2
5. Area Drain Calculation
6. Inlet Control Calculations
7. D-Load Calculations

Appendix C. Referenced Material (On CD)

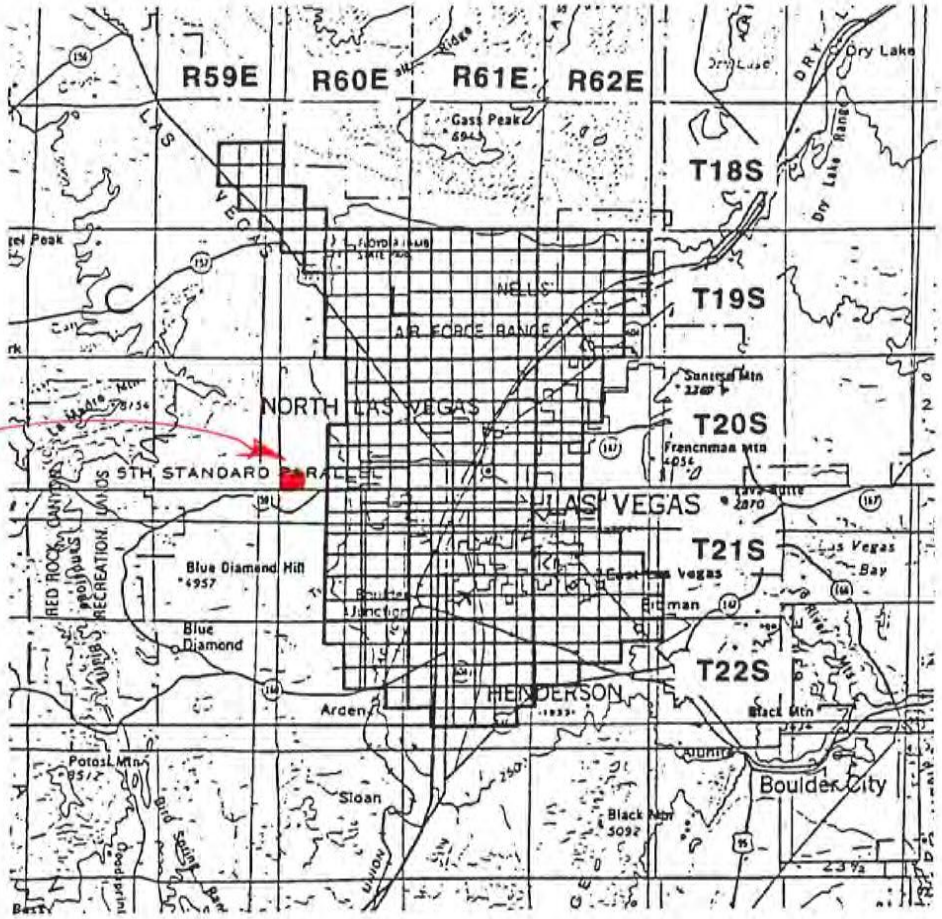
1. Referenced Studies and Grading Plans Received From CLV
2. Technical Drainage Study for Queens Borough Culvert Update 2 Supplement
   a. City of Las Vegas Approval Letter
   b. Supplement Letter
   c. WSPGW Model
   d. Improvement Plans
3. 2013 Las Vegas Valley Flood Control Master Plan Update
   a. ALLGOW3 HEC-1 Model Excerpt

b. Figure H-29
c. Figure H-30
4. LOMR Case No. 06-09-BF86P
5. LOMR Case No. 06-09-B483P
6. Improvement Plans from One Queensridge Place (Sheet C10.03)
7. Improvement Plans from Rampart Boulevard (Sheet SD-5)

APPENDIX A

Hydrologic Information

McCARRAN AIRPORT RAINFALL AREA



TOWNSHIP	RANGE	SECTIONS	TOWNSHIP	RANGE	SECTIONS
18 South	59 East	13-15,22-26,36	20 South	62 East	4-9,16-20,29-32
18 South	60 East	30-32	21 South	60 East	1-4,9-16,21-28,33-36
19 South	60 East	1-6,8-16,21-28,33-36	21 South	61 East	ALL SECTIONS
19 South	61 East	ALL SECTIONS	21 South	62 East	4-9,15-23, 25-36
19 South	62 East	2-11,14-23,27-34	22 South	60 East	1-4,10-15,24
20 South	60 East	1-3,10-15,21-28,33-36	22 South	61 East	1-24,26-29
20 South	61 East	ALL SECTIONS	22 South	62 East	1-10,17-18

Notes:
1. Refer to Table 505 and Figure 516 Depth-Duration- Frequency values in the McCarran Airport Rainfall Area.
2. Refer to Table 506 and Figure 517 for Time-Intensity-Frequency values on the McCarran Airport Rainfall Area.

Revision	Date

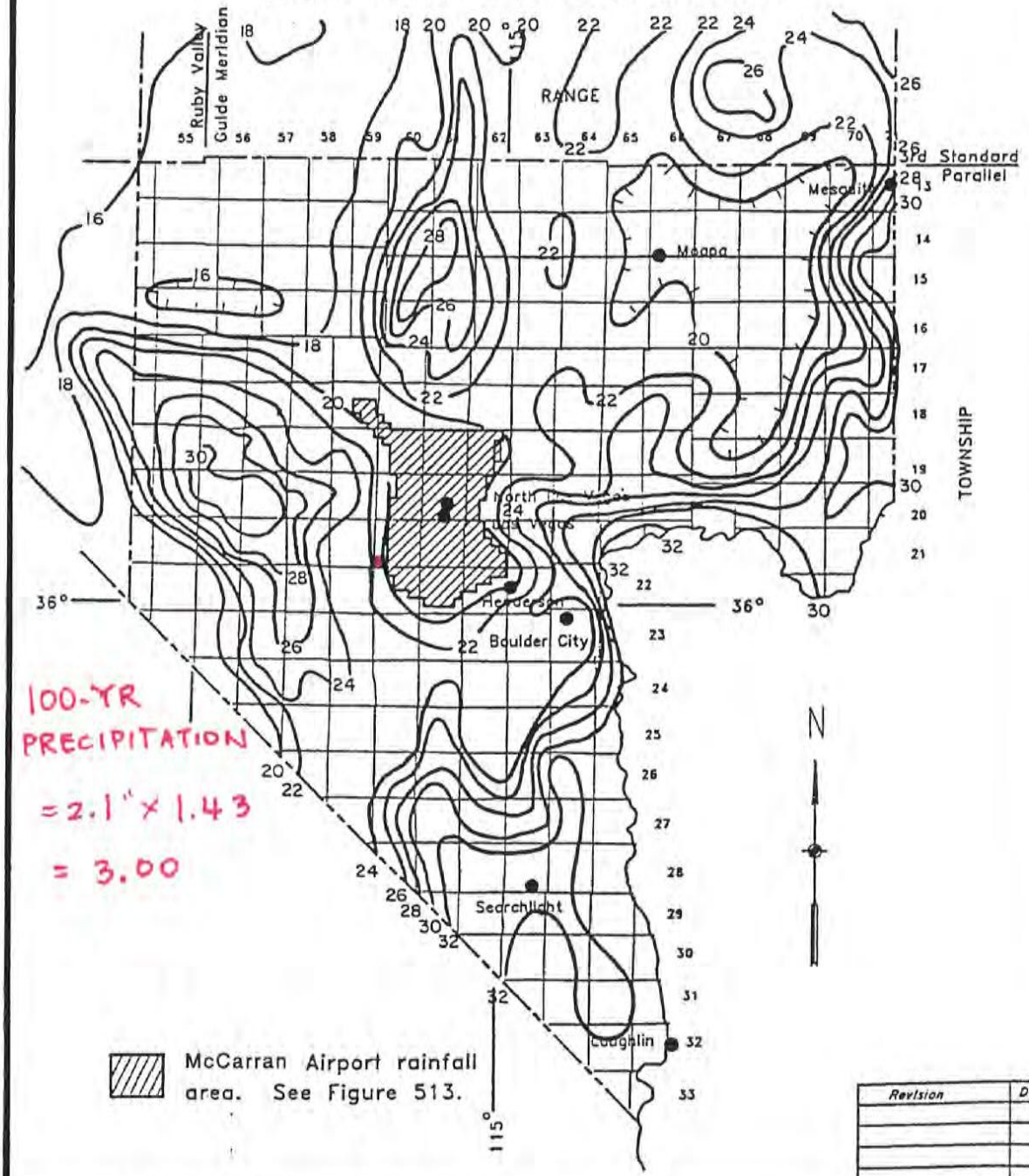
WRC ENGINEERING

REFERENCE:
USACE, Los Angeles District, 1988

FIGURE 513

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

RAINFALL DEPTH-DURATION-FREQUENCY
100-YEAR, 6-HOUR
(DEPTHS IN TENTHS OF INCHES)

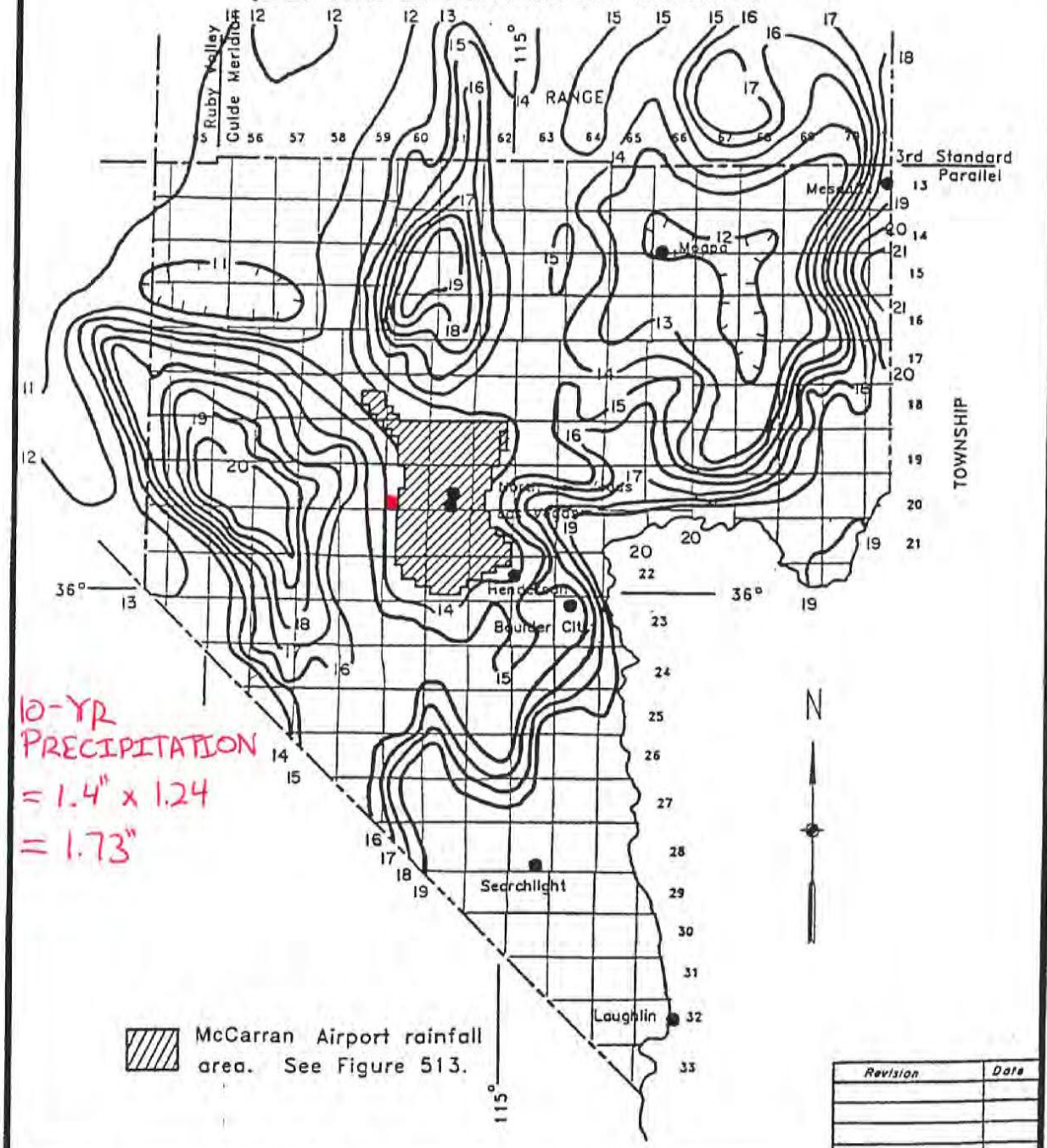


Revision	Date

WRC ENGINEERING	REFERENCE: NOAA ATLAS 2, VOLUME VII NEVADA, 1973	FIGURE 506

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

RAINFALL DEPTH-DURATION-FREQUENCY
10-YEAR, 6-HOUR
(DEPTHS IN TENTHS OF INCHES)



10-YR
PRECIPITATION
= 1.4" x 1.24
= 1.73"

Revision	Date

WRC ENGINEERING	REFERENCE: NOAA ATLAS 2, VOLUME VII NEVADA, 1973	FIGURE 503

PRECIPITATION ADJUSTMENT RATIOS

Recurrence Interval	Ratio to NOAA Atlas 2
2-year	1.00
5-year	1.16
10-year	1.24
25-year	1.33
50-year	1.39
100-year	1.43

1.24 × 1.4 = 1.73

1.43 × 2.1 = 3.00

$\frac{1.73}{3.00} = 0.57$

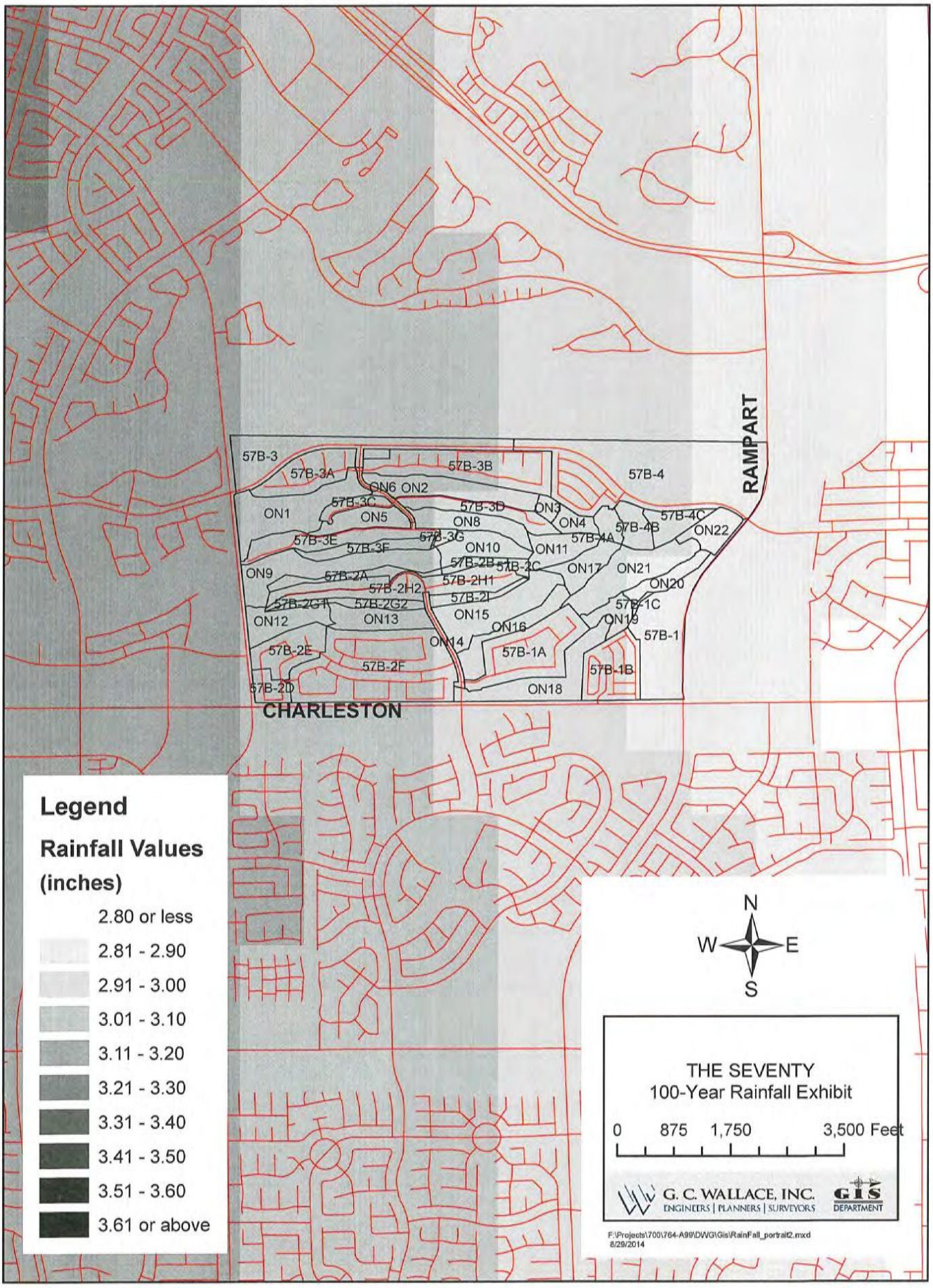
NOTE: 1. Multiply the values obtained from the NOAA Atlas 2 by the above ratios to obtain the adjusted precipitation values.

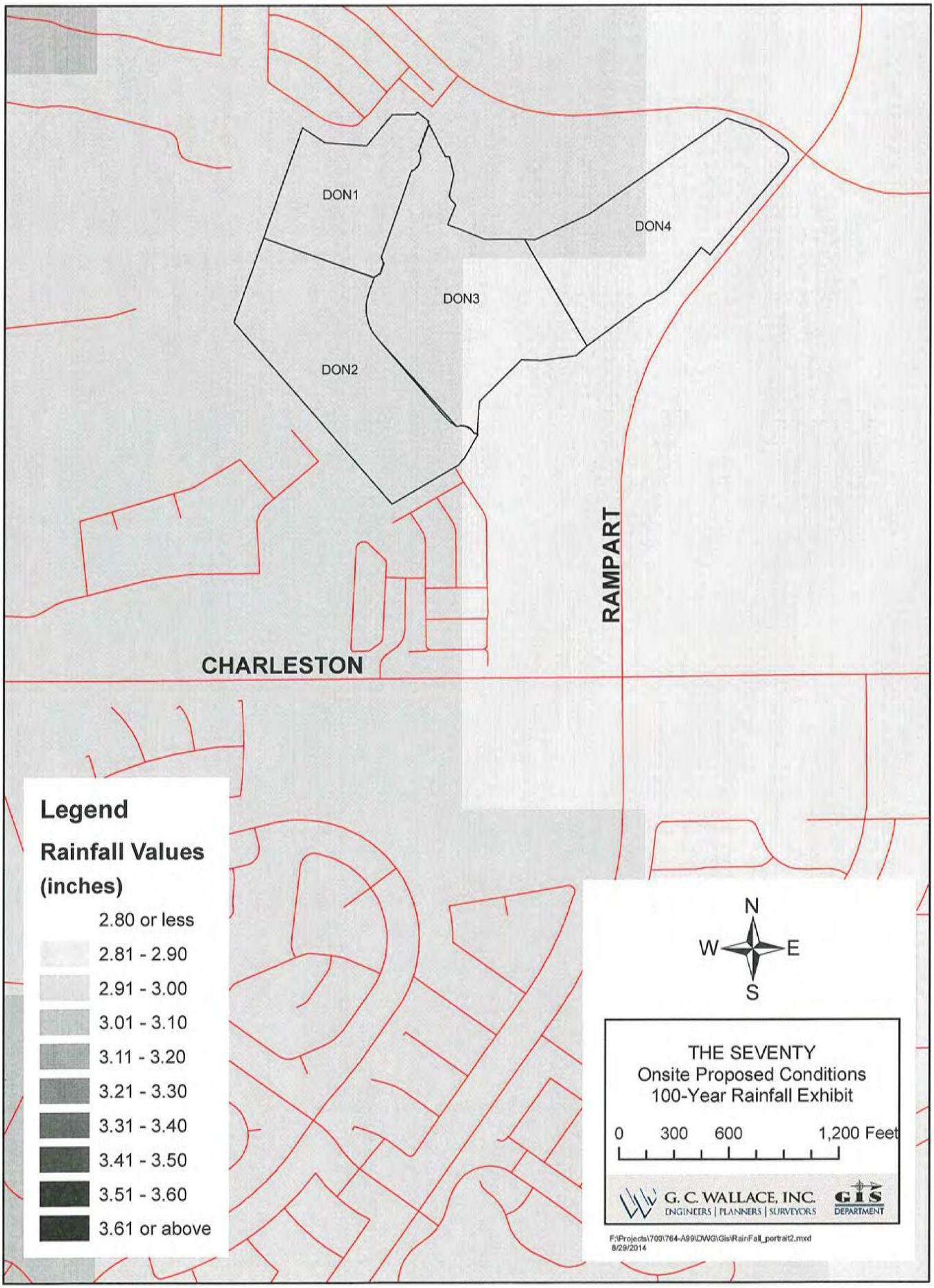
2. NOAA Atlas 2 values for use with TR-55 shall not be adjusted by the above ratios.

3. Tables 505 and 506 require no adjustments.

Revision	Date

WRC ENGINEERING	REFERENCE: USACE, Los Angeles District, 1988	TABLE 501


RAMPART
CHARLESTON
57B-3
57B-3A
57B-3B
57B-4
ON6 ON2
57B-3C
57B-3D
ON3
ON1
ON5
ON8
ON4
57B-4B
57B-4C
ON22
57B-3E
57B-3F
57B-3G
ON10
ON11
57B-4A
57B-2B
57B-2C
ON17
ON21
ON9
57B-2A
57B-2H2
57B-2H1
ON20
57B-2G1
57B-2G2
57B-2I
57B-1C
ON12
ON13
ON15
ON16
ON19
57B-1
ON14
57B-2E
57B-1A
57B-2F
57B-1B
57B-2D
ON18
Legend
Rainfall Values
(inches)
2.80 or less
2.81 - 2.90
2.91 - 3.00
3.01 - 3.10
3.11 - 3.20
3.21 - 3.30
3.31 - 3.40
3.41 - 3.50
3.51 - 3.60
3.61 or above
N
W
E
S
THE SEVENTY
100-Year Rainfall Exhibit
0
875
1,750
3,500 Feet
G. C. WALLACE, INC.
ENGINEERS | PLANNERS | SURVEYORS
GIS
DEPARTMENT
F:\Projects\700\764-A99\DWG\Gis\RainFall_portrait2.mxd
8/29/2014


DON1
DON2
DON3
DON4
RAMPART
CHARLESTON
Legend
Rainfall Values
(inches)
2.80 or less
2.81 - 2.90
2.91 - 3.00
3.01 - 3.10
3.11 - 3.20
3.21 - 3.30
3.31 - 3.40
3.41 - 3.50
3.51 - 3.60
3.61 or above
N
W
E
S
THE SEVENTY
Onsite Proposed Conditions
100-Year Rainfall Exhibit
0 300 600 1,200 Feet
G. C. WALLACE, INC.
ENGINEERS | PLANNERS | SURVEYORS
GIS DEPARTMENT
F:\Projects\700\764-A99\DWG\Gis\RainFall_portrait2.mxd
8/29/2014

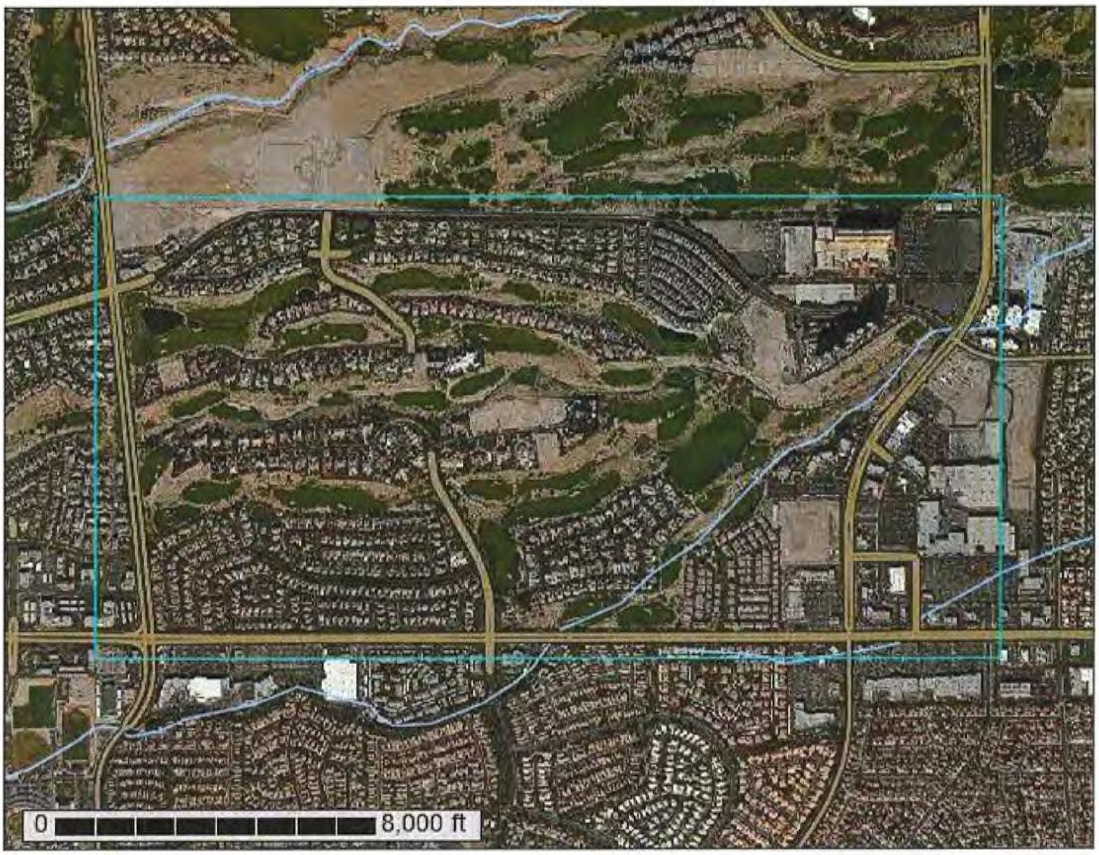
United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Las Vegas Valley Area, Nevada, Part of Clark County



February 3, 2016

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (http://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the

individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Las Vegas Valley Area, Nevada, Part of Clark County
Survey Area Data: Version 10, Aug 22, 2014

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: May 7, 2011—Feb 25, 2014

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Las Vegas Valley Area, Nevada, Part of Clark County (NV788)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
152	Cave gravelly fine sandy loam, 0 to 4 percent slopes	867.7	100.0%
Totals for Area of Interest		**867.7**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas.* Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Las Vegas Valley Area, Nevada, Part of Clark County

152—Cave gravelly fine sandy loam, 0 to 4 percent slopes

Map Unit Setting

National map unit symbol: hr9v
Elevation: 2,000 to 4,800 feet
Mean annual precipitation: 4 to 12 inches
Mean annual air temperature: 57 to 70 degrees F
Frost-free period: 180 to 280 days
Farmland classification: Not prime farmland

Map Unit Composition

Cave and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Cave

Setting

Landform: Fan remnants
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Mixed alluvium

Typical profile

H1 - 0 to 12 inches: gravelly fine sandy loam
H2 - 12 to 36 inches: indurated
H3 - 36 to 60 inches: very gravelly sandy loam

Properties and qualities

Slope: 0 to 4 percent
Depth to restrictive feature: 4 to 20 inches to petrocalcic
Natural drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 40 percent
Gypsum, maximum in profile: 5 percent
Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 12.0
Available water storage in profile: Very low (about 1.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: D
Other vegetative classification: LIMY 3-5" P.Z. (030XB019NV_3)

Soil Information for All Uses

Soil Reports

The Soil Reports section includes various formatted tabular and narrative reports (tables) containing data for each selected soil map unit and each component of each unit. No aggregation of data has occurred as is done in reports in the Soil Properties and Qualities and Suitabilities and Limitations sections.

The reports contain soil interpretive information as well as basic soil properties and qualities. A description of each report (table) is included.

Soil Physical Properties

This folder contains a collection of tabular reports that present soil physical properties. The reports (tables) include all selected map units and components for each map unit. Soil physical properties are measured or inferred from direct observations in the field or laboratory. Examples of soil physical properties include percent clay, organic matter, saturated hydraulic conductivity, available water capacity, and bulk density.

Engineering Properties (Badlands)

This table gives the engineering classifications and the range of engineering properties for the layers of each soil in the survey area.

Hydrologic soil group is a group of soils having similar runoff potential under similar storm and cover conditions. The criteria for determining Hydrologic soil group is found in the National Engineering Handbook, Chapter 7 issued May 2007(http://directives.sc.egov.usda.gov/OpenNonWebContent.aspx?content=17757.wba). Listing HSGs by soil map unit component and not by soil series is a new concept for the engineers. Past engineering references contained lists of HSGs by soil series. Soil series are continually being defined and redefined, and the list of soil series names changes so frequently as to make the task of maintaining a single national list virtually impossible. Therefore, the criteria is now used to calculate the HSG using the component soil properties and no such national series lists will be maintained. All such references are obsolete and their use should be discontinued. Soil properties that influence runoff potential are those that influence the minimum rate of infiltration for a bare soil after prolonged wetting and when not frozen. These properties are depth to a seasonal high water table, saturated hydraulic conductivity after prolonged wetting, and depth to a layer with a very slow water transmission rate. Changes in soil properties caused by land management or climate changes also cause the hydrologic

soil group to change. The influence of ground cover is treated independently. There are four hydrologic soil groups, A, B, C, and D, and three dual groups, A/D, B/D, and C/D. In the dual groups, the first letter is for drained areas and the second letter is for undrained areas.

The four hydrologic soil groups are described in the following paragraphs:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

Depth to the upper and lower boundaries of each layer is indicated.

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is 15 percent or more, an appropriate modifier is added, for example, "gravelly."

Classification of the soils is determined according to the Unified soil classification system (ASTM, 2005) and the system adopted by the American Association of State Highway and Transportation Officials (AASHTO, 2004).

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to particle-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, CL-ML.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of particle-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number.

Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest.

Rock fragments larger than 10 inches in diameter and 3 to 10 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an ovendry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

References:

American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.

American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.

Absence of an entry indicates that the data were not estimated. The asterisk '*' denotes the representative texture; other possible textures follow the dash. The criteria for determining the hydrologic soil group for individual soil components is found in the National Engineering Handbook, Chapter 7 issued May 2007(http://directives.sc.egov.usda.gov/OpenNonWebContent.aspx?content=17757.wba).

Engineering Properties–Las Vegas Valley Area, Nevada, Part of Clark County														
Map unit symbol and soil name	Pct. of map unit	Hydrologic group	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
					Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
			In				*Pct*	*Pct*					*Pct*	
152—Cave gravelly fine sandy loam, 0 to 4 percent slopes														
Cave	100	D	0-12	Gravelly fine sandy loam	SC-SM, SM	A-2, A-4	0- 0- 0	0- 3- 5	70-80-90	60-68-75	40-53-65	25-33-40	15-20 -25	NP-3 -5
			12-36	Indurated	—	—	—	—	—	—	—	—	—	—
			36-60	Gravelly loamy sand, very gravelly sandy loam	GM, GP-GM, SM, SP-SM	A-1, A-2	0- 0- 0	0- 3- 5	35-55-75	30-45-60	20-28-35	10-20-30	0-8 -15	NP

References

American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.

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United States Department of Agriculture, Natural Resources Conservation Service. National forestry manual. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/home/?cid=nrcs142p2_053374

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United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210. http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052290.pdf

RUNOFF CURVE NUMBERS
(URBAN AREAS[1])

Cover description		Curve numbers for hydrologic soil group—			
Cover type and hydrologic condition	Average percent impervious area[2]	A	B	C	D
Fully developed urban areas (vegetation established)					
Open space (lawns, parks, golf courses, cemeteries, etc.)[3]:					
Poor condition (grass cover < 50%)		68	79	86	89
Fair condition (grass cover 50% to 75%)		49	69	79	84
Good condition (grass cover > 75%)		39	61	74	80
Impervious areas:					
Paved parking lots, roofs, driveways, etc. (excluding right-of-way)		98	98	98	98
Streets and roads:					
Paved; curbs and storm sewers (excluding right-of-way)		98	98	98	98
Paved; open ditches (including right-of-way)		83	89	92	93
Gravel (including right-of-way)		76	85	89	91
Dirt (including right-of-way)		72	82	87	89
Western desert urban areas:					
Natural desert landscaping (pervious areas only)[4]		63	77	85	88
Artificial desert landscaping (impervious weed barrier, desert shrub with 1- to 2-inch sand or gravel mulch and basin borders)		96	96	96	96
Urban districts:					
Commercial and business	85	89	92	94	95
Industrial	72	81	88	91	93
Residential districts by average lot size:					

See Table 602A

Developing urban areas					
Newly graded areas (pervious areas only, no vegetation)[5]		77	86	91	94

1 Average runoff condition, and $I_a = 0.2S$.

2 The average percent impervious area shown was used to develop the composite CN's. Other assumptions are as follows: impervious areas are directly connected to the drainage system. Impervious areas have a CN of 98, and pervious areas are considered equivalent to open space in good hydrologic condition. CN's for other combinations of conditions may be computed using Figure 603.

3 CN's shown are equivalent to those of pasture. Composite CN's may be computed for other combinations of open space cover type.

4 Composite CN's for natural desert landscaping should be computed using Figure 603 based on the impervious area percentage (CN #98) and the pervious area CN. The pervious area CN's are assumed equivalent to desert shrub in poor hydrologic condition.

5 Composite CN's to use for the design of temporary measures during grading and construction should be computed using Figure 603 based on the degree of development impervious area percentage) and the CN's for the newly graded pervious areas.

Revision	Date

RUNOFF CURVE NUMBERS - RESIDENTIAL DISTRICTS

Average Lot Size or Usage[1]	Percent Impervious[2]	Curve Number for Hydrologic Soil Groups			
		A	B	C	D
Apartments/Condos	72	81	88	91	93
Townhouses/6,000 sq ft lots or less[3]	69	80	87	90	92
7,000 sq ft lots	63	76	84	89	91
8,000 sq ft lots	58	73	82	88	90
10,000 sq ft lots	38	61	75	83	87
14,000 sq ft lots	30	57	72	81	86
20,000 sq ft lots	25	54	70	80	85
40,000 sq ft lots	20	51	68	79	84
80,000 sq ft lots	12	46	65	77	82

1 Lot size should represent the size of the average lot and not the gross acreage divided by the number of lots.
2 Actual percent impervious value should be compared to selected land use type.
3 In cases where average residential lots are smaller than 6,000 sq ft, commercial/business/industrial land use should be used.

Revision	Date

REFERENCE:

TABLE 602A

Curve Number Matrix

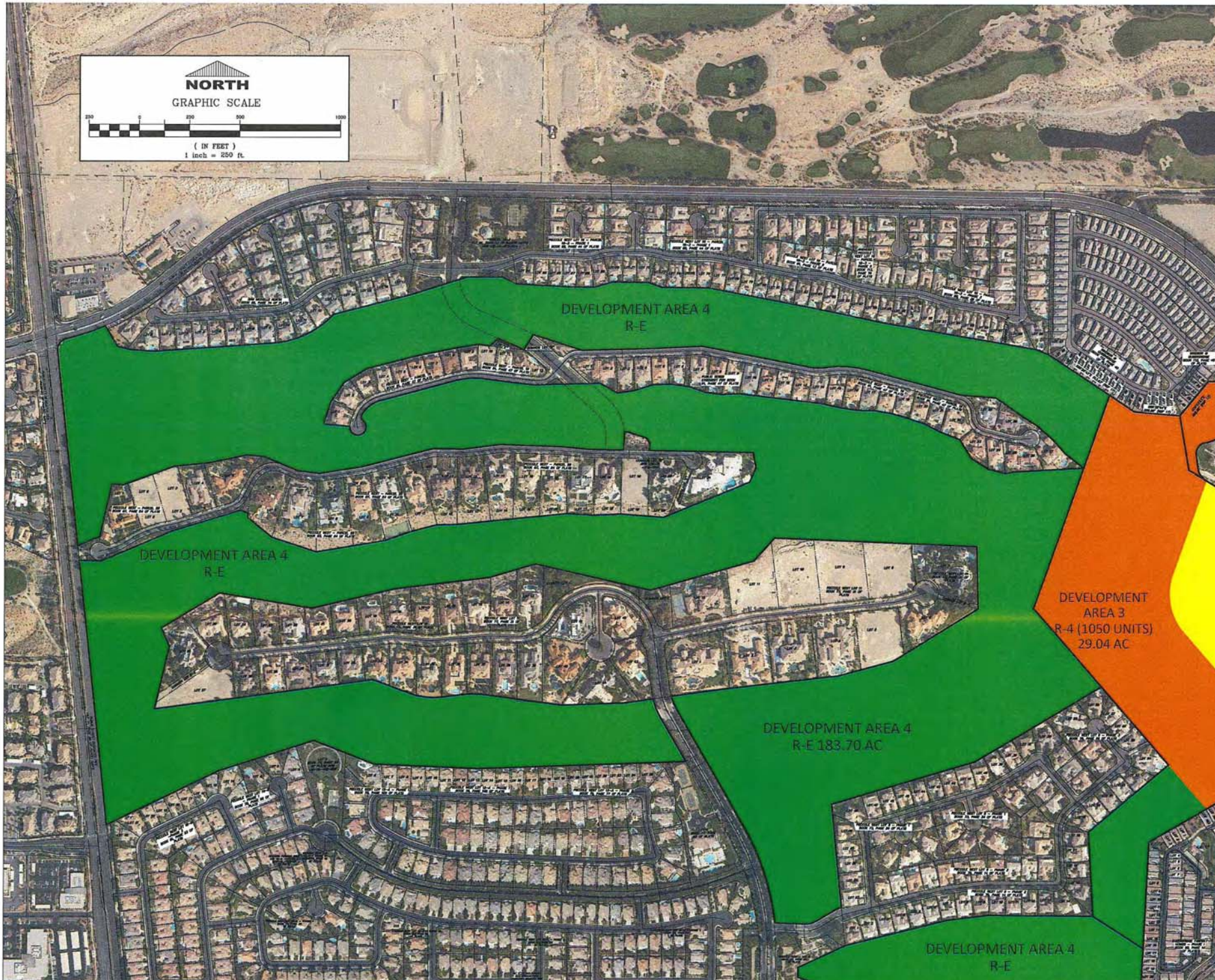
MAP #	COMPONENTS			LAND USE CLASSIFICATION INDEX NUMBER																				
	OPEN DESERT	OPEN GOOD	% IMP	1	2*	3	4	5*	6	7*	8	9*	10	11	12	13	14	15	16	17	18	19	20	21	22
	% --->			100	10	60	35	0	0	0	0	0	15	7	0	0	55	36	19	14	15	10	30	15	20
		% --->		0	85	20	40	71	38	28	15	10	15	8	50	0	20	35	19	14	0	0	0	0	30
			% --->	0	5	20	25	29	62	72	85	90	70	85	50	0	25	29	62	72	85	90	70	85	50
	CN	CN	CN	SOIL TYPE COMPOSITE CN FOR LAND USE TYPE																				
152	88	80	98	88.0	82.0	88.0	87.0	85.0	91.0	93.0	95.0	96.0	94.0	96.0	89.0	30.0	89.0	88.0	93.0	94.0	97.0	97.0	95.0	97.0	91.0

* Please refer to Land use Shown on MPU H-Maps

PERVIOUS AREA CURVE NUMBERS								
CONDITION 1:	---------->	DESERT SHRUB POOR HYDROLOGIC CONDITION						
CONDITION 2:	---------->	LANDSCAPED, LAWNS, TREES, GOOD HYDROLOGIC CONDITION						
CN VALUES								
		HYDROLOGIC SOIL GROUP						
CONDITION		A	B	C	D	ROCK		
1	---------->	63	77	85	88	90		
2	---------->	39	61	74	80	90		
							CONDITION	CONDITION
	MAP	HYDROLOGIC SOIL GROUP					1	2
	UNIT	%A	%B	%C	%D	%ROCK	CN	CN
	152	0	0	0	100	0	88	80

Orchestra (Phase 1)					
WEIGHTED CURVE NUMBERS					
Proposed Conditions					
Basin	Soil	Percent	CN	Land Use	WCN
57B-1	152	5.0%	82.0	Parks, Golf Courses	93.7
	152	54.0%	93.0	Public Facility, Residential	
	152	41.0%	96.0	Commercial, Retail, Casino, High Rise Condo	
57B-1A	152	100.0%	85.0	Medium Residential	85.0
57B-1B	152	100.0%	93.0	Public Facility, Residential	93.0
57B-1C	152	100.0%	96.0	Commercial, Retail, Casino, High Rise Condo	96.0
57B-2A	152	100.0%	87.0	Low Density Residential	87.0
57B-2B	152	100.0%	87.0	Low Density Residential	87.0
57B-2C	152	100.0%	87.0	Low Density Residential	87.0
57B-2D	152	100.0%	91.0	High Density Residential	91.0
57B-2E	152	100.0%	91.0	High Density Residential	91.0
57B-2F	152	100.0%	91.0	High Density Residential	91.0
57B-2G1	152	100.0%	87.0	Low Density Residential	87.0
57B-2G2	152	100.0%	87.0	Low Density Residential	87.0
57B-2H1	152	100.0%	87.0	Low Density Residential	87.0
57B-2H2	152	100.0%	87.0	Low Density Residential	87.0
57B-2I	152	100.0%	87.0	Low Density Residential	87.0
57B-3	152	29.2%	82.0	Parks, Golf Courses	89.3
	152	9.0%	85.0	Medium Residential	
	152	54.0%	93.0	Public Facility, Residential	
	152	7.8%	96.0	Commercial, Retail, Casino, High Rise Condo	
57B-3A	152	100.0%	85.0	Medium Residential	85.0
57B-3B	152	100.0%	85.0	Medium Residential	85.0
57B-3C	152	100.0%	87.0	Low Density Residential	87.0
57B-3D	152	100.0%	87.0	Low Density Residential	87.0
57B-3E	152	100.0%	87.0	Low Density Residential	87.0
57B-3F	152	100.0%	87.0	Low Density Residential	87.0
57B-3G	152	100.0%	87.0	Low Density Residential	87.0
57B-4	152	8.1%	82.0	Parks, Golf Courses	93.8
	152	0.3%	85.0	Medium Residential	
	152	30.2%	93.0	Public Facility, Residential	
	152	61.3%	96.0	Commercial, Retail, Casino, High Rise Condo	

57B-4B	152	100.0%	96.0	Commercial, Retail, Casino, High Rise Condo	96.0
57B-4C	152	100.0%	96.0	Commercial, Retail, Casino, High Rise Condo	96.0
ON1	152	100.0%	82.0	Parks, Golf Courses	82.0
ON2	152	100.0%	82.0	Parks, Golf Courses	82.0
ON3R	152	100.0%	82.0	Parks, Golf Courses	82.0
ON5	152	100.0%	82.0	Parks, Golf Courses	82.0
ON6	152	100.0%	93.0	Public Facility, Residential	93.0
ON8	152	100.0%	82.0	Parks, Golf Courses	82.0
ON9	152	100.0%	82.0	Parks, Golf Courses	82.0
ON10	152	100.0%	82.0	Parks, Golf Courses	82.0
ON11R	152	100.0%	82.0	Parks, Golf Courses	82.0
ON12	152	100.0%	82.0	Parks, Golf Courses	82.0
ON13	152	100.0%	82.0	Parks, Golf Courses	82.0
ON14	152	100.0%	82.0	Parks, Golf Courses	82.0
ON15R	152	100.0%	82.0	Parks, Golf Courses	82.0
ON16R	152	100.0%	82.0	Parks, Golf Courses	82.0
ON18R	152	100.0%	82.0	Parks, Golf Courses	82.0
DON1	152	100.0%	95.0	Commercial and business	95.0
DON2	152	100.0%	95.0	Commercial and business	95.0
DON3	152	100.0%	95.0	Commercial and business	95.0
DON4	152	100.0%	95.0	Commercial and business	95.0



REPLY APP 0551

HYDROLOGIC CRITERIA AND DESIGN MANUAL

TIME OF CONCENTRATION

GCV
ENGINEERS \ SURVEYORS

The Seventy
Existing Conditions

Project No: 840.050
Date: 17-Feb-16
Calculated by: MMC

SUB-BASIN DATA						INITIAL / OVERLAND TIME (Ti)			TRAVEL TIME (Tt)					Tc CHECK URBANIZED BASINS		Tc	Tlag	REMARKS
DESIG:	DEV./EX. (D or E)	CN	K	AREA Ac	AREA Sq Mi	INITIAL LENGTH Feet	SLOPE %	Ti Min	TRAVEL LENGTH Feet	SLOPE %	V1 VELOCITY fps	V2 VELOCITY fps	Tt Min	TOTAL LENGTH Feet	Tc = (L/180)+10 Min	Min	Tlag = 0.6Tc/60 Hours	Rainfall:
(1)		(16)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9a)	(9b)	(10)	(11)	(12)	(13)	(14)	(15)	
57B-1	D	93.7	0.8468	31.1	0.0485	250	2.80	5.1	3020	2.2	3.0	4.5	12.2	3270	28.2	17.3	0.173	2.89
57B-1A	D	85	0.7320	28.4	0.0443	370	2.40	9.5	2080	2.3	3.1	4.6	8.4	2450	23.6	17.9	0.179	2.96
57B-1B	D	93	0.8376	19.3	0.0301	100	1.00	4.7	1630	1.0	2.0	3.1	10.3	1730	19.6	15.0	0.150	2.91
57B-1C	D	96	0.8772	0.6	0.0009	50	1.00	2.8	490	1.2	2.2	3.4	3.7	540	13.0	6.5	0.065	2.89
57B-2A	D	87	0.7584	6.3	0.0098	186	13.40	3.5	2700	1.7	2.6	4.0	12.4	2886	26.0	15.9	0.159	3.05
57B-2B	D	87	0.7584	3.0	0.0047	50	2.00	3.5	1400	2.7	3.3	5.0	5.5	1450	18.1	8.9	0.089	2.99
57B-2C	D	87	0.7584	1.7	0.0027	100	1.00	6.1	222	6.8	5.3	8.0	0.7	322	11.8	6.9	0.069	2.96
57B-2D	D	91	0.8112	5.7	0.0088	110	1.00	5.5	1200	1.1	2.1	3.2	7.6	1310	17.3	13.0	0.130	3.09
57B-2E	D	91	0.8112	14.5	0.0227	110	1.00	5.5	1360	3.4	3.7	5.6	4.8	1470	18.2	10.2	0.102	3.08
57B-2F	D	91	0.8112	57.8	0.0902	110	1.00	5.5	3000	2.5	3.2	4.8	11.2	3110	27.3	16.7	0.167	3.03
57B-2G1	D	87	0.7584	1.6	0.0026	35	5.60	2.0	730	2.9	3.4	5.2	3.2	765	14.3	5.2	0.052	3.08
57B-2G2	D	87	0.7584	4.6	0.0073	40	2.50	2.9	1511	2.2	3.0	4.5	6.5	1551	18.6	9.4	0.094	3.03
57B-2H1	D	87	0.7584	18.6	0.0291	300	3.70	6.9	4120	1.1	2.1	3.2	22.7	4420	34.6	29.6	0.296	3.01
57B-2H2	D	87	0.7584	10.0	0.0156	300	2.30	8.1	2500	2.2	3.0	4.5	10.1	2800	25.6	18.2	0.182	3.04
57B-2I	D	87	0.7584	4.6	0.0072	80	7.50	2.8	1575	2.6	3.3	4.9	6.2	1655	19.2	9.0	0.090	2.99
57B-3	D	89.3	0.7888	30.8	0.0481	380	1.30	10.0	4170	2.4	3.1	4.7	15.6	4550	35.3	25.6	0.256	3.06
57B-3A	D	85	0.7320	16.6	0.0259	170	1.00	8.6	1360	2.0	2.9	4.3	6.2	1530	18.5	14.9	0.149	3.07
57B-3B	D	85	0.7320	32.8	0.0513	110	1.00	6.9	2500	2.4	3.1	4.7	9.7	2610	24.5	16.6	0.166	3.00
57B-3C	D	87	0.7584	4.4	0.0069	130	1.00	7.0	1140	2.5	3.2	4.8	4.8	1270	17.1	11.8	0.118	3.05
57B-3D	D	87	0.7584	11.8	0.0184	125	1.00	6.9	2500	2.7	3.3	5.0	9.1	2625	24.6	16.0	0.160	2.99
57B-3E	D	87	0.7584	16.0	0.0251	240	1.00	9.5	3200	2.5	3.2	4.8	11.9	3440	29.1	21.4	0.214	3.06
57B-3F	D	87	0.7584	7.4	0.0116	180	2.70	5.9	2170	2.5	3.2	4.9	8.3	2350	23.1	14.2	0.142	3.05
57B-3G	D	87	0.7584	1.5	0.0023	220	3.20	6.2	260	4.6	4.3	6.6	1.0	480	12.7	7.2	0.072	2.99
57B-4	D	93.8	0.8482	82.7	0.1293	35	2.00	2.1	4890	2.4	3.1	4.7	18.1	4925	37.4	20.2	0.202	2.91
57B-4A	D	82	0.6924	4.5	0.0070	274	4.70	7.3	600	2.5	3.2	4.8	3.0	874	14.9	10.2	0.102	2.93
57B-4B	D	96	0.8772	7.1	0.0110	150	2.70	3.5	860	2.9	3.4	5.2	3.6	1010	15.6	7.1	0.071	2.91
57B-4C	D	96	0.8772	7.8	0.0122	100	1.00	4.0	1560	1.6	2.6	3.9	7.8	1660	19.2	11.8	0.118	2.90
ON1	D	82	0.6924	25.4	0.0397	165	4.20	5.8	2040	3.0	3.5	5.3	7.2	2205	22.3	13.1	0.131	3.08
ON2	D	82	0.6924	17.5	0.0273	180	5.00	5.8	2700	2.5	3.2	4.8	10.2	2880	26.0	15.9	0.159	3.00
ON3	D	82	0.6924	2.5	0.0040	135	12.00	3.7	300	1.7	2.6	4.0	1.9	435	12.4	5.6	0.056	2.96
ON4	D	82	0.6924	4.7	0.0073	150	9.30	4.3	530	1.0	2.0	3.1	4.3	680	13.8	8.6	0.086	2.94
ON5	D	82	0.6924	9.4	0.0147	125	4.00	5.2	1420	2.9	3.4	5.2	5.4	1545	18.6	10.5	0.105	3.05

ON6	D	93	0.8376	2.3	0.0035	20	4.00	1.3	785	1.7	2.6	4.0	4.4	805	14.5	5.7	0.057	3.04
ON8	D	82	0.6924	12.2	0.0190	65	6.20	3.2	1950	8.7	6.0	9.0	4.1	2015	21.2	7.3	0.073	2.99
ON9	D	82	0.6924	25.5	0.0399	290	15.50	5.0	3085	1.0	2.0	3.1	18.2	3375	28.8	23.2	0.232	3.06
ON10	D	82	0.6924	11.4	0.0177	100	29.00	2.4	1460	2.9	3.4	5.2	5.5	1560	18.7	7.9	0.079	2.98
ON11	D	82	0.6924	10.0	0.0157	270	13.70	5.0	1040	1.6	2.6	3.9	5.6	1310	17.3	10.6	0.106	2.95
ON12	D	82	0.6924	11.6	0.0182	225	3.50	7.2	1300	3.1	3.6	5.4	4.8	1525	18.5	12.1	0.121	3.08
ON13	D	82	0.6924	12.0	0.0187	210	7.10	5.5	1540	3.6	3.8	5.8	5.2	1750	19.7	10.7	0.107	3.04
ON14	D	82	0.6924	3.5	0.0054	100	1.00	7.3	1575	0.5	1.4	2.2	14.1	1675	19.3	21.5	0.193	3.00
ON15	D	82	0.6924	22.5	0.0351	120	7.50	4.1	2160	3.3	3.7	5.6	7.2	2280	22.7	11.4	0.114	2.98
ON16	D	82	0.6924	11.5	0.0180	45	45.00	1.4	2200	3.3	3.7	5.6	7.4	2245	22.5	8.8	0.088	2.97
ON17	D	82	0.6924	9.1	0.0143	41	7.30	2.4	1160	3.4	3.7	5.6	4.2	1201	16.7	6.6	0.066	2.93
ON18	D	82	0.6924	20.3	0.0317	175	0.60	11.5	2930	2.5	3.2	4.9	10.9	3105	27.3	22.4	0.224	2.95
ON19	D	82	0.6924	6.4	0.0100	112	1.80	6.4	785	4.2	4.1	6.3	2.8	897	15.0	9.2	0.092	2.92
ON20	D	82	0.6924	6.6	0.0104	200	9.00	5.0	1415	2.0	2.9	4.3	6.4	1615	19.0	11.4	0.114	2.89
ON21	D	82	0.6924	22.3	0.0348	270	1.10	11.7	2222	3.0	3.5	5.3	7.8	2492	23.8	19.5	0.195	2.91
ON22	D	82	0.6924	8.5	0.0133	65	3.10	4.1	970	4.9	4.5	6.8	3.0	1035	15.8	7.1	0.071	2.88

$Tc = Ti + Tt$ $Tlag = 0.6\ Tc$

$Ti = 1.8\ (1.1 - K)\ L^{1/2} / S^{1/3}$

$K = 0.0132\ (CN) - 0.39$

For the travel time (Tt) calculations,
V1 applies to the first 500 feet of travel distance;
V2 applies to the remaining travel distance.

Existing: $V1 = 14.8*(S/100)^{1/2}$ $V2 = 29.4*(S/100)^{1/2}$

Developed: $V1 = 20.2*(S/100)^{1/2}$ $V2 = 30.6*(S/100)^{1/2}$

REFERENCE: CN values referenced from MPU

STANDARD FORM 4

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*             JUN  1998                 *
*           VERSION 4.1                 *
*                                       *
*  RUN DATE   03MAR16  TIME  10:06:06   *
*                                       *
*****************************************
```

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

```
X     X  XXXXXXX   XXXXX          X
X     X  X        X     X        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


```
          LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
                    *DIAGRAM
*** FREE ***
             1      ID   ************************************************************
             2      ID   * ..................................................... *
             3      ID   * :                                                   : *
             4      ID   * :              THE SEVENTY                          : *
             5      ID   * :                                                   : *
             6      ID   * :              EXISTING CONDITIONS                  : *
             7      ID   * :...................................................: *
             8      ID   * :              RETURN PERIOD_ _ _ _100 & 10 -YEAR   : *
             9      ID   * :              DISTRIBUTION_ _ _ _ 6-HOUR SDN3      : *
            10      ID   * :              PROJECT NO_ _ _ _ _ 840.050          : *
            11      ID   * :              FILENAME_ _ _ _ _ _ EXISTING.H1      : *
            12      ID   * :              DATE MODELED_ _ _ _ 2/22/16          : *
            13      ID   * :              MODELED BY_ _ _ _ _ JAM, MMC, RRD, SHT : *
            14      ID   * :...................................................: *
            15      ID   * :                                                   : *
            16      ID   * :...................................................: *
            17      ID   ************************************************************
            18      ID
            19      ID    REFERENCED HYDROLOGIC MODELS:
            20      ID    2013 LAS VEGAS VALLEY FLOOD CONTROL MASTER PLAN UPDATE
            21      ID    CITY OF LAS VEGAS CITY WIDE HYDROLOGY ANALYSIS (PBS&J 1997)
            22      ID    CLARK COUNTY REGIONAL FLOOD CONTROL DISTRICT 2008 MASTER PLAN UPDATE
            23      ID    GOWAN WATERSHED (ALL)
            24      ID    RECOMMENDED DRAINAGE SYSTEM WITH ULTIMATE DEVELOPMENT
            25      ID    INPUT FILE = ALLGOW3.DAT
            26      ID    INPUT FILE DATE = MAY 5, 2008
            27      ID    DESIGN STORM = 100-YEAR 6-HR STORM
            28      ID    STORM DISTRIBUTION = SDN #3
            29      ID    MODELED BY PBS&J (MICHELE L. D'ALESSANDRO, E.I., CFM)
            30      ID    CHECKED BY PBS&J (HARSHAL B. DESAI, P.E., CFM)
            31      ID    STORM CENTERING = FULL WATERSHED
            32      ID    JR CARDS CONTAIN DARFS BASED ON THE FOLLOWING VALUES:
            33      ID
            34      ID                          AREA    DARF
            35      ID                          SQ. MI.
            36      ID                          0-0.5   0.99
            37      ID                          0.5-1   0.975
            38      ID                          1-2     0.95
            39      ID                          2-3     0.925
            40      ID                          3-4     0.915
            41      ID                          4-5     0.908
            42      ID                          5-6     0.903
            43      ID                          6-7     0.895
            44      ID                          10yr    0.570
            45      ID
            46      ID   JR CARD RATIOS REPRESENT DEPTH-AREA REDUCTION FACTORS (DARF'S)
            47      ID
            48      ID   100-YEAR,  6-HOUR STORM,  SDN3
            49      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
                    *
```



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

            54      KK     ON1
            55      KM   OFFSITE BASIN ON1
            56      PB     3.08
            57      BA   0.0397
            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    .131
            *

68          KK  57B-3A
69          KM  ONSITE BASIN 57B-3A
70          PB    3.07
71          BA  0.0259
72          LS       0       85
73          UD    .149
            *

74          KK    CON1
75          KM  COMBINE 57B-3A AND ON1
76          HC       2
            *

77          KK    RCON1
78          KM  ROUTE CON1 TO CON2
79          KM   LENGTH  SLOPE   n-VALUE        SHAPE    WIDTH   S-SLOPE
80          RD     3020   .027    .040       0   TRAP      50       3
            *

81          KK  57B-3B
82          KM  OFFSITE BASIN 57B-3B
83          PB    3.00
84          BA  0.0513
85          LS       0       85
86          UD    .166
            *

87          KK     ON2
88          KM  OFFSITE BASIN ON2
89          PB    3.00
90          BA  0.0273
91          LS       0       82
92          UD    .159
            *
```



```
1                                   HEC-1 INPUT

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

93          KK    CON2
94          KM  COMBINE CON1, 57B-3B AND ON2
95          HC       3
            *

96          KK  57B-3D
97          KM  OFFSITE BASIN 57B-3D
98          PB    2.99
99          BA  0.0184
100         LS       0       87
101         UD    .160
            *

102         KK     ON3
103         KM  ONSITE BASIN ON3
104         PB    2.96
105         BA  0.0040
106         LS       0       82
107         UD    .056
            *

108         KK    CON3
109         KM  COMBINE CON2, 57B-3D AND ON3
110         HC       3
            *

111         KK     ON4
112         KM  OFFSITE BASIN ON4
113         PB    2.94
114         BA  0.0073
115         LS       0       82
116         UD    .086
            *

117         KK    CON4
118         KM  COMBINE CON3 AND ON4
119         HC       2
            *

120         KK     ON5
121         KM  OFFSITE BASIN ON5
122         PB    3.05
123         BA  0.0147
124         LS       0       82
125         UD    .105
            *

126         KK  57B-3C
127         KM  OFFSITE BASIN 57B-3C
128         PB    3.05
129         BA  0.0069
130         LS       0       87
131         UD    .118
            *
```



```
1                                   HEC-1 INPUT

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

132         KK     ON6
133         KM  OFFSITE BASIN ON6
134         PB    3.04
135         BA  0.0035
136         LS       0       93
137         UD    .057
            *

138         KK    CON6
139         KM  COMBINE 57B-3C AND ON6
140         HC       2
```

```
*
141         KK   CCON6
142         KM  COMBINE ON5 AND CON6
143         HC       2
*
144         KK  RCCON6
145         KM  ROUTE CCON6 TO CON8
146         KM   LENGTH  SLOPE    n-VALUE          SHAPE    WIDTH   S-SLOPE
147         RD    2015    .037    .040       0    TRAP       20       2
*
148         KK     ON8
149         KM  ONSITE BASIN ON8
150         PB    2.99
151         BA  0.0190
152         LS       0       82
153         UD    .073
*
154         KK    CON8
155         KM  COMBINE CCON6 AND ON8
156         HC       2
*
157         KK    SW11
158         BA   0.589
159         PB    3.34
160         LS       0     87.8
161         UD   0.311
*
162         KK    RSW11
163         KM  ROUTE SW11 TO CSW17
164         KM  FACILITY = ANGEL PARK - CHARLESTON BOULEVARD
165         KM  FACILITY # = APCB 0064, 0080
166         KM  LINING = RCB
167         RD    2338  0.0167   0.015       0    TRAP       7       0
*
1                                        HEC-1 INPUT                                        PAGE  5

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

168         KK    SW17
169         BA   0.356
170         PB    3.30
171         LS       0     87.8
172         UD   0.271
*
173         KK    CSW17
174         KM  COMBINE RSW11 AND SW17
175         HC       2
*
176         KK  RCSW17
177         KM  ROUTE CSW17 TO CSW18
178         KM  FACILITY = ANGEL PARK - CHARLESTON BOULEVARD
179         KM  FACILITY # = APCB 0000,0001,0019,0050
180         KM  LINING = RCB
181         RD    3600   0.014   0.015       0    TRAP      11       0
*
182         KK    SW18
183         BA   0.405
184         PB    3.27
185         LS       0     86.8
186         UD   0.271
*
187         KK    CSW18
188         KM  COMBINE RCSW17 AND SW18
189         HC       2
*
190         KK  RCSW18
191         KM  ROUTE CSW18 TO C12A
192         KM  FACILITY = ANGEL PARK SOUTH
193         KM  FACILITY # = APSO 0254,0255,0258,0345,0346; APCB 0000
194         KM  NATURAL WASH
195         KM  LENGTH = 5,200
196         KM  SLOPE = 1.4%
197         KM  N = 0.040
198         KM  HYDRAULIC RADIUS = 1.5
199         KM  VELOCITY =  9.2
200         RM       2   0.157    0.15
*
201         KK     12A
202         BA   0.392
203         PB    3.20
204         LS       0     91.2
205         UD   0.264
*
1                                        HEC-1 INPUT                                        PAGE  6

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

206         KK    C12A
207         KM  COMBINE 12A AND RCSW18
208         HC       2
*
209         KK    RC12A
210         KM  ROUTE THRU 12B
211         KM  FACILITY = ANGEL PARK SOUTH
212         KM  FACILITY # = APSO 0204, 0205
213         KM  NATURAL WASH
214         KM  LENGTH = 2,600
```

```
215          KM  SLOPE = 3.5%
216          KM  N = 0.040
217          KM  HYDRAULIC RADIUS = 1.5
218          KM  VELOCITY = 14.5
219          RM        1    0.05    0.15
             *

220          KK     12B
221          BA   0.260
222          PB    3.13
223          LS       0    91.0
224          UD   0.233
             *

225          KK    C12B
226          KM  COMBINE 12B AND RC12A
227          HC       2
             *

228          KK  57B-2A
229          KM  OFFSITE BASIN 57B-2A
230          PB    3.05
231          BA  0.0098
232          LS       0      87
233          UD    .159
             *

234          KK  57B-3F
235          KM  OFFSITE BASIN 57B-3F
236          PB    3.05
237          BA  0.0116
238          LS       0      87
239          UD    .142
             *

240          KK  57B-3E
241          KM  OFFSITE BASIN 57B-3E
242          PB    3.06
243          BA  0.0251
244          LS       0      87
245          UD    .214
             *
```



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

246          KK     ON9
247          KM  ONSITE BASIN ON9
248          PB    3.06
249          BA  0.0399
250          LS       0      82
251          UD    .232
             *

252          KK     CON9
253          KM  COMBINE C12B, 57B-2A, 57B-3F, 57B-3E AND ON9
254          HC       5
             *

255          KK    RCON9
256          KM  ROUTE CON9 TO CON10
257          KM   LENGTH  SLOPE   n-VALUE        SHAPE    WIDTH   S-SLOPE
258          RD    1540    .030    .040       0   TRAP      50       2
             *

259          KK  57B-3G
260          KM  OFFSITE BASIN 57B-3G
261          PB    2.99
262          BA  0.0023
263          LS       0      87
264          UD    .072
             *

265          KK  57B-2B
266          KM  OFFSITE BASIN 57B-2B
267          PB    2.99
268          BA  0.0047
269          LS       0      87
270          UD    .089
             *

271          KK  57B-2C
272          KM  OFFSITE BASIN 57B-2C
273          PB    2.96
274          BA  0.0027
275          LS       0      87
276          UD    .069
             *

277          KK    ON10
278          KM  ONSITE BASIN ON10
279          PB    2.98
280          BA  0.0177
281          LS       0      82
282          UD    .079
             *
```



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

283          KK   CON10
284          KM  COMBINE C57B-2A, 57B-3G, 57B-2B, 57B-2C AND ON10
285          HC       5
             *

286          KK  CCON10
287          KM  COMBINE CON8 AND CON10
288          HC       2
             *
```

```
289          KK RCCON10
290          KM  ROUTE CCON10 TO CON11
291          KM   LENGTH  SLOPE   n-VALUE          SHAPE    WIDTH   S-SLOPE
292          RD    1040    .014    .040       0    TRAP      20       2
             *
293          KK    ON11
294          KM  ONSITE BASIN ON11
295          PB    2.95
296          BA  0.0157
297          LS       0       82
298          UD    .106
             *
299          KK    CON11
300          KM  COMBINE CCON10 AND ON11
301          HC       2
             *
302          KK  CCON11
303          KM  COMBINE CON4 AND CON11
304          HC       2
             *
305          KK  57B-2D
306          KM  OFFSITE BASIN 57B-2D
307          PB    3.09
308          BA  0.0088
309          LS       0       91
310          UD    .130
             *
311          KK  57B-2E
312          KM  OFFSITE BASIN 57B-2E
313          PB    3.08
314          BA  0.0227
315          LS       0       91
316          UD    .102
             *
```



```
1                                    HEC-1 INPUT

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

317          KK C57B-2E
318          KM  COMBINE 57B-2D AND 57B-2E
319          HC       2
             *
320          KK 57B-2G1
321          KM  OFFSITE BASIN 57B-2G1
322          PB    3.08
323          BA  0.0026
324          LS       0       87
325          UD    .052
             *
326          KK    ON12
327          KM  ONSITE BASIN ON12
328          PB    3.08
329          BA  0.0182
330          LS       0       82
331          UD    .121
             *
332          KK    CON12
333          KM  COMBINE C57B-2E, 57B-2G1 AND ON12
334          HC       3
             *
335          KK 57B-2G2
336          KM  OFFSITE BASIN 57B-2G2
337          PB    3.03
338          BA  0.0073
339          LS       0       87
340          UD    .094
             *
341          KK    ON13
342          KM  ONSITE BASIN ON13
343          PB    3.04
344          BA  0.0187
345          LS       0       82
346          UD    .107
             *
347          KK    CON13
348          KM  COMBINE CON12, 57B-2G2 AND ON13
349          HC       3
             *
350          KK  57B-2F
351          KM  OFFSITE BASIN 57B-2F
352          PB    3.03
353          BA  0.0902
354          LS       0       91
355          UD    .167
             *
```



```
1                                    HEC-1 INPUT

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

356          KK 57B-2H2
357          KM  OFFSITE BASIN 57B-2H2
358          PB    3.04
359          BA  0.0156
360          LS       0       87
361          UD    .182
             *
362          KK    ON14
```

```
363          KM  ONSITE BASIN ON14
364          PB    3.00
365          BA  0.0054
366          LS       0       82
367          UD    .193
             *

368          KK   CON14
369          KM  COMBINE CS7B-2F, S7B-2H2 AND ON14
370          HC       3
             *

371          KK  RCON14
372          KM  ROUTE CON14 TO CON15
373          KM   LENGTH  SLOPE   n-VALUE          SHAPE    WIDTH   S-SLOPE
374          RD    2160    .032    .040        0   TRAP      20       2
             *

375          KK  57B-2I
376          KM  OFFSITE BASIN 57B-2I
377          PB    2.99
378          BA  0.0072
379          LS       0       87
380          UD    .090
             *

381          KK 57B-2H1
382          KM  OFFSITE BASIN 57B-2H1
383          PB    3.01
384          BA  0.0291
385          LS       0       87
386          UD    .296
             *

387          KK   ON15
388          KM  ONSITE BASIN ON15
389          PB    2.98
390          BA  0.0351
391          LS       0       82
392          UD    .114
             *
```



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

393          KK   CON15
394          KM  COMBINE CON13, CON14, S7B-21, S7B-2H1 AND ON15
395          HC       5
             *

396          KK   ON16
397          KM  ONSITE BASIN ON16
398          PB    2.97
399          BA  0.0180
400          LS       0       82
401          UD    .088
             *

402          KK   CON16
403          KM  COMBINE CON15 AND ON16
404          HC       2
             *

405          KK  RCON16
406          KM  ROUTE CON16 TO CON17
407          KM   LENGTH  SLOPE   n-VALUE          SHAPE    WIDTH   S-SLOPE
408          RD    1050    .036    .040        0   TRAP      20       2
             *

409          KK   ON17
410          KM  ONSITE BASIN ON17
411          PB    2.93
412          BA  0.0143
413          LS       0       82
414          UD    .066
             *

415          KK   CON17
416          KM  COMBINE CON16 AND ON17
417          HC       2
             *

418          KK  RCON17
419          KM  ROUTE CON17 TO CON21
420          KM   LENGTH  SLOPE   n-VALUE          SHAPE    WIDTH   S-SLOPE
421          RD    1160    .027    .040        0   TRAP      30       2
             *

422          KK  57B-4A
423          KM  OFFSITE BASIN 57B-4A
424          PB    2.93
425          BA  0.0070
426          LS       0       82
427          UD    .102
             *
```



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

428          KK  CCON17
429          KM  COMBINE CCON11, CON17 AND 57B-4A
430          HC       3
             *

431          KK   ON21
432          KM  ONSITE BASIN ON21
433          PB    2.91
434          BA  0.0348
435          LS       0       82
436          UD    .195
```

```
                *
437             KK   CON21
438             KM  COMBINE CCON17 AND ON21
439             HC       2
                *
440             KK   13B-1
441             BA   0.249
442             PB    3.19
443             LS       0    91.6
444             UD   0.284
                *
445             KK RC13B-1
446             KM  ROUTE 13B-1 TO C13B-2
447             KM  GRIFFITH PARK DRIVE AND HUALAPAI WAY
448             RD    3000   0.018   0.016       0    TRAP       0      50
                *
449             KK   13B-2
450             BA   0.216
451             PB    3.14
452             LS       0    89.7
453             UD   0.231
                *
454             KK  C13B-2
455             KM  COMBINE 13B-2 AND RC13B-1
456             KM  HUALAPAI WAY AND LOCAL FACILITY
457             HC       2
                *
458             KK RC13B-2
459             KM  ROUTE C13B-2 TO CCPIC-A
460             KM  LINING = GRASS
461             RD    4900   0.021    0.03       0    TRAP      40       6
                *
1                                          HEC-1 INPUT                                          PAGE 13

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

462             KK     19A
463             BA   0.253
464             PB    3.25
465             LS       0    89.9
466             UD   0.351
                *
467             KK     R19A
468             KM  ROUTE 19A TO C13A-1
469             KM  UNNAMED ROAD
470             RD    4300   0.021   0.016       0    TRAP       0      50
                *
471             KK   13A-1
472             BA   0.224
473             PB    3.19
474             LS       0    91.4
475             UD   0.302
                *
476             KK  C13A-1
477             KM  COMBINE 13A-1 AND R19A
478             KM  TOWN CENTER DRIVE AND SWALE
479             HC       2
                *
480             KK RC13A-1
481             KM  ROUTE C13A-1 TO C13A-2
482             KM  NATURAL WASH
483             KM  TRAVEL LENGTH = 2,800
484             KM  SLOPE = 2.1%
485             KM  N = 0.040
486             KM  HYDRAULIC RADIUS = 1.5
487             KM  VELOCITY = 11.4
488             RM       1   0.068    0.15
                *
489             KK   13A-2
490             BA   0.188
491             PB    3.15
492             LS       0    90.0
493             UD   0.236
                *
494             KK  C13A-2
495             KM  COMBINE 13A-2 AND RC13A-1
496             HC       2
                *
1                                          HEC-1 INPUT                                          PAGE 14

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

497             KK RC13A-2
498             KM  ROUTE C13A-2 TO CPIC-C
499             KM  LINING = GRASS
500             RD    5200   0.015    0.03       0    TRAP      40       4
                *
501             KK   PIC-C
502             BA   0.243
503             PB    3.08
504             LS       0    90.4
505             UD   0.373
                *
506             KK  CPIC-C
507             KM  COMBINE PIC-C AND RC13A-2
508             HC       2
```

```
*
KK RCPIC-C
KM  ROUTE CPIC-C TO CPIC-A
KM  LINING = GRASS
RD    2200   0.025    0.03       0    TRAP      40       4
*
KK   PIC-A
BA  0.359
PB   3.03
LS      0     91.1
UD  0.499
*
KK  CPIC-A
KM  COMBINE RCPIC-C AND PIC-A
HC       2
*
KK CCPIC-A
KM  COMBINE CPIC-A AND RC13B-2
HC       2
*
KK    ON18
KM  ONSITE BASIN ON18
PB    2.95
BA  0.0317
LS       0       82
UD    .224
*
```


1 HEC-1 INPUT

```
LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9.....10
*
KK   CON18
KM  COMBINE CCPIC-A AND ON18
HC       2
*
KK  57B-1A
KM  OFFSITE BASIN 57B-1A
PB    2.96
BA  0.0443
LS       0       85
UD    .179
*
KK  57B-1B
KM  OFFSITE BASIN 57B-1B
PB    2.91
BA  0.0301
LS       0       93
UD    .150
*
KK    ON19
KM  ONSITE BASIN ON19
PB    2.92
BA  0.0100
LS       0       82
UD    .092
*
KK   CON19
KM  COMBINE CON18, 57B-1A, 57B-1B AND ON19
HC       4
*
KK  RCON19
KM  ROUTE CON19 TO CON20
KM   LENGTH  SLOPE   n-VALUE        SHAPE    WIDTH   S-SLOPE
RD    1480   .024    .040       0   TRAP      50       2
*
KK  57B-1C
KM  OFFSITE BASIN 57B-1C
PB    2.89
BA  0.0009
LS       0       96
UD    .065
*
KK    ON20
KM  ONSITE BASIN ON20
PB    2.89
BA  0.0104
LS       0       82
UD    .114
*
```


1 HEC-1 INPUT

```
LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9.....10
*
KK   CON20
KM  COMBINE CON19, 57B-1C AND ON20
HC       3
*
KK  RCON20
KM  ROUTE CON20 TO CON22
KM   LENGTH  SLOPE   n-VALUE        SHAPE    WIDTH   S-SLOPE
RD     700   .063    .040       0   TRAP      30       2
*
KK  57B-4B
KM  OFFSITE BASIN 57B-4B
PB    2.91
BA  0.0110
```

```
581          LS       0      96
582          UD    .071
             *
583          KK  57B-4C
584          KM  OFFSITE BASIN 57B-4C
585          PB    2.90
586          BA  0.0122
587          LS       0      96
588          UD    .118
             *
589          KK C57B-4C
590          KM  COMBINE 57B-4B AND 57B-4C
591          HC       2
             *
592          KK    ON22
593          KM  ONSITE BASIN ON22
594          PB    2.88
595          BA  0.0133
596          LS       0      82
597          UD    .071
             *
598          KK   CON22
599          KM  COMBINE CON21, CON20, C57B-4C AND ON22
600          HC       4
             *
601          KK   57B-1
602          KM  OFFSITE BASIN 57B-1
603          BA  0.0485
604          PB    2.89
605          LS       0    93.7
606          UD   0.173
             *
```

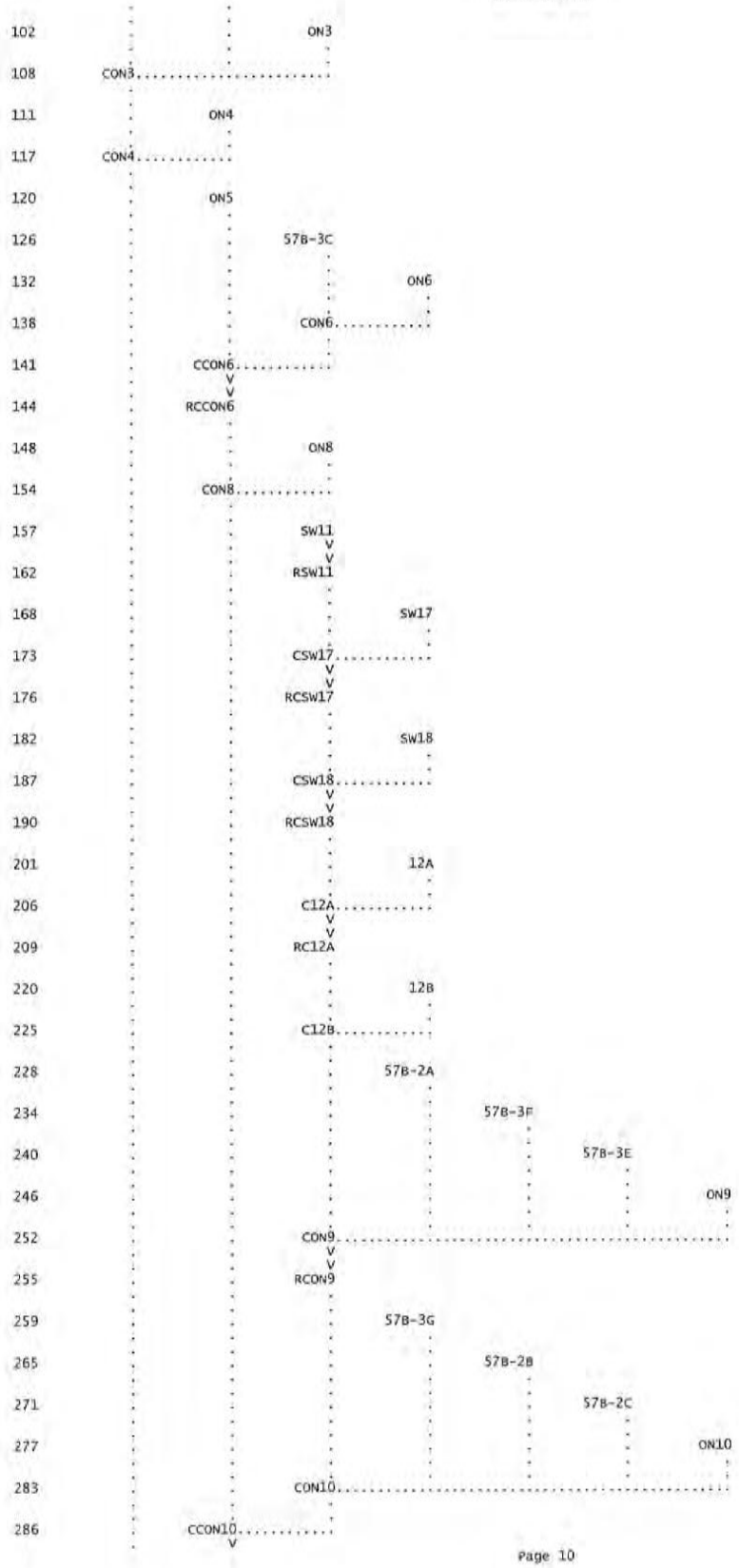

1 HEC-1 INPUT

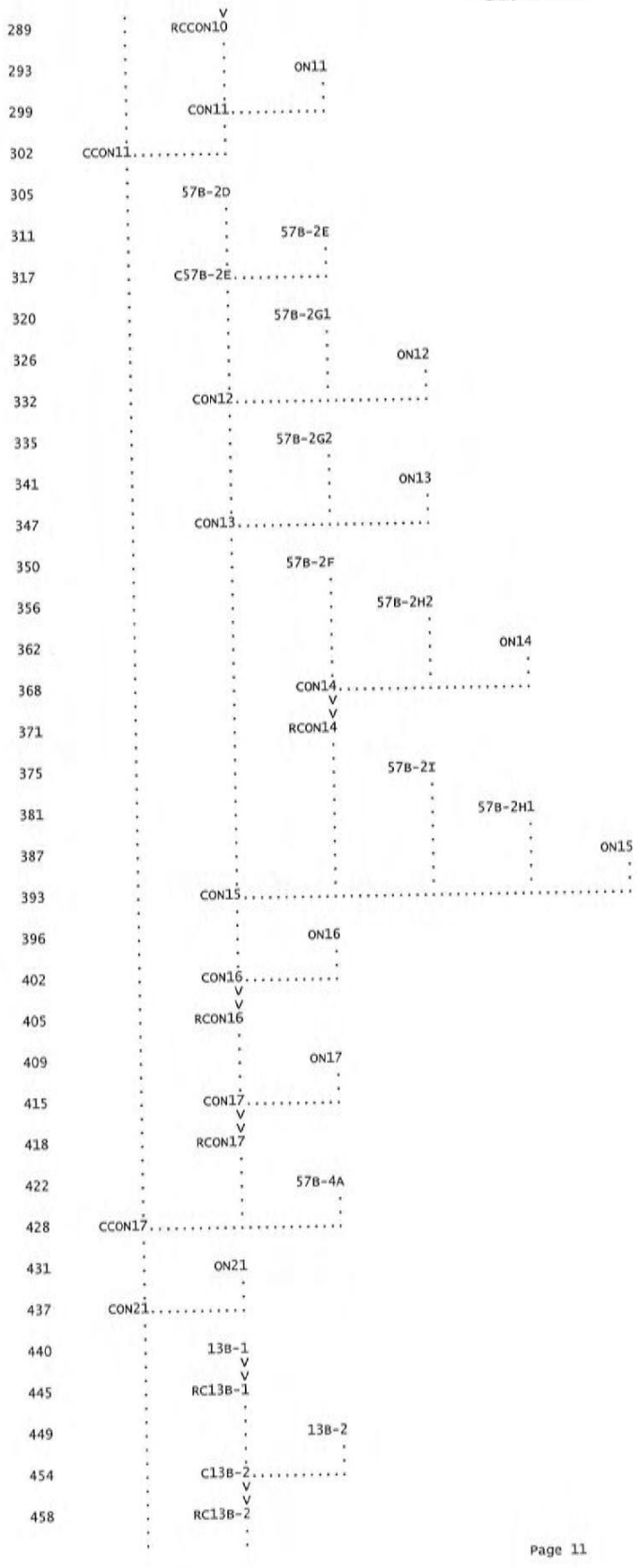
```
LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9.....10
607          KK   57B-3
608          KM  OFFSITE BASIN 57B-3
609          BA  0.0481
610          PB    3.06
611          LS       0    89.3
612          UD   0.256
             *
613          KK   57B-4
614          KM  OFFSITE BASIN 57B-4
615          BA  0.1293
616          PB    2.91
617          LS       0    93.8
618          UD   0.202
             *
619          KK  C57B-4
620          KM  COMBINE 57B-3 AND 57B-4
621          HC       2
             *
622          KK   PIC-B
623          BA   0.441
624          PB    2.98
625          LS       0    91.1
626          UD   0.471
             *
627          KK  RPIC-B
628          KM  ROUTE PIC-B TO CC57B-4
629          KM  FACILITY = ANGEL PARK - PECCOLE 1
630          KM  FACILITY # = APP1 0000
631          KM  LINING = RCP
632          RD    2982   0.024   0.013       0    CIRC       6
             *
633          KK CC57B-4
634          KM  COMBINE CON22, C57B-1, RPIC-B, AND C57B-4
635          HC       4
             *
636          ZZ
```

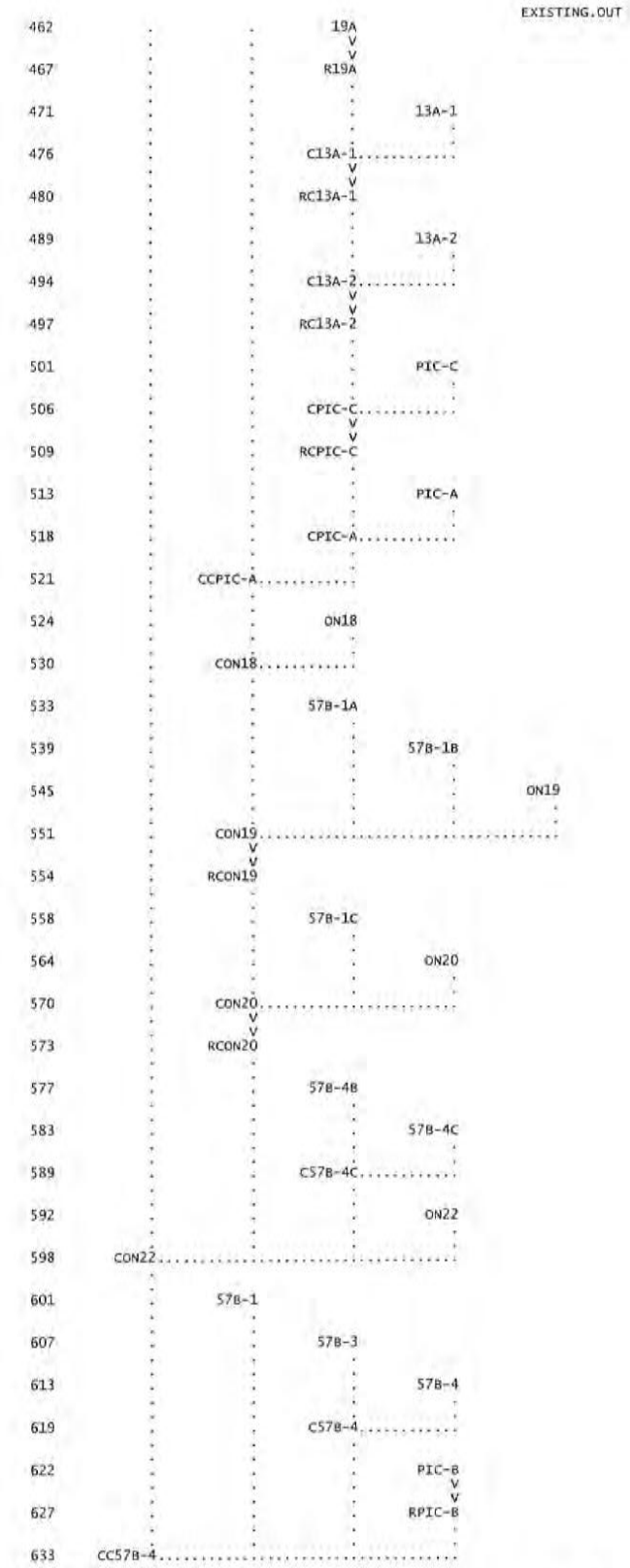
1 SCHEMATIC DIAGRAM OF STREAM NETWORK

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

   54        ON1
             .
             .
   68        .       57B-3A
             .          .
             .          .
   74      CON1.........
             V
             V
   77      RCON1
             .
             .
   81        .       57B-3B
             .          .
             .          .          ON2
   87        .          .           .
             .          .           .
   93      CON2.......................
             .
             .
   96        .       57B-3D
```


102 ON3
108 CON3
111 ON4
117 CON4
120 ON5
126 57B-3C
132 ON6
138 CON6
141 CCON6
144 RCCON6
148 ON8
154 CON8
157 SW11
162 RSW11
168 SW17
173 CSW17
176 RCSW17
182 SW18
187 CSW18
190 RCSW18
201 12A
206 C12A
209 RC12A
220 12B
225 C12B
228 57B-2A
234 57B-3F
240 57B-3E
246 ON9
252 CON9
255 RCON9
259 57B-3G
265 57B-2B
271 57B-2C
277 ON10
283 CON10
286 CCON10


289
RCCON10
293
ON11
299
CON11
302
CCON11
305
57B-2D
311
57B-2E
317
C57B-2E
320
57B-2G1
326
ON12
332
CON12
335
57B-2G2
341
ON13
347
CON13
350
57B-2F
356
57B-2H2
362
ON14
368
CON14
371
RCON14
375
57B-2I
381
57B-2H1
387
ON15
393
CON15
396
ON16
402
CON16
405
RCON16
409
ON17
415
CON17
418
RCON17
422
57B-4A
428
CCON17
431
ON21
437
CON21
440
13B-1
445
RC13B-1
449
13B-2
454
C13B-2
458
RC13B-2



(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

1**********

****

```
*                                        *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)    *
*             JUN  1998                  *
*           VERSION 4.1                  *
*                                        *
*  RUN DATE   03MAR16  TIME  10:06:06    *
*                                        *
******************************************
```


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


```
**************************************************************
*                                                            *
*                                                            *
*                THE SEVENTY                                 *
*                                                            *
*                EXISTING CONDITIONS                         *
*                                                            *
*                RETURN PERIOD_ _ _ _100 & 10 -YEAR          *
*                DISTRIBUTION_ _ _ _ 6-HOUR SDN3             *
*                PROJECT NO_ _ _ _ _ 840.050                 *
*                FILENAME_ _ _ _ _ _ EXISTING.H1             *
*                DATE MODELED_ _ _ _ 2/22/16                 *
*                MODELED BY_ _ _ _ _ JAM, MMC, RRD, SHT      *
*                                                            *
*                                                            *
**************************************************************
```

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 SQ. MI.	DARF
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

     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

OPERATION	STATION	AREA	PLAN		RATIOS APPLIED TO PRECIPITATION 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													
+	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													
+	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	2331.	2283.	2206.	2124.	2092.	2069.	2052.	2028.	1015.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
+ HYDROGRAPH AT	ON11	.02	1	FLOW	19.	18.	17.	17.	16.	16.	16.	16.	7.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
+ 2 COMBINED AT	CON11	2.18	1	FLOW	2336.	2288.	2210.	2128.	2096.	2074.	2056.	2032.	1017.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
+ 2 COMBINED AT	CCON11	2.35	1	FLOW	2443.	2393.	2312.	2227.	2193.	2170.	2152.	2126.	1065.
				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	354.	346.	333.	320.	315.	311.	309.	303.	149.
				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	20.	20.	19.	18.	18.	17.	17.	17.	7.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
2 COMBINED AT														
+	CON17	.29	1	FLOW	368.	360.	347.	333.	328.	323.	321.	316.	153.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.67
ROUTED TO														
+	RCON17	.29	1	FLOW	356.	350.	337.	328.	321.	319.	318.	309.	149.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
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
3 COMBINED AT														
+	CCON17	2.65	1	FLOW	2716.	2660.	2567.	2472.	2434.	2407.	2388.	2359.	1171.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.92
HYDROGRAPH AT														
+	ON21	.03	1	FLOW	34.	33.	32.	30.	30.	29.	29.	29.	12.
				TIME	3.58	3.58	3.67	3.67	3.67	3.67	3.67	3.67	3.67
2 COMBINED AT														
+	CON21	2.68	1	FLOW	2740.	2683.	2589.	2493.	2455.	2427.	2408.	2378.	1177.
				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	12.	12.	12.	11.	11.	11.	11.	10.	4.
+				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	2059.	2020.	1954.	1886.	1856.	1840.	1826.	1804.	923.
+				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
ROUTED TO	RCON19	1.85	1	FLOW	2045.	2006.	1941.	1871.	1840.	1824.	1811.	1788.	922.
+				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	4.00
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	.01	1	FLOW	12.	12.	11.	11.	10.	10.	10.	10.	4.
+				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
3 COMBINED AT	CON20	1.86	1	FLOW	2048.	2009.	1944.	1874.	1843.	1827.	1814.	1791.	923.
+				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	4.00
ROUTED TO	RCON20	1.86	1	FLOW	2040.	2001.	1935.	1865.	1834.	1818.	1805.	1781.	920.
+				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	4.00
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
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	ON22	.01	1	FLOW	18.	17.	16.	16.	15.	15.	15.	15.	6.
+				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
4 COMBINED AT	CON22	4.58	1	FLOW	4729.	4636.	4481.	4318.	4251.	4209.	4177.	4125.	2065.
+				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	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	5339.	5234.	5060.	4878.	4803.	4756.	4720.	4662.	2354.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92

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

ISTAQ	ELEMENT	DT	PEAK	TIME TO PEAK	VOLUME	INTERPOLATED TO COMPUTATION INTERVAL DT	PEAK	TIME TO PEAK	VOLUME
		(MIN)	(CFS)	(MIN)	(IN)	(MIN)	(CFS)	(MIN)	(IN)
FOR PLAN = 1 RATIO= .00									
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									
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

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

FOR PLAN = 1 RATIO=	.00								
RCSW17 MANE	1.65	1211.98	225.57	2.06	5.00	1210.68	225.00	2.06	

EXISTING,OUT

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

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	1.23	2331.18	234.30	2.05	5.00	2330.90	235.00	2.05

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2358E+03 EXCESS= .0000E+00 OUTFLOW= .2358E+03 BASIN STORAGE= .1329E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00									
RCCON10	MANE	1.24	2284.11	234.71	2.00	5.00	2283.17	235.00	2.00

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2307E+03 EXCESS= .0000E+00 OUTFLOW= .2307E+03 BASIN STORAGE= .1356E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00									
RCCON10	MANE	1.26	2205.80	234.98	1.93	5.00	2205.72	235.00	1.93

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2223E+03 EXCESS= .0000E+00 OUTFLOW= .2223E+03 BASIN STORAGE= .1456E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00									
RCCON10	MANE	1.27	2124.92	235.34	1.86	5.00	2124.05	235.00	1.86

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2139E+03 EXCESS= .0000E+00 OUTFLOW= .2139E+03 BASIN STORAGE= .1320E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00									
RCCON10	MANE	1.28	2092.66	235.28	1.83	5.00	2091.76	235.00	1.83

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2106E+03 EXCESS= .0000E+00 OUTFLOW= .2106E+03 BASIN STORAGE= .1358E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00									
RCCON10	MANE	1.28	2069.86	234.86	1.81	5.00	2069.49	235.00	1.81

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2082E+03 EXCESS= .0000E+00 OUTFLOW= .2082E+03 BASIN STORAGE= .1289E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00									
RCCON10	MANE	1.29	2053.30	235.46	1.79	5.00	2052.26	235.00	1.79

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2065E+03 EXCESS= .0000E+00 OUTFLOW= .2065E+03 BASIN STORAGE= .1544E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00									
RCCON10	MANE	1.29	2028.73	235.17	1.77	5.00	2028.03	235.00	1.77

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2039E+03 EXCESS= .0000E+00 OUTFLOW= .2039E+03 BASIN STORAGE= .1398E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00									
RCCON10	MANE	1.63	1018.69	237.34	.87	5.00	1014.91	235.00	.87

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1007E+03 EXCESS= .0000E+00 OUTFLOW= .1007E+03 BASIN STORAGE= .1586E-02 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	1.69	366.03	216.69	1.76	5.00	353.70	215.00	1.76

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2617E+02 EXCESS= .0000E+00 OUTFLOW= .2617E+02 BASIN STORAGE= .1013E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCON16	MANE	1.71	357.22	216.61	1.72	5.00	345.96	215.00	1.72

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2558E+02 EXCESS= .0000E+00 OUTFLOW= .2558E+02 BASIN STORAGE= .1022E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCON16	MANE	1.73	339.51	217.68	1.65	5.00	333.18	215.00	1.65

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2459E+02 EXCESS= .0000E+00 OUTFLOW= .2460E+02 BASIN STORAGE= .9731E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCON16	MANE	1.75	331.60	216.91	1.59	5.00	319.76	215.00	1.59

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2367E+02 EXCESS= .0000E+00 OUTFLOW= .2367E+02 BASIN STORAGE= .1040E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCON16	MANE	1.76	323.47	216.34	1.56	5.00	315.26	215.00	1.56

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2327E+02 EXCESS= .0000E+00 OUTFLOW= .2327E+02 BASIN STORAGE= .9851E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCON16	MANE	1.77	321.71	217.18	1.55	5.00	310.86	215.00	1.55

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2301E+02 EXCESS= .0000E+00 OUTFLOW= .2301E+02 BASIN STORAGE= .9887E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCON16	MANE	1.77	316.30	217.78	1.53	5.00	308.90	215.00	1.53

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2281E+02 EXCESS= .0000E+00 OUTFLOW= .2281E+02 BASIN STORAGE= .1032E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCON16	MANE	1.78	314.00	217.16	1.51	5.00	303.28	215.00	1.51

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2248E+02 EXCESS= .0000E+00 OUTFLOW= .2249E+02 BASIN STORAGE= .1041E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCON16	MANE	2.29	150.40	219.44	.72	5.00	148.93	220.00	.72

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1076E+02 EXCESS= .0000E+00 OUTFLOW= .1076E+02 BASIN STORAGE= .1017E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCON17	MANE	2.23	364.75	218.67	1.74	5.00	356.45	220.00	1.74

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2715E+02 EXCESS= .0000E+00 OUTFLOW= .2716E+02 BASIN STORAGE= .1496E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCON17	MANE	2.25	357.02	218.14	1.70	5.00	349.64	220.00	1.70

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2653E+02 EXCESS= .0000E+00 OUTFLOW= .2653E+02 BASIN STORAGE= .1654E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCON17	MANE	2.28	344.14	218.77	1.63	5.00	337.46	220.00	1.63

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2553E+02 EXCESS= .0000E+00 OUTFLOW= .2553E+02 BASIN STORAGE= .1878E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCON17	MANE	2.31	330.60	219.64	1.57	5.00	328.28	220.00	1.57

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2455E+02 EXCESS= .0000E+00 OUTFLOW= .2455E+02 BASIN STORAGE= .1844E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO=	.00								
RCON17 MANE	2.32	326.22	218.42	1.54	5.00	321.01	220.00	1.54	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2412E+02 EXCESS= .0000E+00 OUTFLOW= .2413E+02 BASIN STORAGE= .1875E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO=	.00								
RCON17 MANE	2.34	322.39	219.50	1.53	5.00	319.39	220.00	1.53	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2387E+02 EXCESS= .0000E+00 OUTFLOW= .2387E+02 BASIN STORAGE= .1904E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO=	.00								
RCON17 MANE	2.34	319.55	217.66	1.51	5.00	318.05	220.00	1.52	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2367E+02 EXCESS= .0000E+00 OUTFLOW= .2367E+02 BASIN STORAGE= .1665E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO=	.00								
RCON17 MANE	2.36	314.02	219.05	1.49	5.00	309.48	220.00	1.49	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2331E+02 EXCESS= .0000E+00 OUTFLOW= .2331E+02 BASIN STORAGE= .1692E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO=	.00								
RCON17 MANE	3.04	152.09	221.83	.71	5.00	149.27	220.00	.71	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1110E+02 EXCESS= .0000E+00 OUTFLOW= .1110E+02 BASIN STORAGE= .1950E-02 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	

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	

EXISTING.OUT

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

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 RC13A-2 MANE	RATIO=	.00	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 RC13A-2 MANE	RATIO=	.00	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 RC13A-2 MANE	RATIO=	.00	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 RC13A-2 MANE	RATIO=	.00	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

FOR PLAN = 1 RC13A-2 MANE	RATIO=	.00	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 RC13A-2 MANE	RATIO=	.00	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 RC13A-2 MANE	RATIO=	.00	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 RC13A-2 MANE	RATIO=	.00	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 RC13A-2 MANE	RATIO=	.00	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 RCPIC-C MANE	RATIO=	.00	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 RCPIC-C MANE	RATIO=	.00	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 RCPIC-C MANE	RATIO=	.00	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 RCPIC-C MANE	RATIO=	.00	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 RCPIC-C MANE	RATIO=	.00	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 RCPIC-C MANE	RATIO=	.00	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 RCPIC-C MANE	RATIO=	.00	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

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								
RCON19 MANE		1.80	2048.82	237.17	2.11	5.00	2044.69	235.00	2.11

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2079E+03 EXCESS= .0000E+00 OUTFLOW= .2079E+03 BASIN STORAGE= .3173E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO=	.00								
RCON19 MANE		1.81	2010.80	237.05	2.07	5.00	2005.77	235.00	2.07

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2036E+03 EXCESS= .0000E+00 OUTFLOW= .2036E+03 BASIN STORAGE= .3176E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO=	.00								
RCON19 MANE		1.83	1943.99	236.30	1.99	5.00	1940.79	235.00	1.99

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1965E+03 EXCESS= .0000E+00 OUTFLOW= .1965E+03 BASIN STORAGE= .3190E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO=	.00								
RCON19 MANE		1.86	1873.16	237.49	1.92	5.00	1871.11	235.00	1.92

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1894E+03 EXCESS= .0000E+00 OUTFLOW= .1894E+03 BASIN STORAGE= .3294E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO=	.00								
RCON19 MANE		1.87	1848.15	237.07	1.89	5.00	1840.12	235.00	1.89

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1866E+03 EXCESS= .0000E+00 OUTFLOW= .1866E+03 BASIN STORAGE= .2772E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO=	.00								
RCON19 MANE		1.87	1825.71	235.94	1.87	5.00	1823.96	235.00	1.87

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1846E+03 EXCESS= .0000E+00 OUTFLOW= .1846E+03 BASIN STORAGE= .2965E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO=	.00								
RCON19 MANE		1.88	1818.28	236.57	1.86	5.00	1811.20	235.00	1.86

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1832E+03 EXCESS= .0000E+00 OUTFLOW= .1832E+03 BASIN STORAGE= .2898E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO=	.00								
RCON19 MANE		1.89	1789.80	237.66	1.84	5.00	1787.73	235.00	1.84

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1809E+03 EXCESS= .0000E+00 OUTFLOW= .1809E+03 BASIN STORAGE= .2791E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO=	.00								
RCON19 MANE		2.41	925.16	238.68	.94	5.00	921.96	240.00	.94

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9262E+02 EXCESS= .0000E+00 OUTFLOW= .9263E+02 BASIN STORAGE= .3358E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO=	.00								
RCON20 MANE		.56	2044.29	235.85	2.10	5.00	2039.68	235.00	2.10

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2087E+03 EXCESS= .0000E+00 OUTFLOW= .2087E+03 BASIN STORAGE= .7328E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO=	.00								
RCON20 MANE		.56	2006.18	235.75	2.06	5.00	2000.73	235.00	2.06

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2044E+03 EXCESS= .0000E+00 OUTFLOW= .2044E+03 BASIN STORAGE= .7376E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO=	.00								
RCON20 MANE		.57	1942.31	235.64	1.99	5.00	1935.31	235.00	1.99

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1972E+03 EXCESS= .0000E+00 OUTFLOW= .1972E+03 BASIN STORAGE= .6937E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO=	.00								
RCON20 MANE		.58	1871.72	235.79	1.92	5.00	1864.98	235.00	1.92

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1901E+03 EXCESS= .0000E+00 OUTFLOW= .1901E+03 BASIN STORAGE= .7025E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO=	.00								
RCON20 MANE		.58	1840.42	235.43	1.89	5.00	1834.24	235.00	1.89

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1873E+03 EXCESS= .0000E+00 OUTFLOW= .1873E+03 BASIN STORAGE= .6843E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00									
RCON20	MANE	.58	1826.16	235.58	1.87	5.00	1817.88	235.00	1.87

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1853E+03 EXCESS= .0000E+00 OUTFLOW= .1853E+03 BASIN STORAGE= .7252E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00									
RCON20	MANE	.58	1813.24	235.58	1.85	5.00	1805.07	235.00	1.85

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1839E+03 EXCESS= .0000E+00 OUTFLOW= .1839E+03 BASIN STORAGE= .6861E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00									
RCON20	MANE	.59	1788.45	235.48	1.83	5.00	1781.38	235.00	1.83

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1816E+03 EXCESS= .0000E+00 OUTFLOW= .1816E+03 BASIN STORAGE= .7265E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00									
RCON20	MANE	.74	922.05	240.78	.94	5.00	919.90	240.00	.94

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9284E+02 EXCESS= .0000E+00 OUTFLOW= .9284E+02 BASIN STORAGE= .7597E-03 PERCENT ERROR= .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

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 ***

HYDROLOGIC CRITERIA AND DESIGN MANUAL

TIME OF CONCENTRATION

GCV ENGINEERS \ SURVEYORS

The Seventy
Proposed Conditions

Project No: 840-050
Date: 17-Feb-16
Calculated by: MMC

SUB-BASIN DATA						INITIAL / OVERLAND TIME (Ti)			TRAVEL TIME (Tt)					Tc CHECK URBANIZED BASINS		Tc	Tlag	REMARKS
DESIG: (1)	DEV./EX. (D or E)	CN (16)	K (2)	AREA Ac (3)	AREA Sq Mi (4)	INITIAL LENGTH Feet (5)	SLOPE % (6)	Ti Min (7)	TRAVEL LENGTH Feet (8)	SLOPE % (9a)	V1 VELOCITY fps (9b)	V2 VELOCITY fps (10)	Tt Min (11)	TOTAL LENGTH Feet (12)	Tc = (L/180)+10 Min (13)	Min (14)	Tlag = 0.6Tc/60 Hours (15)	Rainfall:
57B-1	D	93.7	0.8468	31.1	0.0485	250	2.80	5.1	3020	2.2	3.0	4.5	12.2	3270	28.2	17.3	0.173	2.89
57B-1A	D	85	0.7320	28.4	0.0443	370	2.40	9.5	2080	2.3	3.1	4.6	8.4	2450	23.6	17.9	0.179	2.96
57B-1B	D	93	0.8376	19.3	0.0301	100	1.00	4.7	1630	1.0	2.0	3.1	10.3	1730	19.6	15.0	0.150	2.91
57B-1C	D	96	0.8772	0.6	0.0009	50	1.00	2.8	490	1.2	2.2	3.4	3.7	540	13.0	6.5	0.065	2.89
57B-2A	D	87	0.7584	6.3	0.0098	186	13.40	3.5	2700	1.7	2.6	4.0	12.4	2886	26.0	15.9	0.159	3.05
57B-2B	D	87	0.7584	3.0	0.0047	50	2.00	3.5	1400	2.7	3.3	5.0	5.5	1450	18.1	8.9	0.089	2.99
57B-2C	D	87	0.7584	1.7	0.0027	100	1.00	6.1	222	6.8	5.3	8.0	0.7	322	11.8	6.9	0.069	2.96
57B-2D	D	91	0.8112	5.7	0.0088	110	1.00	5.5	1200	1.1	2.1	3.2	7.6	1310	17.3	13.0	0.130	3.09
57B-2E	D	91	0.8112	14.5	0.0227	110	1.00	5.5	1360	3.4	3.7	5.6	4.8	1470	18.2	10.2	0.102	3.08
57B-2F	D	91	0.8112	57.8	0.0902	110	1.00	5.5	3000	2.5	3.2	4.8	11.2	3110	27.3	16.7	0.167	3.03
57B-2G1	D	87	0.7584	1.6	0.0026	35	5.60	2.0	730	2.9	3.4	5.2	3.2	765	14.3	5.2	0.052	3.08
57B-2G2	D	87	0.7584	4.6	0.0073	40	2.50	2.9	1511	2.2	3.0	4.5	6.5	1551	18.6	9.4	0.094	3.03
57B-2H1	D	87	0.7584	18.6	0.0291	300	3.70	6.9	4120	1.1	2.1	3.2	22.7	4420	34.6	29.6	0.296	3.01
57B-2H2	D	87	0.7584	10.0	0.0156	300	2.30	8.1	2500	2.2	3.0	4.5	10.1	2800	25.6	18.2	0.182	3.04
57B-2I	D	87	0.7584	4.6	0.0072	80	7.50	2.8	1575	2.6	3.3	4.9	6.2	1655	19.2	9.0	0.090	2.99
57B-3	D	89.3	0.7888	30.8	0.0481	380	1.30	10.0	4170	2.4	3.1	4.7	15.6	4550	35.3	25.6	0.256	3.06
57B-3A	D	85	0.7320	16.6	0.0259	170	1.00	8.6	1360	2.0	2.9	4.3	6.2	1530	18.5	14.9	0.149	3.07
57B-3B	D	85	0.7320	32.8	0.0513	110	1.00	6.9	2500	2.4	3.1	4.7	9.7	2610	24.5	16.6	0.166	3.00
57B-3C	D	87	0.7584	4.4	0.0069	130	1.00	7.0	1140	2.5	3.2	4.8	4.8	1270	17.1	11.8	0.118	3.05
57B-3D	D	87	0.7584	11.8	0.0184	125	1.00	6.9	2500	2.7	3.3	5.0	9.1	2625	24.6	16.0	0.160	2.99
57B-3E	D	87	0.7584	16.0	0.0251	240	1.00	9.5	3200	2.5	3.2	4.8	11.9	3440	29.1	21.4	0.214	3.06
57B-3F	D	87	0.7584	7.4	0.0116	180	2.70	5.9	2170	2.5	3.2	4.9	8.3	2350	23.1	14.2	0.142	3.05
57B-3G	D	87	0.7584	1.5	0.0023	220	3.20	6.2	260	4.6	4.3	6.6	1.0	480	12.7	7.2	0.072	2.99
57B-4	D	93.8	0.8482	82.7	0.1293	35	2.00	2.1	4890	2.4	3.1	4.7	18.1	4925	37.4	20.2	0.202	2.91
57B-4B	D	96	0.8772	7.1	0.0110	150	2.70	3.5	860	2.9	3.4	5.2	3.6	1010	15.6	7.1	0.071	2.91
57B-4C	D	96	0.8772	7.8	0.0122	100	1.00	4.0	1560	1.6	2.6	3.9	7.8	1660	19.2	11.8	0.118	2.90
ON1	D	82	0.6924	25.4	0.0397	165	4.20	5.8	2040	3.0	3.5	5.3	7.2	2205	22.3	13.1	0.131	3.08
ON2	D	82	0.6924	17.5	0.0273	180	5.00	5.8	2700	2.5	3.2	4.8	10.2	2880	26.0	15.9	0.159	3.00
ON3R	D	82	0.6924	4.1	0.0065	135	12.00	3.7	500	1.7	2.6	4.0	3.2	635	13.5	6.9	0.069	2.96
ON5	D	82	0.6924	9.4	0.0147	125	4.00	5.2	1420	2.9	3.4	5.2	5.4	1545	18.6	10.5	0.105	3.05
ON6	D	93	0.8376	2.3	0.0035	20	4.00	1.3	785	1.7	2.6	4.0	4.4	805	14.5	5.7	0.057	3.04
ON8	D	82	0.6924	12.2	0.0190	65	6.20	3.2	1950	8.7	6.0	9.0	4.1	2015	21.2	7.3	0.073	2.99

ON9	D	82	0.6924	25.5	0.0399	290	15.50	5.0	3085	1.0	2.0	3.1	18.2	3375	28.8	23.2	0.232	3.06
ON10	D	82	0.6924	11.4	0.0177	100	29.00	2.4	1460	2.9	3.4	5.2	5.5	1560	18.7	7.9	0.079	2.98
ON11R	D	82	0.6924	5.1	0.0080	270	13.70	5.0	350	1.6	2.6	3.9	2.3	620	13.4	7.3	0.073	2.95
ON12	D	82	0.6924	11.6	0.0182	225	3.50	7.2	1300	3.1	3.6	5.4	4.8	1525	18.5	12.1	0.121	3.08
ON13	D	82	0.6924	12.0	0.0187	210	7.10	5.5	1540	3.6	3.8	5.8	5.2	1750	19.7	10.7	0.107	3.04
ON14	D	82	0.6924	3.5	0.0054	100	1.00	7.3	1575	0.5	1.4	2.2	14.1	1675	19.3	21.5	0.193	3.00
ON15R	D	82	0.6924	21.5	0.0335	120	7.50	4.1	2070	3.3	3.7	5.6	7.0	2190	22.2	11.1	0.111	2.98
ON16R	D	82	0.6924	10.9	0.0171	45	45.00	1.4	2050	3.3	3.7	5.6	6.9	2095	21.6	8.3	0.083	2.97
ON18R	D	82	0.6924	18.5	0.0289	175	0.60	11.5	2565	2.5	3.2	4.9	9.7	2740	25.2	21.2	0.212	2.95
DON1	D	95	0.8640	10.8	0.0169	138	15.50	2.0	1515	1.9	2.8	4.2	7.0	1653	19.2	9.0	0.090	2.93
DON2	D	95	0.8640	19.5	0.0304	100	21.00	1.5	1735	1.7	2.6	4.0	8.3	1835	20.2	9.9	0.099	2.93
DON3	D	95	0.8640	21.1	0.0330	240	5.00	3.8	1530	2.8	3.4	5.1	5.8	1770	19.8	9.7	0.097	2.91
DON4	D	95	0.8640	17.4	0.0272	109	2.80	3.1	1650	0.03	0.3	0.5	60.0	1759	19.8	63.1	0.198	2.88

Tc = Ti + Tt Tlag = 0.6 Tc

Ti = 1.8 (1.1 - K) $L^{1/2}$ / $S^{1/3}$

K = 0.0132 (CN) - 0.39

For the travel time (Tt) calculations,
V1 applies to the first 500 feet of travel distance;
V2 applies to the remaining travel distance.

Existing: V1 = 14.8*(S/100)$^{1/2}$
V2 = 29.4*(S/100)$^{1/2}$

Developed: V1 = 20.2*(S/100)$^{1/2}$
V2 = 30.6*(S/100)$^{1/2}$

REFERENCE: CN values referenced from MPU

STANDARD FORM 4

REPLY APP 0582 CLV300680
5718

```
1*****************************************
*                                       *
*    FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*              JUN  1998                *
*            VERSION 4.1                *
*                                       *
*  RUN DATE   03MAR16  TIME  10:06:14   *
*                                       *
*****************************************
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```
*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*          609 SECOND STREET            *
*        DAVIS, CALIFORNIA 95616        *
*            (916) 756-1104             *
*                                       *
*****************************************
```

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

HEC-1 INPUT

```
1
          LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
                    *DIAGRAM
 *** FREE ***
              1     ID   ***************************************************************
              2     ID   * ...................................................... *
              3     ID   * :                                                    : *
              4     ID   * :                THE SEVENTY                         : *
              5     ID   * :                                                    : *
              6     ID   * :                PROPOSED CONDITIONS                 : *
              7     ID   * :....................................................: *
              8     ID   * :                RETURN PERIOD_ _ _ _100 & 10 -YEAR  : *
              9     ID   * :                DISTRIBUTION_ _ _ _ 6-HOUR SDN3     : *
             10     ID   * :                PROJECT NO_ _ _ _ _ 840.050         : *
             11     ID   * :                FILENAME_ _ _ _ _ _ PROPOSED.H1     : *
             12     ID   * :                DATE MODELED_ _ _ _ 2/22/16         : *
             13     ID   * :                MODELED BY_ _ _ _ _ JAM, MMC, RRD, SHT : *
             14     ID   * :....................................................: *
             15     ID   * :                                                    : *
             16     ID   * :                                                    : *
             17     ID   ***************************************************************
             18     ID
             19     ID    REFERENCED HYDROLOGIC MODELS:
             20     ID    2013 LAS VEGAS VALLEY FLOOD CONTROL MASTER PLAN UPDATE
             21     ID    CITY OF LAS VEGAS CITY WIDE HYDROLOGY ANALYSIS (PBS&J 1997)
             22     ID    CLARK COUNTY REGIONAL FLOOD CONTROL DISTRICT 2008 MASTER PLAN UPDATE
             23     ID    GOWAN WATERSHED (ALL)
             24     ID    RECOMMENDED DRAINAGE SYSTEM WITH ULTIMATE DEVELOPMENT
             25     ID    INPUT FILE = ALLGOW3.DAT
             26     ID    INPUT FILE DATE = MAY 5, 2008
             27     ID    DESIGN STORM = 100-YEAR 6-HR STORM
             28     ID    STORM DISTRIBUTION = SDN #3
             29     ID    MODELED BY PBS&J (MICHELE L. D'ALESSANDRO, E.I., CFM)
             30     ID    CHECKED BY PBS&J (HARSHAL B. DESAI, P.E., CFM)
             31     ID    STORM CENTERING = FULL WATERSHED
             32     ID    JR CARDS CONTAIN DARFS BASED ON THE FOLLOWING VALUES:
             33     ID
             34     ID                              AREA     DARF
             35     ID                              SQ. MI.
             36     ID                              0-0.5    0.99
             37     ID                              0.5-1    0.975
             38     ID                              1-2      0.95
             39     ID                              2-3      0.925
             40     ID                              3-4      0.915
             41     ID                              4-5      0.908
             42     ID                              5-6      0.903
             43     ID                              6-7      0.895
             44     ID                              10YR     0.570
             45     ID
             46     ID    JR CARD RATIOS REPRESENT DEPTH-AREA REDUCTION FACTORS (DARF'S)
             47     ID
             48     ID    100-YEAR,  6-HOUR STORM,  SDN3
             49     ID
             50     IT       5       0       0      700
             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
                    *
```


HEC-1 INPUT

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

             54     KK    ON1
             55     KM  OFFSITE BASIN ON1
             56     PB    3.08
             57     BA  0.0397
             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    .131
            *

68          KK  57B-3A
69          KM  ONSITE BASIN 57B-3A
70          PB    3.07
71          BA  0.0259
72          LS       0       85
73          UD    .149
            *

74          KK     CON1
75          KM  COMBINE 57B-3A AND ON1
76          HC        2
            *

77          KK    RCON1
78          KM  ROUTE CON1 TO CON2
79          KM   LENGTH  SLOPE   n-VALUE          SHAPE    WIDTH   S-SLOPE
80          RD     3020    .027    .040       0   TRAP      50       3
            *

81          KK  57B-3B
82          KM  OFFSITE BASIN 57B-3B
83          PB    3.00
84          BA  0.0513
85          LS       0       85
86          UD    .166
            *

87          KK     ON2
88          KM  OFFSITE BASIN ON2
89          PB    3.00
90          BA  0.0273
91          LS       0       82
92          UD    .159
            *
```



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

93          KK     CON2
94          KM  COMBINE CON1, 57B-3B AND ON2
95          HC        3
            *

96          KK  57B-3D
97          KM  OFFSITE BASIN 57B-3D
98          PB    2.99
99          BA  0.0184
100         LS       0       87
101         UD    .160
            *

102         KK    ON3R
103         KM  ONSITE BASIN ON3R
104         PB    2.96
105         BA  0.0065
106         LS       0       82
107         UD    .069
            *

108         KK    CON3R
109         KM  COMBINE CON2, 57B-3D AND ON3R
110         HC        3
            *

111         KK     ON5
112         KM  OFFSITE BASIN ON5
113         PB    3.05
114         BA  0.0147
115         LS       0       82
116         UD    .105
            *

117         KK  57B-3C
118         KM  OFFSITE BASIN 57B-3C
119         PB    3.05
120         BA  0.0069
121         LS       0       87
122         UD    .118
            *

123         KK     ON6
124         KM  OFFSITE BASIN ON6
125         PB    3.04
126         BA  0.0035
127         LS       0       93
128         UD    .057
            *
```



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

129         KK     CON6
130         KM  COMBINE 57B-3C AND ON6
131         HC        2
            *

132         KK    CCON6
133         KM  COMBINE ON5 AND CON6
134         HC        2
            *

135         KK   RCCON6
136         KM  ROUTE CCON6 TO CON8
137         KM   LENGTH  SLOPE   n-VALUE          SHAPE    WIDTH   S-SLOPE
138         RD     2015    .037    .040       0   TRAP      20       2
            *
```

```
139          KK    ON8
140          KM  ONSITE BASIN ON8
141          PB    2.99
142          BA  0.0190
143          LS       0       82
144          UD    .073
             *

145          KK    CON8
146          KM  COMBINE CCON6 AND ON8
147          HC       2
             *

148          KK    SW11
149          KM  REFERENCED FROM 2013 MPU
150          BA   0.589
151          PB    3.34
152          LS       0    87.8
153          UD   0.311
             *

154          KK   RSW11
155          KM  REFERENCED FROM 2013 MPU
156          KM  ROUTE SW11 TO CSW17
157          KM  FACILITY = ANGEL PARK - CHARLESTON BOULEVARD
158          KM  FACILITY # = APCB 0064, 0080
159          KM  LINING = RCB
160          RD    2338  0.0167   0.015       0    TRAP       7       0
             *

161          KK    SW17
162          KM  REFERENCED FROM 2013 MPU
163          BA   0.356
164          PB    3.30
165          LS       0    87.8
166          UD   0.271
             *
```



```
1                                    HEC-1 INPUT

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

167          KK   CSW17
168          KM  REFERENCED FROM 2013 MPU
169          KM  COMBINE RSW11 AND SW17
170          HC       2
             *

171          KK  RCSW17
172          KM  REFERENCED FROM 2013 MPU
173          KM  ROUTE CSW17 TO CSW18
174          KM  FACILITY = ANGEL PARK - CHARLESTON BOULEVARD
175          KM  FACILITY # = APCB 0000,0001,0019,0050
176          KM  LINING = RCB
177          RD    3600   0.014   0.015       0    TRAP      11       0
             *

178          KK    SW18
179          KM  REFERENCED FROM 2013 MPU
180          BA   0.405
181          PB    3.27
182          LS       0    86.8
183          UD   0.271
             *

184          KK   CSW18
185          KM  REFERENCED FROM 2013 MPU
186          KM  COMBINE RCSW17 AND SW18
187          HC       2
             *

188          KK  RCSW18
189          KM  REFERENCED FROM 2013 MPU
190          KM  ROUTE CSW18 TO C12A
191          KM  FACILITY = ANGEL PARK SOUTH
192          KM  FACILITY # = APSO 0254,0255,0258,0345,0346; APCB 0000
193          KM  NATURAL WASH
194          KM  LENGTH = 5,200
195          KM  SLOPE = 1.4%
196          KM  N = 0.040
197          KM  HYDRAULIC RADIUS = 1.5
198          KM  VELOCITY =  9.2
199          RM       2   0.157    0.15
             *

200          KK    12A
201          KM  REFERENCED FROM 2013 MPU
202          BA   0.392
203          PB    3.20
204          LS       0    91.2
205          UD   0.264
             *
```



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1                                    HEC-1 INPUT

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

206          KK    C12A
207          KM  REFERENCED FROM 2013 MPU
208          KM  COMBINE 12A AND RCSW18
209          HC       2
             *

210          KK   RC12A
211          KM  REFERENCED FROM 2013 MPU
212          KM  ROUTE THRU 12B
213          KM  FACILITY = ANGEL PARK SOUTH
214          KM  FACILITY # = APSO 0204, 0205
215          KM  NATURAL WASH
216          KM  LENGTH = 2,600
217          KM  SLOPE = 3.5%
218          KM  N = 0.040
```

```
219          KM  HYDRAULIC RADIUS = 1.5
220          KM  VELOCITY = 14.5
221          RM        1    0.05    0.15
             *

222          KK     12B
223          KM  REFERENCED FROM 2013 MPU
224          BA   0.260
225          PB    3.13
226          LS       0      91.0
227          UD   0.233
             *

228          KK    C12B
229          KM  REFERENCED FROM 2013 MPU
230          KM  COMBINE 12B AND RC12A
231          HC       2
             *

232          KK  57B-2A
233          KM  OFFSITE BASIN 57B-2A
234          PB    3.05
235          BA  0.0098
236          LS       0       87
237          UD    .159
             *

238          KK  57B-3F
239          KM  OFFSITE BASIN 57B-3F
240          PB    3.05
241          BA  0.0116
242          LS       0       87
243          UD    .142
             *
```



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

244          KK  57B-3E
245          KM  OFFSITE BASIN 57B-3E
246          PB    3.06
247          BA  0.0251
248          LS       0       87
249          UD    .214
             *

250          KK     ON9
251          KM  ONSITE BASIN ON9
252          PB    3.06
253          BA  0.0399
254          LS       0       82
255          UD    .232
             *

256          KK    CON9
257          KM  COMBINE C12B, 57B-2A, 57B-3F, 57B-3E AND ON9
258          HC       5
             *

259          KK   RCON9
260          KM  ROUTE CON9 TO CON10
261          KM   LENGTH  SLOPE   n-VALUE        SHAPE   WIDTH   S-SLOPE
262          RD    1540   .030    .040      0    TRAP      50       2
             *

263          KK  57B-3G
264          KM  OFFSITE BASIN 57B-3G
265          PB    2.99
266          BA  0.0023
267          LS       0       87
268          UD    .072
             *

269          KK  57B-2B
270          KM  OFFSITE BASIN 57B-2B
271          PB    2.99
272          BA  0.0047
273          LS       0       87
274          UD    .089
             *

275          KK  57B-2C
276          KM  OFFSITE BASIN 57B-2C
277          PB    2.96
278          BA  0.0027
279          LS       0       87
280          UD    .069
             *
```



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

281          KK    ON10
282          KM  ONSITE BASIN ON10
283          PB    2.98
284          BA  0.0177
285          LS       0       82
286          UD    .079
             *

287          KK   CON10
288          KM  COMBINE CON9, 57B-3G, 57B-2B, 57B-2C AND ON10
289          HC       5
             *

290          KK  CCON10
291          KM  COMBINE CON8 AND CON10
292          HC       2
             *
```

```
293          KK   ON11R
294          KM  ONSITE BASIN ON11R
295          PB    2.95
296          BA  0.0080
297          LS       0       82
298          UD    .073
             *

299          KK  CON11R
300          KM  COMBINE CCON10 AND ON11R
301          HC       2
             *

302          KK  57B-2D
303          KM  OFFSITE BASIN 57B-2D
304          PB    3.09
305          BA  0.0088
306          LS       0       91
307          UD    .130
             *

308          KK  57B-2E
309          KM  OFFSITE BASIN 57B-2E
310          PB    3.08
311          BA  0.0227
312          LS       0       91
313          UD    .102
             *

314          KK C57B-2E
315          KM  COMBINE 57B-2D AND 57B-2E
316          HC       2
             *
```



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

317          KK 57B-2G1
318          KM  OFFSITE BASIN 57B-2G1
319          PB    3.08
320          BA  0.0026
321          LS       0       87
322          UD    .052
             *

323          KK    ON12
324          KM  ONSITE BASIN ON12
325          PB    3.08
326          BA  0.0182
327          LS       0       82
328          UD    .121
             *

329          KK   CON12
330          KM  COMBINE C57B-2E, 57B-2G1 AND ON12
331          HC       3
             *

332          KK 57B-2G2
333          KM  OFFSITE BASIN 57B-2G2
334          PB    3.03
335          BA  0.0073
336          LS       0       87
337          UD    .094
             *

338          KK    ON13
339          KM  ONSITE BASIN ON13
340          PB    3.04
341          BA  0.0187
342          LS       0       82
343          UD    .107
             *

344          KK   CON13
345          KM  COMBINE CON12, 57B-2G2 AND ON13
346          HC       3
             *

347          KK  57B-2F
348          KM  OFFSITE BASIN 57B-2F
349          PB    3.03
350          BA  0.0902
351          LS       0       91
352          UD    .167
             *
```



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

353          KK 57B-2H2
354          KM  OFFSITE BASIN 57B-2H2
355          PB    3.04
356          BA  0.0156
357          LS       0       87
358          UD    .182
             *

359          KK    ON14
360          KM  ONSITE BASIN ON14
361          PB    3.00
362          BA  0.0054
363          LS       0       82
364          UD    .193
             *

365          KK   CON14
366          KM  COMBINE C57B-2F, 57B-2H2 AND ON14
367          HC       3
             *
```

```
368          KK  RCON14
369          KM  ROUTE CON14 TO CON15R
370          KM   LENGTH  SLOPE   n-VALUE        SHAPE    WIDTH   S-SLOPE
371          RD    2160    .032    .040      0    TRAP      20       2
             *

372          KK  57B-2I
373          KM  OFFSITE BASIN 57B-2I
374          PB    2.99
375          BA  0.0072
376          LS       0       87
377          UD    .090
             *

378          KK 57B-2H1
379          KM  OFFSITE BASIN 57B-2H1
380          PB    3.01
381          BA  0.0291
382          LS       0       87
383          UD    .296
             *

384          KK   ON15R
385          KM  ONSITE BASIN ON15R
386          PB    2.98
387          BA  0.0335
388          LS       0       82
389          UD    .111
             *
```



```
1                                    HEC-1 INPUT

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

390          KK  CON15R
391          KM  COMBINE CON13, CON14, 57B-21, 57B-2H1 AND ON15R
392          HC       5
             *

393          KK   ON16R
394          KM  ONSITE BASIN ON16R
395          PB    2.97
396          BA  0.0171
397          LS       0       82
398          UD    .083
             *

399          KK  CON16R
400          KM  COMBINE CON15R AND ON16R
401          HC       2
             *

402          KK   CPPH1
403          KM  COMBINE CON3R, CON11R AND CON16R
404          HC       3
             *

405          KK    DON1
406          KM  ONSITE BASIN DON1
407          PB    2.93
408          BA  0.0169
409          LS       0       95
410          UD    .090
             *

411          KK    DON2
412          KM  ONSITE BASIN DON2
413          PB    2.93
414          BA  0.0304
415          LS       0       95
416          UD    .099
             *

417          KK   CDON2
418          KM  COMBINE CCON16R, CDON1 AND DON2
419          HC       3
             *

420          KK  RCDON2
421          KM  ROUTE CDON2 TO CDON3
422          KM   LENGTH  SLOPE   n-VALUE        SHAPE    WIDTH   S-SLOPE
423          RD    1000    .048    .016      0    TRAP      10       50
             *
```



```
1                                    HEC-1 INPUT

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

424          KK   13B-1
425          KM  REFERENCED FROM 2013 MPU
426          BA   0.249
427          PB    3.19
428          LS       0    91.6
429          UD   0.284
             *

430          KK RC13B-1
431          KM  REFERENCED FROM 2013 MPU
432          KM  ROUTE 13B-1 TO C13B-2
433          KM  GRIFFITH PARK DRIVE AND HUALAPAI WAY
434          RD    3000   0.018   0.016       0    TRAP       0       50
             *

435          KK   13B-2
436          KM  REFERENCED FROM 2013 MPU
437          BA   0.216
438          PB    3.14
439          LS       0    89.7
440          UD   0.231
             *
```

```
441         KK  C13B-2
442         KM  REFERENCED FROM 2013 MPU
443         KM  COMBINE 13B-2 AND RC13B-1
444         KM  HUALAPAI WAY AND LOCAL FACILITY
445         HC       2
            *
446         KK RC13B-2
447         KM  REFERENCED FROM 2013 MPU
448         KM  ROUTE C13B-2 TO CCPIC-A
449         KM  LINING = GRASS
450         RD    4900   0.021    0.03       0    TRAP      40       6
            *
451         KK     19A
452         KM  REFERENCED FROM 2013 MPU
453         BA   0.253
454         PB    3.25
455         LS       0     89.9
456         UD   0.351
            *
457         KK     R19A
458         KM  REFERENCED FROM 2013 MPU
459         KM  ROUTE 19A TO C13A-1
460         KM  UNNAMED ROAD
461         RD    4300   0.021   0.016       0    TRAP       0      50
            *
```



```
LINE        ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
            *
462         KK   13A-1
463         KM  REFERENCED FROM 2013 MPU
464         BA   0.224
465         PB    3.19
466         LS       0     91.4
467         UD   0.302
            *
468         KK  C13A-1
469         KM  REFERENCED FROM 2013 MPU
470         KM  COMBINE 13A-1 AND R19A
471         KM  TOWN CENTER DRIVE AND SWALE
472         HC       2
            *
473         KK RC13A-1
474         KM  REFERENCED FROM 2013 MPU
475         KM  ROUTE C13A-1 TO C13A-2
476         KM  NATURAL WASH
477         KM  TRAVEL LENGTH = 2,800
478         KM  SLOPE = 2.1%
479         KM  N = 0.040
480         KM  HYDRAULIC RADIUS = 1.5
481         KM  VELOCITY = 11.4
482         RM       1   0.068     0.15
            *
483         KK   13A-2
484         KM  REFERENCED FROM 2013 MPU
485         BA   0.188
486         PB    3.15
487         LS       0     90.0
488         UD   0.236
            *
489         KK  C13A-2
490         KM  REFERENCED FROM 2013 MPU
491         KM  COMBINE 13A-2 AND RC13A-1
492         HC       2
            *
493         KK RC13A-2
494         KM  REFERENCED FROM 2013 MPU
495         KM  ROUTE C13A-2 TO CPIC-C
496         KM  LINING = GRASS
497         RD    5200   0.015    0.03       0    TRAP      40       4
            *
498         KK    PIC-C
499         KM  REFERENCED FROM 2013 MPU
500         BA   0.243
501         PB    3.08
502         LS       0     90.4
503         UD   0.373
            *
```



```
LINE        ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
            *
504         KK  CPIC-C
505         KM  REFERENCED FROM 2013 MPU
506         KM  COMBINE PIC-C AND RC13A-2
507         HC       2
            *
508         KK RCPIC-C
509         KM  REFERENCED FROM 2013 MPU
510         KM  ROUTE CPIC-C TO CPIC-A
511         KM  LINING = GRASS
512         RD    2200   0.025    0.03       0    TRAP      40       4
            *
513         KK    PIC-A
514         KM  REFERENCED FROM 2013 MPU
515         BA   0.359
516         PB    3.03
517         LS       0     91.1
518         UD   0.499
```

```
*
519          KK  CPIC-A
520          KM  REFERENCED FROM 2013 MPU
521          KM  COMBINE RCPIC-C AND PIC-A
522          HC       2
*
523          KK CCPIC-A
524          KM  REFERENCED FROM 2013 MPU
525          KM  COMBINE CPIC-A AND RC13B-2
526          HC       2
*
527          KK   ON18R
528          KM  ONSITE BASIN ON18R
529          PB    2.95
530          BA  0.0289
531          LS       0      82
532          UD    .212
*
533          KK  CON18R
534          KM  COMBINE CCPIC-A AND ON18R
535          HC       2
*
536          KK  57B-1A
537          KM  OFFSITE BASIN 57B-1A
538          PB    2.96
539          BA  0.0443
540          LS       0      85
541          UD    .179
*
1                                        HEC-1 INPUT                                        PAGE 15
LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
542          KK CCON18R
543          KM  COMBINE 57B-1A AND CON18R
544          HC       2
*
545          KKRCCON18R
546          KM  ROUTE CCON18R TO CDON3
547          KM   LENGTH  SLOPE   n-VALUE        SHAPE    WIDTH   S-SLOPE
548          RD    1520    .014    .016      0   TRAP      10      50
*
549          KK  57B-1B
550          KM  OFFSITE BASIN 57B-1B
551          PB    2.91
552          BA  0.0301
553          LS       0      93
554          UD    .150
*
555          KK    CP19
556          KM  COMBINE CCON18R AND 57B-1B
557          HC       2
*
558          KK  57B-1C
559          KM  OFFSITE BASIN 57B-1C
560          PB    2.89
561          BA  0.0009
562          LS       0      96
563          UD    .065
*
564          KK    CP20
565          KM  COMBINE CP19 AND 57B-1C
566          HC       2
*
567          KK    DON3
568          KM  ONSITE BASIN DON3
569          PB    2.91
570          BA  0.0330
571          LS       0      95
572          UD    .097
*
573          KK   CDON3
574          KM  COMBINE DON3, CP20 AND CDON2
575          HC       3
*
1                                        HEC-1 INPUT                                        PAGE 16
LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
576          KK  RCDON3
577          KM  ROUTE CDON3 TO CDON4
578          KM   LENGTH  SLOPE   n-VALUE        SHAPE    WIDTH   S-SLOPE
579          RD    1500    .003    .016      0   TRAP      15      50
*
580          KK    DON4
581          KM  ONSITE BASIN DON4
582          PB    2.88
583          BA  0.0272
584          LS       0      95
585          UD    .198
*
586          KK  57B-4B
587          KM  OFFSITE BASIN 57B-4B
588          PB    2.91
589          BA  0.0110
590          LS       0      96
```

```
591          UD    .071
             *

592          KK  57B-4C
593          KM  OFFSITE BASIN 57B-4C
594          PB    2.90
595          BA  0.0122
596          LS       0      96
597          UD    .118
             *

598          KK C57B-4C
599          KM  COMBINE 57B-4B AND 57B-4C
600          HC       2
             *

601          KK   CDON4
602          KM  COMBINE DON4, CDON3 AND C57B-4C
603          HC       3
             *

604          KK   57B-1
605          KM  OFFSITE BASIN 57B-1
606          BA  0.0485
607          PB    2.89
608          LS       0    93.7
609          UD   0.173
             *

610          KK   PIC-B
611          KM  REFERENCED FROM 2013 MPU
612          BA   0.441
613          PB    2.98
614          LS       0    91.1
615          UD   0.471
             *
```


1 HEC-1 INPUT

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

616          KK  RPIC-B
617          KM  REFERENCED FROM 2013 MPU
618          KM  ROUTE PIC-B TO CC57B-4
619          KM  FACILITY = ANGEL PARK - PECCOLE 1
620          KM  FACILITY # = APP1 0000
621          KM  LINING = RCP
622          RD     2982   0.024   0.013       0    CIRC       6
             *

623          KK   57B-3
624          KM  OFFSITE BASIN 57B-3
625          BA  0.0481
626          PB    3.06
627          LS       0    89.3
628          UD   0.256
             *

629          KK   57B-4
630          KM  OFFSITE BASIN 57B-4
631          BA  0.1293
632          PB    2.91
633          LS       0    93.8
634          UD   0.202
             *

635          KK  C57B-4
636          KM  COMBINE 57B-3 AND 57B-4
637          HC       2
             *

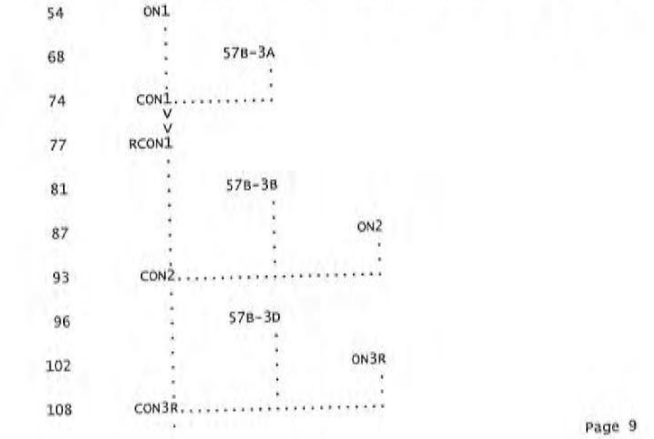
638          KK CC57B-4
639          KM  COMBINE RPIC-B, 57B-1, C57B-4, AND CDON4
640          HC       4
             *
641          ZZ
```

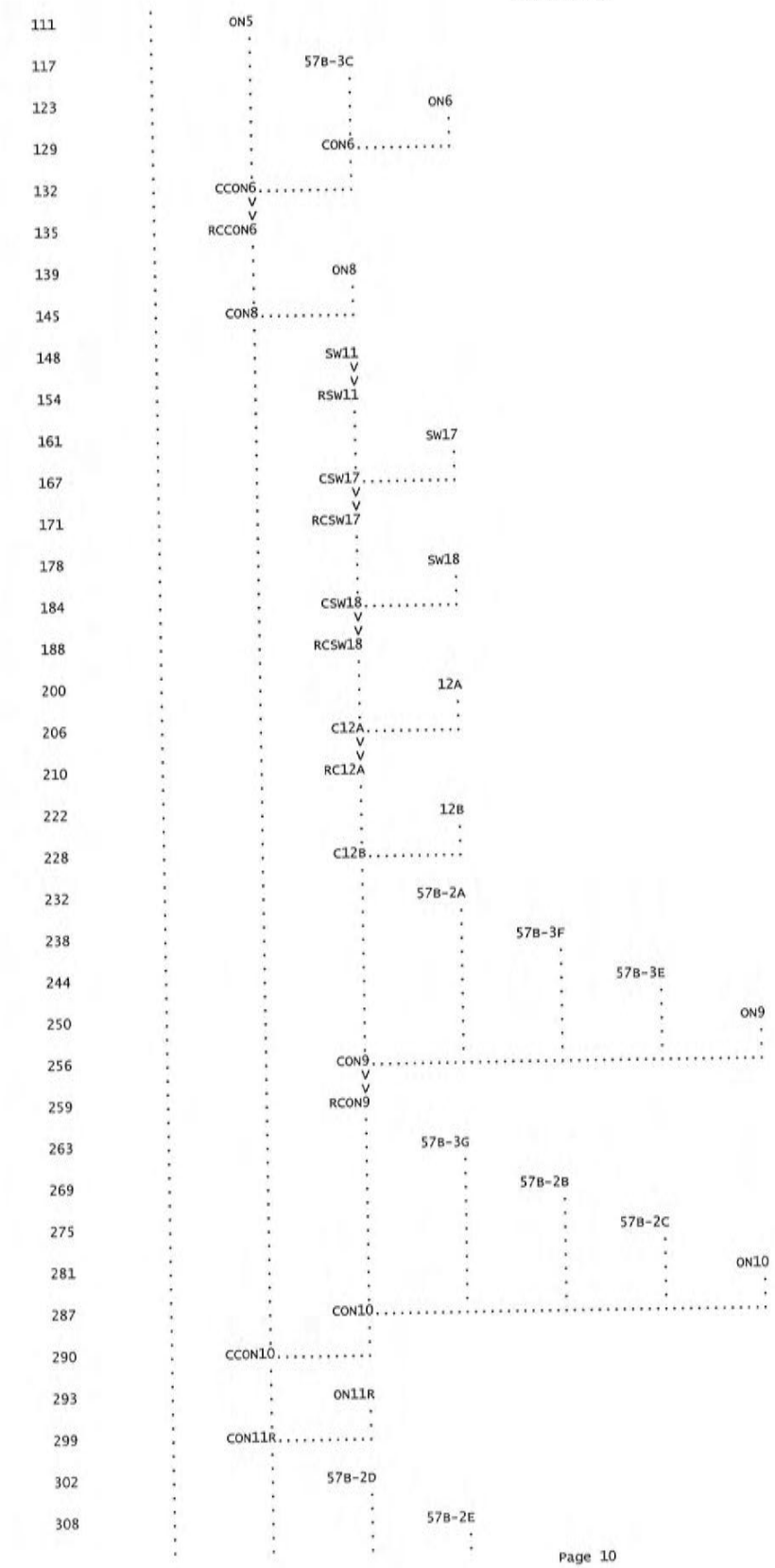
1 SCHEMATIC DIAGRAM OF STREAM NETWORK

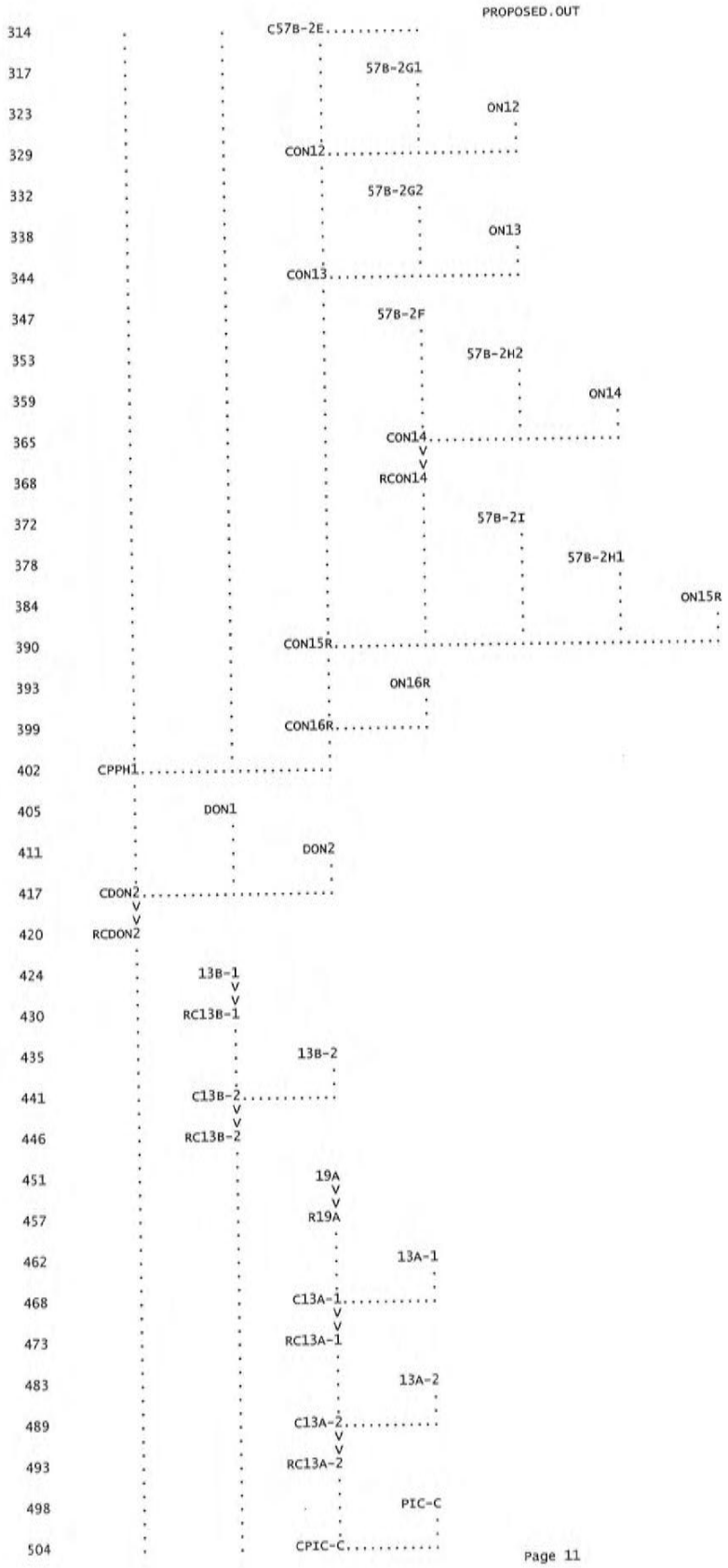
INPUT LINE NO.

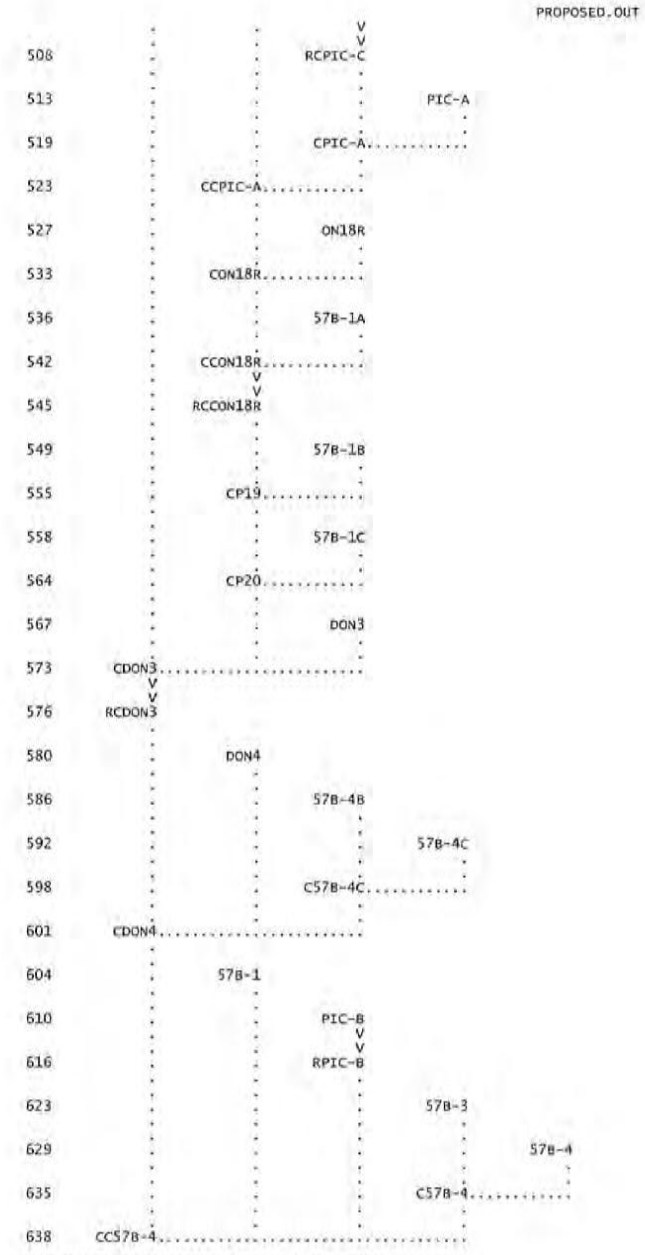
(V) ROUTING (---->) DIVERSION OR PUMP FLOW

(.) CONNECTOR (<----) RETURN OF DIVERTED OR PUMPED FLOW




111
ON5
117
57B-3C
123
ON6
129
CON6
132
CCON6
135
RCCON6
139
ON8
145
CON8
148
SW11
154
RSW11
161
SW17
167
CSW17
171
RCSW17
178
SW18
184
CSW18
188
RCSW18
200
12A
206
C12A
210
RC12A
222
12B
228
C12B
232
57B-2A
238
57B-3F
244
57B-3E
250
ON9
256
CON9
259
RCON9
263
57B-3G
269
57B-2B
275
57B-2C
281
ON10
287
CON10
290
CCON10
293
ON11R
299
CON11R
302
57B-2D
308
57B-2E


314 C57B-2E
317 57B-2G1
323 ON12
329 CON12
332 57B-2G2
338 ON13
344 CON13
347 57B-2F
353 57B-2H2
359 ON14
365 CON14
368 RCON14
372 57B-2I
378 57B-2H1
384 ON15R
390 CON15R
393 ON16R
399 CON16R
402 CPPH1
405 DON1
411 DON2
417 CDON2
420 RCDON2
424 13B-1
430 RC13B-1
435 13B-2
441 C13B-2
446 RC13B-2
451 19A
457 R19A
462 13A-1
468 C13A-1
473 RC13A-1
483 13A-2
489 C13A-2
493 RC13A-2
498 PIC-C
504 CPIC-C



(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

1

```
*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*             JUN  1998                 *
*           VERSION 4.1                 *
*                                       *
*  RUN DATE   24FEB16  TIME  10:49:22   *
*                                       *
*****************************************
```

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

```
************************************************************
* ;.......................................................; *
* ;                                                       ; *
* ;              THE SEVENTY                              ; *
* ;              EHB COMPANIES                            ; *
* ;              PROPOSED CONDITIONS                      ; *
* ;.......................................................; *
* ;              RETURN PERIOD_ _ _ _100 & 10 -YEAR       ; *
* ;              DISTRIBUTION_ _ _ _ 6-HOUR SDN3          ; *
* ;              PROJECT NO_ _ _ _ _ 840.050              ; *
* ;              FILENAME_ _ _ _ _ _ PROPOSED.H1          ; *
* ;              DATE MODELED_ _ _ _ 2/22/16              ; *
************************************************************
```

```
MODELED BY_ _ _ _ _ JAM, MMC, RRD, SHT
```

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 SQ. MI.	DARF
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         700  NUMBER OF HYDROGRAPH ORDINATES
                    NDDATE      3   0  ENDING DATE
                    NDTIME         1015  ENDING TIME
                     ICENT         19  CENTURY MARK

                  COMPUTATION INTERVAL     .08 HOURS
                    TOTAL TIME BASE   58.25 HOURS

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

    JP            MULTI-PLAN OPTION
                      NPLAN          1  NUMBER OF PLANS

    JR            MULTI-RATIO OPTION
                      RATIOS OF PRECIPITATION
                    .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

OPERATION	STATION	AREA	PLAN		RATIOS APPLIED TO PRECIPITATION 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													
+	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	ON3R	.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
3 COMBINED AT	CON3R	.17	1	FLOW	191.	187.	178.	170.	167.	165.	163.	161.	65.
+				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.75
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
HYDROGRAPH AT	ON11R	.01	1	FLOW	11.	11.	10.	10.	10.	9.	9.	9.	4.
+				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
2 COMBINED AT	CON11R	2.17	1	FLOW	2337.	2288.	2209.	2130.	2098.	2075.	2059.	2033.	1026.
+				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	ON15R	.03	1	FLOW	41.	40.	38.	36.	36.	35.	35.	34.	14.
+				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
5 COMBINED AT	CON15R	.26	1	FLOW	344.	337.	324.	312.	307.	304.	301.	297.	142.
+				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT	ON16R	.02	1	FLOW	23.	22.	21.	20.	20.	20.	19.	19.	8.
+				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50

+ 2 COMBINED AT	CON16R	.28	1	FLOW	364.	356.	342.	330.	325.	321.	318.	313.	149.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
+ 3 COMBINED AT	CPPH1	2.61	1	FLOW	2692.	2635.	2543.	2450.	2412.	2386.	2366.	2337.	1153.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
+ HYDROGRAPH AT	DON1	.02	1	FLOW	34.	34.	33.	32.	31.	31.	31.	31.	18.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
+ HYDROGRAPH AT	DON2	.03	1	FLOW	60.	59.	57.	55.	55.	54.	54.	53.	31.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
+ 3 COMBINED AT	CDON2	2.66	1	FLOW	2720.	2663.	2570.	2476.	2438.	2412.	2392.	2363.	1169.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
+ ROUTED TO	RCDON2	2.66	1	FLOW	2712.	2655.	2561.	2467.	2429.	2404.	2383.	2353.	1163.
				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	ON18R	.03	1	FLOW	28.	28.	27.	25.	25.	25.	24.	24.	10.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
+ 2 COMBINED AT	CON18R	1.76	1	FLOW	2013.	1975.	1910.	1844.	1814.	1799.	1786.	1763.	905.
				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

+ 2 COMBINED AT	CCON18R	1.81	1	FLOW	2037.	1998.	1933.	1866.	1836.	1820.	1807.	1784.	913.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	4.00
+ ROUTED TO	RCCON18R	1.81	1	FLOW	2026.	1983.	1915.	1848.	1823.	1804.	1787.	1767.	913.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	4.00
+ 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
+ 2 COMBINED AT	CP19	1.84	1	FLOW	2043.	1999.	1931.	1863.	1838.	1819.	1802.	1782.	920.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	4.00
+ 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
+ 2 COMBINED AT	CP20	1.84	1	FLOW	2043.	2000.	1932.	1864.	1839.	1819.	1802.	1782.	920.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	4.00
+ HYDROGRAPH AT	DON3	.03	1	FLOW	65.	64.	62.	60.	59.	59.	58.	58.	34.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
+ 3 COMBINED AT	CDON3	4.53	1	FLOW	4694.	4597.	4440.	4283.	4221.	4177.	4141.	4092.	2057.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
+ ROUTED TO	RCDON3	4.53	1	FLOW	4670.	4572.	4412.	4253.	4186.	4135.	4103.	4063.	2046.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	4.00
+ 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
+ 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
+ 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
+ 3 COMBINED AT	CDON4	4.58	1	FLOW	4700.	4602.	4441.	4281.	4214.	4162.	4130.	4089.	2059.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	4.00
+ 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	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
+ 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
+ 4 COMBINED AT	CC57B-4	5.25	1	FLOW	5310.	5200.	5020.	4841.	4766.	4709.	4673.	4626.	2326.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	4.00

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

ISTAQ	ELEMENT	DT	PEAK	TIME TO PEAK	VOLUME	DT	INTERPOLATED TO COMPUTATION INTERVAL PEAK	TIME TO PEAK	VOLUME
		(MIN)	(CFS)	(MIN)	(IN)	(MIN)	(CFS)	(MIN)	(IN)
FOR PLAN = 1 RATIO=		.00							
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

PROPOSED,OUT

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

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

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

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

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									
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									
RCDON2	MANE	.81	2715.41	230.47	1.99	5.00	2711.59	230.00	1.99

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2819E+03 EXCESS= .0000E+00 OUTFLOW= .2819E+03 BASIN STORAGE= .2945E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00									
RCDON2	MANE	.81	2659.57	230.89	1.94	5.00	2655.45	230.00	1.94

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2758E+03 EXCESS= .0000E+00 OUTFLOW= .2758E+03 BASIN STORAGE= .3285E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00									
RCDON2	MANE	.82	2565.17	230.51	1.87	5.00	2560.89	230.00	1.87

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2656E+03 EXCESS= .0000E+00 OUTFLOW= .2656E+03 BASIN STORAGE= .3058E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00									
RCDON2	MANE	.83	2471.39	231.01	1.80	5.00	2467.47	230.00	1.80

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2556E+03 EXCESS= .0000E+00 OUTFLOW= .2556E+03 BASIN STORAGE= .2937E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00									
RCDON2	MANE	.83	2432.44	231.09	1.77	5.00	2428.86	230.00	1.77

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2516E+03 EXCESS= .0000E+00 OUTFLOW= .2516E+03 BASIN STORAGE= .2918E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00									
RCDON2	MANE	.83	2408.58	230.88	1.75	5.00	2403.63	230.00	1.75

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2487E+03 EXCESS= .0000E+00 OUTFLOW= .2487E+03 BASIN STORAGE= .3212E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00									
RCDON2	MANE	.84	2387.66	230.52	1.74	5.00	2382.98	230.00	1.74

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2467E+03 EXCESS= .0000E+00 OUTFLOW= .2467E+03 BASIN STORAGE= .2967E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00									
RCDON2	MANE	.84	2357.46	230.40	1.72	5.00	2353.39	230.00	1.72

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2435E+03 EXCESS= .0000E+00 OUTFLOW= .2435E+03 BASIN STORAGE= .3233E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00									
RCDON2	MANE	1.00	1168.71	231.97	.84	5.00	1162.81	235.00	.84

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1196E+03 EXCESS= .0000E+00 OUTFLOW= .1196E+03 BASIN STORAGE= .3200E-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

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

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

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

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

RCCON18R	MANE	2.10	2025.98	234.81	2.11	5.00	2025.84	235.00	2.11

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2035E+03 EXCESS= .0000E+00 OUTFLOW= .2035E+03 BASIN STORAGE= .9016E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCCON18R	MANE	2.11	1985.99	233.85	2.07	5.00	1982.70	235.00	2.07

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1994E+03 EXCESS= .0000E+00 OUTFLOW= .1994E+03 BASIN STORAGE= .8716E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCCON18R	MANE	2.12	1916.18	233.69	2.00	5.00	1915.28	235.00	2.00

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1924E+03 EXCESS= .0000E+00 OUTFLOW= .1924E+03 BASIN STORAGE= .7622E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCCON18R	MANE	2.14	1850.58	237.90	1.93	5.00	1847.74	235.00	1.93

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1855E+03 EXCESS= .0000E+00 OUTFLOW= .1855E+03 BASIN STORAGE= .7102E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCCON18R	MANE	2.15	1823.83	234.59	1.90	5.00	1823.05	235.00	1.90

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1827E+03 EXCESS= .0000E+00 OUTFLOW= .1827E+03 BASIN STORAGE= .9152E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCCON18R	MANE	2.16	1809.04	237.24	1.88	5.00	1803.87	235.00	1.88

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1807E+03 EXCESS= .0000E+00 OUTFLOW= .1807E+03 BASIN STORAGE= .8510E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCCON18R	MANE	2.16	1793.44	237.68	1.86	5.00	1786.79	235.00	1.86

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1794E+03 EXCESS= .0000E+00 OUTFLOW= .1794E+03 BASIN STORAGE= .9037E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00									
RCCON18R	MANE	2.17	1768.17	234.09	1.84	5.00	1766.93	235.00	1.84

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1772E+03 EXCESS= .0000E+00 OUTFLOW= .1772E+03 BASIN STORAGE= .7374E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00									
RCCON18R	MANE	2.57	914.14	241.11	.94	5.00	913.08	240.00	.94

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9071E+02 EXCESS= .0000E+00 OUTFLOW= .9071E+02 BASIN STORAGE= .7244E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00									
RCDON3	MANE	2.99	4683.42	236.06	2.04	5.00	4670.40	235.00	2.04

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4932E+03 EXCESS= .0000E+00 OUTFLOW= .4932E+03 BASIN STORAGE= .1358E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00									
RCDON3	MANE	3.00	4574.67	237.31	2.00	5.00	4572.21	235.00	2.00

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4827E+03 EXCESS= .0000E+00 OUTFLOW= .4826E+03 BASIN STORAGE= .1409E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00									
RCDON3	MANE	3.03	4426.78	236.38	1.93	5.00	4412.02	235.00	1.93

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4654E+03 EXCESS= .0000E+00 OUTFLOW= .4653E+03 BASIN STORAGE= .1506E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00									
RCDON3	MANE	3.06	4264.36	235.48	1.85	5.00	4253.14	235.00	1.85

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4481E+03 EXCESS= .0000E+00 OUTFLOW= .4481E+03 BASIN STORAGE= .1258E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00									
RCDON3	MANE	3.07	4204.50	236.34	1.83	5.00	4186.33	235.00	1.83

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4412E+03 EXCESS= .0000E+00 OUTFLOW= .4412E+03 BASIN STORAGE= .1350E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00									
RCDON3	MANE	3.08	4155.53	236.97	1.81	5.00	4135.11	235.00	1.81

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4364E+03 EXCESS= .0000E+00 OUTFLOW= .4364E+03 BASIN STORAGE= .1751E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00									
RCDON3	MANE	3.08	4118.34	237.49	1.79	5.00	4102.70	235.00	1.79

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4330E+03 EXCESS= .0000E+00 OUTFLOW= .4329E+03 BASIN STORAGE= .1394E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00									
RCDON3	MANE	3.09	4065.99	235.11	1.77	5.00	4062.61	235.00	1.77

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4274E+03 EXCESS= .0000E+00 OUTFLOW= .4274E+03 BASIN STORAGE= .1741E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00									
RCDON3	MANE	3.68	2050.84	239.21	.89	5.00	2046.31	240.00	.89

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2140E+03 EXCESS= .0000E+00 OUTFLOW= .2140E+03 BASIN STORAGE= .1324E-02 PERCENT ERROR= .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

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 ***

LEGEND

(#1) REFERENCED STUDY NO.

REFERENCE ST
#1
#2
#3
#4
#5

REPLY APP 0609

APPENDIX B

Hydraulic Calculations and Information

TRAPEZOIDAL CHANNEL

Section A

Flow "Q"	44	cfs
Manning's "n"	0.025	
Slope (%)	0.65	
Bottom Width	24.0	ft
Side Slope (Lt)	9.5	H:1V
Side Slope (Rt)	5.0	H:1V
Radius	0.0	ft

OUTPUT:

Velocity	2.91	ft/sec
Depth	0.54	ft
Freeboard	0.63	ft
Total Depth	1.17	ft
Froude No.	0.75	ft
Superelevation	0.00	ft

Normal depth calculations using Manning's equation

Fb = 1+0.025Vd^(1/3) Supercritical; 0.5+V^2/2g Subcritical

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TRAPEZOIDAL CHANNEL

Section B

Flow "Q"	44	cfs
Manning's "n"	0.025	
Slope (%)	1.20	
Bottom Width	42.0	ft
Side Slope (Lt)	9.0	H:1V
Side Slope (Rt)	9.0	H:1V
Radius	0.0	ft

OUTPUT:

Velocity	2.97	ft/sec
Depth	0.33	ft
Freeboard	0.64	ft
Total Depth	0.97	ft
Froude No.	0.94	ft
Superelevation	0.00	ft

Normal depth calculations using Manning's equation

Fb = 1+0.025Vd^(1/3) Supercritical; 0.5+V^2/2g Subcritical

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TRAPEZOIDAL CHANNEL

Section C

Flow "Q"	59	cfs
Manning's "n"	0.040	
Slope (%)	5.85	
Bottom Width	42.0	ft
Side Slope (Lt)	3.0	H:1V
Side Slope (Rt)	2.0	H:1V
Radius	0.0	ft

OUTPUT:

Velocity	4.21	ft/sec
Depth	0.33	ft
Freeboard	1.07	ft
Total Depth	1.40	ft
Froude No.	1.30	ft
Superelevation	0.00	ft

Normal depth calculations using Manning's equation

Fb = 1+0.025Vd^(1/3) Supercritical; 0.5+V^2/2g Subcritical

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RIPRAP CHANNEL

Section C

Flow "Q"	59	cfs
Manning's "n"	0.034	
Slope (%)	5.85	
Bottom Width	42.0	ft
Side Slope (Lt)	3.0	H:1V
Side Slope (Rt)	2.0	H:1V
Specific Gravity	2.5	

OUTPUT:

Velocity	4.65	ft/s
Depth	0.30	ft
Freeboard	1.08	ft
Total Depth	1.38	ft
Froude No.	1.51	
Riprap Size D50	4.9	in

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TRAPEZOIDAL CHANNEL

Section D

Flow "Q"	59	cfs
Manning's "n"	0.040	
Slope (%)	4.28	
Bottom Width	42.0	ft
Side Slope (Lt)	3.0	H:1V
Side Slope (Rt)	3.0	H:1V
Radius	0.0	ft

OUTPUT:

Velocity	3.81	ft/sec
Depth	0.36	ft
Freeboard	1.07	ft
Total Depth	1.43	ft
Froude No.	1.13	ft
Superelevation	0.00	ft

Normal depth calculations using Manning's equation

Fb = 1+0.025Vd^(1/3) Supercritical; 0.5+V^2/2g Subcritical

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RIPRAP CHANNEL

Section D

Flow "Q"	59	cfs
Manning's "n"	0.033	
Slope (%)	4.28	
Bottom Width	42.0	ft
Side Slope (Lt)	3.0	H:1V
Side Slope (Rt)	3.0	H:1V
Specific Gravity	2.50	

OUTPUT:

Velocity	4.29	ft/s
Depth	0.32	ft
Freeboard	1.07	ft
Total Depth	1.39	ft
Froude No.	1.35	
Riprap Size D50	3.8	in

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TRAPEZOIDAL CHANNEL

Section E

Flow "Q"	60	cfs
Manning's "n"	0.025	
Slope (%)	0.50	
Bottom Width	10.0	ft
Side Slope (Lt)	2.0	H:1V
Side Slope (Rt)	8.0	H:1V
Radius	0.0	ft

OUTPUT:

Velocity	3.60	ft/sec
Depth	1.08	ft
Freeboard	0.70	ft
Total Depth	1.78	ft
Froude No.	0.71	ft
Superelevation	0.00	ft

Normal depth calculations using Manning's equation

Fb = 1+0.025Vd^(1/3) Supercritical; 0.5+V^2/2g Subcritical

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TRAPEZOIDAL CHANNEL

Section F

Flow "Q"	60	cfs
Manning's "n"	0.025	
Slope (%)	0.73	
Bottom Width	10.0	ft
Side Slope (Lt)	2.0	H:1V
Side Slope (Rt)	2.0	H:1V
Radius	0.0	ft

OUTPUT:

Velocity	4.64	ft/sec
Depth	1.07	ft
Freeboard	0.83	ft
Total Depth	1.90	ft
Froude No.	0.86	ft
Superelevation	0.00	ft

Normal depth calculations using Manning's equation

Fb = 1+0.025Vd^(1/3) Supercritical; 0.5+V^2/2g Subcritical

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TRAPEZOIDAL CHANNEL

Section G

Flow "Q"	34	cfs
Manning's "n"	0.025	
Slope (%)	0.61	
Bottom Width	10.0	ft
Side Slope (Lt)	2.0	H:1V
Side Slope (Rt)	3.0	H:1V
Radius	0.0	ft

OUTPUT:

Velocity	3.55	ft/sec
Depth	0.80	ft
Freeboard	0.70	ft
Total Depth	1.50	ft
Froude No.	0.76	ft
Superelevation	0.00	ft

Normal depth calculations using Manning's equation

Fb = 1+0.025Vd^(1/3) Supercritical; 0.5+V^2/2g Subcritical

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TRAPEZOIDAL CHANNEL

Section H (north half)

Flow "Q"	33	cfs
Manning's "n"	0.040	
Slope (%)	6.15	
Bottom Width	0.0	ft
Side Slope (Lt)	3.0	H:1V
Side Slope (Rt)	50.0	H:1V
Radius	0.0	ft

OUTPUT:

Velocity	3.95	ft/sec
Depth	0.56	ft
Freeboard	1.08	ft
Total Depth	1.64	ft
Froude No.	1.32	ft
Superelevation	0.00	ft

Normal depth calculations using Manning's equation

Fb = 1+0.025Vd^(1/3) Supercritical; 0.5+V^2/2g Subcritical

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RIPRAP CHANNEL

Section H (north half)

Flow "Q"	33	cfs
Manning's "n"	0.034	
Slope (%)	6.15	
Bottom Width	0.0	ft
Side Slope (Lt)	3.0	H:1V
Side Slope (Rt)	50.0	H:1V
Specific Gravity	2.50	

OUTPUT:

Velocity	4.46	ft/s
Depth	0.53	ft
Freeboard	1.09	ft
Total Depth	1.62	ft
Froude No.	1.53	
Riprap Size D50	4.7	in

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TRAPEZOIDAL CHANNEL

Section H (south half)

Flow "Q"	33	cfs
Manning's "n"	0.040	
Slope (%)	6.15	
Bottom Width	0.0	ft
Side Slope (Lt)	2.0	H:1V
Side Slope (Rt)	50.0	H:1V
Radius	0.0	ft

OUTPUT:

Velocity	3.97	ft/sec
Depth	0.57	ft
Freeboard	1.08	ft
Total Depth	1.65	ft
Froude No.	1.31	ft
Superelevation	0.00	ft

Normal depth calculations using Manning's equation

Fb = 1+0.025Vd^(1/3) Supercritical; 0.5+V^2/2g Subcritical

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RIPRAP CHANNEL

Section H (south half)

Flow "Q"	33	cfs
Manning's "n"	0.034	
Slope (%)	6.15	
Bottom Width	0.0	ft
Side Slope (Lt)	2.0	H:1V
Side Slope (Rt)	50.0	H:1V
Specific Gravity	2.50	

OUTPUT:

Velocity	4.48	ft/s
Depth	0.53	ft
Freeboard	1.09	ft
Total Depth	1.62	ft
Froude No.	1.53	
Riprap Size D50	4.7	in

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Worksheet for Facility 25 - 54-inch RCP

Project Description

Friction Method	Manning Formula
Solve For	Full Flow Diameter

Input Data

Roughness Coefficient	0.013	
Channel Slope	2.70	%
Normal Depth	3.69	ft
Diameter	3.69	ft
Discharge	191.00	ft³/s

Results

Diameter	3.69	ft
Normal Depth	3.69	ft
Flow Area	10.72	ft²
Wetted Perimeter	11.61	ft
Hydraulic Radius	0.92	ft
Top Width	0.00	ft
Critical Depth	3.62	ft
Percent Full	100.0	%
Critical Slope	0.02411	ft/ft
Velocity	17.81	ft/s
Velocity Head	4.93	ft
Specific Energy	8.63	ft
Froude Number	0.00	
Maximum Discharge	205.46	ft³/s
Discharge Full	191.00	ft³/s
Slope Full	0.02700	ft/ft
Flow Type	SubCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%

Worksheet for Facility 25 - 54-inch RCP

GVF Output Data

Normal Depth Over Rise	100.00	%
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	3.69	ft
Critical Depth	3.62	ft
Channel Slope	2.70	%
Critical Slope	0.02411	ft/ft

Cross Section for Facility 25 - 54-inch RCP

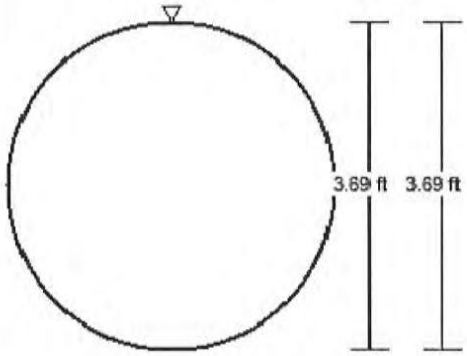
Project Description

Friction Method	Manning Formula
Solve For	Full Flow Diameter

Input Data

Roughness Coefficient	0.013	
Channel Slope	2.70	%
Normal Depth	3.69	ft
Diameter	3.69	ft
Discharge	191.00	ft³/s

Cross Section Image



V: 1
H: 1

Worksheet for Facility 26 - 54-inch RCP

Project Description

Friction Method	Manning Formula
Solve For	Full Flow Diameter

Input Data

Roughness Coefficient	0.013	
Channel Slope	2.50	%
Normal Depth	3.54	ft
Diameter	3.54	ft
Discharge	164.00	ft³/s

Results

Diameter	3.54	ft
Normal Depth	3.54	ft
Flow Area	9.84	ft²
Wetted Perimeter	11.12	ft
Hydraulic Radius	0.89	ft
Top Width	0.00	ft
Critical Depth	3.45	ft
Percent Full	100.0	%
Critical Slope	0.02216	ft/ft
Velocity	16.66	ft/s
Velocity Head	4.31	ft
Specific Energy	7.85	ft
Froude Number	0.00	
Maximum Discharge	176.42	ft³/s
Discharge Full	164.00	ft³/s
Slope Full	0.02500	ft/ft
Flow Type	SubCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%

Worksheet for Facility 26 - 54-inch RCP

GVF Output Data

Normal Depth Over Rise	100.00	%
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	3.54	ft
Critical Depth	3.45	ft
Channel Slope	2.50	%
Critical Slope	0.02216	ft/ft

Cross Section for Facility 26 - 54-inch RCP

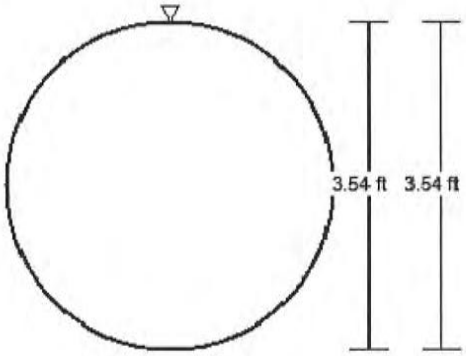
Project Description

Friction Method	Manning Formula
Solve For	Full Flow Diameter

Input Data

Roughness Coefficient	0.013	
Channel Slope	2.50	%
Normal Depth	3.54	ft
Diameter	3.54	ft
Discharge	164.00	ft³/s

Cross Section Image



V: 1
H: 1

Worksheet for Facility 27- 36-inch RCP

Project Description

Friction Method	Manning Formula
Solve For	Full Flow Diameter

Input Data

Roughness Coefficient	0.013	
Channel Slope	4.50	%
Normal Depth	2.09	ft
Diameter	2.09	ft
Discharge	54.00	ft³/s

Results

Diameter	2.09	ft
Normal Depth	2.09	ft
Flow Area	3.43	ft²
Wetted Perimeter	6.57	ft
Hydraulic Radius	0.52	ft
Top Width	0.00	ft
Critical Depth	2.07	ft
Percent Full	100.0	%
Critical Slope	0.04124	ft/ft
Velocity	15.73	ft/s
Velocity Head	3.85	ft
Specific Energy	5.94	ft
Froude Number	0.00	
Maximum Discharge	58.09	ft³/s
Discharge Full	54.00	ft³/s
Slope Full	0.04500	ft/ft
Flow Type	SubCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%

Worksheet for Facility 27- 36-inch RCP

GVF Output Data

Normal Depth Over Rise	100.00	%
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	2.09	ft
Critical Depth	2.07	ft
Channel Slope	4.50	%
Critical Slope	0.04124	ft/ft

Cross Section for Facility 27- 36-inch RCP

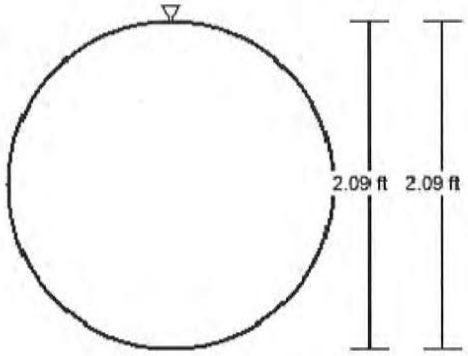
Project Description

Friction Method	Manning Formula
Solve For	Full Flow Diameter

Input Data

Roughness Coefficient	0.013	
Channel Slope	4.50	%
Normal Depth	2.09	ft
Diameter	2.09	ft
Discharge	54.00	ft³/s

Cross Section Image



V: 1
H: 1

Worksheet for Facility 28 - 11x9 RCB

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.015	
Channel Slope	1.50	%
Height	9.00	ft
Bottom Width	11.00	ft
Discharge	2128.00	ft³/s

Results

Normal Depth	7.41	ft
Flow Area	81.51	ft²
Wetted Perimeter	25.82	ft
Hydraulic Radius	3.16	ft
Top Width	11.00	ft
Critical Depth	10.52	ft
Percent Full	82.3	%
Critical Slope	0.00622	ft/ft
Velocity	26.11	ft/s
Velocity Head	10.59	ft
Specific Energy	18.00	ft
Froude Number	1.69	
Discharge Full	2197.70	ft³/s
Slope Full	0.01600	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	82.33	%
Downstream Velocity	Infinity	ft/s

Worksheet for Facility 28 - 11x9 RCB

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	7.41	ft
Critical Depth	10.52	ft
Channel Slope	1.50	%
Critical Slope	0.00622	ft/ft

Cross Section for Facility 28 - 11x9 RCB

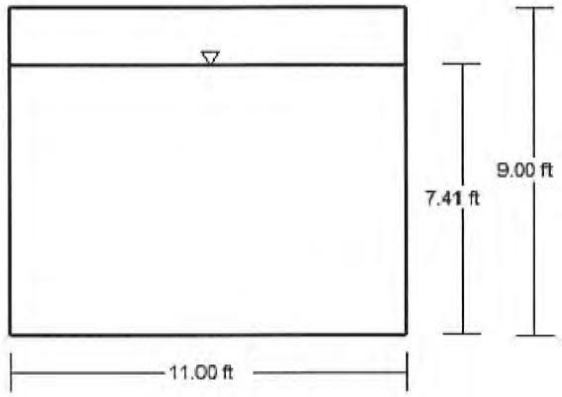
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.015	
Channel Slope	1.50	%
Normal Depth	7.41	ft
Height	9.00	ft
Bottom Width	11.00	ft
Discharge	2128.00	ft³/s

Cross Section Image



V: 1
H: 1

Worksheet for Facility 29 - 66-inch RCP

Project Description

Friction Method	Manning Formula
Solve For	Full Flow Diameter

Input Data

Roughness Coefficient	0.013	
Channel Slope	2.60	%
Normal Depth	4.64	ft
Diameter	4.64	ft
Discharge	344.00	ft³/s

Results

Diameter	4.64	ft
Normal Depth	4.64	ft
Flow Area	16.91	ft²
Wetted Perimeter	14.58	ft
Hydraulic Radius	1.16	ft
Top Width	0.00	ft
Critical Depth	4.55	ft
Percent Full	100.0	%
Critical Slope	0.02329	ft/ft
Velocity	20.35	ft/s
Velocity Head	6.43	ft
Specific Energy	11.07	ft
Froude Number	0.00	
Maximum Discharge	370.05	ft³/s
Discharge Full	344.00	ft³/s
Slope Full	0.02600	ft/ft
Flow Type	SubCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%

Worksheet for Facility 29 - 66-inch RCP

GVF Output Data

Normal Depth Over Rise	100.00	%
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	4.64	ft
Critical Depth	4.55	ft
Channel Slope	2.60	%
Critical Slope	0.02329	ft/ft

Cross Section for Facility 29 - 66-inch RCP

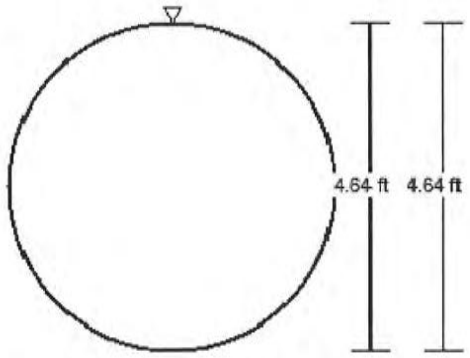
Project Description

Friction Method	Manning Formula
Solve For	Full Flow Diameter

Input Data

Roughness Coefficient	0.013	
Channel Slope	2.60	%
Normal Depth	4.64	ft
Diameter	4.64	ft
Discharge	344.00	ft³/s

Cross Section Image



V: 1
H: 1

Worksheet for Facility 30 - 48-inch RCP

Project Description

Friction Method	Manning Formula
Solve For	Full Flow Diameter

Input Data

Roughness Coefficient	0.013	
Channel Slope	2.50	%
Normal Depth	3.13	ft
Diameter	3.13	ft
Discharge	118.00	ft³/s

Results

Diameter	3.13	ft
Normal Depth	3.13	ft
Flow Area	7.69	ft²
Wetted Perimeter	9.83	ft
Hydraulic Radius	0.78	ft
Top Width	0.00	ft
Critical Depth	3.04	ft
Percent Full	100.0	%
Critical Slope	0.02208	ft/ft
Velocity	15.34	ft/s
Velocity Head	3.66	ft
Specific Energy	6.79	ft
Froude Number	0.00	
Maximum Discharge	126.95	ft³/s
Discharge Full	118.02	ft³/s
Slope Full	0.02499	ft/ft
Flow Type	SubCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%

Worksheet for Facility 30 - 48-inch RCP

GVF Output Data

Normal Depth Over Rise	100.00	%
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	3.13	ft
Critical Depth	3.04	ft
Channel Slope	2.50	%
Critical Slope	0.02208	ft/ft

Cross Section for Facility 30 - 48-inch RCP

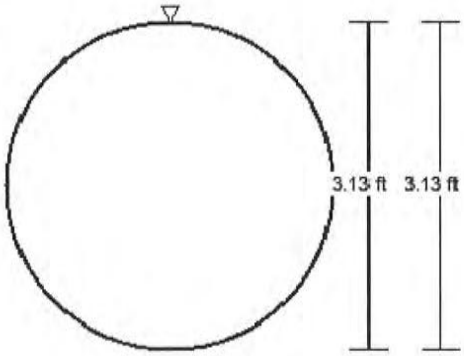
Project Description

Friction Method	Manning Formula
Solve For	Full Flow Diameter

Input Data

Roughness Coefficient	0.013	
Channel Slope	2.50	%
Normal Depth	3.13	ft
Diameter	3.13	ft
Discharge	118.00	ft³/s

Cross Section Image



V: 1
H: 1

Cross Section for Facility 30 - 48-inch RCP

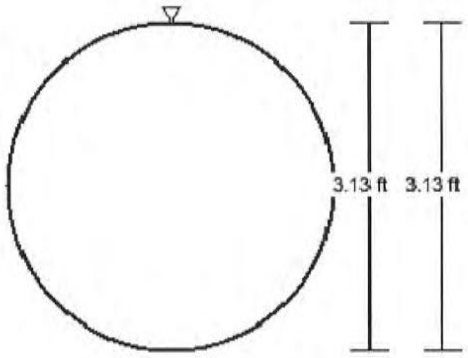
Project Description

Friction Method	Manning Formula
Solve For	Full Flow Diameter

Input Data

Roughness Coefficient	0.013	
Channel Slope	2.50	%
Normal Depth	3.13	ft
Diameter	3.13	ft
Discharge	118.00	ft³/s

Cross Section Image



V: 1
H: 1

Worksheet for Facility 31 - 11x8 RCB

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.015	
Channel Slope	1.50	%
Height	8.00	ft
Bottom Width	11.00	ft
Discharge	1910.00	ft³/s

Results

Normal Depth	6.81	ft
Flow Area	74.96	ft²
Wetted Perimeter	24.63	ft
Hydraulic Radius	3.04	ft
Top Width	11.00	ft
Critical Depth	9.79	ft
Percent Full	85.2	%
Critical Slope	0.00599	ft/ft
Velocity	25.48	ft/s
Velocity Head	10.09	ft
Specific Energy	16.90	ft
Froude Number	1.72	
Discharge Full	1868.81	ft³/s
Slope Full	0.01436	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	85.18	%
Downstream Velocity	Infinity	ft/s

Worksheet for Facility 31 - 11x8 RCB

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	6.81	ft
Critical Depth	9.79	ft
Channel Slope	1.50	%
Critical Slope	0.00599	ft/ft

Cross Section for Facility 31 - 11x8 RCB

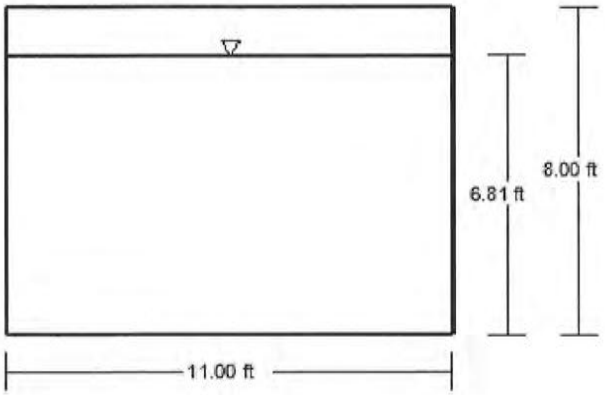
Project Description

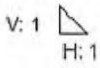
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.015	
Channel Slope	1.50	%
Normal Depth	6.81	ft
Height	8.00	ft
Bottom Width	11.00	ft
Discharge	1910.00	ft³/s

Cross Section Image





WSPGW Stations Referenced from Queens Borough Culvert Study	MAIN 1 WSPGW Stations
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-3500.00	-12145.67
-3401.01	-12046.68
-3350.81	-11996.48
-3325.95	-11971.62
-3315.95	-11961.62
-3225.64	-11871.31
-3223.32	-11868.99
-3152.70	-11798.37
-3135.29	-11780.96
-3049.99	-11695.66
-2906.52	-11552.19
-2433.63	-11079.30
-2318.22	-10963.89
-2200.00	-10845.67
-1733.86	-10379.53
-1565.00	-10210.67
-1000.00	-9645.67

WSPGW ANALYSIS

MAIN 1

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TS -11961.6202621.810 10       .015                                .000
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R  -11868.9902623.000 10       .015                                .000    .000 0
R  -11798.3702625.000 10       .015                             -40.463
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R  -11552.1902631.860 10       .015                                .000
R  -11079.3002645.025 10       .015                              13.909
R  -10963.8902648.238 10       .015                             -66.125
R  -10845.6702651.530 10       .015                                .000
R  -10379.5302655.259 10       .015                                .000    .000 0
R  -10210.6702656.610 10       .015                              90.000
R   -9645.6702659.440 10       .015                                .000    .000 0
R   -9545.6702659.950 10       .015                                .000  11.000 0
R   -9400.6702662.767 10       .015                               0.000
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R   -9119.1702671.317 13       .015                                .000
R   -9030.8402672.200 13       .015                              34.000
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R   -8668.3802675.825 13       .015                                .000
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R   -8544.4602677.064 13       .015                                .000
R   -8492.2502677.586 13       .015                             -19.000
R   -7909.6402683.412 13       .015                                .000
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R   -6922.5702727.166 14       .015                               0.000
R   -6835.1202728.041 14       .015                               0.000
R   -6748.9802728.902 14       .015                               0.000
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R   -6178.9602734.602 14       .015                               0.000
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MAIN1.WSW

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PTS       43.800 25.000 51.800 24.000 61.800 20.000 77.300 17.000 92.800 14.000
PTS      113.100 20.000132.400 25.000140.900 29.000151.700 30.000
PTS  211    .000 35.000 26.300 30.000 37.200 25.000 44.700 25.000 45.700 26.000
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PTS      147.000 35.000
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PTS  4 9    .000 35.000 10.420 30.000 19.300 25.000 24.900 22.000 38.600 20.800
PTS       83.700 20.800 87.600 25.000 98.900 30.000100.600 35.000
PTS  5 8    .000 48.000 19.090 48.000 50.850 45.000111.110 21.000159.240 21.000
PTS      159.240 21.000186.970 35.980248.780 40.000
PTS  6 6    .000 49.000 11.030 48.000 54.930 38.000 84.460 22.000136.390 22.000
PTS      173.210 40.000
Q          2130.000    .0
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THE SEVENTY
GCW INC. PROJECT# 840.050
FILENAME: MAIN1.WSW JAM

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
-12270.670	2614.000	7.896	2621.896	4673.00	17.79	4.92	2626.81	.00	9.43	63.36		1		0 .0
TRANS STR	.0400					.0179	1.34	7.90	1.54		.035			IR-OPEN
-12195.670	2617.000	9.000	2626.000	4673.00	12.16	2.29	2628.29	.00	9.00	73.79		2		0 .0
TRANS STR	.0100					.0066	.33	9.00	.94		.035			IR-OPEN
-12145.670	2617.500	10.039	2627.539	4673.00	8.78	1.20	2628.74	.00	7.49	75.16		3		0 .0
TRANS STR	.0328							10.039	.582		.040			IR-OPEN
-12046.680	2620.750	2.538	2623.288	4673.00	32.08	15.98	2639.26	.00	5.81	63.65		4		0 .0
TRANS STR	.0110					.0369	1.85	2.54	3.74		.015			IR-OPEN
-11996.480	2621.300	2.585	2623.885	4673.00	33.62	17.55	2641.44	.00	6.03	59.41		5		0 .0
TRANS STR	.0141					.0409	1.02	2.59	3.87		.015			IR-OPEN
-11971.620	2621.650	2.384	2624.034	4673.00	34.65	18.64	2642.68	.00	5.85	61.21		6		0 .0
TRANS STR	.0160					.0337	.34	2.38	4.11		.015			IR-OPEN
-11961.620	2621.810	6.099	2627.909	4673.00	31.93	15.83	2643.74	.00	10.56	25.00	12.000	25.000	.00	1 1.0
90.311	.0152					.0248	2.24	6.10	2.33	7.23	.015	.00	.00	BOX
-11871.310	2623.180	5.903	2629.083	4673.00	32.99	16.89	2645.98	.00	10.56	25.00	12.000	25.000	.00	1 1.0
2.319	-.0776					.0262	.06	5.90	2.44	.00	.015	.00	.00	BOX
-11868.990	2623.000	5.853	2628.853	4673.00	33.27	17.19	2646.04	12.00	10.56	25.00	12.000	25.000	.00	1 1.0
70.620	.0283					.0263	1.86	12.00	2.47	5.71	.015	.00	.00	BOX

THE SEVENTY
GCW INC. PROJECT# 840.050
FILENAME: MAIN1.WSW JAM

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
-11798.370	2625.000	5.882	2630.882	4673.00	33.10	17.02	2647.90	.00	10.56	25.00	12.000	25.000	.00	1 1.0
17.410	.0276					.0261	.45	5.88	2.46	5.77	.015	.00	.00	BOX
-11780.960	2625.480	5.887	2631.367	4673.00	33.08	16.99	2648.35	12.00	10.56	25.00	12.000	25.000	.00	1 1.0
85.300	.0279					.0259	2.21	12.00	2.45	5.74	.015	.00	.00	BOX
-11695.660	2627.860	5.923	2633.783	4673.00	32.87	16.78	2650.56	.00	10.56	25.00	12.000	25.000	.00	1 1.0
143.470	.0279					.0252	3.61	5.92	2.43	5.74	.015	.00	.00	BOX
-11552.190	2631.860	6.008	2637.868	4673.00	32.41	16.31	2654.18	.40	10.56	25.00	12.000	25.000	.00	1 1.0
204.461	.0278					.0237	4.84	6.41	2.38	5.75	.015	.00	.00	BOX
-11347.730	2637.552	6.213	2643.765	4673.00	31.34	15.25	2659.02	.38	10.56	25.00	12.000	25.000	.00	1 1.0
164.742	.0278					.0213	3.50	6.59	2.26	5.75	.015	.00	.00	BOX
-11182.990	2642.138	6.516	2648.655	4673.00	29.88	13.86	2662.52	.34	10.56	25.00	12.000	25.000	.00	1 1.0
103.688	.0278					.0188	1.94	6.86	2.11	5.75	.015	.00	.00	BOX
-11079.300	2645.025	6.834	2651.859	4673.00	28.49	12.60	2664.46	12.00	10.56	25.00	12.000	25.000	.00	1 1.0
59.925	.0278					.0167	1.00	12.00	1.96	5.75	.015	.00	.00	BOX
-11019.380	2646.693	7.102	2653.795	4673.00	27.42	11.67	2665.47	12.00	10.56	25.00	12.000	25.000	.00	1 1.0
55.485	.0278					.0150	.83	12.00	1.85	5.75	.015	.00	.00	BOX
-10963.890	2648.238	7.449	2655.687	4673.00	26.14	10.61	2666.30	.00	10.56	25.00	12.000	25.000	.00	1 1.0
26.600	.0278					.0135	.36	7.45	1.72	5.75	.015	.00	.00	BOX

THE SEVENTY
GCW INC. PROJECT# 840.050
FILENAME: MAIN1.WSW JAM

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
-10937.290	2648.979	7.669	2656.648	4673.00	25.39	10.01	2666.66	.00	10.56	25.00	12.000	25.000	.00	1 1.0
34.373	.0278					.0123	.42	7.67	1.65	5.75	.015	.00	.00	BOX
-10902.920	2649.936	8.044	2657.979	4673.00	24.21	9.10	2667.08	.00	10.56	25.00	12.000	25.000	.00	1 1.0
25.571	.0278					.0109	.28	8.04	1.54	5.75	.015	.00	.00	BOX
-10877.340	2650.648	8.436	2659.084	4673.00	23.08	8.27	2667.36	.00	10.56	25.00	12.000	25.000	.00	1 1.0
18.653	.0278					.0096	.18	8.44	1.43	5.75	.015	.00	.00	BOX
-10858.690	2651.167	8.848	2660.015	4673.00	22.01	7.52	2667.54	.00	10.56	25.00	12.000	25.000	.00	1 1.0
13.021	.0278					.0085	.11	8.85	1.33	5.75	.015	.00	.00	BOX
-10845.670	2651.530	9.280	2660.810	4673.00	20.98	6.84	2667.65	.00	10.56	25.00	12.000	25.000	.00	1 1.0
64.175	.0080					.0080	.51	9.28	1.24	9.28	.015	.00	.00	BOX
-10781.500	2652.043	9.280	2661.323	4673.00	20.98	6.84	2668.16	.00	10.56	25.00	12.000	25.000	.00	1 1.0
401.965	.0080					.0077	3.11	9.28	1.24	9.28	.015	.00	.00	BOX
-10379.530	2655.259	9.526	2664.785	4673.00	20.44	6.49	2671.27	12.00	10.56	25.00	12.000	25.000	.00	1 1.0
43.904	.0080					.0074	.33	12.00	1.19	9.28	.015	.00	.00	BOX
-10335.630	2655.610	9.599	2665.209	4673.00	20.28	6.39	2671.60	12.00	10.56	25.00	12.000	25.000	.00	1 1.0
105.124	.0080					.0069	.73	12.00	1.18	9.28	.015	.00	.00	BOX
-10230.500	2656.451	10.068	2666.519	4673.00	19.34	5.81	2672.33	12.00	10.56	25.00	12.000	25.000	.00	1 1.0
19.832	.0080					.0062	.12	12.00	1.10	9.28	.015	.00	.00	BOX

THE SEVENTY
GCW INC. PROJECT# 840.050
FILENAME: MAIN1.WSW JAM

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
-10210.670	2656.610	10.560	2667.170	4673.00	18.44	5.28	2672.45	.00	10.56	25.00	12.000	25.000	.00	1 1.0
77.532	.0050					.0051	.40	10.56	1.02	11.20	.015	.00	.00	BOX
-10133.140	2656.999	11.075	2668.074	4673.00	17.58	4.80	2672.87	.00	10.56	25.00	12.000	25.000	.00	1 1.0
12.322	.0050					.0051	.06	11.08	.95	11.20	.015	.00	.00	BOX
---------- WARNING - Flow depth near top of box conduit ----------														
-10120.820	2657.060	11.082	2668.142	4673.00	17.57	4.79	2672.94	.00	10.56	25.00	12.000	25.000	.00	1 1.0
HYDRAULIC JUMP														
---------- WARNING - Flow depth near top of box conduit ----------														
-10120.820	2657.060	10.052	2667.113	4673.00	19.37	5.83	2672.94	.00	10.56	25.00	12.000	25.000	.00	1 1.0
41.956	.0050					.0068	.29	10.05	1.10	11.20	.015	.00	.00	BOX
-10078.860	2657.270	9.724	2666.995	4673.00	20.02	6.23	2673.22	.00	10.56	25.00	12.000	25.000	.00	1 1.0
66.513	.0050					.0076	.50	9.72	1.15	11.20	.015	.00	.00	BOX
-10012.350	2657.603	9.272	2666.875	4673.00	21.00	6.85	2673.72	.00	10.56	25.00	12.000	25.000	.00	1 1.0
71.908	.0050					.0085	.61	9.27	1.24	11.20	.015	.00	.00	BOX
-9940.438	2657.963	8.840	2666.804	4673.00	22.02	7.53	2674.34	.00	10.56	25.00	12.000	25.000	.00	1 1.0
73.994	.0050					.0096	.71	8.84	1.33	11.20	.015	.00	.00	BOX

THE SEVENTY
GCW INC. PROJECT# 840.050
FILENAME: MAIN1.WSW JAM

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

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
-9866.444	2658.334	8.429	2666.763	4673.00	23.10	8.29	2675.05	.00	10.56	25.00	12.000	25.000	.00	1 1.0
74.374	.0050					.0109	.81	8.43	1.43	11.20	.015	.00	.00	BOX
-9792.070	2658.707	8.037	2666.743	4673.00	24.23	9.11	2675.86	.00	10.56	25.00	12.000	25.000	.00	1 1.0
73.785	.0050					.0123	.91	8.04	1.54	11.20	.015	.00	.00	BOX
-9718.285	2659.076	7.663	2666.739	4673.00	25.41	10.03	2676.76	.00	10.56	25.00	12.000	25.000	.00	1 1.0
72.615	.0050					.0139	1.01	7.66	1.65	11.20	.015	.00	.00	BOX
-9645.670	2659.440	7.306	2666.746	4673.00	26.65	11.03	2677.77	.00	10.56	25.00	12.000	25.000	.00	1 1.0
29.035	.0051					.0151	.44	7.31	1.77	11.11	.015	.00	.00	BOX
-9616.635	2659.588	7.168	2666.756	4673.00	27.16	11.46	2678.21	.00	10.56	25.00	12.000	25.000	.00	1 1.0
70.965	.0051					.0165	1.17	7.17	1.82	11.11	.015	.00	.00	BOX
-9545.670	2659.950	6.834	2666.784	4673.00	28.49	12.60	2679.39	.00	10.56	25.00	12.000	25.000	.00	1 1.0
145.000	.0194					.0172	2.49	6.83	1.96	6.58	.015	.00	.00	BOX
-9400.670	2662.767	6.961	2669.728	4673.00	27.97	12.15	2681.88	.00	10.56	25.00	12.000	25.000	.00	1 1.0
JUNCT STR	.0194					.0215	.11	6.96	1.91		.015	.00	.00	BOX
-9395.670	2662.864	5.401	2668.265	4177.00	32.23	16.13	2684.39	.00	9.80	25.00	12.000	25.000	.00	1 1.0
56.390	.0194					.0268	1.51	5.40	2.49	6.04	.015	.00	.00	BOX
-9339.280	2663.960	5.319	2669.278	4177.00	32.72	16.63	2685.91	.00	9.80	25.00	12.000	25.000	.00	1 1.0
143.610	.0194					.0293	4.21	5.32	2.55	6.04	.015	.00	.00	BOX

Program Package Serial Number: 7044
WATER SURFACE PROFILE LISTING
Date: 3- 3-2016 Time:10: 3:30

THE SEVENTY
GCW INC. PROJECT# 840.050
FILENAME: MAIN1.WSW JAM

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
-9195.670	2666.750	5.071	2671.821	4177.00	34.32	18.29	2690.11	.00	9.80	25.00	12.000	25.000	.00	1 1.0
WALL ENTRANCE														
-9195.670	2666.750	4.619	2671.369	4177.00	36.17	20.31	2691.68	.00	9.54	25.00	12.000	25.000	.00	0 .0
TRANS STR	.0597					.0211	.63	4.62	2.97		.015	.00	.00	BOX
-9165.730	2668.537	9.477	2678.014	4177.00	31.48	15.39	2693.40	.00	12.00	14.00	12.000	14.000	.00	0 .0
13.507	.0597					.0152	.21	9.48	1.80	5.73	.015	.00	.00	BOX
-9152.224	2669.344	9.762	2679.106	4177.00	30.56	14.50	2693.61	.00	12.00	14.00	12.000	14.000	.00	0 .0
18.337	.0597					.0138	.25	9.76	1.72	5.73	.015	.00	.00	BOX
-9133.887	2670.438	10.239	2680.677	4177.00	29.14	13.19	2693.86	.00	12.00	14.00	12.000	14.000	.00	0 .0
14.717	.0597					.0122	.18	10.24	1.60	5.73	.015	.00	.00	BOX
-9119.170	2671.317	10.738	2682.055	4177.00	27.78	11.99	2694.04	12.00	12.00	14.00	12.000	14.000	.00	0 .0
88.330	.0100					.0116	1.03	12.00	1.49	11.34	.015	.00	.00	BOX
-9030.840	2672.200	10.624	2682.824	4177.00	28.08	12.25	2695.07	.00	12.00	14.00	12.000	14.000	.00	0 .0
48.862	.0100					.0119	.58	10.62	1.52	11.34	.015	.00	.00	BOX
-8981.978	2672.689	10.555	2683.243	4177.00	28.27	12.41	2695.65	.00	12.00	14.00	12.000	14.000	.00	0 .0
272.338	.0100					.0128	3.47	10.55	1.53	11.34	.015	.00	.00	BOX
-8709.640	2675.412	10.063	2685.475	4177.00	29.65	13.65	2699.12	.00	12.00	14.00	12.000	14.000	.00	0 .0
41.260	.0100					.0137	.56	10.06	1.65	11.34	.015	.00	.00	BOX

Program Package Serial Number: 7044
WATER SURFACE PROFILE LISTING
Date: 3- 3-2016 Time:10: 3:30

THE SEVENTY
GCW INC. PROJECT# 840.050
FILENAME: MAIN1.WSW JAM

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
-8668.380	2675.825	9.977	2685.802	4177.00	29.91	13.89	2699.69	12.00	12.00	14.00	12.000	14.000	.00	0 .0