McCARTY ROAD LANDFILL
CITY OF HOUSTON, HARRIS COUNTY, TEXAS
TCEQ PERMIT NO. MSW-261B

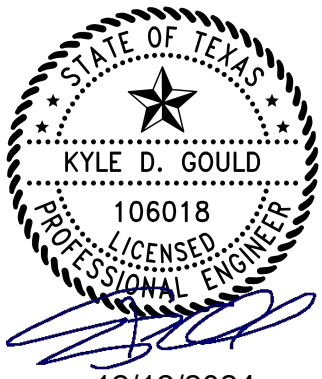
PART III – SITE DEVELOPMENT PLAN
SITE DEVELOPMENT PLAN NARRATIVE

Prepared for

McCarty Road Landfill TX, LP

Approved Site Development Plan August 2008
Revised June 2009
Revised October 2009
Revised February 2010
Revised December 2010
Revised January 2012
Revised October 2014
Revised March 2024

Revised December 2024



12/12/2024

Prepared by

Weaver Consultants Group, LLC
TBPE Registration No. F-3727
6420 Southwest Boulevard, Suite 206
Fort Worth, Texas 76109
817-735-9770

WCG Project No. 0120-439-11-259

south of the site). The floodplain elevation in Greens Bayou ranges from approximately 30.5 ft-msl near US Highway 90 to 32 ft-msl near the northeast corner of the site. Over 4 feet of freeboard exists between the 100-year flood elevation in Greens Bayou and the limits of waste. As discussed in Attachment 6A, the proposed vertical expansion does not impact stormwater flow in Greens Bayou.

The entire waste fill footprint is located outside the 100-year floodplain as defined on the FIRM. The 100-year water surface profile for P116-00-00 and P114-00-00 are also presented in Attachment 6C. As shown in Attachment 6C, the 100-year storm event is contained within the channel banks of these two HCFCD channels.

Refer to Attachment 6C – Floodplain Information for additional information.

The Subtitle D Location Restriction Certification of Compliance for floodplains is included in Parts I/II, Appendix I/IIB.

3.8 Cover System Design

The final cover system will consist of a soil only (pre-Subtitle D areas) and composite (Subtitle D areas) cover system, as well as a GCL alternative final cover for both pre-Subtitle D and Subtitle D areas. The GCL alternative final cover includes replacing the compacted clay infiltration layer with a GCL. As discussed in Attachment 6D, the site will either select the compacted clay infiltration layer option or the GCL infiltration layer option for the remaining footprint that has not received final cover (i.e., only one of the final cover options will be used for the remaining footprint unless a subsequent permit modification is submitted). The final cover system will provide a low maintenance cover, protect against erosion, reduce rainfall percolation through the cover system, and subsequently minimize leachate generation within the landfill. As depicted on Attachment 7A – Landfill Completion Plan, a maximum of 3.5 percent top slopes and 4H:1V sideslopes are provided to minimize erosion and facilitate drainage of the landfill. A composite final cover system will be constructed over the Subtitle D waste disposal areas. Components of the multi-layer final cover system for both pre-Subtitle D and Subtitle D areas include (from top to bottom):

<u>Subtitle D Area</u>

- An erosion layer consisting of a 24-inch-thick layer of earthen material (top 6 inches capable of sustaining plant growth). The vegetation layer will consist of native or introduced grasses capable of providing 90 percent coverage over the cover system.
- A drainage geocomposite will be used as the drainage layer.
- A 40-mil, smooth (topslope) and textured (sideslope), linear low-density polyethylene (LLDPE), geomembrane liner or other equivalent geomembrane liner material may be used.

An 18-inch-thick compacted clay infiltration layer with a coefficient of permeability of less than or equal to $1x10^{-5}$ cm/sec or a geosynthetic clay layer (GCL) with a coefficient of permeability of less than or equal to $3x10^{-9}$ cm/s. Unreinforced GCL will be used on the topslopes and reinforced GCL will be used on the sideslopes.

McCARTY ROAD LANDFILL
CITY OF HOUSTON, HARRIS COUNTY, TEXAS
TCEQ PERMIT NO. MSW-261B

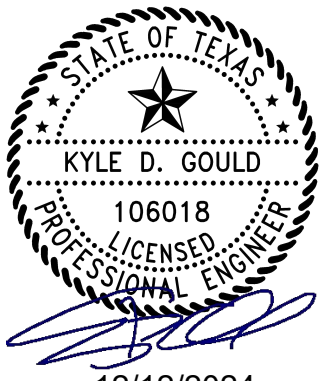
PART III - SITE DEVELOPMENT PLAN
ATTACHMENT 1
SITE LAYOUT PLANS

Prepared for

McCarty Road Landfill TX, LP

Approved Site Development Plan
August 2008
Revised June 2009
Revised October 2009
Revised December 2010
Revised January 2011
Revised January 2012
Revised October 2014

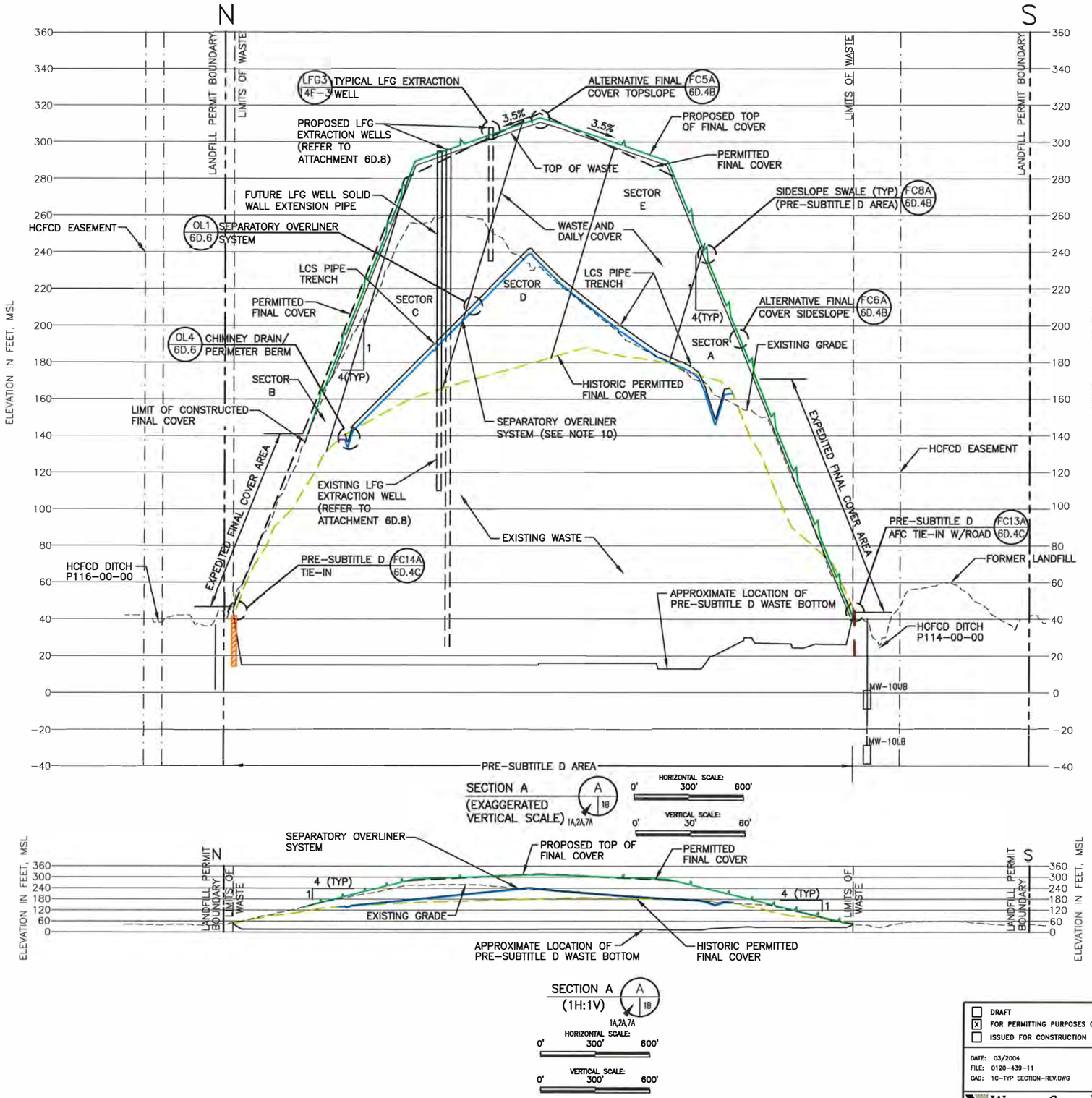
Revised December 2024



12/12/2024

Weaver Consultants Group, LLC
TBPE Registration No. F-3727
6420 Southwest Boulevard, Suite 206
Fort Worth, Texas 76109
817-735-9770

WCG Project No.0120-439-11-259



SECTION A (EXAGGERATED VERTICAL SCALE) — A | 1A,2A,7A

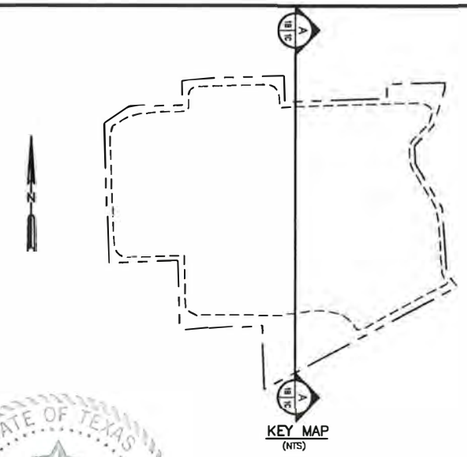
HORIZONTAL SCALE: 0' 300' 600'

VERTICAL SCALE: 0' 30' 60'

SECTION A (1H:1V) — A | 1A,2A,7A

HORIZONTAL SCALE: 0' 300' 600'

VERTICAL SCALE: 0' 300' 600'



KEY MAP (NTS)

STATE OF TEXAS
KYLE D. GOULD
106018
LICENSED PROFESSIONAL ENGINEER
9.24.24

LEGEND

- COMPACTED CLAY SLOPE LINER (SEE NOTE 7)
- SLURRY WALL (SEE NOTE 7)

NOTES:

1. TOPOGRAPHIC MAPPING PREPARED BY FIRMATEK FROM AERIAL PHOTOGRAPHY FLOWN 11-17-2023. THE GRID SYSTEM IS TIED TO THE TEXAS STATE PLANE COORDINATE SYSTEM SOUTH CENTRAL ZONE NAD 1927.
2. REFER TO ATTACHMENT 6D FOR FINAL COVER SYSTEM DETAILS.
3. LANDFILL COMPLETION GRADES ARE SHOWN ON ATTACHMENT 1H.
4. REFER TO ATTACHMENT 14 FOR DETAILS OF THE LANDFILL GAS MANAGEMENT PLAN.
5. DRAINAGE DESIGN INFORMATION IS PROVIDED IN ATTACHMENT 6A-DRAINAGE DESIGN REPORT.
6. SECTOR DESIGNATION INDICATE GENERAL PROGRESSION OF LANDFILL DEVELOPMENT. AS INDICATED IN ATTACHMENT 12-FINAL CLOSURE PLAN, FINAL COVER WILL BE PLACED (WHERE FEASIBLE) AS TOP OF WASTE GRADES ARE REACHED IN EACH SECTOR.
7. THE LOCATIONS OF THE SLURRY WALL AND COMPACTED CLAY SLOPE LINER WERE REPRODUCED FROM A DECEMBER 1992 DRAWING PREPARED BY HALL SOUTHWEST. REFER TO ATTACHMENT 1I FOR LOCATION.
8. REFER TO ATTACHMENT 6D FOR THE DESIGN OF THE SEPARATORY OVERLINER SYSTEM THAT WILL BE INSTALLED WITHIN THE PRE-SUBTITLE D AREA.

- [ ] DRAFT
- [x] FOR PERMITTING PURPOSES ONLY
- [ ] ISSUED FOR CONSTRUCTION

DATE: 03/2004
FILE: 0120-439-11
CAD: 1C-TYP SECTION-REV.DWG

DRAWN BY: JDW
DESIGN BY: SAN
REVIEWED BY: JPY

Weaver Consultants Group
TBPE REGISTRATION NO. F-3727

PREPARED FOR
McCARTY ROAD LANDFILL TX, LP

REVISIONS		
1	08/2004	RESPONSE TO TCEQ 1st TECHNICAL COMMENTS
2	09/2004	RESPONSE TO TCEQ 2nd TECHNICAL COMMENTS
3	02/2008	HARRIS COUNTY SETTLEMENT INFORMATION
4	09/2024	PERMIT MODIFICATION

MAJOR PERMIT AMENDMENT
TYPICAL SECTION A

McCARTY ROAD LANDFILL
HARRIS COUNTY, TEXAS

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ATTACHMENT 1C

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D:\0120\439\FIP MOD 2024\ATT 1\CLEAN\1C-TYP SECTION.dwg, rarrington, 1:2

STATE OF TEXAS
KYLE D. GOULD
106018
PROFESSIONAL ENGINEER
LICENSED
9.24.24

E 3189000 E 3190000 E 3191000 95°14'30" E 3192000 E 3193000 E 3194000 E 3195000

N 747000 N 746000 N 745000 29°49'45" N 744000 N 743000 N 742000 29°49'15"

HCFCD DITCH (P116-00-00)
FORMER SOIL BORROW AREA
LEY ROAD
FINAL COVER AREA (SEE NOTE 5)
HOUSTON PIPE LINE COMPANY EASEMENT
EXISTING 5' HIGH CHAIN LINK FENCE
ACTIVE AREA
CONTAINMENT BERM (SEE NOTE 3)
TEMPORARY ACCESS ROAD (SEE NOTE 9)
DIVERSION BERM
SLOPE
INTERMEDIATE COVER (SEE NOTE 6)
NEP
EP
SEP
GREENS BAYOU (P100-00-00)
UNION PACIFIC RAILROAD SPUR EASEMENT
HCFCD DITCH (P114-00-00)
EXISTING LANDFILL FACILITY
EXISTING MAINTENANCE AND PAINT FACILITY
EXISTING SCALEHOUSE
EXISTING OFFICE BUILDING
EXISTING SITE ACCESS ROAD (OATES ROAD)
CITY OF HOUSTON ROAD EASEMENT
FORMER LANDFILL
HL&P EASEMENT
UNION PACIFIC RAILROAD
EXISTING 5' HIGH CHAIN LINK FENCE
EXISTING 20' HIGH MESH SCREENING FENCE
U.S. HIGHWAY 90 (McCARTY ROAD)

0 300 600
SCALE IN FEET

POND LABELS	
SWP	SOUTHWEST POND
NWP	NORTHWEST POND

LEGEND

- PERMIT BOUNDARY
- LIMITS OF WASTE
- DEED RESTRICTION BOUNDARY (SEE NOTE 11)
- 150 — INTERMEDIATE SIDESLOPE/TOPSLOPE CONTOUR
- 200 — FINAL CONTOUR
- N 745000 — STATE PLANE COORDINATE SYSTEM
- 29°49'45" — GEODETIC COORDINATE SYSTEM
- 20 — EXISTING 10' CONTOUR
- PERIMETER FENCE
- EASEMENT BOUNDARY
- PROPOSED DRAINAGE SWALE
- PROPOSED DRAINAGE LETDOWN
- MW-4UB — EXISTING DETECTION GROUNDWATER MONITORING WELL
- OW7-UB — GROUNDWATER OBSERVATION WELL INSTALLED PER AAWWE AGREEMENT
- OW-1 — GROUNDWATER OBSERVATION WELL INSTALLED PER HARRIS COUNTY AGREEMENT
- GMP-M — EXISTING LANDFILL GAS MONITORING PROBE
- 100-YR FLOODPLAIN (REFER TO ATTACHMENT 6C)
- DIVERSION BERM
- GABIONS
- ACTIVE DISPOSAL AREA
- LIMITS OF UNDEVELOPED SEPARATORY OVERLINER SYSTEM AREA

NOTES:

1. TOPOGRAPHIC MAPPING PREPARED BY FIRMATEK FROM AERIAL PHOTOGRAPHY FLOWN 11-17-2023. THE GRID SYSTEM IS TIED TO THE TEXAS STATE PLANE COORDINATE SYSTEM SOUTH CENTRAL ZONE NAD 1927.
2. PERMIT BOUNDARY AND EASEMENTS WERE REPRODUCED FROM COSTELLO, INC. STANDARD LAND SURVEY DRAWING, DATED MARCH 2004.
3. REFER TO ATTACHMENT 15-LEACHATE AND CONTAMINATED WATER PLAN FOR CONTAMINATED WATER RUN-ON/ RUNOFF BERM DESIGN INFORMATION.
4. THE SECTOR DEVELOPMENT SHOWN IS FOR GENERAL CONDITIONS AND MAY NOT REFLECT THE EXACT CONFIGURATION OF THE LANDFILL. THIS ATTACHMENT IS A CONCEPTUAL PLAN TO AID THE OPERATOR AND IS NOT INTENDED TO SHOW EACH INCREMENT OR DEFINE THE ACTUAL SIZE OF THE INCREMENTS FOR EXCAVATION, LINING, OR FILLING. LOCATION OF ALL-WEATHER ACCESS ROAD FROM LANDFILL HAUL ROAD TO ACTIVE AREA WILL BE DETERMINED DURING SITE OPERATIONS. THE WASTE FILL AREA BELOW THE SEPARATORY OVERLINER WILL LIKELY BE SUBSTANTIALLY DEVELOPED PRIOR TO CONSTRUCTION OF THE INITIAL SEPARATORY OVERLINER CELL.
5. AS INDICATED IN ATTACHMENT 12-FINAL CLOSURE PLAN, McCARTY ROAD LANDFILL TX, LP WILL CONSTRUCT FINAL COVER AS THE SITE IS DEVELOPED. ONCE ANY 20-ACRE SIDESLOPE AREA, LOCATED IN THE EXPEDITED FINAL COVER AREA SHOWN ON FIGURE 12.1A IN ATTACHMENT 12, REACHES THE PERMITTED FINAL ELEVATION, THE LANDFILL WILL COMMENCE PLACEMENT OF FINAL COVER OVER THE 20-ACRE AREA WITHIN 12 MONTHS OF BRINGING THE 20-ACRE AREA TO THE FINAL PERMITTED WASTE FILL GRADE. THIS REQUIREMENT IS CONSISTENT WITH THE DECEMBER 4, 2007 MEDIATED SETTLEMENT AGREEMENT BETWEEN McCARTY ROAD LANDFILL TX, LP AND HARRIS COUNTY.
6. REFER TO PART IV-SITE OPERATING PLAN FOR DAILY AND INTERMEDIATE COVER REQUIREMENTS.
7. LANDFILL HAUL ROAD WILL BE SURFACED WITH CRUSHED STONE TO PROVIDE ALL-WEATHER ACCESS AND WILL BE GRADED TO PROVIDE POSITIVE DRAINAGE AWAY FROM FILL AREA.
8. REFER TO ATTACHMENT 6A-DRAINAGE DESIGN REPORT FOR THE EROSION AND SEDIMENTATION CONTROL PLAN. DRAINAGE STRUCTURES ARE SHOWN AS THE SITE DEVELOPS. ADDITIONALLY BMPs WILL BE USED TO CONTROL EROSION AS NEEDED.
9. MAXIMUM SLOPE ON TEMPORARY ACCESS ROADS IS 10%.
10. REFER TO ATTACHMENT 14 FOR LANDFILL GAS MANAGEMENT PLAN.
11. REFER TO ATTACHMENT 6, APPENDIX 6A-F FOR DEED RESTRICTION INFORMATION.

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- [ ] DRAFT
- [x] FOR PERMITTING PURPOSES ONLY
- [ ] ISSUED FOR CONSTRUCTION

DATE: 03/2004
FILE: 0120-439-11
CAD: 1D-SEQ-LDWG
DRAWN BY: JDW
DESIGN BY: ALO
REVIEWED BY: JPY

Weaver Consultants Group
TBPE REGISTRATION NO. F-3727

PREPARED FOR
McCARTY ROAD LANDFILL TX, LP

REVISIONS		
NO.	DATE	DESCRIPTION
1	06/2004	RESPONSE TO TCEQ 1st TECHNICAL COMMENTS
2	01/2012	PERMIT MODIFICATION
3	09/2024	PERMIT MODIFICATION

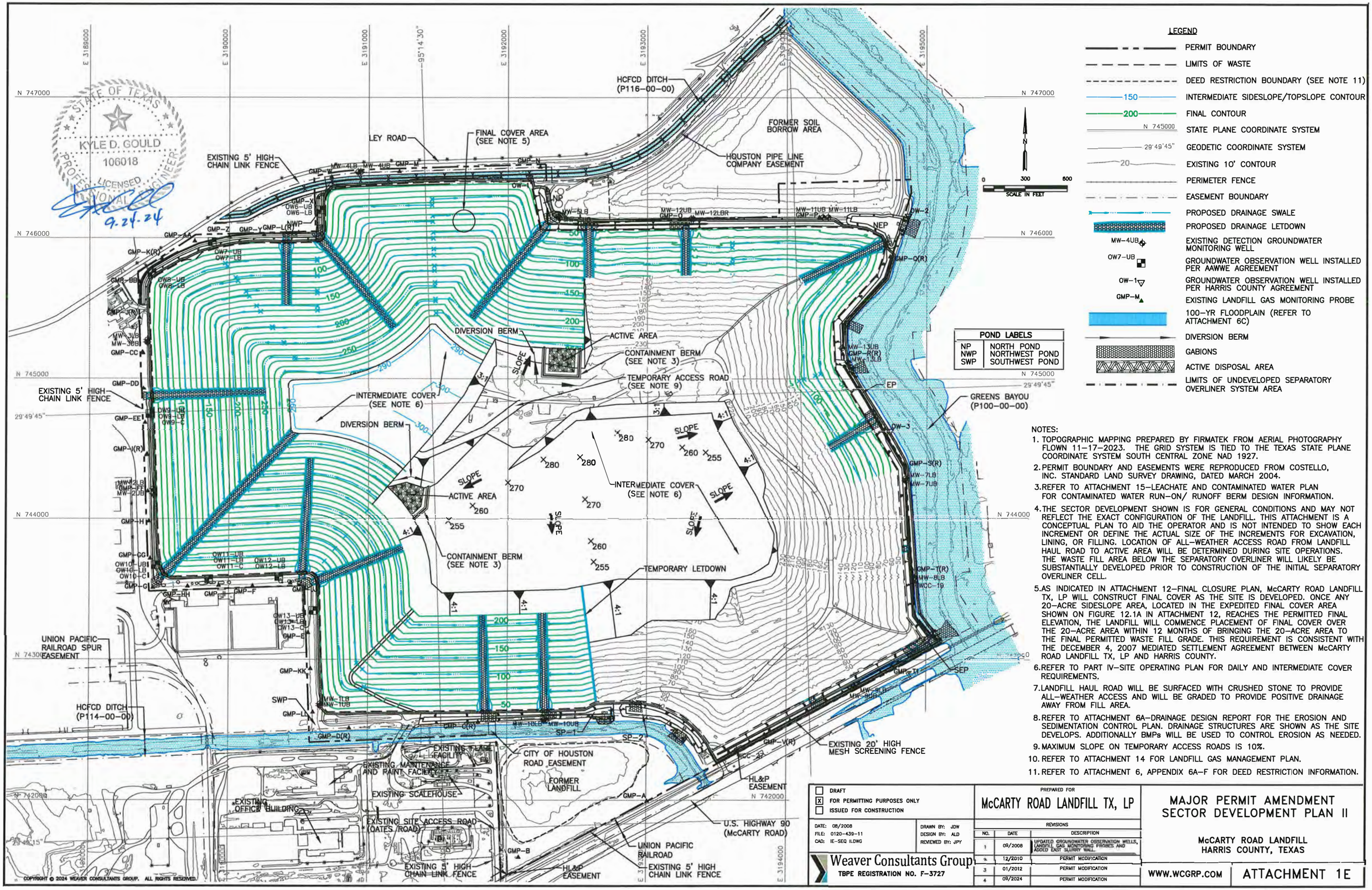
MAJOR PERMIT AMENDMENT SECTOR DEVELOPMENT PLAN I

McCARTY ROAD LANDFILL
HARRIS COUNTY, TEXAS

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ATTACHMENT 1D

G:\0120\439\FIP MOD 2024\ATT 1\CLEAN\ATT 1D-SEQ-1.dwg, farrington, 1:2



POND LABELS

NP	NORTH POND
NWP	NORTHWEST POND
SWP	SOUTHWEST POND

LEGEND

- PERMIT BOUNDARY
- LIMITS OF WASTE
- DEED RESTRICTION BOUNDARY (SEE NOTE 11)
- 150 — INTERMEDIATE SIDESLOPE/TOPSLOPE CONTOUR
- 200 — FINAL CONTOUR
- N 745000 — STATE PLANE COORDINATE SYSTEM
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- 20 — EXISTING 10' CONTOUR
- PERIMETER FENCE
- EASEMENT BOUNDARY
- PROPOSED DRAINAGE SWALE
- PROPOSED DRAINAGE LETDOWN
- MW-4UB — EXISTING DETECTION GROUNDWATER MONITORING WELL
- OW7-UB — GROUNDWATER OBSERVATION WELL INSTALLED PER AAWWE AGREEMENT
- OW-1 — GROUNDWATER OBSERVATION WELL INSTALLED PER HARRIS COUNTY AGREEMENT
- GMP-M — EXISTING LANDFILL GAS MONITORING PROBE
- 100-YR FLOODPLAIN (REFER TO ATTACHMENT 6C)
- DIVERSION BERM
- GABIONS
- ACTIVE DISPOSAL AREA
- LIMITS OF UNDEVELOPED SEPARATORY OVERLINER SYSTEM AREA

NOTES:

1. TOPOGRAPHIC MAPPING PREPARED BY FIRMATEK FROM AERIAL PHOTOGRAPHY FLOWN 11-17-2023. THE GRID SYSTEM IS TIED TO THE TEXAS STATE PLANE COORDINATE SYSTEM SOUTH CENTRAL ZONE NAD 1927.
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3. REFER TO ATTACHMENT 15-LEACHATE AND CONTAMINATED WATER PLAN FOR CONTAMINATED WATER RUN-ON/ RUNOFF BERM DESIGN INFORMATION.
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5. AS INDICATED IN ATTACHMENT 12-FINAL CLOSURE PLAN, McCARTY ROAD LANDFILL TX, LP WILL CONSTRUCT FINAL COVER AS THE SITE IS DEVELOPED. ONCE ANY 20-ACRE SIDESLOPE AREA, LOCATED IN THE EXPEDITED FINAL COVER AREA SHOWN ON FIGURE 12.1A IN ATTACHMENT 12, REACHES THE PERMITTED FINAL ELEVATION, THE LANDFILL WILL COMMENCE PLACEMENT OF FINAL COVER OVER THE 20-ACRE AREA WITHIN 12 MONTHS OF BRINGING THE 20-ACRE AREA TO THE FINAL PERMITTED WASTE FILL GRADE. THIS REQUIREMENT IS CONSISTENT WITH THE DECEMBER 4, 2007 MEDIATED SETTLEMENT AGREEMENT BETWEEN McCARTY ROAD LANDFILL TX, LP AND HARRIS COUNTY.
6. REFER TO PART IV-SITE OPERATING PLAN FOR DAILY AND INTERMEDIATE COVER REQUIREMENTS.
7. LANDFILL HAUL ROAD WILL BE SURFACED WITH CRUSHED STONE TO PROVIDE ALL-WEATHER ACCESS AND WILL BE GRADED TO PROVIDE POSITIVE DRAINAGE AWAY FROM FILL AREA.
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9. MAXIMUM SLOPE ON TEMPORARY ACCESS ROADS IS 10%.
10. REFER TO ATTACHMENT 14 FOR LANDFILL GAS MANAGEMENT PLAN.
11. REFER TO ATTACHMENT 6, APPENDIX 6A-F FOR DEED RESTRICTION INFORMATION.

STATE OF TEXAS
KYLE D. GOULD
106018
PROFESSIONAL ENGINEER
LICENSED
9.24.24

- [ ] DRAFT
- [x] FOR PERMITTING PURPOSES ONLY
- [ ] ISSUED FOR CONSTRUCTION

DATE: 08/2008
FILE: 0120-439-11
CAD: IE-SEQ II.DWG

DRAWN BY: JDW
DESIGN BY: ALD
REVIEWED BY: JPY

Weaver Consultants Group
TBPE REGISTRATION NO. F-3727

PREPARED FOR
McCARTY ROAD LANDFILL TX, LP

REVISIONS

NO.	DATE	DESCRIPTION
1	09/2008	UPDATED GROUNDWATER OBSERVATION WELLS, LANDFILL GAS MONITORING PROBES AND ADDED EAST SLURRY WALL.
2	12/2010	PERMIT MODIFICATION
3	01/2012	PERMIT MODIFICATION
4	09/2024	PERMIT MODIFICATION

MAJOR PERMIT AMENDMENT SECTOR DEVELOPMENT PLAN II

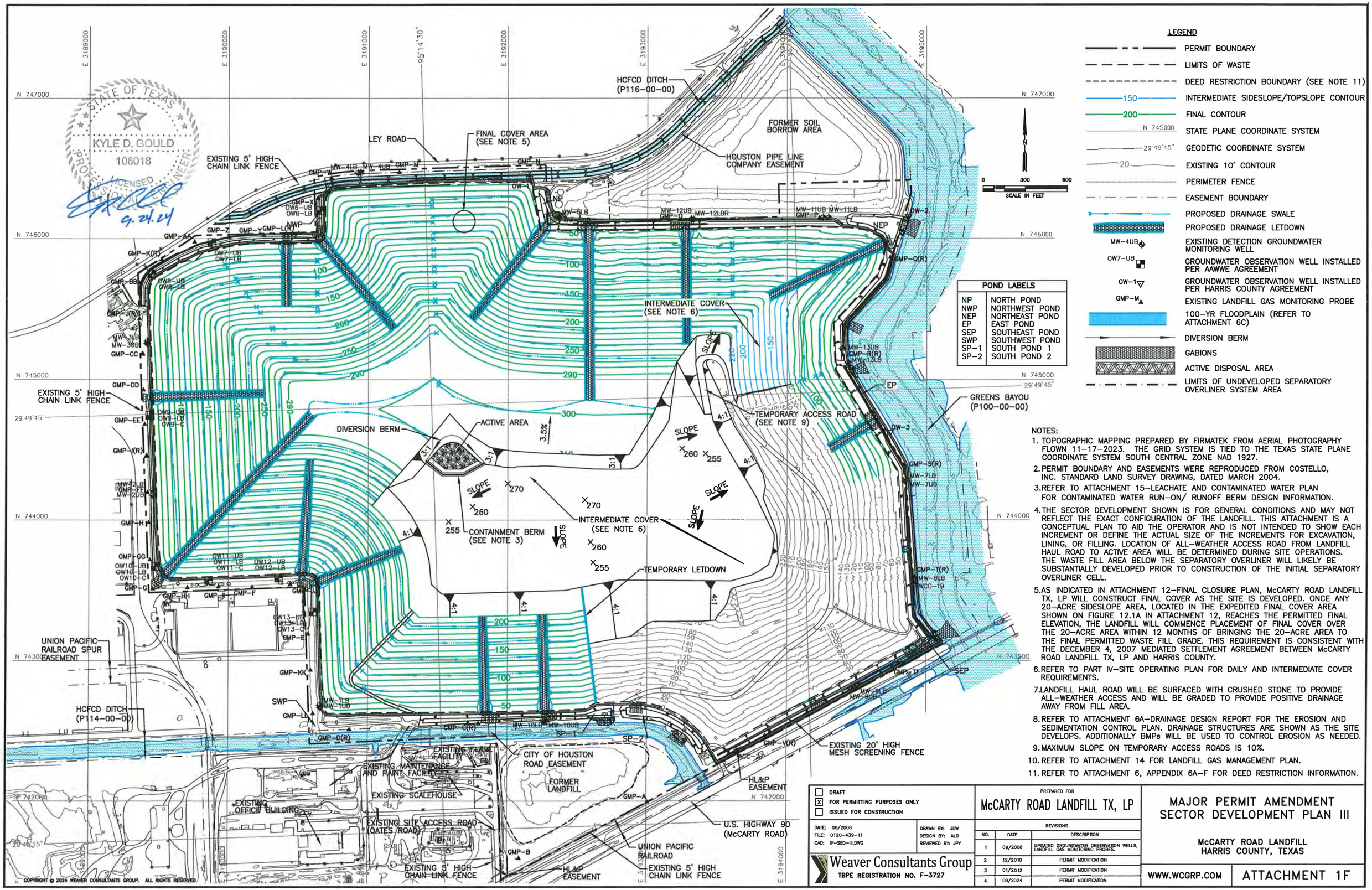
McCARTY ROAD LANDFILL
HARRIS COUNTY, TEXAS

WWW.WCGRP.COM

ATTACHMENT 1E

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O:\0120\439\FIP MOD 2024\ATT 1\CLEAN\ATT 1E-SEQ-II.dwg, rarrington, 1:2



STATE OF TEXAS
KYLE D. GOULD
106018
LICENSED PROFESSIONAL ENGINEER
9.24.24

POND LABELS

NP	NORTH POND
NWP	NORTHWEST POND
NEP	NORTHEAST POND
EP	EAST POND
SEP	SOUTHEAST POND
SWP	SOUTHWEST POND
SP-1	SOUTH POND 1
SP-2	SOUTH POND 2

LEGEND

- PERMIT BOUNDARY
- LIMITS OF WASTE
- DEED RESTRICTION BOUNDARY (SEE NOTE 11)
- 150 — INTERMEDIATE SIDESLOPE/TOPSLOPE CONTOUR
- 200 — FINAL CONTOUR
- N 745000 — STATE PLANE COORDINATE SYSTEM
- 29°49'45" — GEODETIC COORDINATE SYSTEM
- 20 — EXISTING 10' CONTOUR
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- PROPOSED DRAINAGE SWALE
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- MW-4UB — EXISTING DETECTION GROUNDWATER MONITORING WELL
- OW7-UB — GROUNDWATER OBSERVATION WELL INSTALLED PER AAWWE AGREEMENT
- OW-1 — GROUNDWATER OBSERVATION WELL INSTALLED PER HARRIS COUNTY AGREEMENT
- GMP-M — EXISTING LANDFILL GAS MONITORING PROBE
- 100-YR FLOODPLAIN (REFER TO ATTACHMENT 6C)
- DIVERSION BERM
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- ACTIVE DISPOSAL AREA
- LIMITS OF UNDEVELOPED SEPARATORY OVERLINER SYSTEM AREA

NOTES:

1. TOPOGRAPHIC MAPPING PREPARED BY FIRMATEK FROM AERIAL PHOTOGRAPHY FLOWN 11-17-2023. THE GRID SYSTEM IS TIED TO THE TEXAS STATE PLANE COORDINATE SYSTEM SOUTH CENTRAL ZONE NAD 1927.
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5. AS INDICATED IN ATTACHMENT 12-FINAL CLOSURE PLAN, McCARTY ROAD LANDFILL TX, LP WILL CONSTRUCT FINAL COVER AS THE SITE IS DEVELOPED. ONCE ANY 20-ACRE SIDESLOPE AREA, LOCATED IN THE EXPEDITED FINAL COVER AREA SHOWN ON FIGURE 12.1A IN ATTACHMENT 12, REACHES THE PERMITTED FINAL ELEVATION, THE LANDFILL WILL COMMENCE PLACEMENT OF FINAL COVER OVER THE 20-ACRE AREA WITHIN 12 MONTHS OF BRINGING THE 20-ACRE AREA TO THE FINAL PERMITTED WASTE FILL GRADE. THIS REQUIREMENT IS CONSISTENT WITH THE DECEMBER 4, 2007 MEDIATED SETTLEMENT AGREEMENT BETWEEN McCARTY ROAD LANDFILL TX, LP AND HARRIS COUNTY.
6. REFER TO PART IV-SITE OPERATING PLAN FOR DAILY AND INTERMEDIATE COVER REQUIREMENTS.
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9. MAXIMUM SLOPE ON TEMPORARY ACCESS ROADS IS 10%.
10. REFER TO ATTACHMENT 14 FOR LANDFILL GAS MANAGEMENT PLAN.
11. REFER TO ATTACHMENT 6, APPENDIX 6A-F FOR DEED RESTRICTION INFORMATION.

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- [ ] DRAFT
- [x] FOR PERMITTING PURPOSES ONLY
- [ ] ISSUED FOR CONSTRUCTION

DATE: 08/2008
FILE: 0120-439-11
CAD: IF-SEQ-III.DWG

DRAWN BY: JDW
DESIGN BY: ALD
REVIEWED BY: JPY

Weaver Consultants Group
TBPE REGISTRATION NO. F-3727

PREPARED FOR
McCARTY ROAD LANDFILL TX, LP

REVISIONS

NO.	DATE	DESCRIPTION
1	09/2008	UPDATED GROUNDWATER OBSERVATION WELLS, LANDFILL GAS MONITORING PROBES.
2	12/2010	PERMIT MODIFICATION
3	01/2012	PERMIT MODIFICATION
4	09/2024	PERMIT MODIFICATION

MAJOR PERMIT AMENDMENT SECTOR DEVELOPMENT PLAN III

McCARTY ROAD LANDFILL
HARRIS COUNTY, TEXAS

WWW.WCGRP.COM

ATTACHMENT 1F

O:\0120\439\PLIP MOD 2024\ATT 1\CLEAN\ATT 1F-SEQ-III.dwg, rarrington, 1:2

STATE OF TEXAS
KYLE D. GOULD
106018
LICENSED
PROFESSIONAL ENGINEER
9.24.24

E 3189000 E 3190000 E 3191000 95°14'30" E 3192000 E 3193000 E 3194000 E 3195000
N 747000 N 746000 N 745000 29°49'45" N 744000 N 743000 N 742000 29°49'15"

HCFCD DITCH (P116-00-00)
FORMER SOIL BORROW AREA
HOUSTON PIPE LINE COMPANY EASEMENT
LEY ROAD
FINAL COVER AREA (SEE NOTE 5)
EXISTING 5' HIGH CHAIN LINK FENCE
CONTAINMENT BERM (SEE NOTE 3)
ACTIVE AREA
TEMPORARY ACCESS ROAD (SEE NOTE 9)
GREENS BAYOU (P100-00-00)
TEMPORARY LETDOWN
DAILY COVER
INTERMEDIATE COVER (SEE NOTE 6)
SLOPE
3:1
4:1
3.5%
UNION PACIFIC RAILROAD SPUR EASEMENT
HCFCD DITCH (P114-00-00)
EXISTING MAINTENANCE AND PAINT FACILITY
EXISTING SCALEHOUSE
EXISTING OFFICE BUILDING
EXISTING SITE ACCESS ROAD (OATES ROAD)
CITY OF HOUSTON ROAD EASEMENT
FORMER LANDFILL
HL&P EASEMENT
UNION PACIFIC RAILROAD
U.S. HIGHWAY 90 (McCARTY ROAD)
EXISTING 20' HIGH MESH SCREENING FENCE
EXISTING 5' HIGH CHAIN LINK FENCE

0 300 600
SCALE IN FEET

POND LABELS	
NP	NORTH POND
NWP	NORTHWEST POND
NEP	NORTHEAST POND
EP	EAST POND
SEP	SOUTHEAST POND
SWP	SOUTHWEST POND
SP-1	SOUTH POND 1
SP-2	SOUTH POND 2

LEGEND
- PERMIT BOUNDARY
- LIMITS OF WASTE
- DEED RESTRICTION BOUNDARY (SEE NOTE 11)
- 150 INTERMEDIATE SIDESLOPE/TOPSLOPE CONTOUR
- 200 FINAL CONTOUR
- N 745000 STATE PLANE COORDINATE SYSTEM
- 29°49'45" GEODETIC COORDINATE SYSTEM
- 20 EXISTING 10' CONTOUR
- PERIMETER FENCE
- EASEMENT BOUNDARY
- PROPOSED DRAINAGE SWALE
- PROPOSED DRAINAGE LETDOWN
- MW-4UB EXISTING DETECTION GROUNDWATER MONITORING WELL
- OW7-UB GROUNDWATER OBSERVATION WELL INSTALLED PER AAWWE AGREEMENT
- OW-1 GROUNDWATER OBSERVATION WELL INSTALLED PER HARRIS COUNTY AGREEMENT
- GMP-M EXISTING LANDFILL GAS MONITORING PROBE
- 100-YR FLOODPLAIN (REFER TO ATTACHMENT 6C)
- DIVERSION BERM
- GABIONS
- ACTIVE DISPOSAL AREA
- LIMITS OF UNDEVELOPED SEPARATORY OVERLINER SYSTEM AREA

NOTES:
1. TOPOGRAPHIC MAPPING PREPARED BY FIRMATEK FROM AERIAL PHOTOGRAPHY FLOWN 11-17-2023. THE GRID SYSTEM IS TIED TO THE TEXAS STATE PLANE COORDINATE SYSTEM SOUTH CENTRAL ZONE NAD 1927.
2. PERMIT BOUNDARY AND EASEMENTS WERE REPRODUCED FROM COSTELLO, INC. STANDARD LAND SURVEY DRAWING, DATED MARCH 2004.
3. REFER TO ATTACHMENT 15-LEACHATE AND CONTAMINATED WATER PLAN FOR CONTAMINATED WATER RUN-ON/ RUNOFF BERM DESIGN INFORMATION.
4. THE SECTOR DEVELOPMENT SHOWN IS FOR GENERAL CONDITIONS AND MAY NOT REFLECT THE EXACT CONFIGURATION OF THE LANDFILL. THIS ATTACHMENT IS A CONCEPTUAL PLAN TO AID THE OPERATOR AND IS NOT INTENDED TO SHOW EACH INCREMENT OR DEFINE THE ACTUAL SIZE OF THE INCREMENTS FOR EXCAVATION, LINING, OR FILLING. LOCATION OF ALL-WEATHER ACCESS ROAD FROM LANDFILL HAUL ROAD TO ACTIVE AREA WILL BE DETERMINED DURING SITE OPERATIONS. THE WASTE FILL AREA BELOW THE SEPARATORY OVERLINER WILL LIKELY BE SUBSTANTIALLY DEVELOPED PRIOR TO CONSTRUCTION OF THE INITIAL SEPARATORY OVERLINER CELL.
5. AS INDICATED IN ATTACHMENT 12-FINAL CLOSURE PLAN, McCARTY ROAD LANDFILL TX, LP WILL CONSTRUCT FINAL COVER AS THE SITE IS DEVELOPED. ONCE ANY 20-ACRE SIDESLOPE AREA, LOCATED IN THE EXPEDITED FINAL COVER AREA SHOWN ON FIGURE 12.1A IN ATTACHMENT 12, REACHES THE PERMITTED FINAL ELEVATION, THE LANDFILL WILL COMMENCE PLACEMENT OF FINAL COVER OVER THE 20-ACRE AREA WITHIN 12 MONTHS OF BRINGING THE 20-ACRE AREA TO THE FINAL PERMITTED WASTE FILL GRADE. THIS REQUIREMENT IS CONSISTENT WITH THE DECEMBER 4, 2007 MEDIATED SETTLEMENT AGREEMENT BETWEEN McCARTY ROAD LANDFILL TX, LP AND HARRIS COUNTY.
6. REFER TO PART IV-SITE OPERATING PLAN FOR DAILY AND INTERMEDIATE COVER REQUIREMENTS.
7. LANDFILL HAUL ROAD WILL BE SURFACED WITH CRUSHED STONE TO PROVIDE ALL-WEATHER ACCESS AND WILL BE GRADED TO PROVIDE POSITIVE DRAINAGE AWAY FROM FILL AREA.
8. REFER TO ATTACHMENT 6A-DRAINAGE DESIGN REPORT FOR THE EROSION AND SEDIMENTATION CONTROL PLAN. DRAINAGE STRUCTURES ARE SHOWN AS THE SITE DEVELOPS. ADDITIONALLY BMPs WILL BE USED TO CONTROL EROSION AS NEEDED.
9. MAXIMUM SLOPE ON TEMPORARY ACCESS ROADS IS 10%.
10. REFER TO ATTACHMENT 14 FOR LANDFILL GAS MANAGEMENT PLAN.
11. REFER TO ATTACHMENT 6, APPENDIX 6A-F FOR DEED RESTRICTION INFORMATION.

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DATE: 08/2008
FILE: 0120-439-11
CAD: IG-SEQ-IV.DWG
DRAWN BY: JDW
DESIGN BY: ALD
REVIEWED BY: JPY

Weaver Consultants Group
TBPE REGISTRATION NO. F-3727

PREPARED FOR
McCARTY ROAD LANDFILL TX, LP

REVISIONS

NO.	DATE	DESCRIPTION
1	09/2006	UPDATED GROUNDWATER OBSERVATION WELLS, LANDFILL GAS MONITORING PROBES.
2	12/2010	PERMIT MODIFICATION
3	01/2012	PERMIT MODIFICATION
4	09/2024	PERMIT MODIFICATION

MAJOR PERMIT AMENDMENT
SECTOR DEVELOPMENT PLAN IV

McCARTY ROAD LANDFILL
HARRIS COUNTY, TEXAS

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ATTACHMENT 1G

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POND LABELS	
NP	NORTH POND
NWP	NORTHWEST POND
NEP	NORTHEAST POND
EP	EAST POND
SEP	SOUTHEAST POND
SWP	SOUTHWEST POND
SP-1	SOUTH POND 1
SP-2	SOUTH POND 2

N

0 300 600

SCALE IN FEET

LEGEND

- PERMIT BOUNDARY
- LIMITS OF WASTE
- DEED RESTRICTION BOUNDARY (SEE NOTE 10)
- 200 — FINAL CONTOUR
- N 745000 — STATE PLANE COORDINATE SYSTEM
- 29°49'45" — GEODETIC COORDINATE SYSTEM
- 20 — EXISTING 10' CONTOUR
- MW-4UB — EXISTING DETECTION GROUNDWATER MONITORING WELL
- OW7-UB — GROUNDWATER OBSERVATION WELL INSTALLED PER AAWWE AGREEMENT
- OW-1 — GROUNDWATER OBSERVATION WELL INSTALLED PER HARRIS COUNTY AGREEMENT
- GMP-M — EXISTING LANDFILL GAS MONITORING PROBE
- PERIMETER FENCE
- EASEMENT BOUNDARY
- 100-YR FLOODPLAIN (REFER TO ATTACHMENT 6C)
- GABIONS
- PROPOSED DRAINAGE SWALE
- PROPOSED DRAINAGE LETDOWN

NOTES:

1. TOPOGRAPHIC MAPPING PREPARED BY FIRMATEK FROM AERIAL PHOTOGRAPHY FLOWN 11-17-2023. THE GRID SYSTEM IS TIED TO THE TEXAS STATE PLANE COORDINATE SYSTEM SOUTH CENTRAL ZONE NAD 1927.
2. PERMIT BOUNDARY AND EASEMENTS WERE REPRODUCED FROM COSTELLO, INC. STANDARD LAND SURVEY DRAWING, DATED MARCH 2004.
3. REFER TO ATTACHMENT 7B FOR POST DEVELOPMENT DRAINAGE INFORMATION.
4. REFER TO ATTACHMENT 6A-DRAINAGE DESIGN REPORT FOR DRAINAGE DESIGN INFORMATION.
5. FINAL COVER DETAILS ARE PROVIDED IN ATTACHMENT 6D FINAL COVER SYSTEM DETAILS.
6. TYPICAL SIDESLOPES ARE 4H:1V, TYPICAL TOPSLOPE IS 3.5%.
7. MAXIMUM FINAL COVER ELEVATION: 314.5 FT-MSL
   MAXIMUM WASTE ELEVATION: 313.5 FT-MSL
8. REFER TO ATTACHMENT 2 FOR TYPICAL CROSS SECTION INFORMATION.
9. REFER TO ATTACHMENT 14 FOR LANDFILL GAS MANAGEMENT PLAN.
10. REFER TO ATTACHMENT 6, APPENDIX 6A-F FOR DEED RESTRICTION INFORMATION.

STATE OF TEXAS
KYLE D. GOULD
106018
PROFESSIONAL ENGINEER
LICENSED
6.24.24

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DATE: 06/2008
FILE: 0120-439-11
CAD: IH-COMPLETION.DWG

DRAWN BY: JDW
DESIGN BY: ALD
REVIEWED BY: JPY

Weaver Consultants Group
TBPE REGISTRATION NO. F-3727

PREPARED FOR
McCARTY ROAD LANDFILL TX, LP

REVISIONS		
NO.	DATE	DESCRIPTION
1	02/2009	REMOVED "NEW ENTRANCE ROAD" CALLOUT
2	10/2009	UPDATED GROUNDWATER OBSERVATION WELLS, LANDFILL GAS MONITORING PROBES.
3	12/2010	PERMIT MODIFICATION
4	01/2012	PERMIT MODIFICATION
5	09/2024	PERMIT MODIFICATION

MAJOR PERMIT AMENDMENT
LANDFILL COMPLETION PLAN

McCARTY ROAD LANDFILL
HARRIS COUNTY, TEXAS

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ATTACHMENT 1H

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O:\0120\439\FIP MOD 2024\ATT 1\CLEAN\ATT 1H-COMPLETION.dwg, tarrington, 1:2

McCARTY ROAD LANDFILL
CITY OF HOUSTON, HARRIS COUNTY, TEXAS
TCEQ PERMIT NO. MSW-261B

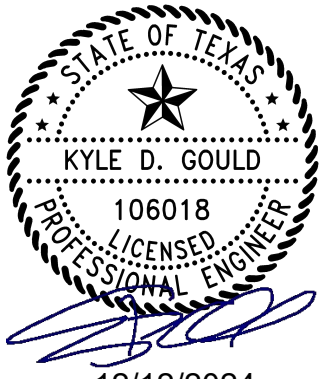
PART III - SITE DEVELOPMENT PLAN
ATTACHMENT 2
FILL CROSS SECTIONS

Prepared for

McCarty Road Landfill TX, LP

Approved Site Development Plan
August 2008
Revised October 2009
Revised December 2010
Revised January 2011
Revised January 2012
Revised October 2014

Revised December 2024



12/12/2024

Weaver Consultants Group, LLC
TBPE Registration No. F-3727
6420 Southwest Boulevard, Suite 206
Fort Worth, Texas 76109
817-735-9770

WCG Project No.0120-439-11-259

STATE OF TEXAS
KYLE D. GOULD
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PROFESSIONAL ENGINEER
12/12/2024

HCFCD DITCH P116-00-00
LEY ROAD
FORMER SOIL BORROW AREA
HOUSTON PIPE LINE COMPANY EASEMENT
GREENS BAYOU P100-00-00
UNION PACIFIC RAILROAD SPUR EASEMENT
HCFCD DITCH P114-00-00
EXISTING FLARE FACILITY
EXISTING MAINTENANCE AND PAINT FACILITY
EXISTING SCALEHOUSE
EXISTING SITE ACCESS ROAD (OATES ROAD)
EXISTING OFFICE BUILDING
CITY OF HOUSTON ROAD EASEMENT
FORMER LANDFILL
HL&P EASEMENT
U.S. HIGHWAY 90 (McCARTY ROAD)
UNION PACIFIC RAILROAD
HL&P EASEMENT
SEP
NEP
SWP

LEGEND

- PERMIT BOUNDARY
- LIMITS OF WASTE
- DEED RESTRICTION BOUNDARY (SEE NOTE 5)
- STATE PLANE COORDINATE SYSTEM
- GEODETIC COORDINATE SYSTEM
- EXISTING CONTOUR
- FINAL CONTOURS
- COMPACTED CLAY SLOPE LINER
- CLAY CUTOFF WALL
- SLURRY WALL
- DEEP SLURRY WALL
- NORTHERN EAST SLURRY WALL EXTENSION (REFER TO ATT. 6D)
- EAST SLURRY WALL EXTENSION (REFER TO ATT. 6D)
- SLURRY WALL EXTENSION OF GWRT (REFER TO ATT. 6D)
- EXISTING DETECTION GROUNDWATER MONITORING WELL
- PROPOSED OBSERVATION WELL CLUSTERS (SEE NOTE 7)
- EXISTING OBSERVATION WELL (SEE NOTE 7)
- EXISTING LANDFILL GAS MONITORING PROBE
- EXISTING LANDFILL GAS MONITORING PROBE TO BE DECOMMISSIONED
- PROPOSED LANDFILL GAS MONITORING PROBE (SEE NOTE 6)
- EASEMENT BOUNDARY
- SOUTHWEST LAB SOIL BORING
- WOODWARD CLYDE SOIL BORING
- GABIONS
- PROPOSED DRAINAGE SWALE
- PROPOSED DRAINAGE LETDOWN
- GROUND WATER RECOVERY TRENCH
- GROUND WATER RECOVERY TRENCH SUMP
- CONSTRUCTED FINAL COVER

NOTES:

1. TOPOGRAPHIC MAPPING PREPARED BY FIRMATEK FROM AERIAL PHOTOGRAPHY FLOWN 11-17-2023. THE GRID SYSTEM IS TIED TO THE TEXAS STATE PLANE COORDINATE SYSTEM SOUTH CENTRAL ZONE NAD 1927.
2. PERMIT BOUNDARY AND EASEMENTS WERE REPRODUCED FROM COSTELLO, INC. STANDARD LAND SURVEY DRAWING, DATED MARCH 2004.
3. BORING LOCATIONS HAVE BEEN REPRODUCED FROM VARIOUS SUBSURFACE INVESTIGATIONS PREVIOUSLY COMPLETED AND ARE APPROXIMATE. ONLY BORINGS SHOWN ON SECTIONS ARE PRESENTED ON THIS DRAWING. PLEASE REFER TO ATTACHMENT 4, FIGURE 4B.2 FOR A FIGURE THAT SHOWS ALL THE BORINGS COMPLETED AT THE SITE.
4. REFER TO ATTACHMENT 1H FOR THE FINAL CONTOUR PLAN AND 1I FOR THE BOTTOM OF WASTE PLAN.
5. REFER TO ATTACHMENT 6, APPENDIX 6A-F FOR DEED RESTRICTION INFORMATION.
6. PROPOSED PROBES DESIGNATED WITH "(R)" ARE REPLACEMENT PROBES. PROPOSED PROBES GMP-W THROUGH GMP-LL WERE ADDED ALONG THE WESTERN PERIMETER OF THE LANDFILL AS PART OF THE AAWWE SETTLEMENT AGREEMENT.
7. GROUNDWATER OBSERVATION WELLS OW-1, OW-2, OW-3, OW-4 AND OW-5 WERE ADDED ALONG THE NORTHERN AND EASTERN PERIMETER OF THE LANDFILL AS PART OF THE HARRIS COUNTY SETTLEMENT AGREEMENT. ADDITIONAL PROPOSED OBSERVATION WELLS WERE ADDED ALONG THE WESTERN PERIMETER OF THE LANDFILL AS PART OF THE AAWWE SETTLEMENT AGREEMENT.

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DATE: 08/2008
FILE: 0120-439-11
CAD: 2A-SITE PLAN.DWG
DRAWN BY: SRF
DESIGN BY: DOL
REVIEWED BY: JPY

Weaver Consultants Group
TBPE REGISTRATION NO. F-3727

PREPARED FOR
McCARTY ROAD LANDFILL TX, LP

REVISIONS		
1	09/2008	UPDATED LANDFILL GAS MONITORING PROBES AND ADDED EAST SLURRY WALL.
2	12/2010	PERMIT MODIFICATION
3	01/2012	PERMIT MODIFICATION
4	10/2014	PERMIT MODIFICATION
5	12/2024	PERMIT MODIFICATION

TYPICAL SECTION SITE PLAN

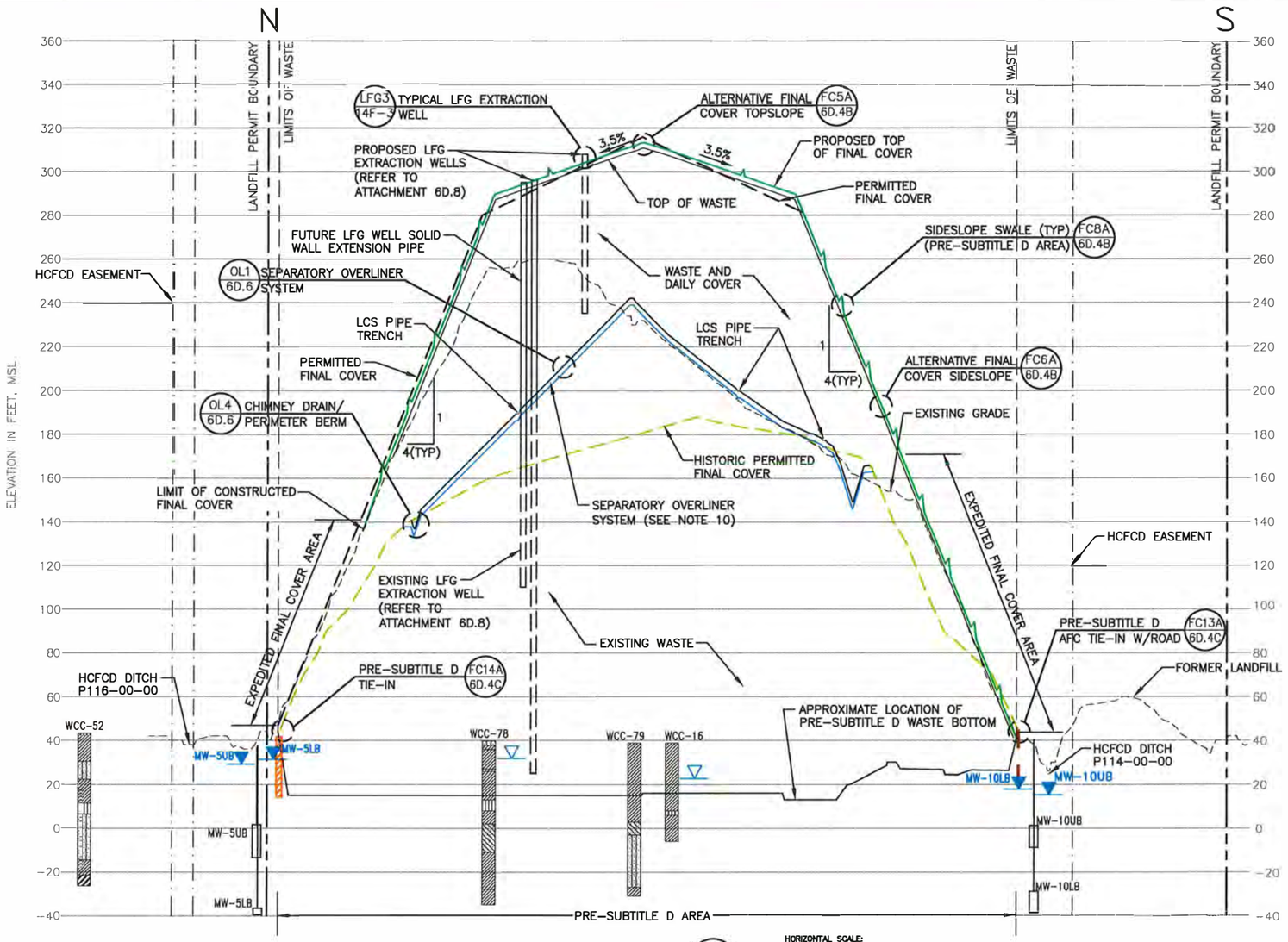
McCARTY ROAD LANDFILL
HARRIS COUNTY, TEXAS

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ATTACHMENT 2A

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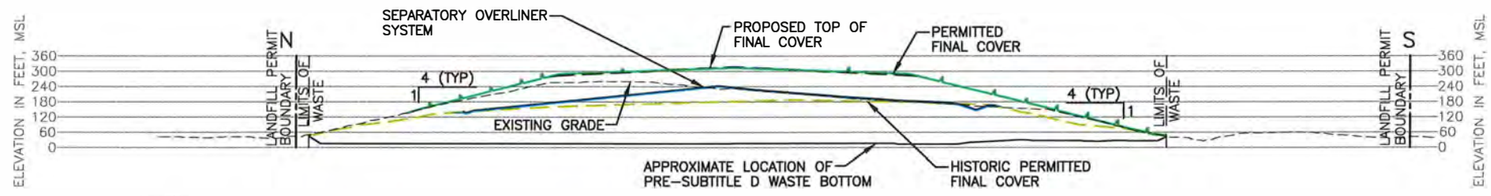
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SECTION A (EXAGGERATED VERTICAL SCALE) — A / 2B — 1B,2A,7A

HORIZONTAL SCALE: 0' 300' 600'

VERTICAL SCALE: 0' 30' 60'



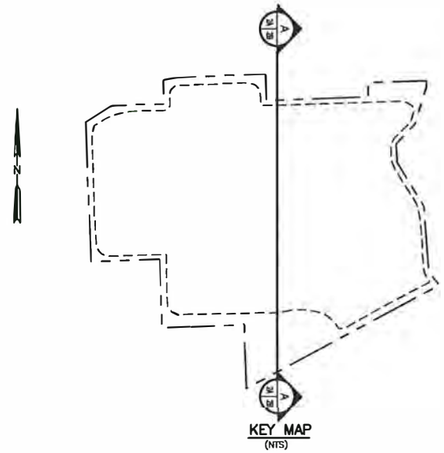
SECTION A (1H:1V) — A / 2B — 1B,2A,7A

HORIZONTAL SCALE: 0' 300' 600'

VERTICAL SCALE: 0' 300' 600'

LEGEND

- MW-10UB — APPROXIMATE POTENTIOMETRIC SURFACE IN NOVEMBER 2002
- APPROXIMATE ELEVATION THAT GROUNDWATER WAS FIRST ENCOUNTERED DURING DRILLING
- COMPACTED CLAY SLOPE LINER (SEE NOTE 8)
- SLURRY WALL (SEE NOTE 8)



BORING LEGEND

- LOW PLASTICITY CLAY
- HIGH PLASTICITY CLAY
- SILT
- SILTY SAND
- CLAYEY SAND

STATE OF TEXAS
KYLE D. GOULD
106018
LICENSED
PROFESSIONAL ENGINEER
9.24.24

NOTES:

1. TOPOGRAPHIC MAPPING PREPARED BY FIRMATEK FROM AERIAL PHOTOGRAPHY FLOWN 11-17-2023. THE GRID SYSTEM IS TIED TO THE TEXAS STATE PLANE COORDINATE SYSTEM SOUTH CENTRAL ZONE NAD 1927.
2. REFER TO ATTACHMENT 6D FOR FINAL COVER SYSTEM DETAILS.
3. LANDFILL COMPLETION AND TOP OF LINER GRADES ARE SHOWN ON ATTACHMENTS 1H AND 1I.
4. SEE ATTACHMENT 4 FOR BORING DATA. BORINGS PROJECTED INTO THE LINE OF THE SECTION. SEE ATTACHMENT 2A FOR APPROXIMATE BORING LOCATIONS.
5. REFER TO ATTACHMENT 14 FOR DETAILS OF THE LANDFILL GAS MANAGEMENT PLAN.
6. DRAINAGE DESIGN INFORMATION IS PROVIDED IN ATTACHMENT 6A-DRAINAGE DESIGN REPORT.
7. MAXIMUM FINAL COVER ELEVATION IS 314.5 FT-MSL FOR GCL FINAL COVER. DEEPEST EXCAVATION IS 1.8 FT-MSL.
8. THE LOCATIONS OF THE SLURRY WALL AND COMPACTED CLAY SLOPE LINER WERE REPRODUCED FROM A DECEMBER 1992 DRAWING PREPARED BY HALL SOUTHWEST. REFER TO ATTACHMENT 1I FOR LOCATION.
9. MINIMUM BUFFER ZONE WIDTH BETWEEN THE PERMIT BOUNDARY AND LIMITS OF WASTE IS A MINIMUM OF 50 FEET.
10. REFER TO ATTACHMENT 6D FOR THE DESIGN OF THE SEPARATORY OVERLINER SYSTEM THAT WILL BE INSTALLED WITHIN THE PRE-SUBTITLE D AREA.

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DATE: 03/2004
FILE: 0120-439-11
CAD: SEC-A.DWG
DRAWN BY: JDW
DESIGN BY: SAN
REVIEWED BY: JPY

Weaver Consultants Group
TBPE REGISTRATION NO. F-3727

PREPARED FOR
McCARTY ROAD LANDFILL TX, LP

REVISIONS		
1	06/2004	RESPONSE TO TCEQ 1st TECHNICAL COMMENTS
2	09/2004	RESPONSE TO TCEQ 2nd TECHNICAL COMMENTS
3	02/2008	HARRIS COUNTY SETTLEMENT INFORMATION
4	09/2024	PERMIT MODIFICATION

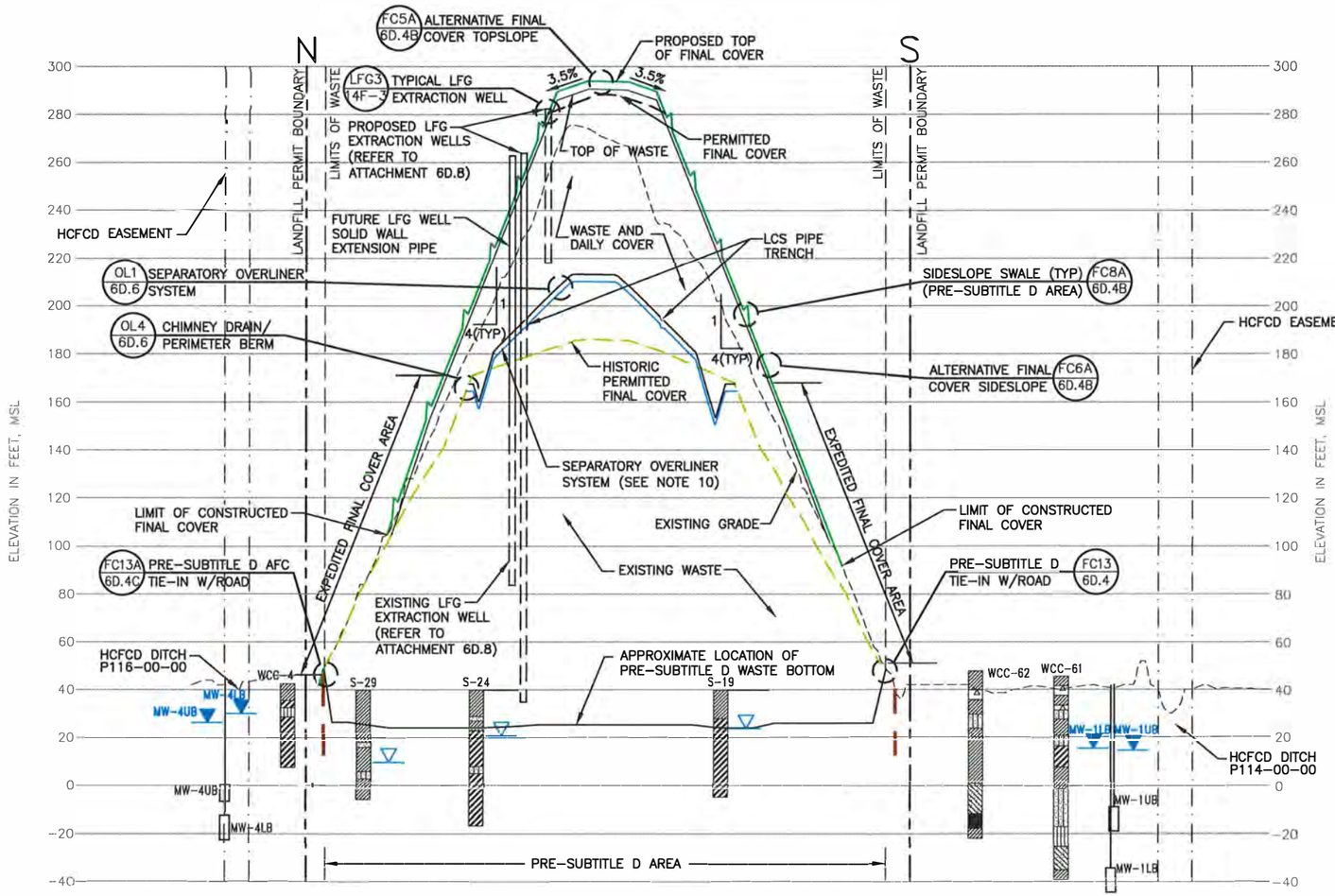
MAJOR PERMIT AMENDMENT
TYPICAL SECTION A

McCARTY ROAD LANDFILL
HARRIS COUNTY, TEXAS

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ATTACHMENT 2B

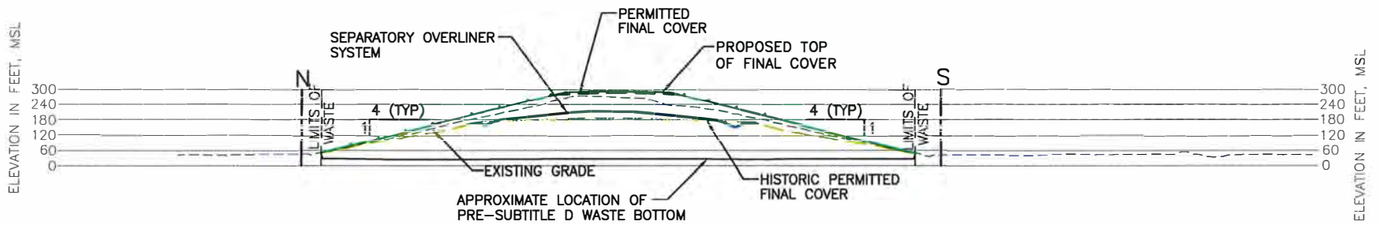
O:\0120\439\PLIP MOD 2024\ATT 2\CLEAN\ATT 2B-SEC-A.dwg, farrington, 1:2



SECTION B (EXAGGERATED VERTICAL SCALE) B 2C 2A,7A

HORIZONTAL SCALE: 0 300 600

VERTICAL SCALE: 0 30 60



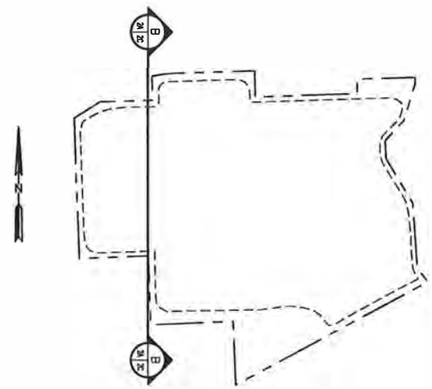
LEGEND

- MW-10UB — APPROXIMATE POTENTIOMETRIC SURFACE IN NOVEMBER 2002
- APPROXIMATE ELEVATION THAT GROUNDWATER WAS FIRST ENCOUNTERED DURING DRILLING
- COMPACTED CLAY SLOPE LINER (SEE NOTE 8)

SECTION B (1H:1V) B 2C 2A,7A

HORIZONTAL SCALE: 0' 300' 600'

VERTICAL SCALE: 0' 300' 600'



KEY MAP (NTS)

BORING LEGEND

- LOW PLASTICITY CLAY
- HIGH PLASTICITY CLAY
- SILT
- SILTY SAND
- CLAYEY SAND
- POORLY-SORTED SAND
- BRECCIA
- LOW PLASTICITY SILTY CLAY

STATE OF TEXAS
KYLE D. GOULD
106018
PROFESSIONAL LICENSED ENGINEER

6.24.24

NOTES:

1. TOPOGRAPHIC MAPPING PREPARED BY FIRMATEK FROM AERIAL PHOTOGRAPHY FLOWN 11-17-2023. THE GRID SYSTEM IS TIED TO THE TEXAS STATE PLANE COORDINATE SYSTEM SOUTH CENTRAL ZONE NAD 1927.
2. REFER TO ATTACHMENT 6D FOR FINAL COVER SYSTEM DETAILS.
3. LANDFILL COMPLETION AND TOP OF LINER GRADES ARE SHOWN ON ATTACHMENTS 1H AND 1I.
4. SEE ATTACHMENT 4 FOR BORING DATA. BORINGS PROJECTED INTO THE LINE OF THE SECTION. SEE ATTACHMENT 2A FOR APPROXIMATE BORING LOCATIONS.
5. REFER TO ATTACHMENT 14 FOR DETAILS OF THE LANDFILL GAS MANAGEMENT PLAN.
6. DRAINAGE DESIGN INFORMATION IS PROVIDED IN ATTACHMENT 6A-DRAINAGE DESIGN REPORT.
7. MAXIMUM FINAL COVER ELEVATION IS 314.5 FT-MSL FOR GCL FINAL COVER. DEEPEST EXCAVATION IS 1.8 FT-MSL.
8. THE LOCATIONS OF THE SLURRY WALL AND COMPACTED CLAY SLOPE LINER WERE REPRODUCED FROM A DECEMBER 1992 DRAWING PREPARED BY HALL SOUTHWEST. REFER TO ATTACHMENT 1I FOR LOCATION.
9. MINIMUM BUFFER ZONE WIDTH BETWEEN THE PERMIT BOUNDARY AND LIMITS OF WASTE IS A MINIMUM OF 50 FEET.
10. REFER TO ATTACHMENT 6D FOR THE DESIGN OF THE SEPARATORY OVERLINER SYSTEM THAT WILL BE INSTALLED WITHIN THE PRE-SUBTITLE D AREA.

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DATE: 02/2004
FILE: 0120-439-11
CAD: SEC-B.DWG
DRAWN BY: JDW
DESIGN BY: SAN
REVIEWED BY: JPY

Weaver Consultants Group
TBPE REGISTRATION NO. F-3727

PREPARED FOR
McCARTY ROAD LANDFILL TX, LP

REVISIONS

1	06/2004	RESPONSE TO TCEQ 1st TECHNICAL COMMENTS
2	09/2004	RESPONSE TO TCEQ 2nd TECHNICAL COMMENTS
3	02/2008	HARRIS COUNTY SETTLEMENT INFORMATION
4	09/2024	PERMIT MODIFICATION

MAJOR PERMIT AMENDMENT
TYPICAL SECTION B

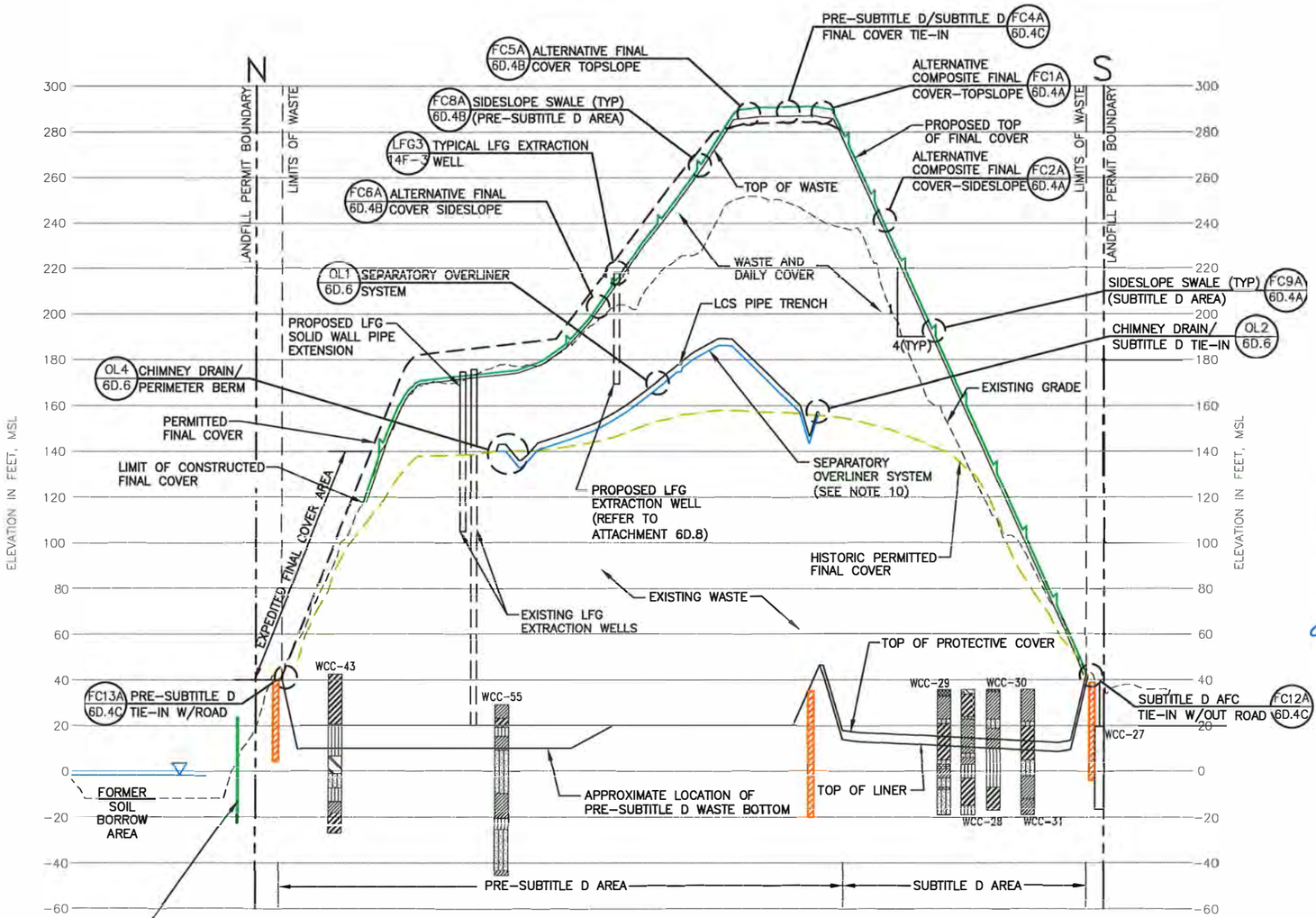
McCARTY ROAD LANDFILL
HARRIS COUNTY, TEXAS

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ATTACHMENT 2C

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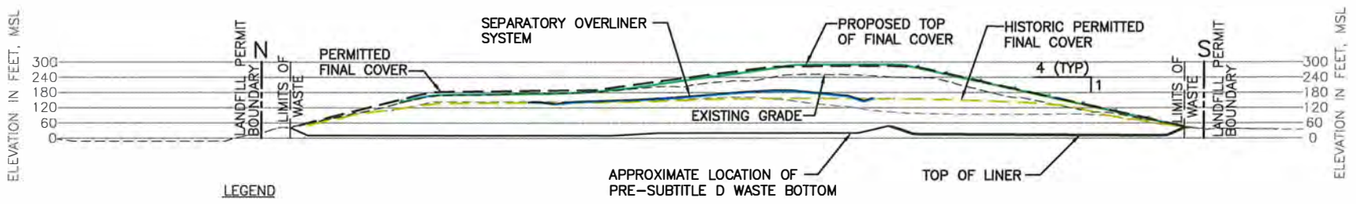
O:\0120\439\FIP MOD 2024\ATT 2\CLEAN\ATT 2C-SEC-B.dwg, tarrington, 1:2



SECTION C (EXAGGERATED VERTICAL SCALE) C 2A,7A 2D

HORIZONTAL SCALE: 0 300 600

VERTICAL SCALE: 0 30 60



LEGEND

MW-10UB APPROXIMATE POTENTIOMETRIC SURFACE IN NOVEMBER 2002

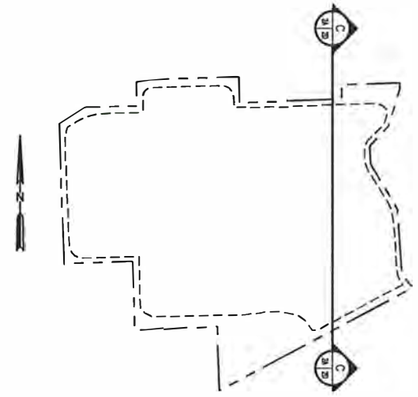
APPROXIMATE ELEVATION THAT GROUNDWATER WAS FIRST ENCOUNTERED DURING DRILLING

SLURRY WALL (SEE NOTE 8)

SECTION C (1H:1V) C 2A,7A 2D

HORIZONTAL SCALE: 0' 300' 600'

VERTICAL SCALE: 0' 300' 600'



KEY MAP (NTS)

STATE OF TEXAS
KYLE D. GOULD
106018
PROFESSIONAL ENGINEER
LICENSED
9.24.24

BORING LEGEND

- LOW PLASTICITY CLAY
- LOW TO HIGH PLASTICITY CLAY
- HIGH PLASTICITY CLAY
- SILT
- SILTY SAND
- POORLY-GRADED GRAVEL
- FILL (MADE GROUND)
- LOW PLASTICITY SANDY CLAY

NOTES:

1. TOPOGRAPHIC MAPPING PREPARED BY FIRMATEK FROM AERIAL PHOTOGRAPHY FLOWN 11-17-2023. THE GRID SYSTEM IS TIED TO THE TEXAS STATE PLANE COORDINATE SYSTEM SOUTH CENTRAL ZONE NAD 1927.
2. REFER TO ATTACHMENT 6D FOR FINAL COVER SYSTEM DETAILS.
3. LANDFILL COMPLETION AND TOP OF LINER GRADES ARE SHOWN ON ATTACHMENTS 1H AND 1I.
4. SEE ATTACHMENT 4 FOR BORING DATA. BORINGS PROJECTED INTO THE LINE OF THE SECTION. SEE ATTACHMENT 2A FOR APPROXIMATE BORING LOCATIONS.
5. REFER TO ATTACHMENT 14 FOR DETAILS OF THE LANDFILL GAS MANAGEMENT PLAN.
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9. MINIMUM BUFFER ZONE WIDTH BETWEEN THE PERMIT BOUNDARY AND LIMITS OF WASTE IS A MINIMUM OF 50 FEET.
10. REFER TO ATTACHMENT 6D FOR THE DESIGN OF THE SEPARATORY OVERLINER SYSTEM THAT WILL BE INSTALLED WITHIN THE PRE-SUBTITLE D AREA.

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FILE: 0120-439-11
CAD: SEC-C.DWG

DRAWN BY: JDW
DESIGN BY: SAN
REVIEWED BY: JPY

Weaver Consultants Group
TBPE REGISTRATION NO. F-3727

PREPARED FOR
McCARTY ROAD LANDFILL TX, LP

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4	09/20 8	PERMIT MODIFICATION

MAJOR PERMIT AMENDMENT
TYPICAL SECTION C

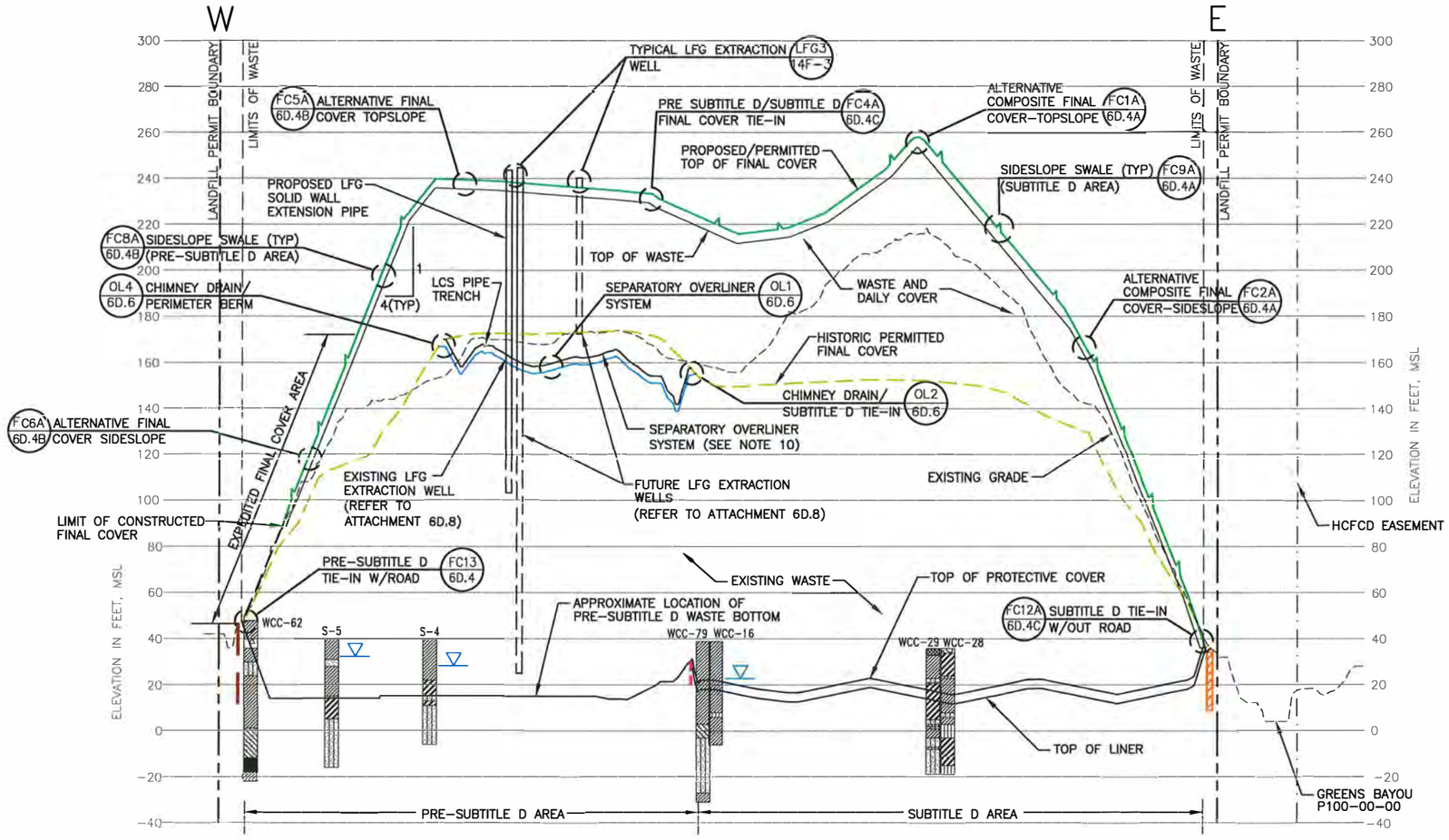
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ATTACHMENT 2D

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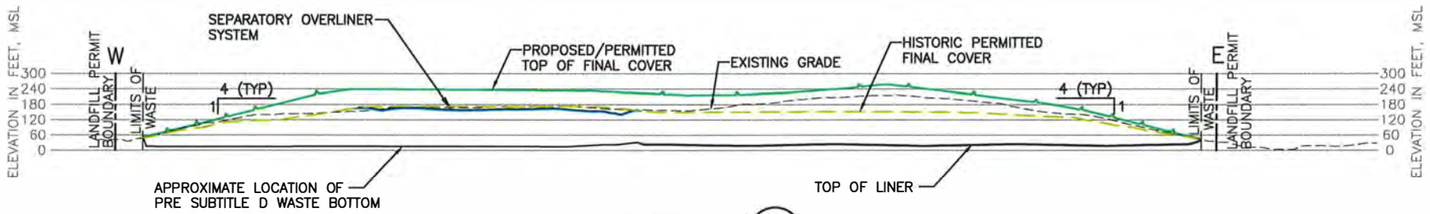
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SECTION D (EXAGGERATED VERTICAL SCALE) — D 2A,7A 2E

HORIZONTAL SCALE: 0 300 600

VERTICAL SCALE: 0 30 60



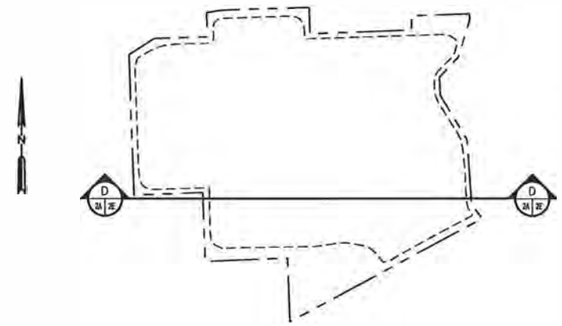
SECTION D (1H:1V) — D 2A,7A 2E

HORIZONTAL SCALE: 0' 300' 600'

VERTICAL SCALE: 0' 300' 600'

LEGEND

- MW-10UB — APPROXIMATE POTENTIOMETRIC SURFACE IN NOVEMBER 2002
- APPROXIMATE ELEVATION THAT GROUNDWATER WAS FIRST ENCOUNTERED DURING DRILLING
- COMPACTED CLAY SLOPE LINER (SEE NOTE 8)
- CLAY CUTOFF WALL (SEE NOTE 8)
- SLURRY WALL (SEE NOTE 8)



KEY MAP
(NTS)

STATE OF TEXAS
KYLE D. GOULD
106018
PROFESSIONAL ENGINEER
LICENSED
9.24.24

BORING LEGEND

- LOW PLASTICITY CLAY
- HIGH PLASTICITY CLAY
- SILT
- SILTY SAND
- CLAYEY SAND
- POORLY-GRADED GRAVEL
- FILL (MADE GROUND)
- POORLY-SORTED SAND
- BRECCIA
- LOW PLASTICITY SILTY CLAY

NOTES:

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DESIGN BY: SAN
REVIEWED BY: JPY

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TYPICAL SECTION D

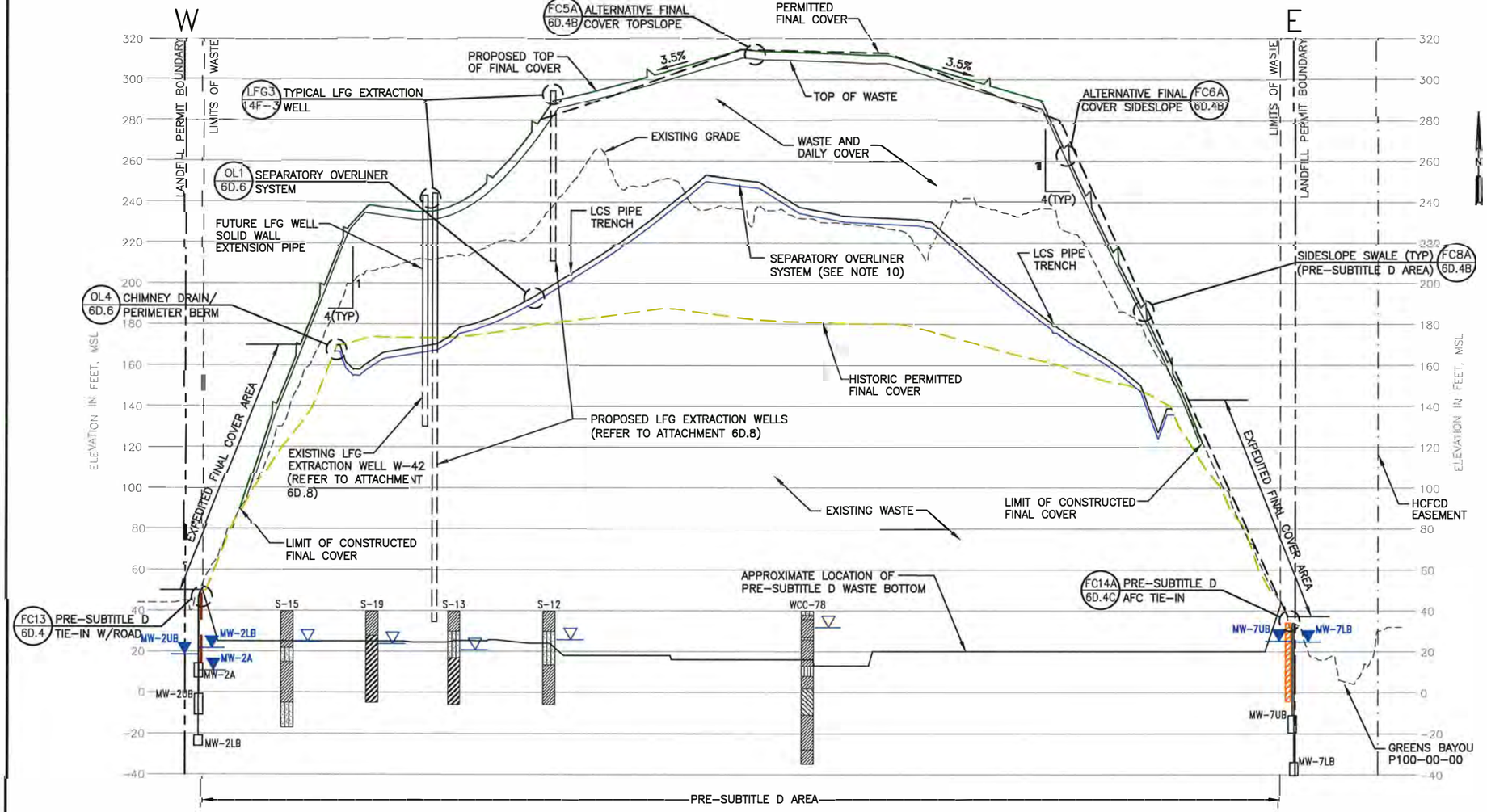
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ATTACHMENT 2E

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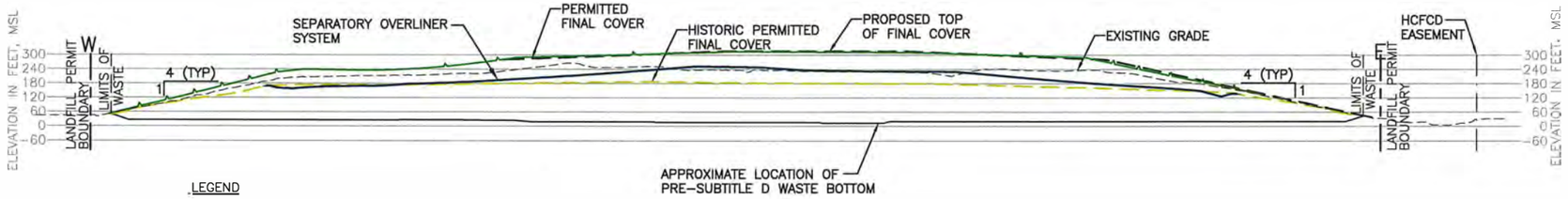
G:\0120\439\FIG MOD 2024\ATT 2\CLEAN\ATT 2E-SEC-D.dwg, rarrington, 1:2



HORIZONTAL SCALE: 0 300 600

SECTION E (EXAGGERATED VERTICAL SCALE) — E 2A,7A 2F

VERTICAL SCALE: 0 30 60



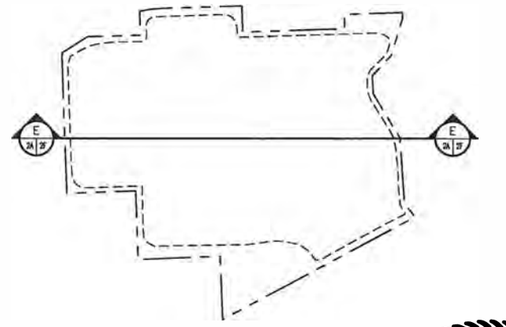
SECTION E (1H:1V) — E 2A,7A 2F

HORIZONTAL SCALE: 0' 300' 600'

VERTICAL SCALE: 0' 300' 600'

LEGEND

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- COMPACTED CLAY SLOPE LINER (SEE NOTE 8)
- SLURRY WALL (SEE NOTE 8)



KEY MAP (NTS)

BORING LEGEND

- LOW PLASTICITY CLAY
- HIGH PLASTICITY CLAY
- SILT
- SILTY SAND
- CLAYEY SAND

STATE OF TEXAS
KYLE D. GOULD
106018
LICENSED PROFESSIONAL ENGINEER
12/12/2024

NOTES:

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DATE: 03/2004
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DRAWN BY: JDW
DESIGN BY: SAN
REVIEWED BY: JPY

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5	12/2024	PERMIT MODIFICATION

MAJOR PERMIT AMENDMENT
TYPICAL SECTION E

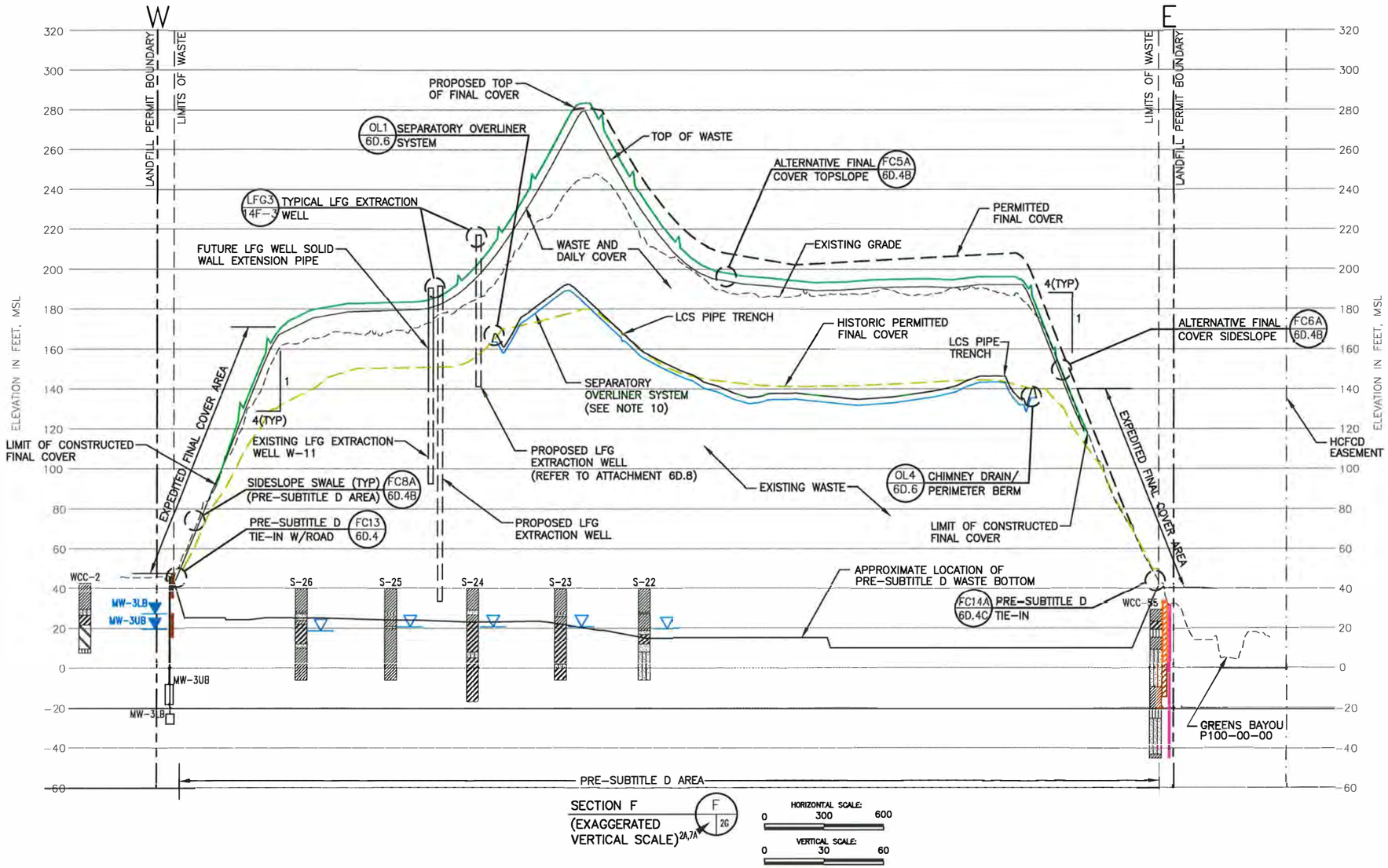
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HARRIS COUNTY, TEXAS

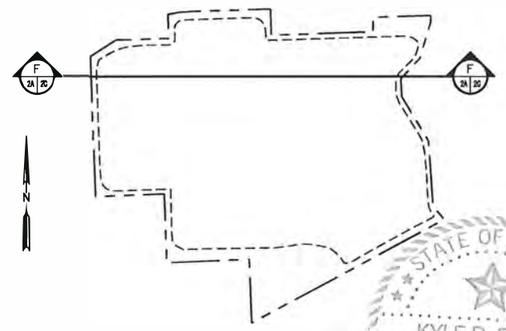
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BORING LEGEND

- LOW PLASTICITY CLAY
- LOW TO HIGH PLASTICITY CLAY
- HIGH PLASTICITY CLAY
- SILT
- SILTY SAND
- POORLY-SORTED SAND

STATE OF TEXAS
KYLE D. GOULD
106018
LICENSED
PROFESSIONAL ENGINEER
9.24.24

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TYPICAL SECTION F

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TCEQ PERMIT NO. MSW-261B

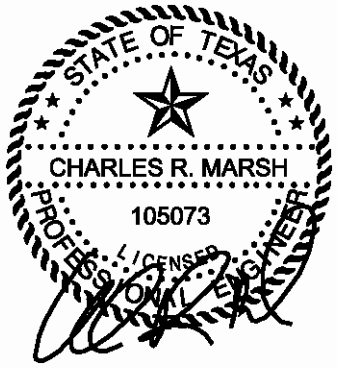
PART III – SITE DEVELOPMENT PLAN
ATTACHMENT 6
GROUNDWATER AND SURFACE WATER PROTECTION PLAN

Prepared for

McCarty Road Landfill TX, LP

Approved Site Development Plan
August 2008
Revised October 2009
Revised August 2010
Revised December 2010
Revised January 2011
Revised October 2014

Revised December 2024



12/12/2024

Weaver Consultants Group, LLC
TBPE Registration No. F-3727
6420 Southwest Boulevard, Suite 206
Fort Worth, Texas 76109
817-735-9770

WCG Project No.0120-439-11-259

McCARTY ROAD LANDFILL
CITY OF HOUSTON, HARRIS COUNTY, TEXAS
TCEQ PERMIT NO. MSW-261B

MAJOR PERMIT AMENDMENT APPLICATION

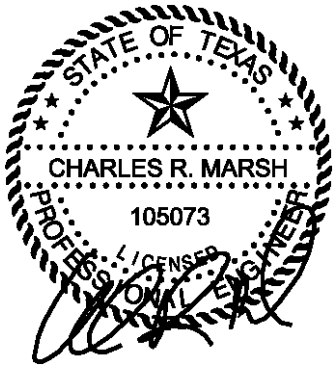
PART III - SITE DEVELOPMENT PLAN
ATTACHMENT 6A
DRAINAGE DESIGN REPORT

Prepared for

McCarty Road Landfill TX, LP

Approved Site Development Plan
August 2008
Revised October 2010
Revised January 2012
Revised March 2024

Revised December 2024



12/12/2024

Weaver Consultants Group, LLC
TBPE Registration No. F-3727
6420 Southwest Boulevard, Suite 206
Fort Worth, Texas 76109
817-735-9770

WCG Project No.0120-439-11-259

- HCFCD P100-00-00. This unit description belongs to Greens Bayou, which is located east of the site.

The peak flow generated from the area within the solid waste fill area will increase with this vertical expansion because the 4H:1V sideslope area has increased, the topdeck of the landfill has decreased, and the hydrologic modeling (e.g., precipitation model and modeling program) has been updated. Thus, drainage flowing from the landfill area will be conveyed to the perimeter channels faster than the currently permitted landfill configuration. To offset this increase in the peak flows, additional detention ponds and upgrades to the existing perimeter channels (and their outlet structures) have been incorporated into the design for the vertical expansion to attenuate the peak flows leaving the site. These drainage improvements are detailed in Attachments 6A.1 through 6A.30.

In addition, Table 6.1 has been developed to facilitate a comparison of flow rates and volumes entering the three downstream HCFCD drainage structures. A summary of peak flows and volumes is listed below.

- Peak Flow. As shown on Table 6.1, for each of these three discharges the peak flow for the landfill expansion condition is consistent with the peak flow for the existing permitted landfill condition. The perimeter channel improvements and new detention ponds adequately attenuate the increase in peak flow generated by expanding the landfill vertically. In addition, the shape of the hydrographs in each case is similar. In general, for the expansion case the hydrograph peaks are reduced and the tail end of the hydrograph is slightly higher due to the additional detention that is added to the expansion drainage design.

Table 6.1
Flow Rates and Runoff Volumes for the Design Storm Event

Stormwater Discharge Point	Existing Permitted Conditions				Postdevelopment Conditions			
	Flow Rate (cfs)		Runoff Volume (ac-ft)		Flow Rate (cfs)		Runoff Volume (ac-ft)	
	25 year	100 year	25 year	100 year	25 year	100 year	25 year	100 year
North (P116-00-00)	1,077	1,456	146	241	1,068	1,451	148	240
East (P100-00-00)	776	1,027	68	136	745	1,002	82	132
South (P114-00-00)	2,537	3,842	123	240	2,530	3,822	128	256

- Volumes. As shown in Table 6.1, the volumes of flow entering each HCFCD channel for both the existing permitted condition and the proposed vertical

expansion condition are very similar. As discussed in Attachment 6A-A, the curve numbers used to represent the landfill final cover in both cases is 88. No change to the final cover system design is proposed. Therefore, the main reason for the additional volume for the postdevelopment condition is the changes to the hydrologic model provided by HCFCD. The pond areas are modeled with a curve number of 100 (i.e., the decrease in infiltration due to the detention ponds results in a slightly increased total volume of runoff generated from the site).

Also shown in the Table 6.1, postdevelopment runoff volumes generated from the landfill's three drainage basins do not significantly alter the existing permitted conditions. This demonstration was submitted to the HCFCD in July 2011. Excerpts from the HCFCD submittal and their September 15, 2011 approval letter is included in Attachment 6B.

4.4 Effect of Vertical Expansion on Peak Flows, Volumes, and Velocities Entering and Exiting the Landfill Permit Boundary

The purpose of this section is to provide a demonstration that the peak flows, volumes, and velocities are not significantly altered at the landfill permit boundary. To complete this analysis, the HEC-HMS models for both the existing permitted and proposed vertical expansion cases were incorporated into the Greens Bayou model obtained from the HCFCD in February 2024. The resulting model, which is included in Appendix 6A-A, assesses the impact of the proposed vertical expansion on the local and regional drainage patterns.

The results of this demonstration are provided on Table 6-2 and Figures 4.3 through 4.6. Each discharge point is discussed in the following subsections.

4.4.1 HCFCD Channel P116-00-00 (North)

As shown in Attachment 6A.1, the permit boundary encompasses P116-00-00 on the north portion of the site. The hydrographs for stormwater entering and exiting the permit boundary are shown on Figure 4.4 for the 25-year and 100-year storm events. As Figure 4.4 shows, the hydrographs entering the site are similar for each storm event. The proposed condition results in no increases in discharge rate nor increases in the water surface elevation in P116-00-00. Additionally, the increased flow rates do not cause erosive flow velocities in P116-00-00.

As shown in Table 6-2, the volume of flow entering and exiting the permit boundary is consistent. The changes in volume is due to the changes made to the HCFCD hydrologic model.

The velocities entering and exiting the permit boundary in the channel are similar, as shown on Table 6-2. This is to be expected given that the flow rates are similar and the channel cross-sections are the same. As demonstrated in the approved HCFCD analysis

(see Appendix B), the increase in flow rate, volume, and velocity in P116-00-00 has no adverse impact on Greens Bayou downstream of the permit boundary.

4.4.2 HCFCD Channel P114-00-00 (South)

The permit boundary encompasses P114-00-00 on the southern portion of the site. The hydrographs entering and exiting the site are shown on Figure 4.5 for the 25-year and 100-year storm events. As with HCFCD channel P116-00-00, the hydrographs entering the permit boundary are similar for each storm event. The peak flow leaving the permit boundary for this channel is decreased slightly.

As shown on Table 6-2 the volume of flow entering the permit boundary is unchanged by the expansion condition. The volume exiting the permit boundary is lower for the expansion condition. This result occurs because the differences between the drainage areas under the permitted and proposed conditions (refer to Figure 4.2) and the hydrologic model differences.

The differences in velocities in the channel entering and exiting the permit boundary are similar to the differences in flow rates for the permitted expansion conditions, as shown on Table 6-2. This is to be expected given that the flow rate and channel cross-section is the same. In both cases, the velocities are well below an erosive velocity (i.e., 5 ft/sec).

As demonstrated in the approved HCFCD analysis (see Appendix B), the increase in flow rate, volume, and velocity in P114-00-00 has no adverse impact on Greens Bayou downstream of the permit boundary.

4.4.3 Greens Bayou (P100-00-00 located east of the site)

As shown on Figures 4.2 and 4.3, the location of the permitted outfalls will not be modified with the vertical expansion of the landfill along the eastern portion of the site. As shown on Figure 4.6, and listed in Table 6-2, the combined peak flow leaving the permit boundary on the eastern portion of the site for the vertical expansion is less than the permitted condition, due to the updates to the hydrologic model.

Also, the volume of flow has been increased, as shown in Table 6-2. This is due to the changes in the hydrologic modeling method and drainage area delineations.

A velocity comparison is not applicable to this portion of the site since the outfall locations and design have not been modified and the flow rates have slightly decreased (i.e., the velocities will be less). However, as demonstrated in Appendix 6A-B the outfall structures have been designed to manage the incremental velocities created at each outfall structure. Each outfall structure includes a low-water outlet and emergency spillway which is lined with gabions to protect the underlying soil from erosive velocities. In addition, the design of these outfalls, which are located within the HCFCD easement, have been approved by HCFCD (refer to Attachment 6B).

TABLE 6-2
FLOW RATE, VOLUME, AND VELOCITY COMPARISON AT PERMIT BOUNDARY

COMPARISON POINT	EXISTING PERMITTED CONDITION						VERTICAL EXPANSION CONDITION					
	FLOW RATE (cfs)		RUN-OFF VOLUME (ac-ft)		VELOCITY (ft/sec)		FLOW RATE (cfs)		RUN-OFF VOLUME (ac-ft)		VELOCITY (ft/sec)	
	25 year	100 year	25 year	100 year	25 year	100 year	25 year	100 year	25 year	100 year	25 year	100 year
ENTERING P116-00-00 (North)	51	77	50	81	1.91	2.55	51	77	50	81	1.91	2.55
LEAVING P116-00-00	1,077	1,456	146	241	4.57	3.00	1,068	1,451	148	240	4.51	4.98
ENTERING P114-00-00 (South)	733	1,080	379	634	2.52	3.63	733	1,080	379	634	2.52	3.63
LEAVING P114-00-00	2,537	3,842	1,374	2,314	2.94	3.08	2,530	3,822	1,379	2,300	2.94	3.07
Leaving Eastern Permit Boundary to Greens Bayou	776	1,027	68	136	N/A[1]	N/A[1]	745	1,002	82	132	N/A[1]	N/A[1]

1 A velocity comparison is not applicable to this portion of the site.

4.5 Effect of Vertical Expansion on Greens Bayou

Sections 4.3 and 4.4 demonstrated that the vertical expansion will not adversely alter existing drainage patterns. The purpose of this Section is to provide a final demonstration that shows the flow in Greens Bayou downstream of the site is also not adversely impacted by the proposed vertical expansion of the landfill.

Figure 4.1 shows the Greens Bayou watershed in the area of the site. This figure also shows the individual drainage areas, as reproduced from previous HCFCD studies. Note that flow from the northern and eastern portion of the landfill discharges to Greens Bayou at a location adjacent to the site. Flow from the southern portion of the site drains to P114-00-00, which flows beneath US Highway 90 before discharging to Greens Bayou approximately 3,000 feet south of the site.

To demonstrate that the proposed vertical expansion does not adversely alter the existing drainage patterns of Greens Bayou, both the HEC-HMS analysis for the permitted and proposed conditions were incorporated into the regional study obtained from the HCFCD. Hydrographs for both conditions were developed at the downstream point of Area P100 T, as shown on Figure 4.1. The resulting hydrographs for both the 25-year and 100-year storm events are presented on Figure 4.7. As shown on Figure 4.7, the hydrographs for both the permitted and proposed vertical expansion conditions are similar in shape and scale. As shown in Appendix 6B, when the permit boundary is incorporated into the existing HCFCD hydrologic model, the peak flow rates downstream of the permit boundary are decreased due to the timing of the hydrographs in Greens Bayou.

4.6 Summary

The updated detention pond designs will result in increased flow rates discharged from this permit boundary; however, the regional drainage patterns (e.g., flow rates in Greens Bayou downstream of the permit boundary) are not adversely impacted.

From the hydrological evaluations of the existing permitted and postdevelopment conditions, the drainage conditions at the permit boundary will not be adversely altered by the proposed development. Given that: (1) drainage patterns are not adversely altered and (2) stormwater discharge outfall locations are consistent with the permitted and existing configurations, it is concluded that the proposed landfill development will not significantly alter existing permitted drainage patterns consistent with §330.56 (f)(4)(A)(iv) and §330.55(b)(5)(D).

4.5 Effect of Vertical Expansion on Greens Bayou

Sections 4.3 and 4.4 demonstrated that the vertical expansion will not adversely alter existing drainage patterns. The purpose of this Section is to provide a final demonstration that shows the flow in Greens Bayou downstream of the site is also not adversely impacted by the proposed vertical expansion of the landfill.

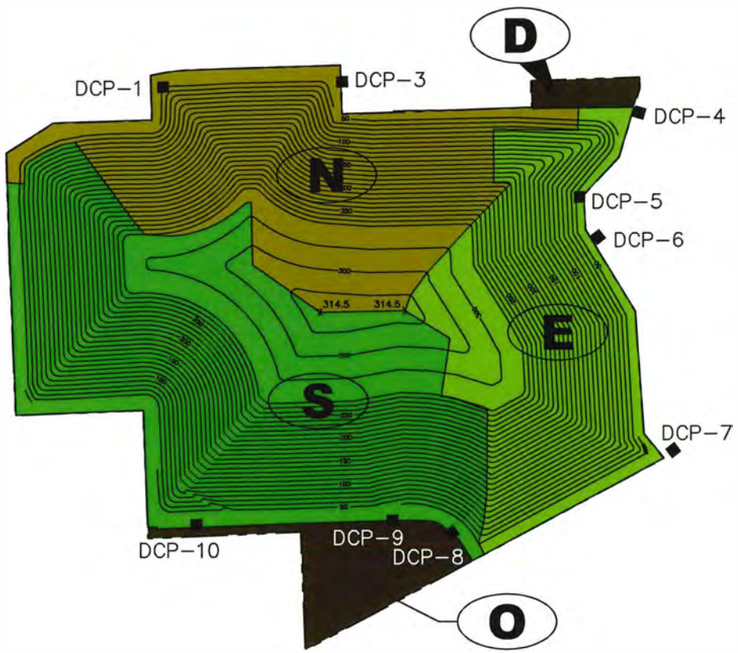
Figure 4.1 shows the Greens Bayou watershed in the area of the site. This figure also shows the individual drainage areas, as reproduced from previous HCFCD studies. Note that flow from the northern and eastern portion of the landfill discharges to Greens Bayou at a location adjacent to the site. Flow from the southern portion of the site drains to P114-00-00, which flows beneath US Highway 90 before discharging to Greens Bayou approximately 3,000 feet south of the site.

To demonstrate that the proposed vertical expansion does not adversely alter the existing drainage patterns of Greens Bayou, both the HEC-HMS analysis for the permitted and proposed conditions were incorporated into the regional study obtained from the HCFCD. Hydrographs for both conditions were developed at the downstream point of Area P100 T, as shown on Figure 4.1. The resulting hydrographs for both the 25-year and 100-year storm events are presented on Figure 4.7. As shown on Figure 4.7, the hydrographs for both the permitted and proposed vertical expansion conditions are similar in shape and scale. As shown in Appendix 6B, when the permit boundary is incorporated into the existing HCFCD hydrologic model, the peak flow rates downstream of the permit boundary are decreased due to the timing of the hydrographs in Greens Bayou.

4.6 Summary

The updated detention pond designs will result in increased flow rates discharged from this permit boundary; however, the regional drainage patterns (e.g., flow rates in Greens Bayou downstream of the pemit boundary) are not adversely impacted.

From the hydrological evaluations of the existing permitted and postdevelopment conditions, the drainage conditions at the permit boundary will not be adversely altered by the proposed development. Given that: (1) drainage patterns are not adversely altered and (2) stormwater discharge outfall locations are consistent with the permitted and existing configurations, it is concluded that the proposed landfill development will not significantly alter existing permitted drainage patterns consistent with §330.56 (f)(4)(A)(iv) and §330.55(b)(5)(D).



CURRENTLY PERMITTED CONDITION
DRAINAGE AREAS

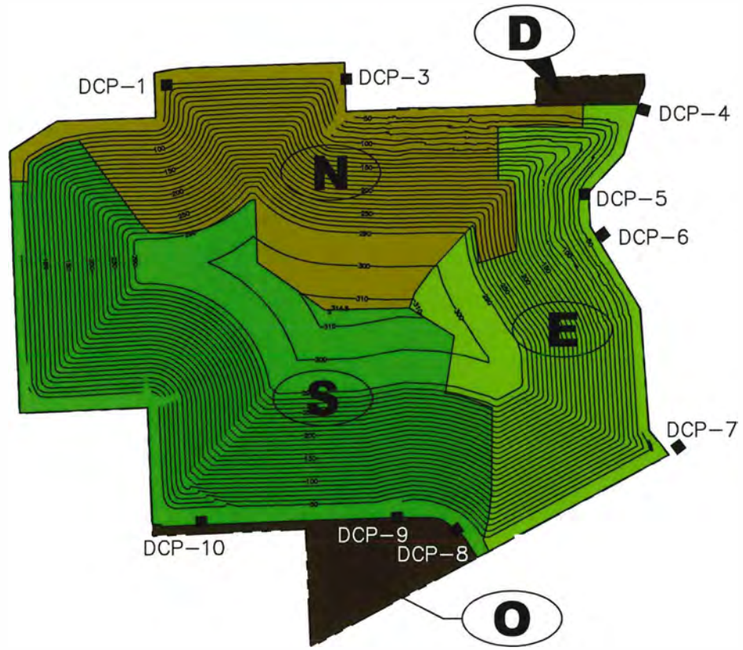
N= 125.99 ACRES

S= 195.10 ACRES

E= 105.41 ACRES

D= 5.49 ACRES

O= 26.26 ACRES



PROPOSED FINAL CONTOUR IMPROVEMENTS
DRAINAGE AREAS

N= 124.69 ACRES

S= 195.10 ACRES

E= 106.71 ACRES

D= 5.49 ACRES

O= 26.26 ACRES

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NOTES:

1. DRAINAGE AREA D FLOWS INTO THE NORTHERN SOIL BORROW AREA.
2. DRAINAGE AREA O IS MOSTLY COMPRISED OF THE OLD LANDFILL.
3. SEE ATTACHMENT 7 FOR PROPOSED FINAL COMPLETION PLAN.
4. FLOW FROM DRAINAGE AREA Ⓦ SHEET FLOWS TO AN AREA WEST OF THE SITE.

LEGEND

PERMIT BOUNDARY

ELEVATION OF FINAL COVER SYSTEM

DRAINAGE AREA BOUNDARY

S — DRAINAGE AREA DESIGNATION

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CAD: FIG-4.2DRAIN AREA.DWG
DRAWN BY: JDW
DESIGN BY: SAN/ALO
REVIEWED BY: JPY

PREPARED FOR
McCARTY ROAD LANDFILL TX, LP

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MAJOR PERMIT AMENDMENT
SITE DRAINAGE PATTERNS

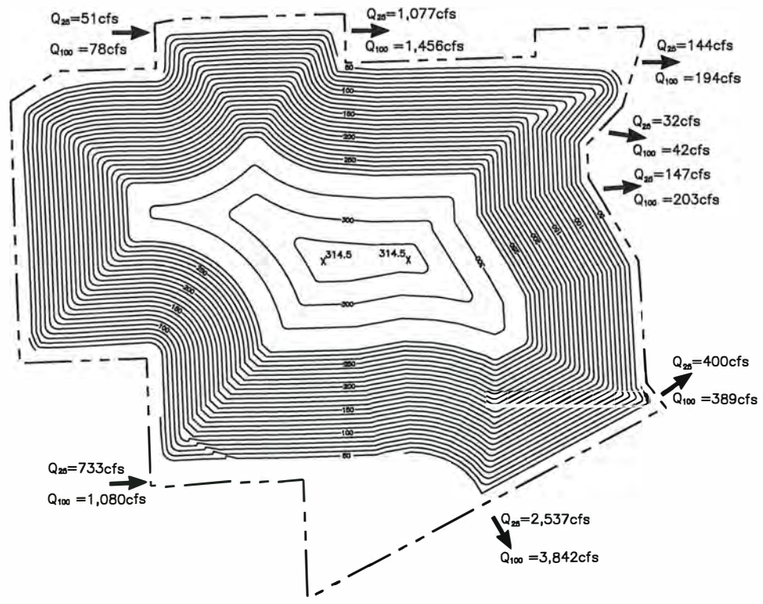
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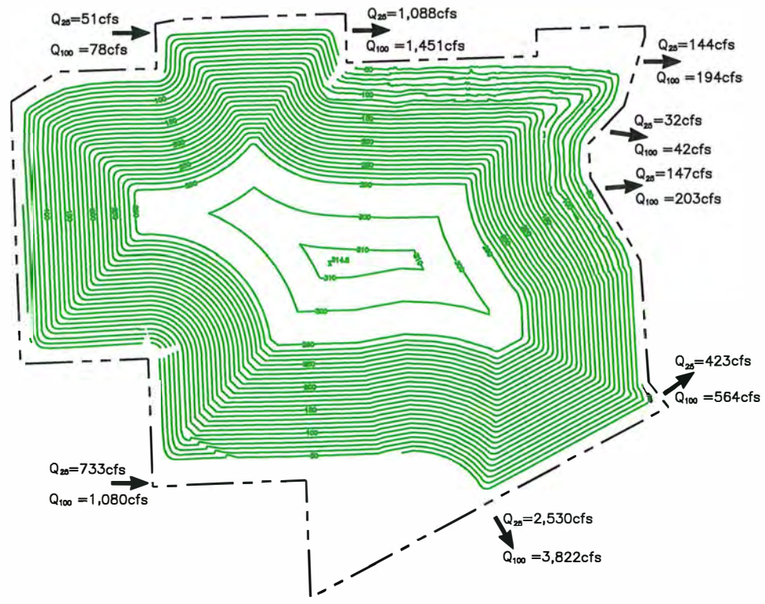
FIGURE 4.2

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O:\0120\439\FIP MOD 2024\ATT 6\FIGURES\CLEAN\FIG-4.2 DRAIN AREA.dwg, 11/26/2024 1:2



CURRENTLY PERMITTED CONDITION



PROPOSED FINAL CONTOUR IMPROVEMENTS

LEGEND

PERMIT BOUNDARY

100 ELEVATION OF FINAL COVER SYSTEM

NOTES:

1. SEE ATTACHMENT 6A–A FOR POST DEVELOPMENT HYDROLOGIC INFORMATION.
2. SEE ATTACHMENT 6A–E FOR CURRENTLY PERMITTED HYDROLOGIC INFORMATION.

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MAJOR PERMIT AMENDMENT
SITE DRAINAGE PATTERNS

McCARTY ROAD LANDFILL
HARRIS COUNTY, TEXAS

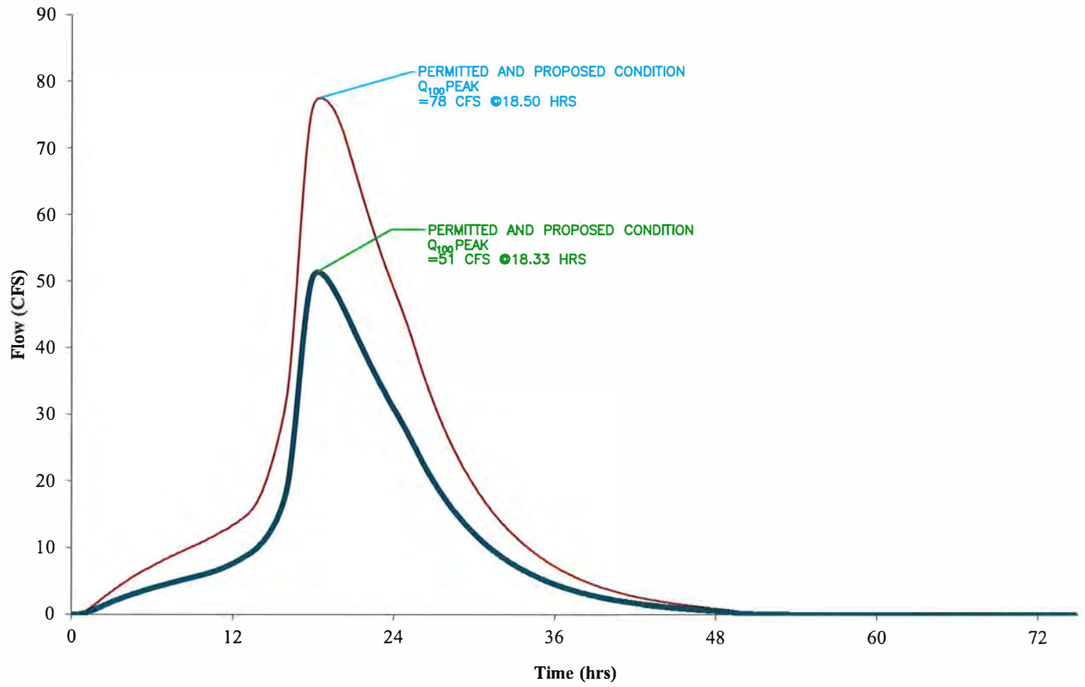
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FIGURE 4.3

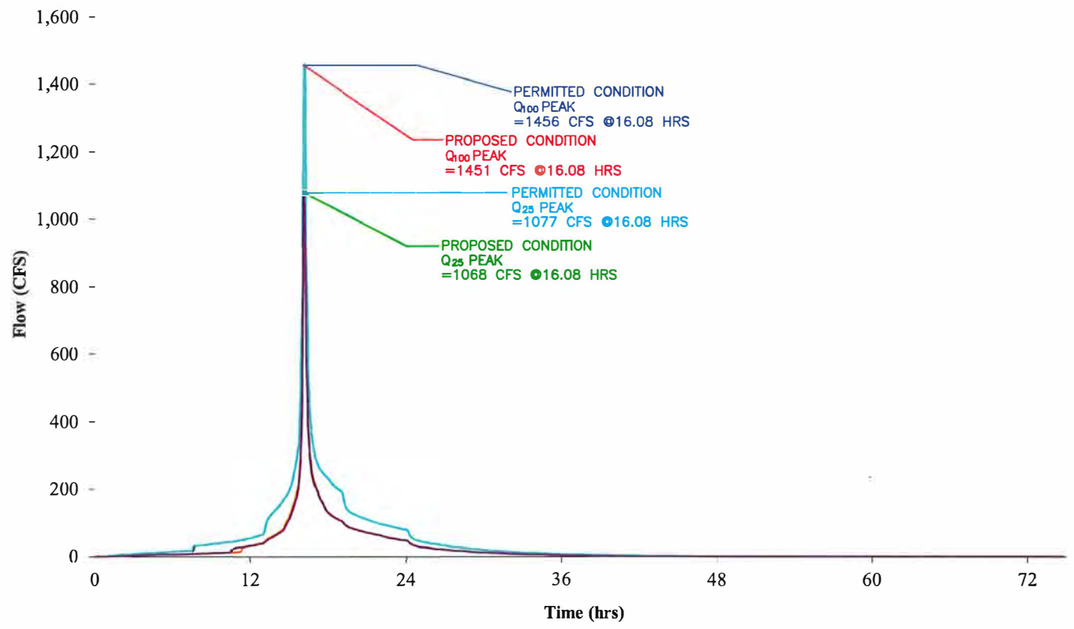
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G:\0120\439\PLIP MOD 2024\ATT 6\FIGURES\CLEAN\FIG-4.3 PATTERNS.dwg, vguzman, 1:2

PEAK FLOW ENTERING NORTHWEST PERMIT BOUNDARY
HCFCD DITCH P116-00-00



PEAK FLOW LEAVING NORTHEAST PERMIT BOUNDARY
HCFCD DITCH P116-00-00



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0:\0120\439\FLIP MOD 2024\ATT 6\FIGURES\CLEAN\FIG-4.4 PEAK.dwg, yguzman, 1:2

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CAD: FIG-4.4 PEAK.DWG

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DESIGN BY: SAN
REVIEWED BY: JPY

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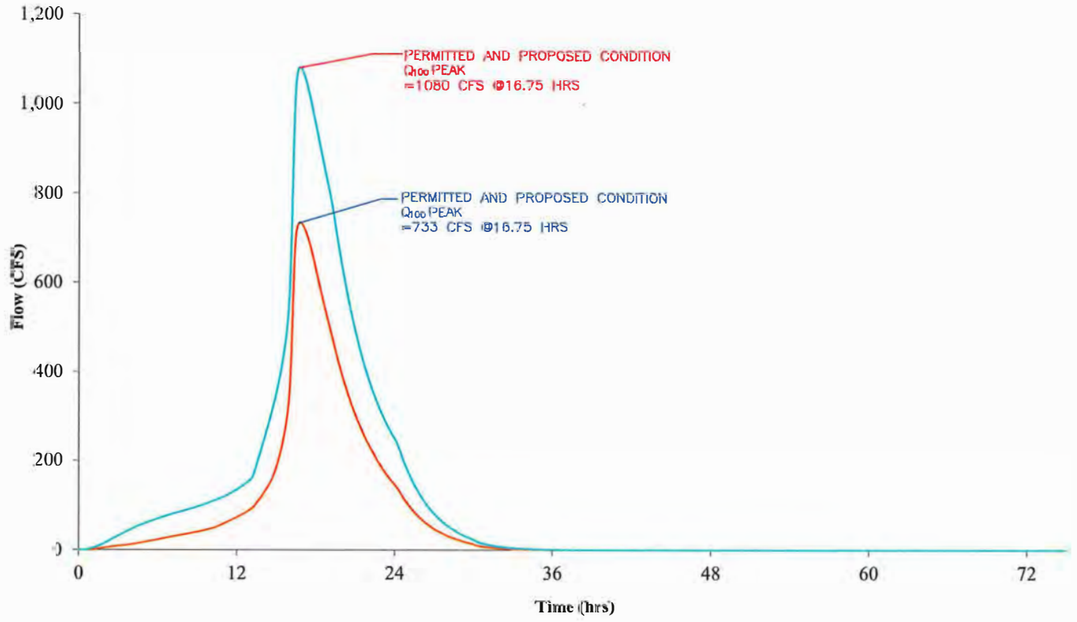
MAJOR PERMIT AMENDMENT
PEAK FLOW COMPARISON HCFCD DITCH P116-00-00 (NORTH)

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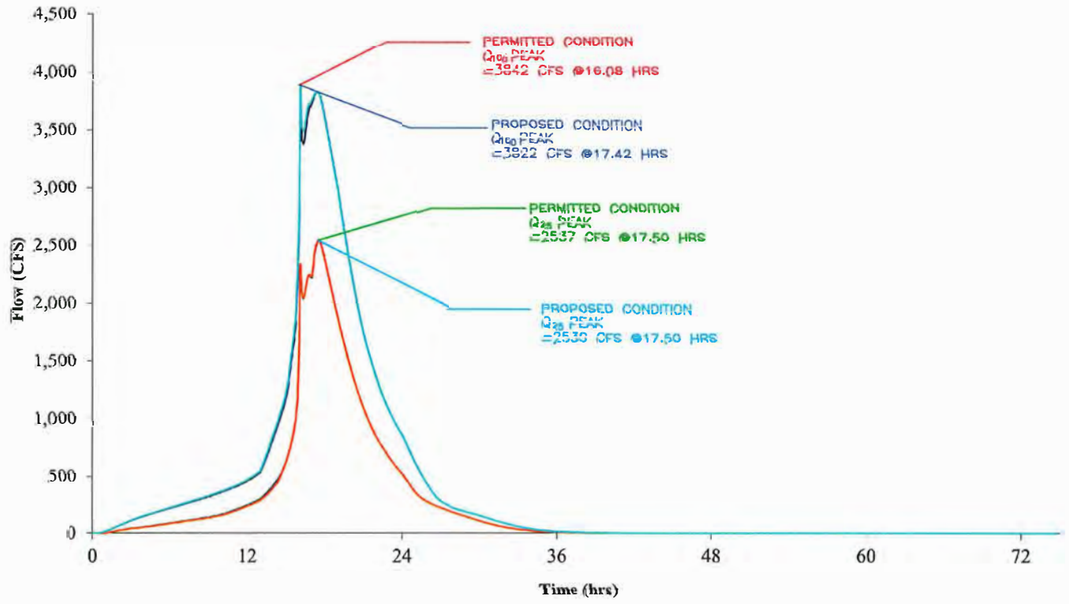
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FIGURE 4.4

PEAK FLOW ENTERING SOUTHWEST PERMIT BOUNDARY
HCFCD DITCH P114-00-00



PEAK FLOW LEAVING SOUTH PERMIT BOUNDARY
HCFCD DITCH P114-00-00



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O:\0120\439\FLIP MOD 2024\ATT 6\FIGURES\CLEAN\FIG-4.5 PEAK.dwg, vguzman, 1:2

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DESIGN BY: SAN
REVIEWED BY: JDW

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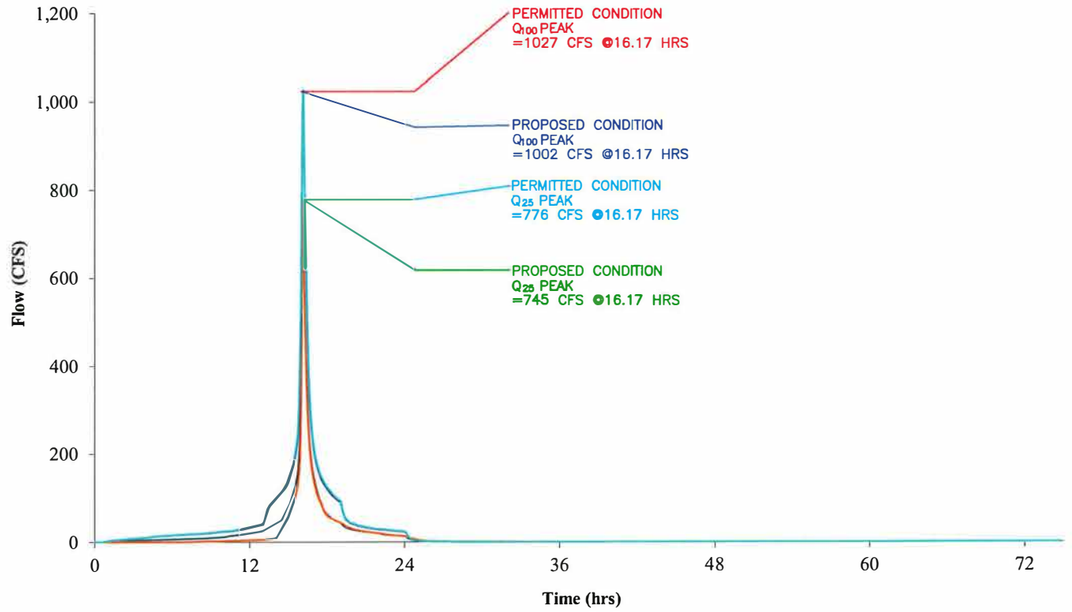
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NO.	DATE	DESCRIPTION
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3	12/2024	PERMIT MODIFICATION

MAJOR PERMIT AMENDMENT
PEAK FLOW COMPARISON HCFCD DITCH P114-00-00 (SOUTH)
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FIGURE 4.5

COMBINED FLOW INTO GREENS BAYOU (EAST)



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FILE: 0120-439-11
CAD: FIG-4.6 PEAK.DWG
DRAWN BY: JDW
DESIGN BY: SAN
REVIEWED BY: JPY

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MAJOR PERMIT AMENDMENT
COMBINED FLOW
INTO GREENS BAYOU (EAST)
McCARTY ROAD LANDFILL
HARRIS COUNTY, TEXAS

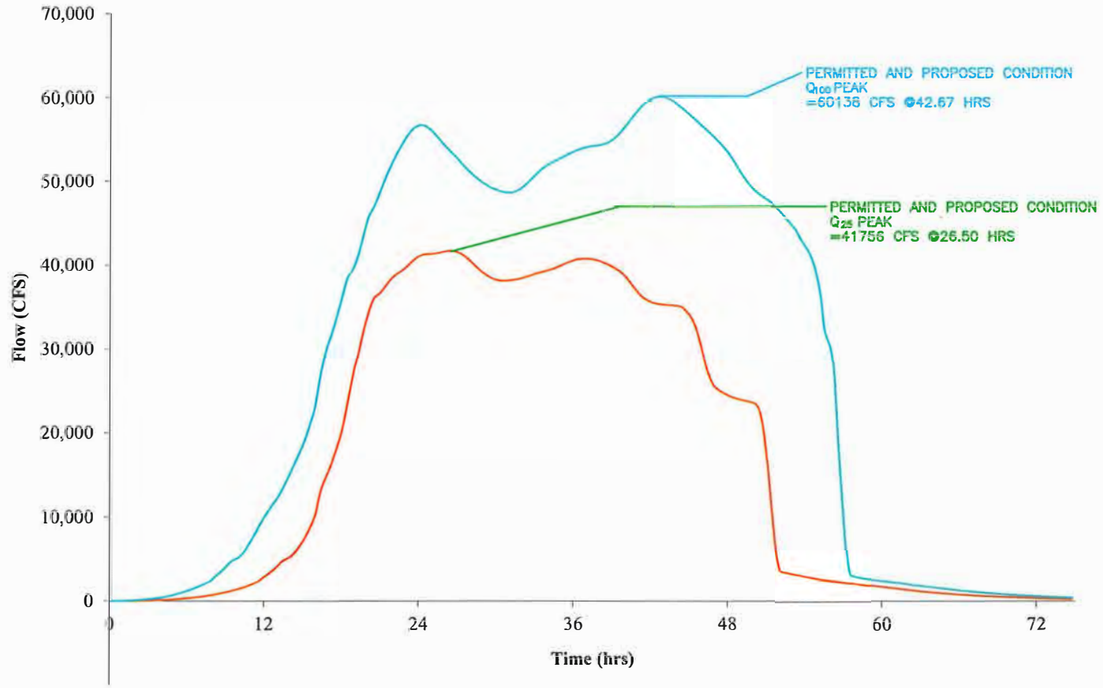
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FIGURE 4.6

D:\0120\439\FIP MOD 2024\ATT 6\FIGURES\CLEAN\FIG-4.6 PEAK.dwg, vguzman, 1:2

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PEAK FLOW FOR COMBINED FLOW IN GREENS BAYOU
HCFCD CHANNEL P100-00-00



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D:\0120\439\FIP MOD 2024\ATT 6\FIGURES\CLEAN\FIG-4.7 PEAK.dwg, vguzman, 1:2

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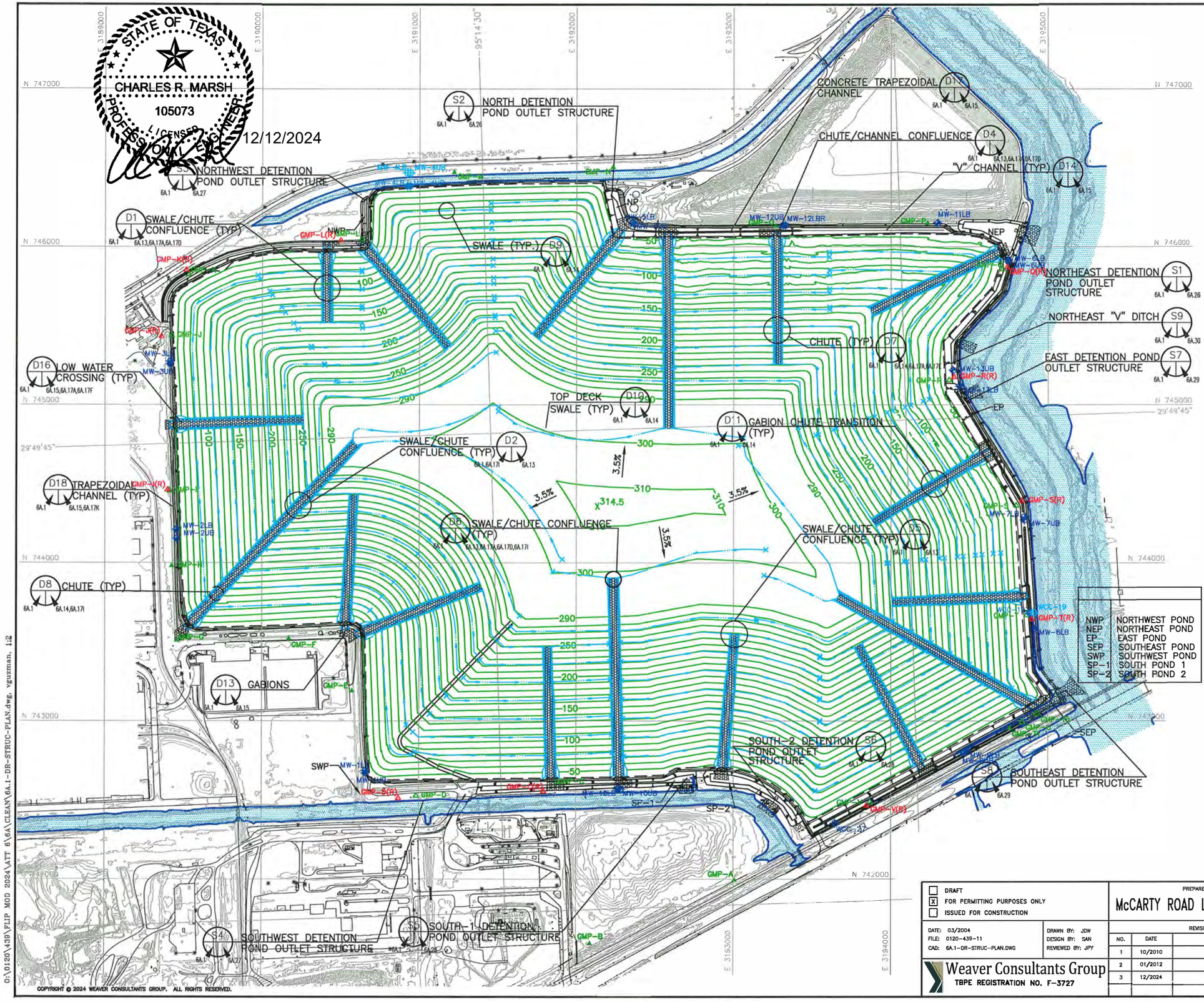
MAJOR PERMIT AMENDMENT
COMBINED FLOW COMPARISON
FOR GREENS BAYOU

McCARTY ROAD LANDFILL
HARRIS COUNTY, TEXAS

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FIGURE 4.7

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NWP	NORTHWEST POND
NEP	NORTHEAST POND
EP	EAST POND
SEP	SOUTHEAST POND
SWP	SOUTHWEST POND
SP-1	SOUTH POND 1
SP-2	SOUTH POND 2

LEGEND

- PERMIT BOUNDARY
- LIMITS OF WASTE
- DEED RESTRICTION BOUNDARY (SEE NOTE 7)
- 200 FINAL CONTOUR
- 745000 N STATE PLANE COORDINATE SYSTEM
- 29°49'45" GEODETIC COORDINATE SYSTEM
- EXISTING GROUND CONTOUR
- PROPOSED DRAINAGE SWALE
- PROPOSED DRAINAGE LETDOWN (SEE NOTE 9)
- MW-4UB EXISTING DETECTION GROUNDWATER MONITORING WELL
- MW-4UB EXISTING DETECTION GROUNDWATER MONITORING WELL TO BE DECOMMISSIONED
- MW-4UB PROPOSED DETECTION REPLACEMENT MONITORING WELL
- GMP-M EXISTING LANDFILL GAS MONITORING PROBE (SEE NOTE 8)
- GMP-J EXISTING LANDFILL GAS MONITORING PROBE TO BE DECOMMISSIONED (SEE NOTE 8)
- GMP-J PROPOSED REPLACEMENT LANDFILL GAS MONITORING PROBE (SEE NOTE 8)
- EASEMENT BOUNDARY
- GABIONS
- 100-YR FLOODPLAIN (REFER TO ATTACHMENT 6C)

N
0 300 600
SCALE IN FEET

NOTES:

1. TOPOGRAPHIC MAPPING PREPARED BY FIRMATEK FROM AERIAL PHOTOGRAPHY FLOWN 11-17-2023. THE GRID SYSTEM IS TIED TO THE TEXAS STATE PLANE COORDINATE SYSTEM SOUTH CENTRAL ZONE NAD 1927.
2. PERMIT BOUNDARY AND EASEMENTS WERE REPRODUCED FROM COSTELLO, INC. STANDARD LAND SURVEY DRAWING, DATED MARCH 2004.
3. REFER TO ATTACHMENT 7B FOR POST DEVELOPMENT DRAINAGE INFORMATION.
4. COVER DETAILS ARE PROVIDED IN ATTACHMENT 6D-FINAL COVER DETAILS.
5. TYPICAL SIDESLOPES ARE 4H:1V, TYPICAL TOPSLOPE IS 3.5%.
6. DETENTION POND INFORMATION IS PROVIDED ON ATTACHMENTS 6A.18 THROUGH 6A.25.
7. REFER TO ATTACHMENT 6, APPENDIX 6A-F FOR DEED RESTRICTION INFORMATION.
8. GAS MONITORING PROBES GMP-Q, GMP-R, AND GMP-S ARE BEING DECOMMISSIONED AND RELOCATED AS DOCUMENTED IN A PERMIT MODIFICATION SUBMITTED BY WEAVER BOOS CONSULTANTS (WBC) IN APRIL 2004. GMP-T5 AND GMP-U ARE BEING DECOMMISSIONED IN A PERMIT MODIFICATION SUBMITTED BY WBC IN APRIL 2004. GMP-T1 WILL BECOME A PERMANENT GAS MONITORING PROBE FOR THIS AREA. REFER TO ATTACHMENT 14 FOR ADDITIONAL INFORMATION.
9. GABION-LINED LETDOWN DETAILS ARE INCLUDED ON ATTACHMENTS 6A.13 THROUGH 6A.17. FLEXIBLE MEMBRANE LINED (FML) LETDOWN DETAILS ARE INCLUDED ON ATTACHMENTS 6A.17A THROUGH 6A.17C. FLEXAMAT LETDOWN DETAILS ARE INCLUDED ON ATTACHMENTS 6A.17D THROUGH 6A.17H. ARTICULATED BLOCK LETDOWN DETAILS ARE INCLUDED ON ATTACHMENTS 6A.17I THROUGH 6A.17L.

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CAD: 6A.1-DR-STRUC-PLAN.DWG
DRAWN BY: JDW
DESIGN BY: SAN
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1	10/2010	PERMIT MODIFICATION
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3	12/2024	PERMIT MODIFICATION

MAJOR PERMIT AMENDMENT DRAINAGE STRUCTURE PLAN

McCARTY ROAD LANDFILL
HARRIS COUNTY, TEXAS

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ATTACHMENT 6A.1

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12/12/2024

HOUSTON PIPE LINE COMPANY EASEMENT

CITY OF HOUSTON ROAD EASEMENT

SCALE IN FEET: 0 300 600

LEGEND

- PERMIT BOUNDARY
- LIMITS OF WASTE
- DEED RESTRICTION BOUNDARY (SEE NOTE 4)
- 200 FINAL CONTOUR
- 745000 N STATE PLANE COORDINATE SYSTEM
- 29°49'45" GEODETIC COORDINATE SYSTEM
- EXISTING CONTOUR
- PROPOSED DRAINAGE SWALE
- PROPOSED DRAINAGE LETDOWN
- MW-4UB EXISTING DETECTION GROUNDWATER MONITORING WELL
- MW-4UB EXISTING DETECTION GROUNDWATER MONITORING WELL TO BE DECOMMISSIONED
- MW-4UB PROPOSED DETECTION REPLACEMENT MONITORING WELL
- GMP-M EXISTING LANDFILL GAS MONITORING PROBE (SEE NOTE 5)
- GMP-J EXISTING LANDFILL GAS MONITORING PROBE TO BE DECOMMISSIONED (SEE NOTE 5)
- GMP-J(R) PROPOSED REPLACEMENT LANDFILL GAS MONITORING ROBE (SEE NOTE 5)
- EASEMENT BOUNDARY
- GABIONS
- 100-YR FLOODPLAIN (REFER TO ATTACHMENT 6C)
- DA9 DRAINAGE AREA DESIGNATION
- DRAINAGE AREA BOUNDARY

NOTES:

1. TOPOGRAPHIC MAPPING PREPARED BY FIRMATEK FROM AERIAL PHOTOGRAPHY FLOWN 11-17-2023. THE GRID SYSTEM IS TIED TO THE TEXAS STATE PLANE COORDINATE SYSTEM SOUTH CENTRAL ZONE NAD 1927.
2. PERMIT BOUNDARY AND EASEMENTS WERE REPRODUCED FROM COSTELLO, INC. STANDARD LAND SURVEY DRAWING, DATED MARCH 2004.
3. REFER TO ATTACHMENT 7B FOR POST DEVELOPMENT DRAINAGE INFORMATION.
4. REFER TO ATTACHMENT 6, APPENDIX 6A-F FOR DEED RESTRICTION INFORMATION.
5. GAS MONITORING PROBES GMP-Q, GMP-R, AND GMP-S ARE BEING DECOMMISSIONED AND RELOCATED AS DOCUMENTED IN A PERMIT MODIFICATION SUBMITTED BY WEAVER BOOS CONSULTANTS (WBC) IN APRIL 2004. GMP-T5 AND GMP-U ARE BEING DECOMMISSIONED IN A PERMIT MODIFICATION SUBMITTED BY WBC IN APRIL 2004. GMP-T1 WILL BECOME A PERMANENT GAS MONITORING PROBE FOR THIS AREA. REFER TO ATTACHMENT 14 FOR ADDITIONAL INFORMATION.

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DRAWN BY: JDW
DESIGN BY: SAN
REVIEWED BY: JPY

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MAJOR PERMIT AMENDMENT
DRAINAGE AREA PLAN

McCARTY ROAD LANDFILL
HARRIS COUNTY, TEXAS

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ATTACHMENT 6A.2

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12/12/2024

CHANNEL B
CHANNEL C
CHANNEL I
CHANNEL A
CHANNEL H
CHANNEL G
CHANNEL E
CHANNEL D
CHANNEL F
NP
NWP
NEP
EP
SEP
SWP
SP-1
SP-2

CHUTE DA1 OUTFALL Qp=227 cfs Q100=345 cfs
CHUTE DA2 OUTFALL Qp=214 cfs Q100=301 cfs
CHUTE DA3 OUTFALL Qp=246 cfs Q100=342 cfs
CHUTE DA4 OUTFALL Qp=169 cfs Q100=252 cfs
CHUTE DA5 OUTFALL Qp=66 cfs Q100=92 cfs
CHUTE DA6 OUTFALL Qp=247 cfs Q100=341 cfs
CHUTE DA7 OUTFALL Qp=273 cfs Q100=365 cfs
CHUTE DA8 OUTFALL Qp=192 cfs Q100=210 cfs
CHUTE DA9 OUTFALL Qp=180 cfs Q100=250 cfs
CHUTE DA10 OUTFALL Qp=211 cfs Q100=292 cfs
CHUTE DA11 OUTFALL Qp=127 cfs Q100=176 cfs
CHUTE DA12 OUTFALL Qp=185 cfs Q100=257 cfs
CHUTE DA13 OUTFALL Qp=285 cfs Q100=394 cfs
CHUTE DA14 OUTFALL Qp=220 cfs Q100=306 cfs
CHUTE DA15 OUTFALL Qp=196 cfs Q100=272 cfs
CHUTE DA16 OUTFALL Qp=187 cfs Q100=254 cfs
CHUTE DA17 OUTFALL Qp=308 cfs Q100=431 cfs

POND LABELS

NP	NORTH POND
NWP	NORTHWEST POND
NEP	NORTHEAST POND
EP	EAST POND
SEP	SOUTHEAST POND
SWP	SOUTHWEST POND
SP-1	SOUTH POND 1
SP-2	SOUTH POND 2

LEGEND

- PERMIT BOUNDARY
- LIMITS OF WASTE
- DEED RESTRICTION BOUNDARY (SEE NOTE 4)
- STATE PLANE COORDINATE SYSTEM
- GEODETIC COORDINATE SYSTEM
- EXISTING CONTOUR
- EXISTING DETECTION GROUNDWATER MONITORING WELL
- EXISTING DETECTION GROUNDWATER MONITORING WELL TO BE DECOMMISSIONED
- PROPOSED DETECTION REPLACEMENT MONITORING WELL
- EXISTING LANDFILL GAS MONITORING PROBE (SEE NOTE 5)
- EXISTING LANDFILL GAS MONITORING PROBE TO BE DECOMMISSIONED (SEE NOTE 5)
- PROPOSED REPLACEMENT LANDFILL GAS MONITORING PROBE (SEE NOTE 5)
- EASEMENT BOUNDARY
- GABIONS
- CONCRETE
- PI: POINT OF INTERSECTION
- PVI: POINT OF VERTICAL INTERSECTION
- STA: STATION (FT)
- ELEV: ELEVATION (FT-MSL)
- Q_{25}=99 cfs: 25-YEAR PEAK FLOW RATE (CUBIC FEET PER SECOND)
- Q_{100}=129 cfs: 100-YEAR PEAK FLOW RATE (CUBIC FEET PER SECOND)

0 300 600 SCALE IN FEET

NOTES:

1. TOPOGRAPHIC MAPPING PREPARED BY FIRMATEK FROM AERIAL PHOTOGRAPHY FLOWN 11-17-2023. THE GRID SYSTEM IS TIED TO THE TEXAS STATE PLANE COORDINATE SYSTEM SOUTH CENTRAL ZONE NAD 1927.
2. PERMIT BOUNDARY AND EASEMENTS WERE REPRODUCED FROM COSTELLO, INC. STANDARD LAND SURVEY DRAWING, DATED MARCH 2004.
3. CHANNEL PROFILE INFORMATION PRESENTED ON ATTACHMENTS DA-4 THROUGH DA-13.
4. REFER TO ATTACHMENT B, APPENDIX DA-F FOR DEED RESTRICTION INFORMATION.
5. GAS MONITORING PROBES GMP-Q, GMP-R, AND GMP-S ARE BEING DECOMMISSIONED AND RELOCATED AS DOCUMENTED IN A PERMIT MODIFICATION SUBMITTED BY WEAVER BOOS CONSULTANTS (WBC) IN APRIL 2004. GMP-T5 AND GMP-U ARE BEING DECOMMISSIONED IN A PERMIT MODIFICATION SUBMITTED BY WBC IN APRIL 2004. GMP-T1 WILL BECOME A PERMANENT GAS MONITORING PROBE FOR THIS AREA.

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CAD: GA03-PR-STRUC-PLAN.DWG
DRAWN BY: JDW
DESIGN BY: SAN
REVIEWED BY: JPT

Weaver Consultants Group
TBPE REGISTRATION NO. F-5727

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1	01/2012	PERMIT MODIFICATION
2	12/2024	PERMIT MODIFICATION

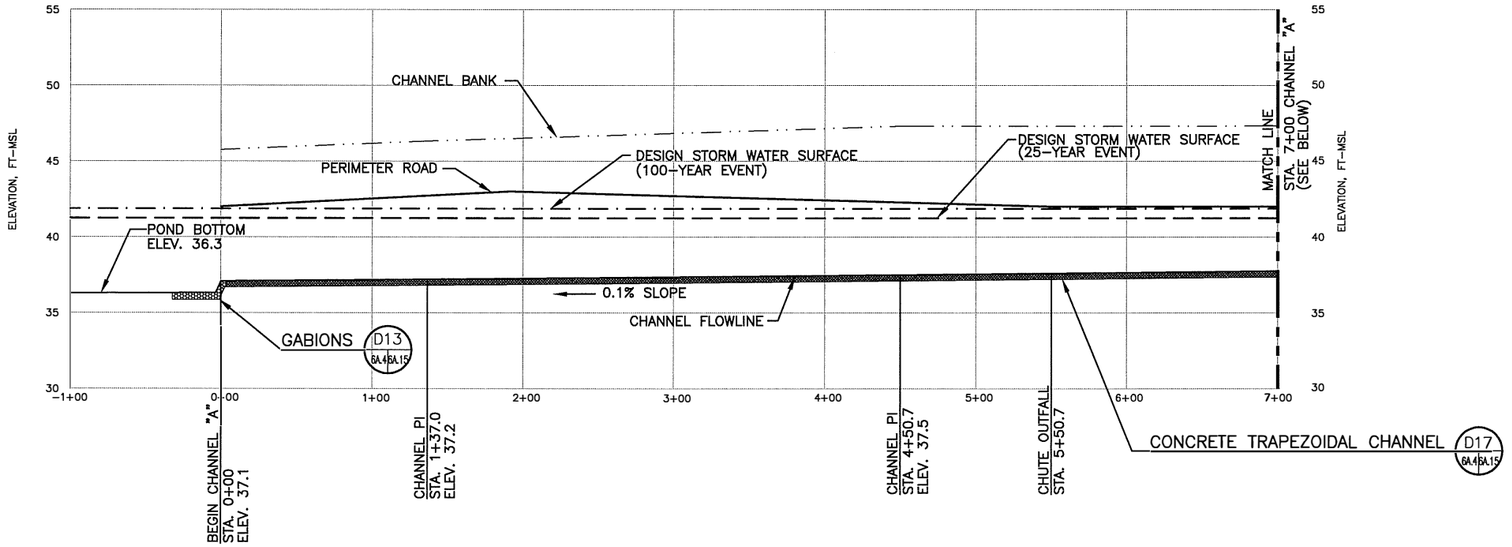
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ATTACHMENT DA.3

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CHANNEL "A" PA 6A.3 6A.4

0 50 100 SCALE IN FEET — HORIZONTAL

0 5 10 SCALE IN FEET — VERTICAL

25-YEAR CHANNEL "A" INFORMATION

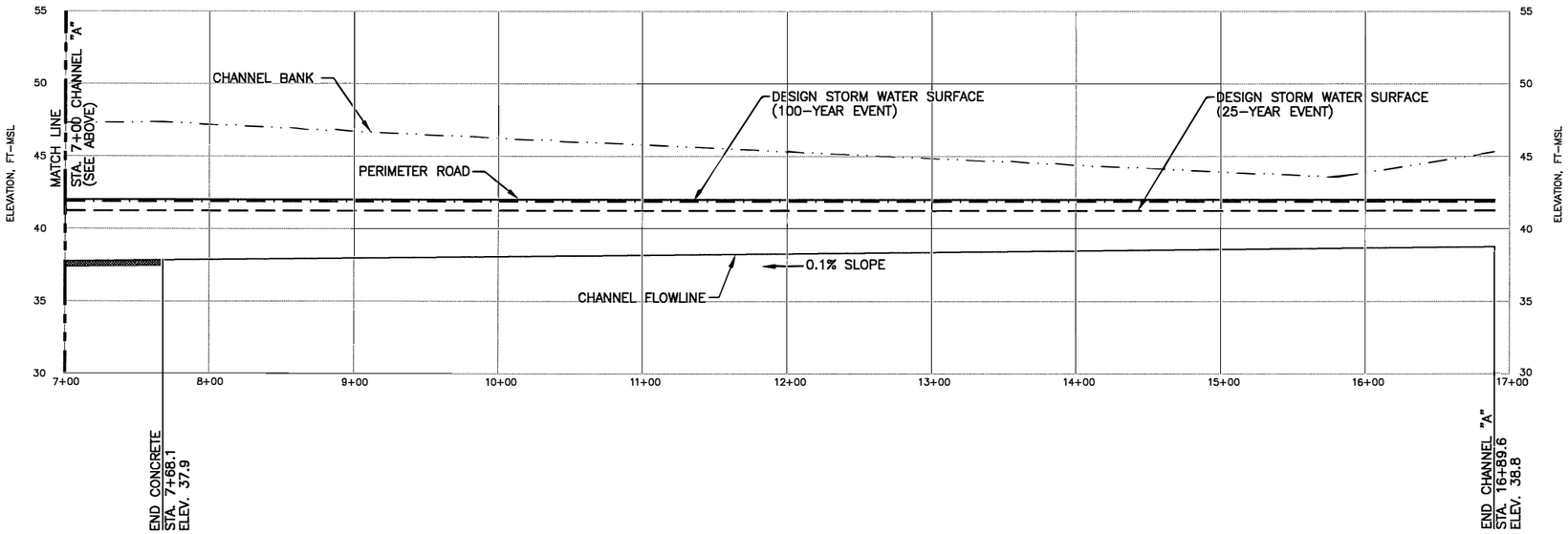
CHANNEL STATION FROM	CHANNEL STATION TO	BOTTOM WIDTH (FT)	PEAK INFLOW (CFS)	SLOPE (%)	FLOW DEPTH (FT.)	VELOCITY (FT/S)
0+00	1+37	12	315	0.1	2.99	5.02
1+37	4+50.7	12	315	0.1	2.99	5.02
4+50.7	7+68.1	12	315	0.1	2.99	5.02
7+68.1	16+89.6	0	34	0.1	2.82	1.43

NOTE: NORMAL DEPTH CALCULATION DOES NOT ACCOUNT FOR BACK WATER WHICH WILL INCREASE FLOW DEPTH (SEE PROFILE) AND DECREASE VELOCITY.

100-YEAR CHANNEL "A" INFORMATION

CHANNEL STATION FROM	CHANNEL STATION TO	BOTTOM WIDTH (FT)	PEAK INFLOW (CFS)	SLOPE (%)	FLOW DEPTH (FT.)	VELOCITY (FT/S)
0+00	1+37	12	432	0.1	3.50	5.47
1+37	4+50.7	12	432	0.1	3.50	5.47
4+50.7	7+68.1	12	432	0.1	3.50	5.47
7+68.1	16+89.6	0	48	0.1	3.21	1.55

NOTE: NORMAL DEPTH CALCULATION DOES NOT ACCOUNT FOR BACK WATER WHICH WILL INCREASE FLOW DEPTH (SEE PROFILE) AND DECREASE VELOCITY.



CHANNEL "A" PA 6A.3 6A.4

0 50 100 SCALE IN FEET — HORIZONTAL

0 5 10 SCALE IN FEET — VERTICAL

NOTES:

1. REFER TO ATTACHMENT 6A.3 FOR PROFILE LOCATIONS.
2. CONTOURS AND ELEVATIONS DEVELOPED BY BASE MAPPING FROM AERIAL PHOTOGRAPHY FLOWN FEBRUARY 18, 2003. THE GRID SYSTEM IS TIED TO THE TEXAS STATE PLANE COORDINATE SYSTEM SOUTH CENTRAL ZONE NAD 1927.
3. HYDRAULIC CALCULATIONS INCLUDED IN ATTACHMENT 6A-B.

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DATE: 03/2004
FILE: 0120-439-11
CAD: 6A.04-PROA.DWG
DRAWN BY: JDW
DESIGN BY: SAN
REVIEWED BY: JPY

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PERIMETER CHANNEL "A" PROFILE

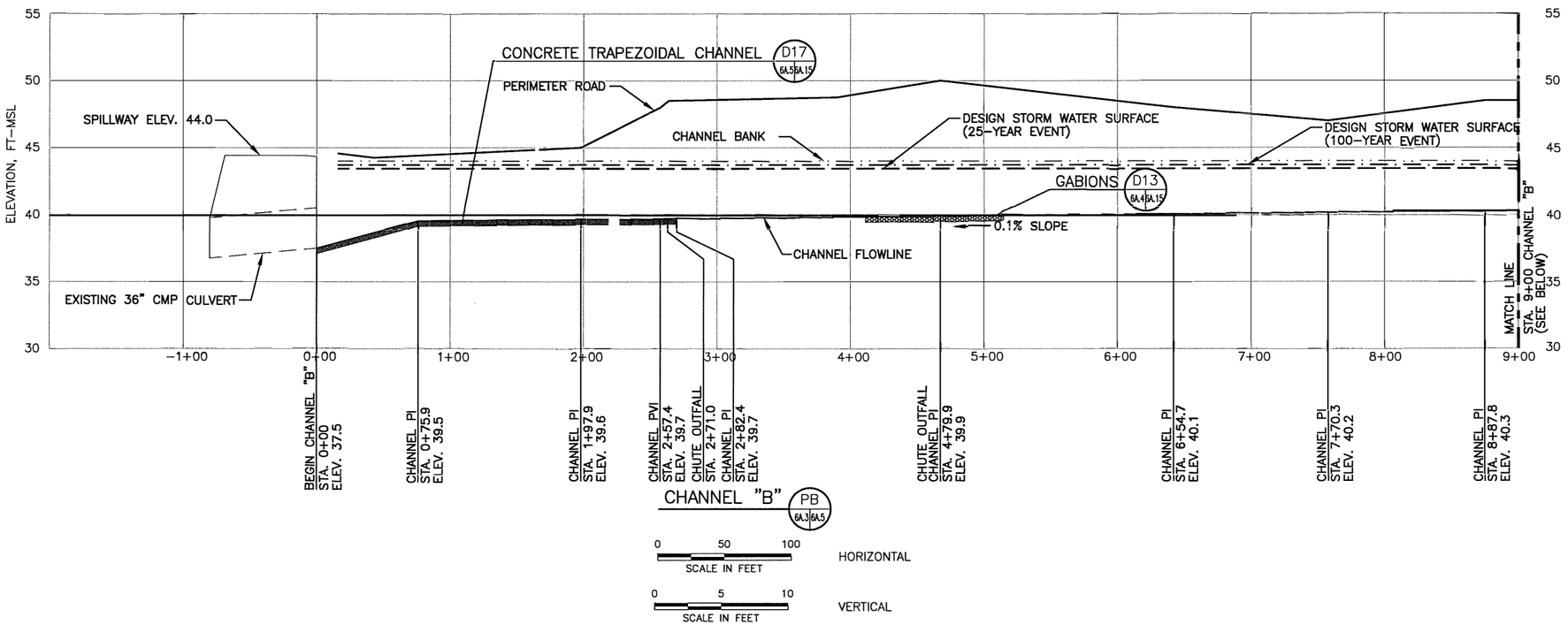
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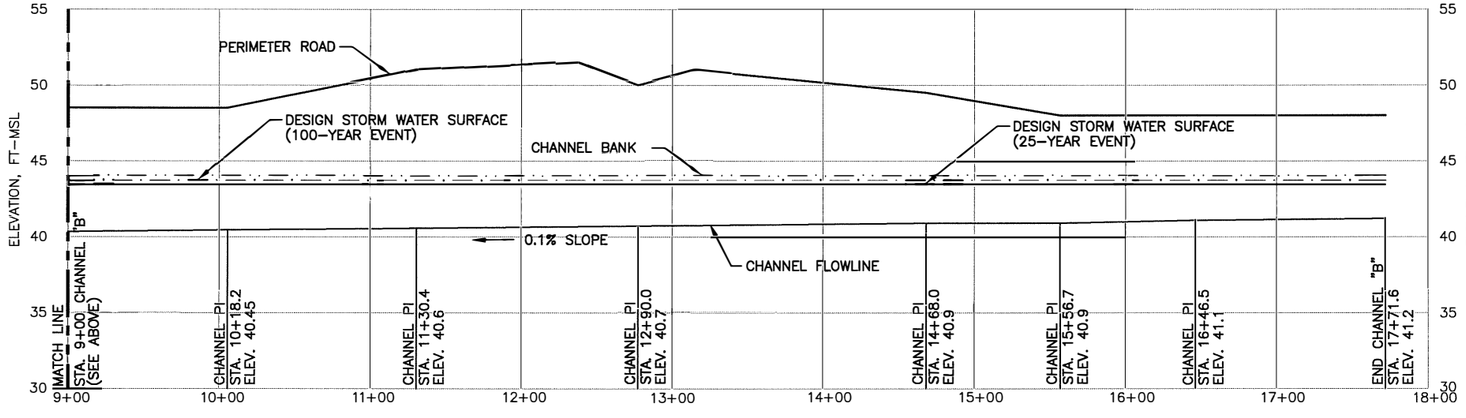
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25-YEAR CHANNEL "B" INFORMATION

CHANNEL STATION FROM	CHANNEL STATION TO	BOTTOM WIDTH (FT)	PEAK INFLOW (CFS)	SLOPE (%)	FLOW DEPTH (FT.)	VELOCITY (FT/S)
0+00	0+75.9	25	378	0.1	2.49	5.07
0+75.9	1+97.9	25	378	0.1	2.49	5.07
1+97.9	2+57.4	25	378	0.1	2.49	5.07
2+57.4	2+82.4	25	113	0.1	1.23	3.35
2+82.4	4+79.9	25	113	0.1	2.18	1.76
4+79.9	6+54.7	25	37	0.1	1.13	1.20
6+54.7	7+70.3	25	37	0.1	1.13	1.20
7+70.3	8+87.8	25	37	0.1	1.13	1.20
8+87.8	10+18.2	25	37	0.1	1.13	1.20
10+18.2	11+30.4	25	37	0.1	1.13	1.20
11+30.4	12+90.0	25	37	0.1	1.13	1.20
12+90.0	14+68.0	25	37	0.1	1.13	1.20
14+68.0	15+56.7	25	37	0.1	1.13	1.20
15+56.7	16+46.5	25	37	0.1	1.13	1.20
16+46.5	17+71.6	25	37	0.1	1.13	1.20

NOTE: NORMAL DEPTH CALCULATION DOES NOT ACCOUNT FOR BACK WATER WHICH WILL INCREASE FLOW DEPTH (SEE PROFILE) AND DECREASE VELOCITY.

100-YEAR CHANNEL "B" INFORMATION

CHANNEL STATION FROM	CHANNEL STATION TO	BOTTOM WIDTH (FT)	PEAK INFLOW (CFS)	SLOPE (%)	FLOW DEPTH (FT.)	VELOCITY (FT/S)
0+00	0+75.9	25	525	0.1	3.00	5.65
0+75.9	1+97.9	25	525	0.1	3.00	5.65
1+97.9	2+57.4	25	525	0.1	3.00	5.65
2+57.4	2+82.4	25	159	0.1	1.50	3.78
2+82.4	4+79.9	25	159	0.1	2.66	1.98
4+79.9	6+54.7	25	54	0.1	1.42	1.37
6+54.7	7+70.3	25	54	0.1	1.42	1.37
7+70.3	8+87.8	25	54	0.1	1.42	1.37
8+87.8	10+18.2	25	54	0.1	1.42	1.37
10+18.2	11+30.4	25	54	0.1	1.42	1.37
11+30.4	12+90.0	25	54	0.1	1.42	1.37
12+90.0	14+68.0	25	54	0.1	1.42	1.37
14+68.0	15+56.7	25	54	0.1	1.42	1.37
15+56.7	16+46.5	25	54	0.1	1.42	1.37
16+46.5	17+71.6	25	54	0.1	1.42	1.37

NOTE: NORMAL DEPTH CALCULATION DOES NOT ACCOUNT FOR BACK WATER WHICH WILL INCREASE FLOW DEPTH (SEE PROFILE) AND DECREASE VELOCITY.

NOTES:

1. REFER TO ATTACHMENT 6A.3 FOR PROFILE LOCATIONS.
2. CONTOURS AND ELEVATIONS DEVELOPED BY BASE MAPPING FROM AERIAL PHOTOGRAPHY FLOWN FEBRUARY 18, 2003. THE GRID SYSTEM IS TIED TO THE TEXAS STATE PLANE COORDINATE SYSTEM SOUTH CENTRAL ZONE NAD 1927.
3. HYDRAULIC CALCULATIONS INCLUDED IN ATTACHMENT 6A-B.

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DATE: 03/2004
FILE: 0120-439-11
CAD: 6A.05-PROB.DWG
DRAWN BY: JDW
DESIGN BY: SAN
REVIEWED BY: JPY

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TBPE REGISTRATION NO. F-3727

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NO.	DATE	DESCRIPTION
1	01/2012	PERMIT MODIFICATION
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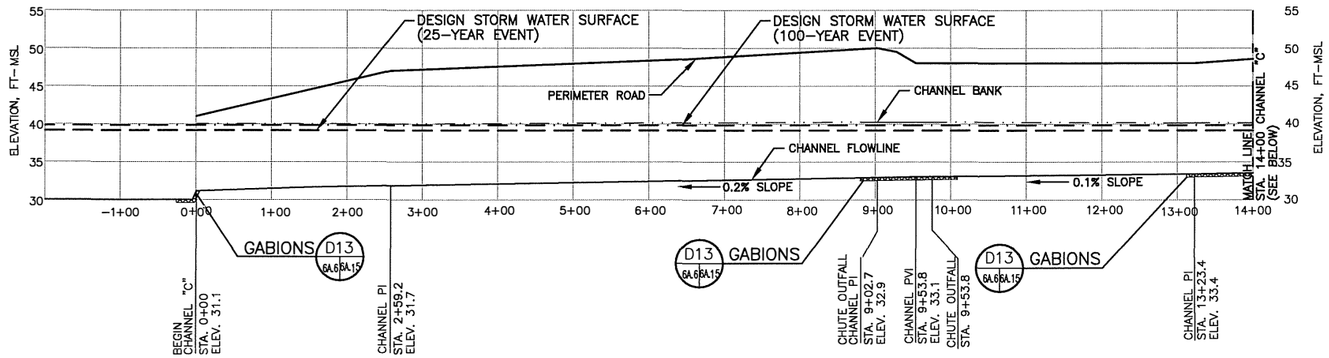
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ATTACHMENT 6A.5

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CHANNEL "C" PC 6A.3&A.6

0 100 200 SCALE IN FEET — HORIZONTAL

0 10 20 SCALE IN FEET — VERTICAL

25-YEAR CHANNEL "C" INFORMATION

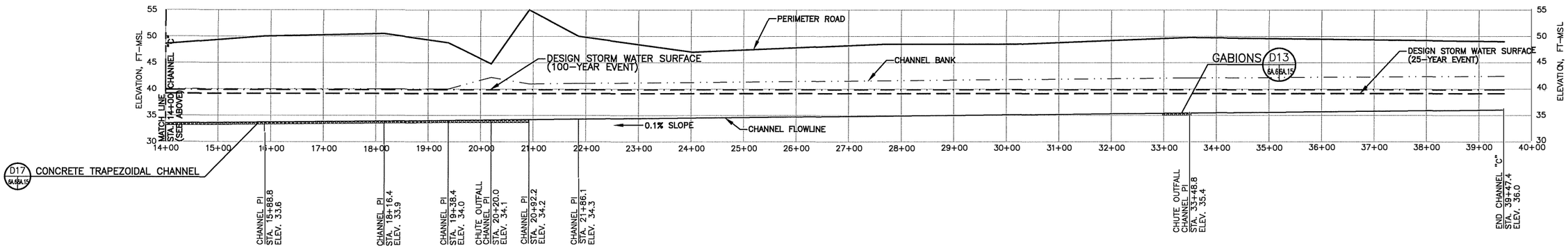
CHANNEL STATION FROM	CHANNEL STATION TO	BOTTOM WIDTH (FT)	PEAK INFLOW (CFS)	SLOPE (%)	FLOW DEPTH (FT.)	VELOCITY (FT/S)
0+00	2+59.2	25	1090	0.2	6.38	4.53
2+59.2	9+02.7	25	1090	0.2	6.38	4.53
9+02.7	9+53.8	25	1090	0.2	6.38	4.53
9+53.8	13+23.4	25	654	0.1	5.84	3.05
13+23.4	15+88.8	15	654	0.1	4.29	6.46
15+88.8	18+16.4	15	654	0.1	4.29	6.46
18+16.4	19+38.4	15	654	0.1	4.29	6.46
19+38.4	20+20.0	15	654	0.1	4.29	6.46
20+20.0	20+92.2	15	375	0.1	5.35	2.72
20+92.2	21+86.1	15	375	0.1	5.35	2.72
21+86.1	33+48.8	15	375	0.1	5.35	2.72
33+48.8	39+47.8	15	29	0.1	1.31	1.26

NOTE: NORMAL DEPTH CALCULATION DOES NOT ACCOUNT FOR BACK WATER WHICH WILL INCREASE FLOW DEPTH (SEE PROFILE) AND DECREASE VELOCITY.

100-YEAR CHANNEL "C" INFORMATION

CHANNEL STATION FROM	CHANNEL STATION TO	BOTTOM WIDTH (FT)	PEAK INFLOW (CFS)	SLOPE (%)	FLOW DEPTH (FT.)	VELOCITY (FT/S)
0+00	2+59.2	25	1551	0.2	7.68	5.00
2+59.2	9+02.7	25	1551	0.2	7.68	5.00
9+02.7	9+53.8	25	1551	0.2	7.68	5.00
9+53.8	13+23.4	25	949	0.1	7.12	3.40
13+23.4	15+88.8	15	949	0.1	5.21	7.16
15+88.8	18+16.4	15	949	0.1	5.21	7.16
18+16.4	19+38.4	15	949	0.1	5.21	7.16
19+38.4	20+20.0	15	949	0.1	5.21	7.16
20+20.0	20+92.2	15	531	0.1	6.38	2.99
20+92.2	21+86.1	15	531	0.1	6.38	2.99
21+86.1	33+48.8	15	531	0.1	6.38	2.99
33+48.8	39+47.4	15	36	0.1	1.91	1.56

NOTE: NORMAL DEPTH CALCULATION DOES NOT ACCOUNT FOR BACK WATER WILL INCREASE FLOW DEPTH (SEE PROFILE) AND DECREASE VELOCITY.



CHANNEL "C" PC 6A.3&A.6

0 100 200 SCALE IN FEET — HORIZONTAL

0 10 20 SCALE IN FEET — VERTICAL

NOTES:

1. REFER TO ATTACHMENT 6A.3 FOR PROFILE LOCATIONS.
2. CONTOURS AND ELEVATIONS DEVELOPED BY BASE MAPPING FROM AERIAL PHOTOGRAPHY FLOWN FEBRUARY 18, 2003. THE GRID SYSTEM IS TIED TO THE TEXAS STATE PLANE COORDINATE SYSTEM SOUTH CENTRAL ZONE NAD 1927.
3. HYDRAULIC CALCULATIONS INCLUDED IN ATTACHMENT 6A-B.

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CAD: 6A.06-PROC.DWG

DRAWN BY: JDW
DESIGN BY: SAN
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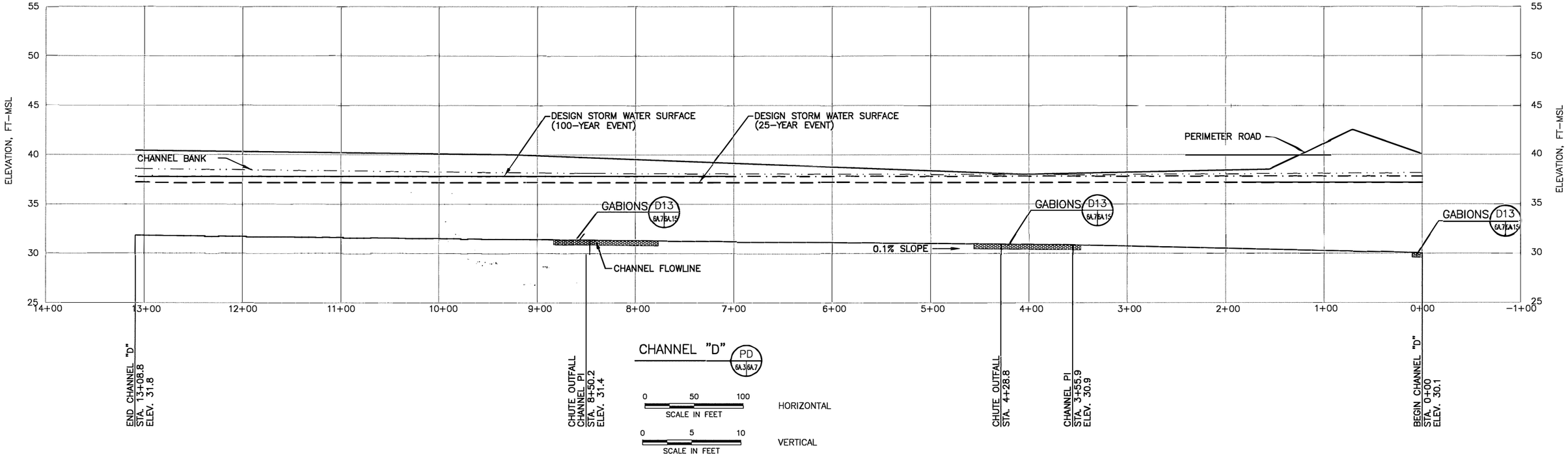
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ATTACHMENT 6A.6

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25-YEAR CHANNEL "D" INFORMATION

CHANNEL STATION FROM	CHANNEL STATION TO	BOTTOM WIDTH (FT)	PEAK INFLOW (CFS)	SLOPE (%)	FLOW DEPTH (FT.)	VELOCITY (FT/S)
0+00	3+55.9	15	452	0.1	5.41	2.67
3+55.9	8+50.2	10	265	0.1	4.68	2.36
8+50.2	13+08.8	15	29	0.1	1.28	1.21

NOTE: NORMAL DEPTH CALCULATION DOES NOT ACCOUNT FOR BACK WATER WHICH WILL INCREASE FLOW DEPTH (SEE PROFILE) AND DECREASE VELOCITY.

100-YEAR CHANNEL "D" INFORMATION

CHANNEL STATION FROM	CHANNEL STATION TO	BOTTOM WIDTH (FT)	PEAK INFLOW (CFS)	SLOPE (%)	FLOW DEPTH (FT.)	VELOCITY (FT/S)
0+00	3+55.9	15	649	0.1	6.43	2.94
3+55.9	8+50.2	10	371	0.1	5.47	2.57
8+50.2	13+08.8	15	40	0.1	1.53	1.34

NOTE: NORMAL DEPTH CALCULATION DOES NOT ACCOUNT FOR BACK WATER WHICH WILL INCREASE FLOW DEPTH (SEE PROFILE) AND DECREASE VELOCITY.

NOTES:

1. REFER TO ATTACHMENT 6A.3 FOR PROFILE LOCATIONS.
2. CONTOURS AND ELEVATIONS DEVELOPED BY BASE MAPPING FROM AERIAL PHOTOGRAPHY FLOWN FEBRUARY 18, 2003. THE GRID SYSTEM IS TIED TO THE TEXAS STATE PLANE COORDINATE SYSTEM SOUTH CENTRAL ZONE NAD 1927.
3. THE PEAK WATER SURFACE ELEVATION FOR PILOT CHANNEL "D" WAS TAKEN FROM THE PROPOSED HEC-1 ANALYSIS FOR SOUTH POND-2 IN ATTACHMENT 6A-B.
3. HYDRAULIC CALCULATIONS INCLUDED IN ATTACHMENT 6A-B.

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DATE: 03/2004
FILE: 0120-439-11
CAD: 6A.07-PROD.DWG
DRAWN BY: JDW
DESIGN BY: SAN
REVIEWED BY: JPY

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NO.	DATE	DESCRIPTION
1	12/2024	PERMIT MODIFICATION

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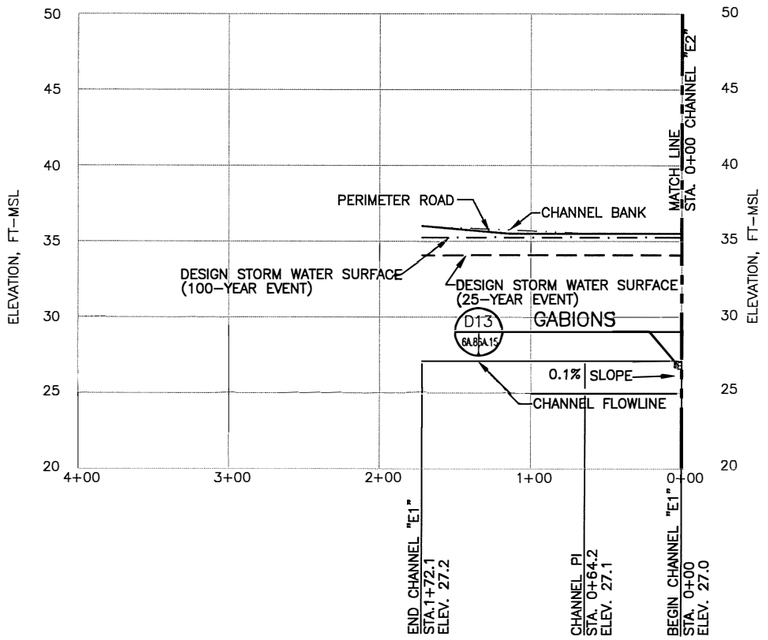
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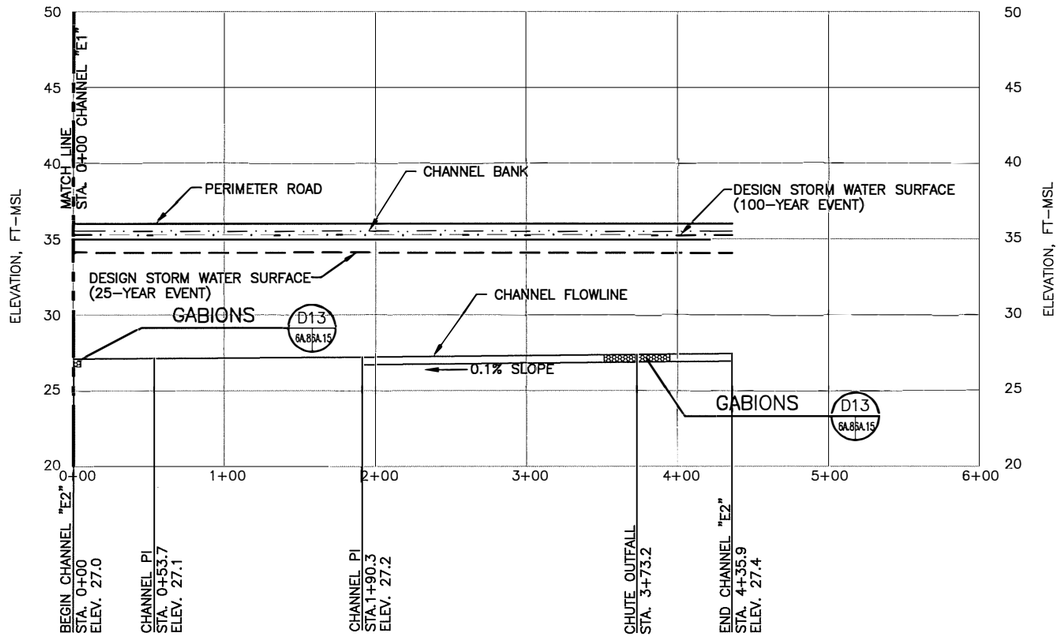
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CHANNEL "E1" PE1 6A.3&6A.8

0 50 100 SCALE IN FEET — HORIZONTAL

0 5 10 SCALE IN FEET — VERTICAL



CHANNEL "E2" PE2 6A.3&6A.8

0 50 100 SCALE IN FEET — HORIZONTAL

0 5 10 SCALE IN FEET — VERTICAL

25-YEAR CHANNEL "E1" INFORMATION

CHANNEL STATION FROM	CHANNEL STATION TO	BOTTOM WIDTH (FT)	PEAK INFLOW (CFS)	SLOPE (%)	FLOW DEPTH (FT.)	VELOCITY (FT/S)
0+00	0+64.2	25	26	0.1	0.91	1.03
0+64.2	1+72.1	30	26	0.1	0.82	0.98

NOTE: NORMAL DEPTH CALCULATION DOES NOT ACCOUNT FOR BACK WATER WHICH WILL INCREASE FLOW DEPTH (SEE PROFILE) AND DECREASE VELOCITY.

100-YEAR CHANNEL "E1" INFORMATION

CHANNEL STATION FROM	CHANNEL STATION TO	BOTTOM WIDTH (FT)	PEAK INFLOW (CFS)	SLOPE (%)	FLOW DEPTH (FT.)	VELOCITY (FT/S)
0+00	0+64.2	25	37	0.1	1.12	1.17
0+64.2	1+72.1	30	37	0.1	1.01	1.11

NOTE: NORMAL DEPTH CALCULATION DOES NOT ACCOUNT FOR BACK WATER WHICH WILL INCREASE FLOW DEPTH (SEE PROFILE) AND DECREASE VELOCITY.

NOTES:

1. REFER TO ATTACHMENT 6A.3 FOR PROFILE LOCATIONS.
2. CONTOURS AND ELEVATIONS DEVELOPED BY BASE MAPPING FROM AERIAL PHOTOGRAPHY FLOWN FEBRUARY 18, 2003. THE GRID SYSTEM IS TIED TO THE TEXAS STATE PLANE COORDINATE SYSTEM SOUTH CENTRAL ZONE NAD 1927.
3. HYDRAULIC CALCULATIONS INCLUDED IN ATTACHMENT 6A-B.

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25-YEAR CHANNEL "E2" INFORMATION

CHANNEL STATION FROM	CHANNEL STATION TO	BOTTOM WIDTH (FT)	PEAK INFLOW (CFS)	SLOPE (%)	FLOW DEPTH (FT.)	VELOCITY (FT/S)
0+00	0+53.6	25	318	0.1	3.76	2.33
0+53.6	1+90.3	35	318	0.1	3.21	2.22
1+90.3	4+35.9	45	318	0.1	2.82	2.11

NOTE: NORMAL DEPTH CALCULATION DOES NOT ACCOUNT FOR BACK WATER WHICH WILL INCREASE FLOW DEPTH (SEE PROFILE) AND DECREASE VELOCITY.

100-YEAR CHANNEL "E2" INFORMATION

CHANNEL STATION FROM	CHANNEL STATION TO	BOTTOM WIDTH (FT)	PEAK INFLOW (CFS)	SLOPE (%)	FLOW DEPTH (FT.)	VELOCITY (FT/S)
0+00	0+53.6	25	442	0.1	4.48	2.57
0+53.6	1+90.3	35	442	0.1	3.86	2.46
1+90.3	4+35.9	45	442	0.1	3.41	2.35

NOTE: NORMAL DEPTH CALCULATION DOES NOT ACCOUNT FOR BACK WATER WHICH WILL INCREASE FLOW DEPTH (SEE PROFILE) AND DECREASE VELOCITY.

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DATE: 03/2004
FILE: 0120-439-11
CAD: 6A.08-PROF.DWG
DRAWN BY: JOW
DESIGN BY: SAN
REVIEWED BY: JPY

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TBPE REGISTRATION NO. F-3727

PREPARED FOR
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1	12/2024	PERMIT MODIFICATION

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PERIMETER CHANNEL "E" PROFILE

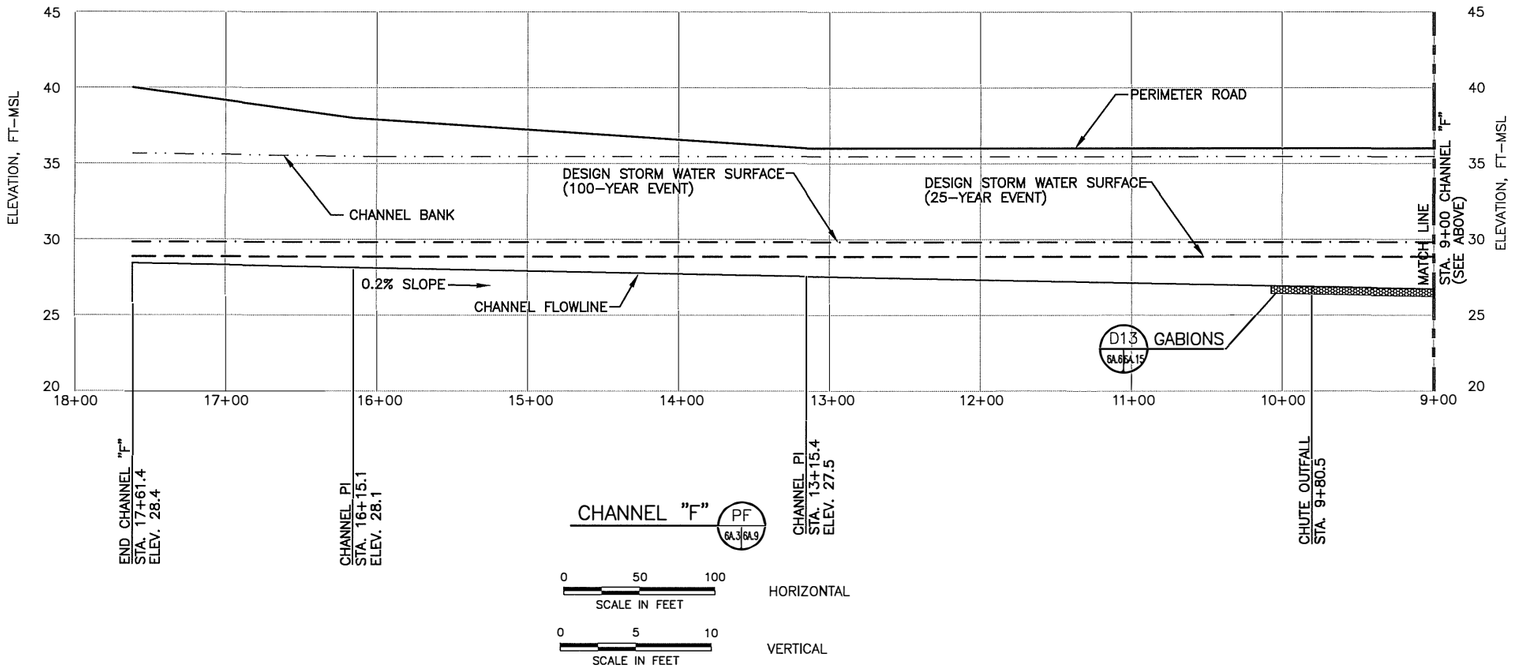
McCARTY ROAD LANDFILL
HARRIS COUNTY, TEXAS

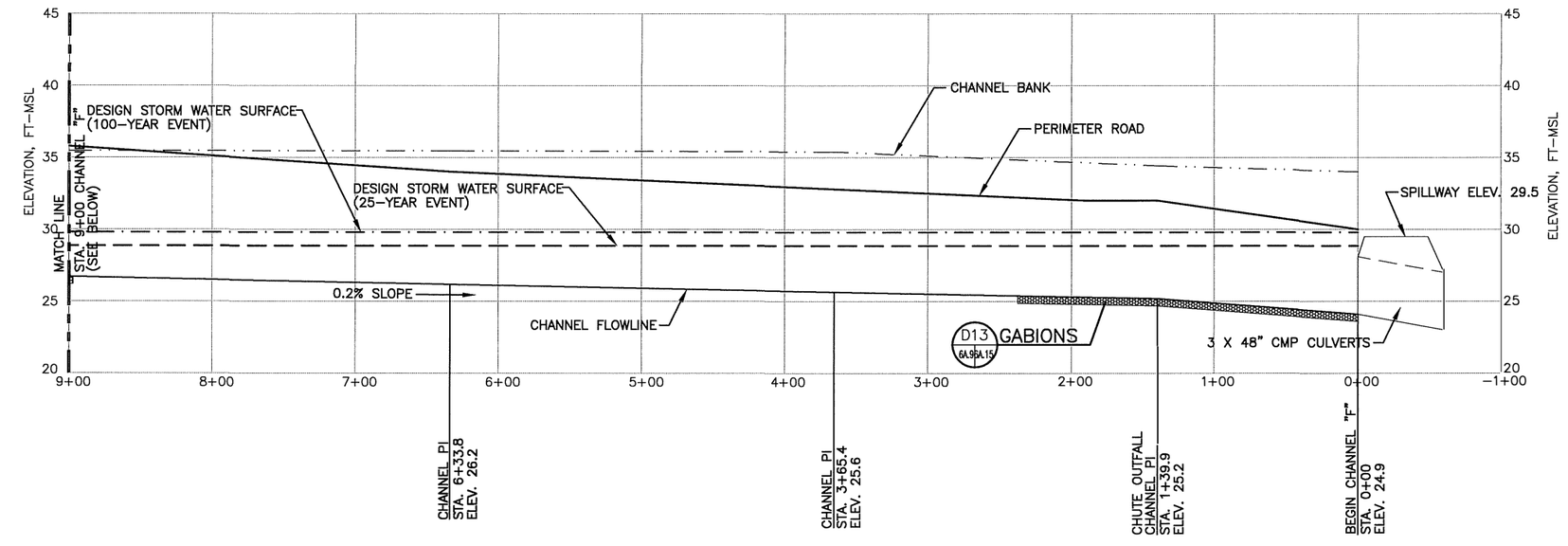
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ATTACHMENT 6A.8

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STATE OF TEXAS
CHARLES R. MARSH
105073
LICENSED
PROFESSIONAL ENGINEER

12/12/2024

25-YEAR CHANNEL "F" INFORMATION

CHANNEL STATION FROM	CHANNEL STATION TO	BOTTOM WIDTH (FT)	PEAK INFLOW (CFS)	SLOPE (%)	FLOW DEPTH (FT.)	VELOCITY (FT/S)
0+00	1+39.9	35	594	0.2	3.81	3.50
1+39.9	3+65.4	20	221	0.2	2.88	2.82
3+65.4	6+33.8	15	221	0.2	3.27	2.91
6+33.8	13+15.4	15	35	0.2	1.18	1.65
13+15.4	16+15.1	12	35	0.2	1.32	1.73
16+15.1	17+61.4	12	35	0.2	1.32	1.73

NOTE: NORMAL DEPTH CALCULATION DOES NOT ACCOUNT FOR BACK WATER WHICH WILL INCREASE FLOW DEPTH (SEE PROFILE) AND DECREASE VELOCITY.

100-YEAR CHANNEL "F" INFORMATION

CHANNEL STATION FROM	CHANNEL STATION TO	BOTTOM WIDTH (FT)	PEAK INFLOW (CFS)	SLOPE (%)	FLOW DEPTH (FT.)	VELOCITY (FT/S)
0+00	1+39.9	35	817	0.2	4.56	3.86
1+39.9	3+65.4	20	817	0.2	5.78	4.11
3+65.4	6+33.8	15	817	0.2	6.35	3.20
6+33.8	13+15.4	15	50	0.2	1.45	1.85
13+15.4	16+15.1	12	50	0.2	1.62	1.93
16+15.1	17+61.4	12	50	0.2	1.62	1.93

NOTE: NORMAL DEPTH CALCULATION DOES NOT ACCOUNT FOR BACK WATER WHICH WILL INCREASE FLOW DEPTH (SEE PROFILE) AND DECREASE VELOCITY.

NOTES:

1. REFER TO ATTACHMENT 6A.3 FOR PROFILE LOCATIONS.
2. CONTOURS AND ELEVATIONS DEVELOPED BY BASE MAPPING FROM AERIAL PHOTOGRAPHY FLOWN FEBRUARY 18, 2003. THE GRID SYSTEM IS TIED TO THE TEXAS STATE PLANE COORDINATE SYSTEM SOUTH CENTRAL ZONE NAD 1927.
3. HYDRAULIC CALCULATIONS INCLUDED IN ATTACHMENT 6A-B.

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PERIMETER CHANNEL "F" PROFILE

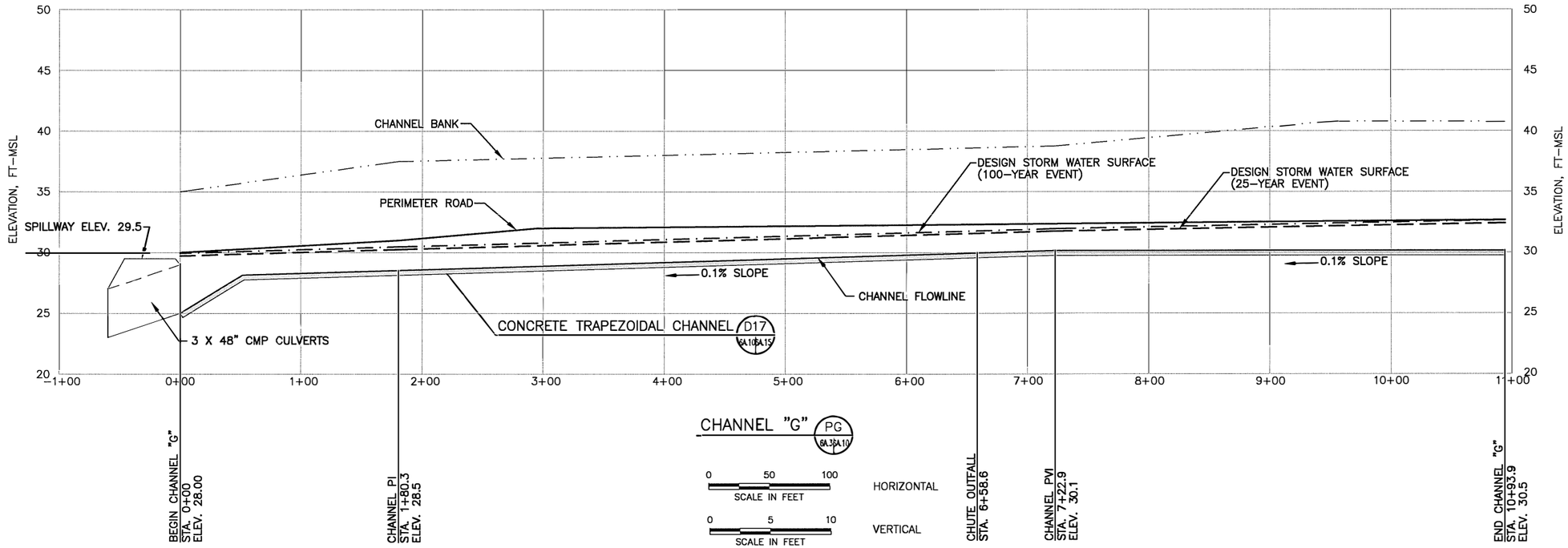
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25-YEAR CHANNEL "G" INFORMATION

CHANNEL STATION FROM	CHANNEL STATION TO	BOTTOM WIDTH (FT)	PEAK INFLOW (CFS)	SLOPE (%)	FLOW DEPTH (FT.)	VELOCITY (FT/S)
0+00	1+80.3	12	179	0.1	2.23	4.28
1+80.3	7+22.9	12	179	0.1	2.23	4.28
7+22.9	10+93.9	0	33	0.1	1.93	2.96

NOTE: NORMAL DEPTH CALCULATION DOES NOT ACCOUNT FOR BACK WATER WHICH WILL INCREASE FLOW DEPTH (SEE PROFILE) AND DECREASE VELOCITY.

100-YEAR CHANNEL "G" INFORMATION

CHANNEL STATION FROM	CHANNEL STATION TO	BOTTOM WIDTH (FT)	PEAK INFLOW (CFS)	SLOPE (%)	FLOW DEPTH (FT.)	VELOCITY (FT/S)
0+00	1+80.3	12	246	0.1	2.64	4.69
1+80.3	7+22.9	12	246	0.1	2.64	4.69
7+22.9	10+93.9	0	246	0.1	4.10	4.88

NOTE: NORMAL DEPTH CALCULATION DOES NOT ACCOUNT FOR BACK WATER WHICH WILL INCREASE FLOW DEPTH (SEE PROFILE) AND DECREASE VELOCITY.

NOTES:

1. REFER TO ATTACHMENT 6A.3 FOR PROFILE LOCATIONS.
2. CONTOURS AND ELEVATIONS DEVELOPED BY BASE MAPPING FROM AERIAL PHOTOGRAPHY FLOWN FEBRUARY 18, 2003. THE GRID SYSTEM IS TIED TO THE TEXAS STATE PLANE COORDINATE SYSTEM SOUTH CENTRAL ZONE NAD 1927.
3. HYDRAULIC CALCULATIONS INCLUDED IN ATTACHMENT 6A-B.

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PERIMETER CHANNEL "G" PROFILE

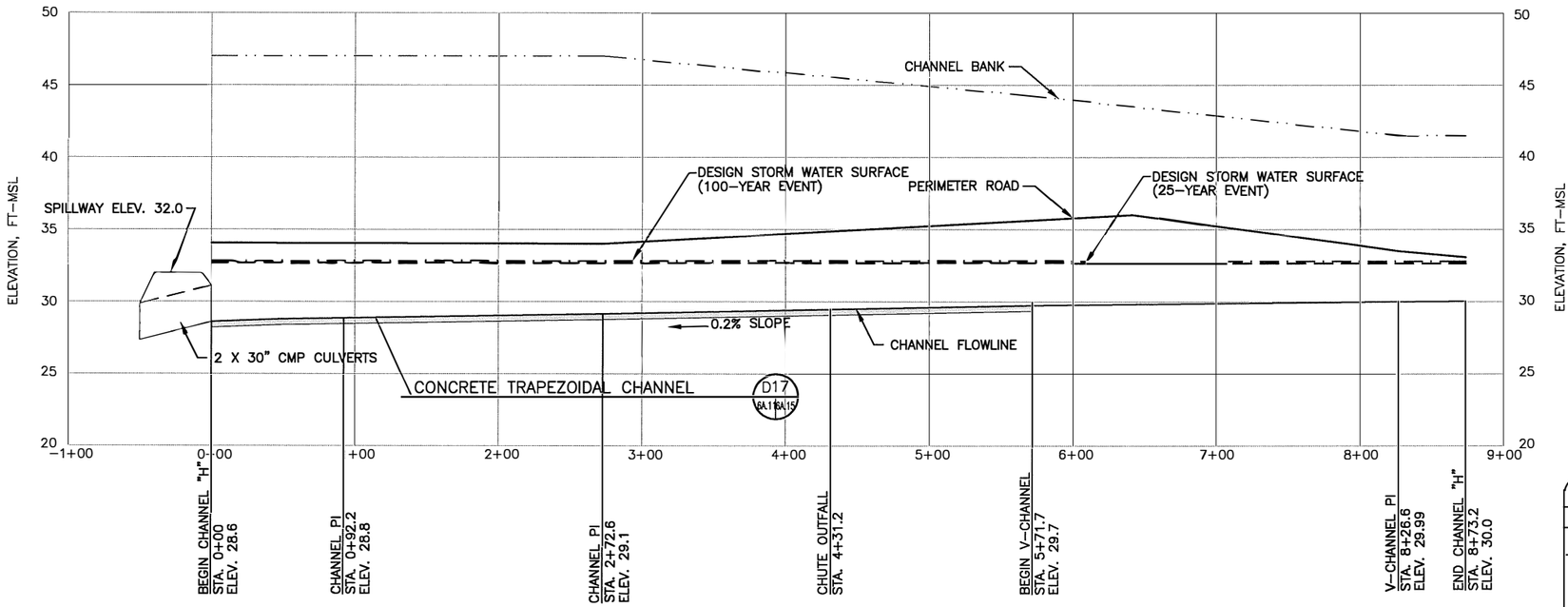
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CHANNEL "H" PH 6A.3&A.11

0 50 100
SCALE IN FEET
HORIZONTAL

0 5 10
SCALE IN FEET
VERTICAL

STATE OF TEXAS
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105073
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12/12/2024

25-YEAR CHANNEL "H" INFORMATION

CHANNEL STATION FROM	CHANNEL STATION TO	BOTTOM WIDTH (FT)	PEAK INFLOW (CFS)	SLOPE (%)	FLOW DEPTH (FT.)	VELOCITY (FT/S)
0+00	0+48.6	12	270	0.2	2.31	6.17
0+48.6	2+72.9	12	270	0.2	2.31	6.17
2+72.9	5+71.7	12	270	0.2	2.31	6.17
5+71.7	8+26.6	0	25	0.2	2.21	1.71
8+26.6	8+73.2	0	25	0.2	2.21	1.71

NOTE: NORMAL DEPTH CALCULATION DOES NOT ACCOUNT FOR BACK WATER WHICH WILL INCREASE FLOW DEPTH (SEE PROFILE) AND DECREASE VELOCITY.

100-YEAR CHANNEL "H" INFORMATION

CHANNEL STATION FROM	CHANNEL STATION TO	BOTTOM WIDTH (FT)	PEAK INFLOW (CFS)	SLOPE (%)	FLOW DEPTH (FT.)	VELOCITY (FT/S)
0+00	0+48.6	12	374	0.2	2.74	6.76
0+48.6	2+72.6	12	374	0.2	2.74	6.76
2+72.6	5+71.7	12	374	0.2	2.74	6.76
5+71.7	8+26.6	0	35	0.2	2.50	1.86
8+26.6	8+73.2	0	35	0.2	2.50	1.86

NOTE: NORMAL DEPTH CALCULATION DOES NOT ACCOUNT FOR BACK WATER WHICH WILL INCREASE FLOW DEPTH (SEE PROFILE) AND DECREASE VELOCITY.

NOTES:

1. REFER TO ATTACHMENT 6A.3 FOR PROFILE LOCATIONS.
2. CONTOURS AND ELEVATIONS DEVELOPED BY BASE MAPPING FROM AERIAL PHOTOGRAPHY FLOWN FEBRUARY 18, 2003. THE GRID SYSTEM IS TIED TO THE TEXAS STATE PLANE COORDINATE SYSTEM SOUTH CENTRAL ZONE NAD 1927.
3. HYDRAULIC CALCULATIONS INCLUDED IN ATTACHMENT 6A-B.

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PERIMETER CHANNEL "H" PROFILE

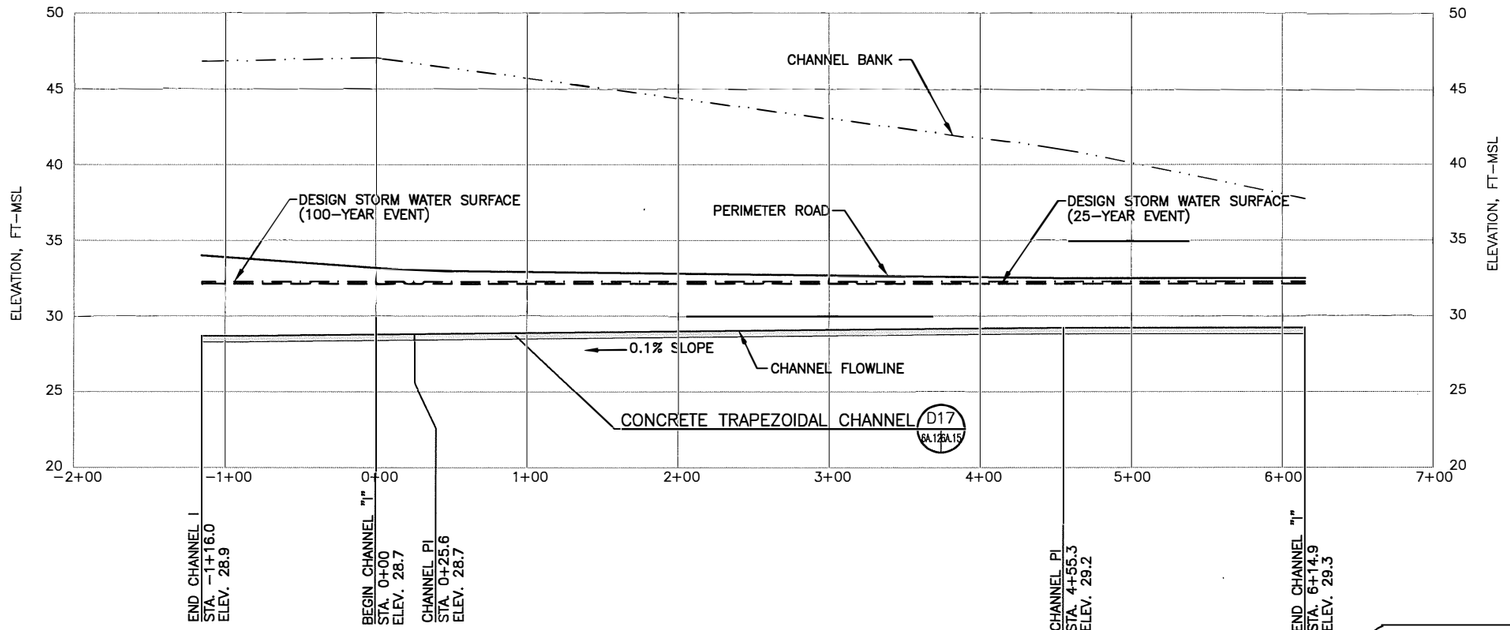
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CHANNEL "I" PI 6A.3 6A.12

0 50 100
SCALE IN FEET
HORIZONTAL

0 5 10
SCALE IN FEET
VERTICAL

25–YEAR CHANNEL "I" INFORMATION

CHANNEL STATION FROM	CHANNEL STATION TO	BOTTOM WIDTH (FT)	PEAK INFLOW 25–YEAR (CFS)	SLOPE (%)	FLOW DEPTH (FT.)	VELOCITY (FT/S)
–1+16.0	0+00	0	41	0.1	2.09	3.12
0+00	0+25.6	0	41	0.1	2.09	3.12
0+25.6	4+55.3	0	41	0.1	2.09	3.12
4+55.3	6+14.9	0	41	0.1	2.09	3.12

NOTE: NORMAL DEPTH CALCULATION DOES NOT ACCOUNT FOR BACK WATER WHICH WILL INCREASE FLOW DEPTH (SEE PROFILE) AND DECREASE VELOCITY.

100–YEAR CHANNEL "I" INFORMATION

CHANNEL STATION FROM	CHANNEL STATION TO	BOTTOM WIDTH (FT)	PEAK INFLOW 25–YEAR (CFS)	SLOPE (%)	FLOW DEPTH (FT.)	VELOCITY (FT/S)
–1+16.0	0+00	0	50	0.1	2.26	3.28
0+00	0+25.6	0	50	0.1	2.26	3.28
0+25.6	4+55.3	0	50	0.1	2.26	3.28
4+55.3	6+14.9	0	50	0.1	2.26	3.28

NOTE: NORMAL DEPTH CALCULATION DOES NOT ACCOUNT FOR BACK WATER WHICH WILL INCREASE FLOW DEPTH (SEE PROFILE) AND DECREASE VELOCITY.

NOTES:

1. REFER TO ATTACHMENT 6A.3 FOR PROFILE LOCATIONS.
2. CONTOURS AND ELEVATIONS DEVELOPED BY BASE MAPPING FROM AERIAL PHOTOGRAPHY FLOWN FEBRUARY 18, 2003. THE GRID SYSTEM IS TIED TO THE TEXAS STATE PLANE COORDINATE SYSTEM SOUTH CENTRAL ZONE NAD 1927.
3. HYDRAULIC CALCULATIONS INCLUDED IN ATTACHMENT 6A–B.

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PERIMETER CHANNEL "I" PROFILE

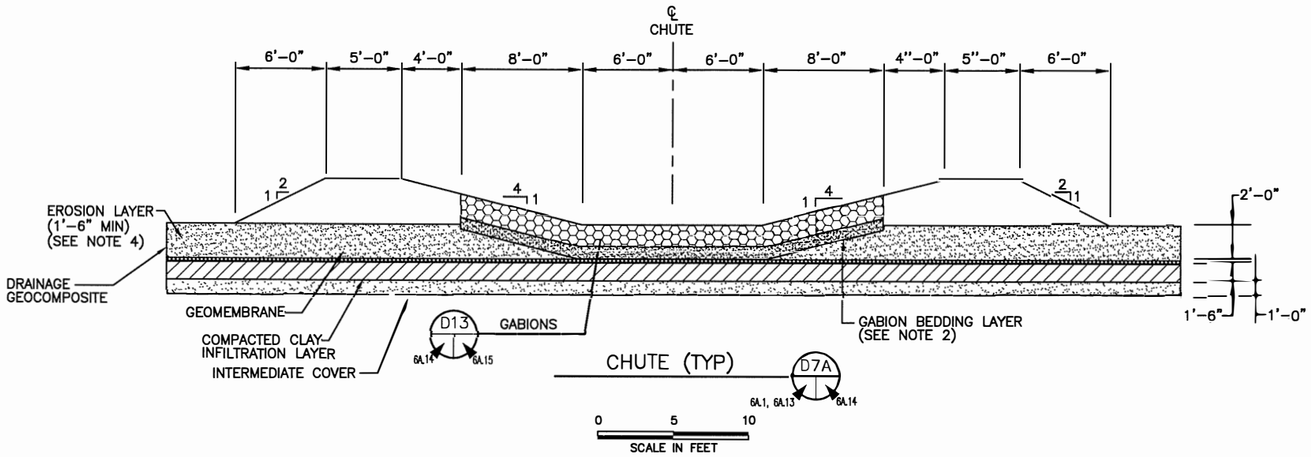
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HARRIS COUNTY, TEXAS

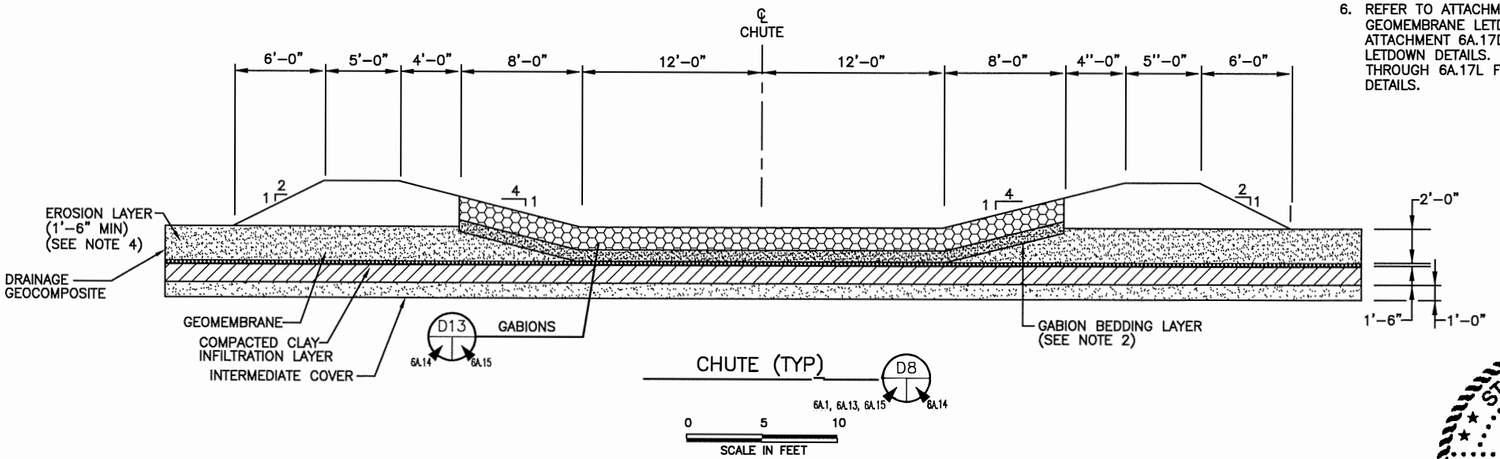
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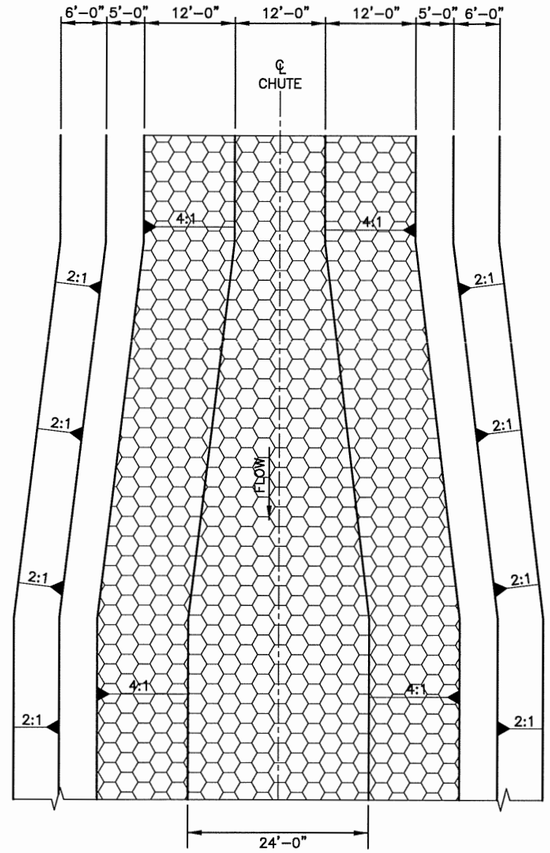
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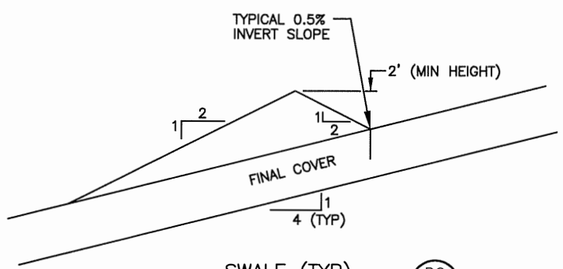
NOTES:

1. REFER TO ATTACHMENT 6A.1–DRAINAGE STRUCTURE PLAN FOR LOCATION OF DETAILS.
2. BEDDING MATERIAL WILL CONSIST OF A SW OR SP MATERIAL AS DEFINED BY UNIFIED SOIL CLASSIFICATION SYSTEM. (USCS).
3. BOTTOM WIDTH OF CHUTES WILL VARY PER ENERGY DISSIPATOR CALCULATIONS (SEE APPENDIX 6A–C).
4. TOP 6 INCHES OF EROSION LAYER WILL BE CAPABLE OF SUSTAINING VEGETATIVE GROWTH.
5. DETAILS ARE SHOWN WITH SUBTITLE–D FINAL COVER CONFIGURATION.
6. REFER TO ATTACHMENT 6A.17A THROUGH 6A.17C FOR GEOMEMBRANE LETDOWN DETAILS. REFER TO ATTACHMENT 6A.17D THROUGH 6A.17H FOR FLEXAMAT LETDOWN DETAILS. REFER TO ATTACHMENT 6A.17I THROUGH 6A.17L FOR ARTICULATED BLOCK LETDOWN DETAILS.



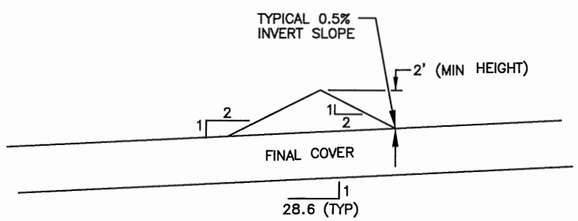
GABION CHUTE TRANSITION (TYP) D11 6A.1 6A.14

0 10 20
SCALE IN FEET



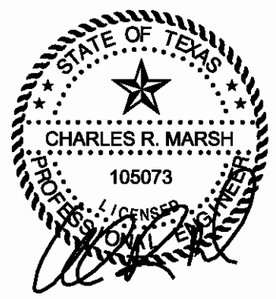
SWALE (TYP) D9 6A.1, 6A.13 6A.14

0 3 6
SCALE IN FEET



TOP DECK SWALE (TYP) D10 6A.1, 6A.13 6A.10

0 3 6
SCALE IN FEET



12/12/2024

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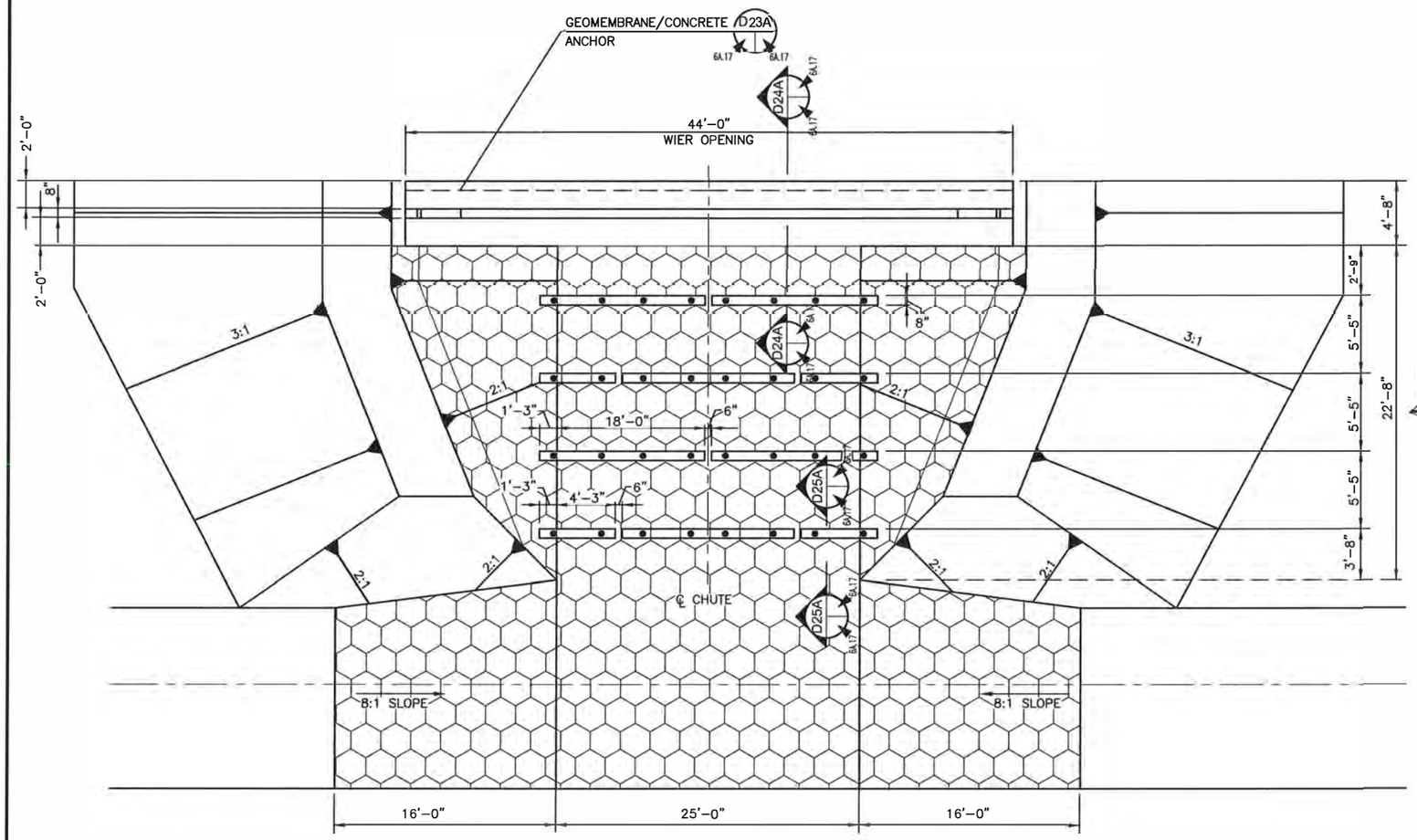
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NO.	DATE	DESCRIPTION
1	10/2010	PERMIT MODIFICATION
2	01/2012	PERMIT MODIFICATION
3	12/2024	PERMIT MODIFICATION

DRAINAGE DETAILS

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HARRIS COUNTY, TEXAS

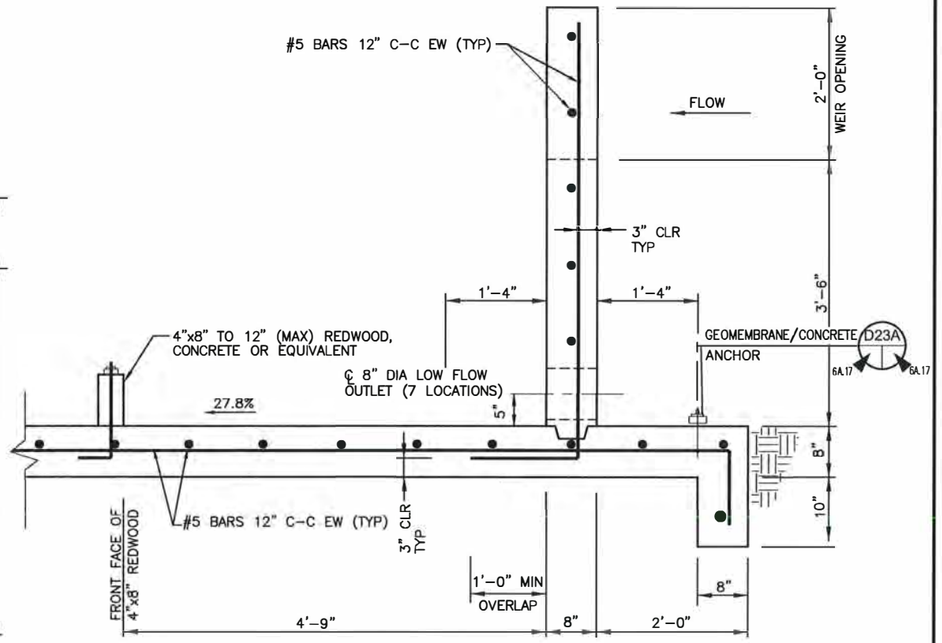
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ATTACHMENT 6A.14



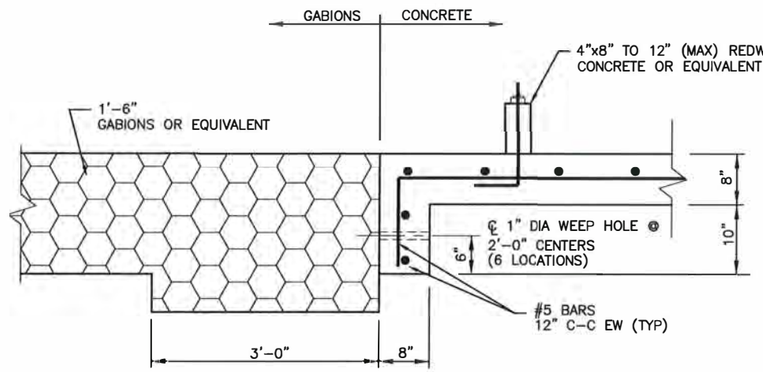
ENERGY DISSIPATOR DETAIL (SEE NOTE 1) D22A 6A.16 6A.17

0 5 10
SCALE IN FEET



WEIR SECTION D24A 6A.17 6A.17

0 1 2
SCALE IN FEET



DISSIPATOR SECTION (TYP) D25A 6A.17 6A.17

0 1 2
SCALE IN FEET

NOTE:

1. CHUTE BOTTOM DOWNSTREAM OF WEIR SHALL BE LINED WITH 3,500 PSI REINFORCED CONCRETE AS SHOWN IN WEIR SECTION DETAIL.
2. REFER TO ATTACHMENT 6A.17A THROUGH 6A.17D FOR GEOMEMBRANE LETDOWN DETAILS.

STATE OF TEXAS
CHARLES R. MARSH
105073
LICENSED PROFESSIONAL ENGINEER
9.24.24

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2	09/2024	PERMIT MODIFICATION

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ENERGY DISSIPATOR DETAILS

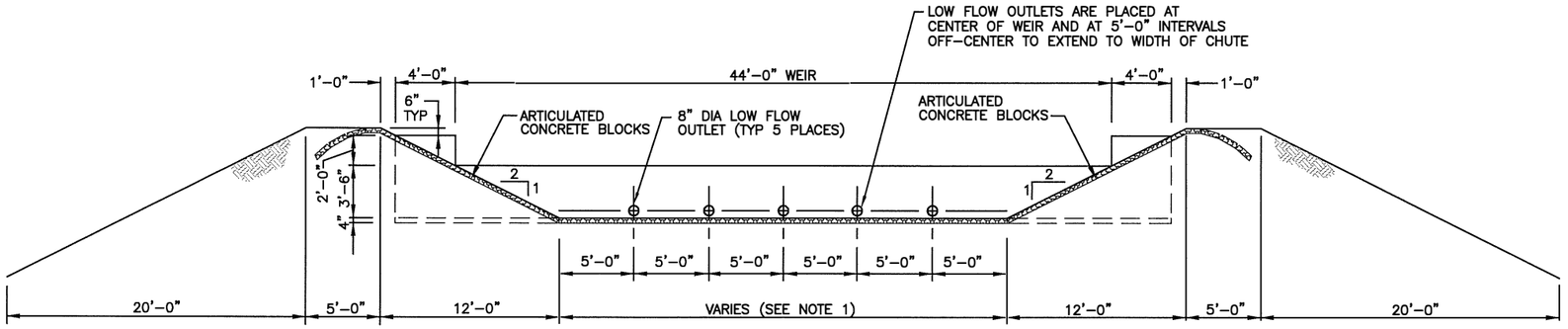
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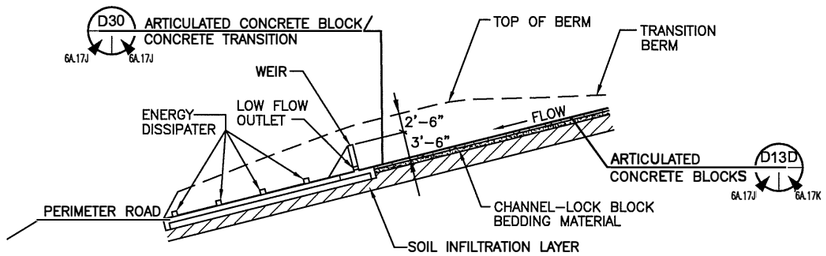
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SECTION D20D

0 5 10 6A.17L 6A.17J

SCALE IN FEET



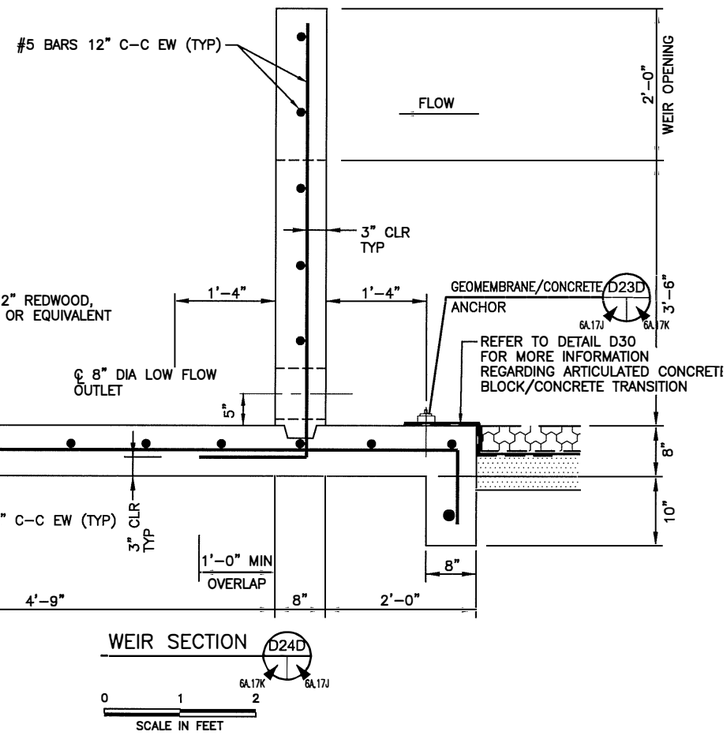
LONGITUDINAL SECTION D21D

0 10 20 6A.17J 6A.17J

SCALE IN FEET

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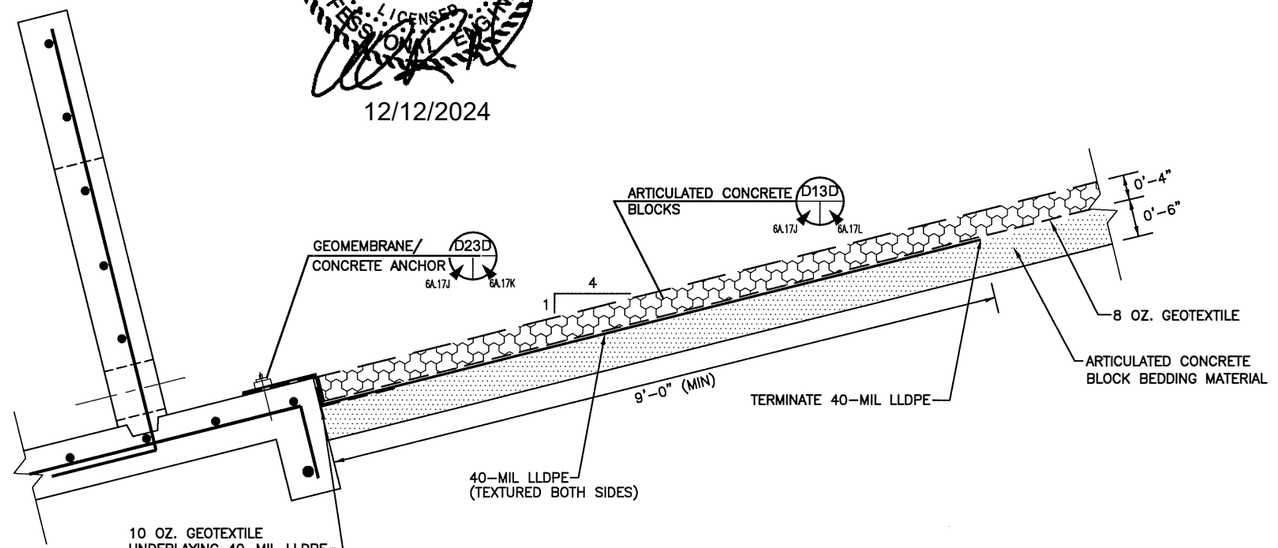
12/12/2024



WEIR SECTION D24D

0 1 2 6A.17K 6A.17J

SCALE IN FEET



ARTICULTAED CONCRETE BLOCK/CONCRETE TRANSITION D30

0 1 2 6A.17J 6A.17J

SCALE IN FEET

NOTE:

1. DESIGN DIMENSIONS SHOWN ARE BASED ON CHUTE WITH 30-FOOT BOTTOM WIDTH. DESIGN ELEMENTS FOR EACH CHUTE WILL BE BASED ON CALCULATIONS PRESENTED IN APPENDIX 6A-C AND MAY VARY FROM THE DIMENSIONS SHOWN ON THIS PLAN.

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LETDOWN DETAILS

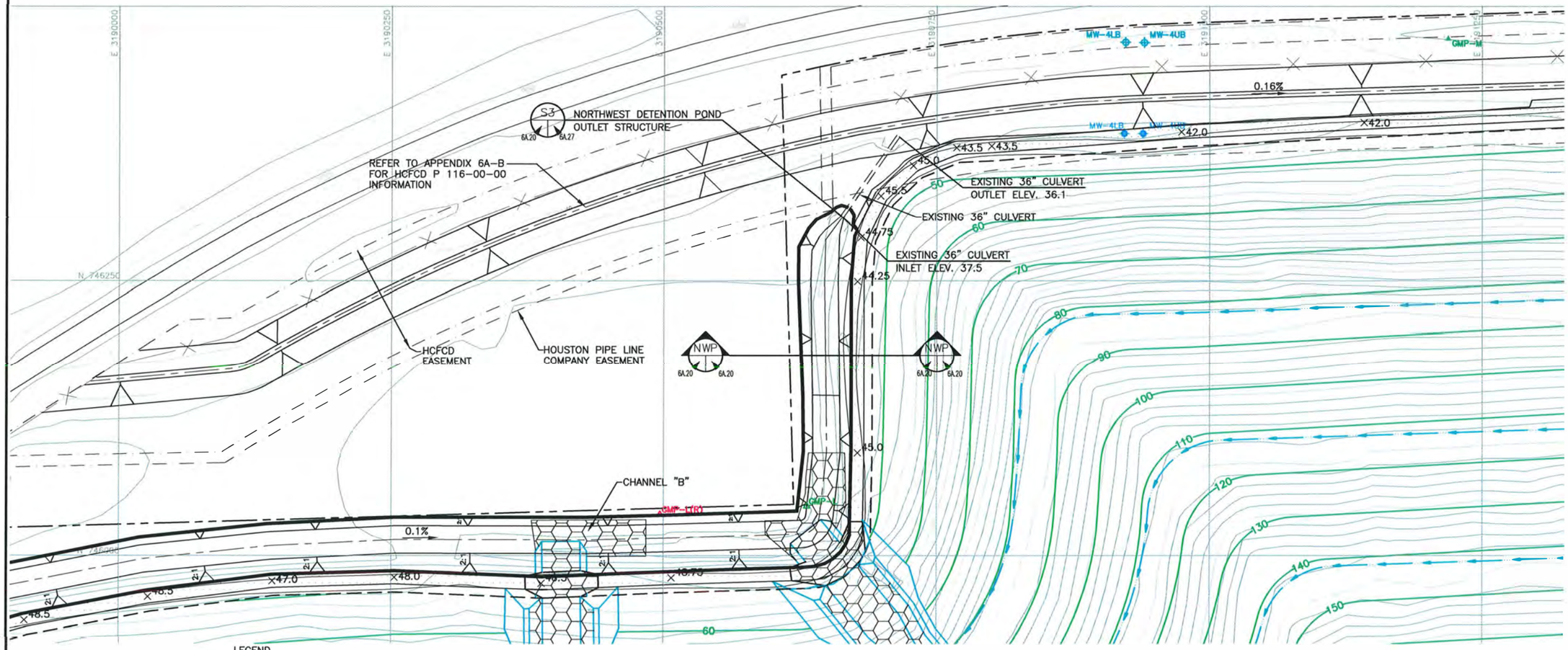
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ATTACHMENT 6A.17J

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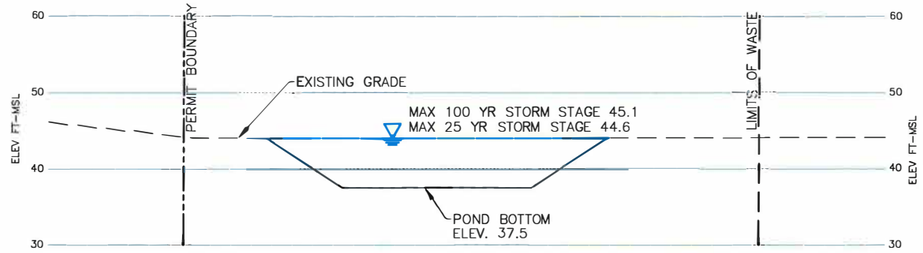


NORTHWEST DETENTION POND	
ELEVATION (FT-MSL)	SURFACE AREA (AC)
39.5	0.0004
40.0	0.1103
41.0	0.1267
42.0	0.1433
43.0	0.1585
44.0	0.1735

* BOLD OUTLINE OF THE POND REPRESENTS THE LIMITS OF THE POND.

LEGEND

- PERMIT BOUNDARY
- EXISTING CONTOUR
- N 746000 STATE PLANE COORDINATE SYSTEM
- 50 FINAL CONTOUR
- LIMIT OF WASTE
- EASEMENT BOUNDARY
- PROPOSED DRAINAGE LETDOWN
- GABIONS
- PROPOSED DRAINAGE SWALE
- MW-4UB EXISTING DETECTION GROUNDWATER MONITORING WELL TO BE DECOMMISSIONED
- MW-4UB PROPOSED DETECTION REPLACEMENT MONITORING WELL
- GMP-M EXISTING LANDFILL GAS MONITORING PROBE
- GMP-J(R) PROPOSED REPLACEMENT LANDFILL GAS MONITORING PROBE
- POND LIMIT



NORTHWEST DETENTION POND SECTION NWP 6A.20 6A.14

0 10 20 SCALE IN FEET HORIZONTAL

0 10 20 SCALE IN FEET VERTICAL

STATE OF TEXAS
CHARLES R. MARSH
105073
LICENSED
PROFESSIONAL ENGINEER
9.24.24

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CAD: 6A.20-NW-OUTLET.DWG

DRAWN BY: JDW
DESIGN BY: SAN/ALD
REVIEWED BY: JPY

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TBPE REGISTRATION NO. F-3727

PREPARED FOR
McCARTY ROAD LANDFILL TX, LP

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NO.	DATE	DESCRIPTION
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2	09/2024	PERMIT MODIFICATION

MAJOR PERMIT AMENDMENT NORTHEAST POND

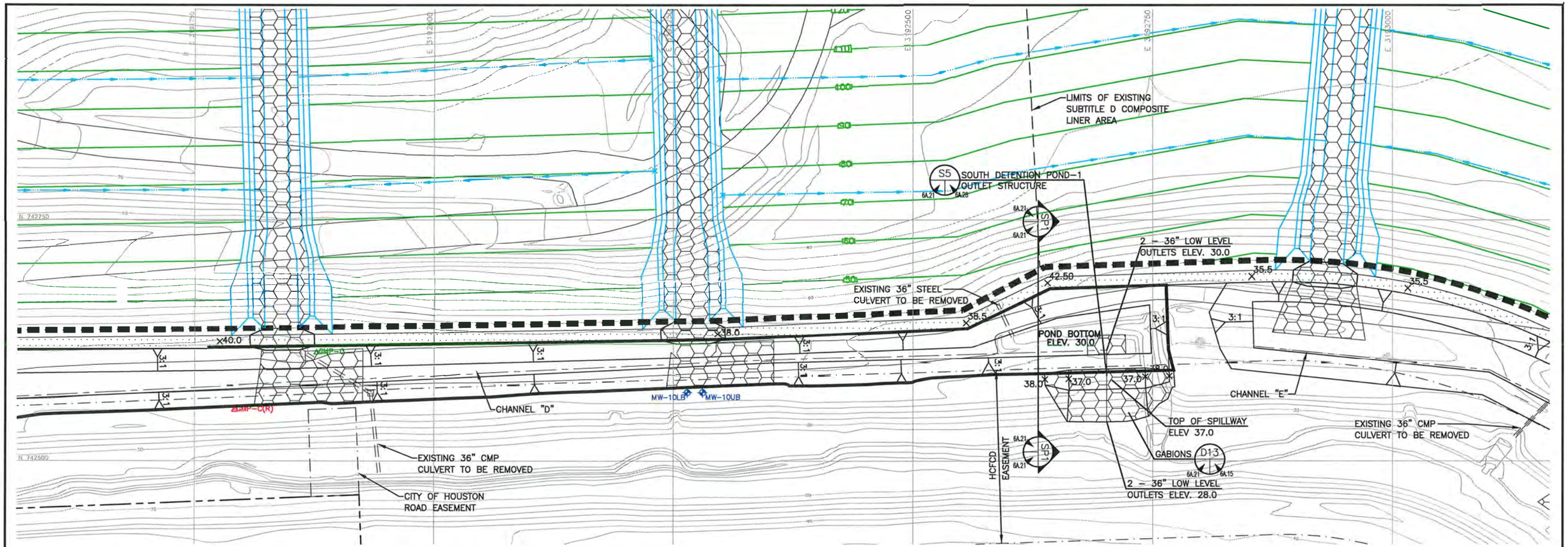
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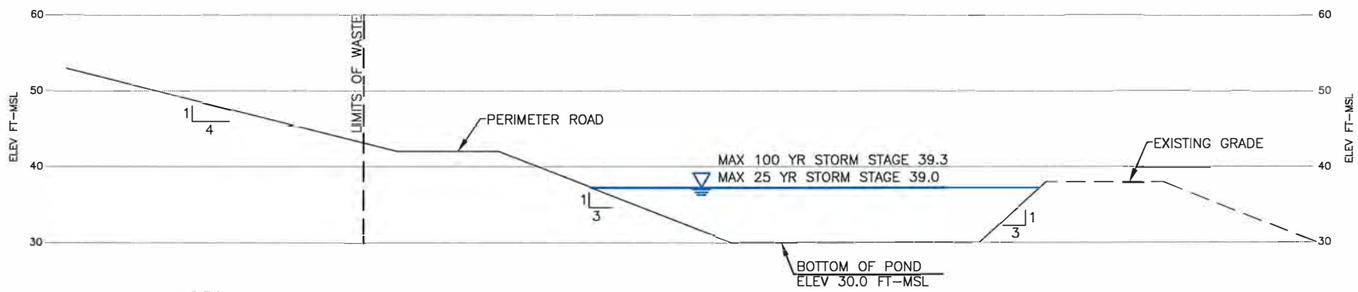
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LEGEND

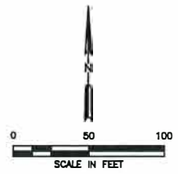
- PERMIT BOUNDARY
- EXISTING CONTOUR
- N 746000 STATE PLANE COORDINATE SYSTEM
- 50 FINAL CONTOUR
- LIMITS OF WASTE
- EASEMENT BOUNDARY
- PROPOSED DRAINAGE LETDOWN
- GABIONS
- PROPOSED DRAINAGE SWALE
- MW-11UB EXISTING DETECTION GROUNDWATER MONITORING WELL
- GMP-J EXISTING LANDFILL GAS MONITORING PROBE TO BE DECOMMISSIONED
- GMP-J PROPOSED REPLACEMENT LANDFILL GAS MONITORING PROBE
- POND LIMITS



SOUTH DETENTION POND-1 SECTION SP1 6A.21 6A.21

0 10 20 SCALE IN FEET HORIZONTAL

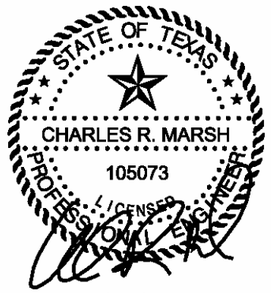
0 10 20 SCALE IN FEET VERTICAL



SOUTH DETENTION POND-1

ELEVATION (FT-MSL)	SURFACE AREA (AC)
30.0	0.0012
32.0	0.5971
34.0	0.9844
36.0	1.3785
38.0	1.7659

* BOLD OUTLINE OF THE POND REPRESENTS THE LIMITS OF THE POND.



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MAJOR PERMIT AMENDMENT SOUTH POND-1

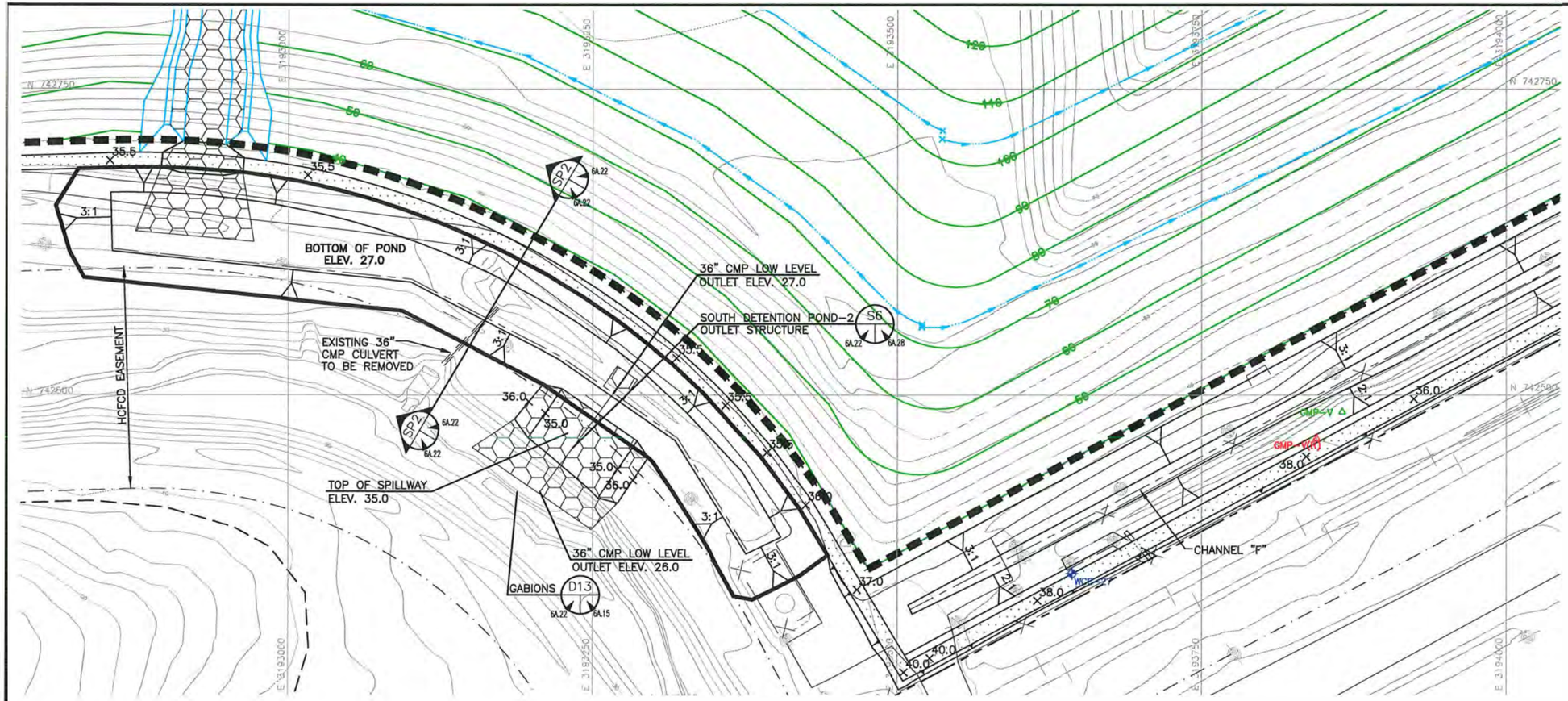
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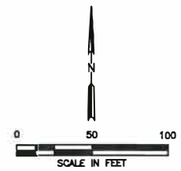
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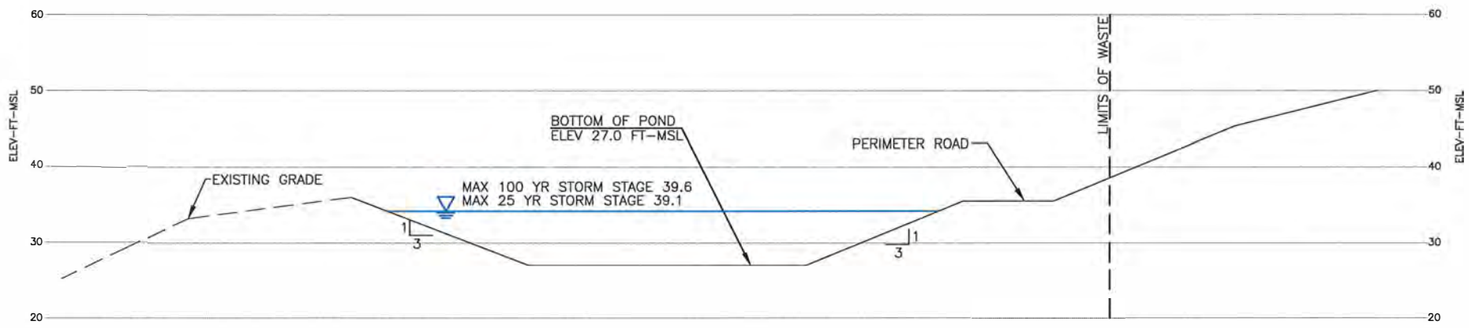
SOUTH DETENTION POND-2

ELEVATION (FT-MSL)	SURFACE AREA (AC)
27.0	0.0010
28.0	0.5542
29.0	0.6472
30.0	0.7417
31.0	0.8379
32.0	0.9357
33.0	1.0352
34.0	1.1362
35.0	1.2332
36.0	1.3376

* BOLD OUTLINE OF THE POND REPRESENTS THE LIMITS OF THE POND.

LEGEND

- PERMIT BOUNDARY
- EXISTING CONTOUR
- N 746000 STATE PLANE COORDINATE SYSTEM
- 50 FINAL CONTOUR
- LIMITS OF WASTE
- EASEMENT BOUNDARY
- PROPOSED DRAINAGE LETDOWN
- GABIONS
- PROPOSED DRAINAGE SWALE
- WCC-27 EXISTING DETECTION GROUNDWATER MONITORING WELL
- GMP-J EXISTING LANDFILL GAS MONITORING PROBE TO BE DECOMMISSIONED
- GMP-J(R) PROPOSED REPLACEMENT LANDFILL GAS MONITORING PROBE
- POND LIMITS



SOUTH DETENTION POND-2 SECTION SP2 6A.22 6A.22

0 10 20 SCALE IN FEET HORIZONTAL

0 10 20 SCALE IN FEET VERTICAL

STATE OF TEXAS
CHARLES R. MARSH
105073
LICENSED
PROFESSIONAL ENGINEER

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REVISIONS		
NO.	DATE	DESCRIPTION
1	12/2024	PERMIT MODIFICATION

MAJOR PERMIT AMENDMENT
SOUTH POND-2

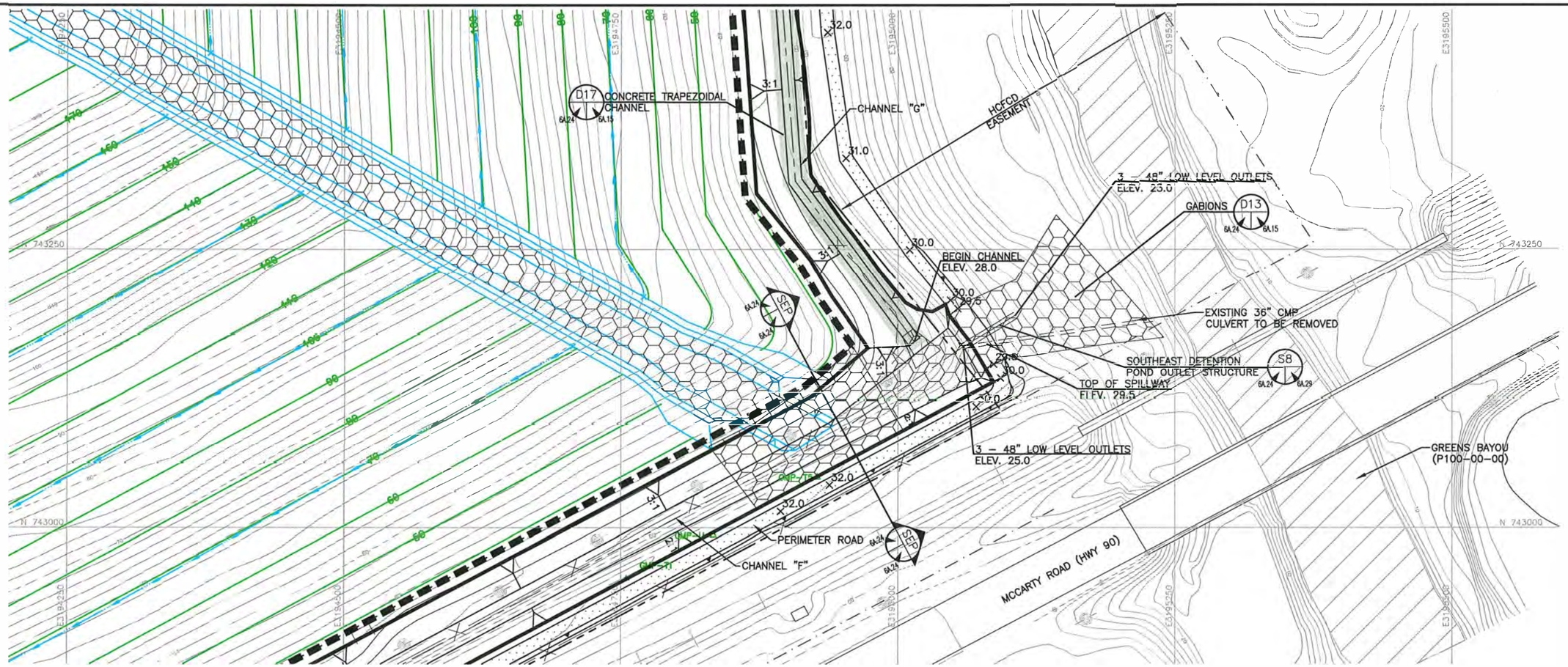
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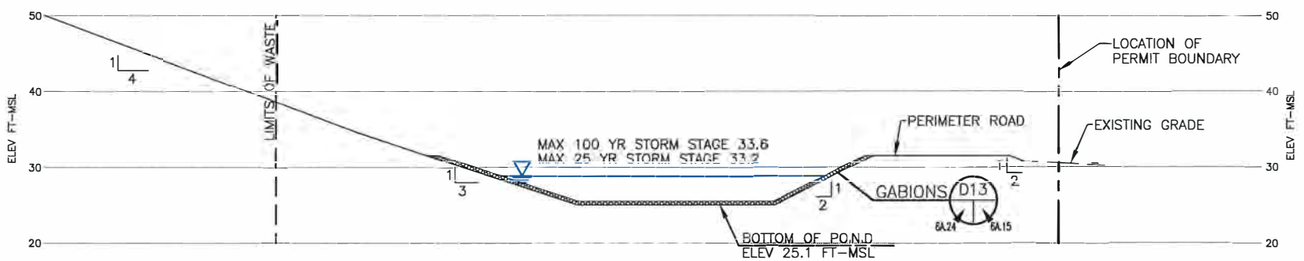


SOUTHEAST DETENTION POND	
ELEVATION (FT–MSL)	SURFACE AREA (AC)
25.0	0.0556
26.0	0.3693
27.0	0.6752
28.0	1.0046
29.0	1.3702
30.0	1.7328

* BOLD OUTLINE OF THE POND REPRESENTS THE LIMITS OF THE POND.

LEGEND

- PERMIT BOUNDARY
- EXISTING CONTOUR
- N 746000 STATE PLANE COORDINATE SYSTEM
- 50 FINAL CONTOUR
- LIMITS OF WASTE
- EASEMENT BOUNDARY
- PROPOSED DRAINAGE LETDOWN
- GABIONS
- CONCRETE
- PROPOSED DRAINAGE SWALE
- GMP–M EXISTING LANDFILL GAS MONITORING PROBE (SEE NOTE 1)
- GMP–U EXISTING LANDFILL GAS MONITORING PROBE TO BE DECOMMISSIONED (SEE NOTE 1)
- POND LIMITS



SOUTHEAST DETENTION POND SECTION SEP 6A.24 6A.24

0 10 20 SCALE IN FEET HORIZONTAL

0 5 10 SCALE IN FEET VERTICAL

NOTE:

1. GMP–T5 AND GMP–U ARE BEING DECOMMISSIONED VIA A PERMIT MODIFICATION SUBMITTED BY WBC IN APRIL 2004. GMP–T1 WILL BECOME A PERMANENT GAS MONITORING PROBE FOR THIS AREA. REFER TO ATTACHMENT 14 FOR ADDITIONAL INFORMATION.

STATE OF TEXAS
CHARLES R. MARSH
105073
LICENSED PROFESSIONAL ENGINEER

12/12/2024

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DESIGN BY: SAN/ALD
REVIEWED BY: JPY

Weaver Consultants Group
TBPE REGISTRATION NO. F-3727

PREPARED FOR
McCARTY ROAD LANDFILL TX, LP

REVISIONS		
NO.	DATE	DESCRIPTION
1	12/2024	PERMIT MODIFICATION

MAJOR PERMIT AMENDMENT
SOUTHEAST POND

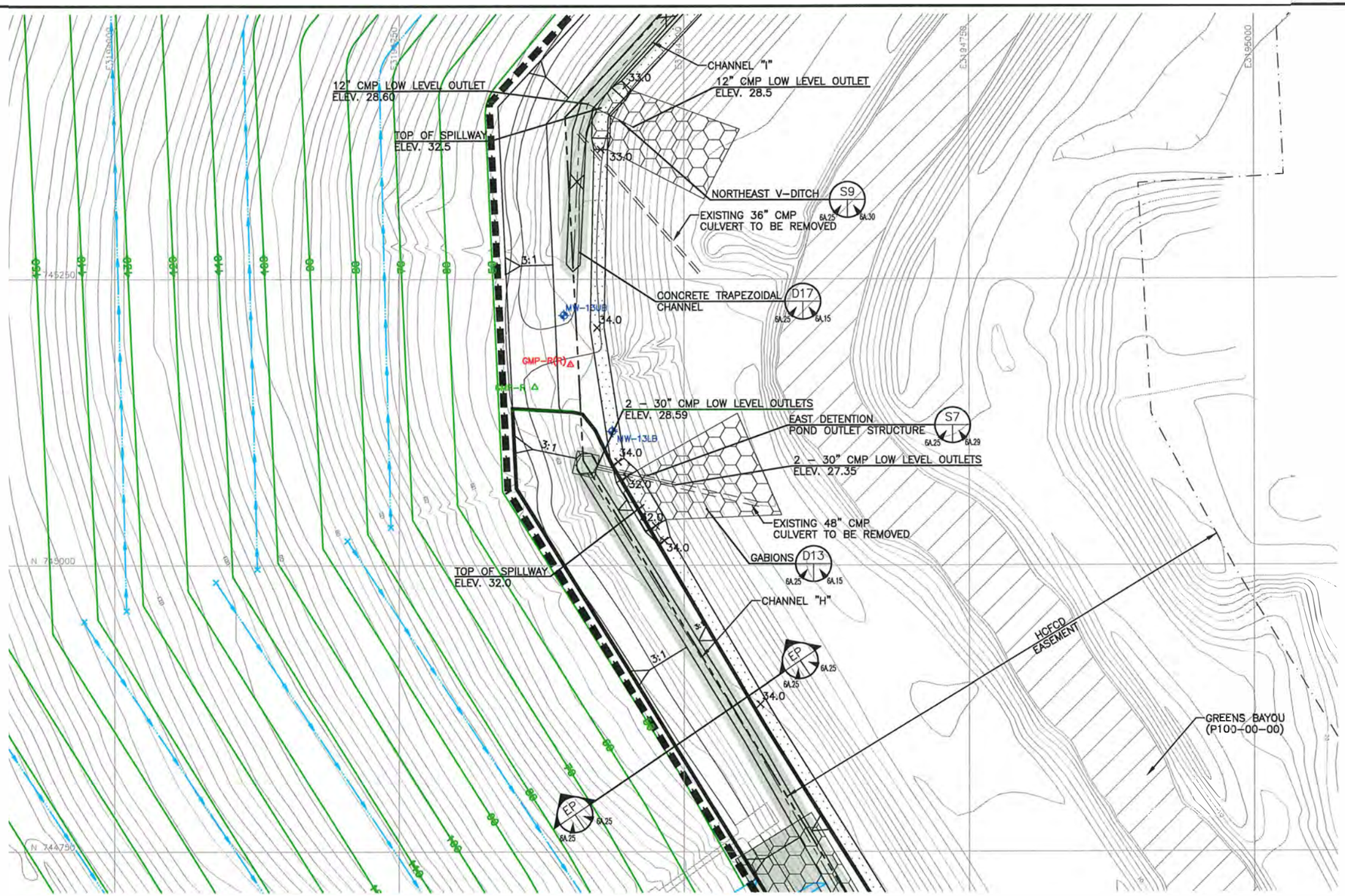
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HARRIS COUNTY, TEXAS

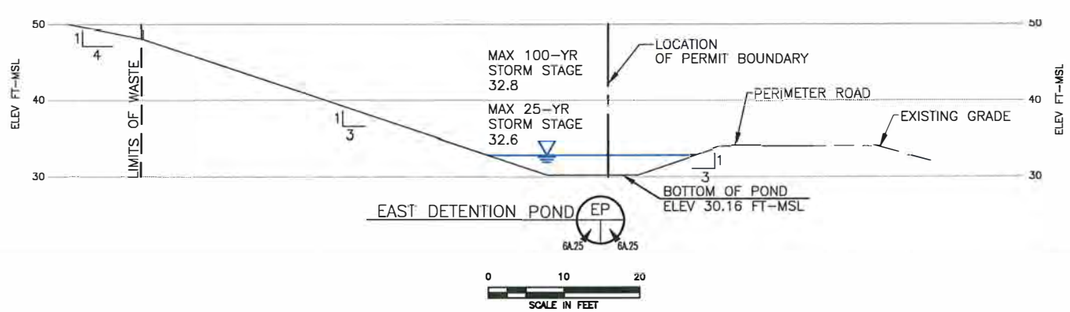
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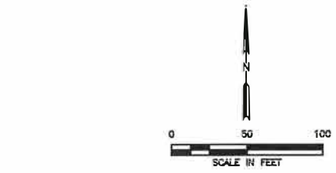
ATTACHMENT 6A.24

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LEGEND

- PERMIT BOUNDARY
- EXISTING CONTOUR
- N 746000 STATE PLANE COORDINATE SYSTEM
- 50 FINAL CONTOUR
- LIMITS OF WASTE
- EASEMENT BOUNDARY
- GABIONS
- CONCRETE
- PROPOSED DRAINAGE SWALE
- MW-11UB EXISTING DETECTION GROUNDWATER MONITORING WELL
- GMP-M EXISTING LANDFILL GAS MONITORING PROBE
- GMP-R EXISTING LANDFILL GAS MONITORING PROBE TO BE DECOMMISSIONED (SEE NOTE 1)
- GMP-R(R) PROPOSED REPLACEMENT LANDFILL GAS MONITORING PROBE (SEE NOTE 1)
- POND LIMITS

STATE OF TEXAS
CHARLES R. MARSH
105073
PROFESSIONAL ENGINEER
LICENSED

12/12/2024

EAST DETENTION POND

ELEVATION (FT-MSL)	SURFACE AREA (AC)
28.6	0.0061
29.0	0.1531
30.0	0.2422
31.0	0.3672
32.0	0.4937
33.0	0.6217

* BOLD OUTLINE OF THE POND REPRESENTS THE LIMITS OF THE POND.

NOTE:

1. GAS MONITORING PROBE GMP-R WILL BE DECOMMISIONED AND RELOCATED AS DOCUMENTED IN A PERMIT MODIFICATION SUBMITTED BY WEAVER BOOS CONSULTANTS IN APRIL 2004. REFER TO ATTACHMENT 14 FOR ADDITIONAL INFORMATION.

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DATE: 03/2004
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DESIGN BY: SAN/ALD
REVIEWED BY: JPY

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TBPE REGISTRATION NO. F-3727

PREPARED FOR
McCARTY ROAD LANDFILL TX, LP

REVISIONS		
NO.	DATE	DESCRIPTION
1	12/2024	PERMIT MODIFICATION

MAJOR PERMIT AMENDMENT
EAST POND

McCARTY ROAD LANDFILL
HARRIS COUNTY, TEXAS

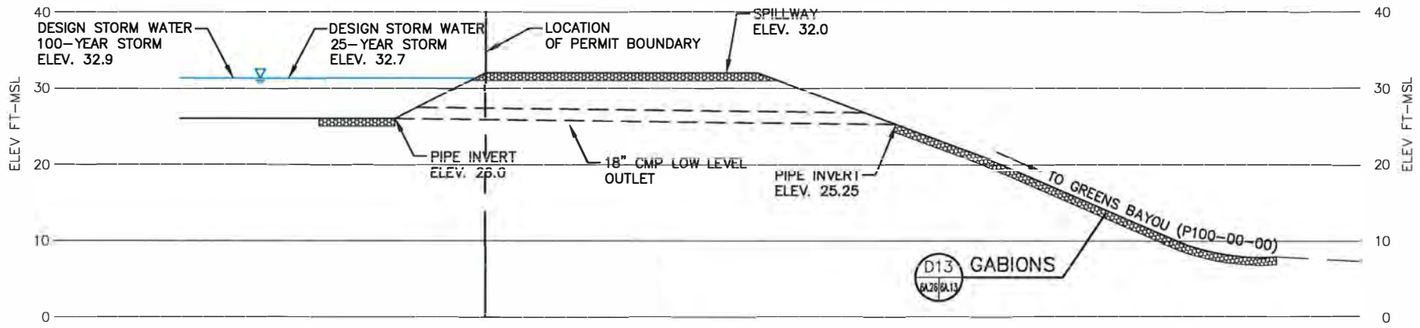
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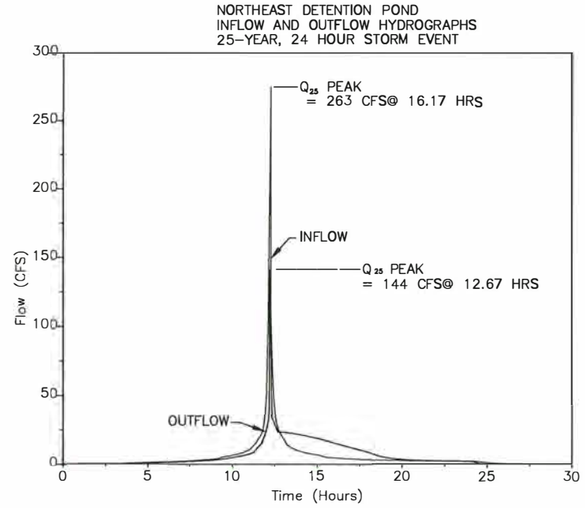
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NORTHEAST DETENTION POND	
BOTTOM ELEVATION	26.0 FT.
SPILLWAY ELEVATION	32.0 FT.
SPILLWAY LENGTH	80.0 FT.
PEAK 25-YEAR EVENT INFLOW	189.0 CFS
PEAK 25-YEAR EVENT OUTFLOW	144.0 CFS
PEAK 100-YEAR EVENT INFLOW	263.0 CFS
PEAK 100-YEAR EVENT OUTFLOW	194.0 CFS

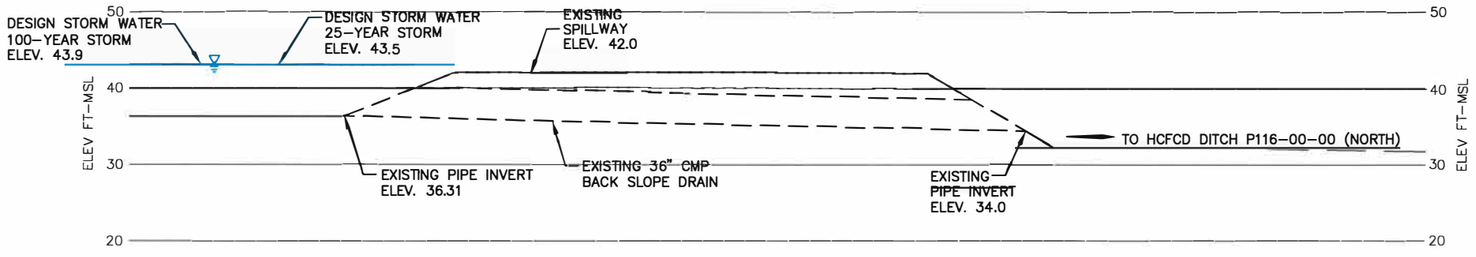


NORTHEAST DETENTION POND
OUTLET STRUCTURE
S1
6A.26
6A.1,6A.18

0 10 20
SCALE IN FEET

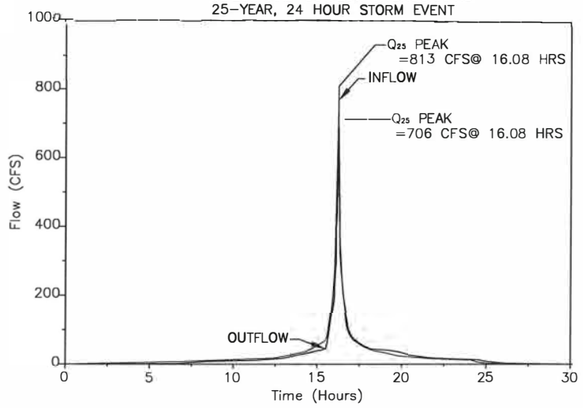






NORTH DETENTION POND
OUTLET STRUCTURE
S2
6A.26
6A.1,6A.19

0 10 20
SCALE IN FEET



NORTH DETENTION POND	
BOTTOM ELEVATION	36.3 FT.
SPILLWAY ELEVATION	42.0 FT.
SPILLWAY LENGTH	125.0 FT.
PEAK 25-YEAR EVENT INFLOW	813.0 CFS
PEAK 25-YEAR EVENT OUTFLOW	706.0 CFS
PEAK 100-YEAR EVENT INFLOW	1126.0 CFS
PEAK 100-YEAR EVENT OUTFLOW	942.0 CFS

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REVIEWED BY: JPY

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MAJOR PERMIT AMENDMENT
POND OUTLET STRUCTURE DETAILS

McCARTY ROAD LANDFILL
HARRIS COUNTY, TEXAS

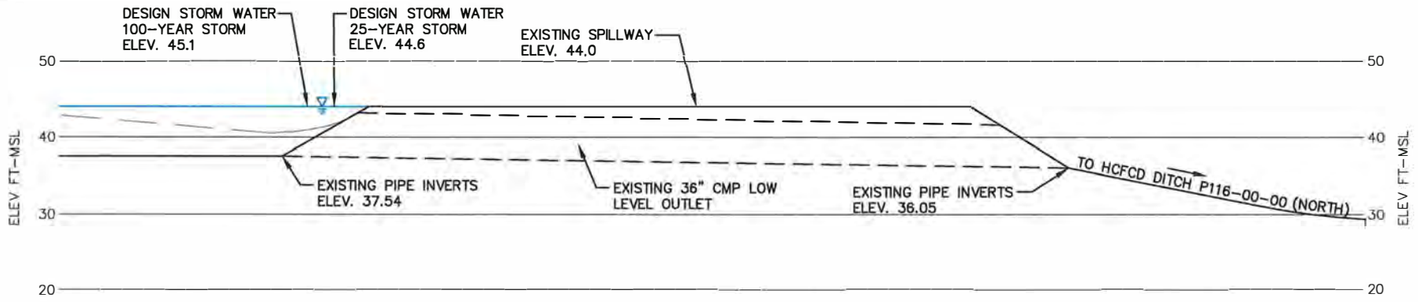
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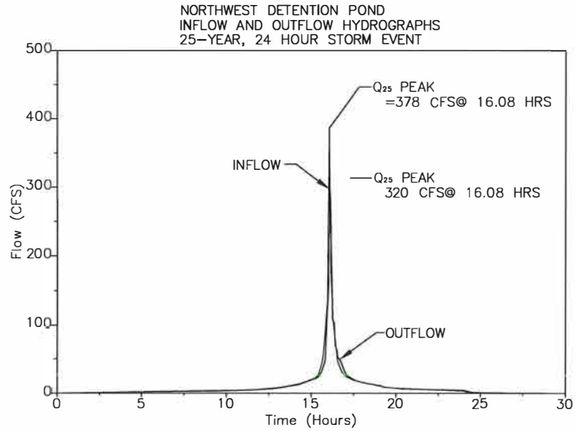
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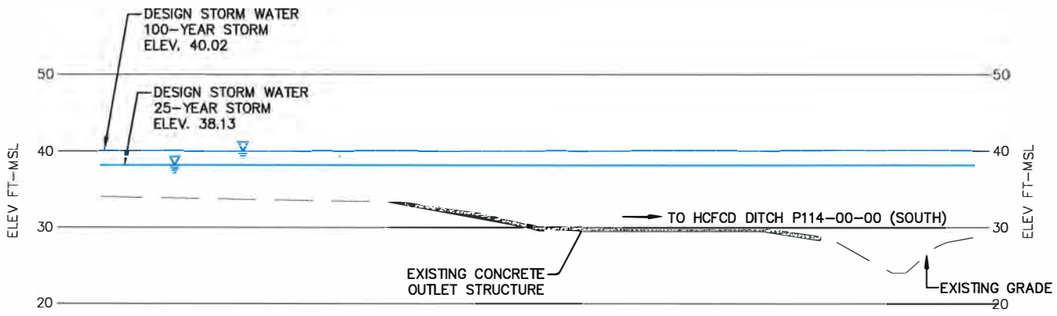
NORTHWEST DETENTION POND	
BOTTOM ELEVATION	37.54 FT.
SPILLWAY ELEVATION	46.0 FT.
SPILLWAY LENGTH	30.0 FT.
PEAK 25–YEAR EVENT INFLOW	378.0 CFS
PEAK 25–YEAR EVENT OUTFLOW	320.0 CFS
PEAK 100–YEAR EVENT INFLOW	525.0 CFS
PEAK 100–YEAR EVENT OUTFLOW	415.0 CFS



NORTHWEST DETENTION POND
OUTLET STRUCTURE
S3
6A.27
6A.1,6A.20

0 10 20
SCALE IN FEET



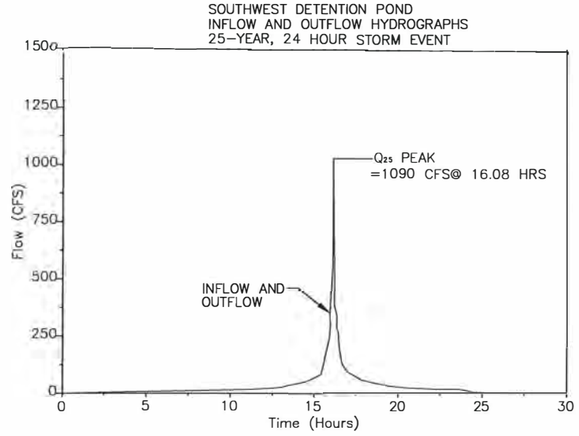


SOUTHWEST DETENTION POND
OUTLET STRUCTURE
S4
6A.27
6A.1,6A.23

0 10 20
SCALE IN FEET

SOUTHWEST DETENTION POND	
BOTTOM ELEVATION	30.0 FT.
SPILLWAY ELEVATION	39.0 FT.
SPILLWAY LENGTH	150.0 FT.
PEAK 25–YEAR EVENT INFLOW	1090.0 CFS
PEAK 25–YEAR EVENT OUTFLOW	1090.0 CFS
PEAK 100–YEAR EVENT INFLOW	1551.0 CFS
PEAK 100–YEAR EVENT OUTFLOW	1551.0 CFS

STATE OF TEXAS
CHARLES R. MARSH
105073
PROFESSIONAL ENGINEER
9.9.24



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DESIGN BY: SAN/ALD
REVIEWED BY: JPY

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1	01/2012	PERMIT MODIFICATION
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MAJOR PERMIT AMENDMENT
POND OUTLET STRUCTURE DETAILS

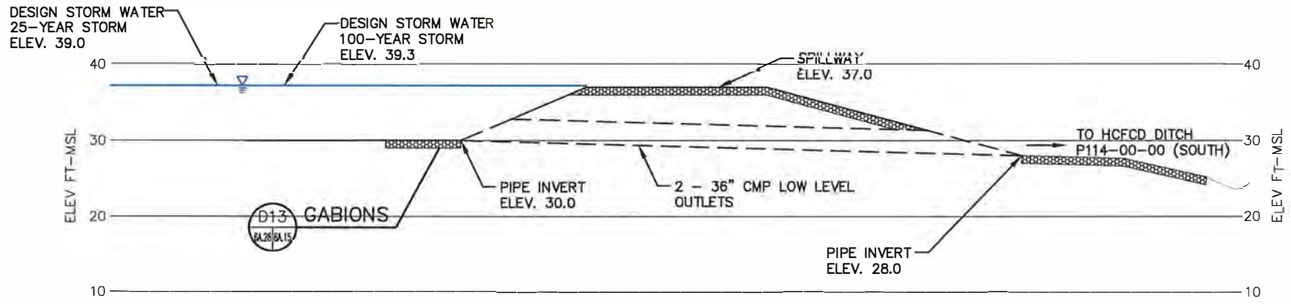
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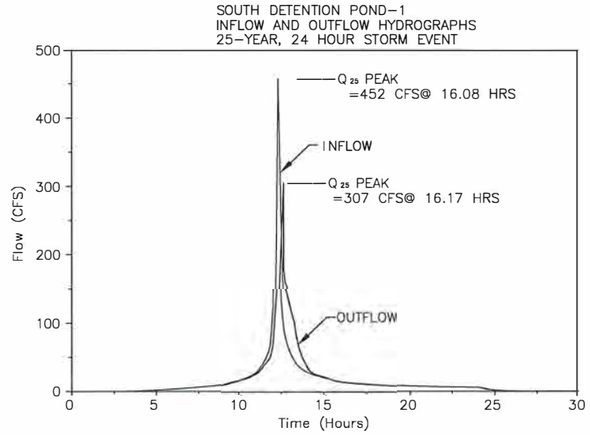
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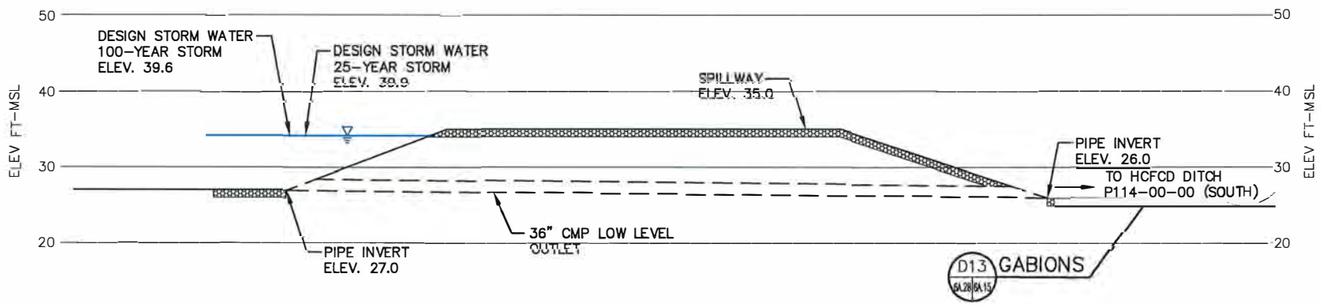


SOUTH DETENTION POND-1
OUTLET STRUCTURE (S5)

0 10 20
SCALE IN FEET

SOUTH DETENTION POND-1	
BOTTOM ELEVATION	30.0 FT.
SPILLWAY ELEVATION	37.0 FT.
SPILLWAY LENGTH	80.0 FT.
PEAK 25-YEAR EVENT INFLOW	452.0 CFS
PEAK 25-YEAR EVENT OUTFLOW	307.0 CFS
PEAK 100-YEAR EVENT INFLOW	649.0 CFS
PEAK 100-YEAR EVENT OUTFLOW	415.0 CFS





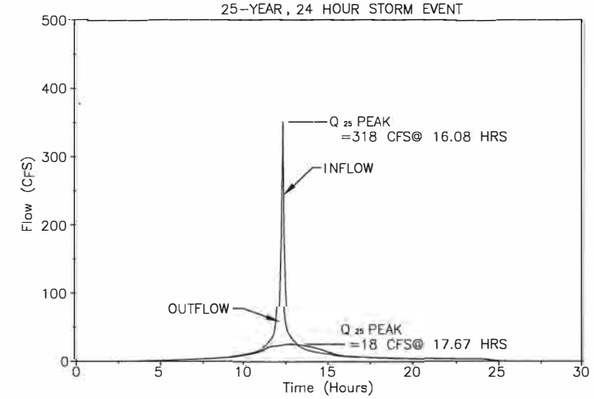
SOUTH DETENTION POND-2
OUTLET STRUCTURE (S6)

0 10 20
SCALE IN FEET

SOUTH DETENTION POND-2	
BOTTOM ELEVATION	27.0 FT.
SPILLWAY ELEVATION	35.0 FT.
SPILLWAY LENGTH	75.0 FT.
PEAK 25-YEAR EVENT INFLOW	318.0 CFS
PEAK 25-YEAR EVENT OUTFLOW	18.0 CFS
PEAK 100-YEAR EVENT INFLOW	442.0 CFS
PEAK 100-YEAR EVENT OUTFLOW	75.0 CFS

STATE OF TEXAS
CHARLES R. MARSH
105073
LICENSED
PROFESSIONAL ENGINEER

12/12/2024



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DATE: 03/2004
FILE: 0120-439-11
CAD: 6A-28 OUTLET SP1&SP2.DWG
DRAWN BY: JDW
DESIGN BY: SAN/ALD
REVIEWED BY: JPY

PREPARED FOR
McCARTY ROAD LANDFILL TX, LP

REVISIONS		
NO.	DATE	DESCRIPTION
1	12/2024	PERMIT MODIFICATION

Weaver Consultants Group
TBPE REGISTRATION NO. F-3727

MAJOR PERMIT AMENDMENT
POND OUTLET STRUCTURE DETAILS

McCARTY ROAD LANDFILL
HARRIS COUNTY, TEXAS

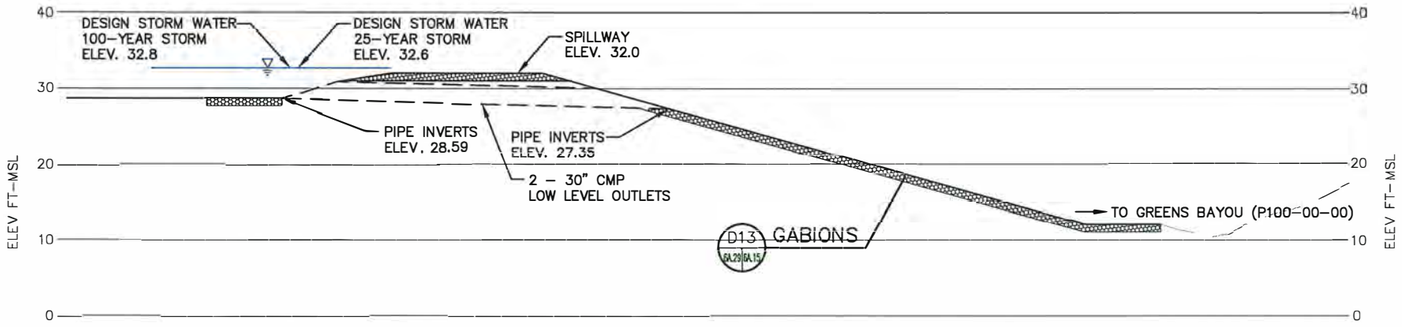
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ATTACHMENT 6A.28

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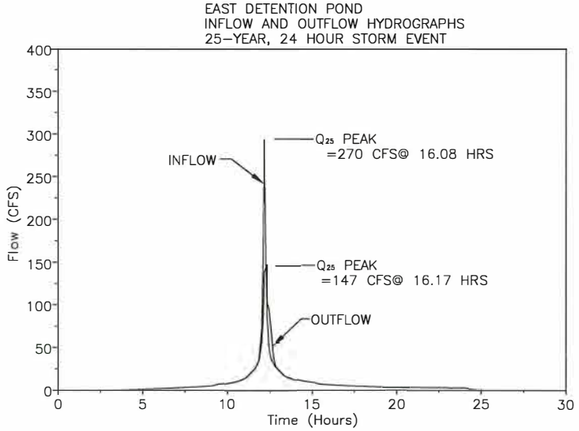
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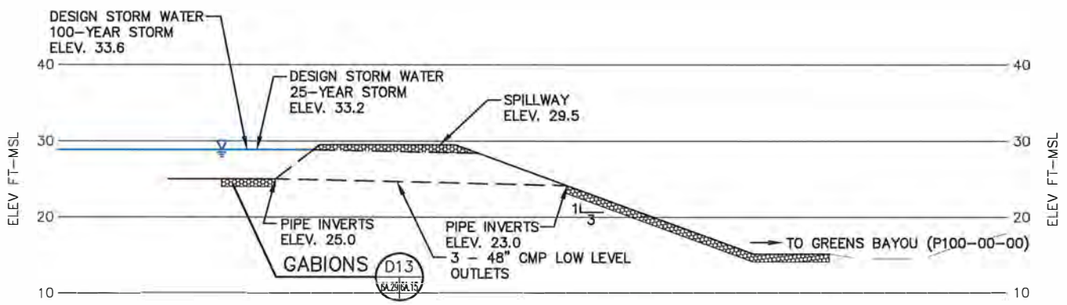
EAST DETENTION POND	
BOTTOM ELEVATION	28.59 FT.
SPILLWAY ELEVATION	32.0 FT.
SPILLWAY LENGTH	80.0 FT.
PEAK 25-YEAR EVENT INFLOW	270.0 CFS
PEAK 25-YEAR EVENT OUTFLOW	147.0 CFS
PEAK 100-YEAR EVENT INFLOW	374.0 CFS
PEAK 100-YEAR EVENT OUTFLOW	203.0 CFS



EAST DETENTION POND
OUTLET STRUCTURE (S7, 6A.29, 6A.1, 6A.25)

0 10 20
SCALE IN FEET

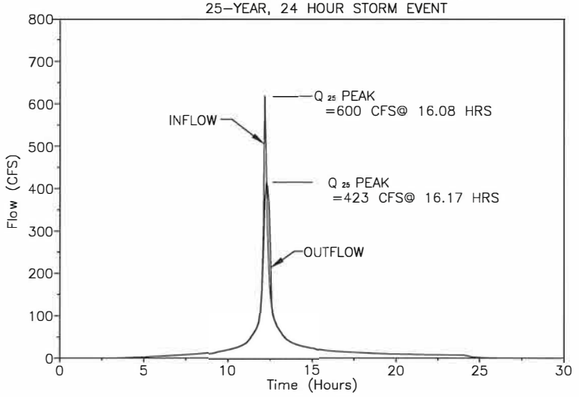




SOUTHEAST DETENTION POND
OUTLET STRUCTURE (S8, 6A.29, 6A.1, 6A.24)

0 10 20
SCALE IN FEET

SOUTHEAST DETENTION POND	
BOTTOM ELEVATION	25.0 FT.
SPILLWAY ELEVATION	29.5 FT.
SPILLWAY LENGTH	60.0 FT.
PEAK 25-YEAR EVENT INFLOW	600.0 CFS
PEAK 25-YEAR EVENT OUTFLOW	423.0 CFS
PEAK 100-YEAR EVENT INFLOW	817.0 CFS
PEAK 100-YEAR EVENT OUTFLOW	564.0 CFS



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FILE: 0120-439-11
CAD: 6A-29 OUTLET E&SE.DWG

DRAWN BY: JDW
DESIGN BY: SAN/ALD
REVIEWED BY: JPY

Weaver Consultants Group
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McCARTY ROAD LANDFILL TX, LP

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POND OUTLET STRUCTURE DETAILS

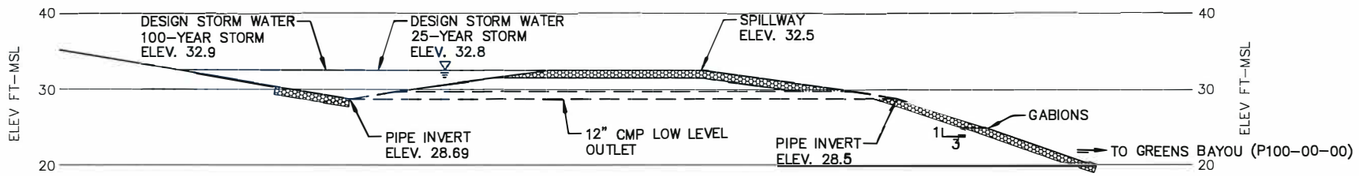
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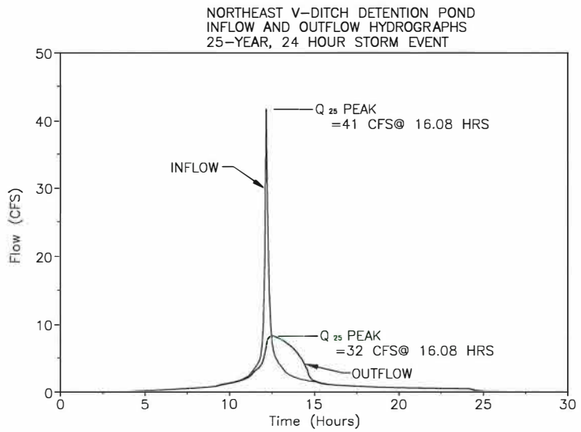
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O:\0120\439\FIP MOD 2024\ATT 6\6A\CLEAN\6A.29OUTLET E&SE.dwg, vguzman, 1:2



NORTHEAST V-DITCH DETENTION POND S9
OUTLET STRUCTURE
6A.30
6A.1,6A.25

0 10 20
SCALE IN FEET



NORTHEAST V-DITCH	
BOTTOM ELEVATION	28.7 FT.
SPILLWAY ELEVATION	32 FT.
SPILLWAY LENGTH	50 FT.
PEAK 25-YEAR EVENT INFLOW	41 CFS
PEAK 25-YEAR EVENT OUTFLOW	32 CFS
PEAK 100-YEAR EVENT INFLOW	50 CFS
PEAK 100-YEAR EVENT OUTFLOW	42 CFS

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0:\0120\439\FLIP MOD 2024\ATT 6\6A\CLEAN\6A.30OUTLET NEV.dwg, vgurman, 1:2

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DATE: 03/2004
FILE: 0120-439-11
CAD: 6A-30OUTLET NEV.DWG

DRAWN BY: JDW
DESIGN BY: SAN/ALD
REVIEWED BY: JPY

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POND OUTLET STRUCTURE DETAILS

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ATTACHMENT 6A.30

ATTACHMENT 6A

APPENDIX 6A-A

POSTDEVELOPMENT HYDROLOGIC CALCULATIONS

Includes pages 6A-A-1 through 6A-A-125



Hypothetical Storm Data

Precipitation data
NOAA Atlas 14 or approved by the Harris County Flood Control District.

Time	5 min	15 min	60 min	2 hr	3 hr	6 hr	12 hr	24 hr
25 Year Event	1.03 in.	2.06 in.	3.95 in.	5.40 in.	6.40 in.	8.18 in.	9.94 in.	11.80 in.
100 Year Event	1.40 in.	2.60 in.	5.50 in.	7.60 in.	9.20 in.	12.80 in.	15.50 in.	18.90 in.

REGIONAL POSTDEVELOPMENT INFORMATION

A regional hydrologic analysis has been developed for the proposed expansion condition of the McCarty Road Landfill to estimate the flow entering and existing the landfill's permit boundary. This information has also been reviewed by the HCFCD (refer to Attachment 6B for more information). An overall view of the Greens Bayou drainage area is shown on Sheet 6A-A-12a. This drawing was reproduced from information obtained from HCFCD in May 2003. In addition, the drainage areas that flow to HCFCD units P114-00-00 (south ditch) and P116-00-00 (north ditch) are shown on Sheet 6A-A-12b. These drainage areas were reproduced from information provided by the HCFCD in April 2011.

The following information has been used to develop the regional hydrologic analysis for the permitted site condition:

- Greens Bayou watershed upstream of the outlet of subbasin "P100T", which is located downstream of the landfill. The landfill drainage areas were incorporated into this regional file. The input files for the non-landfill drainage areas were obtained from the HCFCD in April 2011.

- The hypothetical storm data used is on page 6A-A-1 (25-year data from NOAA Atlas 14. 100-year data was the 500-year precipitation data included in the previous hydrologic model provided by HCFCD per HCFCD direction).

- The precipitation losses for the landfill area were developed consistent with the procedures presented on page 6A-A-3. The losses for the off-site area were modeled using the input files that were obtained from the HCFCD.

- A direct runoff method (i.e., Kinematic Wave) was used for the landfill area (refer to page 6A-A-6). The ESPEY "10 Minute" Method was used for the non-landfill areas (except as noted on page 6A-A-8).

The results of the analyses are presented on the following pages.

```
Basin: P1000000
     Description: green's & hall's bayous (p100-00-00 & p118-00-00) watershed
     Last Modified Date: 30 November 2011
     Last Modified Time: 21:29:16
     Version: 4.11
     Filepath Separator: \
     Unit System: English
     Missing Flow To Zero: No
     Enable Flow Ratio: No
     Compute Local Flow At Junctions: No
     Unregulated Output Required: No
     Enable Sediment Routing: No
     Enable Quality Routing: No
End:
Subbasin: P100A
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:38
     Canvas X: 3051378.7
     Canvas Y: 1.3909644E7
     Label X: 16.0
     Label Y: 0.0
     Area: 1.719
     Downstream: P1000000_2203_J
     Discretization: None
     File: P1000000.sqlite
     Canopy: Simple
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None
     Initial Canopy Storage Percent: 0.0
     Canopy Storage Capacity: 0.1
     Crop Coefficient: 1.0
     End Canopy:

     Surface: None
     LossRate: Green and Ampt
     Percent Impervious Area: 37.722
     Initial Variable: Water Content
     Initial Content: 0.024
     Saturated Content: 0.46
     Wetting Front Suction: 3.5
     Hydraulic Conductivity: 0.024
     Transform: Clark
     Clark Method: Specified
     Time of Concentration: 0.71
     Storage Coefficient: 5.09
     Time Area Method: Default

     Baseflow: None
End:
Junction: P1000000_2203_J
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:38
     Canvas X: 3055991.77
     Canvas Y: 1.3907448851E7
     Label X: -52.0
     Label Y: -28.0
     Downstream: P1000000_2197_J
End:
Subbasin: P161A
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:38
     Canvas X: 3053975.294
     Canvas Y: 1.3911765829E7
     Label X: 16.0
     Label Y: 0.0
     Area: 0.554
     Downstream: P1000000_2197_J
     Discretization: None
     File: P1000000.sqlite
     Canopy: Simple
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None
     Initial Canopy Storage Percent: 0.0
     Canopy Storage Capacity: 0.1
     Crop Coefficient: 1.0
     End Canopy:
     Surface: None
     LossRate: Green and Ampt
     Percent Impervious Area: 40.036
     Initial Variable: Water Content
     Initial Content: 0.024
     Saturated Content: 0.46
     Wetting Front Suction: 3.5
     Hydraulic Conductivity: 0.024
     Transform: Clark
     Clark Method: Specified
     Time of Concentration: 0.57
     Storage Coefficient: 2.48
     Time Area Method: Default
     Baseflow: None
End:
Junction: P1000000_2197_J
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:38
     Canvas X: 3057074.687
     Canvas Y: 1.3907215432E7
     Label X: 16.0
     Label Y: -12.0
     Downstream: P1000000_2159_R
End:
Reach: P1000000_2159_R
     Description: RS 219744 to RS 215936
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:38
     Canvas X: 3060476.883
     Canvas Y: 1.3908565063E7
     From Canvas X: 3057074.687
     From Canvas Y: 1.3907215432E7
     Label X: -26.0
     Label Y: -25.0
     Downstream: P1000000_2159_J

     Route: Modified Puls
     Initial Variable: Combined Inflow
```

```
     Number of Reaches: 14
     Storage Outflow Table Name: P1000000_2159_R
     Channel Loss: None
End:
Subbasin: P100B
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:38
     Canvas X: 3059186.137
     Canvas Y: 1.3904964002E7
     Label X: 16.0
     Label Y: 0.0
     Area: 0.383
     Downstream: P1000000_2159_J
     Discretization: None
     File: P1000000.sqlite
     Canopy: Simple
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None
     Initial Canopy Storage Percent: 0.0
     Canopy Storage Capacity: 0.1
     Crop Coefficient: 1.0
     End Canopy:
     Surface: None
     LossRate: Green and Ampt
     Percent Impervious Area: 40.525
     Initial Variable: Water Content
     Initial Content: 0.024
     Saturated Content: 0.46
     Wetting Front Suction: 3.5
     Hydraulic Conductivity: 0.024
     Transform: Clark
     Clark Method: Specified
     Time of Concentration: 0.13
     Storage Coefficient: 2.13
     Time Area Method: Default
     Baseflow: None
End:
Junction: P1000000_2159_J
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:38
     Canvas X: 3060476.883
     Canvas Y: 1.3908565063E7
     Label X: -24.0
     Label Y: -24.0
     Downstream: P1000000_2137_J
End:
Subbasin: P151A
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:38
     Canvas X: 3057151.361
     Canvas Y: 1.3913815659E7
     Label X: 16.0
     Label Y: 0.0
     Area: 2.067
     Downstream: P1000000_2137_J
     Discretization: None
     File: P1000000.sqlite
     Canopy: Simple
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None
     Initial Canopy Storage Percent: 0.0
     Canopy Storage Capacity: 0.1
     Crop Coefficient: 1.0
     End Canopy:
     Surface: None
     LossRate: Green and Ampt
     Percent Impervious Area: 26.028
     Initial Variable: Water Content
     Initial Content: 0.024
     Saturated Content: 0.46
     Wetting Front Suction: 3.5
     Hydraulic Conductivity: 0.024
     Transform: Clark
     Clark Method: Specified
     Time of Concentration: 1.19
     Storage Coefficient: 9.37
     Time Area Method: Default
     Baseflow: None
End:
unction: P1000000_2137_J
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:38
     Canvas X: 3061167.231
     Canvas Y: 1.3909142018E7
     Label X: -3.0
     Label Y: 19.0
     Downstream: P1000000_2105_R
End:
Reach: P1000000_2105_R
     Description: RS 213673 to RS 210486
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:38
     Canvas X: 3065806.253
     Canvas Y: 1.3909349735E7
     From Canvas X: 3061167.231
     From Canvas Y: 1.3909142018E7
     Label X: -50.0
     Label Y: 22.0
     Downstream: P1000000_2105_J
     Route: Modified Puls
     Initial Variable: Combined Inflow
     Number of Reaches: 16
     Storage Outflow Table Name: P1000000_2105_R
     Channel Loss: None
End:
Subbasin: P100C
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:38
     Canvas X: 3063313.644
     Canvas Y: 1.3906372452E7
     Label X: 16.0
     Label Y: 0.0
     Area: 1.327
     Downstream: P1000000_2105_J
```

```
     Discretization: None
     File: P1000000.sqlite
     Canopy: Simple
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None
     Initial Canopy Storage Percent: 0.0
     Canopy Storage Capacity: 0.1
     Crop Coefficient: 1.0
     End Canopy:
     Surface: None
     LossRate: Green and Ampt
     Percent Impervious Area: 20.724
     Initial Variable: Water Content
     Initial Content: 0.024
     Saturated Content: 0.46
     Wetting Front Suction: 3.5
     Hydraulic Conductivity: 0.024
     Transform: Clark
     Clark Method: Specified
     Time of Concentration: 0.7
     Storage Coefficient: 5.79
     Time Area Method: Default
     Baseflow: None
End:
Junction: P1000000_2105_J
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:38
     Canvas X: 3065806.253
     Canvas Y: 1.3909349735E7
     Label X: -14.0
     Label Y: -31.0
     Downstream: P1000000_2083_R
End:
Reach: P1000000_2083_R
     Description: RS 210486 to RS 208303
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:38
     Canvas X: 3067779.568
     Canvas Y: 1.3909176637E7
     From Canvas X: 3065806.253
     From Canvas Y: 1.3909349735E7
     Label X: -36.0
     Label Y: -4.0
     Downstream: P1000000_2083_J
     Route: Modified Puls
     Initial Variable: Combined Inflow
     Number of Reaches: 4
     Storage Outflow Table Name: P1000000_2083_R
     Channel Loss: None
End:
Subbasin: P100D
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:38
     Canvas X: 3063244.405
     Canvas Y: 1.391457729E7
     Label X: 16.0
     Label Y: 0.0
     Area: 1.85
     Downstream: P1000000_2083_J
     Discretization: None
     File: P1000000.sqlite
     Canopy: Simple
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None
     Initial Canopy Storage Percent: 0.0
     Canopy Storage Capacity: 0.1
     Crop Coefficient: 1.0
     End Canopy:
     Surface: None
     LossRate: Green and Ampt
     Percent Impervious Area: 37.111
     Initial Variable: Water Content
     Initial Content: 0.024
     Saturated Content: 0.46
     Wetting Front Suction: 3.5
     Hydraulic Conductivity: 0.024
     Transform: Clark
     Clark Method: Specified
     Time of Concentration: 0.6
     Storage Coefficient: 6.41
     Time Area Method: Default
     Baseflow: None
End:
Junction: P1000000_2083_J
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     Last Modified Time: 20:45:38
     Canvas X: 3067779.568
     Canvas Y: 1.3909176637E7
     Label X: 0.0
     Label Y: 21.0
     Downstream: P1000000_2048_R
End:
Reach: P1000000_2048_R
     Description: RS 208303 to RS 204744
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:38
     Canvas X: 3070633.538
     Canvas Y: 1.3909497829E7
     From Canvas X: 3067779.568
     From Canvas Y: 1.3909176637E7
     Label X: -37.0
     Label Y: -23.0
     Downstream: P1000000_2047_J
     Route: Modified Puls
     Initial Variable: Combined Inflow
     Number of Reaches: 6
     Storage Outflow Table Name: P1000000_2048_R
     Channel Loss: None
End:
Subbasin: P100E
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:38
     Canvas X: 3068125.764
```

```
     Canvas Y: 1.391295017E7
     Label X: 16.0
     Label Y: 0.0
     Area: 1.784
     Downstream: P1000000_2047_J
     Discretization: None
     File: P1000000.sqlite
     Canopy: Simple
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None
     Initial Canopy Storage Percent: 0.0
     Canopy Storage Capacity: 0.1
     Crop Coefficient: 1.0
     End Canopy:
     Surface: None
     LossRate: Green and Ampt
     Percent Impervious Area: 26.211
     Initial Variable: Water Content
     Initial Content: 0.024
     Saturated Content: 0.46
     Wetting Front Suction: 3.5
     Hydraulic Conductivity: 0.024
     Transform: Clark
     Clark Method: Specified
     Time of Concentration: 0.96
     Storage Coefficient: 7.37
     Time Area Method: Default
     Baseflow: None
End:
Junction: P1000000_2047_J
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:38
     Canvas X: 3070633.538
     Canvas Y: 1.3909497829E7
     Label X: 16.0
     Label Y: 0.0
     Downstream: P1000000_2020_R
End:
Reach: P1000000_2020_R
     Description: RS 204744 to RS 201967
     Last Modified Date: 29 February 2024
     Last Modified Time: 22:16:42
     Canvas X: 3074982.881353641
     Canvas Y: 1.3906785653910847E7
     From Canvas X: 3070633.538
     From Canvas Y: 1.3909497829E7
     Label X: -1.0
     Label Y: 9.0
     Downstream: P1000000_2020_J
     Route: Modified Puls
     Initial Variable: Combined Inflow
     Number of Reaches: 6
     Storage Outflow Table Name: P1000000_2020_R
     Channel Loss: None
End:

Subbasin: P100F
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:38
     Canvas X: 3072423.024
     Canvas Y: 1.3906885179E7
     Label X: 16.0
     Label Y: 0.0
     Area: 1.087
     Downstream: P1000000_2020_J
     Discretization: None
     File: P1000000.sqlite
     Canopy: Simple
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None
     Initial Canopy Storage Percent: 0.0
     Canopy Storage Capacity: 0.1
     Crop Coefficient: 1.0
     End Canopy:
     Surface: None
     LossRate: Green and Ampt
     Percent Impervious Area: 18.783
     Initial Variable: Water Content
     Initial Content: 0.024
     Saturated Content: 0.46
     Wetting Front Suction: 3.5
     Hydraulic Conductivity: 0.024
     Transform: Clark
     Clark Method: Specified
     Time of Concentration: 0.44
     Storage Coefficient: 6.24
     Time Area Method: Default
     Baseflow: None
End:
Junction: P1000000_2020_J
     Last Modified Date: 29 February 2024
     Last Modified Time: 22:16:42
     Canvas X: 3074982.881353641
     Canvas Y: 1.3906785653910847E7
     Label X: 16.0
     Label Y: 5.0
     Downstream: P1000000_1972_D
End:
Diversion: P1000000_1972_D
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:38
     Canvas X: 3076373.917689928
     Canvas Y: 1.3909577049452752E7
     Label X: 16.0
     Label Y: 0.0
     Downstream: P1000000_1929_R
     Diverter: Inflow-Diversion Table
     Maximum Diversion Volume: 480.3
     Maximum Diversion Flow: 6000
     Inflow Diversion Table Name: P1000000_1972_D
     End Diverter:
End:

Reach: P1000000_1929_R
```

```
     Description: RS 201967 to RS 192935
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:38
     Canvas X: 3081829.48
     Canvas Y: 1.3908808898E7
     From Canvas X: 3076373.917689928
     From Canvas Y: 1.390957704945275 2E7
     Label X: -51.0
     Label Y: 9.0
     Downstream: P1000000_1929_J
     Route: Modified Puls
     Initial Variable: Combined Inflow
     Number of Reaches: 21
     Storage Outflow Table Name: P1000000_1929_R
     Channel Loss: None
End:
Subbasin: P100G
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:38
     Canvas X: 3076226.743
     Canvas Y: 1.3906580169E7
     Label X: 16.0
     Label Y: 0.0
     Area: 1.434
     Downstream: P1000000_1929_J
     Discretization: None
     File: P1000000.sqlite
     Canopy: Simple
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None
     Initial Canopy Storage Percent: 0.0
     Canopy Storage Capacity: 0.1
     Crop Coefficient: 1.0
     End Canopy:
     Surface: None
     LossRate: Green and Ampt
     Percent Impervious Area: 19.06
     Initial Variable: Water Content
     Initial Content: 0.024
     Saturated Content: 0.46
     Wetting Front Suction: 3.5
     Hydraulic Conductivity: 0.024
     Transform: Clark
     Clark Method: Specified
     Time of Concentration: 0.92
     Storage Coefficient: 0.4
     Time Area Method: Default
     Baseflow: None
End:

Junction: P1000000_1929_J
     Description: just upstream of p100H7
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:38
     Canvas X: 3081829.48
     Canvas Y: 1.3908808898E7
     Label X: -20.0
     Label Y: -30.0
     Downstream: P1000000_1918_D
End:
Subbasin: P152A
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:38
     Canvas X: 3076069.4
     Canvas Y: 1.39170571E7
     Label X: 16.0
     Label Y: 0.0
     Area: 4.289
     Downstream: P1000000_1918_D
     Discretization: None
     File: P1000000.sqlite
     Canopy: Simple
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None
     Initial Canopy Storage Percent: 0.0
     Canopy Storage Capacity: 0.1
     Crop Coefficient: 1.0
     End Canopy:
     Surface: None
     LossRate: Green and Ampt
     Percent Impervious Area: 43.547
     Initial Variable: Water Content
     Initial Content: 0.024
     Saturated Content: 0.46
     Wetting Front Suction: 3.5
     Hydraulic Conductivity: 0.024
     Transform: Clark
     Clark Method: Specified
     Time of Concentration: 1.68
     Storage Coefficient: 4.83
     Time Area Method: Default
     Baseflow: None
End:

Diversion: P1000000_1918_D
     Description: p100 overflow to p148
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:38
     Canvas X: 3083295.451
     Canvas Y: 1.3908819617E7
     Label X: 16.0
     Label Y: 0.0
     Downstream: P1000000_1856_R
     Divert To: P1480000_0073_J
     Diverter: Inflow-Diversion Table
     Inflow Diversion Table Name: P1000000_1918_D
     End Diverter:
End:
Reach: P1000000_1856_R
     Description: RS 192935 to RS 185578
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:38
     Canvas X: 3090174.474
     Canvas Y: 1.3905582415E7
```

```
     From Canvas X: 3083295.451
     From Canvas Y: 1.3908819617E7
     Label X: -28.0
     Label Y: 15.0
     Downstream: P1000000_1856_J
     Route: Modified Puls
     Initial Variable: Combined Inflow
     Number of Reaches: 21
     Storage Outflow Table Name: P1000000_1856_R
     Channel Loss: None
End:
Subbasin: P100H
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:38
     Canvas X: 3086146.077
     Canvas Y: 1.3906455235E7
     Label X: 16.0
     Label Y: 0.0
     Area: 1.381
     Downstream: P1000000_1856_J
     Discretization: None
     File: P1000000.sqlite
     Canopy: Simple
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None
     Initial Canopy Storage Percent: 0.0
     Canopy Storage Capacity: 0.1
     Crop Coefficient: 1.0
     End Canopy:
     Surface: None
     LossRate: Green and Ampt
     Percent Impervious Area: 37.318
     Initial Variable: Water Content
     Initial Content: 0.024
     Saturated Content: 0.46
     Wetting Front Suction: 3.5
     Hydraulic Conductivity: 0.024
     Transform: Clark
     Clark Method: Specified
     Time of Concentration: 0.5
     Storage Coefficient: 3.59
     Time Area Method: Default
     Baseflow: None
End:
Junction: P1000000_1856_J
     Description: just upstream of p100#8
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:38
     Canvas X: 3090174.474
     Canvas Y: 1.3905582415E7
     Label X: -65.0
     Label Y: -6.0
     Downstream: P1000000_1845_D
End:
Subbasin: P148A
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:38
     Canvas X: 3078493.803
     Canvas Y: 1.3903996013E7
     Label X: 16.0
     Label Y: 0.0
     Area: 2.135
     Downstream: P1480000_0073_J
     Discretization: None
     File: P1000000.sqlite
     Canopy: Simple
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None
     Initial Canopy Storage Percent: 0.0
     Canopy Storage Capacity: 0.1
     Crop Coefficient: 1.0
     End Canopy:
     Surface: None
     LossRate: Green and Ampt
     Percent Impervious Area: 34.29
     Initial Variable: Water Content
     Initial Content: 0.024
     Saturated Content: 0.46
     Wetting Front Suction: 3.5
     Hydraulic Conductivity: 0.024
     Transform: Clark
     Clark Method: Specified
     Time of Concentration: 1.02
     Storage Coefficient: 5.51
     Time Area Method: Default
     Baseflow: None
End:
Junction: P1480000_0073_J
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:38
     Canvas X: 3083511.926
     Canvas Y: 1.3904464997E7
     Label X: 16.0
     Label Y: 0.0
     Downstream: P1000000_1845_D
End:
Diversion: P1000000_1845_D
     Description: p100 overflow into p118 (via p148)
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:38
     Canvas X: 3090802.604
     Canvas Y: 1.3904861624E7
     Label X: 16.0
     Label Y: 0.0
     Downstream: P1000000_1741_R
     Divert To: P1180000_1036_R
     Diverter: Inflow-Diversion Table
     Inflow Diversion Table Name: P1000000_1845_D
     End Diverter:
End:
Reach: P1000000_1741_R
     Description: RS 185578 to RS 174086
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:38
```

```
     Canvas X: 3098343.167
     Canvas Y: 1.3909856992E7
     From Canvas X: 3090802.604
     From Canvas Y: 1.3904861624E7
     Label X: 16.0
     Label Y: 0.0
     Downstream: P1000000_1741_J

     Route: Modified Puls
     Initial Variable: Combined Inflow
     Number of Reaches: 17
     Storage Outflow Table Name: P1000000_1741_R
     Channel Loss: None
End:

Subbasin: P100I
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:38
     Canvas X: 3100350.105
     Canvas Y: 1.3908537367E7
     Label X: 16.0
     Label Y: 0.0
     Area: 2.137
     Downstream: P1000000_1741_J

     Discretization: None
     File: P1000000.sqlite

     Canopy: Simple
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None
     Initial Canopy Storage Percent: 0.0
     Canopy Storage Capacity: 0.1
     Crop Coefficient: 1.0
     End Canopy:

     Surface: None

     LossRate: Green and Ampt
     Percent Impervious Area: 31.683
     Initial Variable: Water Content
     Initial Content: 0.024
     Saturated Content: 0.46
     Wetting Front Suction: 3.5
     Hydraulic Conductivity: 0.024

     Transform: Clark
     Clark Method: Specified
     Time of Concentration: 0.74
     Storage Coefficient: 5.29
     Time Area Method: Default

     Baseflow: None
End:

Junction: P1000000_1741_J
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:38
     Canvas X: 3098343.167
     Canvas Y: 1.3909856992E7
     Label X: 16.0
     Label Y: 0.0
     Downstream: P1000000_1730_J
End:

Subbasin: P147A
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:38
     Canvas X: 3084808.499
     Canvas Y: 1.3912561311E7
     Label X: 16.0
     Label Y: 0.0
     Area: 1.474
     Downstream: P1470000_0055_J

     Discretization: None
     File: P1000000.sqlite

     Canopy: Simple
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None
     Initial Canopy Storage Percent: 0.0
     Canopy Storage Capacity: 0.1
     Crop Coefficient: 1.0
     End Canopy:

     Surface: None

     LossRate: Green and Ampt
     Percent Impervious Area: 42.755
     Initial Variable: Water Content
     Initial Content: 0.024
     Saturated Content: 0.46
     Wetting Front Suction: 3.5
     Hydraulic Conductivity: 0.024

     Transform: Clark
     Clark Method: Specified
     Time of Concentration: 0.44
     Storage Coefficient: 5.33
     Time Area Method: Default

     Baseflow: None
End:

Junction: P1470000_0055_J
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:38
     Canvas X: 3091717.176
     Canvas Y: 1.3911614251E7
     Label X: -24.0
     Label Y: 14.0
     Downstream: P1470000_0018_R
End:
```

```
Reach: P1470000_0018_R
     Description: RS 5510 to RS 1772
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:38
     Canvas X: 3097102.123
     Canvas Y: 1.3910657248E7
     From Canvas X: 3091717.176
     From Canvas Y: 1.3911614251E7
     Label X: -48.0
     Label Y: -5.0
     Downstream: P1470000_0018_J

     Route: Modified Puls
     Initial Variable: Combined Inflow
     Number of Reaches: 10
     Storage Outflow Table Name: P1470000_0018_R
     Channel Loss: None
End:

Subbasin: P147B
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:38
     Canvas X: 3094179.498
     Canvas Y: 1.391234975E7
     Label X: 16.0
     Label Y: 0.0
     Area: 1.043
     Downstream: P1470000_0018_J

     Discretization: None
     File: P1000000.sqlite

     Canopy: Simple
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None
     Initial Canopy Storage Percent: 0.0
     Canopy Storage Capacity: 0.1
     Crop Coefficient: 1.0
     End Canopy:

     Surface: None

     LossRate: Green and Ampt
     Percent Impervious Area: 22.653
     Initial Variable: Water Content
     Initial Content: 0.024
     Saturated Content: 0.46
     Wetting Front Suction: 3.5
     Hydraulic Conductivity: 0.024

     Transform: Clark
     Clark Method: Specified
     Time of Concentration: 1.01
     Storage Coefficient: 6.19
     Time Area Method: Default

     Baseflow: None
End:

Junction: P1470000_0018_J
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:38
     Canvas X: 3097102.123
     Canvas Y: 1.3910657248E7
     Label X: 16.0
     Label Y: 0.0
     Downstream: P1000000_1730_J
End:

Junction: P1000000_1730_J
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:38
     Canvas X: 3098636.266
     Canvas Y: 1.3910346207E7
     Label X: 16.0
     Label Y: 0.0
     Downstream: P1000000_1716_R
End:

Reach: P1000000_1716_R
     Description: RS 173023 to RS 171583
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:38
     Canvas X: 3099201.186
     Canvas Y: 1.3911673927E7
     From Canvas X: 3098636.266
     From Canvas Y: 1.3910346207E7
     Label X: 16.0
     Label Y: 0.0
     Downstream: P1000000_1716_J

     Route: Modified Puls
     Initial Variable: Combined Inflow
     Number of Reaches: 3
     Storage Outflow Table Name: P1000000_1716_R
     Channel Loss: None
End:

Junction: P1000000_1716_J
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:38
     Canvas X: 3099201.186
     Canvas Y: 1.3911673927E7
     Label X: -66.0
     Label Y: -4.0
     Downstream: P1000000_1709_J
End:

Subbasin: P146A
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:38
     Canvas X: 3095216.3
     Canvas Y: 1.39147187E7
```

```
     Label X: 16.0
     Label Y: 0.0
     Area: 0.552
     Downstream: P1000000_1709_J

     Discretization: None
     File: P1000000.sqlite

     Canopy: Simple
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None
     Initial Canopy Storage Percent: 0.0
     Canopy Storage Capacity: 0.1
     Crop Coefficient: 1.0
     End Canopy:

     Surface: None

     LossRate: Green and Ampt
     Percent Impervious Area: 16.033
     Initial Variable: Water Content
     Initial Content: 0.024
     Saturated Content: 0.46
     Wetting Front Suction: 3.5
     Hydraulic Conductivity: 0.024

     Transform: Clark
     Clark Method: Specified
     Time of Concentration: 0.75
     Storage Coefficient: 4.35
     Time Area Method: Default

     Baseflow: None
End:

Junction: P1000000_1709_J
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:38
     Canvas X: 3100153.082
     Canvas Y: 1.3911933246E7
     Label X: 16.0
     Label Y: 0.0
     Downstream: P1000000_1690_R
End:

Reach: P1000000_1690_R
     Description: RS 170916 to RS 169017
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:38
     Canvas X: 3101824.388
     Canvas Y: 1.3912747832E7
     From Canvas X: 3100153.082
     From Canvas Y: 1.3911933246E7
     Label X: 16.0
     Label Y: 0.0
     Downstream: P1000000_1690_J

     Route: Modified Puls
     Initial Variable: Combined Inflow
     Number of Reaches: 8
     Storage Outflow Table Name: P1000000_1690_R
     Channel Loss: None
End:

Junction: P1000000_1690_J
     Description: just upstream of p100#11
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:38
     Canvas X: 3101824.388
     Canvas Y: 1.3912747832E7
     Label X: -67.0
     Label Y: -6.0
     Downstream: P1000000_1686_J
End:

Subbasin: P145A
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:38
     Canvas X: 3081892.926
     Canvas Y: 1.3919972776E7
     Label X: 16.0
     Label Y: 0.0
     Area: 1.032
     Downstream: P1450000_0232_J

     Discretization: None
     File: P1000000.sqlite

     Canopy: Simple
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None
     Initial Canopy Storage Percent: 0.0
     Canopy Storage Capacity: 0.1
     Crop Coefficient: 1.0
     End Canopy:

     Surface: None

     LossRate: Green and Ampt
     Percent Impervious Area: 39.283
     Initial Variable: Water Content
     Initial Content: 0.024
     Saturated Content: 0.46
     Wetting Front Suction: 3.5
     Hydraulic Conductivity: 0.024

     Transform: Clark
     Clark Method: Specified
     Time of Concentration: 0.33
     Storage Coefficient: 3.33
     Time Area Method: Default

     Baseflow: None
End:
```

```
Junction: P1450000_0232_J
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:38
     Canvas X: 3084085.095
     Canvas Y: 1.3918467311E7
     Label X: -23.0
     Label Y: -29.0
     Downstream: P1450000_0208_R
End:

Reach: P1450000_0208_R
     Description: RS 23148 to RS 20769
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:38
     Canvas X: 3086198.028
     Canvas Y: 1.3920131246E7
     From Canvas X: 3084085.095
     From Canvas Y: 1.3918467311E7
     Label X: -51.0
     Label Y: -12.0
     Downstream: P1450000_0208_J

     Route: Modified Puls
     Initial Variable: Combined Inflow
     Number of Reaches: 2
     Storage Outflow Table Name: P1450000_0208_R
     Channel Loss: None
End:

Subbasin: P145B
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:38
     Canvas X: 3084560.505
     Canvas Y: 1.392271959E7
     Label X: 16.0
     Label Y: 0.0
     Area: 0.98
     Downstream: P1450000_0208_J

     Discretization: None
     File: P1000000.sqlite

     Canopy: Simple
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None
     Initial Canopy Storage Percent: 0.0
     Canopy Storage Capacity: 0.1
     Crop Coefficient: 1.0
     End Canopy:

     Surface: None

     LossRate: Green and Ampt
     Percent Impervious Area: 20.533
     Initial Variable: Water Content
     Initial Content: 0.024
     Saturated Content: 0.46
     Wetting Front Suction: 3.5
     Hydraulic Conductivity: 0.024

     Transform: Clark
     Clark Method: Specified
     Time of Concentration: 0.44
     Storage Coefficient: 5.34
     Time Area Method: Default

     Baseflow: None
End:

Junction: P1450000_0208_J
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:38
     Canvas X: 3086198.028
     Canvas Y: 1.3920131246E7
     Label X: 10.0
     Label Y: 14.0
     Downstream: P1450000_0188_R
End:

Reach: P1450000_0188_R
     Description: RS 20769 to RS 18779
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:38
     Canvas X: 3087280.907
     Canvas Y: 1.3918282429E7
     From Canvas X: 3086198.028
     From Canvas Y: 1.3920131246E7
     Label X: 7.0
     Label Y: 13.0
     Downstream: P1450000_0188_J

     Route: Modified Puls
     Initial Variable: Combined Inflow
     Number of Reaches: 3
     Storage Outflow Table Name: P1450000_0188_R
     Channel Loss: None
End:

Subbasin: P145C
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:38
     Canvas X: 3085907.5
     Canvas Y: 1.3916407201E7
     Label X: 16.0
     Label Y: 0.0
     Area: 0.606
     Downstream: P1450000_0188_J

     Discretization: None
     File: P1000000.sqlite

     Canopy: Simple
     Allow Simultaneous Precip Et: No
```

```
     Plant Uptake Method: None
     Initial Canopy Storage Percent: 0.0
     Canopy Storage Capacity: 0.1
     Crop Coefficient: 1.0
     End Canopy:

     Surface: None

     LossRate: Green and Ampt
     Percent Impervious Area: 8.523
     Initial Variable: Water Content
     Initial Content: 0.024
     Saturated Content: 0.46
     Wetting Front Suction: 3.5
     Hydraulic Conductivity: 0.024

     Transform: Clark
     Clark Method: Specified
     Time of Concentration: 1
     Storage Coefficient: 6.48
     Time Area Method: Default

     Baseflow: None
End:

Junction: P1450000_0188_J
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:38
     Canvas X: 3087280.907
     Canvas Y: 1.3918282429E7
     Label X: 2.0
     Label Y: -28.0
     Downstream: P1450000_0139_R
End:

Reach: P1450000_0139_R
     Description: RS 18779 to RS 13898
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:38
     Canvas X: 3091533.186
     Canvas Y: 1.3918678604E7
     From Canvas X: 3087280.907
     From Canvas Y: 1.3918282429E7
     Label X: -47.0
     Label Y: -3.0
     Downstream: P1450000_0139_J

     Route: Modified Puls
     Initial Variable: Combined Inflow
     Number of Reaches: 8
     Storage Outflow Table Name: P1450000_0139_R
     Channel Loss: None
End:

Subbasin: P145D
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:38
     Canvas X: 3090952.129
     Canvas Y: 1.3916512847E7
     Label X: 18.0
     Label Y: -9.0
     Area: 1.062
     Downstream: P1450000_0139_J

     Discretization: None
     File: P1000000.sqlite

     Canopy: Simple
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None
     Initial Canopy Storage Percent: 0.0
     Canopy Storage Capacity: 0.1
     Crop Coefficient: 1.0
     End Canopy:

     Surface: None

     LossRate: Green and Ampt
     Percent Impervious Area: 20.328
     Initial Variable: Water Content
     Initial Content: 0.024
     Saturated Content: 0.46
     Wetting Front Suction: 3.5
     Hydraulic Conductivity: 0.024

     Transform: Clark
     Clark Method: Specified
     Time of Concentration: 0.29
     Storage Coefficient: 5.84
     Time Area Method: Default

     Baseflow: None
End:

Junction: P1450000_0139_J
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:38
     Canvas X: 3091533.186
     Canvas Y: 1.3918678604E7
     Label X: -21.0
     Label Y: -32.0
     Downstream: P1450000_0119_J
End:

Subbasin: P245A
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:38
     Canvas X: 3086864.703
     Canvas Y: 1.3924261285E7
     Label X: 16.0
     Label Y: 0.0
     Area: 1.467
     Downstream: P1450000_0119_J
```

```
     Discretization: None
     File: P1000000.sqlite

     Canopy: Simple
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None
     Initial Canopy Storage Percent: 0.0
     Canopy Storage Capacity: 0.1
     Crop Coefficient: 1.0
     End Canopy:

     Surface: None

     LossRate: Green and Ampt
     Percent Impervious Area: 3.493
     Initial Variable: Water Content
     Initial Content: 0.024
     Saturated Content: 0.46
     Wetting Front Suction: 3.5
     Hydraulic Conductivity: 0.024

     Transform: Clark
     Clark Method: Specified
     Time of Concentration: 1.13
     Storage Coefficient: 6.66
     Time Area Method: Default

     Baseflow: None
End:

Junction: P1450000_0119_J
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:38
     Canvas X: 3092748.123
     Canvas Y: 1.3919233249E7
     Label X: -6.0
     Label Y: 24.0
     Downstream: P1450000_0096_R
End:

Reach: P1450000_0096_R
     Description: RS 11866 to RS 9612
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:38
     Canvas X: 3095706.23
     Canvas Y: 1.3918440899E7
     From Canvas X: 3092748.123
     From Canvas Y: 1.3919233249E7
     Label X: -48.0
     Label Y: -4.0
     Downstream: P1450000_0096_J

     Route: Modified Puls
     Initial Variable: Combined Inflow
     Number of Reaches: 3
     Storage Outflow Table Name: P1450000_0096_R
     Channel Loss: None
End:

Junction: P1450000_0096_J
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:38
     Canvas X: 3095706.23
     Canvas Y: 1.3918440899E7
     Label X: -19.0
     Label Y: -25.0
     Downstream: P1450000_0074_J
End:

Subbasin: P14503A
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:38
     Canvas X: 3094149.058
     Canvas Y: 1.3931589856E7
     Label X: 16.0
     Label Y: 0.0
     Area: 1.698
     Downstream: P1450300_0103_J

     Discretization: None
     File: P1000000.sqlite

     Canopy: Simple
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None
     Initial Canopy Storage Percent: 0.0
     Canopy Storage Capacity: 0.1
     Crop Coefficient: 1.0
     End Canopy:

     Surface: None

     LossRate: Green and Ampt
     Percent Impervious Area: 20.093
     Initial Variable: Water Content
     Initial Content: 0.024
     Saturated Content: 0.46
     Wetting Front Suction: 3.5
     Hydraulic Conductivity: 0.024

     Transform: Clark
     Clark Method: Specified
     Time of Concentration: 0.6
     Storage Coefficient: 7.58
     Time Area Method: Default

     Baseflow: None
End:

Junction: P1450300_0103_J
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:38
     Canvas X: 3093312.439
     Canvas Y: 1.3928185683E7
```

```
     Label X: 16.0
     Label Y: 0.0
     Downstream: P1450300_0037_R
End:

Reach: P1450300_0037_R
     Description: RS 10252 to RS 3741
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:38
     Canvas X: 3095504.957
     Canvas Y: 1.3922329352E7
     From Canvas X: 3093312.439
     From Canvas Y: 1.3928185683E7
     Label X: -76.0
     Label Y: 18.0
     Downstream: P1450300_0037_J

     Route: Modified Puls
     Initial Variable: Combined Inflow
     Number of Reaches: 11
     Storage Outflow Table Name: P1450300_0037_R
     Channel Loss: None
End:

Subbasin: P14503B
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:38
     Canvas X: 3096889.706
     Canvas Y: 1.3926195107E7
     Label X: 16.0
     Label Y: 0.0
     Area: 2.397
     Downstream: P1450300_0037_J

     Discretization: None
     File: P1000000.sqlite

     Canopy: Simple
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None
     Initial Canopy Storage Percent: 0.0
     Canopy Storage Capacity: 0.1
     Crop Coefficient: 1.0
     End Canopy:

     Surface: None

     LossRate: Green and Ampt
     Percent Impervious Area: 26.481
     Initial Variable: Water Content
     Initial Content: 0.024
     Saturated Content: 0.46
     Wetting Front Suction: 3.5
     Hydraulic Conductivity: 0.024

     Transform: Clark
     Clark Method: Specified
     Time of Concentration: 0.37
     Storage Coefficient: 5.65
     Time Area Method: Default

     Baseflow: None
End:

Junction: P1450300_0037_J
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:38
     Canvas X: 3095504.957
     Canvas Y: 1.3922329352E7
     Label X: 16.0
     Label Y: 0.0
     Downstream: P1450300_0014_R
End:

Reach: P1450300_0014_R
     Description: RS 3741 to RS 1398
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:38
     Canvas X: 3095494.936
     Canvas Y: 1.3920104835E7
     From Canvas X: 3095504.957
     From Canvas Y: 1.3922329352E7
     Label X: 16.0
     Label Y: 0.0
     Downstream: P1450300_0014_J

     Route: Modified Puls
     Initial Variable: Combined Inflow
     Number of Reaches: 7
     Storage Outflow Table Name: P1450300_0014_R
     Channel Loss: None
End:

Subbasin: P14503C
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:38
     Canvas X: 3091361.879
     Canvas Y: 1.3924299076E7
     Label X: 16.0
     Label Y: 0.0
     Area: 0.928
     Downstream: P1450300_0014_J

     Discretization: None
     File: P1000000.sqlite

     Canopy: Simple
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None
     Initial Canopy Storage Percent: 0.0
     Canopy Storage Capacity: 0.1
     Crop Coefficient: 1.0
     End Canopy:
```

```
     Surface: None

     LossRate: Green and Ampt
     Percent Impervious Area: 7.879
     Initial Variable: Water Content
     Initial Content: 0.024
     Saturated Content: 0.46
     Wetting Front Suction: 3.5
     Hydraulic Conductivity: 0.024

     Transform: Clark
     Clark Method: Specified
     Time of Concentration: 0.89
     Storage Coefficient: 7.64
     Time Area Method: Default

     Baseflow: None
End:

Junction: P1450300_0014_J
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:38
     Canvas X: 3095494.936
     Canvas Y: 1.3920104835E7
     Label X: 16.0
     Label Y: 0.0
     Downstream: P1450000_0074_J
End:

Junction: P1450000_0074_J
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:38
     Canvas X: 3096683.461
     Canvas Y: 1.3918731428E7
     Label X: 16.0
     Label Y: 0.0
     Downstream: P1450000_0010_R
End:

Reach: P1450000_0010_R
     Description: RS 7531 to RS 973
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:38
     Canvas X: 3101565.554
     Canvas Y: 1.3913717487E7
     From Canvas X: 3096683.461
     From Canvas Y: 1.3918731428E7
     Label X: 16.0
     Label Y: 0.0
     Downstream: P1450000_0010_J

     Route: Modified Puls
     Initial Variable: Combined Inflow
     Number of Reaches: 10
     Storage Outflow Table Name: P1450000_0010_R
     Channel Loss: None
End:

Subbasin: P145E
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:38
     Canvas X: 3099168.771
     Canvas Y: 1.3918405898E7
     Label X: 16.0
     Label Y: 0.0
     Area: 1.871
     Downstream: P1450000_0010_J

     Discretization: None
     File: P1000000.sqlite

     Canopy: Simple
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None
     Initial Canopy Storage Percent: 0.0
     Canopy Storage Capacity: 0.1
     Crop Coefficient: 1.0
     End Canopy:

     Surface: None

     LossRate: Green and Ampt
     Percent Impervious Area: 38.256
     Initial Variable: Water Content
     Initial Content: 0.024
     Saturated Content: 0.46
     Wetting Front Suction: 3.5
     Hydraulic Conductivity: 0.024

     Transform: Clark
     Clark Method: Specified
     Time of Concentration: 0.66
     Storage Coefficient: 3.77
     Time Area Method: Default

     Baseflow: None
End:

Junction: P1450000_0010_J
     Description: just upstream of p10089
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:38
     Canvas X: 3101565.554
     Canvas Y: 1.3913717487E7
     Label X: 16.0
     Label Y: 0.0
     Downstream: P1000000_1686_J
End:

Junction: P1000000_1686_J
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:38
     Canvas X: 3102519.183
     Canvas Y: 1.3913106669E7
```

```
     Label X: -32.0
     Label Y: -29.0
     Downstream: P1000000_1557_R
End:

Reach: P1000000_1557_R
     Description: RS 168562 to RS 155731
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:38
     Canvas X: 3112221.616
     Canvas Y: 1.3910798607E7
     From Canvas X: 3102519.183
     From Canvas Y: 1.3913106669E7
     Label X: -49.0
     Label Y: -7.0
     Downstream: P1000000_1557_J

     Route: Modified Puls
     Initial Variable: Combined Inflow
     Number of Reaches: 24
     Storage Outflow Table Name: P1000000_1557_R
     Channel Loss: None
End:

Subbasin: P100J
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:38
     Canvas X: 3105205.121
     Canvas Y: 1.3905511296E7
     Label X: 16.0
     Label Y: 0.0
     Area: 5.887
     Downstream: P1000000_1557_J

     Discretization: None
     File: P1000000.sqlite

     Canopy: Simple
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None
     Initial Canopy Storage Percent: 0.0
     Canopy Storage Capacity: 0.1
     Crop Coefficient: 1.0
     End Canopy:

     Surface: None

     LossRate: Green and Ampt
     Percent Impervious Area: 40.852
     Initial Variable: Water Content
     Initial Content: 0.024
     Saturated Content: 0.46
     Wetting Front Suction: 3.5
     Hydraulic Conductivity: 0.024

     Transform: Clark
     Clark Method: Specified
     Time of Concentration: 0.86
     Storage Coefficient: 6.87
     Time Area Method: Default

     Baseflow: None
End:

Junction: P1000000_1557_J
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:38
     Canvas X: 3112221.616
     Canvas Y: 1.3910798607E7
     Label X: -25.0
     Label Y: 18.0
     Downstream: P1000000_1554_D
End:

Diversion: P1000000_1554_D
     Description: p100 to p138 overflow
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:38
     Canvas X: 3112972.011
     Canvas Y: 1.3909643935E7
     Label X: 16.0
     Label Y: 0.0
     Downstream: P1000000_1540_J
     Divert To: P1380000_0141_D

     Diverter: Inflow-Diversion Table
     Inflow Diversion Table Name: P1000000_1554_D
     End Diverter:
End:

Subbasin: P156A
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:38
     Canvas X: 3106390.6
     Canvas Y: 1.39216538E7
     Label X: 16.0
     Label Y: 0.0
     Area: 1.311
     Downstream: P1560000_0048_J

     Discretization: None
     File: P1000000.sqlite

     Canopy: Simple
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None
     Initial Canopy Storage Percent: 0.0
     Canopy Storage Capacity: 0.1
     Crop Coefficient: 1.0
     End Canopy:

     Surface: None

     LossRate: Green and Ampt
```

```
     Percent Impervious Area: 18.106
     Initial Variable: Water Content
     Initial Content: 0.024
     Saturated Content: 0.46
     Wetting Front Suction: 3.5
     Hydraulic Conductivity: 0.024

     Transform: Clark
     Clark Method: Specified
     Time of Concentration: 0.95
     Storage Coefficient: 5.18
     Time Area Method: Default

     Baseflow: None
End:

Junction: P1560000_0048_J
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:38
     Canvas X: 3111809.811
     Canvas Y: 1.3916571914E7
     Label X: 16.0
     Label Y: 0.0
     Downstream: P1560000_0019_R
End:

Reach: P1560000_0019_R
     Description: RS 4805 TO RS 1870
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:38
     Canvas X: 3112919.941
     Canvas Y: 1.3912594298E7
     From Canvas X: 3111809.811
     From Canvas Y: 1.3916571914E7
     Label X: 16.0
     Label Y: 0.0
     Downstream: P1560000_0019_J

     Route: Modified Puls
     Initial Variable: Combined Inflow
     Number of Reaches: 2
     Storage Outflow Table Name: P1560000_0019_R
     Channel Loss: None
End:

Subbasin: P156B
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:38
     Canvas X: 3110436.5
     Canvas Y: 1.3913583E7
     Label X: 16.0
     Label Y: 0.0
     Area: 0.911
     Downstream: P1560000_0019_J

     Discretization: None
     File: P1000000.sqlite

     Canopy: Simple
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None
     Initial Canopy Storage Percent: 0.0
     Canopy Storage Capacity: 0.1
     Crop Coefficient: 1.0
     End Canopy:

     Surface: None

     LossRate: Green and Ampt
     Percent Impervious Area: 41.884
     Initial Variable: Water Content
     Initial Content: 0.024
     Saturated Content: 0.46
     Wetting Front Suction: 3.5
     Hydraulic Conductivity: 0.024

     Transform: Clark
     Clark Method: Specified
     Time of Concentration: 0.39
     Storage Coefficient: 2.1
     Time Area Method: Default

     Baseflow: None
End:

Junction: P1560000_0019_J
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:38
     Canvas X: 3112919.941
     Canvas Y: 1.3912594298E7
     Label X: 7.0
     Label Y: 15.0
     Downstream: P1000000_1540_J
End:

Junction: P1000000_1540_J
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:38
     Canvas X: 3113618.265
     Canvas Y: 1.3910865114E7
     Label X: 16.0
     Label Y: 0.0
     Downstream: P1000000_1498_R
End:

Reach: P1000000_1498_R
     Description: RS 154008 to RS 149842
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:38
     Canvas X: 3117675.196
     Canvas Y: 1.3910266551E7
     From Canvas X: 3113618.265
     From Canvas Y: 1.3910865114E7
     Label X: -47.0
```

```
     Label Y: -11.0
     Downstream: P1000000_1498_J

     Route: Modified Puls
     Initial Variable: Combined Inflow
     Number of Reaches: 7
     Storage Outflow Table Name: P1000000_1498_R
     Channel Loss: None
End:

Junction: P1000000_1498_J
     Description: just upstream of p100#13
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:38
     Canvas X: 3117675.196
     Canvas Y: 1.3910266551E7
     Label X: -52.0
     Label Y: -30.0
     Downstream: P1000000_1488_J
End:

Junction: P1550000_0063_J
     Description: p155_upstream
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:38
     Canvas X: 3117271.972
     Canvas Y: 1.3915442365E7
     Label X: 16.0
     Label Y: 0.0
     Downstream: P1550000_0008_J
End:

Subbasin: P155A
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:38
     Canvas X: 3115710.048
     Canvas Y: 1.3914434994E7
     Label X: 16.0
     Label Y: 0.0
     Area: 1.47
     Downstream: P1550000_0008_J

     Discretization: None
     File: P1000000.sqlite

     Canopy: Simple
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None
     Initial Canopy Storage Percent: 0.0
     Canopy Storage Capacity: 0.1
     Crop Coefficient: 1.0
     End Canopy:

     Surface: None

     LossRate: Green and Ampt
     Percent Impervious Area: 46.093
     Initial Variable: Water Content
     Initial Content: 0.024
     Saturated Content: 0.46
     Wetting Front Suction: 3.5
     Hydraulic Conductivity: 0.024

     Transform: Clark
     Clark Method: Specified
     Time of Concentration: 0.54
     Storage Coefficient: 2.57
     Time Area Method: Default

     Baseflow: None
End:

Junction: P1550000_0008_J
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:38
     Canvas X: 3117954.554
     Canvas Y: 1.3912230546E7
     Label X: 16.0
     Label Y: 0.0
     Downstream: P1000000_1488_J
End:

Junction: P1000000_1488_J
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:38
     Canvas X: 3118489.039
     Canvas Y: 1.3911030221E7
     Label X: 16.0
     Label Y: 0.0
     Downstream: P1000000_1433_R
End:

Reach: P1000000_1433_R
     Description: RS 148819 to RS 143348
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:38
     Canvas X: 3123095.521
     Canvas Y: 1.3907506508E7
     From Canvas X: 3118489.039
     From Canvas Y: 1.3911030221E7
     Label X: -70.0
     Label Y: 32.0
     Downstream: P1000000_1433_J

     Route: Modified Puls
     Initial Variable: Combined Inflow
     Number of Reaches: 20
     Storage Outflow Table Name: P1000000_1433_R
     Channel Loss: None
End:

Subbasin: P100K
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:38
```

```
     Canvas X: 3117276.153
     Canvas Y: 1.3907672775E7
     Label X: -16.0
     Label Y: -29.0
     Area: 1.64
     Downstream: P1000000_1433_J

     Discretization: None
     File: P1000000.sqlite

     Canopy: Simple
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None
     Initial Canopy Storage Percent: 0.0
     Canopy Storage Capacity: 0.1
     Crop Coefficient: 1.0
     End Canopy:

     Surface: None

     LossRate: Green and Ampt
     Percent Impervious Area: 38.52
     Initial Variable: Water Content
     Initial Content: 0.024
     Saturated Content: 0.46
     Wetting Front Suction: 3.5
     Hydraulic Conductivity: 0.024

     Transform: Clark
     Clark Method: Specified
     Time of Concentration: 0.64
     Storage Coefficient: 4.15
     Time Area Method: Default

     Baseflow: None
End:

Junction: P1000000_1433_J
     Description: just upstream of p100#14
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:38
     Canvas X: 3123095.521
     Canvas Y: 1.3907506508E7
     Label X: 16.0
     Label Y: 0.0
     Downstream: P1000000_1424_J
End:

Subbasin: P140A
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:38
     Canvas X: 3111753.983
     Canvas Y: 1.3925584222E7
     Label X: 16.0
     Label Y: 0.0
     Area: 0.966
     Downstream: P1400403_0259_J

     Discretization: None
     File: P1000000.sqlite

     Canopy: Simple
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None
     Initial Canopy Storage Percent: 0.0
     Canopy Storage Capacity: 0.1
     Crop Coefficient: 1.0
     End Canopy:

     Surface: None

     LossRate: Green and Ampt
     Percent Impervious Area: 33.042
     Initial Variable: Water Content
     Initial Content: 0.024
     Saturated Content: 0.46
     Wetting Front Suction: 3.5
     Hydraulic Conductivity: 0.024

     Transform: Clark
     Clark Method: Specified
     Time of Concentration: 0.36
     Storage Coefficient: 4.51
     Time Area Method: Default

     Baseflow: None
End:

Junction: P1400403_0259_J
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:38
     Canvas X: 3112380.381
     Canvas Y: 1.3922340235E7
     Label X: 16.0
     Label Y: 0.0
     Downstream: P1400000_0172_R
End:

Reach: P1400000_0172_R
     Description: RS 25945 to RS 17175
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:38
     Canvas X: 3114940.886
     Canvas Y: 1.3917477831E7
     From Canvas X: 3112380.381
     From Canvas Y: 1.3922340235E7
     Label X: -102.0
     Label Y: -20.0
     Downstream: P1400400_0172_J

     Route: Modified Puls
     Initial Variable: Combined Inflow
     Number of Reaches: 33
     Storage Outflow Table Name: P1400000_0172_R
```

```
     Channel Loss: None
End:

Subbasin: P140B
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:38
     Canvas X: 3114960.338
     Canvas Y: 1.3921029243E7
     Label X: -18.0
     Label Y: 19.0
     Area: 1.312
     Downstream: P1400400_0172_J

     Discretization: None
     File: P1000000.sqlite

     Canopy: Simple
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None
     Initial Canopy Storage Percent: 0.0
     Canopy Storage Capacity: 0.1
     Crop Coefficient: 1.0
     End Canopy:

     Surface: None

     LossRate: Green and Ampt
     Percent Impervious Area: 9.439
     Initial Variable: Water Content
     Initial Content: 0.024
     Saturated Content: 0.46
     Wetting Front Suction: 3.5
     Hydraulic Conductivity: 0.024

     Transform: Clark
     Clark Method: Specified
     Time of Concentration: 0.94
     Storage Coefficient: 4.99
     Time Area Method: Default

     Baseflow: None
End:

Junction: P1400400_0172_J
     Description: upstream of p140 diversion into p155
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3114940.886
     Canvas Y: 1.3917477831E7
     Label X: -57.0
     Label Y: 1.0
     Downstream: P1400400_0164_D
End:

Diversion: P1400400_0164_D
     Description: p140 overflow to p155
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3115780.036
     Canvas Y: 1.3916424015E7
     Label X: -6.0
     Label Y: 19.0
     Downstream: P1400400_0159_D
     Divert To: P1550000_0063_J

     Diverter: Inflow-Diversion Table
     Inflow Diversion Table Name: P1400400_0164_D
     End Diverter:
End:

Diversion: P1400400_0159_D
     Description: p140 diversion into p155
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3117087.549
     Canvas Y: 1.3916638681E7
     Label X: 6.0
     Label Y: -27.0
     Downstream: P1400400_0150_J
     Divert To: P1550000_0063_J

     Diverter: Inflow-Diversion Table
     Inflow Diversion Table Name: P1400400_0159_D
     End Diverter:
End:

Junction: P1400400_0150_J
     Description: downstream of p140 diversion into p155
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3118551.182
     Canvas Y: 1.3916638681E7
     Label X: -12.0
     Label Y: 20.0
     Downstream: P1400000_0112_R
End:

Reach: P1400000_0112_R
     Description: RS 15039 to RS 11211
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3121574.306
     Canvas Y: 1.3916721317E7
     From Canvas X: 3118551.182
     From Canvas Y: 1.3916638681E7
     Label X: -43.0
     Label Y: -11.0
     Downstream: P1400000_0112_J

     Route: Modified Puls
     Initial Variable: Combined Inflow
     Number of Reaches: 12
     Storage Outflow Table Name: P1400000_0112_R
     Channel Loss: None
```

```
End:

Subbasin: P140C
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3117181.695
     Canvas Y: 1.3923366179E7
     Label X: 16.0
     Label Y: 0.0
     Area: 1.273
     Downstream: P1400000_0112_J

     Discretization: None
     File: P1000000.sqlite

     Canopy: Simple
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None
     Initial Canopy Storage Percent: 0.0
     Canopy Storage Capacity: 0.1
     Crop Coefficient: 1.0
     End Canopy:

     Surface: None

     LossRate: Green and Ampt
     Percent Impervious Area: 29.556
     Initial Variable: Water Content
     Initial Content: 0.024
     Saturated Content: 0.46
     Wetting Front Suction: 3.5
     Hydraulic Conductivity: 0.024

     Transform: Clark
     Clark Method: Specified
     Time of Concentration: 0.67
     Storage Coefficient: 6.66
     Time Area Method: Default

     Baseflow: None
End:

Junction: P1400000_0112_J
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3121574.306
     Canvas Y: 1.3916721317E7
     Label X: -40.0
     Label Y: -28.0
     Downstream: P1400000_0020_R
End:

Reach: P1400000_0020_R
     Description: RS 11211 to RS 1955
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3124254.758
     Canvas Y: 1.3908750751E7
     From Canvas X: 3121574.306
     From Canvas Y: 1.3916721317E7
     Label X: 16.0
     Label Y: 0.0
     Downstream: P1400000_0020_J

     Route: Modified Puls
     Initial Variable: Combined Inflow
     Number of Reaches: 10
     Storage Outflow Table Name: P1400000_0020_R
     Channel Loss: None
End:

Subbasin: P140D
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3125537.455
     Canvas Y: 1.3914416312E7
     Label X: 16.0
     Label Y: 0.0
     Area: 3.873
     Downstream: P1400000_0020_J

     Discretization: None
     File: P1000000.sqlite

     Canopy: Simple
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None
     Initial Canopy Storage Percent: 0.0
     Canopy Storage Capacity: 0.1
     Crop Coefficient: 1.0
     End Canopy:

     Surface: None

     LossRate: Green and Ampt
     Percent Impervious Area: 35.915
     Initial Variable: Water Content
     Initial Content: 0.024
     Saturated Content: 0.46
     Wetting Front Suction: 3.5
     Hydraulic Conductivity: 0.024

     Transform: Clark
     Clark Method: Specified
     Time of Concentration: 0.75
     Storage Coefficient: 9.71
     Time Area Method: Default

     Baseflow: None
End:

Junction: P1400000_0020_J
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
```

```
     Canvas X: 3124254.758
     Canvas Y: 1.3908750751E7
     Label X: 16.0
     Label Y: 0.0
     Downstream: P1000000_1424_J
End:

Junction: P1000000_1424_J
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3124691.691
     Canvas Y: 1.3906941198E7
     Label X: 16.0
     Label Y: 0.0
     Downstream: P1000000_1334_R
End:

Reach: P1000000_1334_R
     Description: RS 142362 to RS 133393
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3127618.002
     Canvas Y: 1.390122159E7
     From Canvas X: 3124691.691
     From Canvas Y: 1.3906941198E7
     Label X: -50.0
     Label Y: -24.0
     Downstream: P1000000_1334_J

     Route: Modified Puls
     Initial Variable: Combined Inflow
     Number of Reaches: 17
     Storage Outflow Table Name: P1000000_1334_R
     Channel Loss: None
End:

Subbasin: P100L
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3121133.563
     Canvas Y: 1.3903183548E7
     Label X: 16.0
     Label Y: 0.0
     Area: 2.719
     Downstream: P1000000_1334_J

     Discretization: None
     File: P1000000.sqlite

     Canopy: Simple
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None
     Initial Canopy Storage Percent: 0.0
     Canopy Storage Capacity: 0.1
     Crop Coefficient: 1.0
     End Canopy:

     Surface: None

     LossRate: Green and Ampt
     Percent Impervious Area: 41.05
     Initial Variable: Water Content
     Initial Content: 0.024
     Saturated Content: 0.46
     Wetting Front Suction: 3.5
     Hydraulic Conductivity: 0.024

     Transform: Clark
     Clark Method: Specified
     Time of Concentration: 0.86
     Storage Coefficient: 5.66
     Time Area Method: Default

     Baseflow: None
End:

Junction: P1000000_1334_J
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3127618.002
     Canvas Y: 1.390122159E7
     Label X: -10.0
     Label Y: 22.0
     Downstream: P1000000_1308_J
End:

Subbasin: P138A
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3108396.3
     Canvas Y: 1.3899456903E7
     Label X: 16.0
     Label Y: 0.0
     Area: 2.729
     Downstream: P1380000_0141_D

     Discretization: None
     File: P1000000.sqlite

     Canopy: Simple
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None
     Initial Canopy Storage Percent: 0.0
     Canopy Storage Capacity: 0.1
     Crop Coefficient: 1.0
     End Canopy:

     Surface: None

     LossRate: Green and Ampt
     Percent Impervious Area: 41.605
     Initial Variable: Water Content
     Initial Content: 0.024
     Saturated Content: 0.46
```

```
     Wetting Front Suction: 3.5
     Hydraulic Conductivity: 0.024

     Transform: Clark
     Clark Method: Specified
     Time of Concentration: 0.94
     Storage Coefficient: 9.4
     Time Area Method: Default

     Baseflow: None
End:

Diversion: P1380000_0141_D
     Description: p138 to p118 overflow
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3114416.601
     Canvas Y: 1.3898873193E7
     Label X: -48.0
     Label Y: -23.0
     Downstream: P1380000_0130_J
     Divert To: P1180000_0643_R

     Diverter: Inflow-Diversion Table
     Inflow Diversion Table Name: P1380000_0141_D
     End Diverter:
End:

Junction: P1380000_0130_J
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3116048.035
     Canvas Y: 1.3899293632E7
     Label X: 16.0
     Label Y: 0.0
     Downstream: P1380000_0013_R
End:

Reach: P1380000_0013_R
     Description: RS 12961 to RS 1307
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3127807.758
     Canvas Y: 1.3899956267E7
     From Canvas X: 3116048.035
     From Canvas Y: 1.3899293632E7
     Label X: 20.0
     Label Y: -22.0
     Downstream: P1380000_0013_J

     Route: Modified Puls
     Initial Variable: Combined Inflow
     Number of Reaches: 25
     Storage Outflow Table Name: P1380000_0013_R
     Channel Loss: None
End:

Subbasin: P138B
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3123919.453
     Canvas Y: 1.3897342187E7
     Label X: 16.0
     Label Y: 0.0
     Area: 3.581
     Downstream: P1380000_0013_J

     Discretization: None
     File: P1000000.sqlite

     Canopy: Simple
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None
     Initial Canopy Storage Percent: 0.0
     Canopy Storage Capacity: 0.1
     Crop Coefficient: 1.0
     End Canopy:

     Surface: None

     LossRate: Green and Ampt
     Percent Impervious Area: 38.31
     Initial Variable: Water Content
     Initial Content: 0.024
     Saturated Content: 0.46
     Wetting Front Suction: 3.5
     Hydraulic Conductivity: 0.024

     Transform: Clark
     Clark Method: Specified
     Time of Concentration: 0.83
     Storage Coefficient: 8.1
     Time Area Method: Default

     Baseflow: None
End:

Junction: P1380000_0013_J
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3127807.758
     Canvas Y: 1.3899956267E7
     Label X: -10.0
     Label Y: -32.0
     Downstream: P1000000_1308_J
End:

Junction: P1000000_1308_J
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3129313.932
     Canvas Y: 1.3900456759E7
     Label X: 17.0
     Label Y: 0.0
```

```
     Downstream: P1000000_1226_R
End:

Reach: P1000000_1226_R
     Description: RS 130839 to RS 122556
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3138078.831
     Canvas Y: 1.390002163E7
     From Canvas X: 3129313.932
     From Canvas Y: 1.3900456759E7
     Label X: -22.0
     Label Y: 16.0
     Downstream: P1000000_1226_J

     Route: Modified Puls
     Initial Variable: Combined Inflow
     Number of Reaches: 17
     Storage Outflow Table Name: P1000000_1226_R
     Channel Loss: None
End:

Subbasin: P100M
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3134069.187
     Canvas Y: 1.389839504E7
     Label X: 16.0
     Label Y: 0.0
     Area: 4.345
     Downstream: P1000000_1226_J

     Discretization: None
     File: P1000000.sqlite

     Canopy: Simple
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None
     Initial Canopy Storage Percent: 0.0
     Canopy Storage Capacity: 0.1
     Crop Coefficient: 1.0
     End Canopy:

     Surface: None

     LossRate: Green and Ampt
     Percent Impervious Area: 29.615
     Initial Variable: Water Content
     Initial Content: 0.024
     Saturated Content: 0.46
     Wetting Front Suction: 3.5
     Hydraulic Conductivity: 0.024

     Transform: Clark
     Clark Method: Specified
     Time of Concentration: 1.12
     Storage Coefficient: 11.35
     Time Area Method: Default

     Baseflow: None
End:

Junction: P1000000_1226_J
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3138078.831
     Canvas Y: 1.390002163E7
     Label X: -26.0
     Label Y: -28.0
     Downstream: P1000000_1123_R
End:

Reach: P1000000_1123_R
     Description: RS 122556 to RS 112280
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3146938.304
     Canvas Y: 1.3899459153E7
     From Canvas X: 3138078.831
     From Canvas Y: 1.390002163E7
     Label X: -35.0
     Label Y: -16.0
     Downstream: P1000000_1123_J

     Route: Modified Puls
     Initial Variable: Combined Inflow
     Number of Reaches: 23
     Storage Outflow Table Name: P1000000_1123_R
     Channel Loss: None
End:

Subbasin: P100N
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3143646.204
     Canvas Y: 1.3896732363E7
     Label X: 16.0
     Label Y: 0.0
     Area: 3.014
     Downstream: P1000000_1123_J

     Discretization: None
     File: P1000000.sqlite

     Canopy: Simple
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None
     Initial Canopy Storage Percent: 0.0
     Canopy Storage Capacity: 0.1
     Crop Coefficient: 1.0
     End Canopy:

     Surface: None
```

```
     LossRate: Green and Ampt
     Percent Impervious Area: 26.561
     Initial Variable: Water Content
     Initial Content: 0.024
     Saturated Content: 0.46
     Wetting Front Suction: 3.5
     Hydraulic Conductivity: 0.024

     Transform: Clark
     Clark Method: Specified
     Time of Concentration: 1.27
     Storage Coefficient: 7.54
     Time Area Method: Default

     Baseflow: None
End:

Junction: P1000000_1123_J
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3146938.304
     Canvas Y: 1.3899459153E7
     Label X: -32.0
     Label Y: -34.0
     Downstream: P1000000_1114_J
End:

Subbasin: P133A
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3137657.018
     Canvas Y: 1.3910974658E7
     Label X: 16.0
     Label Y: 0.0
     Area: 2.989
     Downstream: P1330000_0092_J

     Discretization: None
     File: P1000000.sqlite

     Canopy: Simple
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None
     Initial Canopy Storage Percent: 0.0
     Canopy Storage Capacity: 0.1
     Crop Coefficient: 1.0
     End Canopy:

     Surface: None

     LossRate: Green and Ampt
     Percent Impervious Area: 32.376
     Initial Variable: Water Content
     Initial Content: 0.024
     Saturated Content: 0.46
     Wetting Front Suction: 3.5
     Hydraulic Conductivity: 0.024

     Transform: Clark
     Clark Method: Specified
     Time of Concentration: 1.31
     Storage Coefficient: 11.01
     Time Area Method: Default

     Baseflow: None
End:

Junction: P1330000_0092_J
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3143015.028
     Canvas Y: 1.3904922634E7
     Label X: 16.0
     Label Y: 0.0
     Downstream: P1330000_0017_R
End:

Reach: P1330000_0017_R
     Description: RS 9228 to RS 1734
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3147235.415
     Canvas Y: 1.3900403689E7
     From Canvas X: 3143015.028
     From Canvas Y: 1.3904922634E7
     Label X: 17.0
     Label Y: 1.0
     Downstream: P1330000_0017_J

     Route: Modified Puls
     Initial Variable: Combined Inflow
     Number of Reaches: 12
     Storage Outflow Table Name: P1330000_0017_R
     Channel Loss: None
End:

Subbasin: P133B
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3146141.2
     Canvas Y: 1.39044767E7
     Label X: 16.0
     Label Y: 0.0
     Area: 1.253
     Downstream: P1330000_0017_J

     Discretization: None
     File: P1000000.sqlite

     Canopy: Simple
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None
     Initial Canopy Storage Percent: 0.0
     Canopy Storage Capacity: 0.1
```

```
     Crop Coefficient: 1.0
     End Canopy:

     Surface: None

     LossRate: Green and Ampt
     Percent Impervious Area: 12.853
     Initial Variable: Water Content
     Initial Content: 0.024
     Saturated Content: 0.46
     Wetting Front Suction: 3.5
     Hydraulic Conductivity: 0.024

     Transform: Clark
     Clark Method: Specified
     Time of Concentration: 0.57
     Storage Coefficient: 6.14
     Time Area Method: Default

     Baseflow: None
End:

Junction: P1330000_0017_J
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3147235.415
     Canvas Y: 1.3900403689E7
     Label X: 16.0
     Label Y: 0.0
     Downstream: P1000000_1114_J
End:

Junction: P1000000_1114_J
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3148102.178
     Canvas Y: 1.3899459153E7
     Label X: 17.0
     Label Y: -10.0
     Downstream: P1000000_1038_R
End:

Reach: P1000000_1038_R
     Description: RS 111431 to RS 103765
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3156515.322
     Canvas Y: 1.3901487618E7
     From Canvas X: 3148102.178
     From Canvas Y: 1.3899459153E7
     Label X: 16.0
     Label Y: 0.0
     Downstream: P1000000_1038_J

     Route: Modified Puls
     Initial Variable: Combined Inflow
     Number of Reaches: 28
     Storage Outflow Table Name: P1000000_1038_R
     Channel Loss: None
End:

Subbasin: P100O
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3152790.926
     Canvas Y: 1.3903981633E7
     Label X: 16.0
     Label Y: 0.0
     Area: 3.083
     Downstream: P1000000_1038_J

     Discretization: None
     File: P1000000.sqlite

     Canopy: Simple
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None
     Initial Canopy Storage Percent: 0.0
     Canopy Storage Capacity: 0.1
     Crop Coefficient: 1.0
     End Canopy:

     Surface: None

     LossRate: Green and Ampt
     Percent Impervious Area: 3.64
     Initial Variable: Water Content
     Initial Content: 0.024
     Saturated Content: 0.46
     Wetting Front Suction: 3.5
     Hydraulic Conductivity: 0.024

     Transform: Clark
     Clark Method: Specified
     Time of Concentration: 1.11
     Storage Coefficient: 9.91
     Time Area Method: Default

     Baseflow: None
End:

Junction: P1000000_1038_J
     Description: just upstream of p100#18
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3156515.322
     Canvas Y: 1.3901487618E7
     Label X: -73.0
     Label Y: -1.0
     Downstream: P1000000_1003_J
End:

Subbasin: P130A
     Last Modified Date: 15 February 2024
```

```
     Last Modified Time: 20:45:39
     Canvas X: 3131804.864
     Canvas Y: 1.3930833274E7
     Label X: 16.0
     Label Y: 0.0
     Area: 2.909
     Downstream: P530_15_01

     Discretization: None
     File: P1000000.sqlite

     Canopy: Simple
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None
     Initial Canopy Storage Percent: 0.0
     Canopy Storage Capacity: 0.1
     Crop Coefficient: 1.0
     End Canopy:

     Surface: None

     LossRate: Green and Ampt
     Percent Impervious Area: 15.039
     Initial Variable: Water Content
     Initial Content: 0.024
     Saturated Content: 0.46
     Wetting Front Suction: 3.5
     Hydraulic Conductivity: 0.024

     Transform: Clark
     Clark Method: Specified
     Time of Concentration: 0.53
     Storage Coefficient: 6.37
     Time Area Method: Default

     Baseflow: None
End:

Reservoir: P530_15_01
     Description: reservior relationship taken from "request for clomr bush intercontinental airport ditch y detention and garners bayou realignment"-
dodson (march 3, 2000).  relationship taken from post project conditions model's (postprj.ih1)  relationship for the north pond.
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3134454.47
     Canvas Y: 1.3926630451E7
     Label X: 16.0
     Label Y: 0.0
     Downstream: P1300000_0447_R

     Route: Modified Puls
     Routing Curve: Storage-Outflow
     Initial Outflow Equals Inflow: Yes
     Storage-Outflow Table: P530_15_01
End:

Reach: P1300000_0447_R
     Description: RS 47315 to RS 44743
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3136987.065
     Canvas Y: 1.3925834639E7
     From Canvas X: 3134454.47
     From Canvas Y: 1.3926630451E7
     Label X: 19.0
     Label Y: 3.0
     Downstream: P1300000_0447_J

     Route: Modified Puls
     Initial Variable: Combined Inflow
     Number of Reaches: 17
     Storage Outflow Table Name: P1300000_0447_R
     Channel Loss: None
End:

Subbasin: P130B
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3130726.592
     Canvas Y: 1.3925221134E7
     Label X: 16.0
     Label Y: 0.0
     Area: 1.019
     Downstream: P1300000_0447_J

     Discretization: None
     File: P1000000.sqlite

     Canopy: Simple
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None
     Initial Canopy Storage Percent: 0.0
     Canopy Storage Capacity: 0.1
     Crop Coefficient: 1.0
     End Canopy:

     Surface: None

     LossRate: Green and Ampt
     Percent Impervious Area: 44.107
     Initial Variable: Water Content
     Initial Content: 0.024
     Saturated Content: 0.46
     Wetting Front Suction: 3.5
     Hydraulic Conductivity: 0.024

     Transform: Clark
     Clark Method: Specified
     Time of Concentration: 0.42
     Storage Coefficient: 3.34
     Time Area Method: Default

     Baseflow: None
End:
```

```
Junction: P1300000_0447_J
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3136987.065
     Canvas Y: 1.3925834639E7
     Label X: 16.0
     Label Y: 0.0
     Downstream: P1300000_0361_R
End:

Reach: P1300000_0361_R
     Description: RS 44743 to RS 36087
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3143806.778
     Canvas Y: 1.3923394558E7
     From Canvas X: 3136987.065
     From Canvas Y: 1.3925834639E7
     Label X: -12.0
     Label Y: 11.0
     Downstream: P1300000_0361_J

     Route: Modified Puls
     Initial Variable: Combined Inflow
     Number of Reaches: 31
     Storage Outflow Table Name: P1300000_0361_R
     Channel Loss: None
End:

Subbasin: P130C
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3141934.766
     Canvas Y: 1.3928225664E7
     Label X: 16.0
     Label Y: 0.0
     Area: 2.632
     Downstream: P1300000_0361_J

     Discretization: None
     File: P1000000.sqlite

     Canopy: Simple
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None
     Initial Canopy Storage Percent: 0.0
     Canopy Storage Capacity: 0.1
     Crop Coefficient: 1.0
     End Canopy:

     Surface: None

     LossRate: Green and Ampt
     Percent Impervious Area: 22.942
     Initial Variable: Water Content
     Initial Content: 0.024
     Saturated Content: 0.46
     Wetting Front Suction: 3.5
     Hydraulic Conductivity: 0.024

     Transform: Clark
     Clark Method: Specified
     Time of Concentration: 0.68
     Storage Coefficient: 0.68
     Time Area Method: Default

     Baseflow: None
End:

Junction: P1300000_0361_J
     Description: just upstream of p130#2
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3143806.778
     Canvas Y: 1.3923394558E7
     Label X: -59.0
     Label Y: -15.0
     Downstream: P1300000_0342_J
End:

Subbasin: P13008A
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3132334.81
     Canvas Y: 1.3922465215E7
     Label X: -63.0
     Label Y: -4.0
     Area: 1.886
     Downstream: P530_08_01

     Discretization: None
     File: P1000000.sqlite

     Canopy: Simple
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None
     Initial Canopy Storage Percent: 0.0
     Canopy Storage Capacity: 0.1
     Crop Coefficient: 1.0
     End Canopy:

     Surface: None

     LossRate: Green and Ampt
     Percent Impervious Area: 41.522
     Initial Variable: Water Content
     Initial Content: 0.024
     Saturated Content: 0.46
     Wetting Front Suction: 3.5
     Hydraulic Conductivity: 0.024

     Transform: Clark
     Clark Method: Specified
     Time of Concentration: 0.97
```

```
     Storage Coefficient: 3.07
     Time Area Method: Default

     Baseflow: None
End:

Reservoir: P530_08_01
     Description: Reservoir on P130-08-00 (1995)
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3142534.758
     Canvas Y: 1.3922190405E7
     Label X: -28.0
     Label Y: -26.0
     Downstream: P1300000_0342_J

     Route: Modified Puls
     Routing Curve: Storage-Outflow
     Initial Outflow Equals Inflow: Yes
     Storage-Outflow Table: P530_08_01
End:

Subbasin: P13009A
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3147340.938
     Canvas Y: 1.392774062E7
     Label X: 16.0
     Label Y: 0.0
     Area: 1.447
     Downstream: P1300000_0342_J

     Discretization: None
     File: P1000000.sqlite

     Canopy: Simple
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None
     Initial Canopy Storage Percent: 0.0
     Canopy Storage Capacity: 0.1
     Crop Coefficient: 1.0
     End Canopy:

     Surface: None

     LossRate: Green and Ampt
     Percent Impervious Area: 34.738
     Initial Variable: Water Content
     Initial Content: 0.024
     Saturated Content: 0.46
     Wetting Front Suction: 3.5
     Hydraulic Conductivity: 0.024

     Transform: Clark
     Clark Method: Specified
     Time of Concentration: 0.65
     Storage Coefficient: 4.63
     Time Area Method: Default

     Baseflow: None
End:

Junction: P1300000_0342_J
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3145002.421
     Canvas Y: 1.3922881891E7
     Label X: 16.0
     Label Y: 0.0
     Downstream: P1300000_0302_R
End:

Reach: P1300000_0302_R
     Description: RS 34160 to RS 30188
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3147580.886
     Canvas Y: 1.3920118449E7
     From Canvas X: 3145002.421
     From Canvas Y: 1.3922881891E7
     Label X: -87.0
     Label Y: -10.0
     Downstream: P1300000_0302_J

     Route: Modified Puls
     Initial Variable: Combined Inflow
     Number of Reaches: 8
     Storage Outflow Table Name: P1300000_0302_R
     Channel Loss: None
End:

Subbasin: P130D
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3147719.684
     Canvas Y: 1.3922005859E7
     Label X: 16.0
     Label Y: 0.0
     Area: 0.669
     Downstream: P1300000_0302_J

     Discretization: None
     File: P1000000.sqlite

     Canopy: Simple
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None
     Initial Canopy Storage Percent: 0.0
     Canopy Storage Capacity: 0.1
     Crop Coefficient: 1.0
     End Canopy:

     Surface: None
```

```
     LossRate: Green and Ampt
     Percent Impervious Area: 31.042
     Initial Variable: Water Content
     Initial Content: 0.024
     Saturated Content: 0.46
     Wetting Front Suction: 3.5
     Hydraulic Conductivity: 0.024

     Transform: Clark
     Clark Method: Specified
     Time of Concentration: 0.32
     Storage Coefficient: 3.08
     Time Area Method: Default

     Baseflow: None
End:

Junction: P1300000_0302_J
     Description: just upstream of p130#3
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3147580.886
     Canvas Y: 1.3920118449E7
     Label X: 14.0
     Label Y: 15.0
     Downstream: P1300000_0294_J
End:

Subbasin: P13007A
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3151293.279
     Canvas Y: 1.3921669783E7
     Label X: -43.0
     Label Y: 27.0
     Area: 0.845
     Downstream: P1300000_0294_J

     Discretization: None
     File: P1000000.sqlite

     Canopy: Simple
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None
     Initial Canopy Storage Percent: 0.0
     Canopy Storage Capacity: 0.1
     Crop Coefficient: 1.0
     End Canopy:

     Surface: None

     LossRate: Green and Ampt
     Percent Impervious Area: 7.83
     Initial Variable: Water Content
     Initial Content: 0.024
     Saturated Content: 0.46
     Wetting Front Suction: 3.5
     Hydraulic Conductivity: 0.024

     Transform: Clark
     Clark Method: Specified
     Time of Concentration: 0.77
     Storage Coefficient: 5.24
     Time Area Method: Default

     Baseflow: None
End:

Junction: P1300000_0294_J
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3148630.627
     Canvas Y: 1.3919734712E7
     Label X: 16.0
     Label Y: 0.0
     Downstream: P1300000_0257_R
End:

Reach: P1300000_0257_R
     Description: RS 29377 to RS 25741
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3149741.049
     Canvas Y: 1.3914861644E7
     From Canvas X: 3148630.627
     From Canvas Y: 1.3919734712E7
     Label X: -50.0
     Label Y: 10.0
     Downstream: P1300000_0257_J

     Route: Modified Puls
     Initial Variable: Combined Inflow
     Number of Reaches: 9
     Storage Outflow Table Name: P1300000_0257_R
     Channel Loss: None
End:

Subbasin: P130E
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3150540.481
     Canvas Y: 1.3916578173E7
     Label X: 16.0
     Label Y: 0.0
     Area: 1.037
     Downstream: P1300000_0257_J

     Discretization: None
     File: P1000000.sqlite

     Canopy: Simple
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None
     Initial Canopy Storage Percent: 0.0
```

```
     Canopy Storage Capacity: 0.1
     Crop Coefficient: 1.0
     End Canopy:

     Surface: None

     LossRate: Green and Ampt
     Percent Impervious Area: 20.219
     Initial Variable: Water Content
     Initial Content: 0.024
     Saturated Content: 0.46
     Wetting Front Suction: 3.5
     Hydraulic Conductivity: 0.024

     Transform: Clark
     Clark Method: Specified
     Time of Concentration: 0.5
     Storage Coefficient: 4.02
     Time Area Method: Default

     Baseflow: None
End:

Junction: P1300000_0257_J
     Description: just upstream of p130#4
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3149741.049
     Canvas Y: 1.3914861644E7
     Label X: 16.0
     Label Y: 0.0
     Downstream: P1300000_0227_J
End:

Subbasin: P13005A
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3125260.476
     Canvas Y: 1.392021558E7
     Label X: -20.0
     Label Y: 22.0
     Area: 1.198
     Downstream: P1300500_0195_J

     Discretization: None
     File: P1000000.sqlite

     Canopy: Simple
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None
     Initial Canopy Storage Percent: 0.0
     Canopy Storage Capacity: 0.1
     Crop Coefficient: 1.0
     End Canopy:

     Surface: None

     LossRate: Green and Ampt
     Percent Impervious Area: 37.529
     Initial Variable: Water Content
     Initial Content: 0.024
     Saturated Content: 0.46
     Wetting Front Suction: 3.5
     Hydraulic Conductivity: 0.024

     Transform: Clark
     Clark Method: Specified
     Time of Concentration: 1.09
     Storage Coefficient: 2.93
     Time Area Method: Default

     Baseflow: None
End:

Junction: P1300500_0195_J
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3132509.659
     Canvas Y: 1.3917591113E7
     Label X: -66.0
     Label Y: -7.0
     Downstream: P1300500_0162_J
End:

Subbasin: P13005B
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3132407.517
     Canvas Y: 1.3919192719E7
     Label X: -20.0
     Label Y: 22.0
     Area: 0.929
     Downstream: P1300500_0162_J

     Discretization: None
     File: P1000000.sqlite

     Canopy: Simple
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None
     Initial Canopy Storage Percent: 0.0
     Canopy Storage Capacity: 0.1
     Crop Coefficient: 1.0
     End Canopy:

     Surface: None

     LossRate: Green and Ampt
     Percent Impervious Area: 17.876
     Initial Variable: Water Content
     Initial Content: 0.024
     Saturated Content: 0.46
     Wetting Front Suction: 3.5
     Hydraulic Conductivity: 0.024
```

```
     Transform: Clark
     Clark Method: Specified
     Time of Concentration: 1.21
     Storage Coefficient: 5.32
     Time Area Method: Default

     Baseflow: None
End:

Junction: P1300500_0162_J
     Description: p130-05-00 #2 prior to reservior routing
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3134747.303
     Canvas Y: 1.3917460362E7
     Label X: 5.0
     Label Y: 18.0
     Downstream: P530_05_01
End:

Reservoir: P530_05_01
     Description: Reservoir on P130-05-00.  Relationship taken from "IAH Drainage Masterplan (January 1996)" Hec-1 model (95hlfinal.ihl)
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3136609.259
     Canvas Y: 1.391762052E7
     Label X: -22.0
     Label Y: -27.0
     Downstream: P1300500_0144_R

     Route: Modified Puls
     Routing Curve: Elevation-Storage-Outflow
     Initial Outflow Equals Inflow: Yes
     Storage-Outflow Table: P530_05_01
     Elevation-Storage Table: P530_05_01
     Primary Table: Storage-Outflow
End:

Reach: P1300500_0144_R
     Description: RS 15121 to RS 14427
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3139079.071
     Canvas Y: 1.3916982485E7
     From Canvas X: 3136609.259
     From Canvas Y: 1.391762052E7
     Label X: -38.0
     Label Y: -29.0
     Downstream: P1300500_0144_J

     Route: Modified Puls
     Initial Variable: Combined Inflow
     Number of Reaches: 1
     Storage Outflow Table Name: P1300500_0144_R
     Channel Loss: None
End:

Subbasin: P13005C
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3137766.076
     Canvas Y: 1.3918561143E7
     Label X: -20.0
     Label Y: 22.0
     Area: 0.639
     Downstream: P1300500_0144_J

     Discretization: None
     File: P1000000.sqlite

     Canopy: Simple
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None
     Initial Canopy Storage Percent: 0.0
     Canopy Storage Capacity: 0.1
     Crop Coefficient: 1.0
     End Canopy:

     Surface: None

     LossRate: Green and Ampt
     Percent Impervious Area: 10.809
     Initial Variable: Water Content
     Initial Content: 0.024
     Saturated Content: 0.46
     Wetting Front Suction: 3.5
     Hydraulic Conductivity: 0.024

     Transform: Clark
     Clark Method: Specified
     Time of Concentration: 0.33
     Storage Coefficient: 3.63
     Time Area Method: Default

     Baseflow: None
End:

Junction: P1300500_0144_J
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3139079.071
     Canvas Y: 1.3916982485E7
     Label X: 16.0
     Label Y: 0.0
     Downstream: P1300500_0114_J
End:

Subbasin: P1300502A
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3133439.666
     Canvas Y: 1.3914224528E7
     Label X: -16.0
```

```
     Label Y: -28.0
     Area: 0.923
     Downstream: P1300502_0144_J

     Discretization: None
     File: P1000000.sqlite

     Canopy: Simple
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None
     Initial Canopy Storage Percent: 0.0
     Canopy Storage Capacity: 0.1
     Crop Coefficient: 1.0
     End Canopy:

     Surface: None

     LossRate: Green and Ampt
     Percent Impervious Area: 1.201
     Initial Variable: Water Content
     Initial Content: 0.024
     Saturated Content: 0.46
     Wetting Front Suction: 3.5
     Hydraulic Conductivity: 0.024

     Transform: Clark
     Clark Method: Specified
     Time of Concentration: 1.24
     Storage Coefficient: 5.57
     Time Area Method: Default

     Baseflow: None
End:

Junction: P1300502_0144_J
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3136736.7936990825
     Canvas Y: 1.3915055935708027E7
     Label X: -45.0
     Label Y: 18.0
     Downstream: P1300502_0126_R
End:

Reach: P1300502_0126_R
     Description: RS 14427 to RS 12599
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3139395.0838532113
     Canvas Y: 1.391569030040389 9E7
     From Canvas X: 3136736.7936990825
     From Canvas Y: 1.3915055935708027E7
     Label X: -21.0
     Label Y: -9.0
     Downstream: P1300502_0126_J

     Route: Lag
     Initial Variable: Combined Inflow
     Lag: 9.8
     Channel Loss: None
End:

Subbasin: P1300502B
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3138458.640730734
     Canvas Y: 1.3914270531798853E7
     Label X: 16.0
     Label Y: 0.0
     Area: 0.135
     Downstream: P1300502_0126_J

     Discretization: None
     File: P1000000.sqlite

     Canopy: Simple
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None
     Initial Canopy Storage Percent: 0.0
     Canopy Storage Capacity: 0.1
     Crop Coefficient: 1.0
     End Canopy:

     Surface: None

     LossRate: Green and Ampt
     Percent Impervious Area: 36.341
     Initial Variable: Water Content
     Initial Content: 0.024
     Saturated Content: 0.46
     Wetting Front Suction: 3.5
     Hydraulic Conductivity: 0.024

     Transform: Clark
     Clark Method: Specified
     Time of Concentration: 0.17
     Storage Coefficient: 1.98
     Time Area Method: Default

     Baseflow: None
End:

Junction: P1300502_0126_J
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3139395.0838532113
     Canvas Y: 1.3915690300403899E7
     Label X: 14.0
     Label Y: -9.0
     Downstream: P1300500_0114_J
End:

Junction: P1300500_0114_J
     Last Modified Date: 15 February 2024
```

```
     Last Modified Time: 20:45:39
     Canvas X: 3140778.7354929172
     Canvas Y: 1.3916602215573186E7
     Label X: 16.0
     Label Y: 0.0
     Downstream: P1300500_0016_R
End:

Reach: P1300500_0016_R
     Description: RS 11352 to RS 1649
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3148584.536
     Canvas Y: 1.3913292335E7
     From Canvas X: 3140778.7354929172
     From Canvas Y: 1.3916602215573186E7
     Label X: -31.0
     Label Y: 22.0
     Downstream: P1300500_0016_J

     Route: Modified Puls
     Initial Variable: Combined Inflow
     Number of Reaches: 28
     Storage Outflow Table Name: P1300500_0016_R
     Channel Loss: None
End:

Subbasin: P13005D
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3143897.226
     Canvas Y: 1.3917685264E7
     Label X: -22.0
     Label Y: 22.0
     Area: 2.675
     Downstream: P1300500_0016_J

     Discretization: None
     File: P1000000.sqlite

     Canopy: Simple
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None
     Initial Canopy Storage Percent: 0.0
     Canopy Storage Capacity: 0.1
     Crop Coefficient: 1.0
     End Canopy:

     Surface: None

     LossRate: Green and Ampt
     Percent Impervious Area: 18.641
     Initial Variable: Water Content
     Initial Content: 0.024
     Saturated Content: 0.46
     Wetting Front Suction: 3.5
     Hydraulic Conductivity: 0.024

     Transform: Clark
     Clark Method: Specified
     Time of Concentration: 0.91
     Storage Coefficient: 7.24
     Time Area Method: Default

     Baseflow: None
End:

Junction: P1300500_0016_J
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3148584.536
     Canvas Y: 1.3913292335E7
     Label X: -53.0
     Label Y: -31.0
     Downstream: P1300000_0227_J
End:

Junction: P1300000_0227_J
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3150462.297
     Canvas Y: 1.3913441282E7
     Label X: 16.0
     Label Y: 0.0
     Downstream: P1300000_0195_R
End:

Reach: P1300000_0195_R
     Description: RS 22793 to RS 19487
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3154971.463
     Canvas Y: 1.3912820104E7
     From Canvas X: 3150462.297
     From Canvas Y: 1.3913441282E7
     Label X: 16.0
     Label Y: 0.0
     Downstream: P1300000_0195_J

     Route: Modified Puls
     Initial Variable: Combined Inflow
     Number of Reaches: 8
     Storage Outflow Table Name: P1300000_0195_R
     Channel Loss: None
End:

Subbasin: P130F
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3151313.48
     Canvas Y: 1.3911845926E7
     Label X: 16.0
     Label Y: 0.0
     Area: 1.205
```

```
     Downstream: P1300000_0195_J

     Discretization: None
     File: P1000000.sqlite

     Canopy: Simple
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None
     Initial Canopy Storage Percent: 0.0
     Canopy Storage Capacity: 0.1
     Crop Coefficient: 1.0
     End Canopy:

     Surface: None

     LossRate: Green and Ampt
     Percent Impervious Area: 26.907
     Initial Variable: Water Content
     Initial Content: 0.024
     Saturated Content: 0.46
     Wetting Front Suction: 3.5
     Hydraulic Conductivity: 0.024

     Transform: Clark
     Clark Method: Specified
     Time of Concentration: 0.34
     Storage Coefficient: 4.34
     Time Area Method: Default

     Baseflow: None
End:

Junction: P1300000_0195_J
     Description: just upstream of p130#5
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3154971.463
     Canvas Y: 1.3912820104E7
     Label X: -43.0
     Label Y: -33.0
     Downstream: P1300000_0166_J
End:

Subbasin: P1300301A
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3153516.509
     Canvas Y: 1.3918960864E7
     Label X: -27.0
     Label Y: 21.0
     Area: 0.677
     Downstream: P1300300_0032_J

     Discretization: None
     File: P1000000.sqlite

     Canopy: Simple
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None
     Initial Canopy Storage Percent: 0.0
     Canopy Storage Capacity: 0.1
     Crop Coefficient: 1.0
     End Canopy:

     Surface: None

     LossRate: Green and Ampt
     Percent Impervious Area: 13.327
     Initial Variable: Water Content
     Initial Content: 0.024
     Saturated Content: 0.46
     Wetting Front Suction: 3.5
     Hydraulic Conductivity: 0.024

     Transform: Clark
     Clark Method: Specified
     Time of Concentration: 0.6
     Storage Coefficient: 4.43
     Time Area Method: Default

     Baseflow: None
End:

Junction: P1300300_0032_J
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3155072.702
     Canvas Y: 1.3915636445E7
     Label X: 16.0
     Label Y: 0.0
     Downstream: P1300300_0008_R
End:

Reach: P1300300_0008_R
     Description: RS 3222 to RS 747
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3155572.126
     Canvas Y: 1.3913446665E7
     From Canvas X: 3155072.702
     From Canvas Y: 1.3915636445E7
     Label X: 16.0
     Label Y: 0.0
     Downstream: P1300300_0008_J

     Route: Modified Puls
     Initial Variable: Combined Inflow
     Number of Reaches: 3
     Storage Outflow Table Name: P1300300_0008_R
     Channel Loss: None
End:

Subbasin: P13003A
     Last Modified Date: 15 February 2024
```

```
     Last Modified Time: 20:45:39
     Canvas X: 3156111.602
     Canvas Y: 1.3918280663E7
     Label X: 16.0
     Label Y: 0.0
     Area: 1.576
     Downstream: P1300300_0008_J

     Discretization: None
     File: P1000000.sqlite

     Canopy: Simple
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None
     Initial Canopy Storage Percent: 0.0
     Canopy Storage Capacity: 0.1
     Crop Coefficient: 1.0
     End Canopy:

     Surface: None

     LossRate: Green and Ampt
     Percent Impervious Area: 21.975
     Initial Variable: Water Content
     Initial Content: 0.024
     Saturated Content: 0.46
     Wetting Front Suction: 3.5
     Hydraulic Conductivity: 0.024

     Transform: Clark
     Clark Method: Specified
     Time of Concentration: 0.74
     Storage Coefficient: 4.45
     Time Area Method: Default

     Baseflow: None
End:

Junction: P1300300_0008_J
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3155572.126
     Canvas Y: 1.3913446665E7
     Label X: 16.0
     Label Y: 0.0
     Downstream: P1300000_0166_J
End:

Junction: P1300000_0166_J
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3155634.751
     Canvas Y: 1.3912691726E7
     Label X: 21.0
     Label Y: 3.0
     Downstream: P1300000_0107_R
End:

Reach: P1300000_0107_R
     Description: RS 16634 to RS 10650
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3159775.168
     Canvas Y: 1.3908842015E7
     From Canvas X: 3155634.751
     From Canvas Y: 1.3912691726E7
     Label X: -81.0
     Label Y: -24.0
     Downstream: P1300000_0107_J

     Route: Modified Puls
     Initial Variable: Combined Inflow
     Number of Reaches: 16
     Storage Outflow Table Name: P1300000_0107_R
     Channel Loss: None
End:

Subbasin: P130G
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3158063.404
     Canvas Y: 1.391323008E7
     Label X: 16.0
     Label Y: 0.0
     Area: 1.693
     Downstream: P1300000_0107_J

     Discretization: None
     File: P1000000.sqlite

     Canopy: Simple
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None
     Initial Canopy Storage Percent: 0.0
     Canopy Storage Capacity: 0.1
     Crop Coefficient: 1.0
     End Canopy:

     Surface: None

     LossRate: Green and Ampt
     Percent Impervious Area: 17.739
     Initial Variable: Water Content
     Initial Content: 0.024
     Saturated Content: 0.46
     Wetting Front Suction: 3.5
     Hydraulic Conductivity: 0.024

     Transform: Clark
     Clark Method: Specified
     Time of Concentration: 0.54
     Storage Coefficient: 6.68
     Time Area Method: Default
```

```
     Baseflow: None
End:

Junction: P1300000_0107_J
     Description: just upstream of p130#6
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3159775.168
     Canvas Y: 1.3908842015E7
     Label X: -60.0
     Label Y: -10.0
     Downstream: P1300000_0093_J
End:

Subbasin: P13002A
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3171656.355
     Canvas Y: 1.3921323061E7
     Label X: 16.0
     Label Y: 0.0
     Area: 2.49
     Downstream: P1300200_0115_J

     Discretization: None
     File: P1000000.sqlite

     Canopy: Simple
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None
     Initial Canopy Storage Percent: 0.0
     Canopy Storage Capacity: 0.1
     Crop Coefficient: 1.0
     End Canopy:

     Surface: None

     LossRate: Green and Ampt
     Percent Impervious Area: 10.386
     Initial Variable: Water Content
     Initial Content: 0.024
     Saturated Content: 0.46
     Wetting Front Suction: 3.5
     Hydraulic Conductivity: 0.024

     Transform: Clark
     Clark Method: Specified
     Time of Concentration: 1.29
     Storage Coefficient: 9.83
     Time Area Method: Default

     Baseflow: None
End:

Junction: P1300200_0115_J
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3167762.488
     Canvas Y: 1.3914971932E7
     Label X: 16.0
     Label Y: 0.0
     Downstream: P1300200_0100_J
End:

Subbasin: P1300202A
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3164691.208
     Canvas Y: 1.3920332051E7
     Label X: -60.0
     Label Y: -8.0
     Area: 2.27
     Downstream: P1300200_0100_J

     Discretization: None
     File: P1000000.sqlite

     Canopy: Simple
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None
     Initial Canopy Storage Percent: 0.0
     Canopy Storage Capacity: 0.1
     Crop Coefficient: 1.0
     End Canopy:

     Surface: None

     LossRate: Green and Ampt
     Percent Impervious Area: 16.979
     Initial Variable: Water Content
     Initial Content: 0.024
     Saturated Content: 0.46
     Wetting Front Suction: 3.5
     Hydraulic Conductivity: 0.024

     Transform: Clark
     Clark Method: Specified
     Time of Concentration: 1.27
     Storage Coefficient: 7.37
     Time Area Method: Default

     Baseflow: None
End:

Junction: P1300200_0100_J
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3167222.679
     Canvas Y: 1.3914578017E7
     Label X: 16.0
     Label Y: 0.0
     Downstream: P1300200_0012_R
End:
```

```
Reach: P1300200_0012_R
     Description: RS 9999 to RS 1205
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3161082.123
     Canvas Y: 1.3908907612E7
     From Canvas X: 3167222.679
     From Canvas Y: 1.3914578017E7
     Label X: 15.0
     Label Y: -13.0
     Downstream: P1300200_0023_J

     Route: Modified Puls
     Initial Variable: Combined Inflow
     Number of Reaches: 12
     Storage Outflow Table Name: P1300200_0012_R
     Channel Loss: None
End:

Subbasin: P13002B
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3163758.836
     Canvas Y: 1.3913215861E7
     Label X: 16.0
     Label Y: 0.0
     Area: 2.646
     Downstream: P1300200_0023_J

     Discretization: None
     File: P1000000.sqlite

     Canopy: Simple
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None
     Initial Canopy Storage Percent: 0.0
     Canopy Storage Capacity: 0.1
     Crop Coefficient: 1.0
     End Canopy:

     Surface: None

     LossRate: Green and Ampt
     Percent Impervious Area: 5.683
     Initial Variable: Water Content
     Initial Content: 0.024
     Saturated Content: 0.46
     Wetting Front Suction: 3.5
     Hydraulic Conductivity: 0.024

     Transform: Clark
     Clark Method: Specified
     Time of Concentration: 0.79
     Storage Coefficient: 9.84
     Time Area Method: Default

     Baseflow: None
End:

Junction: P1300200_0023_J
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3161082.123
     Canvas Y: 1.3908907612E7
     Label X: 16.0
     Label Y: 0.0
     Downstream: P1300000_0093_J
End:

Junction: P1300000_0093_J
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3160409.035
     Canvas Y: 1.3908296144E7
     Label X: 5.0
     Label Y: -23.0
     Downstream: P1300000_0043_R
End:

Reach: P1300000_0043_R
     Description: RS 9308 to RS 4337
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3158137.86
     Canvas Y: 1.3902526428E7
     From Canvas X: 3160409.035
     From Canvas Y: 1.3908296144E7
     Label X: -95.0
     Label Y: 26.0
     Downstream: P1300000_0043_J

     Route: Modified Puls
     Initial Variable: Combined Inflow
     Number of Reaches: 20
     Storage Outflow Table Name: P1300000_0043_R
     Channel Loss: None
End:

Subbasin: P130H
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3161221.88
     Canvas Y: 1.3905778308E7
     Label X: 16.0
     Label Y: 0.0
     Area: 2.368
     Downstream: P1300000_0043_J

     Discretization: None
     File: P1000000.sqlite

     Canopy: Simple
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None
```

```
     Initial Canopy Storage Percent: 0.0
     Canopy Storage Capacity: 0.1
     Crop Coefficient: 1.0
     End Canopy:

     Surface: None

     LossRate: Green and Ampt
     Percent Impervious Area: 14.74
     Initial Variable: Water Content
     Initial Content: 0.024
     Saturated Content: 0.46
     Wetting Front Suction: 3.5
     Hydraulic Conductivity: 0.024

     Transform: Clark
     Clark Method: Specified
     Time of Concentration: 2
     Storage Coefficient: 8.56
     Time Area Method: Default

     Baseflow: None
End:

Junction: P1300000_0043_J
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3158137.86
     Canvas Y: 1.3902526428E7
     Label X: 18.0
     Label Y: -1.0
     Downstream: P1000000_1003_J
End:

Junction: P1000000_1003_J
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3158211.252
     Canvas Y: 1.3901088576E7
     Label X: 15.0
     Label Y: 0.0
     Downstream: P1000000_0860_R
End:

Reach: P1000000_0860_R
     Description: RS 100298 to RS 85988
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3160672.013
     Canvas Y: 1.3890314431E7
     From Canvas X: 3158211.252
     From Canvas Y: 1.3901088576E7
     Label X: 16.0
     Label Y: 0.0
     Downstream: P1000000_0860_J

     Route: Modified Puls
     Initial Variable: Combined Inflow
     Number of Reaches: 27
     Storage Outflow Table Name: P1000000_0860_R
     Channel Loss: None
End:

Subbasin: P100P
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3154054.56
     Canvas Y: 1.3895834518E7
     Label X: 16.0
     Label Y: 0.0
     Area: 5.378
     Downstream: P1000000_0860_J

     Discretization: None
     File: P1000000.sqlite

     Canopy: Simple
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None
     Initial Canopy Storage Percent: 0.0
     Canopy Storage Capacity: 0.1
     Crop Coefficient: 1.0
     End Canopy:

     Surface: None

     LossRate: Green and Ampt
     Percent Impervious Area: 5.21
     Initial Variable: Water Content
     Initial Content: 0.024
     Saturated Content: 0.46
     Wetting Front Suction: 3.5
     Hydraulic Conductivity: 0.024

     Transform: Clark
     Clark Method: Specified
     Time of Concentration: 1.44
     Storage Coefficient: 11.4
     Time Area Method: Default

     Baseflow: None
End:

Junction: P1000000_0860_J
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3160672.013
     Canvas Y: 1.3890314431E7
     Label X: 16.0
     Label Y: 0.0
     Downstream: P1000000_0851_J
End:

Subbasin: P127A
```

```
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3166165.777
     Canvas Y: 1.3892990728E7
     Label X: 16.0
     Label Y: 0.0
     Area: 5.056
     Downstream: P1000000_0851_J

     Discretization: None
     File: P1000000.sqlite

     Canopy: Simple
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None
     Initial Canopy Storage Percent: 0.0
     Canopy Storage Capacity: 0.1
     Crop Coefficient: 1.0
     End Canopy:

     Surface: None

     LossRate: Green and Ampt
     Percent Impervious Area: 12.414
     Initial Variable: Water Content
     Initial Content: 0.024
     Saturated Content: 0.46
     Wetting Front Suction: 3.5
     Hydraulic Conductivity: 0.024

     Transform: Clark
     Clark Method: Specified
     Time of Concentration: 2.18
     Storage Coefficient: 14.75
     Time Area Method: Default

     Baseflow: None
End:

Junction: P1000000_0851_J
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3161569.858
     Canvas Y: 1.3889183811E7
     Label X: 16.0
     Label Y: 0.0
     Downstream: P1000000_0817_R
End:

Reach: P1000000_0817_R
     Description: RS 85105 to RS 81700
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3160309.62
     Canvas Y: 1.3884520266E7
     From Canvas X: 3161569.858
     From Canvas Y: 1.3889183811E7
     Label X: 16.0
     Label Y: 0.0
     Downstream: P1000000_0817_J

     Route: Modified Puls
     Initial Variable: Combined Inflow
     Number of Reaches: 9
     Storage Outflow Table Name: P1000000_0817_R
     Channel Loss: None
End:

Subbasin: P126A
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3147544.208
     Canvas Y: 1.388961114E7
     Label X: 16.0
     Label Y: 0.0
     Area: 3.711
     Downstream: P1260000_0127_D

     Discretization: None
     File: P1000000.sqlite

     Canopy: Simple
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None
     Initial Canopy Storage Percent: 0.0
     Canopy Storage Capacity: 0.1
     Crop Coefficient: 1.0
     End Canopy:

     Surface: None

     LossRate: Green and Ampt
     Percent Impervious Area: 23.459
     Initial Variable: Water Content
     Initial Content: 0.024
     Saturated Content: 0.46
     Wetting Front Suction: 3.5
     Hydraulic Conductivity: 0.024

     Transform: Clark
     Clark Method: Specified
     Time of Concentration: 2.06
     Storage Coefficient: 9.79
     Time Area Method: Default

     Baseflow: None
End:

Diversion: P1260000_0127_D
     Description: p126 to p125 overflow
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3152313.921
     Canvas Y: 1.3889413773E7
```

```
     Label X: 16.0
     Label Y: 0.0
     Downstream: P1000000_0817_J
     Divert To: P1250000_0129_J

     Diverter: Inflow-Diversion Table
     Inflow Diversion Table Name: P1260000_0127_D
     End Diverter:
End:

Junction: P1000000_0817_J
     Description: just upstream of p100#20
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3160309.62
     Canvas Y: 1.3884520266E7
     Label X: 16.0
     Label Y: 0.0
     Downstream: P1000000_0795_J
End:

Subbasin: P100Q
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3164923.133
     Canvas Y: 1.3885655336E7
     Label X: 16.0
     Label Y: 0.0
     Area: 2.627
     Downstream: P1000000_0795_J

     Discretization: None
     File: P1000000.sqlite

     Canopy: Simple
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None
     Initial Canopy Storage Percent: 0.0
     Canopy Storage Capacity: 0.1
     Crop Coefficient: 1.0
     End Canopy:

     Surface: None

     LossRate: Green and Ampt
     Percent Impervious Area: 5.615
     Initial Variable: Water Content
     Initial Content: 0.024
     Saturated Content: 0.46
     Wetting Front Suction: 3.5
     Hydraulic Conductivity: 0.024

     Transform: Clark
     Clark Method: Specified
     Time of Concentration: 1.19
     Storage Coefficient: 9.02
     Time Area Method: Default

     Baseflow: None
End:

Junction: P1000000_0795_J
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3160895.463
     Canvas Y: 1.3883458425E7
     Label X: 16.0
     Label Y: 0.0
     Downstream: P1000000_0734_R
End:

Reach: P1000000_0734_R
     Description: RS 79493 to RS 73452
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3163019.144
     Canvas Y: 1.3880016598E7
     From Canvas X: 3160895.463
     From Canvas Y: 1.3883458425E7
     Label X: 17.0
     Label Y: 3.0
     Downstream: P1000000_0735_J

     Route: Modified Puls
     Initial Variable: Combined Inflow
     Number of Reaches: 9
     Storage Outflow Table Name: P1000000_0734_R
     Channel Loss: None
End:

Subbasin: P125A
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3144052.48
     Canvas Y: 1.3885948258E7
     Label X: 16.0
     Label Y: 0.0
     Area: 2.35
     Downstream: P1250000_0129_J

     Discretization: None
     File: P1000000.sqlite

     Canopy: Simple
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None
     Initial Canopy Storage Percent: 0.0
     Canopy Storage Capacity: 0.1
     Crop Coefficient: 1.0
     End Canopy:

     Surface: None

     LossRate: Green and Ampt
```

```
     Percent Impervious Area: 30.658
     Initial Variable: Water Content
     Initial Content: 0.024
     Saturated Content: 0.46
     Wetting Front Suction: 3.5
     Hydraulic Conductivity: 0.024

     Transform: Clark
     Clark Method: Specified
     Time of Concentration: 0.78
     Storage Coefficient: 8.08
     Time Area Method: Default

     Baseflow: None
End:

Junction: P1250000_0129_J
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3150548.572
     Canvas Y: 1.3882874796E7
     Label X: -26.0
     Label Y: -28.0
     Downstream: P1250000_0027_R
End:

Reach: P1250000_0027_R
     Description: RS 12856 to RS 2679
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3159316.737
     Canvas Y: 1.3881560648E7
     From Canvas X: 3150548.572
     From Canvas Y: 1.3882874796E7
     Label X: -80.0
     Label Y: -21.0
     Downstream: P1250000_0027_J

     Route: Modified Puls
     Initial Variable: Combined Inflow
     Number of Reaches: 19
     Storage Outflow Table Name: P1250000_0027_R
     Channel Loss: None
End:

Subbasin: P125B
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3153629.279
     Canvas Y: 1.3883564185E7
     Label X: 16.0
     Label Y: 0.0
     Area: 1.865
     Downstream: P1250000_0027_J

     Discretization: None
     File: P1000000.sqlite

     Canopy: Simple
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None
     Initial Canopy Storage Percent: 0.0
     Canopy Storage Capacity: 0.1
     Crop Coefficient: 1.0
     End Canopy:

     Surface: None

     LossRate: Green and Ampt
     Percent Impervious Area: 7.007
     Initial Variable: Water Content
     Initial Content: 0.024
     Saturated Content: 0.46
     Wetting Front Suction: 3.5
     Hydraulic Conductivity: 0.024

     Transform: Clark
     Clark Method: Specified
     Time of Concentration: 1.06
     Storage Coefficient: 5.08
     Time Area Method: Default

     Baseflow: None
End:

Junction: P1250000_0027_J
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3159316.737
     Canvas Y: 1.3881560648E7
     Label X: -25.0
     Label Y: -30.0
     Downstream: P1000000_0735_J
End:

Junction: P1000000_0735_J
     Description: just upstream of p100#21
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3163019.144
     Canvas Y: 1.3880016598E7
     Label X: 16.0
     Label Y: 0.0
     Downstream: P1000000_0720_J
End:

Subbasin: P121A
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3171373.463
     Canvas Y: 1.3879845388E7
     Label X: 16.0
     Label Y: 0.0
     Area: 3.824
```

```
     Downstream: P1000000_0720_J

     Discretization: None
     File: P1000000.sqlite

     Canopy: Simple
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None
     Initial Canopy Storage Percent: 0.0
     Canopy Storage Capacity: 0.1
     Crop Coefficient: 1.0
     End Canopy:

     Surface: None

     LossRate: Green and Ampt
     Percent Impervious Area: 13.002
     Initial Variable: Water Content
     Initial Content: 0.024
     Saturated Content: 0.46
     Wetting Front Suction: 3.5
     Hydraulic Conductivity: 0.024

     Transform: Clark
     Clark Method: Specified
     Time of Concentration: 1.3
     Storage Coefficient: 13.64
     Time Area Method: Default

     Baseflow: None
End:

Junction: P1000000_0720_J
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3163565.07
     Canvas Y: 1.3878609188E7
     Label X: 16.0
     Label Y: 0.0
     Downstream: P1000000_0640_R
End:

Reach: P1000000_0640_R
     Description: RS 71993 to RS 64048
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3162700.479
     Canvas Y: 1.3872490538E7
     From Canvas X: 3163565.07
     From Canvas Y: 1.3878609188E7
     Label X: -113.0
     Label Y: -7.0
     Downstream: P1000000_0640_J

     Route: Modified Puls
     Initial Variable: Combined Inflow
     Number of Reaches: 10
     Storage Outflow Table Name: P1000000_0640_R
     Channel Loss: None
End:

Subbasin: P100R
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3159208.858
     Canvas Y: 1.3878841963E7
     Label X: 16.0
     Label Y: 0.0
     Area: 2.968
     Downstream: P1000000_0640_J

     Discretization: None
     File: P1000000.sqlite

     Canopy: Simple
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None
     Initial Canopy Storage Percent: 0.0
     Canopy Storage Capacity: 0.1
     Crop Coefficient: 1.0
     End Canopy:

     Surface: None

     LossRate: Green and Ampt
     Percent Impervious Area: 20.885
     Initial Variable: Water Content
     Initial Content: 0.024
     Saturated Content: 0.46
     Wetting Front Suction: 3.5
     Hydraulic Conductivity: 0.024

     Transform: Clark
     Clark Method: Specified
     Time of Concentration: 0.81
     Storage Coefficient: 7.24
     Time Area Method: Default

     Baseflow: None
End:

Junction: P1000000_0640_J
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3162700.479
     Canvas Y: 1.3872490538E7
     Label X: 16.0
     Label Y: 0.0
     Downstream: P1000000_0635_J
End:

Reach: P1180000_1036_R
     Description: RS 185578 to RS 103600
     Last Modified Date: 15 February 2024
```

```
     Last Modified Time: 20:45:39
     Canvas X: 3084951.09
     Canvas Y: 1.3898919396E7
     From Canvas X: 3091598.416
     From Canvas Y: 1.3903420459E7
     Label X: -39.0
     Label Y: -3.0
     Downstream: P1180000_1036_J

     Route: Lag
     Initial Variable: Combined Inflow
     Lag: 277.78
     Channel Loss: None
End:

Subbasin: P118A
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3080380.073
     Canvas Y: 1.3900064661E7
     Label X: 16.0
     Label Y: 0.0
     Area: 1.672
     Downstream: P1180000_1036_J

     Discretization: None
     File: P1000000.sqlite

     Canopy: Simple
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None
     Initial Canopy Storage Percent: 0.0
     Canopy Storage Capacity: 0.1
     Crop Coefficient: 1.0
     End Canopy:

     Surface: None

     LossRate: Green and Ampt
     Percent Impervious Area: 32.542
     Initial Variable: Water Content
     Initial Content: 0.024
     Saturated Content: 0.46
     Wetting Front Suction: 3.5
     Hydraulic Conductivity: 0.024

     Transform: Clark
     Clark Method: Specified
     Time of Concentration: 0.25
     Storage Coefficient: 6.11
     Time Area Method: Default

     Baseflow: None
End:

Junction: P1180000_1036_J
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3084951.09
     Canvas Y: 1.3898919396E7
     Label X: -34.0
     Label Y: -33.0
     Downstream: P1180000_0846_R
End:

Reach: P1180000_0846_R
     Description: RS 103600 to RS 84594
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3099865.828
     Canvas Y: 1.3892083474E7
     From Canvas X: 3084951.09
     From Canvas Y: 1.3898919396E7
     Label X: -94.0
     Label Y: -15.0
     Downstream: P1180000_0846_J

     Route: Modified Puls
     Initial Variable: Combined Inflow
     Number of Reaches: 51
     Storage Outflow Table Name: P1180000_0846_R
     Channel Loss: None
End:

Subbasin: P118B
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3093319.135
     Canvas Y: 1.3893080355E7
     Label X: 16.0
     Label Y: 0.0
     Area: 5.513
     Downstream: P1180000_0846_J

     Discretization: None
     File: P1000000.sqlite

     Canopy: Simple
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None
     Initial Canopy Storage Percent: 0.0
     Canopy Storage Capacity: 0.1
     Crop Coefficient: 1.0
     End Canopy:

     Surface: None

     LossRate: Green and Ampt
     Percent Impervious Area: 24.055
     Initial Variable: Water Content
     Initial Content: 0.024
     Saturated Content: 0.46
     Wetting Front Suction: 3.5
     Hydraulic Conductivity: 0.024
```

```
     Transform: Clark
     Clark Method: Specified
     Time of Concentration: 0.89
     Storage Coefficient: 6.62
     Time Area Method: Default

     Baseflow: None
End:

Junction: P1180000_0846_J
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3099865.828
     Canvas Y: 1.3892083474E7
     Label X: -18.0
     Label Y: -29.0
     Downstream: P1180000_0835_J
End:

Subbasin: P11831A
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3095185.626
     Canvas Y: 1.3903386516E7
     Label X: 16.0
     Label Y: 0.0
     Area: 1.096
     Downstream: P1183100_9903_J

     Discretization: None
     File: P1000000.sqlite

     Canopy: Simple
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None
     Initial Canopy Storage Percent: 0.0
     Canopy Storage Capacity: 0.1
     Crop Coefficient: 1.0
     End Canopy:

     Surface: None

     LossRate: Green and Ampt
     Percent Impervious Area: 10.857
     Initial Variable: Water Content
     Initial Content: 0.024
     Saturated Content: 0.46
     Wetting Front Suction: 3.5
     Hydraulic Conductivity: 0.024

     Transform: Clark
     Clark Method: Specified
     Time of Concentration: 0.67
     Storage Coefficient: 6
     Time Area Method: Default

     Baseflow: None
End:

Junction: P1183100_9903_J
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3097304.924
     Canvas Y: 1.3901330937E7
     Label X: -65.0
     Label Y: -10.0
     Downstream: P1180000_9902_R
End:

Reach: P1180000_9902_R
     Description: No X-Section
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3098292.918
     Canvas Y: 1.3898176202E7
     From Canvas X: 3097304.924
     From Canvas Y: 1.3901330937E7
     Label X: -126.0
     Label Y: -11.0
     Downstream: P1183100_9902_J

     Route: Modified Puls
     Initial Variable: Combined Inflow
     Number of Reaches: 1
     Storage Outflow Table Name: P1180000_9902_R
     Channel Loss: None
End:

Subbasin: P11831B
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3100732.702
     Canvas Y: 1.3901809232E7
     Label X: -17.0
     Label Y: 19.0
     Area: 1.251
     Downstream: P1183100_9902_J

     Discretization: None
     File: P1000000.sqlite

     Canopy: Simple
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None
     Initial Canopy Storage Percent: 0.0
     Canopy Storage Capacity: 0.1
     Crop Coefficient: 1.0
     End Canopy:

     Surface: None

     LossRate: Green and Ampt
     Percent Impervious Area: 20.449
```

```
     Initial Variable: Water Content
     Initial Content: 0.024
     Saturated Content: 0.46
     Wetting Front Suction: 3.5
     Hydraulic Conductivity: 0.024

     Transform: Clark
     Clark Method: Specified
     Time of Concentration: 0.2
     Storage Coefficient: 5.79
     Time Area Method: Default

     Baseflow: None
End:

Junction: P1183100_9902_J
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3098292.918
     Canvas Y: 1.3898176202E7
     Label X: 25.0
     Label Y: 4.0
     Downstream: P1180000_9901_R
End:

Reach: P1180000_9901_R
     Description: No X-Sections
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3100789.166
     Canvas Y: 1.3893930542E7
     From Canvas X: 3098292.918
     From Canvas Y: 1.3898176202E7
     Label X: 109.0
     Label Y: -5.0
     Downstream: P1183100_9901_J

     Route: Modified Puls
     Initial Variable: Combined Inflow
     Number of Reaches: 10
     Storage Outflow Table Name: P1180000_9901_R
     Channel Loss: None
End:

Subbasin: P11831C
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3100134.834
     Canvas Y: 1.3896428417E7
     Label X: 0.0
     Label Y: 20.0
     Area: 0.718
     Downstream: P1183100_9901_J

     Discretization: None
     File: P1000000.sqlite

     Canopy: Simple
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None
     Initial Canopy Storage Percent: 0.0
     Canopy Storage Capacity: 0.1
     Crop Coefficient: 1.0
     End Canopy:

     Surface: None

     LossRate: Green and Ampt
     Percent Impervious Area: 27.41
     Initial Variable: Water Content
     Initial Content: 0.024
     Saturated Content: 0.46
     Wetting Front Suction: 3.5
     Hydraulic Conductivity: 0.024

     Transform: Clark
     Clark Method: Specified
     Time of Concentration: 0.42
     Storage Coefficient: 4.18
     Time Area Method: Default

     Baseflow: None
End:

Junction: P1183100_9901_J
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3100789.166
     Canvas Y: 1.3893930542E7
     Label X: 9.0
     Label Y: 10.0
     Downstream: P1180000_0835_J
End:

Junction: P1180000_0835_J
     Description: node p118#2d
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3100836.944
     Canvas Y: 1.3892967007E7
     Label X: 13.0
     Label Y: 8.0
     Downstream: P1180000_0660_R
End:

Reach: P1180000_0660_R
     Description: routing
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3116644.506
     Canvas Y: 1.3890976759E7
     From Canvas X: 3100836.944
     From Canvas Y: 1.3892967007E7
     Label X: -76.0
```

```
     Label Y: -31.0
     Downstream: P1180000_0643_J

     Route: Modified Puls
     Initial Variable: Combined Inflow
     Number of Reaches: 70
     Storage Outflow Table Name: P1180000_0660_R
     Channel Loss: None
End:

Reach: P1180000_0643_R
     Description: pl38 overflow to pl18 (lag)
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3116644.506
     Canvas Y: 1.3890976759E7
     From Canvas X: 3116486.794
     From Canvas Y: 1.3896889258E7
     Label X: -96.0
     Label Y: 2.0
     Downstream: P1180000_0643_J

     Route: Lag
     Initial Variable: Combined Inflow
     Lag: 138.89
     Channel Loss: None
End:

Subbasin: P118C
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3108624.564
     Canvas Y: 1.3894435523E7
     Label X: 16.0
     Label Y: 0.0
     Area: 6.032
     Downstream: P1180000_0643_J

     Discretization: None
     File: P1000000.sqlite

     Canopy: Simple
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None
     Initial Canopy Storage Percent: 0.0
     Canopy Storage Capacity: 0.1
     Crop Coefficient: 1.0
     End Canopy:

     Surface: None

     LossRate: Green and Ampt
     Percent Impervious Area: 40.94
     Initial Variable: Water Content
     Initial Content: 0.024
     Saturated Content: 0.46
     Wetting Front Suction: 3.5
     Hydraulic Conductivity: 0.024

     Transform: Clark
     Clark Method: Specified
     Time of Concentration: 1.8
     Storage Coefficient: 6.02
     Time Area Method: Default

     Baseflow: None
End:

Junction: P1180000_0643_J
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3116644.506
     Canvas Y: 1.3890976759E7
     Label X: -54.0
     Label Y: 38.0
     Downstream: P1180000_0641_J
End:

Subbasin: P1182JA
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3115543.139
     Canvas Y: 1.3886128142E7
     Label X: -18.0
     Label Y: -38.0
     Area: 1.575
     Downstream: P1180000_0641_J

     Discretization: None
     File: P1000000.sqlite

     Canopy: Simple
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None
     Initial Canopy Storage Percent: 0.0
     Canopy Storage Capacity: 0.1
     Crop Coefficient: 1.0
     End Canopy:

     Surface: None

     LossRate: Green and Ampt
     Percent Impervious Area: 32.946
     Initial Variable: Water Content
     Initial Content: 0.024
     Saturated Content: 0.46
     Wetting Front Suction: 3.5
     Hydraulic Conductivity: 0.024

     Transform: Clark
     Clark Method: Specified
     Time of Concentration: 0.37
     Storage Coefficient: 5.61
     Time Area Method: Default
```

```
     Baseflow: None
End:

Junction: P1180000_0641_J
     Description: node p118#3
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3118325.474
     Canvas Y: 1.38898547E7
     Label X: 16.0
     Label Y: 0.0
     Downstream: P1180000_0441_R
End:

Reach: P1180000_0441_R
     Description: RS 64094 to RS 44143
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3127386.409
     Canvas Y: 1.3880875933E7
     From Canvas X: 3118325.474
     From Canvas Y: 1.38898547E7
     Label X: -48.0
     Label Y: 59.0
     Downstream: P1180000_0441_J

     Route: Modified Puls
     Initial Variable: Combined Inflow
     Number of Reaches: 45
     Storage Outflow Table Name: P1180000_0441_R
     Channel Loss: None
End:

Subbasin: P118D
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3126560.613
     Canvas Y: 1.3890210587E7
     Label X: 16.0
     Label Y: 0.0
     Area: 6.331
     Downstream: P1180000_0441_J

     Discretization: None
     File: P1000000.sqlite

     Canopy: Simple
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None
     Initial Canopy Storage Percent: 0.0
     Canopy Storage Capacity: 0.1
     Crop Coefficient: 1.0
     End Canopy:

     Surface: None

     LossRate: Green and Ampt
     Percent Impervious Area: 35.763
     Initial Variable: Water Content
     Initial Content: 0.024
     Saturated Content: 0.46
     Wetting Front Suction: 3.5
     Hydraulic Conductivity: 0.024

     Transform: Clark
     Clark Method: Specified
     Time of Concentration: 1.81
     Storage Coefficient: 6.51
     Time Area Method: Default

     Baseflow: None
End:

Junction: P1180000_0441_J
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3127386.409
     Canvas Y: 1.3880875933E7
     Label X: -60.0
     Label Y: -4.0
     Downstream: P1180000_0432_J
End:

Subbasin: P11818A
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3121396.351575456
     Canvas Y: 1.387601326699834 1E7
     Label X: -18.0
     Label Y: -32.0
     Area: 3.51
     Downstream: P1180000_0432_J

     Discretization: None
     File: P1000000.sqlite

     Canopy: Simple
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None
     Initial Canopy Storage Percent: 0.0
     Canopy Storage Capacity: 0.1
     Crop Coefficient: 1.0
     End Canopy:

     Surface: None

     LossRate: Green and Ampt
     Percent Impervious Area: 43.133
     Initial Variable: Water Content
     Initial Content: 0.024
     Saturated Content: 0.46
     Wetting Front Suction: 3.5
     Hydraulic Conductivity: 0.024
```

```
     Transform: Clark
     Clark Method: Specified
     Time of Concentration: 0.73
     Storage Coefficient: 8.9
     Time Area Method: Default

     Baseflow: None
End:

Junction: P1180000_0432_J
     Description: node p118ff4
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3127814.032
     Canvas Y: 1.388027029E7
     Label X: -4.0
     Label Y: -31.0
     Downstream: P1180000_0382_R
End:

Reach: P1180000_0382_R
     Description: RS 43215 to RS 38170
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3133716.739
     Canvas Y: 1.3879988372E7
     From Canvas X: 3127814.032
     From Canvas Y: 1.388027029E7
     Label X: -43.0
     Label Y: 16.0
     Downstream: P1180000_0382_J

     Route: Modified Puls
     Initial Variable: Combined Inflow
     Number of Reaches: 25
     Storage Outflow Table Name: P1180000_0382_R
     Channel Loss: None
End:

Subbasin: P118E
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3129346.515
     Canvas Y: 1.387756794E7
     Label X: -15.0
     Label Y: -32.0
     Area: 1.017
     Downstream: P1180000_0382_J

     Discretization: None
     File: P1000000.sqlite

     Canopy: Simple
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None
     Initial Canopy Storage Percent: 0.0
     Canopy Storage Capacity: 0.1
     Crop Coefficient: 1.0
     End Canopy:

     Surface: None

     LossRate: Green and Ampt
     Percent Impervious Area: 42.997
     Initial Variable: Water Content
     Initial Content: 0.024
     Saturated Content: 0.46
     Wetting Front Suction: 3.5
     Hydraulic Conductivity: 0.024

     Transform: Clark
     Clark Method: Specified
     Time of Concentration: 0.88
     Storage Coefficient: 4.87
     Time Area Method: Default

     Baseflow: None
End:

Junction: P1180000_0382_J
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3133716.739
     Canvas Y: 1.3879988372E7
     Label X: -38.0
     Label Y: 17.0
     Downstream: P1180000_0361_J
End:

Subbasin: P11814A
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3134825.7
     Canvas Y: 1.38864755E7
     Label X: -21.0
     Label Y: 22.0
     Area: 2.871
     Downstream: P1180000_0361_J

     Discretization: None
     File: P1000000.sqlite

     Canopy: Simple
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None
     Initial Canopy Storage Percent: 0.0
     Canopy Storage Capacity: 0.1
     Crop Coefficient: 1.0
     End Canopy:

     Surface: None

     LossRate: Green and Ampt
```

```
     Percent Impervious Area: 40.213
     Initial Variable: Water Content
     Initial Content: 0.024
     Saturated Content: 0.46
     Wetting Front Suction: 3.5
     Hydraulic Conductivity: 0.024

     Transform: Clark
     Clark Method: Specified
     Time of Concentration: 0.91
     Storage Coefficient: 6.78
     Time Area Method: Default

     Baseflow: None
End:

Junction: P1180000_0361_J
     Description: node p118#5
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3134284.227
     Canvas Y: 1.387988465E7
     Label X: 19.0
     Label Y: 4.0
     Downstream: P1180000_0233_R
End:

Reach: P1180000_0233_R
     Description: RS 36107 to RS 23286
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3144371.577
     Canvas Y: 1.3876084164E7
     From Canvas X: 3134284.227
     From Canvas Y: 1.387988465E7
     Label X: -26.0
     Label Y: 19.0
     Downstream: P1180000_0233_J

     Route: Modified Puls
     Initial Variable: Combined Inflow
     Number of Reaches: 20
     Storage Outflow Table Name: P1180000_0233_R
     Channel Loss: None
End:

Subbasin: P118F
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3134679.5155567788
     Canvas Y: 1.3875496421133686E7
     Label X: -12.0
     Label Y: -34.0
     Area: 5.698
     Downstream: P1180000_0233_J

     Discretization: None
     File: P1000000.sqlite

     Canopy: Simple
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None
     Initial Canopy Storage Percent: 0.0
     Canopy Storage Capacity: 0.1
     Crop Coefficient: 1.0
     End Canopy:

     Surface: None

     LossRate: Green and Ampt
     Percent Impervious Area: 39.453
     Initial Variable: Water Content
     Initial Content: 0.024
     Saturated Content: 0.46
     Wetting Front Suction: 3.5
     Hydraulic Conductivity: 0.024

     Transform: Clark
     Clark Method: Specified
     Time of Concentration: 1.29
     Storage Coefficient: 4.33
     Time Area Method: Default

     Baseflow: None
End:

Junction: P1180000_0233_J
     Description: node p118#6
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3144371.577
     Canvas Y: 1.3876084164E7
     Label X: 16.0
     Label Y: 0.0
     Downstream: P1180000_0036_R
End:

Reach: P1180000_0036_R
     Description: RS 23286 to RS 3597
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3161386.8428929625
     Canvas Y: 1.387158143352632E7
     From Canvas X: 3144371.577
     From Canvas Y: 1.3876084164E7
     Label X: -106.0
     Label Y: -11.0
     Downstream: P1180000_0036_J

     Route: Modified Puls
     Initial Variable: Combined Inflow
     Number of Reaches: 21
     Storage Outflow Table Name: P1180000_0036_R
     Channel Loss: None
```

```
End:

Subbasin: Pl18G
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3152826.961
     Canvas Y: 1.3876260326E7
     Label X: -13.0
     Label Y: 20.0
     Area: 7.318
     Downstream: P1180000_0036_J

     Discretization: None
     File: P1000000.sqlite

     Canopy: Simple
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None
     Initial Canopy Storage Percent: 0.0
     Canopy Storage Capacity: 0.1
     Crop Coefficient: 1.0
     End Canopy:

     Surface: None

     LossRate: Green and Ampt
     Percent Impervious Area: 29.313
     Initial Variable: Water Content
     Initial Content: 0.024
     Saturated Content: 0.46
     Wetting Front Suction: 3.5
     Hydraulic Conductivity: 0.024

     Transform: Clark
     Clark Method: Specified
     Time of Concentration: 3.05
     Storage Coefficient: 6.03
     Time Area Method: Default

     Baseflow: None
End:

Junction: P1180000_0036_J
     Description: node p118#7 (node p100#19 in green's)
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3161386.8428929625
     Canvas Y: 1.387158143352632E7
     Label X: -51.0
     Label Y: -21.0
     Downstream: P1000000_0635_J
End:

Subbasin: DA8
     Last Modified Date: 15 July 2024
     Last Modified Time: 18:16:01
     Canvas X: 3138748.574436885
     Canvas Y: 1.3871216083373717E7
     From Canvas X: -3296.949702542275
     From Canvas Y: -8954.678204435855
     Label X: 1.0
     Label Y: 0.0
     Area: 0.03376
     Downstream: C/CHA2

     Discretization: None
     File: P1000000.sqlite

     Canopy 1: None
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None

     Surface 1: None

     LossRate 1: SCS
     Percent Impervious Area: 0.0
     Curve Number: 88
     Initial Abstraction: 0.0001

     Transform: Kinematic Wave

     Plane: 1
     Plane 1 Length: 120
     Plane 1 Slope: 0.25
     Plane 1 Roughness: 0.3
     Plane 1 Percent of Area: 100
     Plane 1 Number of Steps: 5

     Channel: Main
     Channel Length: 1065
     Channel Slope: 0.005
     Channel Mannings N: 0.03
     Shape: Trapezoid
     Channel Width: 0
     Channel Side Slope: 3
     Channel Number of Steps: 5
     Route with Muskingum Cunge: Yes

     Baseflow: Recession
     Recession Factor: 1
     Initial Baseflow: 0
     Threshold Flow: 0.0001
End:

Subbasin: CHA1
     Last Modified Date: 11 March 2024
     Last Modified Time: 14:23:45
     Canvas X: 3139775.970513737
     Canvas Y: 1.3872020091419792E7
     From Canvas X: -3581.8712817737033
     From Canvas Y: -7285.851811788976
     Area: 0.00728
     Downstream: C/CHA2
```

```
     Discretization: None
     File: Pl000000.sqlite

     Canopy 1: None
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None

     Surface 1: None

     LossRate 1: SCS
     Percent Impervious Area: 0.0
     Curve Number: 88
     Initial Abstraction: 0.0001

     Transform: Kinematic Wave

     Plane: 1
     Plane 1 Length: 140
     Plane 1 Slope: 0.25
     Plane 1 Roughness: 0.3
     Plane 1 Percent of Area: 100
     Plane 1 Number of Steps: 5

     Channel: Main
     Channel Length: 1045
     Channel Slope: 0.001
     Channel Mannings N: 0.04
     Shape: Trapezoid
     Channel Width: 0
     Channel Side Slope: 3
     Channel Number of Steps: 5
     Route with Muskingum Cunge: Yes

     Baseflow: Recession
     Recession Factor: 1
     Initial Baseflow: 0
     Threshold Flow: 0.0001
End:

Subbasin: CHA2
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3138813.312282963
     Canvas Y: 1.3869934923908383E7
     From Canvas X: -3419.0589507841505
     From Canvas Y: -10786.316928068176
     Area: 0.00458
     Downstream: C/CHA2

     Discretization: None
     File: Pl000000.sqlite

     Canopy 1: None
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None

     Surface 1: None

     LossRate 1: SCS
     Percent Impervious Area: 0.0
     Curve Number: 88
     Initial Abstraction: 0.0001

     Transform: Kinematic Wave

     Plane: 1
     Plane 1 Length: 160
     Plane 1 Slope: 0.25
     Plane 1 Roughness: 0.3
     Plane 1 Percent of Area: 100
     Plane 1 Number of Steps: 5

     Channel: Main
     Channel Length: 655
     Channel Slope: 0.001
     Channel Mannings N: 0.015
     Shape: Trapezoid
     Channel Width: 12
     Channel Side Slope: 3
     Channel Number of Steps: 5
     Route with Muskingum Cunge: Yes

     Baseflow: Recession
     Recession Factor: 1
     Initial Baseflow: 0
     Threshold Flow: 0.0001
End:

Subbasin: DA2
     Last Modified Date: 15 July 2024
     Last Modified Time: 18:16:10
     Canvas X: 3140571.6786263287
     Canvas Y: 1.3869767629315436E7
     From Canvas X: -3514.483504598029
     From Canvas Y: -11286.678204435855
     Label X: 1.0
     Label Y: 0.0
     Area: 0.04667
     Downstream: C/NP

     Discretization: None
     File: Pl000000.sqlite

     Canopy 1: None
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None

     Surface 1: None

     LossRate 1: SCS
     Percent Impervious Area: 0.0
     Curve Number: 88
     Initial Abstraction: 0.0001
```

```
     Transform: Kinematic Wave

     Plane: 1
     Plane 1 Length: 420
     Plane 1 Slope: 0.035
     Plane 1 Roughness: 0.3
     Plane 1 Percent of Area: 100
     Plane 1 Number of Steps: 5

     Channel: Main
     Channel Length: 840
     Channel Slope: 0.005
     Channel Mannings N: 0.03
     Shape: Trapezoid
     Channel Width: 0
     Channel Side Slope: 3
     Channel Number of Steps: 5
     Route with Muskingum Cunge: Yes

     Baseflow: Recession
     Recession Factor: 1
     Initial Baseflow: 0
     Threshold Flow: 0.0001
End:

Junction: C/CHA2
     Last Modified Date: 15 July 2024
     Last Modified Time: 18:16:01
     Canvas X: 3141866.99492358
     Canvas Y: 1.387074624896322E7
     From Canvas X: -3703.9805300161242
     From Canvas Y: -6878.820984315127
     Downstream: C/NP
End:

Subbasin: DA7
     Last Modified Date: 25 April 2024
     Last Modified Time: 16:00:13
     Canvas X: 3140555.3688128716
     Canvas Y: 1.3868751038927963E7
     From Canvas X: -3595.8896700926125
     From Canvas Y: -12629.879935102537
     Label X: 1.0
     Label Y: 0.0
     Area: 0.03596
     Downstream: C/NP

     Discretization: None
     File: P1000000.sqlite

     Canopy 1: None
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None

     Surface 1: None

     LossRate 1: SCS
     Percent Impervious Area: 0.0
     Curve Number: 88
     Initial Abstraction: 0.0001

     Transform: Kinematic Wave

     Plane: 1
     Plane 1 Length: 120
     Plane 1 Slope: 0.25
     Plane 1 Roughness: 0.3
     Plane 1 Percent of Area: 100
     Plane 1 Number of Steps: 5

     Channel: Main
     Channel Length: 765
     Channel Slope: 0.005
     Channel Mannings N: 0.03
     Shape: Trapezoid
     Channel Width: 0
     Channel Side Slope: 3
     Channel Number of Steps: 5
     Route with Muskingum Cunge: Yes

     Baseflow: Recession
     Recession Factor: 1
     Initial Baseflow: 0
     Threshold Flow: 0.0001
End:

Subbasin: NP
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3141873.283883354
     Canvas Y: 1.386851090699831E7
     From Canvas X: -2944.6403461340815
     From Canvas Y: -13688.160086534917
     Label X: 1.0
     Label Y: 0.0
     Area: 0.00706
     Downstream: C/NP

     Discretization: None
     File: P1000000.sqlite

     Canopy: None
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None

     Surface: None

     LossRate: SCS
     Percent Impervious Area: 0.0
     Curve Number: 99
     Initial Abstraction: 0.0001

     Transform: Snyder
     Snyder Method: Standard
```

```
     Snyder Tp: 0.2
     Snyder Cp: 0.69

     Baseflow: Recession
     Recession Factor: 1
     Initial Baseflow: 0
     Threshold Flow: 0.0001
End:

Junction: C/NP
     Last Modified Date: 15 July 2024
     Last Modified Time: 18:16:10
     Canvas X: 3144318.5407833965
     Canvas Y: 1.3870529936093235E7
     Downstream: DCP3
End:

Reservoir: DCP3
     Last Modified Date: 15 July 2024
     Last Modified Time: 18:16:10
     Canvas X: 3147328.909985282
     Canvas Y: 1.387111046543221E7
     Label X: -1.0
     Label Y: -2.0
     Rating Table Name: DCP-3
     Downstream: NDISC

     Route: Modified Puls
     Routing Curve: Elevation-Area-Outflow
     Initial Elevation: 36
     Elevation-Area Table: DCP-3
     Elevation-Outflow Table: DCP-3
     Primary Table: Elevation-Outflow
End:

Subbasin: CHB1
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3139439.218551732
     Canvas Y: 1.3875017791683355E7
     Area: 0.00817
     Downstream: C/CHB2

     Discretization: None
     File: P1000000.sqlite

     Canopy 1: None
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None

     Surface 1: None

     LossRate 1: SCS
     Percent Impervious Area: 0.0
     Curve Number: 88
     Initial Abstraction: 0.0001

     Transform: Kinematic Wave

     Plane: 1
     Plane 1 Length: 180
     Plane 1 Slope: 0.25
     Plane 1 Roughness: 0.3
     Plane 1 Percent of Area: 100
     Plane 1 Number of Steps: 5

     Channel: Main
     Channel Length: 1250
     Channel Slope: 0.001
     Channel Mannings N: 0.04
     Shape: Trapezoid
     Channel Width: 12
     Channel Side Slope: 2
     Channel Number of Steps: 5
     Route with Muskingum Cunge: Yes

     Baseflow: Recession
     Recession Factor: 1
     Initial Baseflow: 0
     Threshold Flow: 0.0001
End:

Subbasin: DA5
     Last Modified Date: 2 April 2024
     Last Modified Time: 15:43:44
     Canvas X: 3139411.584136502
     Canvas Y: 1.3874318522742234E7
     From Canvas X: 162.81233098963276
     From Canvas Y: -1506.0140616558492
     Label X: 1.0
     Label Y: -2.0
     Area: 0.00881
     Downstream: C/CHB2

     Discretization: None
     File: P1000000.sqlite

     Canopy 1: None
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None

     Surface 1: None

     LossRate 1: SCS
     Percent Impervious Area: 0.0
     Curve Number: 88
     Initial Abstraction: 0.0001

     Transform: Kinematic Wave

     Plane: 1
     Plane 1 Length: 120
     Plane 1 Slope: 0.25
     Plane 1 Roughness: 0.3
```

```
     Plane 1 Percent of Area: 100
     Plane 1 Number of Steps: 5

     Channel: Main
     Channel Length: 405
     Channel Slope: 0.005
     Channel Mannings N: 0.03
     Shape: Trapezoid
     Channel Width: 0
     Channel Side Slope: 3
     Channel Number of Steps: 5
     Route with Muskingum Cunge: Yes

     Baseflow: Recession
     Recession Factor: 1
     Initial Baseflow: 0
     Threshold Flow: 0.0001
End:

Subbasin: CHB2
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3139683.6036795117
     Canvas Y: 1.3873449653780103E7
     From Canvas X: 244.21849648468196
     From Canvas Y: -3419.058950783685
     Area: 0.00158
     Downstream: C/CHB2

     Discretization: None
     File: P1000000.sqlite

     Canopy 1: None
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None

     Surface 1: None

     LossRate 1: SCS
     Percent Impervious Area: 0.0
     Curve Number: 88
     Initial Abstraction: 0.0001

     Transform: Kinematic Wave

     Plane: 1
     Plane 1 Length: 175
     Plane 1 Slope: 0.25
     Plane 1 Roughness: 0.3
     Plane 1 Percent of Area: 100
     Plane 1 Number of Steps: 5

     Channel: Main
     Channel Length: 220
     Channel Slope: 0.001
     Channel Mannings N: 0.04
     Shape: Trapezoid
     Channel Width: 12
     Channel Side Slope: 2
     Channel Number of Steps: 5
     Route with Muskingum Cunge: Yes

     Baseflow: Recession
     Recession Factor: 1
     Initial Baseflow: 0
     Threshold Flow: 0.0001
End:

Junction: C/CHB2
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3142468.056107117
     Canvas Y: 1.387430184429621E7
     Downstream: C/CHB3
End:

Subbasin: DA6
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3141991.3482967657
     Canvas Y: 1.3873078591611 56E7
     From Canvas X: 203.51541373692453
     From Canvas Y: -5169.291508924216
     Label X: 1.0
     Label Y: 0.0
     Area: 0.03352
     Downstream: C/CHB3

     Discretization: None
     File: P1000000.sqlite

     Canopy 1: None
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None

     Surface 1: None

     LossRate 1: SCS
     Percent Impervious Area: 0.0
     Curve Number: 88
     Initial Abstraction: 0.0001

     Transform: Kinematic Wave

     Plane: 1
     Plane 1 Length: 120
     Plane 1 Slope: 0.25
     Plane 1 Roughness: 0.3
     Plane 1 Percent of Area: 100
     Plane 1 Number of Steps: 5

     Channel: Main
     Channel Length: 700
     Channel Slope: 0.005
```

```
     Channel Mannings N:  0.03
     Shape: Trapezoid
     Channel Width: 0
     Channel Side Slope: 1
     Channel Number of Steps: 5
     Route with Muskingum Cunge: Yes

     Baseflow: Recession
     Recession Factor: 1
     Initial Baseflow: 0
     Threshold Flow:  0.0001
End:

Subbasin: CHB3
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3142856.016856327
     Canvas Y: 1.3872434689492738E7
     From Canvas X: 244.21849648468196
     From Canvas Y: -7326.554894536734
     Area: 0.00257
     Downstream: C/CHB3

     Discretization: None
     File: P1000000.sqlite

     Canopy 1: None
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None

     Surface 1: None

     LossRate 1: SCS
     Percent Impervious Area:  0.0
     Curve Number:  88
     Initial Abstraction:  0.001

     Transform: Kinematic Wave

     Plane: 1
     Plane 1 Length: 175
     Plane 1 Slope: 0.25
     Plane 1 Roughness: 0.3
     Plane 1 Percent of Area: 100
     Plane 1 Number of Steps: 5

     Channel: Main
     Channel Length: 300
     Channel Slope: 0.001
     Channel Mannings N:  0.015
     Shape: Trapezoid
     Channel Width: 12
     Channel Side Slope: 2
     Channel Number of Steps: 5
     Route with Muskingum Cunge: Yes

     Baseflow: Recession
     Recession Factor: 1
     Initial Baseflow: 0
     Threshold Flow:  0.0001
End:

Junction: C/CHB3
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3144035.079538541
     Canvas Y: 1.387327127933680 5E7
     Downstream: DCP-1
End:

Reservoir: DCP-1
     Last Modified Date: 28 May 2024
     Last Modified Time: 14:58:22
     Canvas X: 3146004.8721122886
     Canvas Y: 1.3873366306770386E7
     Downstream: NDISC

     Route: Modified Puls
     Routing Curve: Elevation-Area-Outflow
     Initial Outflow: 0.0
     Elevation-Area Table: DCP-1
     Elevation-Outflow Table: DCP-1
     Primary Table: Elevation-Outflow
End:

Subbasin: DA18
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3144566.260277199
     Canvas Y: 1.387158538838128 2E7
     From Canvas X: 936.1709031905048
     From Canvas Y: -8059.210383992642
     Label X: 2.0
     Label Y: -2.0
     Area: 0.01289
     Downstream: NDISC

     Discretization: None
     File: P1000000.sqlite

     Canopy: None
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None

     Surface: None

     LossRate: SCS
     Percent Impervious Area: 0.0
     Curve Number: 88
     Initial Abstraction: 0.0001

     Transform: Snyder
     Snyder Method: Standard
     Snyder Tp:  0.16
```

```
     Snyder Cp: 0.65

     Baseflow: Recession
     Recession Factor: 1
     Initial Baseflow: 0
     Threshold Flow: 0.0001
End:

Junction: NDISC
     Last Modified Date: 31 July 2024
     Last Modified Time: 18:46:00
     Canvas X: 3147252.338604387
     Canvas Y: 1.387270679625740 5E7
     Downstream: NDCP
End:

Subbasin: P100O1
     Last Modified Date: 25 April 2024
     Last Modified Time: 15:58:01
     Canvas X: 3146764.1353728725
     Canvas Y: 1.3874118291560112E7
     Area: 0.08
     Downstream: NDCP

     Discretization: None
     File: P1000000.sqlite

     Canopy: None
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None

     Surface: None

     LossRate: None

     Transform: Clark
     Clark Method: Specified
     Time of Concentration: 1.91
     Storage Coefficient: 6.1
     Time Area Method: Default

     Baseflow: Recession
     Recession Factor: 0.390121
     Initial Baseflow: 0
     Threshold Flow: 0.0001
End:

Junction: NDCP
     Last Modified Date: 15 July 2024
     Last Modified Time: 18:16:10
     Canvas X: 3148245.5011856994
     Canvas Y: 1.3873434245802257E7
     Label X: -1.0
     Label Y: 1.0
     Downstream: P1000000_0635_J
End:

Junction: P1000000_0635_J
     Last Modified Date: 15 July 2024
     Last Modified Time: 18:16:10
     Canvas X: 3163607.5990297203
     Canvas Y: 1.387132991121751E7
     Label X: 16.0
     Label Y: -1.0
     Downstream: P1000000_0580_R
End:

Reach: P1000000_0580_R
     Description: RS 63532 to RS 57991
     Last Modified Date: 15 July 2024
     Last Modified Time: 18:16:10
     Canvas X: 3163833.005
     Canvas Y: 1.3866792347E7
     From Canvas X: 3163607.5990297203
     From Canvas Y: 1.387132991121751E7
     Label X: 9.0
     Label Y: 0.0
     Downstream: P1000000_0580_J

     Route: Modified Puls
     Initial Variable: Combined Inflow
     Number of Reaches: 8
     Storage Outflow Table Name: P1000000_0580_R
     Channel Loss: None
End:

Subbasin: P100S
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3165227.747
     Canvas Y: 1.3870196044E7
     Label X: 13.0
     Label Y: -1.0
     Area: 1.494
     Downstream: P1000000_0580_J

     Discretization: None
     File: P1000000.sqlite

     Canopy: Simple
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None
     Initial Canopy Storage Percent: 0.0
     Canopy Storage Capacity: 0.1
     Crop Coefficient: 1.0
     End Canopy:

     Surface: None

     LossRate: Green and Ampt
     Percent Impervious Area: 36.735
     Initial Variable: Water Content
     Initial Content: 0.024
     Saturated Content: 0.46
```

```
     Wetting Front Suction: 3.5
     Hydraulic Conductivity: 0.024

     Transform: Clark
     Clark Method: Specified
     Time of Concentration: 0.62
     Storage Coefficient: 4.37
     Time Area Method: Default

     Baseflow: None
End:

Subbasin: DA12
     Last Modified Date: 2 April 2024
     Last Modified Time: 15:44:33
     Canvas X: 3152210.292600303
     Canvas Y: 1.3867494721545966E7
     From Canvas X: 6113.668992493767
     From Canvas Y: -10803.95683445409
     Label X: 0.0
     Label Y: -1.0
     Area: 0.02504
     Downstream: C/DA12

     Discretization: None
     File: P1000000.sqlite

     Canopy 1: None
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None

     Surface 1: None

     LossRate 1: SCS
     Percent Impervious Area: 0.0
     Curve Number: 88
     Initial Abstraction: 0.0001

     Transform: Kinematic Wave

     Plane: 1
     Plane 1 Length: 120
     Plane 1 Slope: 0.25
     Plane 1 Roughness: 0.3
     Plane 1 Percent of Area: 100
     Plane 1 Number of Steps: 5

     Channel: Main
     Channel Length: 635
     Channel Slope: 0.005
     Channel Mannings N: 0.03
     Shape: Trapezoid
     Channel Width: 0
     Channel Side Slope: 3
     Channel Number of Steps: 5
     Route with Muskingum Cunge: Yes

     Baseflow: Recession
     Recession Factor: 1
     Initial Baseflow: 0
     Threshold Flow: 0.0001
End:

Subbasin: CHF1
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3152233.629940156
     Canvas Y: 1.386826987031238E7
     From Canvas X: 6072.96590974601
     From Canvas Y: -8646.693448841572
     Label X: 2.0
     Label Y: 0.0
     Area: 0.00629
     Downstream: C/DA12

     Discretization: None
     File: P1000000.sqlite

     Canopy 1: None
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None

     Surface 1: None

     LossRate 1: SCS
     Percent Impervious Area: 0.0
     Curve Number: 88
     Initial Abstraction: 0.0001

     Transform: Kinematic Wave

     Plane: 1
     Plane 1 Length: 180
     Plane 1 Slope: 0.25
     Plane 1 Roughness: 0.3
     Plane 1 Percent of Area: 100
     Plane 1 Number of Steps: 5

     Channel: Main
     Channel Length: 765
     Channel Slope: 0.002
     Channel Mannings N: 0.04
     Shape: Trapezoid
     Channel Width: 15
     Channel Side Slope: 3
     Channel Number of Steps: 5
     Route with Muskingum Cunge: Yes

     Baseflow: Recession
     Recession Factor: 1
     Initial Baseflow: 0
     Threshold Flow: 0.0001
End:
```

```
Subbasin: DA3
     Last Modified Date: 15 July 2024
     Last Modified Time: 18:16:49
     Canvas X: 3154554.6370455706
     Canvas Y: 1.3867306853623284E7
     From Canvas X: 9593.897337043658
     From Canvas Y: -9027.251962199807
     Label X: -1.0
     Label Y: 2.0
     Area: 0.03346
     Downstream: C/D4

     Discretization: None
     File: P1000000.sqlite

     Canopy 1: None
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None

     Surface 1: None

     LossRate 1: SCS
     Percent Impervious Area: 0.0
     Curve Number: 88
     Initial Abstraction: 0.001

     Transform: Kinematic Wave

     Plane: 1
     Plane 1 Length: 380
     Plane 1 Slope: 0.035
     Plane 1 Roughness: 0.3
     Plane 1 Percent of Area: 100
     Plane 1 Number of Steps: 5

     Channel: Main
     Channel Length: 1220
     Channel Slope: 0.005
     Channel Mannings N: 0.03
     Shape: Trapezoid
     Channel Width: 0
     Channel Side Slope: 3
     Channel Number of Steps: 5
     Route with Muskingum Cunge: Yes

     Baseflow: Recession
     Recession Factor: 1
     Initial Baseflow: 0
     Threshold Flow: 0.0001
End:

Junction: C/DA12
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3154936.619526873
     Canvas Y: 1.386848010283465E7
     Label X: 0.0
     Label Y: -3.0
     Downstream: C/D4
End:

Subbasin: DA11
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3152383.817854105
     Canvas Y: 1.3869310535203032E7
     From Canvas X: 6287.699811715633
     From Canvas Y: -8954.707394985482
     Area: 0.01714
     Downstream: C/CHG2

     Discretization: None
     File: P1000000.sqlite

     Canopy 1: None
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None

     Surface 1: None

     LossRate 1: SCS
     Percent Impervious Area: 0.0
     Curve Number: 88
     Initial Abstraction: 0.0001

     Transform: Kinematic Wave

     Plane: 1
     Plane 1 Length: 120
     Plane 1 Slope: 0.25
     Plane 1 Roughness: 0.3
     Plane 1 Percent of Area: 100
     Plane 1 Number of Steps: 5

     Channel: Main
     Channel Length: 575
     Channel Slope: 0.005
     Channel Mannings N: 0.03
     Shape: Trapezoid
     Channel Width: 0
     Channel Side Slope: 3
     Channel Number of Steps: 5
     Route with Muskingum Cunge: Yes

     Baseflow: Recession
     Recession Factor: 1
     Initial Baseflow: 0
     Threshold Flow: 0.0001
End:

Subbasin: CHG1
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3152143.5302872653
```

```
     Canvas Y: 1.38711230259861O5E7
     From Canvas X: 6246.996728967875
     From Canvas Y: -6797.4440093729645
     Label X: 2.0
     Label Y: 0.0
     Area: 0.00463
     Downstream: C/CHG2

     Discretization: None
     File: P1000000.sqlite

     Canopy 1: None
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None

     Surface 1: None

     LossRate 1: SCS
     Percent Impervious Area: 0.0
     Curve Number: 88
     Initial Abstraction: 0.0001

     Transform: Kinematic Wave

     Plane: 1
     Plane 1 Length: 145
     Plane 1 Slope: 0.25
     Plane 1 Roughness: 0.3
     Plane 1 Percent of Area: 100
     Plane 1 Number of Steps: 5

     Channel: Main
     Channel Length: 675
     Channel Slope: 0.003
     Channel Mannings N: 0.04
     Shape: Trapezoid
     Channel Width: 0
     Channel Side Slope: 3
     Channel Number of Steps: 5
     Route with Muskingum Cunge: Yes

     Baseflow: Recession
     Recession Factor: 1
     Initial Baseflow: 0
     Threshold Flow: 0.0001
End:

Subbasin: CHG2
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3152143.5302872653
     Canvas Y: 1.3870191996239S7E7
     From Canvas X: 6191.805118782911
     From Canvas Y: -7809.290196094662
     Label X: 2.0
     Label Y: 0.0
     Area: 0.00356
     Downstream: C/CHG2

     Discretization: None
     File: P1000000.sqlite

     Canopy 1: None
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None

     Surface 1: None

     LossRate 1: SCS
     Percent Impervious Area: 0.0
     Curve Number: 88
     Initial Abstraction: 0.0001

     Transform: Kinematic Wave

     Plane: 1
     Plane 1 Length: 205
     Plane 1 Slope: 0.25
     Plane 1 Roughness: 0.3
     Plane 1 Percent of Area: 100
     Plane 1 Number of Steps: 5

     Channel: Main
     Channel Length: 415
     Channel Slope: 0.0003
     Channel Mannings N: 0.015
     Shape: Trapezoid
     Channel Width: 12
     Channel Side Slope: 3
     Channel Number of Steps: 5
     Route with Muskingum Cunge: Yes

     Baseflow: Recession
     Recession Factor: 1
     Initial Baseflow: 0
     Threshold Flow: 0.0001
End:

Junction: C/CHG2
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3154913.9010610674
     Canvas Y: 1.3869797166877715E7
     Downstream: C/D4
End:

Subbasin: CHF2
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3155357.0845736954
     Canvas Y: 1.3866798242647 36E7
     From Canvas X: 9634.600419791415
     From Canvas Y: -11184.515347812325
     Label X: 4.0
```

```
     Label Y: -2.0
     Area: 0.00657
     Downstream: C/D4

     Discretization: None
     File: P1000000.sqlite

     Canopy 1: None
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None

     Surface 1: None

     LossRate 1: SCS
     Percent Impervious Area: 0.0
     Curve Number: 88
     Initial Abstraction: 0.0001

     Transform: Kinematic Wave

     Plane: 1
     Plane 1 Length: 160
     Plane 1 Slope: 0.25
     Plane 1 Roughness: 0.3
     Plane 1 Percent of Area: 100
     Plane 1 Number of Steps: 5

     Channel: Main
     Channel Length: 1000
     Channel Slope: 0.002
     Channel Mannings N: 0.04
     Shape: Trapezoid
     Channel Width: 20
     Channel Side Slope: 3
     Channel Number of Steps: 5
     Route with Muskingum Cunge: Yes

     Baseflow: Recession
     Recession Factor: 1
     Initial Baseflow: 0
     Threshold Flow: 0.0001
End:

Junction: C/D4
     Last Modified Date: 15 July 2024
     Last Modified Time: 18:16:49
     Canvas X: 3157639.60911359
     Canvas Y: 1.3867519039870484E7
     Label X: -1.0
     Label Y: 0.0
     Downstream: DCP-7
End:

Reservoir: DCP-7
     Last Modified Date: 15 July 2024
     Last Modified Time: 18:16:49
     Canvas X: 3160342.896533727
     Canvas Y: 1.3867044441208908E7
     Downstream: EDCP

     Route: Modified Puls
     Routing Curve: Elevation-Area-Outflow
     Initial Elevation: 25
     Elevation-Area Table: DCP-7
     Elevation-Outflow Table: DCP-7
     Primary Table: Elevation-Outflow
End:

Subbasin: DA10
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3157005.2475422863
     Canvas Y: 1.386991315805092E7
     From Canvas X: 14483.659546290059
     From Canvas Y: -8082.946979967877
     Area: 0.02838
     Downstream: C/CHH2

     Discretization: None
     File: P1000000.sqlite

     Canopy 1: None
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None

     Surface 1: None

     LossRate 1: SCS
     Percent Impervious Area: 0.0
     Curve Number: 88
     Initial Abstraction: 0.0001

     Transform: Kinematic Wave

     Plane: 1
     Plane 1 Length: 120
     Plane 1 Slope: 0.25
     Plane 1 Roughness: 0.3
     Plane 1 Percent of Area: 100
     Plane 1 Number of Steps: 5

     Channel: Main
     Channel Length: 635
     Channel Slope: 0.005
     Channel Mannings N: 0.03
     Shape: Trapezoid
     Channel Width: 0
     Channel Side Slope: 3
     Channel Number of Steps: 5
     Route with Muskingum Cunge: Yes

     Baseflow: Recession
     Recession Factor: 1
     Initial Baseflow: 0
```

```
     Threshold Flow: 0.0001
End:

Subbasin: CHH2
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3157023.644745681
     Canvas Y: 1.3869324447542284E7
     From Canvas X: 14524.362629037816
     From Canvas Y: -10240.210365580395
     Label X: 0.0
     Label Y: -1.0
     Area: 0.00469
     Downstream: C/CHH2

     Discretization: None
     File: P1000000.sqlite

     Canopy 1: None
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None

     Surface 1: None

     LossRate 1: SCS
     Percent Impervious Area: 0.0
     Curve Number: 88
     Initial Abstraction: 0.0001

     Transform: Kinematic Wave

     Plane: 1
     Plane 1 Length: 185
     Plane 1 Slope: 0.25
     Plane 1 Roughness: 0.3
     Plane 1 Percent of Area: 100
     Plane 1 Number of Steps: 5

     Channel: Main
     Channel Length: 450
     Channel Slope: 0.002
     Channel Mannings N: 0.015
     Shape: Trapezoid
     Channel Width: 12
     Channel Side Slope: 3
     Channel Number of Steps: 5
     Route with Muskingum Cunge: Yes

     Baseflow: Recession
     Recession Factor: 1
     Initial Baseflow: 0
     Threshold Flow: 0.0001
End:

Subbasin: CHH1
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3157005.247542286
     Canvas Y: 1.3870612251779929E7
     From Canvas X: 13733.282883055974
     From Canvas Y: -8492.476043062285
     Label X: 0.0
     Label Y: -1.0
     Area: 0.0035
     Downstream: C/CHH2

     Discretization: None
     File: P1000000.sqlite

     Canopy 1: None
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None

     Surface 1: None

     LossRate 1: SCS
     Percent Impervious Area: 0.0
     Curve Number: 88
     Initial Abstraction: 0.0001

     Transform: Kinematic Wave

     Plane: 1
     Plane 1 Length: 190
     Plane 1 Slope: 0.25
     Plane 1 Roughness: 0.3
     Plane 1 Percent of Area: 100
     Plane 1 Number of Steps: 5

     Channel: Main
     Channel Length: 425
     Channel Slope: 0.002
     Channel Mannings N: 0.015
     Shape: Trapezoid
     Channel Width: 0
     Channel Side Slope: 3
     Channel Number of Steps: 5
     Route with Muskingum Cunge: Yes

     Baseflow: Recession
     Recession Factor: 1
     Initial Baseflow: 0
     Threshold Flow: 0.0001
End:

Junction: C/CHH2
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3158697.7902546185
     Canvas Y: 1.386851497059290 9E7
     Downstream: DCP-6
End:

Reservoir: DCP-6
```

```
     Last Modified Date: 5 July 2024
     Last Modified Time: 19:33:31
     Canvas X: 3159875.2112718932
     Canvas Y: 1.3867871068474086E7
     Label X: 1.0
     Label Y: 2.0
     Downstream: EDCP

     Route: Modified Puls
     Routing Curve: Elevation-Area-Outflow
     Initial Outflow: 0
     Elevation-Area Table: DCP-6
     Elevation-Outflow Table: DCP-6
     Primary Table: Elevation-Area
End:

Subbasin: DA9
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3155846.223728406
     Canvas Y: 1.3871881658014179E7
     From Canvas X: 13536.203571451362
     From Canvas Y: -6077.651809921488
     Label X: 1.0
     Label Y: 0.0
     Area: 0.024
     Downstream: C/NEP

     Discretization: None
     File: P1000000.sqlite

     Canopy 1: None
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None

     Surface 1: None

     LossRate 1: SCS
     Percent Impervious Area: 0.0
     Curve Number: 88
     Initial Abstraction: 0.0001

     Transform: Kinematic Wave

     Plane: 1
     Plane 1 Length: 120
     Plane 1 Slope: 0.25
     Plane 1 Roughness: 0.3
     Plane 1 Percent of Area: 100
     Plane 1 Number of Steps: 5

     Channel: Main
     Channel Length: 800
     Channel Slope: 0.005
     Channel Mannings N: 0.03
     Shape: Trapezoid
     Channel Width: 0
     Channel Side Slope: 3
     Channel Number of Steps: 5
     Route with Muskingum Cunge: Yes

     Baseflow: Recession
     Recession Factor: 1
     Initial Baseflow: 0
     Threshold Flow: 0.0001
End:

Subbasin: NEP
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3155956.6069487752
     Canvas Y: 1.3871164167881776E7
     From Canvas X: 13576.90665419912
     From Canvas Y: -8234.915195534006
     Label X: 0.0
     Label Y: -1.0
     Area: 0.00307
     Downstream: C/NEP

     Discretization: None
     File: P1000000.sqlite

     Canopy: None
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None

     Surface: None

     LossRate: SCS
     Percent Impervious Area: 0.0
     Curve Number: 99
     Initial Abstraction: 0.0001

     Transform: Snyder
     Snyder Method: Standard
     Snyder Tp: 0.21
     Snyder Cp: 0.71

     Baseflow: Recession
     Recession Factor: 1
     Initial Baseflow: 0
     Threshold Flow: 0.0001
End:

Junction: C/NEP
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3158771.379068198
     Canvas Y: 1.3870796223813878E7
     Downstream: DCP-4
End:

Reservoir: DCP-4
     Last Modified Date: 21 March 2024
```

```
     Last Modified Time: 16:28:18
     Canvas X: 3159930.402882078
     Canvas Y: 1.3870207513305241E7
     Downstream: EDCP

     Route: Modified Puls
     Routing Curve: Elevation-Area-Outflow
     Initial Elevation: 26
     Elevation-Area Table: DCP-4
     Elevation-Outflow Table: DCP-4
     Primary Table: Elevation-Outflow
End:

Subbasin: CH1
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3158715.7198048118
     Canvas Y: 1.38696432452046E7
     From Canvas X: 16658.43822284881
     From Canvas Y: -9743.485873917118
     Label X: 0.0
     Label Y: -1.0
     Area: 0.00566
     Downstream: DCP-5

     Discretization: None
     File: P1000000.sqlite

     Canopy 1: None
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None

     Surface 1: None

     LossRate 1: SCS
     Percent Impervious Area: 0.0
     Curve Number: 88
     Initial Abstraction: 0.0001

     Transform: Kinematic Wave

     Plane: 1
     Plane 1 Length: 150
     Plane 1 Slope: 0.25
     Plane 1 Roughness: 0.3
     Plane 1 Percent of Area: 100
     Plane 1 Number of Steps: 5

     Channel: Main
     Channel Length: 735
     Channel Slope: 0.001
     Channel Mannings N: 0.015
     Shape: Trapezoid
     Channel Width: 0
     Channel Side Slope: 3
     Channel Number of Steps: 5
     Route with Muskingum Cunge: Yes

     Baseflow: Recession
     Recession Factor: 1
     Initial Baseflow: 0
     Threshold Flow: 0.0001
End:

Reservoir: DCP-5
     Last Modified Date: 12 March 2024
     Last Modified Time: 13:50:34
     Canvas X: 3159983.3167187297
     Canvas Y: 1.3869080343080483E7
     Downstream: EDCP

     Route: Modified Puls
     Routing Curve: Elevation-Area-Outflow
     Initial Outflow: 0
     Elevation-Area Table: DCP-5
     Elevation-Outflow Table: DCP-5
     Primary Table: Elevation-Outflow
End:

Junction: EDCP
     Last Modified Date: 31 July 2024
     Last Modified Time: 19:28:45
     Canvas X: 3162176.142387936
     Canvas Y: 1.3869192822934723E7
     Downstream: P1000000_0580_J
End:

Junction: P1000000_0580_J
     Last Modified Date: 15 July 2024
     Last Modified Time: 18:16:49
     Canvas X: 3163833.005
     Canvas Y: 1.3866792347E7
     Label X: 17.0
     Label Y: -1.0
     Downstream: P1000000_0541_R
End:

Reach: P1000000_0541_R
     Description: RS 57991 to RS 54063
     Last Modified Date: 15 July 2024
     Last Modified Time: 18:16:49
     Canvas X: 3163797.845
     Canvas Y: 1.3864276916E7
     From Canvas X: 3163833.005
     From Canvas Y: 1.3866792347E7
     Label X: -18.0
     Label Y: -2.0
     Downstream: P1000000_0541_J

     Route: Modified Puls
     Initial Variable: Combined Inflow
     Number of Reaches: 7
     Storage Outflow Table Name: P1000000_0541_R
     Channel Loss: None
```

```
End:

Junction: P1000000_0541_J
     Last Modified Date: 15 July 2024
     Last Modified Time: 18:16:49
     Canvas X: 3163797.845
     Canvas Y: 1.3864276916E7
     Label X: 16.0
     Label Y: 0.0
     Downstream: P1000000_0530_J
End:

Subbasin: P114B
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3158901.004254058
     Canvas Y: 1.3866227611512385E7
     Label X: 16.0
     Label Y: 0.0
     Area: 1.467
     Downstream: P1140000_0036_J

     Discretization: None
     File: P1000000.sqlite

     Canopy: Simple
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None
     Initial Canopy Storage Percent: 0.0
     Canopy Storage Capacity: 0.1
     Crop Coefficient: 1.0
     End Canopy:

     Surface: None

     LossRate: Green and Ampt
     Percent Impervious Area: 47.784
     Initial Variable: Water Content
     Initial Content: 0.024
     Saturated Content: 0.46
     Wetting Front Suction: 3.5
     Hydraulic Conductivity: 0.024

     Transform: Clark
     Clark Method: Specified
     Time of Concentration: 0.74
     Storage Coefficient: 2.13
     Time Area Method: Default

     Baseflow: None
End:

Subbasin: P114A
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3146500.016
     Canvas Y: 1.3865936177E7
     Label X: 16.0
     Label Y: 0.0
     Area: 0.675
     Downstream: P1140000_0119_J

     Discretization: None
     File: P1000000.sqlite

     Canopy: Simple
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None
     Initial Canopy Storage Percent: 0.0
     Canopy Storage Capacity: 0.1
     Crop Coefficient: 1.0
     End Canopy:

     Surface: None

     LossRate: Green and Ampt
     Percent Impervious Area: 29.311
     Initial Variable: Water Content
     Initial Content: 0.024
     Saturated Content: 0.46
     Wetting Front Suction: 3.5
     Hydraulic Conductivity: 0.024

     Transform: Clark
     Clark Method: Specified
     Time of Concentration: 0.4
     Storage Coefficient: 2.61
     Time Area Method: Default

     Baseflow: None
End:

Junction: P1140000_0119_J
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3153674.405
     Canvas Y: 1.3865537705E7
     Label X: 1.0
     Label Y: 5.0
     Downstream: P1140000_0036_R
End:

Reach: P1140000_0036_R
     Description: RS 11883 to RS 3645
     Last Modified Date: 31 July 2024
     Last Modified Time: 18:54:25
     Canvas X: 3159355.1067900625
     Canvas Y: 1.3865196565229932E7
     From Canvas X: 3153674.405
     From Canvas Y: 1.3865537705E7
     Label X: -82.0
     Label Y: -21.0
     Downstream: P1140000_0036_J
```

```
     Route: Modified Puls
     Initial Variable: Combined Inflow
     Number of Reaches: 15
     Storage Outflow Table Name: P1140000_0036_R
     Channel Loss: None
End:

Subbasin: DA17
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3153206.7215413293
     Canvas Y: 1.3861998850833308E7
     From Canvas X: 8435.728351480793
     From Canvas Y: -13446.910774568096
     Label X: -1.0
     Label Y: 2.0
     Area: 0.04305
     Downstream: C/CHCl

     Discretization: None
     File: P1000000.sqlite

     Canopy 1: None
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None

     Surface 1: None

     LossRate 1: SCS
     Percent Impervious Area: 0.0
     Curve Number: 88
     Initial Abstraction: 0.0001

     Transform: Kinematic Wave

     Plane: 1
     Plane 1 Length: 120
     Plane 1 Slope: 0.25
     Plane 1 Roughness: 0.3
     Plane 1 Percent of Area: 100
     Plane 1 Number of Steps: 5

     Channel: Main
     Channel Length: 1195
     Channel Slope: 0.005
     Channel Mannings N: 0.03
     Shape: Trapezoid
     Channel Width: 0
     Channel Side Slope: 3
     Channel Number of Steps: 5
     Route with Muskingum Cunge: Yes

     Baseflow: Recession
     Recession Factor: 1
     Initial Baseflow: 0
     Threshold Flow: 0.0001
End:

Subbasin: CHCl
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3153226.3082817416
     Canvas Y: 1.386155814917402 5E7
     From Canvas X: 8401.316123487428
     From Canvas Y: -15095.721245743334
     Label X: -1.0
     Label Y: 2.0
     Area: 0.00867
     Downstream: C/CHCl

     Discretization: None
     File: P1000000.sqlite

     Canopy 1: None
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None

     Surface 1: None

     LossRate 1: SCS
     Percent Impervious Area: 0.0
     Curve Number: 88
     Initial Abstraction: 0.0001

     Transform: Kinematic Wave

     Plane: 1
     Plane 1 Length: 175
     Plane 1 Slope: 0.25
     Plane 1 Roughness: 0.3
     Plane 1 Percent of Area: 100
     Plane 1 Number of Steps: 5

     Channel: Main
     Channel Length: 1310
     Channel Slope: 0.001
     Channel Mannings N: 0.04
     Shape: Trapezoid
     Channel Width: 12
     Channel Side Slope: 2
     Channel Number of Steps: 5
     Route with Muskingum Cunge: Yes

     Baseflow: Recession
     Recession Factor: 1
     Initial Baseflow: 0
     Threshold Flow: 0.0001
End:

Subbasin: DA19
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3153187.1348009165
     Canvas Y: 1.3862478725973414E7
```

```
     From Canvas X: 8506.546717713587
     From Canvas Y: -13960.343929752707
     Label X: -1.0
     Label Y: 2.0
     Area: 0.00413
     Downstream: C/CHCl

     Discretization: None
     File: P1000000.sqlite

     Canopy 1: None
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None

     Surface 1: None

     LossRate 1: SCS
     Percent Impervious Area: 0.0
     Curve Number: 88
     Initial Abstraction: 0.0001

     Transform: Kinematic Wave

     Plane: 1
     Plane 1 Length: 180
     Plane 1 Slope: 0.25
     Plane 1 Roughness: 0.3
     Plane 1 Percent of Area: 100
     Plane 1 Number of Steps: 5

     Channel: Main
     Channel Length: 570
     Channel Slope: 0.01
     Channel Mannings N: 0.03
     Shape: Trapezoid
     Channel Width: 15
     Channel Side Slope: 2
     Channel Number of Steps: 5
     Route with Muskingum Cunge: Yes

     Baseflow: Recession
     Recession Factor: 1
     Initial Baseflow: 0
     Threshold Flow: 0.0001
End:

Junction: C/CHCl
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3154662.588050735
     Canvas Y: 1.3861559180704875E7
     Downstream: C/CHC2
End:

Subbasin: DAl
     Last Modified Date: 8 April 2024
     Last Modified Time: 16:08:54
     Canvas X: 3153206.7215413293
     Canvas Y: 1.3861195794476394E7
     From Canvas X: 8526.133458126336
     From Canvas Y: -15243.275426773354
     Label X: -1.0
     Label Y: 2.0
     Area: 0.047430
     Downstream: C/CHC2

     Discretization: None
     File: P1000000.sqlite

     Canopy 1: None
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None

     Surface 1: None

     LossRate 1: SCS
     Percent Impervious Area: 0.0
     Curve Number: 88
     Initial Abstraction: 0.0001

     Transform: Kinematic Wave

     Plane: 1
     Plane 1 Length: 350
     Plane 1 Slope: 0.035
     Plane 1 Roughness: 0.3
     Plane 1 Percent of Area: 100
     Plane 1 Number of Steps: 5

     Channel: Main
     Channel Length: 1640
     Channel Slope: 0.005
     Channel Mannings N: 0.03
     Shape: Trapezoid
     Channel Width: 0
     Channel Side Slope: 3
     Channel Number of Steps: 5
     Route with Muskingum Cunge: Yes

     Baseflow: Recession
     Recession Factor: 1
     Initial Baseflow: 0
     Threshold Flow: 0.0001
End:

Subbasin: CHC2
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3153236.101651948
     Canvas Y: 1.3860696332595874E7
     From Canvas X: 8455.315091893543
     From Canvas Y: -14729.842271588743
     Label X: -1.0
     Label Y: 2.0
```

```
     Area: 0.00694
     Downstream: C/CHC2

     Discretization: None
     File: P1000000.sqlite

     Canopy 1: None
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None

     Surface 1: None

     LossRate 1: SCS
     Percent Impervious Area: 0.0
     Curve Number: 88
     Initial Abstraction: 0.0001

     Transform: Kinematic Wave

     Plane: 1
     Plane 1 Length: 175
     Plane 1 Slope: 0.25
     Plane 1 Roughness: 0.3
     Plane 1 Percent of Area: 100
     Plane 1 Number of Steps: 5

     Channel: Main
     Channel Length: 1045
     Channel Slope: 0.0017
     Channel Mannings N: 0.015
     Shape: Trapezoid
     Channel Width: 18
     Channel Side Slope: 2
     Channel Number of Steps: 5
     Route with Muskingum Cunge: Yes

     Baseflow: Recession
     Recession Factor: 1
     Initial Baseflow: 0
     Threshold Flow: 0.0001
End:

Junction: C/CHC2
     Last Modified Date: 8 April 2024
     Last Modified Time: 16:08:54
     Canvas X: 3155571.1373866135
     Canvas Y: 1.3860728672723863E7
     Downstream: C/DA15
End:

Subbasin: DA15
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3153226.3082817416
     Canvas Y: 1.385968761546463E7
     From Canvas X: 8350.084497667383
     From Canvas Y: -15865.21958757937
     Label X: -1.0
     Label Y: 2.0
     Area: 0.02641
     Downstream: C/DA15

     Discretization: None
     File: P1000000.sqlite

     Canopy 1: None
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None

     Surface 1: None

     LossRate 1: SCS
     Percent Impervious Area: 0.0
     Curve Number: 88
     Initial Abstraction: 0.0001

     Transform: Kinematic Wave

     Plane: 1
     Plane 1 Length: 120
     Plane 1 Slope: 0.25
     Plane 1 Roughness: 0.3
     Plane 1 Percent of Area: 100
     Plane 1 Number of Steps: 5

     Channel: Main
     Channel Length: 895
     Channel Slope: 0.005
     Channel Mannings N: 0.03
     Shape: Trapezoid
     Channel Width: 0
     Channel Side Slope: 3
     Channel Number of Steps: 5
     Route with Muskingum Cunge: Yes

     Baseflow: Recession
     Recession Factor: 1
     Initial Baseflow: 0
     Threshold Flow: 0.0001
End:

Subbasin: DA16
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3153245.8950221543
     Canvas Y: 1.3860275217677005E7
     From Canvas X: 8420.902863900177
     From Canvas Y: -16378.652742763981
     Label X: -1.0
     Label Y: 2.0
     Area: 0.02628
     Downstream: C/DA15

     Discretization: None
```

```
     File: P1000000.sqlite

     Canopy 1: None
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None

     Surface 1: None

     LossRate 1: SCS
     Percent Impervious Area: 0.0
     Curve Number: 88
     Initial Abstraction: 0.0001

     Transform: Kinematic Wave

     Plane: 1
     Plane 1 Length: 120
     Plane 1 Slope: 0.25
     Plane 1 Roughness: 0.3
     Plane 1 Percent of Area: 100
     Plane 1 Number of Steps: 5

     Channel: Main
     Channel Length: 815
     Channel Slope: 0.005
     Channel Mannings N: 0.03
     Shape: Trapezoid
     Channel Width: 0
     Channel Side Slope: 3
     Channel Number of Steps: 5
     Route with Muskingum Cunge: Yes

     Baseflow: Recession
     Recession Factor: 1
     Initial Baseflow: 0
     Threshold Flow: 0.0001
End:

Junction: C/DA15
     Last Modified Date: 8 April 2024
     Last Modified Time: 16:08:54
     Canvas X: 3156291.410474084
     Canvas Y: 1.3859824130732179E7
     Downstream: C/SWP
End:

Subbasin: CHC3
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3153342.9224868603
     Canvas Y: 1.3859310886791714E7
     From Canvas X: 7261.560653702356
     From Canvas Y: -17972.54034953192
     Label X: 2.0
     Label Y: -8.0
     Area: 0.00639
     Downstream: C/SWP

     Discretization: None
     File: P1000000.sqlite

     Canopy 1: None
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None

     Surface 1: None

     LossRate 1: SCS
     Percent Impervious Area: 0.0
     Curve Number: 88
     Initial Abstraction: 0.0001

     Transform: Kinematic Wave

     Plane: 1
     Plane 1 Length: 185
     Plane 1 Slope: 0.25
     Plane 1 Roughness: 0.3
     Plane 1 Percent of Area: 100
     Plane 1 Number of Steps: 5

     Channel: Main
     Channel Length: 1000
     Channel Slope: 0.003
     Channel Mannings N: 0.04
     Shape: Trapezoid
     Channel Width: 18
     Channel Side Slope: 2
     Channel Number of Steps: 5
     Route with Muskingum Cunge: Yes

     Baseflow: Recession
     Recession Factor: 1
     Initial Baseflow: 0
     Threshold Flow: 0.0001
End:

Subbasin: SWP
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3153245.8950221543
     Canvas Y: 1.3858737658554621E7
     From Canvas X: 8217.378399882
     From Canvas Y: -16746.50610748306
     Label X: -1.0
     Label Y: 2.0
     Area: 0.0054
     Downstream: C/SWP

     Discretization: None
     File: P1000000.sqlite

     Canopy: None
     Allow Simultaneous Precip Et: No
```

```
     Plant Uptake Method: None

     Surface: None

     LossRate: SCS
     Percent Impervious Area: 0.0
     Curve Number: 99
     Initial Abstraction: 0.0001

     Transform: Snyder
     Snyder Method: Standard
     Snyder Tp: 0.16
     Snyder Cp: 0.68

     Baseflow: Recession
     Recession Factor: 1
     Initial Baseflow: 0
     Threshold Flow: 0.0001
End:

Junction: C/SWP
     Last Modified Date: 8 April 2024
     Last Modified Time: 16:08:54
     Canvas X: 3157613.4927259176
     Canvas Y: 1.385911748927113E7
     Downstream: SDCP
End:

Subbasin: DA14
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3154698.153911653
     Canvas Y: 1.3863886368314996E7
     From Canvas X: 9713.494725445285
     From Canvas Y: -12334.119751505554
     Label X: -1.0
     Label Y: 2.0
     Area: 0.02952
     Downstream: C/CHD2

     Discretization: None
     File: P1000000.sqlite

     Canopy 1: None
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None

     Surface 1: None

     LossRate 1: SCS
     Percent Impervious Area: 0.0
     Curve Number: 88
     Initial Abstraction: 0.0001

     Transform: Kinematic Wave

     Plane: 1
     Plane 1 Length: 120
     Plane 1 Slope: 0.25
     Plane 1 Roughness: 0.3
     Plane 1 Percent of Area: 100
     Plane 1 Number of Steps: 5

     Channel: Main
     Channel Length: 875
     Channel Slope: 0.005
     Channel Mannings N: 0.03
     Shape: Trapezoid
     Channel Width: 0
     Channel Side Slope: 3
     Channel Number of Steps: 5
     Route with Muskingum Cunge: Yes

     Baseflow: Recession
     Recession Factor: 1
     Initial Baseflow: 0
     Threshold Flow: 0.0001
End:

Subbasin: CHD1
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3154644.8834591773
     Canvas Y: 1.3864409619945737E7
     From Canvas X: 8757.676979265641
     From Canvas Y: -13560.153993554413
     Label X: 2.0
     Label Y: -8.0
     Area: 0.00479
     Downstream: C/CHD2

     Discretization: None
     File: P1000000.sqlite

     Canopy 1: None
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None

     Surface 1: None

     LossRate 1: SCS
     Percent Impervious Area: 0.0
     Curve Number: 88
     Initial Abstraction: 0.0001

     Transform: Kinematic Wave

     Plane: 1
     Plane 1 Length: 190
     Plane 1 Slope: 0.25
     Plane 1 Roughness: 0.3
     Plane 1 Percent of Area: 100
     Plane 1 Number of Steps: 5
```

```
     Channel: Main
     Channel Length: 430
     Channel Slope: 0.001
     Channel Mannings N: 0.04
     Shape: Trapezoid
     Channel Width: 15
     Channel Side Slope: 3
     Channel Number of Steps: 5
     Route with Muskingum Cunge: Yes

     Baseflow: Recession
     Recession Factor: 1
     Initial Baseflow: 0
     Threshold Flow: 0.0001
End:

Subbasin: CHD2
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3154662.2746951324
     Canvas Y: 1.3863575415105153E7
     From Canvas X: 8805.515934626106
     From Canvas Y: -14229.899368602782
     Label X: 2.0
     Label Y: -8.0
     Area: 0.003
     Downstream: C/CHD2

     Discretization: None
     File: P1000000.sqlite

     Canopy 1: None
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None

     Surface 1: None

     LossRate 1: SCS
     Percent Impervious Area: 0.0
     Curve Number: 88
     Initial Abstraction: 0.0001

     Transform: Kinematic Wave

     Plane: 1
     Plane 1 Length: 185
     Plane 1 Slope: 0.25
     Plane 1 Roughness: 0.3
     Plane 1 Percent of Area: 100
     Plane 1 Number of Steps: 5

     Channel: Main
     Channel Length: 430
     Channel Slope: 0.001
     Channel Mannings N: 0.04
     Shape: Trapezoid
     Channel Width: 10
     Channel Side Slope: 3
     Channel Number of Steps: 5
     Route with Muskingum Cunge: Yes

     Baseflow: None
End:

Junction: C/CHD2
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3156085.483617111
     Canvas Y: 1.3863814609881956E7
     Downstream: C/CHD3
End:

Subbasin: DA4
     Last Modified Date: 15 July 2024
     Last Modified Time: 15:56:07
     Canvas X: 3154602.4760009316
     Canvas Y: 1.386295350868546 4E7
     From Canvas X: 9575.957728783134
     From Canvas Y: -13063.663820754737
     Label X: -1.0
     Label Y: 2.0
     Area: 0.03574
     Downstream: C/CHD3

     Discretization: None
     File: P1000000.sqlite

     Canopy 1: None
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None

     Surface 1: None

     LossRate 1: SCS
     Percent Impervious Area: 0.0
     Curve Number: 88
     Initial Abstraction: 0.0001

     Transform: Kinematic Wave

     Plane: 1
     Plane 1 Length: 361.6
     Plane 1 Slope: 0.035
     Plane 1 Roughness: 0.3
     Plane 1 Percent of Area: 100
     Plane 1 Number of Steps: 5

     Channel: Main
     Channel Length: 860.17
     Channel Slope: 0.005
     Channel Mannings N: 0.03
     Shape: Trapezoid
     Channel Width: 0
     Channel Side Slope: 3
```

```
     Channel Number of Steps: 5
     Route with Muskingum Cunge: Yes

     Baseflow: Recession
     Recession Factor: 1
     Initial Baseflow: 0
     Threshold Flow: 0.0001
End:

Subbasin: CHD3
     Last Modified Date: 11 March 2024
     Last Modified Time: 21:34:45
     Canvas X: 3154602.4760009316
     Canvas Y: 1.386258275678142E7
     From Canvas X: 8667.978937963955
     From Canvas Y: -14959.443437851965
     Label X: 2.0
     Label Y: -8.0
     Area: 0.00335
     Downstream: C/CHD3

     Discretization: None
     File: P1000000.sqlite

     Canopy 1: None
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None

     Surface 1: None

     LossRate 1: SCS
     Percent Impervious Area: 0.0
     Curve Number: 88
     Initial Abstraction: 0.0001

     Transform: Kinematic Wave

     Plane: 1
     Plane 1 Length: 150
     Plane 1 Slope: 0.25
     Plane 1 Roughness: 0.3
     Plane 1 Percent of Area: 100
     Plane 1 Number of Steps: 5

     Channel: Main
     Channel Length: 450
     Channel Slope: 0.001
     Channel Mannings N: 0.04
     Shape: Trapezoid
     Channel Width: 15
     Channel Side Slope: 3
     Channel Number of Steps: 5

     Baseflow: Recession
     Recession Factor: 1
     Initial Baseflow: 0
     Threshold Flow: 0.0001
End:

Junction: C/CHD3
     Last Modified Date: 15 July 2024
     Last Modified Time: 15:56:07
     Canvas X: 3156061.564139431
     Canvas Y: 1.3862929589207783E7
     Downstream: DCP-9
End:

Reservoir: DCP-9
     Last Modified Date: 15 July 2024
     Last Modified Time: 15:56:07
     Canvas X: 3158202.357391819
     Canvas Y: 1.3863922247531516E7
     Downstream: SDCP

     Route: Modified Puls
     Routing Curve: Elevation-Area-Outflow
     Initial Elevation: 30
     Elevation-Area Table: DCP-9
     Elevation-Outflow Table: DCP-9
     Primary Table: Elevation-Outflow
End:

Subbasin: DA13
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3155870.2083179886
     Canvas Y: 1.3864723550033816E7
     From Canvas X: 10957.30756482156
     From Canvas Y: -11742.112678915262
     Label X: -1.0
     Label Y: 2.0
     Area: 0.03852
     Downstream: C/CHE2

     Discretization: None
     File: P1000000.sqlite

     Canopy 1: None
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None

     Surface 1: None

     LossRate 1: SCS
     Percent Impervious Area: 0.0
     Curve Number: 88
     Initial Abstraction: 0.0001

     Transform: Kinematic Wave

     Plane: 1
     Plane 1 Length: 120
     Plane 1 Slope: 0.25
     Plane 1 Roughness: 0.3
```

```
     Plane 1 Percent of Area: 100
     Plane 1 Number of Steps: 5

     Channel: Main
     Channel Length: 715
     Channel Slope: 0.005
     Channel Mannings N: 0.03
     Shape: Trapezoid
     Channel Width: 0
     Channel Side Slope: 3
     Channel Number of Steps: 5
     Route with Muskingum Cunge: Yes

     Baseflow: Recession
     Recession Factor: 1
     Initial Baseflow: 0
     Threshold Flow: 0.0001
End:

Subbasin: CHE2
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3155930.007012189
     Canvas Y: 1.3864364757868605E7
     From Canvas X: 10049.32877400238
     From Canvas Y: -13637.892296012491
     Label X: 2.0
     Label Y: -8.0
     Area: 0.00516
     Downstream: C/CHE2

     Discretization: None
     File: P1000000.sqlite

     Canopy 1: None
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None

     Surface 1: None

     LossRate 1: SCS
     Percent Impervious Area: 0.0
     Curve Number: 80
     Initial Abstraction: 0.0001

     Transform: Kinematic Wave

     Plane: 1
     Plane 1 Length: 170
     Plane 1 Slope: 0.25
     Plane 1 Roughness: 0.3
     Plane 1 Percent of Area: 100
     Plane 1 Number of Steps: 5

     Channel: Main
     Channel Length: 560
     Channel Slope: 0.001
     Channel Mannings N: 0.04
     Shape: Trapezoid
     Channel Width: 25
     Channel Side Slope: 3
     Channel Number of Steps: 5
     Route with Muskingum Cunge: Yes

     Baseflow: Recession
     Recession Factor: 1
     Initial Baseflow: 0
     Threshold Flow: 0.0001
End:

Subbasin: CHE1
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3155834.329101468
     Canvas Y: 1.3865166060370896E7
     From Canvas X: 10001.489818641916
     From Canvas Y: -12968.146920964122
     Label X: 2.0
     Label Y: -8.0
     Area: 0.00128
     Downstream: C/CHE2

     Discretization: None
     File: P1000000.sqlite

     Canopy 1: None
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None

     Surface 1: None

     LossRate 1: SCS
     Percent Impervious Area: 0.0
     Curve Number: 80
     Initial Abstraction: 0.0001

     Transform: Kinematic Wave

     Plane: 1
     Plane 1 Length: 215
     Plane 1 Slope: 0.25
     Plane 1 Roughness: 0.3
     Plane 1 Percent of Area: 100
     Plane 1 Number of Steps: 5

     Channel: Main
     Channel Length: 50
     Channel Slope: 0.001
     Channel Mannings N: 0.04
     Shape: Trapezoid
     Channel Width: 25
     Channel Side Slope: 3
     Channel Number of Steps: 5
     Route with Muskingum Cunge: Yes
```

```
     Baseflow: Recession
     Recession Factor: 1
     Initial Baseflow: 0
     Threshold Flow: 0.0001
End:

Junction: C/CHE2
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3157552.8740764027
     Canvas Y: 1.386497773743981 9E7
     Downstream: DCP-8
End:

Reservoir: DCP-8
     Last Modified Date: 21 March 2024
     Last Modified Time: 16:30:04
     Canvas X: 3158474.0316405874
     Canvas Y: 1.3865042530441396E7
     From Canvas X: -1575.6295014619827
     From Canvas Y: -1839.5265691652894
     Downstream: SDCP

     Route: Modified Puls
     Routing Curve: Elevation-Area-Outflow
     Initial Elevation: 27
     Elevation-Area Table: DCP-8
     Elevation-Outflow Table: DCP-8
     Primary Table: Elevation-Outflow
End:

Junction: SDCP
     Last Modified Date: 31 July 2024
     Last Modified Time: 19:02:15
     Canvas X: 3159044.1388886482
     Canvas Y: 1.3863893461643 06E7
     Downstream: P1140000_0036_J
End:

Subbasin: FIL1
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3160344.6292422
     Canvas Y: 1.3863465086195257E7
     From Canvas X: 14172.34212704841
     From Canvas Y: -12221.209536416456
     Label X: 2.0
     Label Y: 0.0
     Area: 0.0228
     Downstream: C/FILL
     Discretization: None
     File: P1000000.sqlite
     Canopy: None
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None
     Surface: None
     LossRate: SCS
     Percent Impervious Area: 0.0
     Curve Number: 83
     Initial Abstraction: 0.0001
     Transform: Snyder
     Snyder Method: Standard
     Snyder Tp: 0.36
     Snyder Cp: 0.71
     Baseflow: Recession
     Recession Factor: 1
     Initial Baseflow: 0
     Threshold Flow: 0.0001
End:
Subbasin: FIL2
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3161182.2102578473
     Canvas Y: 1.3863730320183545E7
     From Canvas X: 14674.890736436937
     From Canvas Y: -12584.161309864372
     Label X: 2.0
     Label Y: 0.0
     Area: 0.0206
     Downstream: C/FILL
     Discretization: None
     File: P1000000.sqlite
     Canopy: None
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None
     Surface: None
     LossRate: SCS
     Percent Impervious Area: 0.0
     Curve Number: 83
     Initial Abstraction: 0.0001
     Transform: Snyder
     Snyder Method: Standard
     Snyder Tp: 0.54
     Snyder Cp: 0.7
     Baseflow: Recession
     Recession Factor: 1
     Initial Baseflow: 0
     Threshold Flow: 0.0001
End:

Junction: C/FILL
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3160442.3470273586
     Canvas Y: 1.3864246828476528E7
     Downstream: P1140000_0036_J
End:
Junction: P1140000_0036_J
     Last Modified Date: 31 July 2024
     Last Modified Time: 18:54:25
     Canvas X: 3159355.1067900625
     Canvas Y: 1.3865196565229932E7
     Label X: -24.0
```

```
     Label Y: 19.0
     Downstream: P1140000_0026_R
End:
Reach: P1140000_0026_R
     Description: RS 3645 to RS 2644
     Last Modified Date: 31 July 2024
     Last Modified Time: 18:54:25
     Canvas X: 3162850.4268136267
     Canvas Y: 1.386366129803858 3E7
     From Canvas X: 3159355.1067900625
     From Canvas Y: 1.3865196565229932E7
     Label X: -61.0
     Label Y: 0.0
     Downstream: P1140000_0026_J
     Route: Modified Puls
     Initial Variable: Combined Inflow
     Number of Reaches: 2
     Storage Outflow Table Name: P1140000_0026_R
     Channel Loss: None
End:
Subbasin: P114C
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3159953.2579855756
     Canvas Y: 1.3862186174856646E7
     Label X: 16.0
     Label Y: 0.0
     Area: 0.471
     Downstream: P1140000_0026_J
     Discretization: None
     File: P1000000.sqlite
     Canopy: Simple
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None
     Initial Canopy Storage Percent: 0.0
     Canopy Storage Capacity: 0.1
     Crop Coefficient: 1.0
     End Canopy:
     Surface: None
     LossRate: Green and Ampt
     Percent Impervious Area: 40.408
     Initial Variable: Water Content
     Initial Content: 0.024
     Saturated Content: 0.46
     Wetting Front Suction: 3.5
     Hydraulic Conductivity: 0.024
     Transform: Clark
     Clark Method: Specified
     Time of Concentration: 0.36
     Storage Coefficient: 1.51
     Time Area Method: Default
     Baseflow: None
End:
Junction: P1140000_0026_J
     Last Modified Date: 15 July 2024
     Last Modified Time: 15:56:07
     Canvas X: 3162850.4268136267
     Canvas Y: 1.386366129803858 3E7
     Label X: -35.0
     Label Y: -26.0
     Downstream: P1000000_0530_J
End:
Junction: P1000000_0530_J
     Last Modified Date: 15 July 2024
     Last Modified Time: 18:16:49
     Canvas X: 3164468.6323797987
     Canvas Y: 1.386355314129328E7
     Label X: 16.0
     Label Y: 0.0
     Downstream: P1000000_0472_R
End:
Reach: P1000000_0472_R
     Description: RS 52958 to RS 47168
     Last Modified Date: 15 July 2024
     Last Modified Time: 18:16:49
     Canvas X: 3167389.227
     Canvas Y: 1.386168314E7
     From Canvas X: 3164468.6323797987
     From Canvas Y: 1.386355314129328E7
     Label X: -76.0
     Label Y: -38.0
     Downstream: P1000000_0472_J
     Route: Modified Puls
     Initial Variable: Combined Inflow
     Number of Reaches: 9
     Storage Outflow Table Name: P1000000_0472_R
     Channel Loss: None
End:
Subbasin: P100T
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3162999.76
     Canvas Y: 1.3860486013E7
     Label X: 16.0
     Label Y: 0.0
     Area: 1.947
     Downstream: P1000000_0472_J
     Discretization: None
     File: P1000000.sqlite
     Canopy: Simple
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None
     Initial Canopy Storage Percent: 0.0
     Canopy Storage Capacity: 0.1
     Crop Coefficient: 1.0
     End Canopy:
     Surface: None
     LossRate: Green and Ampt
     Percent Impervious Area: 20.257
     Initial Variable: Water Content
     Initial Content: 0.024
     Saturated Content: 0.46
     Wetting Front Suction: 3.5
     Hydraulic Conductivity: 0.024
```

```
     Transform: Clark
     Clark Method: Specified
     Time of Concentration: 3.84
     Storage Coefficient: 10.36
     Time Area Method: Default
     Baseflow: None
End:
Junction: P1000000_0472_J
     Description: just upstream of p100#25
     Last Modified Date: 15 July 2024
     Last Modified Time: 18:16:49
     Canvas X: 3167389.227
     Canvas Y: 1.386168314E7
     Label X: -40.0
     Label Y: -27.0
     Downstream: P1000000_0460_J
End:
Subbasin: P110A
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3169128.104
     Canvas Y: 1.3866791146E7
     Label X: 16.0
     Label Y: 0.0
     Area: 1.991
     Downstream: P1000000_0460_J
     Discretization: None
     File: P1000000.sqlite
     Canopy: Simple
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None
     Initial Canopy Storage Percent: 0.0
     Canopy Storage Capacity: 0.1
     Crop Coefficient: 1.0
     End Canopy:
     Surface: None
     LossRate: Green and Ampt
     Percent Impervious Area: 36.448
     Initial Variable: Water Content
     Initial Content: 0.024
     Saturated Content: 0.46
     Wetting Front Suction: 3.5
     Hydraulic Conductivity: 0.024
     Transform: Clark
     Clark Method: Specified
     Time of Concentration: 1.2
     Storage Coefficient: 3.05
     Time Area Method: Default
     Baseflow: None
End:
Junction: P1000000_0460_J
     Last Modified Date: 15 July 2024
     Last Modified Time: 18:16:49
     Canvas X: 3168220.565
     Canvas Y: 1.3861649886E7
     Label X: 16.0
     Label Y: 0.0
     Downstream: P1000000_0445_R
End:
Reach: P1000000_0445_R
     Description: RS 46018 to RS 44499
     Last Modified Date: 15 July 2024
     Last Modified Time: 18:16:49
     Canvas X: 3169051.903
     Canvas Y: 1.386055252E7
     From Canvas X: 3168220.565
     From Canvas Y: 1.3861649886E7
     Label X: 9.0
     Label Y: 1.0
     Downstream: P1000000_0445_J

     Route: Modified Puls
     Initial Variable: Combined Inflow
     Number of Reaches: 3
     Storage Outflow Table Name: P1000000_0445_R
     Channel Loss: None
End:
Junction: P1000000_0445_J
     Description: just upstream of p100#26
     Last Modified Date: 15 July 2024
     Last Modified Time: 18:16:49
     Canvas X: 3169051.903
     Canvas Y: 1.386055252E7
     Label X: -63.0
     Label Y: -12.0
     Downstream: P1000000_0432_J
End:
Subbasin: P109A
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3172615.804
     Canvas Y: 1.3864006004E7
     Label X: 16.0
     Label Y: 0.0
     Area: 1.415
     Downstream: P1000000_0432_J
     Discretization: None
     File: P1000000.sqlite
     Canopy: Simple
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None
     Initial Canopy Storage Percent: 0.0
     Canopy Storage Capacity: 0.1
     Crop Coefficient: 1.0
     End Canopy:
     Surface: None
     LossRate: Green and Ampt
     Percent Impervious Area: 19.912
     Initial Variable: Water Content
     Initial Content: 0.024
     Saturated Content: 0.46
     Wetting Front Suction: 3.5
     Hydraulic Conductivity: 0.024
     Transform: Clark
```

```
     Clark Method: Specified
     Time of Concentration: 0.69
     Storage Coefficient: 3.99
     Time Area Method: Default
     Baseflow: None
End:
Junction: P1000000_0432_J
     Last Modified Date: 15 July 2024
     Last Modified Time: 18:16:49
     Canvas X: 3169983.002
     Canvas Y: 1.386055252E7
     Label X: 16.0
     Label Y: 0.0
     Downstream: P1000000_3901_R
End:
Reach: P1000000_3901_R
     Description: RS 43183 to RS 390137
     Last Modified Date: 15 July 2024
     Last Modified Time: 18:16:49
     Canvas X: 3171279.89
     Canvas Y: 1.3858058505E7
     From Canvas X: 3169983.002
     From Canvas Y: 1.386055252E7
     Label X: -14.0
     Label Y: 1.0
     Downstream: P1000000_0390_J
     Route: Modified Puls
     Initial Variable: Combined Inflow
     Number of Reaches: 5
     Storage Outflow Table Name: P1000000_3901_R
     Channel Loss: None
End:
Subbasin: P100U
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3168885.636
     Canvas Y: 1.3858790083E7
     Label X: 16.0
     Label Y: 0.0
     Area: 0.5
     Downstream: P1000000_0390_J
     Discretization: None
     File: P1000000.sqlite
     Canopy: Simple
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None
     Initial Canopy Storage Percent: 0.0
     Canopy Storage Capacity: 0.1
     Crop Coefficient: 1.0
     End Canopy:
     Surface: None
     LossRate: Green and Ampt
     Percent Impervious Area: 25.387
     Initial Variable: Water Content
     Initial Content: 0.024
     Saturated Content: 0.46
     Wetting Front Suction: 3.5
     Hydraulic Conductivity: 0.024
     Transform: Clark
     Clark Method: Specified
     Time of Concentration: 0.4
     Storage Coefficient: 2.82
     Time Area Method: Default
     Baseflow: None
End:
Junction: P1000000_0390_J
     Last Modified Date: 15 July 2024
     Last Modified Time: 18:16:49
     Canvas X: 3171279.89
     Canvas Y: 1.3858058505E7
     Label X: 16.0
     Label Y: 0.0
     Downstream: P1000000_0381_J
End:
Subbasin: P107A
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3178470.75
     Canvas Y: 1.3873352636E7
     Label X: 16.0
     Label Y: 0.0
     Area: 2.574
     Downstream: P1070000_0198_J
     Discretization: None
     File: P1000000.sqlite
     Canopy: Simple
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None
     Initial Canopy Storage Percent: 0.0
     Canopy Storage Capacity: 0.1
     Crop Coefficient: 1.0
     End Canopy:
     Surface: None
     LossRate: Green and Ampt
     Percent Impervious Area: 34.157
     Initial Variable: Water Content
     Initial Content: 0.024
     Saturated Content: 0.46
     Wetting Front Suction: 3.5
     Hydraulic Conductivity: 0.024
     Transform: Clark
     Clark Method: Specified
     Time of Concentration: 0.34
     Storage Coefficient: 6.58
     Time Area Method: Default
     Baseflow: None
End:
Junction: P1070000_0198_J
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3177591.986
     Canvas Y: 1.3871851413E7
     Label X: 16.0
     Label Y: 0.0
```

```
     Downstream: P1070000_0026_R
End:
Reach: P1070000_0026_R
     Description: RS 19812 to RS 2594
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3174003.698
     Canvas Y: 1.3858926254E7
     From Canvas X: 3177591.986
     From Canvas Y: 1.3871851413E7
     Label X: 16.0
     Label Y: 0.0
     Downstream: P1070000_0026_J
     Route: Modified Puls
     Initial Variable: Combined Inflow
     Number of Reaches: 28
     Storage Outflow Table Name: P1070000_0026_R
     Channel Loss: None
End:
Subbasin: P107B
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3177958.137
     Canvas Y: 1.3863246846E7
     Label X: 18.0
     Label Y: 0.0
     Area: 2.402
     Downstream: P1070000_0026_J
     Discretization: None
     File: P1000000.sqlite
     Canopy: Simple
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None
     Initial Canopy Storage Percent: 0.0
     Canopy Storage Capacity: 0.1
     Crop Coefficient: 1.0
     End Canopy:

     Surface: None
     LossRate: Green and Ampt
     Percent Impervious Area: 27.839
     Initial Variable: Water Content
     Initial Content: 0.024
     Saturated Content: 0.46
     Wetting Front Suction: 3.5
     Hydraulic Conductivity: 0.024
     Transform: Clark
     Clark Method: Specified
     Time of Concentration: 1.21
     Storage Coefficient: 4.25
     Time Area Method: Default
     Baseflow: None
End:
Junction: P1070000_0026_J
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3174003.698
     Canvas Y: 1.3858926254E7
     Label X: 16.0
     Label Y: 0.0
     Downstream: P1000000_0301_J
End:
Junction: P1000000_0301_J
     Last Modified Date: 15 July 2024
     Last Modified Time: 18:16:49
     Canvas X: 3172144.482
     Canvas Y: 1.3857293674E7
     Label X: 16.0
     Label Y: 1.0
     Downstream: P1000000_0181_R
End:
Reach: P1000000_0181_R
     Description: RS 38132 TO RS 18088
     Last Modified Date: 15 July 2024
     Last Modified Time: 18:16:49
     Canvas X: 3174804.764
     Canvas Y: 1.3847118093E7
     From Canvas X: 3172144.482
     From Canvas Y: 1.3857293674E7
     Label X: 13.0
     Label Y: 35.0
     Downstream: P1000000_0181_J
     Route: Modified Puls
     Initial Variable: Combined Inflow
     Number of Reaches: 21
     Storage Outflow Table Name: P1000000_0181_R
     Channel Loss: None
End:
Subbasin: P100V
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3169750.227
     Canvas Y: 1.3852604926E7
     Label X: 16.0
     Label Y: 0.0
     Area: 3.814
     Downstream: P1000000_0181_J
     Discretization: None
     File: P1000000.sqlite
     Canopy: Simple
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None
     Initial Canopy Storage Percent: 0.0
     Canopy Storage Capacity: 0.1
     Crop Coefficient: 1.0
     End Canopy:
     Surface: None
     LossRate: Green and Ampt
     Percent Impervious Area: 33.235
     Initial Variable: Water Content
     Initial Content: 0.024
     Saturated Content: 0.46
     Wetting Front Suction: 3.5
     Hydraulic Conductivity: 0.024
```

```
     Transform: Clark
     Clark Method: Specified
     Time of Concentration: 4.31
     Storage Coefficient: 3.95
     Time Area Method: Default
     Baseflow: None
End:
Junction: P1000000_0181_J
     Last Modified Date: 15 July 2024
     Last Modified Time: 18:16:49
     Canvas X: 3174804.764
     Canvas Y: 1.3847118093E7
     Label X: 16.0
     Label Y: 0.0
     Downstream: P1000000_0010_R
End:
Reach: P1000000_0010_R
     Description: RS 18088 TO RS 982
     Last Modified Date: 15 July 2024
     Last Modified Time: 18:16:49
     Canvas X: 3183084.894
     Canvas Y: 1.3839868823E7
     From Canvas X: 3174804.764
     From Canvas Y: 1.3847118093E7
     Label X: 13.0
     Label Y: 35.0
     Downstream: P1000000_0010_J
     Route: Modified Puls
     Initial Variable: Combined Inflow
     Number of Reaches: 18
     Storage Outflow Table Name: P1000000_0010_R
     Channel Loss: None
End:
Subbasin: P100W
     Last Modified Date: 15 February 2024
     Last Modified Time: 20:45:39
     Canvas X: 3181495.353
     Canvas Y: 1.3849596154E7
     Label X: 16.0
     Label Y: 0.0
     Area: 5.564
     Downstream: P1000000_0010_J
     Discretization: None
     File: P1000000.sqlite
     Canopy: Simple
     Allow Simultaneous Precip Et: No
     Plant Uptake Method: None
     Initial Canopy Storage Percent: 0.0
     Canopy Storage Capacity: 0.1
     Crop Coefficient: 1.0
     End Canopy:
     Surface: None
     LossRate: Green and Ampt
     Percent Impervious Area: 46.812
     Initial Variable: Water Content
     Initial Content: 0.024
     Saturated Content: 0.46
     Wetting Front Suction: 3.5
     Hydraulic Conductivity: 0.024
     Transform: Clark
     Clark Method: Specified
     Time of Concentration: 5.51
     Storage Coefficient: 2.76
     Time Area Method: Default
     Baseflow: None
End:
Junction: P1000000_0010_J
     Last Modified Date: 15 July 2024
     Last Modified Time: 18:16:49
     Canvas X: 3183084.894
     Canvas Y: 1.3839868823E7
     Label X: 16.0
     Label Y: 0.0
End:
Basin Layer Properties:
     Element Layer:
          Name: Icons
          Layer shown: Yes
     End Layer:
End:
Basin Schematic Properties:
     Last View N: 1.3870012932507532E7
     Last View S: 1.3855501430259507E7
     Last View W: 3148071.1977935187
     Last View E: 3167430.7865713555
     Maximum View N: 1.394E7
     Maximum View S: 1.3834E7
     Maximum View W: 3070000.0
     Maximum View E: 3180000.0
     Extent Method: Manual
     Buffer: 0
     Draw Icons: Yes
     Draw Icon Labels: Name
     Draw Map Objects: No
     Draw Gridlines: Yes
     Draw Flow Direction: No
     Draw HillShade Layer: Yes
     Draw Elevation Layer: Yes
     Elevation Layer Color Palette: Gray Scale
     Ignore Elevation Color Ramp Scale: No
     Use Interpolated Color Ramp for Elevation Layer: Yes
     Color Ramp Opacity Level for Elevation Layer: 33.0
     Fix Element Locations: No
     Fix Hydrologic Order: No
End:
```

Elevation-Area-Discharge Function for DCP1

Elevation (ft-msl)	Area (ac)	Discharge (cfs)
37.5	0.0004	0
38.0	0.0140	0
39.0	0.0687	11
40.0	0.1103	26
41.0	0.1267	43
42.0	0.1433	49
42.5	0.1510	54
43.0	0.1585	87
44.0	0.1735	213
45.0		395
46.0		607
47.0	2.0000	831

Elevation-Area-Discharge Function for DCP3

Elevation (ft-msl)	Area (ac)	Discharge (cfs)
36.0	0.5487	0
37.0	0.6455	0
38.0	0.7445	0
39.0	0.8415	0
40.0	0.9391	0
41.0	1.0373	0.1
42.0	1.1361	0.2
42.5	1.1869	126
43.0	1.2309	353
44.0	1.3279	996

Elevation-Area-Discharge Function for DCP4

Elevation (ft-msl)	Area (ac)	Discharge (cfs)
26.0	0	0
27.0	0	0
28.0	0	0
29.0	0	0
30.0	0	0
31.0	0	0
32.0	1.0262	1
32.5	1.0755	78
33.0	1.0755	218
33.5	1.0755	396
37.0	10	475

Elevation-Area-Discharge Function for DCP5

Elevation (ft-msl)	Area (ac)	Discharge (cfs)
28.7	0.1000	0
32.5	0.3100	3
33.0	0.3200	51
36.0	5.0000	286

Elevation-Area-Discharge Function for DCP6

Elevation (ft-msl)	Area (ac)	Discharge (cfs)
28.6	0.0000	0
32.0	0.3100	9
32.1	4.0000	17
33.0	4.5000	241
34.0	4.7500	651
36.0	5.0000	1770

Elevation-Area-Discharge Function for DCP7

Elevation (ft-msl)	Area (ac)	Discharge (cfs)
25.0	0.0000	0
26.0	0.0000	0
27.0	0.0000	0
28.0	0.0000	0
29.0	0.0000	0
29.5	0.0000	0
30.0	0.0000	0
31.0	0.0000	0
31.5	0.0000	0
32.0	1.8500	65
34.0	5.0000	735
38.0	10.0000	635

Elevation-Area-Discharge Function for DCP8

Elevation (ft-msl)	Area (ac)	Discharge (cfs)
27.0	0	0
29.0	0	0
31.0	0	0
33.0	0	0
35.0	0	0
36.0	0	0
37.0	0.0000	0
38.0	10.0000	0
41.0	15.0000	465

Elevation-Area-Discharge Function for DCP9

Elevation (ft-msl)	Area (ac)	Discharge (cfs)
30.0	0	0
32.0	0	0
34.0	0	0
36.0	0	0
37.0	0	0
38.0	1.766	27
39.0	5.0	304
42.0	15	864

Proposed Condition, 25-Year Frequency Storm Event				
Hydrologic Element	**Drainage Area (mi^2)**	**Peak Discharge (cfs)**	**Time of Peak**	**Volume (Ac-ft)**
P100A	1.700	1,212.2	1 June 2007, 17:30	978.9
P1000000_2203_J	1.700	1,212.2	1 June 2007, 17:30	978.9
P161A	0.600	622.3	1 June 2007, 16:50	316.6
P1000000_2197_J	2.300	1,815.1	1 June 2007, 17:10	1,295.5
P1000000_2159_R	2.300	1,449.4	2 June 2007, 00:15	1,295.5
P100B	0.400	475.1	1 June 2007, 16:30	219.0
P1000000_2159_J	2.700	1,514.8	2 June 2007, 00:05	1,514.6
P151A	2.100	936.0	1 June 2007, 18:20	1,155.9
P1000000_2137_J	4.700	2,207.5	1 June 2007, 18:30	2,670.5
P1000000_2105_R	4.700	2,188.3	2 June 2007, 01:15	2,670.5
P100C	1.300	848.6	1 June 2007, 17:35	735.9
P1000000_2105_J	6.000	2,898.9	1 June 2007, 19:50	3,406.5
P1000000_2083_R	6.000	2,886.6	1 June 2007, 20:30	3,406.5
P100D	1.900	1,113.9	1 June 2007, 17:35	1,052.5
P1000000_2083_J	7.900	3,819.5	1 June 2007, 20:00	4,459.0
P1000000_2048_R	7.900	3,811.3	1 June 2007, 20:45	4,459.0
P100E	1.800	964.3	1 June 2007, 17:55	998.0
P1000000_2047_J	9.700	4,646.8	1 June 2007, 20:15	5,457.0
P1000000_2020_R	9.700	4,627.4	1 June 2007, 21:35	5,457.0
P100F	1.100	659.5	1 June 2007, 17:30	601.0
P1000000_2020_J	10.800	5,107.3	1 June 2007, 21:10	6,057.9
P1000000_1972_D	10.800	5,107.3	1 June 2007, 21:10	5,577.6
P1000000_1929_R	10.800	4,930.4	2 June 2007, 03:30	5,577.6
P100G	1.400	701.1	1 June 2007, 18:05	793.2
P1000000_1929_J	12.200	5,251.4	2 June 2007, 03:15	6,370.8
P152A	4.300	3,110.0	1 June 2007, 18:00	2,464.3
P1000000_1918_D	16.500	5,619.0	2 June 2007, 00:45	8,281.4
P1000000_1856_R	16.500	5,557.5	2 June 2007, 06:50	8,281.3
P100H	1.400	1,227.2	1 June 2007, 17:05	786.0
P1000000_1856_J	17.900	5,761.1	1 June 2007, 18:50	9,067.3
P148A	2.100	1,421.1	1 June 2007, 17:40	1,209.4
P1480000_0073_J	2.100	1,893.1	1 June 2007, 17:50	1,763.2
P1000000_1845_D	20.000	7,252.0	1 June 2007, 18:45	10,583.6
P1000000_1741_R	20.000	7,079.4	1 June 2007, 22:00	10,583.5
P100I	2.100	1,463.2	1 June 2007, 17:30	1,205.7
P1000000_1741_J	22.100	8,022.9	1 June 2007, 21:40	11,789.1
P147A	1.500	1,011.7	1 June 2007, 17:20	845.9
P1470000_0055_J	1.500	1,011.7	1 June 2007, 17:20	845.9
P1470000_0018_R	1.500	1,007.8	1 June 2007, 18:05	845.9
P147B	1.000	636.2	1 June 2007, 17:50	580.2
P1470000_0018_J	2.500	1,641.6	1 June 2007, 18:00	1,426.1
P1000000_1730_J	24.700	9,331.0	1 June 2007, 19:50	13,215.2
P1000000_1716_R	24.700	9,311.5	1 June 2007, 20:15	13,215.2
P1000000_1716_J	24.700	9,311.5	1 June 2007, 20:15	13,215.2
P146A	0.600	427.5	1 June 2007, 17:20	303.9
P1000000_1709_J	25.200	9,622.7	1 June 2007, 20:10	13,519.1
P1000000_1690_R	25.200	9,580.3	1 June 2007, 21:20	13,519.0
P1000000_1690_J	25.200	9,580.3	1 June 2007, 21:20	13,519.0
P145A	1.000	964.3	1 June 2007, 16:55	589.1

Proposed Condition, 25-Year Frequency Storm Event				
Hydrologic Element	**Drainage Area (mi^2)**	**Peak Discharge (cfs)**	**Time of Peak**	**Volume (Ac-ft)**
P1450000_0232_J	1.000	964.3	1 June 2007, 16:55	589.1
P1450000_0208_R	1.000	960.9	1 June 2007, 17:10	589.1
P145B	1.000	663.3	1 June 2007, 17:20	543.3
P1450000_0208_J	2.000	1,622.5	1 June 2007, 17:10	1,132.4
P1450000_0188_R	2.000	1,618.8	1 June 2007, 17:30	1,132.4
P145C	0.600	354.7	1 June 2007, 17:50	329.6
P1450000_0188_J	2.600	1,970.8	1 June 2007, 17:30	1,462.1
P1450000_0139_R	2.600	1,966.3	1 June 2007, 17:55	1,462.1
P145D	1.100	675.7	1 June 2007, 17:20	588.6
P1450000_0139_J	3.700	2,631.1	1 June 2007, 17:50	2,050.7
P245A	1.500	838.4	1 June 2007, 17:55	791.5
P1450000_0119_J	5.100	3,469.1	1 June 2007, 17:55	2,842.1
P1450000_0096_R	5.100	3,428.7	1 June 2007, 18:35	2,842.1
P1450000_0096_J	5.100	3,428.7	1 June 2007, 18:35	2,842.1
P14503A	1.700	897.0	1 June 2007, 17:45	940.8
P1450300_0103_J	1.700	897.0	1 June 2007, 17:45	940.8
P1450300_0037_R	1.700	894.9	1 June 2007, 18:30	940.8
P14503B	2.400	1,566.1	1 June 2007, 17:20	1,341.4
P1450300_0037_J	4.100	2,417.6	1 June 2007, 17:50	2,282.2
P1450300_0014_R	4.100	2,409.3	1 June 2007, 18:30	2,282.2
P14503C	0.900	482.5	1 June 2007, 17:55	504.2
P1450300_0014_J	5.000	2,886.9	1 June 2007, 18:25	2,786.4
P1450000_0074_J	10.200	6,314.1	1 June 2007, 18:30	5,628.6
P1450000_0010_R	10.200	6,299.6	1 June 2007, 19:05	5,628.6
P145E	1.900	1,609.9	1 June 2007, 17:10	1,066.4
P1450000_0010_J	12.000	7,633.9	1 June 2007, 18:55	6,694.9
P1000000_1686_J	37.300	16,180.1	1 June 2007, 20:20	20,213.9
P1000000_1557_R	37.300	15,881.8	2 June 2007, 00:15	20,213.5
P100J	5.900	3,380.9	1 June 2007, 17:50	3,368.6
P1000000_1557_J	43.100	17,870.9	2 June 2007, 00:05	23,582.1
P1000000_1554_D	43.100	17,194.9	2 June 2007, 00:05	23,259.1
P156A	1.300	902.2	1 June 2007, 17:35	724.1
P1560000_0048_J	1.300	902.2	1 June 2007, 17:35	724.1
P1560000_0019_R	1.300	901.7	1 June 2007, 17:45	724.1
P156B	0.900	1,137.7	1 June 2007, 16:40	522.1
P1560000_0019_J	2.200	1,947.5	1 June 2007, 17:10	1,246.2
P1000000_1540_J	45.400	17,791.6	2 June 2007, 00:05	24,505.2
P1000000_1498_R	45.400	17,542.9	2 June 2007, 01:35	24,505.1
P1000000_1498_J	45.400	17,542.9	2 June 2007, 01:35	24,505.1
P1550000_0063_J	0.000	1,042.3	1 June 2007, 20:05	1,065.8
P155A	1.500	1,619.2	1 June 2007, 16:50	847.9
P1550000_0008_J	1.500	2,581.2	1 June 2007, 17:05	1,913.7
P1000000_1488_J	46.800	18,426.5	2 June 2007, 01:20	26,418.7
P1000000_1433_R	46.800	18,196.1	2 June 2007, 04:00	26,418.2
P100K	1.600	1,325.9	1 June 2007, 17:15	935.1
P1000000_1433_J	48.500	18,391.0	2 June 2007, 04:00	27,353.3
P140A	1.000	738.4	1 June 2007, 17:10	546.2

Proposed Condition, 25-Year Frequency Storm Event				
Hydrologic Element	**Drainage Area (mi^2)**	**Peak Discharge (cfs)**	**Time of Peak**	**Volume (Ac-ft)**
P1400403_0259_J	1.000	738.4	1 June 2007, 17:10	546.2
P1400000_0172_R	1.000	672.9	1 June 2007, 23:40	546.2
P140B	1.300	921.9	1 June 2007, 17:35	714.7
P1400400_0172_J	2.300	1,222.4	1 June 2007, 20:05	1,260.8
P1400400_0164_D	2.300	574.6	1 June 2007, 20:05	810.9
P1400400_0159_D	2.300	180.1	1 June 2007, 20:05	195.0
P1400400_0150_J	2.300	180.1	1 June 2007, 20:05	195.0
P1400000_0112_R	2.300	180.1	1 June 2007, 20:35	195.0
P140C	1.300	742.4	1 June 2007, 17:40	715.8
P1400000_0112_J	3.600	920.0	1 June 2007, 17:45	910.9
P1400000_0020_R	3.600	914.9	1 June 2007, 18:45	910.9
P140D	3.900	1,724.3	1 June 2007, 18:05	2,199.4
P1400000_0020_J	7.400	2,628.5	1 June 2007, 18:30	3,110.3
P1000000_1424_J	55.900	19,651.1	2 June 2007, 03:55	30,463.6
P1000000_1334_R	55.900	18,886.5	2 June 2007, 08:15	30,462.7
P100L	2.700	1,786.1	1 June 2007, 17:40	1,556.3
P1000000_1334_J	58.600	19,106.1	2 June 2007, 08:15	32,019.0
P138A	2.700	1,249.6	1 June 2007, 18:10	1,563.4
P1380000_0141_D	2.700	1,255.6	1 June 2007, 23:50	1,681.0
P1380000_0130_J	2.700	1,255.6	1 June 2007, 23:50	1,681.0
P1380000_0013_R	2.700	1,207.0	2 June 2007, 03:55	1,681.0
P138B	3.600	1,824.9	1 June 2007, 17:55	2,041.1
P1380000_0013_J	6.300	2,699.1	1 June 2007, 19:45	3,722.2
P1000000_1308_J	64.900	19,969.2	2 June 2007, 08:10	35,741.2
P1000000_1226_R	64.900	19,818.5	2 June 2007, 10:45	35,740.2
P100M	4.300	1,708.4	1 June 2007, 18:35	2,440.5
P1000000_1226_J	69.300	20,349.6	2 June 2007, 10:40	38,180.8
P1000000_1123_R	69.300	20,194.7	2 June 2007, 14:10	38,177.8
P100N	3.000	1,599.8	1 June 2007, 18:10	1,686.9
P1000000_1123_J	72.300	20,357.7	2 June 2007, 14:05	39,864.8
P133A	3.000	1,205.0	1 June 2007, 18:40	1,687.3
P1330000_0092_J	3.000	1,205.0	1 June 2007, 18:40	1,687.3
P1330000_0017_R	3.000	1,200.3	1 June 2007, 20:10	1,686.4
P133B	1.300	765.8	1 June 2007, 17:35	686.3
P1330000_0017_J	4.200	1,864.9	1 June 2007, 19:25	2,372.7
P1000000_1114_J	76.500	20,684.0	2 June 2007, 14:00	42,237.5
P1000000_1038_R	76.500	20,546.3	2 June 2007, 18:10	42,231.9
P100O	3.100	1,314.3	1 June 2007, 18:20	1,663.7
P1000000_1038_J	79.600	20,703.6	2 June 2007, 18:10	43,895.6
P130A	2.900	1,735.0	1 June 2007, 17:35	1,598.8
P530_15_01	2.900	1,203.0	1 June 2007, 22:00	1,595.6
P1300000_0447_R	2.900	1,199.7	2 June 2007, 00:15	1,594.8
P130B	1.000	951.6	1 June 2007, 16:55	586.0
P1300000_0447_J	3.900	1,529.1	1 June 2007, 22:10	2,180.8
P1300000_0361_R	3.900	1,521.3	2 June 2007, 01:25	2,179.7
P130C	2.600	1,261.1	1 June 2007, 17:55	1,464.8
P1300000_0361_J	6.600	2,336.9	1 June 2007, 23:55	3,644.5

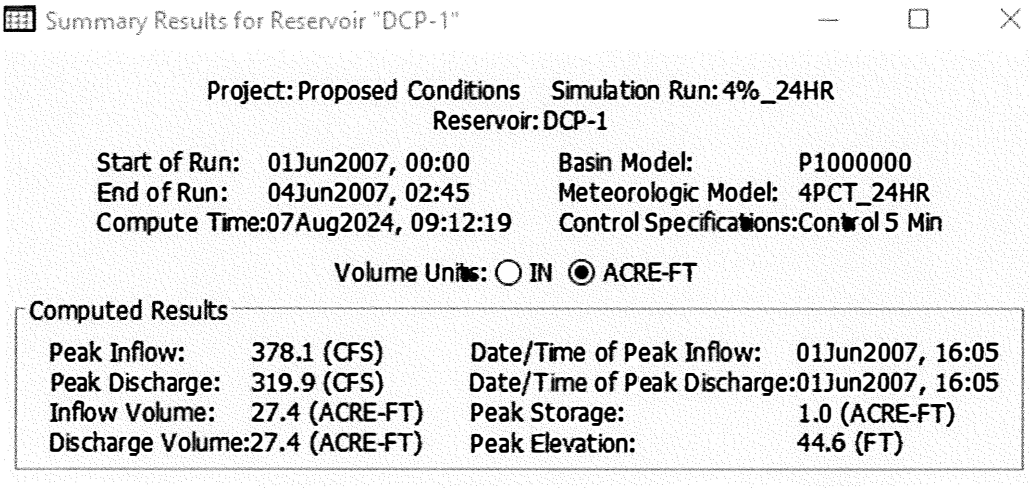
Proposed Condition, 25-Year Frequency Storm Event				
Hydrologic Element	**Drainage Area (mi^2)**	**Peak Discharge (cfs)**	**Time of Peak**	**Volume (Ac-ft)**
P13008A	1.900	1,844.5	1 June 2007, 17:15	1,080.3
P530_08_01	1.900	859.7	1 June 2007, 21:30	1,080.3
P13009A	1.400	1,086.0	1 June 2007, 17:20	820.2
P1300000_0342_J	9.900	3,930.8	1 June 2007, 19:05	5,545.0
P1300000_0302_R	9.900	3,914.9	1 June 2007, 20:30	5,544.5
P130D	0.700	655.0	1 June 2007, 16:50	377.1
P1300000_0302_J	10.600	4,284.4	1 June 2007, 20:00	5,921.5
P13007A	0.800	574.3	1 June 2007, 17:30	459.1
P1300000_0294_J	11.400	4,756.0	1 June 2007, 19:45	6,380.6
P1300000_0257_R	11.400	4,733.8	1 June 2007, 21:10	6,380.1
P130E	1.000	849.5	1 June 2007, 17:10	574.7
P1300000_0257_J	12.400	5,248.1	1 June 2007, 20:45	6,954.8
P13005A	1.200	1,201.8	1 June 2007, 17:15	682.0
P1300500_0195_J	1.200	1,201.8	1 June 2007, 17:15	682.0
P13005B	0.900	626.3	1 June 2007, 17:45	512.9
P1300500_0162_J	2.100	1,816.5	1 June 2007, 17:25	1,194.9
P530_05_01	2.100	1,070.0	1 June 2007, 17:30	1,194.9
P1300500_0144_R	2.100	1,023.7	2 June 2007, 01:30	1,194.9
P13005C	0.600	557.9	1 June 2007, 17:00	348.8
P1300500_0144_J	2.800	1,144.1	2 June 2007, 00:30	1,543.8
P1300502A	0.900	596.9	1 June 2007, 17:50	496.1
P1300502_0144_J	0.900	596.9	1 June 2007, 17:50	496.1
P1300502_0126_R	0.900	596.8	1 June 2007, 18:00	496.1
P1300502B	0.100	175.0	1 June 2007, 16:30	76.7
P1300502_0126_J	1.100	734.5	1 June 2007, 17:40	572.8
P1300500_0114_J	3.800	1,753.5	1 June 2007, 18:10	2,116.6
P1300500_0016_R	3.800	1,733.0	1 June 2007, 21:35	2,116.6
P13005D	2.700	1,457.1	1 June 2007, 17:55	1,478.7
P1300500_0016_J	6.500	2,909.5	1 June 2007, 20:55	3,595.3
P1300000_0227_J	18.900	8,155.5	1 June 2007, 20:50	10,550.0
P1300000_0195_R	18.900	8,116.0	1 June 2007, 22:10	10,549.6
P130F	1.200	942.0	1 June 2007, 17:05	674.8
P1300000_0195_J	20.100	8,617.2	1 June 2007, 21:50	11,224.4
P1300301A	0.700	517.8	1 June 2007, 17:15	371.1
P1300300_0032_J	0.700	517.8	1 June 2007, 17:15	371.1
P1300300_0008_R	0.700	517.6	1 June 2007, 17:25	371.1
P13003A	1.600	1,205.9	1 June 2007, 17:20	875.8
P1300300_0008_J	2.300	1,723.4	1 June 2007, 17:20	1,246.8
P1300000_0166_J	22.400	9,697.0	1 June 2007, 20:30	12,471.2
P1300000_0107_R	22.400	9,660.6	1 June 2007, 23:05	12,470.2
P130G	1.700	978.0	1 June 2007, 17:40	934.5
P1300000_0107_J	24.100	10,287.8	1 June 2007, 22:50	13,404.7
P13002A	2.500	1,073.4	1 June 2007, 18:30	1,358.4
P1300200_0115_J	2.500	1,073.4	1 June 2007, 18:30	1,358.4
P1300202A	2.300	1,216.5	1 June 2007, 18:05	1,251.5
P1300200_0100_J	4.800	2,287.4	1 June 2007, 18:15	2,609.9
P1300200_0012_R	4.800	2,284.1	1 June 2007, 18:55	2,609.8

Proposed Condition, 25-Year Frequency Storm Event				
Hydrologic Element	**Drainage Area (mi^2)**	**Peak Discharge (cfs)**	**Time of Peak**	**Volume (Ac-ft)**
P13002B	2.600	1,137.2	1 June 2007, 18:10	1,432.6
P1300200_0023_J	7.400	3,409.9	1 June 2007, 18:50	4,042.4
P1300000_0093_J	31.500	13,095.5	1 June 2007, 22:15	17,447.1
P1300000_0043_R	31.500	13,013.8	2 June 2007, 01:05	17,446.2
P130H	2.400	1,130.4	1 June 2007, 18:45	1,300.9
P1300000_0043_J	33.900	13,757.8	2 June 2007, 00:50	18,747.1
P1000000_1003_J	113.500	28,614.1	2 June 2007, 09:00	62,642.6
P1000000_0860_R	113.500	27,815.7	2 June 2007, 15:00	62,632.7
P100P	5.400	2,060.3	1 June 2007, 18:45	2,905.4
P1000000_0860_J	118.900	28,464.7	2 June 2007, 08:35	65,538.1
P127A	5.100	1,592.7	1 June 2007, 19:40	2,725.3
P1000000_0851_J	123.900	29,269.4	2 June 2007, 08:25	68,263.4
P1000000_0817_R	123.900	29,223.2	2 June 2007, 10:00	68,256.8
P126A	3.700	1,615.7	1 June 2007, 18:55	2,066.9
P1260000_0127_D	3.700	1,369.1	1 June 2007, 18:55	1,952.8
P1000000_0817_J	127.600	29,688.0	2 June 2007, 09:50	70,209.6
P100Q	2.600	1,203.8	1 June 2007, 18:15	1,422.2
P1000000_0795_J	130.300	29,980.9	2 June 2007, 09:45	71,631.8
P1000000_0734_R	130.300	29,967.5	2 June 2007, 10:35	71,621.0
P125A	2.400	1,193.3	1 June 2007, 17:55	1,323.7
P1250000_0129_J	2.400	1,426.0	1 June 2007, 18:15	1,437.9
P1250000_0027_R	2.400	1,392.7	1 June 2007, 21:30	1,437.9
P125B	1.900	1,291.4	1 June 2007, 17:40	1,011.9
P1250000_0027_J	4.200	2,304.5	1 June 2007, 20:50	2,449.8
P1000000_0735_J	134.500	30,289.8	2 June 2007, 10:25	74,070.8
P121A	3.800	1,284.5	1 June 2007, 19:05	2,075.5
P1000000_0720_J	138.300	30,800.4	2 June 2007, 10:20	76,146.4
P1000000_0640_R	138.300	30,759.5	2 June 2007, 11:45	76,134.4
P100R	3.000	1,620.1	1 June 2007, 17:50	1,646.5
P1000000_0640_J	141.300	30,958.5	2 June 2007, 11:40	77,780.9
P1180000_1036_R	0.000	356.4	1 June 2007, 23:20	246.8
P118A	1.700	1,038.8	1 June 2007, 17:25	944.6
P1180000_1036_J	1.700	1,038.8	1 June 2007, 17:25	1,191.4
P1180000_0846_R	1.700	960.3	2 June 2007, 03:05	1,191.4
P118B	5.500	3,213.1	1 June 2007, 17:50	3,073.5
P1180000_0846_J	7.200	3,963.5	1 June 2007, 18:35	4,264.9
P11831A	1.100	679.7	1 June 2007, 17:35	598.4
P1183100_9903_J	1.100	679.7	1 June 2007, 17:35	598.4
P1180000_9902_R	1.100	599.0	1 June 2007, 19:35	598.4
P11831B	1.300	800.9	1 June 2007, 17:20	693.5
P1183100_9902_J	2.300	1,344.8	1 June 2007, 18:15	1,291.9
P1180000_9901_R	2.300	1,314.4	1 June 2007, 21:30	1,291.9
P11831C	0.700	575.4	1 June 2007, 17:10	402.4
P1183100_9901_J	3.100	1,653.0	1 June 2007, 20:55	1,694.3
P1180000_0835_J	10.200	5,551.0	1 June 2007, 18:30	5,959.2
P1180000_0660_R	10.200	4,934.1	2 June 2007, 12:25	5,959.2
P1180000_0643_R	0.000	324.5	2 June 2007, 02:10	205.4

Proposed Condition, 25-Year Frequency Storm Event				
Hydrologic Element	**Drainage Area (mi^2)**	**Peak Discharge (cfs)**	**Time of Peak**	**Volume (Ac-ft)**
P118C	6.000	3,765.1	1 June 2007, 18:15	3,452.1
P1180000_0643_J	16.300	6,140.2	1 June 2007, 20:00	9,616.6
P11823A	1.600	1,038.1	1 June 2007, 17:20	890.3
P1180000_0641_J	17.900	6,990.7	1 June 2007, 19:55	10,507.0
P1180000_0441_R	17.900	6,603.1	2 June 2007, 04:15	10,507.0
P118D	6.300	3,732.9	1 June 2007, 18:20	3,594.5
P1180000_0441_J	24.200	7,910.7	2 June 2007, 03:30	14,101.4
P11818A	3.500	1,676.7	1 June 2007, 18:00	2,015.5
P1180000_0432_J	27.700	9,037.1	1 June 2007, 22:05	16,116.9
P1180000_0382_R	27.700	8,788.2	2 June 2007, 04:30	16,116.9
P118E	1.000	740.1	1 June 2007, 17:30	583.9
P1180000_0382_J	28.700	8,929.7	2 June 2007, 04:15	16,700.8
P11814A	2.900	1,663.0	1 June 2007, 17:50	1,641.2
P1180000_0361_J	31.600	9,529.6	2 June 2007, 01:00	18,342.0
P1180000_0233_R	31.600	9,500.2	2 June 2007, 06:05	18,342.0
P118F	5.700	4,452.8	1 June 2007, 17:40	3,253.5
P1180000_0233_J	37.300	10,884.0	1 June 2007, 23:50	21,595.5
P1180000_0036_R	37.300	10,840.8	2 June 2007, 01:25	21,595.4
P118G	7.300	4,439.3	1 June 2007, 19:10	4,113.5
P1180000_0036_J	44.600	14,651.1	1 June 2007, 19:50	25,709.0
DA8	0.000	247.0	1 June 2007, 16:05	15.1
CHA1	0.000	33.9	1 June 2007, 16:05	4.1
CHA2	0.000	34.0	1 June 2007, 16:05	2.4
DA2	0.000	202.2	1 June 2007, 16:10	20.2
C/CHA2	0.000	314.9	1 June 2007, 16:05	21.6
DA7	0.000	273.4	1 June 2007, 16:05	18.2
NP	0.000	31.4	1 June 2007, 16:15	4.4
C/NP	0.100	796.2	1 June 2007, 16:05	64.4
DCP3	0.100	721.9	1 June 2007, 16:05	63.1
CHB1	0.000	37.1	1 June 2007, 16:05	4.4
DA5	0.000	66.4	1 June 2007, 16:05	4.4
CHB2	0.000	9.5	1 June 2007, 16:05	0.9
C/CHB2	0.000	113.1	1 June 2007, 16:05	9.7
DA6	0.000	247.2	1 June 2007, 16:05	16.4
CHB3	0.000	17.9	1 June 2007, 16:05	1.3
C/CHB3	0.100	378.1	1 June 2007, 16:05	27.4
DCP-1	0.100	311.9	1 June 2007, 16:05	27.4
DA18	0.000	59.3	1 June 2007, 16:10	7.3
NDISC	0.200	1,076.7	1 June 2007, 16:05	97.8
P100O1	0.100	51.3	1 June 2007, 18:20	50.3
NDCP	0.300	1,096.2	1 June 2007, 16:05	148.1
P1000000_0635_J	186.100	41,299.7	2 June 2007, 00:50	103,638.0
P1000000_0580_R	186.100	41,228.9	2 June 2007, 01:45	103,626.8
P100S	1.500	1,166.6	1 June 2007, 17:15	849.5
DA12	0.000	185.4	1 June 2007, 16:05	11.6
CHF1	0.000	35.3	1 June 2007, 16:05	2.9
DA3	0.000	167.3	1 June 2007, 16:10	16.2

Proposed Condition, 25-Year Frequency Storm Event				
Hydrologic Element	**Drainage Area (mi^2)**	**Peak Discharge (cfs)**	**Time of Peak**	**Volume (Ac-ft)**
C/DA12	0.000	220.7	1 June 2007, 16:05	14.5
DA11	0.000	127.1	1 June 2007, 16:05	8.0
CHG1	0.000	33.2	1 June 2007, 16:05	2.4
CHG2	0.000	18.6	1 June 2007, 16:05	2.0
C/CHG2	0.000	178.9	1 June 2007, 16:05	12.4
CHF2	0.000	38.1	1 June 2007, 16:05	3.2
C/D4	0.100	593.9	1 June 2007, 16:05	46.3
DCP-7	0.100	393.0	1 June 2007, 16:10	46.3
DA10	0.000	210.6	1 June 2007, 16:05	13.2
CHH2	0.000	33.9	1 June 2007, 16:05	2.2
CHH1	0.000	25.1	1 June 2007, 16:05	1.9
C/CHH2	0.000	269.6	1 June 2007, 16:05	17.3
DCP-6	0.000	245.8	1 June 2007, 16:05	17.3
DA9	0.000	180.0	1 June 2007, 16:05	11.6
NEP	0.000	13.6	1 June 2007, 16:15	1.9
C/NEP	0.000	188.6	1 June 2007, 16:05	13.5
DCP-4	0.000	43.0	1 June 2007, 16:25	13.5
CH1	0.000	40.5	1 June 2007, 16:05	3.1
DCP-5	0.000	27.0	1 June 2007, 16:10	3.1
EDCP	0.200	631.9	1 June 2007, 16:10	80.3
P1000000_0580_J	187.800	41,554.9	2 June 2007, 01:40	104,556.6
P1000000_0541_R	187.800	41,489.7	2 June 2007, 02:30	104,547.0
P1000000_0541_J	187.800	41,489.7	2 June 2007, 02:30	104,547.0
P114B	1.500	1,805.9	1 June 2007, 16:55	848.3
P114A	0.700	733.2	1 June 2007, 16:45	379.4
P1140000_0119_J	0.700	733.2	1 June 2007, 16:45	379.4
P1140000_0036_R	0.700	720.0	1 June 2007, 17:55	379.4
DA17	0.000	307.5	1 June 2007, 16:05	18.7
CHC1	0.000	38.9	1 June 2007, 16:05	4.6
DA19	0.000	28.7	1 June 2007, 16:05	2.0
C/CHC1	0.100	375.2	1 June 2007, 16:05	25.2
DA1	0.000	227.1	1 June 2007, 16:05	23.6
CHC2	0.000	51.5	1 June 2007, 16:05	3.2
C/CHC2	0.100	653.7	1 June 2007, 16:05	52.1
DA15	0.000	195.9	1 June 2007, 16:05	12.4
DA16	0.000	187.2	1 June 2007, 16:05	12.9
C/DA15	0.200	1,036.8	1 June 2007, 16:05	77.4
CHC3	0.000	33.9	1 June 2007, 16:05	2.7
SWP	0.000	26.6	1 June 2007, 16:10	3.4
C/SWP	0.200	1,090.1	1 June 2007, 16:05	83.4
DA14	0.000	220.2	1 June 2007, 16:05	14.1
CHD1	0.000	28.7	1 June 2007, 16:05	2.5
CHD2	0.000	15.9	1 June 2007, 16:05	1.7
C/CHD2	0.000	264.9	1 June 2007, 16:05	18.2
DA4	0.000	169.0	1 June 2007, 16:10	17.4
CHD3	0.000	20.0	1 June 2007, 16:05	1.9
C/CHD3	0.100	451.6	1 June 2007, 16:05	37.5

Proposed Condition, 25-Year Frequency Storm Event				
Hydrologic Element	**Drainage Area (mi^2)**	**Peak Discharge (cfs)**	**Time of Peak**	**Volume (Ac-ft)**
DCP-9	0.100	210.1	1 June 2007, 16:15	37.5
DA13	0.000	284.5	1 June 2007, 16:05	17.7
CHE2	0.000	26.0	1 June 2007, 16:05	2.5
CHE1	0.000	7.9	1 June 2007, 16:05	0.7
C/CHE2	0.000	318.4	1 June 2007, 16:05	20.9
DCP-8	0.000	82.2	1 June 2007, 16:20	20.9
SDCP	0.300	1,291.9	1 June 2007, 16:05	141.7
FIL1	0.000	73.5	1 June 2007, 16:25	12.2
FIL2	0.000	53.3	1 June 2007, 16:35	11.0
C/FILL	0.000	122.0	1 June 2007, 16:25	23.3
P1140000_0036_J	2.500	2,585.9	1 June 2007, 17:30	1,392.8
P1140000_0026_R	2.500	2,558.9	1 June 2007, 17:40	1,392.8
P114C	0.500	717.6	1 June 2007, 16:30	269.3
P1140000_0026_J	3.000	3,104.5	1 June 2007, 17:35	1,662.1
P1000000_0530_J	190.800	41,759.0	2 June 2007, 02:30	106,209.1
P1000000_0472_R	190.800	41,706.8	2 June 2007, 03:30	106,195.3
P100T	1.900	798.5	1 June 2007, 20:10	1,078.8
P1000000_0472_J	192.700	42,219.3	2 June 2007, 03:25	107,274.0
P110A	2.000	1,942.3	1 June 2007, 17:20	1,131.6
P1000000_0460_J	194.700	42,410.0	2 June 2007, 03:20	108,405.6
P1000000_0445_R	194.700	42,403.5	2 June 2007, 03:35	108,397.4
P1000000_0445_J	194.700	42,403.5	2 June 2007, 03:35	108,397.4
P109A	1.400	1,163.2	1 June 2007, 17:15	783.7
P1000000_0432_J	196.100	42,580.5	2 June 2007, 03:30	109,181.1
P1000000_3901_R	196.100	42,570.2	2 June 2007, 03:55	109,166.8
P100U	0.500	516.5	1 June 2007, 16:50	279.3
P1000000_0390_J	196.600	42,599.2	2 June 2007, 03:55	109,446.1
P107A	2.600	1,520.0	1 June 2007, 17:30	1,457.8
P1070000_0198_J	2.600	1,520.0	1 June 2007, 17:30	1,457.8
P1070000_0026_R	2.600	1,467.1	1 June 2007, 22:15	1,457.8
P107B	2.400	1,891.3	1 June 2007, 17:35	1,347.1
P1070000_0026_J	5.000	3,119.2	1 June 2007, 18:20	2,804.9
P1000000_0381_J	201.600	43,763.2	2 June 2007, 02:15	112,251.0
P1000000_0181_R	201.600	43,714.7	2 June 2007, 04:10	112,169.5
P100V	3.800	2,827.6	1 June 2007, 20:00	2,157.0
P1000000_0181_J	205.400	44,409.0	2 June 2007, 03:50	114,326.5
P1000000_0010_R	205.400	44,338.4	2 June 2007, 06:05	114,222.5
P100W	5.600	4,513.5	1 June 2007, 20:30	3,212.8
P1000000_0010_J	211.000	44,783.9	2 June 2007, 05:40	117,435.3


Summary Results for Reservoir "DCP-1"
Project: Proposed Conditions Simulation Run: 4%_24HR
Reservoir: DCP-1
Start of Run: 01Jun2007, 00:00
End of Run: 04Jun2007, 02:45
Compute Time: 07Aug2024, 09:12:19
Basin Model: P1000000
Meteorologic Model: 4PCT_24HR
Control Specifications: Control 5 Min
Volume Units: IN ACRE-FT
Computed Results
Peak Inflow: 378.1 (CFS)
Peak Discharge: 319.9 (CFS)
Inflow Volume: 27.4 (ACRE-FT)
Discharge Volume: 27.4 (ACRE-FT)
Date/Time of Peak Inflow: 01Jun2007, 16:05
Date/Time of Peak Discharge: 01Jun2007, 16:05
Peak Storage: 1.0 (ACRE-FT)
Peak Elevation: 44.6 (FT)

Summary Results for Reservoir "DCP3"

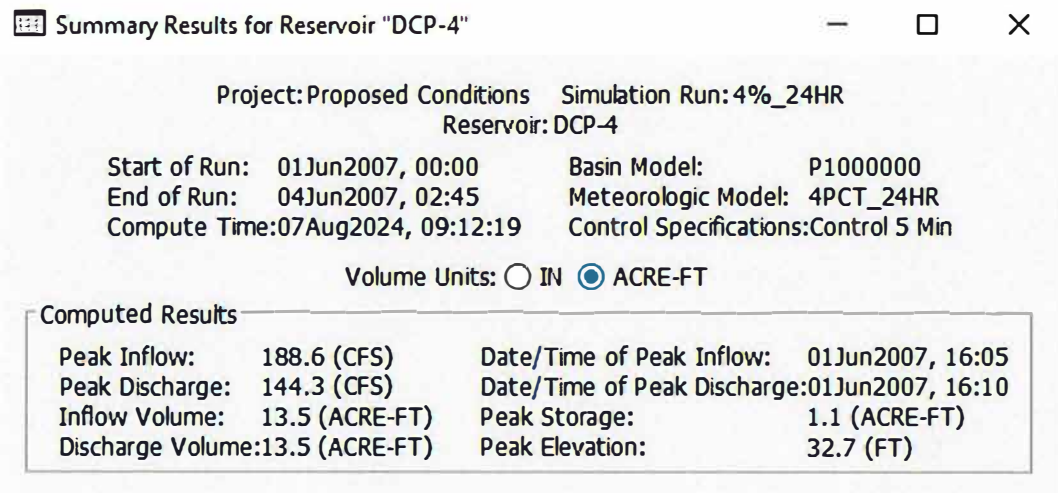
Project: Proposed Conditions Simulation Run: 4%_24HR
Reservoir: DCP3

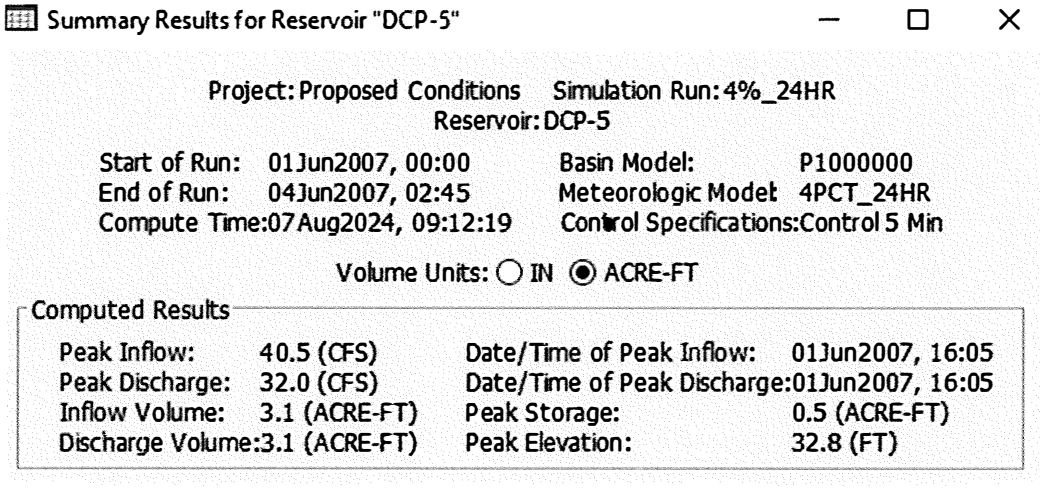
Start of Run:	01Jun2007, 00:00	Basin Model:	P1000000
End of Run:	04Jun2007, 02:45	Meteorologic Model:	4PCT_24HR
Compute Time:	DATA CHANGED, RECOMPUTE	Control Specifications:	Control 5 Min

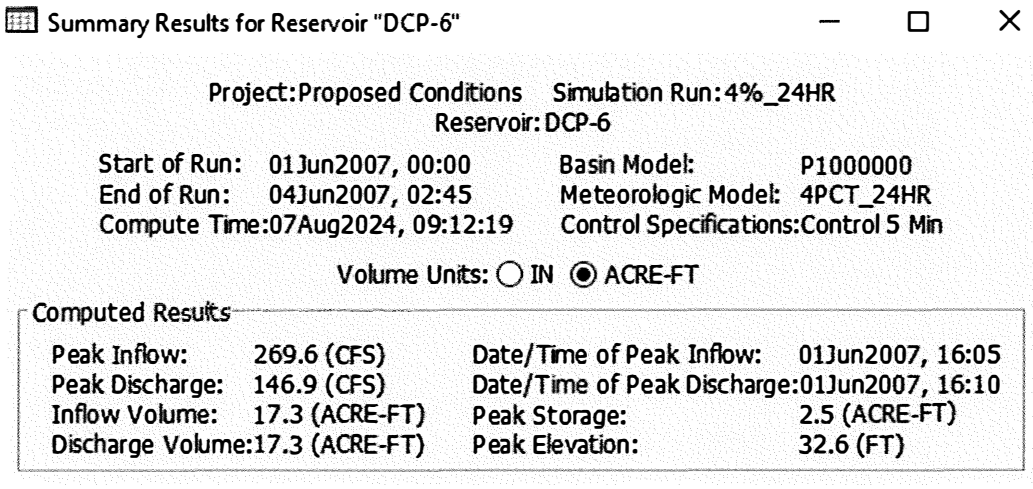
Volume Units: ○ IN ◉ ACRE-FT

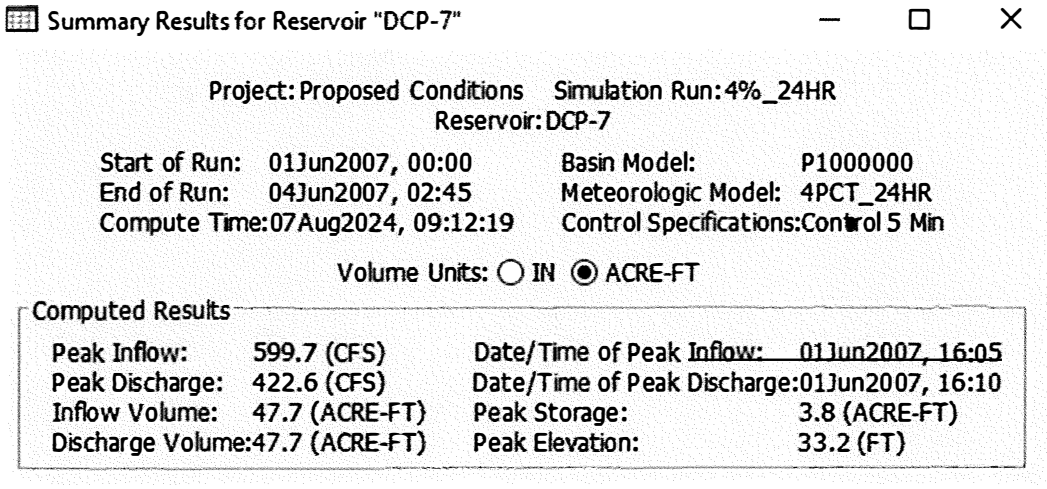
Computed Results

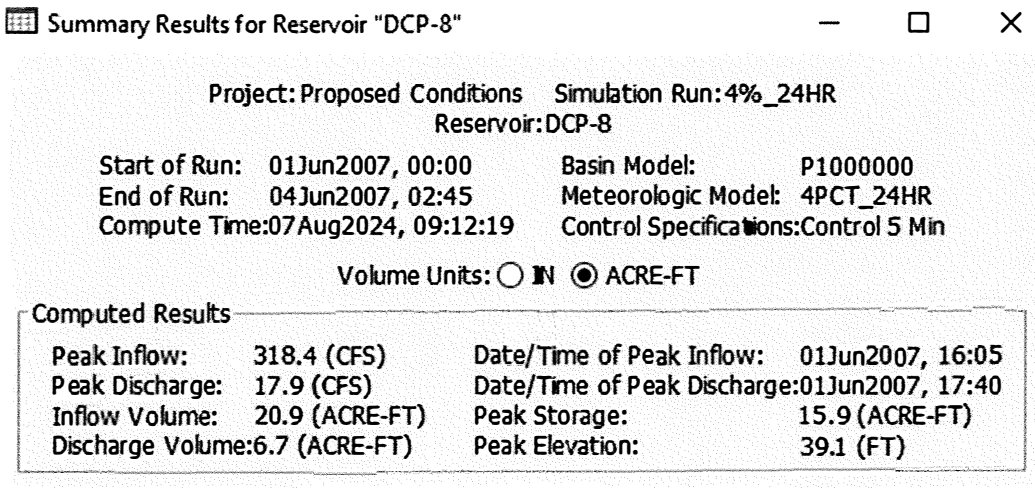
Peak Inflow:	813.4 (CFS)	Date/Time of Peak Inflow:	01Jun2007, 16:05
Peak Discharge:	705.5 (CFS)	Date/Time of Peak Discharge:	01Jun2007, 16:05
Inflow Volume:	67.5 (ACRE-FT)	Peak Storage:	6.9 (ACRE-FT)
Discharge Volume:	63.1 (ACRE-FT)	Peak Elevation:	43.5 (FT)

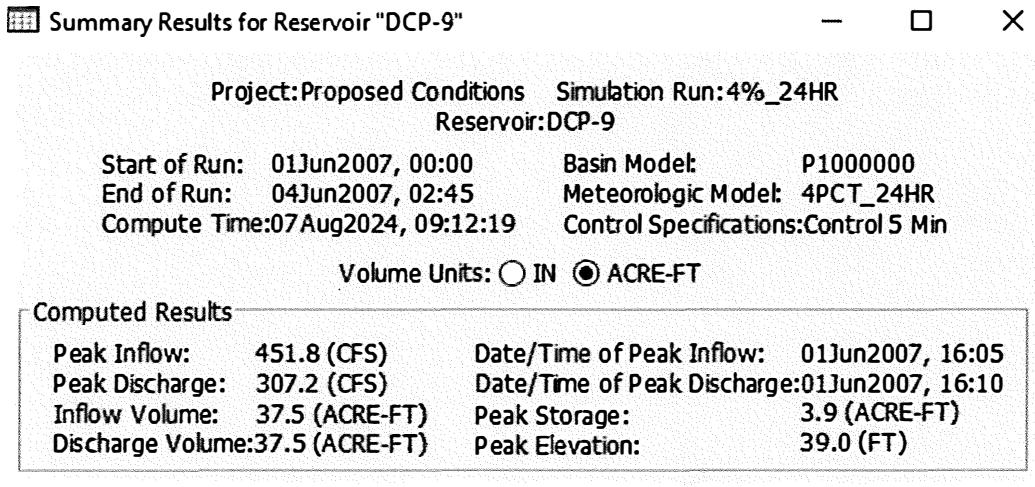

Summary Results for Reservoir "DCP-4"
Project: Proposed Conditions Simulation Run: 4%_24HR
Reservoir: DCP-4
Start of Run: 01Jun2007, 00:00
End of Run: 04Jun2007, 02:45
Compute Time: 07Aug2024, 09:12:19
Basin Model: P1000000
Meteorologic Model: 4PCT_24HR
Control Specifications: Control 5 Min
Volume Units: IN ACRE-FT
Computed Results
Peak Inflow: 188.6 (CFS)
Peak Discharge: 144.3 (CFS)
Inflow Volume: 13.5 (ACRE-FT)
Discharge Volume: 13.5 (ACRE-FT)
Date/Time of Peak Inflow: 01Jun2007, 16:05
Date/Time of Peak Discharge: 01Jun2007, 16:10
Peak Storage: 1.1 (ACRE-FT)
Peak Elevation: 32.7 (FT)


Summary Results for Reservoir "DCP-5"
Project: Proposed Conditions Simulation Run: 4%_24HR
Reservoir: DCP-5
Start of Run: 01Jun2007, 00:00
End of Run: 04Jun2007, 02:45
Compute Time: 07Aug2024, 09:12:19
Basin Model: P1000000
Meteorologic Model: 4PCT_24HR
Control Specifications: Control 5 Min
Volume Units: IN ACRE-FT
Computed Results
Peak Inflow: 40.5 (CFS)
Peak Discharge: 32.0 (CFS)
Inflow Volume: 3.1 (ACRE-FT)
Discharge Volume: 3.1 (ACRE-FT)
Date/Time of Peak Inflow: 01Jun2007, 16:05
Date/Time of Peak Discharge: 01Jun2007, 16:05
Peak Storage: 0.5 (ACRE-FT)
Peak Elevation: 32.8 (FT)


Summary Results for Reservoir "DCP-6"
Project:Proposed Conditions Simulation Run:4%_24HR
Reservoir:DCP-6
Start of Run: 01Jun2007, 00:00
End of Run: 04Jun2007, 02:45
Compute Time:07Aug2024, 09:12:19
Basin Model: P1000000
Meteorologic Model: 4PCT_24HR
Control Specifications:Control 5 Min
Volume Units: IN ACRE-FT
Computed Results
Peak Inflow: 269.6 (CFS)
Peak Discharge: 146.9 (CFS)
Inflow Volume: 17.3 (ACRE-FT)
Discharge Volume:17.3 (ACRE-FT)
Date/Time of Peak Inflow: 01Jun2007, 16:05
Date/Time of Peak Discharge:01Jun2007, 16:10
Peak Storage: 2.5 (ACRE-FT)
Peak Elevation: 32.6 (FT)


Summary Results for Reservoir "DCP-7"
Project: Proposed Conditions Simulation Run: 4%_24HR
Reservoir: DCP-7
Start of Run: 01Jun2007, 00:00
End of Run: 04Jun2007, 02:45
Compute Time: 07Aug2024, 09:12:19
Basin Model: P1000000
Meteorologic Model: 4PCT_24HR
Control Specifications: Control 5 Min
Volume Units: IN ACRE-FT
Computed Results
Peak Inflow: 599.7 (CFS)
Peak Discharge: 422.6 (CFS)
Inflow Volume: 47.7 (ACRE-FT)
Discharge Volume: 47.7 (ACRE-FT)
Date/Time of Peak Inflow: 01Jun2007, 16:05
Date/Time of Peak Discharge: 01Jun2007, 16:10
Peak Storage: 3.8 (ACRE-FT)
Peak Elevation: 33.2 (FT)


Summary Results for Reservoir "DCP-8"
Project: Proposed Conditions Simulation Run: 4%_24HR
Reservoir: DCP-8
Start of Run: 01Jun2007, 00:00
End of Run: 04Jun2007, 02:45
Compute Time: 07Aug2024, 09:12:19
Basin Model: P1000000
Meteorologic Model: 4PCT_24HR
Control Specifications: Control 5 Min
Volume Units: IN ACRE-FT
Computed Results
Peak Inflow: 318.4 (CFS)
Peak Discharge: 17.9 (CFS)
Inflow Volume: 20.9 (ACRE-FT)
Discharge Volume: 6.7 (ACRE-FT)
Date/Time of Peak Inflow: 01Jun2007, 16:05
Date/Time of Peak Discharge: 01Jun2007, 17:40
Peak Storage: 15.9 (ACRE-FT)
Peak Elevation: 39.1 (FT)


Summary Results for Reservoir "DCP-9"
Project: Proposed Conditions Simulation Run: 4%_24HR
Reservoir: DCP-9
Start of Run: 01Jun2007, 00:00
End of Run: 04Jun2007, 02:45
Compute Time: 07Aug2024, 09:12:19
Basin Model: P1000000
Meteorologic Model: 4PCT_24HR
Control Specifications: Control 5 Min
Volume Units: IN ACRE-FT
Computed Results
Peak Inflow: 451.8 (CFS)
Peak Discharge: 307.2 (CFS)
Inflow Volume: 37.5 (ACRE-FT)
Discharge Volume: 37.5 (ACRE-FT)
Date/Time of Peak Inflow: 01Jun2007, 16:05
Date/Time of Peak Discharge: 01Jun2007, 16:10
Peak Storage: 3.9 (ACRE-FT)
Peak Elevation: 39.0 (FT)

Proposed Condition, 100-Year Frequency Storm Event				
Hydrologic Element	**Drainage Area (mi^2)**	**Peak Discharge (cfs)**	**Time of Peak**	**Volume (Ac-ft)**
P100A	1.700	1,830.0	1 June 2007, 17:30	1,626.6
P1000000_2203_J	1.700	1,830.0	1 June 2007, 17:30	1,626.6
P161A	0.600	913.9	1 June 2007, 16:50	525.4
P1000000_2197_J	2.300	2,713.3	1 June 2007, 17:10	2,152.0
P1000000_2159_R	2.300	2,353.8	1 June 2007, 22:55	2,152.0
P100B	0.400	693.7	1 June 2007, 16:30	363.4
P1000000_2159_J	2.700	2,504.2	1 June 2007, 22:50	2,515.4
P151A	2.100	1,474.6	1 June 2007, 19:05	1,934.0
P1000000_2137_J	4.700	3,717.6	1 June 2007, 22:30	4,449.4
P1000000_2105_R	4.700	3,379.5	2 June 2007, 04:55	4,449.4
P100C	1.300	1,293.6	1 June 2007, 17:45	1,235.3
P1000000_2105_J	6.000	3,787.9	1 June 2007, 21:40	5,684.7
P1000000_2083_R	6.000	3,771.5	1 June 2007, 22:45	5,684.7
P100D	1.900	1,701.1	1 June 2007, 17:50	1,749.6
P1000000_2083_J	7.900	5,232.2	1 June 2007, 19:40	7,434.2
P1000000_2048_R	7.900	5,143.8	1 June 2007, 22:10	7,434.2
P100E	1.800	1,490.9	1 June 2007, 18:20	1,669.5
P1000000_2047_J	9.700	6,354.1	1 June 2007, 21:20	9,103.7
P1000000_2020_R	9.700	6,336.6	1 June 2007, 22:40	9,103.7
P100F	1.100	1,009.6	1 June 2007, 17:45	1,009.9
P1000000_2020_J	10.800	7,036.0	1 June 2007, 22:00	10,113.6
P1000000_1972_D	10.800	7,036.0	1 June 2007, 22:00	9,633.3
P1000000_1929_R	10.800	6,968.8	2 June 2007, 02:10	9,633.3
P100G	1.400	1,096.4	1 June 2007, 18:35	1,332.7
P1000000_1929_J	12.200	7,588.3	2 June 2007, 01:55	10,966.0
P152A	4.300	4,696.3	1 June 2007, 18:05	4,081.1
P1000000_1918_D	16.500	7,927.3	2 June 2007, 01:30	13,372.1
P1000000_1856_R	16.500	7,607.7	2 June 2007, 07:00	13,371.9
P100H	1.400	1,826.4	1 June 2007, 17:00	1,306.3
P1000000_1856_J	17.900	7,700.7	2 June 2007, 06:55	14,678.2
P148A	2.100	2,156.8	1 June 2007, 17:50	2,013.6
P1480000_0073_J	2.100	3,355.6	1 June 2007, 19:15	3,688.6
P1000000_1845_D	20.000	8,865.8	1 June 2007, 18:05	17,260.8
P1000000_1741_R	20.000	8,661.1	1 June 2007, 23:20	17,260.5
P100I	2.100	2,215.4	1 June 2007, 17:35	2,010.5
P1000000_1741_J	22.100	10,041.4	1 June 2007, 21:00	19,270.9
P147A	1.500	1,528.2	1 June 2007, 17:25	1,401.5
P1470000_0055_J	1.500	1,528.2	1 June 2007, 17:25	1,401.5
P1470000_0018_R	1.500	1,512.8	1 June 2007, 19:05	1,401.5
P147B	1.000	974.1	1 June 2007, 18:00	972.7
P1470000_0018_J	2.500	2,468.1	1 June 2007, 18:50	2,374.2
P1000000_1730_J	24.700	12,207.3	1 June 2007, 20:25	21,645.1
P1000000_1716_R	24.700	12,099.2	1 June 2007, 21:35	21,645.1
P1000000_1716_J	24.700	12,099.2	1 June 2007, 21:35	21,645.1
P146A	0.600	643.5	1 June 2007, 17:20	511.5
P1000000_1709_J	25.200	12,506.7	1 June 2007, 21:30	22,156.6
P1000000_1690_R	25.200	12,310.8	2 June 2007, 00:55	22,156.4
P1000000_1690_J	25.200	12,310.8	2 June 2007, 00:55	22,156.4
P145A	1.000	1,430.7	1 June 2007, 16:55	978.0

Proposed Condition, 100-Year Frequency Storm Event				
Hydrologic Element	**Drainage Area (mi^2)**	**Peak Discharge (cfs)**	**Time of Peak**	**Volume (Ac-ft)**
P1450000_0232_J	1.000	1,430.7	1 June 2007, 16:55	978.0
P1450000_0208_R	1.000	1,404.1	1 June 2007, 17:30	978.0
P145B	1.000	1,006.6	1 June 2007, 17:25	912.1
P1450000_0208_J	2.000	2,410.6	1 June 2007, 17:30	1,890.1
P1450000_0188_R	2.000	2,386.6	1 June 2007, 18:10	1,890.1
P145C	0.600	546.3	1 June 2007, 18:05	557.4
P1450000_0188_J	2.600	2,932.8	1 June 2007, 18:10	2,447.5
P1450000_0139_R	2.600	2,902.5	1 June 2007, 19:25	2,447.5
P145D	1.100	1,030.2	1 June 2007, 17:30	988.2
P1450000_0139_J	3.700	3,872.4	1 June 2007, 19:05	3,435.7
P245A	1.500	1,295.9	1 June 2007, 18:15	1,342.7
P1450000_0119_J	5.100	5,151.3	1 June 2007, 19:00	4,778.4
P1450000_0096_R	5.100	5,045.9	1 June 2007, 20:15	4,778.4
P1450000_0096_J	5.100	5,045.9	1 June 2007, 20:15	4,778.4
P14503A	1.700	1,390.3	1 June 2007, 18:10	1,579.6
P1450300_0103_J	1.700	1,390.3	1 June 2007, 18:10	1,579.6
P1450300_0037_R	1.700	1,388.6	1 June 2007, 19:05	1,579.6
P14503B	2.400	2,380.6	1 June 2007, 17:30	2,243.8
P1450300_0037_J	4.100	3,710.0	1 June 2007, 18:10	3,823.4
P1450300_0014_R	4.100	3,579.9	1 June 2007, 21:00	3,823.4
P14503C	0.900	751.3	1 June 2007, 18:25	853.0
P1450300_0014_J	5.000	4,239.7	1 June 2007, 20:45	4,676.5
P1450000_0074_J	10.200	9,260.5	1 June 2007, 20:25	9,454.8
P1450000_0010_R	10.200	9,199.5	1 June 2007, 21:50	9,454.8
P145E	1.900	2,400.2	1 June 2007, 17:10	1,771.4
P1450000_0010_J	12.000	10,553.5	1 June 2007, 21:25	11,226.2
P1000000_1686_J	37.300	22,365.8	1 June 2007, 21:55	33,382.6
P1000000_1557_R	37.300	22,031.3	2 June 2007, 02:05	33,381.9
P100J	5.900	5,182.7	1 June 2007, 18:05	5,587.3
P1000000_1557_J	43.100	24,580.7	2 June 2007, 01:40	38,969.2
P1000000_1554_D	43.100	23,046.3	2 June 2007, 01:40	37,805.6
P156A	1.300	1,369.2	1 June 2007, 17:40	1,217.3
P1560000_0048_J	1.300	1,369.2	1 June 2007, 17:40	1,217.3
P1560000_0019_R	1.300	1,368.8	1 June 2007, 17:50	1,217.3
P156B	0.900	1,660.0	1 June 2007, 16:40	865.5
P1560000_0019_J	2.200	2,900.1	1 June 2007, 17:10	2,082.7
P1000000_1540_J	45.400	23,762.7	2 June 2007, 01:15	39,888.3
P1000000_1498_R	45.400	23,724.5	2 June 2007, 02:25	39,888.0
P1000000_1498_J	45.400	23,724.5	2 June 2007, 02:25	39,888.0
P1550000_0063_J	0.000	1,593.5	1 June 2007, 19:10	1,839.4
P155A	1.500	2,379.1	1 June 2007, 16:50	1,402.1
P1550000_0008_J	1.500	3,801.9	1 June 2007, 17:05	3,241.5
P1000000_1488_J	46.800	25,235.8	2 June 2007, 01:55	43,129.5
P1000000_1433_R	46.800	25,086.0	2 June 2007, 06:05	43,128.6
P100K	1.600	1,983.8	1 June 2007, 17:15	1,553.0
P1000000_1433_J	48.500	25,282.1	2 June 2007, 06:00	44,681.7
P140A	1.000	1,108.9	1 June 2007, 17:10	910.0

Proposed Condition, 100-Year Frequency Storm Event				
Hydrologic Element	**Drainage Area (mi^2)**	**Peak Discharge (cfs)**	**Time of Peak**	**Volume (Ac-ft)**
P1400403_0259_J	1.000	1,108.9	1 June 2007, 17:10	910.0
P1400000_0172_R	1.000	982.5	2 June 2007, 02:25	910.0
P140B	1.300	1,398.8	1 June 2007, 17:40	1,207.9
P1400400_0172_J	2.300	1,784.5	1 June 2007, 19:10	2,117.9
P1400400_0164_D	2.300	594.5	1 June 2007, 19:10	1,091.6
P1400400_0159_D	2.300	191.0	1 June 2007, 19:10	278.5
P1400400_0150_J	2.300	191.0	1 June 2007, 19:10	278.5
P1400000_0112_R	2.300	191.0	1 June 2007, 19:40	278.5
P140C	1.300	1,138.3	1 June 2007, 17:55	1,195.2
P1400000_0112_J	3.600	1,327.7	1 June 2007, 18:00	1,473.6
P1400000_0020_R	3.600	1,325.8	1 June 2007, 18:50	1,473.6
P140D	3.900	2,713.5	1 June 2007, 18:55	3,658.5
P1400000_0020_J	7.400	4,039.1	1 June 2007, 18:55	5,132.1
P1000000_1424_J	55.900	26,951.5	2 June 2007, 05:25	49,813.8
P1000000_1334_R	55.900	26,615.7	2 June 2007, 10:45	49,812.4
P100L	2.700	2,708.9	1 June 2007, 17:45	2,581.1
P1000000_1334_J	58.600	26,848.1	2 June 2007, 10:40	52,393.5
P138A	2.700	1,958.7	1 June 2007, 18:55	2,591.9
P1380000_0141_D	2.700	1,621.4	1 June 2007, 22:35	2,718.9
P1380000_0130_J	2.700	1,621.4	1 June 2007, 22:35	2,718.9
P1380000_0013_R	2.700	1,612.0	2 June 2007, 05:05	2,718.9
P138B	3.600	2,830.1	1 June 2007, 18:30	3,390.5
P1380000_0013_J	6.300	3,956.6	1 June 2007, 19:20	6,109.3
P1000000_1308_J	64.900	28,660.2	2 June 2007, 09:40	58,502.8
P1000000_1226_R	64.900	28,382.0	2 June 2007, 13:45	58,501.2
P100M	4.300	2,727.0	1 June 2007, 19:15	4,074.6
P1000000_1226_J	69.300	29,048.5	2 June 2007, 13:40	62,575.8
P1000000_1123_R	69.300	28,997.7	2 June 2007, 15:35	62,571.1
P100N	3.000	2,480.1	1 June 2007, 18:35	2,821.6
P1000000_1123_J	72.300	29,324.9	2 June 2007, 10:25	65,392.7
P133A	3.000	1,917.5	1 June 2007, 19:20	2,812.3
P1330000_0092_J	3.000	1,917.5	1 June 2007, 19:20	2,812.3
P1330000_0017_R	3.000	1,895.6	1 June 2007, 21:45	2,811.0
P133B	1.300	1,173.0	1 June 2007, 17:45	1,157.4
P1330000_0017_J	4.200	2,819.8	1 June 2007, 20:30	3,968.5
P1000000_1114_J	76.500	30,118.3	2 June 2007, 10:00	69,361.1
P1000000_1038_R	76.500	30,090.4	2 June 2007, 12:40	69,352.0
P100O	3.100	2,094.3	1 June 2007, 19:05	2,822.1
P1000000_1038_J	79.600	30,548.1	2 June 2007, 12:30	72,174.1
P130A	2.900	2,661.6	1 June 2007, 17:50	2,692.9
P530_15_01	2.900	1,829.4	1 June 2007, 22:35	2,688.4
P1300000_0447_R	2.900	1,826.3	2 June 2007, 00:20	2,687.3
P130B	1.000	1,411.5	1 June 2007, 16:55	970.1
P1300000_0447_J	3.900	2,354.3	1 June 2007, 22:10	3,657.5
P1300000_0361_R	3.900	2,330.7	2 June 2007, 03:25	3,655.9
P130C	2.600	1,973.7	1 June 2007, 18:35	2,455.3
P1300000_0361_J	6.600	3,610.9	1 June 2007, 22:35	6,111.2

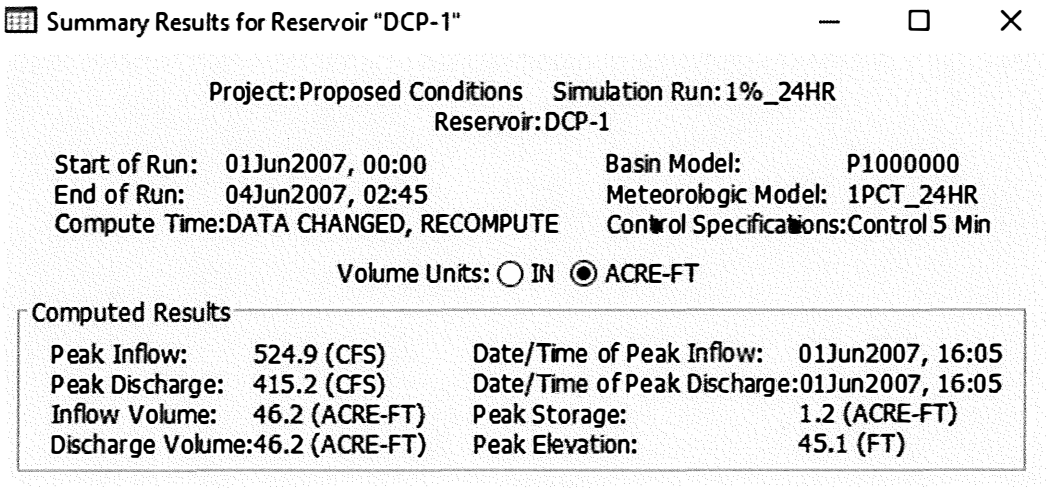
Proposed Condition, 100-Year Frequency Storm Event				
Hydrologic Element	**Drainage Area (mi^2)**	**Peak Discharge (cfs)**	**Time of Peak**	**Volume (Ac-ft)**
P13008A	1.900	2,729.4	1 June 2007, 17:15	1,791.1
P530_08_01	1.900	1,774.3	1 June 2007, 20:20	1,791.1
P13009A	1.400	1,633.2	1 June 2007, 17:25	1,365.3
P1300000_0342_J	9.900	6,516.3	1 June 2007, 20:00	9,267.6
P1300000_0302_R	9.900	6,439.4	1 June 2007, 21:50	9,266.9
P130D	0.700	970.4	1 June 2007, 16:50	629.0
P1300000_0302_J	10.600	6,870.7	1 June 2007, 21:35	9,895.9
P13007A	0.800	873.6	1 June 2007, 17:35	776.7
P1300000_0294_J	11.400	7,492.2	1 June 2007, 21:25	10,672.6
P1300000_0257_R	11.400	7,433.0	1 June 2007, 23:05	10,671.9
P130E	1.000	1,273.0	1 June 2007, 17:10	964.8
P1300000_0257_J	12.400	8,022.7	1 June 2007, 22:50	11,636.7
P13005A	1.200	1,776.5	1 June 2007, 17:15	1,133.4
P1300500_0195_J	1.200	1,776.5	1 June 2007, 17:15	1,133.4
P13005B	0.900	952.7	1 June 2007, 17:55	862.4
P1300500_0162_J	2.100	2,710.9	1 June 2007, 17:25	1,995.8
P530_05_01	2.100	2,512.4	1 June 2007, 19:15	1,995.8
P1300500_0144_R	2.100	1,611.3	1 June 2007, 22:10	1,995.8
P13005C	0.600	833.8	1 June 2007, 16:55	589.1
P1300500_0144_J	2.800	2,034.0	1 June 2007, 21:25	2,584.9
P1300502A	0.900	913.6	1 June 2007, 18:00	842.9
P1300502_0144_J	0.900	913.6	1 June 2007, 18:00	842.9
P1300502_0126_R	0.900	913.5	1 June 2007, 18:05	842.9
P1300502B	0.100	255.0	1 June 2007, 16:30	127.6
P1300502_0126_J	1.100	1,116.0	1 June 2007, 17:40	970.4
P1300500_0114_J	3.800	2,875.0	1 June 2007, 20:20	3,555.3
P1300500_0016_R	3.800	2,799.2	2 June 2007, 01:55	3,555.3
P13005D	2.700	2,254.3	1 June 2007, 18:15	2,485.0
P1300500_0016_J	6.500	4,362.1	1 June 2007, 21:10	6,040.3
P1300000_0227_J	18.900	12,230.7	1 June 2007, 22:25	17,677.0
P1300000_0195_R	18.900	12,202.0	1 June 2007, 23:45	17,676.4
P130F	1.200	1,414.1	1 June 2007, 17:10	1,128.4
P1300000_0195_J	20.100	12,839.6	1 June 2007, 23:20	18,804.9
P1300301A	0.700	780.2	1 June 2007, 17:20	625.7
P1300300_0032_J	0.700	780.2	1 June 2007, 17:20	625.7
P1300300_0008_R	0.700	780.1	1 June 2007, 17:25	625.7
P13003A	1.600	1,815.0	1 June 2007, 17:25	1,468.8
P1300300_0008_J	2.300	2,595.1	1 June 2007, 17:25	2,094.5
P1300000_0166_J	22.400	14,241.1	1 June 2007, 22:00	20,899.4
P1300000_0107_R	22.400	14,206.8	2 June 2007, 00:20	20,898.0
P130G	1.700	1,503.8	1 June 2007, 17:55	1,571.4
P1300000_0107_J	24.100	15,109.0	1 June 2007, 24:00	22,469.3
P13002A	2.500	1,706.1	1 June 2007, 19:10	2,294.5
P1300200_0115_J	2.500	1,706.1	1 June 2007, 19:10	2,294.5
P1300202A	2.300	1,887.8	1 June 2007, 18:30	2,105.4
P1300200_0100_J	4.800	3,586.6	1 June 2007, 18:50	4,399.9
P1300200_0012_R	4.800	3,584.8	1 June 2007, 19:25	4,399.7

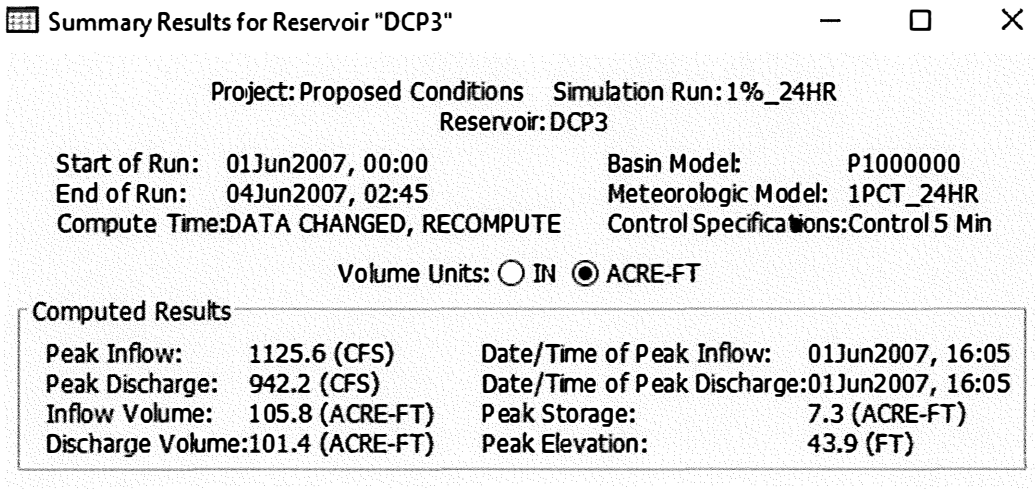
Proposed Condition, 100-Year Frequency Storm Event				
Hydrologic Element	**Drainage Area (mi^2)**	**Peak Discharge (cfs)**	**Time of Peak**	**Volume (Ac-ft)**
P13002B	2.600	1,809.0	1 June 2007, 19:00	2,427.0
P1300200_0023_J	7.400	5,388.6	1 June 2007, 19:15	6,826.7
P1300000_0093_J	31.500	19,344.9	1 June 2007, 23:00	29,296.0
P1300000_0043_R	31.500	19,295.5	2 June 2007, 01:25	29,294.7
P130H	2.400	1,779.2	1 June 2007, 19:15	2,191.5
P1300000_0043_J	33.900	20,484.6	2 June 2007, 01:05	31,486.2
P1000000_1003_J	113.500	44,896.7	2 June 2007, 05:10	103,660.3
P1000000_0860_R	113.500	44,579.8	2 June 2007, 09:10	103,658.2
P100P	5.400	3,315.6	1 June 2007, 19:25	4,923.7
P1000000_0860_J	118.900	45,811.8	2 June 2007, 09:05	108,581.9
P127A	5.100	2,587.6	1 June 2007, 20:05	4,599.4
P1000000_0851_J	123.900	47,090.6	2 June 2007, 09:05	113,181.3
P1000000_0817_R	123.900	46,213.7	2 June 2007, 12:40	113,170.6
P126A	3.700	2,559.1	1 June 2007, 19:25	3,463.6
P1260000_0127_D	3.700	2,079.9	1 June 2007, 19:25	3,101.1
P1000000_0817_J	127.600	46,790.0	2 June 2007, 12:35	116,271.7
P100Q	2.600	1,902.5	1 June 2007, 19:00	2,409.4
P1000000_0795_J	130.300	47,145.2	2 June 2007, 12:35	118,681.1
P1000000_0734_R	130.300	46,754.5	2 June 2007, 15:05	118,663.8
P125A	2.400	1,853.8	1 June 2007, 18:25	2,208.7
P1250000_0129_J	2.400	2,323.4	1 June 2007, 18:50	2,571.2
P1250000_0027_R	2.400	2,299.8	1 June 2007, 21:30	2,571.2
P125B	1.900	1,963.1	1 June 2007, 17:45	1,712.9
P1250000_0027_J	4.200	3,817.4	1 June 2007, 20:25	4,284.1
P1000000_0735_J	134.500	47,032.1	2 June 2007, 15:00	122,947.8
P121A	3.800	2,083.4	1 June 2007, 19:35	3,501.2
P1000000_0720_J	138.300	47,633.7	2 June 2007, 15:00	126,449.0
P1000000_0640_R	138.300	47,495.2	2 June 2007, 16:35	126,429.7
P100R	3.000	2,504.0	1 June 2007, 18:15	2,763.2
P1000000_0640_J	141.300	47,662.9	2 June 2007, 16:35	129,192.9
P1180000_1036_R	0.000	905.2	1 June 2007, 22:45	1,106.0
P118A	1.700	1,583.3	1 June 2007, 17:35	1,574.3
P1180000_1036_J	1.700	1,951.9	1 June 2007, 22:25	2,680.3
P1180000_0846_R	1.700	1,704.4	2 June 2007, 09:45	2,680.3
P118B	5.500	4,935.2	1 June 2007, 18:05	5,148.5
P1180000_0846_J	7.200	5,774.9	1 June 2007, 18:15	7,828.8
P11831A	1.100	1,040.3	1 June 2007, 17:45	1,010.4
P1183100_9903_J	1.100	1,040.3	1 June 2007, 17:45	1,010.4
P1180000_9902_R	1.100	874.7	1 June 2007, 20:30	1,010.4
P11831B	1.300	1,220.5	1 June 2007, 17:25	1,164.2
P1183100_9902_J	2.300	1,989.2	1 June 2007, 19:00	2,174.6
P1180000_9901_R	2.300	1,884.7	2 June 2007, 00:55	2,174.6
P11831C	0.700	862.4	1 June 2007, 17:10	672.7
P1183100_9901_J	3.100	2,198.1	2 June 2007, 00:20	2,847.3
P1180000_0835_J	10.200	7,721.6	1 June 2007, 19:05	10,676.2
P1180000_0660_R	10.200	6,837.3	2 June 2007, 18:20	10,676.2
P1180000_0643_R	0.000	1,300.5	2 June 2007, 00:55	1,036.7

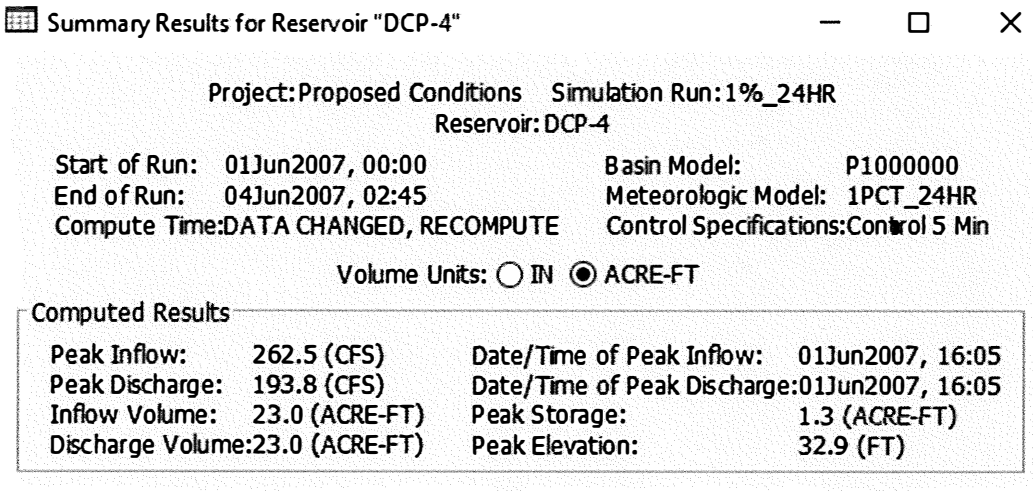
Proposed Condition, 100-Year Frequency Storm Event				
Hydrologic Element	**Drainage Area (mi^2)**	**Peak Discharge (cfs)**	**Time of Peak**	**Volume (Ac-ft)**
P118C	6.000	5,753.8	1 June 2007, 18:25	5,725.4
P1180000_0643_J	16.300	8,721.5	1 June 2007, 19:25	17,438.3
P11823A	1.600	1,575.2	1 June 2007, 17:30	1,483.5
P1180000_0641_J	17.900	10,176.1	1 June 2007, 19:20	18,921.8
P1180000_0441_R	17.900	9,477.0	2 June 2007, 06:05	18,921.8
P118D	6.300	5,736.2	1 June 2007, 18:35	5,979.5
P1180000_0441_J	24.200	11,067.9	2 June 2007, 05:30	24,901.4
P11818A	3.500	2,614.3	1 June 2007, 18:40	3,338.6
P1180000_0432_J	27.700	12,188.9	1 June 2007, 20:50	28,239.9
P1180000_0382_R	27.700	11,977.1	2 June 2007, 09:25	28,239.9
P118E	1.000	1,114.3	1 June 2007, 17:35	967.2
P1180000_0382_J	28.700	12,333.8	2 June 2007, 01:20	29,207.1
P11814A	2.900	2,548.0	1 June 2007, 18:05	2,723.2
P1180000_0361_J	31.600	13,696.3	2 June 2007, 01:10	31,930.3
P1180000_0233_R	31.600	13,066.1	2 June 2007, 07:25	31,930.3
P118F	5.700	6,684.3	1 June 2007, 17:40	5,400.7
P1180000_0233_J	37.300	13,784.8	1 June 2007, 20:40	37,331.0
P1180000_0036_R	37.300	13,770.9	1 June 2007, 21:50	37,330.9
P118G	7.300	6,865.0	1 June 2007, 19:15	6,869.0
P1180000_0036_J	44.600	20,329.1	1 June 2007, 19:55	44,199.9
DA8	0.000	341.8	1 June 2007, 16:05	25.9
CHA1	0.000	47.9	1 June 2007, 16:05	6.8
CHA2	0.000	42.1	1 June 2007, 16:05	3.4
DA2	0.000	300.7	1 June 2007, 16:05	35.2
C/CHA2	0.000	431.8	1 June 2007, 16:05	36.1
DA7	0.000	364.5	1 June 2007, 16:05	27.4
NP	0.000	41.7	1 June 2007, 16:15	7.1
C/NP	0.100	1,125.6	1 June 2007, 16:05	105.8
DCP3	0.100	942.2	1 June 2007, 16:05	101.4
CHB1	0.000	53.5	1 June 2007, 16:05	6.8
DA5	0.000	92.2	1 June 2007, 16:05	7.5
CHB2	0.000	13.1	1 June 2007, 16:05	1.4
C/CHB2	0.000	158.8	1 June 2007, 16:05	15.7
DA6	0.000	341.4	1 June 2007, 16:05	28.3
CHB3	0.000	24.8	1 June 2007, 16:05	2.2
C/CHB3	0.100	524.9	1 June 2007, 16:05	46.2
DCP-1	0.100	415.2	1 June 2007, 16:05	46.2
DA18	0.000	79.6	1 June 2007, 16:10	12.1
NDISC	0.200	1,417.5	1 June 2007, 16:05	159.7
P100O1	0.100	77.5	1 June 2007, 18:30	80.6
NDCP	0.300	1,451.1	1 June 2007, 16:05	240.3
P1000000_0635_J	186.100	60,359.1	2 June 2007, 16:25	173,633.1
P1000000_0580_R	186.100	60,308.0	2 June 2007, 17:15	173,615.1
P100S	1.500	1,749.4	1 June 2007, 17:20	1,412.4
DA12	0.000	256.7	1 June 2007, 16:05	19.9
CHF1	0.000	50.3	1 June 2007, 16:05	4.9
DA3	0.000	210.1	1 June 2007, 16:05	24.0

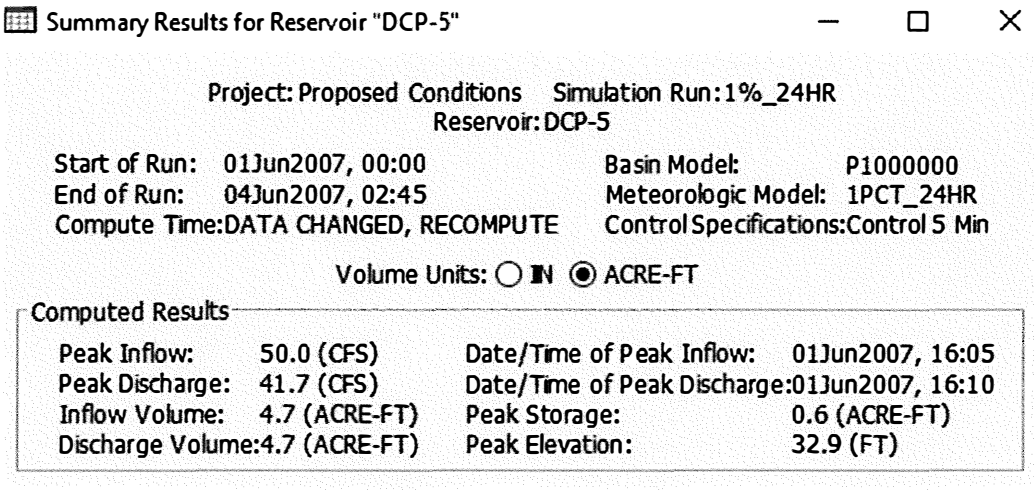
Proposed Condition, 100-Year Frequency Storm Event				
Hydrologic Element	**Drainage Area (mi^2)**	**Peak Discharge (cfs)**	**Time of Peak**	**Volume (Ac-ft)**
C/DA12	0.000	307.0	1 June 2007, 16:05	24.7
DA11	0.000	176.1	1 June 2007, 16:05	13.6
CHG1	0.000	46.5	1 June 2007, 16:05	4.0
CHG2	0.000	23.1	1 June 2007, 16:05	3.2
C/CHG2	0.000	245.7	1 June 2007, 16:05	20.9
CHF2	0.000	54.4	1 June 2007, 16:05	5.5
C/D4	0.100	817.2	1 June 2007, 16:05	75.1
DCP-7	0.100	564.3	1 June 2007, 16:10	75.1
DA10	0.000	291.7	1 June 2007, 16:05	22.8
CHH2	0.000	47.4	1 June 2007, 16:05	3.6
CHH1	0.000	34.9	1 June 2007, 16:05	3.1
C/CHH2	0.000	374.0	1 June 2007, 16:05	29.5
DCP-6	0.000	203.1	1 June 2007, 16:10	29.5
DA9	0.000	250.3	1 June 2007, 16:05	19.9
NEP	0.000	18.1	1 June 2007, 16:15	3.1
C/NEP	0.000	262.5	1 June 2007, 16:05	23.0
DCP-4	0.000	193.8	1 June 2007, 16:05	23.0
CH1	0.000	50.0	1 June 2007, 16:05	4.7
DCP-5	0.000	41.7	1 June 2007, 16:10	4.7
EDCP	0.200	1,001.9	1 June 2007, 16:10	132.2
P1000000_0580_J	187.800	60,314.6	2 June 2007, 17:15	175,159.7
P1000000_0541_R	187.800	60,137.2	2 June 2007, 18:40	175,144.0
P1000000_0541_J	187.800	60,137.2	2 June 2007, 18:40	175,144.0
P114B	1.500	2,634.0	1 June 2007, 16:55	1,401.5
P114A	0.700	1,080.1	1 June 2007, 16:45	633.6
P1140000_0119_J	0.700	1,080.1	1 June 2007, 16:45	633.6
P1140000_0036_R	0.700	1,061.8	1 June 2007, 17:50	633.6
DA17	0.000	431.0	1 June 2007, 16:05	32.3
CHC1	0.000	56.1	1 June 2007, 16:05	7.1
DA19	0.000	44.0	1 June 2007, 16:05	3.2
C/CHC1	0.100	531.1	1 June 2007, 16:05	42.6
DA1	0.000	344.6	1 June 2007, 16:05	40.4
CHC2	0.000	73.3	1 June 2007, 16:05	5.4
C/CHC2	0.100	949.0	1 June 2007, 16:05	88.5
DA15	0.000	272.2	1 June 2007, 16:05	21.2
DA16	0.000	254.0	1 June 2007, 16:05	20.6
C/DA15	0.200	1,475.2	1 June 2007, 16:05	130.3
CHC3	0.000	49.1	1 June 2007, 16:05	4.4
SWP	0.000	34.9	1 June 2007, 16:10	5.4
C/SWP	0.200	1,550.7	1 June 2007, 16:05	140.1
DA14	0.000	306.1	1 June 2007, 16:05	24.2
CHD1	0.000	39.9	1 June 2007, 16:05	4.2
CHD2	0.000	24.6	1 June 2007, 16:05	2.7
C/CHD2	0.000	370.7	1 June 2007, 16:05	31.0
DA4	0.000	251.5	1 June 2007, 16:05	29.9
CHD3	0.000	27.3	1 June 2007, 16:05	3.2
C/CHD3	0.100	649.4	1 June 2007, 16:05	64.0

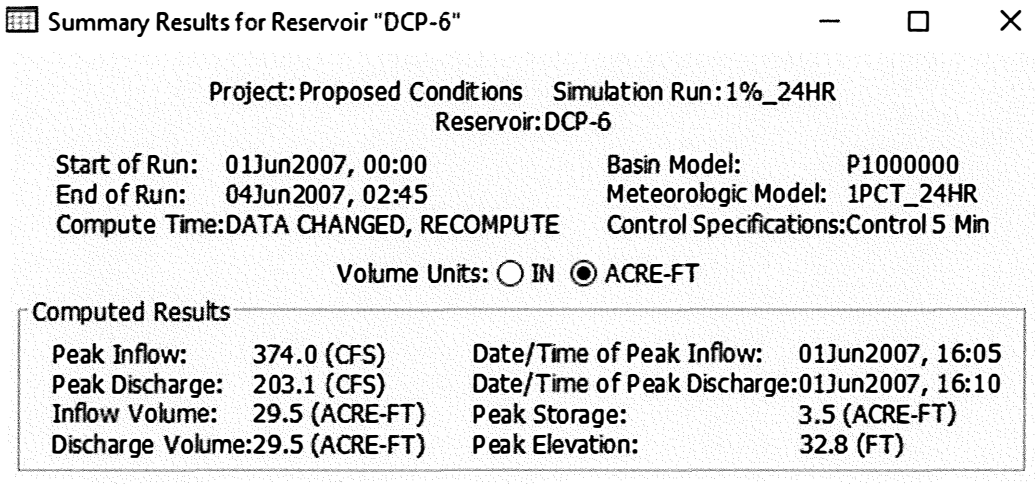
Proposed Condition, 100-Year Frequency Storm Event				
Hydrologic Element	**Drainage Area (mi^2)**	**Peak Discharge (cfs)**	**Time of Peak**	**Volume (Ac-ft)**
DCP-9	0.100	414.7	1 June 2007, 16:10	64.0
DA13	0.000	393.7	1 June 2007, 16:05	30.5
CHE2	0.000	36.9	1 June 2007, 16:05	4.2
CHE1	0.000	11.0	1 June 2007, 16:05	1.2
C/CHE2	0.000	441.6	1 June 2007, 16:05	35.9
DCP-8	0.000	75.0	1 June 2007, 16:30	21.7
SDCP	0.300	1,931.2	1 June 2007, 16:05	225.8
FIL1	0.000	103.3	1 June 2007, 16:25	20.7
FIL2	0.000	76.1	1 June 2007, 16:35	18.7
C/FILL	0.000	173.4	1 June 2007, 16:25	39.5
P1140000_0036_J	2.500	3,821.8	1 June 2007, 17:25	2,300.4
P1140000_0026_R	2.500	3,806.4	1 June 2007, 17:35	2,300.4
P114C	0.500	1,032.9	1 June 2007, 16:30	446.8
P1140000_0026_J	3.000	4,643.8	1 June 2007, 17:20	2,747.3
P1000000_0530_J	190.800	60,137.6	2 June 2007, 18:40	177,891.3
P1000000_0472_R	190.800	59,934.5	2 June 2007, 20:30	177,868.9
P100T	1.900	1,272.7	1 June 2007, 20:30	1,811.2
P1000000_0472_J	192.700	60,096.9	2 June 2007, 20:30	179,680.1
P110A	2.000	2,876.7	1 June 2007, 17:20	1,881.7
P1000000_0460_J	194.700	60,096.9	2 June 2007, 20:30	181,561.8
P1000000_0445_R	194.700	60,058.9	2 June 2007, 21:00	181,548.3
P1000000_0445_J	194.700	60,058.9	2 June 2007, 21:00	181,548.3
P109A	1.400	1,743.3	1 June 2007, 17:15	1,316.1
P1000000_0432_J	196.100	60,059.1	2 June 2007, 21:00	182,864.5
P1000000_3901_R	196.100	60,016.1	2 June 2007, 21:40	182,841.2
P100U	0.500	763.2	1 June 2007, 16:50	467.5
P1000000_0390_J	196.600	60,016.1	2 June 2007, 21:40	183,308.8
P107A	2.600	2,325.3	1 June 2007, 17:45	2,427.4
P1070000_0198_J	2.600	2,325.3	1 June 2007, 17:45	2,427.4
P1070000_0026_R	2.600	2,221.1	2 June 2007, 00:35	2,427.4
P107B	2.400	2,841.6	1 June 2007, 17:35	2,251.4
P1070000_0026_J	5.000	4,142.2	1 June 2007, 18:00	4,678.8
P1000000_0381_J	201.600	60,541.7	2 June 2007, 02:40	187,987.5
P1000000_0181_R	201.600	60,399.9	2 June 2007, 04:40	187,855.5
P100V	3.800	4,353.3	1 June 2007, 20:00	3,593.5
P1000000_0181_J	205.400	61,383.0	2 June 2007, 04:30	191,449.0
P1000000_0010_R	205.400	61,151.7	2 June 2007, 07:05	191,280.3
P100W	5.600	6,925.5	1 June 2007, 20:30	5,310.8
P1000000_0010_J	211.000	61,649.4	2 June 2007, 06:55	196,591.1

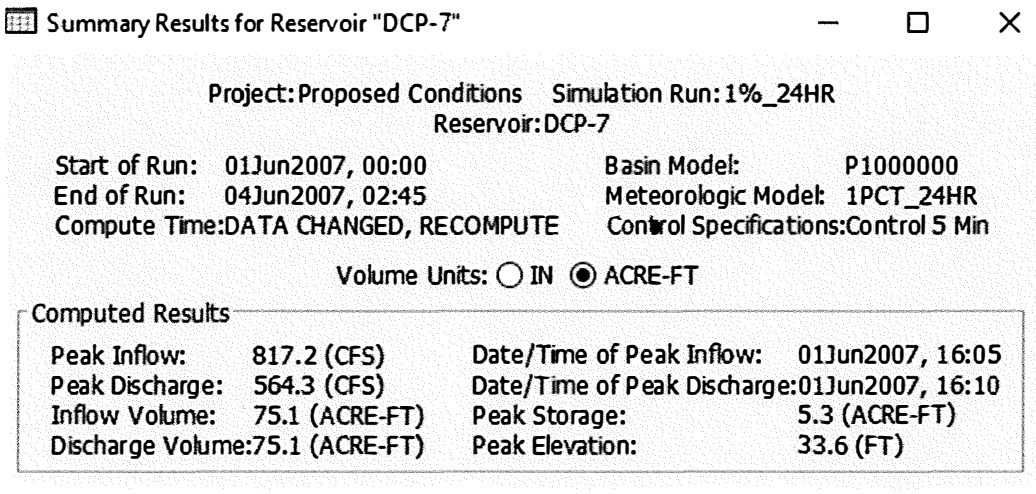

Summary Results for Reservoir "DCP-1"
Project: Proposed Conditions Simulation Run: 1%_24HR
Reservoir: DCP-1
Start of Run: 01Jun2007, 00:00
End of Run: 04Jun2007, 02:45
Compute Time: DATA CHANGED, RECOMPUTE
Basin Model: P1000000
Meteorologic Model: 1PCT_24HR
Control Specifications: Control 5 Min
Volume Units: IN ACRE-FT
Computed Results
Peak Inflow: 524.9 (CFS)
Peak Discharge: 415.2 (CFS)
Inflow Volume: 46.2 (ACRE-FT)
Discharge Volume: 46.2 (ACRE-FT)
Date/Time of Peak Inflow: 01Jun2007, 16:05
Date/Time of Peak Discharge: 01Jun2007, 16:05
Peak Storage: 1.2 (ACRE-FT)
Peak Elevation: 45.1 (FT)

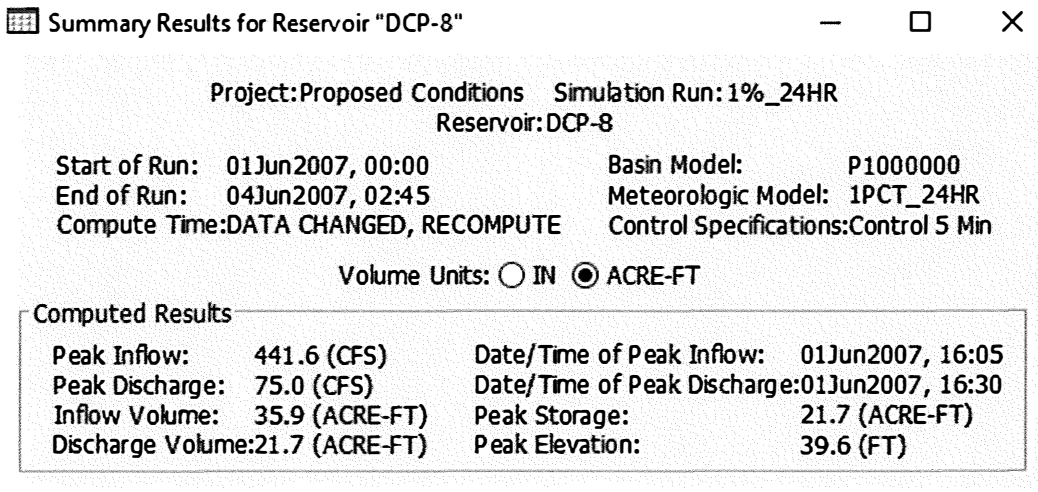

Summary Results for Reservoir "DCP3"
Project: Proposed Conditions Simulation Run: 1%_24HR
Reservoir: DCP3
Start of Run: 01Jun2007, 00:00
End of Run: 04Jun2007, 02:45
Compute Time: DATA CHANGED, RECOMPUTE
Basin Model: P1000000
Meteorologic Model: 1PCT_24HR
Control Specifications: Control 5 Min
Volume Units: IN ACRE-FT
Computed Results
Peak Inflow: 1125.6 (CFS)
Peak Discharge: 942.2 (CFS)
Inflow Volume: 105.8 (ACRE-FT)
Discharge Volume: 101.4 (ACRE-FT)
Date/Time of Peak Inflow: 01Jun2007, 16:05
Date/Time of Peak Discharge: 01Jun2007, 16:05
Peak Storage: 7.3 (ACRE-FT)
Peak Elevation: 43.9 (FT)

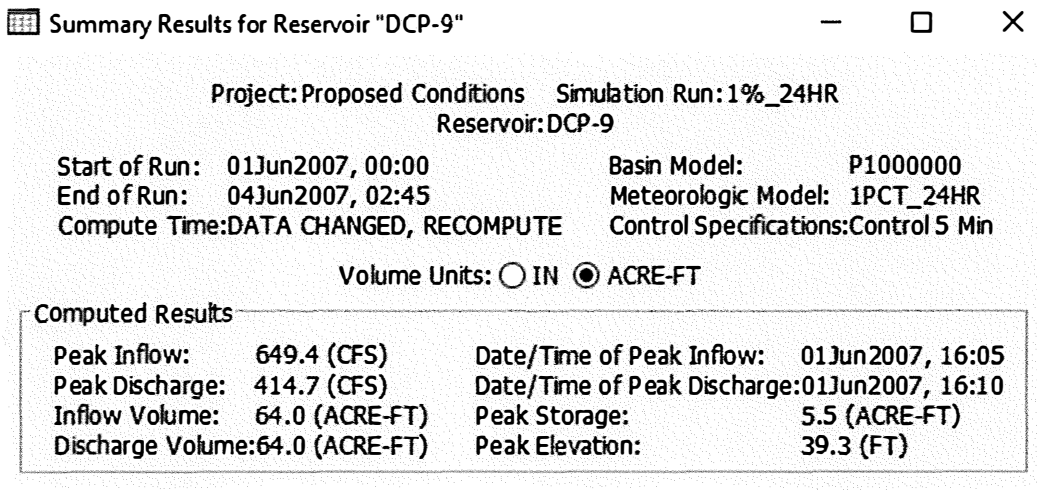

Summary Results for Reservoir "DCP-4"
Project: Proposed Conditions Simulation Run: 1%_24HR
Reservoir: DCP-4
Start of Run: 01Jun2007, 00:00
End of Run: 04Jun2007, 02:45
Compute Time: DATA CHANGED, RECOMPUTE
Basin Model: P1000000
Meteorologic Model: 1PCT_24HR
Control Specifications: Control 5 Min
Volume Units: IN ACRE-FT
Computed Results
Peak Inflow: 262.5 (CFS)
Peak Discharge: 193.8 (CFS)
Inflow Volume: 23.0 (ACRE-FT)
Discharge Volume: 23.0 (ACRE-FT)
Date/Time of Peak Inflow: 01Jun2007, 16:05
Date/Time of Peak Discharge: 01Jun2007, 16:05
Peak Storage: 1.3 (ACRE-FT)
Peak Elevation: 32.9 (FT)


Summary Results for Reservoir "DCP-5"
Project: Proposed Conditions Simulation Run: 1%_24HR
Reservoir: DCP-5
Start of Run: 01Jun2007, 00:00
End of Run: 04Jun2007, 02:45
Compute Time: DATA CHANGED, RECOMPUTE
Basin Model: P1000000
Meteorologic Model: 1PCT_24HR
Control Specifications: Control 5 Min
Volume Units: IN ACRE-FT
Computed Results
Peak Inflow: 50.0 (CFS)
Peak Discharge: 41.7 (CFS)
Inflow Volume: 4.7 (ACRE-FT)
Discharge Volume: 4.7 (ACRE-FT)
Date/Time of Peak Inflow: 01Jun2007, 16:05
Date/Time of Peak Discharge: 01Jun2007, 16:10
Peak Storage: 0.6 (ACRE-FT)
Peak Elevation: 32.9 (FT)


Summary Results for Reservoir "DCP-6"
Project: Proposed Conditions Simulation Run: 1%_24HR
Reservoir: DCP-6
Start of Run: 01Jun2007, 00:00
End of Run: 04Jun2007, 02:45
Compute Time: DATA CHANGED, RECOMPUTE
Basin Model: P1000000
Meteorologic Model: 1PCT_24HR
Control Specifications: Control 5 Min
Volume Units: IN ACRE-FT
Computed Results
Peak Inflow: 374.0 (CFS)
Peak Discharge: 203.1 (CFS)
Inflow Volume: 29.5 (ACRE-FT)
Discharge Volume: 29.5 (ACRE-FT)
Date/Time of Peak Inflow: 01Jun2007, 16:05
Date/Time of Peak Discharge: 01Jun2007, 16:10
Peak Storage: 3.5 (ACRE-FT)
Peak Elevation: 32.8 (FT)


Summary Results for Reservoir "DCP-7"
Project: Proposed Conditions Simulation Run: 1%_24HR
Reservoir: DCP-7
Start of Run: 01Jun2007, 00:00
End of Run: 04Jun2007, 02:45
Compute Time: DATA CHANGED, RECOMPUTE
Basin Model: P1000000
Meteorologic Model: 1PCT_24HR
Control Specifications: Control 5 Min
Volume Units: IN ACRE-FT
Computed Results
Peak Inflow: 817.2 (CFS)
Peak Discharge: 564.3 (CFS)
Inflow Volume: 75.1 (ACRE-FT)
Discharge Volume: 75.1 (ACRE-FT)
Date/Time of Peak Inflow: 01Jun2007, 16:05
Date/Time of Peak Discharge: 01Jun2007, 16:10
Peak Storage: 5.3 (ACRE-FT)
Peak Elevation: 33.6 (FT)


Summary Results for Reservoir "DCP-8"
Project:Proposed Conditions Simulation Run:1%_24HR
Reservoir:DCP-8
Start of Run: 01Jun2007, 00:00
End of Run: 04Jun2007, 02:45
Compute Time:DATA CHANGED, RECOMPUTE
Basin Model: P1000000
Meteorologic Model: 1PCT_24HR
Control Specifications:Control 5 Min
Volume Units: IN ACRE-FT
Computed Results
Peak Inflow: 441.6 (CFS)
Peak Discharge: 75.0 (CFS)
Inflow Volume: 35.9 (ACRE-FT)
Discharge Volume:21.7 (ACRE-FT)
Date/Time of Peak Inflow: 01Jun2007, 16:05
Date/Time of Peak Discharge:01Jun2007, 16:30
Peak Storage: 21.7 (ACRE-FT)
Peak Elevation: 39.6 (FT)

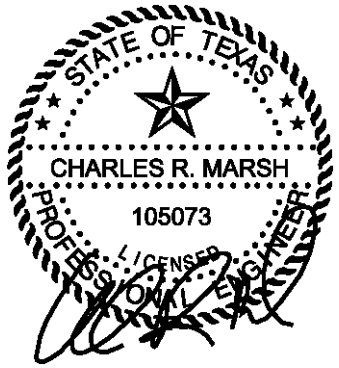

Summary Results for Reservoir "DCP-9"
Project: Proposed Conditions Simulation Run: 1%_24HR
Reservoir: DCP-9
Start of Run: 01Jun2007, 00:00
End of Run: 04Jun2007, 02:45
Compute Time: DATA CHANGED, RECOMPUTE
Basin Model: P1000000
Meteorologic Model: 1PCT_24HR
Control Specifications: Control 5 Min
Volume Units: IN ACRE-FT
Computed Results
Peak Inflow: 649.4 (CFS)
Peak Discharge: 414.7 (CFS)
Inflow Volume: 64.0 (ACRE-FT)
Discharge Volume: 64.0 (ACRE-FT)
Date/Time of Peak Inflow: 01Jun2007, 16:05
Date/Time of Peak Discharge: 01Jun2007, 16:10
Peak Storage: 5.5 (ACRE-FT)
Peak Elevation: 39.3 (FT)

ATTACHMENT 6A

APPENDIX 6A-B

PERIMETER CHANNEL AND DETENTION POND DESIGN

Includes pages 6A-B.1-1 through 6A-B.2B2-20



12/12/2024

PERIMETER CHANNEL DESIGN

Perimeter channels have been designed to contain stormwater runoff from both the 25-year and 100-year storm frequencies. A summary of the design information that is included in this Attachment and related Attachments are listed below.

- Flow rates used for perimeter channel calculations taken from HEC-1 analysis located in Attachment 6A-A.

- Perimeter channel design system information is summarized on Attachment 6A.3.

- Channel profiles are presented on Attachments 6A.4 through 6A.12.

- Hydraulic calculations are summarized on pages 6A-B.1-2, 6A-B.1-3, 6A-B.1-6, and 6A-B.1-7.

- Perimeter Channel Erosion Control Design information is included on pages 6A-B.1-10, 6A-B.1-11, and 6A-B.1-12.

McCARTY ROAD LANDFILL
0120-439-11-03-11
PERIMETER CHANNEL HYDRAULIC ANALYSIS
100-YEAR NORMAL DEPTH CALCULATIONS

Channel[2]	Station[2]		Flow Rate[3] (cfs)	Bottom Slope (ft/ft)	Bottom Width (ft)	Left Side Slope (ft/ft)	Right Side Slope (ft/ft)	Manning's N-Value	Normal Depth[1] (ft)	Flow Vel.[1] (fps)	Froude No.[1]	Vel. Head[1] (ft)	Energy Head[1] (ft)	Flow Area[1] (sq.ft.)	Top width of Flow[1] (ft)
A	0+00	1+37	432	0.001	12	3	3	0.015	3.50	5.47	0.624	0.47	3.97	78.91	33.03
A	1+37	4+50.7	432	0.001	12	3	3	0.015	3.50	5.47	0.624	0.47	3.97	78.91	33.03
A	4+50.7	7+68.1	432	0.001	12	3	3	0.015	3.50	5.47	0.624	0.47	3.97	78.91	33.03
A	7+68.1	16+89.6	48	0.001	0	3	3	0.040	3.21	1.55	0.216	0.04	3.25	30.90	19.26
B	0+00	0+75.9	525	0.001	25	2	2	0.015	3.00	5.65	0.628	0.50	3.50	92.99	37.00
B	0+75.9	1+97.9	525	0.001	25	2	2	0.015	3.00	5.65	0.628	0.50	3.50	92.99	37.00
B	1+97.9	2+57.4	525	0.001	25	2	2	0.015	3.00	5.65	0.628	0.50	3.50	92.99	37.00
B	2+57.4	2+82.4	159	0.001	25	2	2	0.015	1.50	3.78	0.572	0.22	1.72	42.06	31.01
B	2+82.4	4+79.9	159	0.001	25	2	2	0.040	2.66	1.98	0.232	0.06	2.72	80.48	35.62
B	4+79.9	6+54.7	54	0.001	25	2	2	0.040	1.42	1.37	0.213	0.03	1.45	39.44	30.67
B	6+54.7	7+70.3	54	0.001	25	2	2	0.040	1.42	1.37	0.213	0.03	1.45	39.44	30.67
B	7+70.3	8+87.8	54	0.001	25	2	2	0.040	1.42	1.37	0.213	0.03	1.45	39.44	30.67
B	8+87.8	10+18.2	54	0.001	25	2	2	0.040	1.42	1.37	0.213	0.03	1.45	39.44	30.67
B	10+18.2	11+30.4	54	0.001	25	2	2	0.040	1.42	1.37	0.213	0.03	1.45	39.44	30.67
B	11+30.4	12+90.0	54	0.001	25	2	2	0.040	1.42	1.37	0.213	0.03	1.45	39.44	30.67
B	12+90.0	14+68.0	54	0.001	25	2	2	0.040	1.42	1.37	0.213	0.03	1.45	39.44	30.67
B	14+68.0	15+56.7	54	0.001	25	2	2	0.040	1.42	1.37	0.213	0.03	1.45	39.44	30.67
B	15+56.7	16+46.5	54	0.001	25	2	2	0.040	1.42	1.37	0.213	0.03	1.45	39.44	30.67
B	16+46.5	17+71.6	54	0.001	25	2	2	0.040	1.42	1.37	0.213	0.03	1.45	39.44	30.67
C	0+00	2+59.2	1551	0.002	25	2	2	0.040	7.68	5.00	0.374	0.39	8.07	310.10	55.73
C	2+59.2	9+02.7	1551	0.002	25	2	2	0.040	7.68	5.00	0.374	0.39	8.07	310.10	55.73
C	9+02.7	9+53.8	1551	0.002	25	2	2	0.040	7.68	5.00	0.374	0.39	8.07	310.10	55.73
C	9+53.8	13+23.4	949	0.001	25	2	2	0.040	7.12	3.40	0.262	0.18	7.30	274.45	53.48
C	13+23.4	15+88.8	949	0.001	15	2	2	0.015	5.21	7.16	0.657	0.80	6.01	132.50	35.85
C	15+88.8	18+16.4	949	0.001	15	2	2	0.015	5.21	7.16	0.657	0.80	6.01	132.50	35.85
C	18+16.4	19+38.4	949	0.001	15	2	2	0.015	5.21	7.16	0.657	0.80	6.01	132.50	35.85
C	19+38.4	20+20.0	949	0.001	15	2	2	0.015	5.21	7.16	0.657	0.80	6.01	132.50	35.85
C	20+20.0	20+92.2	531	0.001	15	2	2	0.040	6.38	2.99	0.252	0.14	6.52	177.30	40.54
C	20+92.2	21+86.1	531	0.001	15	2	2	0.040	6.38	2.99	0.252	0.14	6.52	177.30	40.54
C	21+86.1	33+48.8	531	0.001	15	2	2	0.040	6.38	2.99	0.252	0.14	6.52	177.30	40.54
C	33+48.8	39+47.4	56	0.001	15	2	2	0.040	1.91	1.56	0.218	0.04	1.95	35.95	22.64
D	0+00	3+55.8	649	0.001	15	3	3	0.040	6.43	2.94	0.256	0.13	6.57	220.63	53.60
D	3+55.8	8+50.2	371	0.001	10	3	3	0.040	5.47	2.57	0.247	0.10	5.57	144.30	42.80
D	8+50.2	13+08.8	40	0.001	15	3	3	0.040	1.53	1.34	0.212	0.03	1.56	29.95	24.17
E1	0+00	0+64.2	37	0.001	25	3	3	0.040	1.12	1.17	0.205	0.02	1.14	31.74	31.71
E1	0+64.2	1+72.1	37	0.001	30	3	3	0.040	1.01	1.11	0.203	0.02	1.03	33.38	36.06
E2	0+00	0+53.6	442	0.001	25	3	3	0.040	4.48	2.57	0.248	0.10	4.58	172.23	51.88
E2	0+53.6	1+90.3	442	0.001	35	3	3	0.040	3.86	2.46	0.246	0.09	3.95	179.86	58.17
E2	1+90.3	4+35.9	442	0.001	45	3	3	0.040	3.41	2.35	0.244	0.09	3.49	188.23	65.45

McCARTY ROAD LANDFILL
0120-439-11-03-11
PERIMETER CHANNEL HYDRAULIC ANALYSIS
100-YEAR NORMAL DEPTH CALCULATIONS

Channel[2]	Station[2]		Flow Rate[3] (cfs)	Bottom Slope (ft/ft)	Bottom Width (ft)	Left Side Slope (ft/ft)	Right Side Slope (ft/ft)	Manning's N-Value	Normal Depth[1] (ft)	Flow Vel.[1] (fps)	Froude No.[1]	Vel. Head[1] (ft)	Energy Head[1] (ft)	Flow Area[1] (sq.ft.)	Top width of Flow[1] (ft)
F	0+00	1+40	817	0.002	35	3	2	0.040	4.56	3.86	0.356	0.23	4.79	211.48	57.79
F	1+40	3+65.4	817	0.002	20	3	2	0.040	5.78	4.11	0.359	0.26	6.04	198.96	48.88
F	3+65.4	6+33.7	817	0.002	15	3	2	0.040	6.35	4.17	0.359	0.27	6.62	195.94	46.74
F	6+33.7	13+15.4	50	0.002	15	3	2	0.040	1.45	1.85	0.297	0.05	1.50	26.95	22.24
F	13+15.4	16+15.1	50	0.002	12	3	2	0.040	1.62	1.93	0.299	0.06	1.67	25.94	20.08
F	16+15.1	17+61.4	50	0.002	12	3	2	0.040	1.62	1.93	0.299	0.06	1.67	25.94	20.08
G	0+00	1+80.3	246	0.001	12	3	3	0.015	2.64	4.68	0.602	0.34	2.98	52.49	27.82
G	1+80.3	7+22.9	246	0.001	12	3	3	0.015	2.64	4.69	0.602	0.34	2.98	52.49	27.82
G	7+22.9	10+93.9	246	0.001	0	3	3	0.015	4.10	4.88	0.601	0.37	4.47	50.40	24.59
H	0+00	0+98.2	374	0.002	12	3	3	0.015	2.74	6.76	0.855	0.71	3.45	55.29	28.42
H	0+98.2	2+72.6	374	0.002	12	3	3	0.015	2.74	6.76	0.855	0.71	3.45	55.29	28.42
H	2+72.6	5+71.7	374	0.002	12	3	3	0.015	2.74	6.76	0.855	0.71	3.45	55.29	27.42
H	5+71.7	8+26.5	35	0.002	0	3	3	0.040	2.50	1.86	0.293	0.05	2.56	18.80	15.02
H	8+26.5	8+73.2	35	0.002	0	3	3	0.040	2.50	1.86	0.293	0.05	2.56	18.80	15.02
I	-1+16.0	0+00	50	0.001	0	3	3	0.015	2.26	3.28	0.544	0.17	2.42	15.27	13.53
I	0+00	0+25.6	50	0.001	0	3	3	0.015	2.26	3.28	0.544	0.17	2.42	15.27	13.53
I	0+25.6	4+55.3	50	0.001	0	3	3	0.015	2.26	3.28	0.544	0.17	2.42	15.27	13.53
I	4+55.3	6+14.9	50	0.001	0	3	3	0.015	2.26	3.28	0.544	0.17	2.42	15.27	13.53

Note: 1) Calculations were performed using the HYDROCALC HYDRAULIC FOR WINDOWS Computer Program developed by Dodson and Associates (Version 1.2a, 1996).
2) Refer to Attachment 6A.3 for channel locations.
3) Flow rates are taken from HEC-1 model. See HEC-1 Output-Post Development Conditions in Attachment 6A-A.

Example Calculation: Calculate the normal depth for Channel C between stations 2+59.2 and 9+02.7.

List of Symbols

Q_d = design flow rate for channel, cfs
R = hydraulic radius, ft
n = Manning's roughness coefficient
S = channel slope, ft/ft
b = bottom width of channel, ft
z = z-ratio (ratio of run to rise for channel sideslope)
A_f = flow area, sf
g = gravitational acceleration = 32.2 ft/s^2
T = top width of flow, ft
d = normal depth of channel, ft

The program uses an iterative process to calculate the normal depth of the channel to satisfy Manning's Equation

$$Q = \frac{1.486}{n} A R^{0.67} S^{0.5}$$

Design Inputs:

Q_d =	1551	cfs (from 100-year, 24-hour storm HEC-1 analysis, Attachment 6A-A
S =	0.002	ft/ft
b =	25	ft
z =	2	(H) : 1 (V)
n =	0.04	

Step 1 - Based on the geometry of the channel cross-section, solve for R and A_f

$$R = \frac{bd + zd^2}{b + 2d(z^2 + 1)^{0.5}}$$

$$A_f = bd + zd^2$$

assume: d= 7.68 ft

R = 5.223 ft

A_f = 310.10 sf

solve for Q Q = 1551

if Q is not equal to Q_d, select a new d and repeat calculations

Step 2 - solve for velocity, T, Froude number, velocity head, and energy head

$Q = VA \Rightarrow \quad V = Q/A$

$V =$ 5.00 ft/s

$T = b + 2(z \times d)$

$T =$ 55.73 ft

$$F_r = \frac{V}{(gA/T)^{0.5}}$$

$F_r =$ 0.374

$$\text{Velocity Head} = \frac{V^2}{2g}$$

Velocity Head = 0.39 ft

Energy Head = water elevation + velocity head

Energy Head = 8.07 ft

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PERIMETER CHANNEL HYDRAULIC ANALYSIS
25-YEAR NORMAL DEPTH CALCULATIONS

Channel[2]	Station[2]		Flow Rate[3] (cfs)	Bottom Slope (ft/ft)	Bottom Width (ft)	Left Side Slope (ft/ft)	Right Side Slope (ft/ft)	Manning's N-Value	Normal Depth[1] (ft)	Flow Vel.[1] (fps)	Froude No.[1]	Vel. Head[1] (ft)	Energy Head[1] (ft)	Flow Area[1] (sq.ft.)	Top width of Flow[1] (ft)
A	0+00	1+37	315	0.001	12	3	3	0.015	2.99	5.02	0.612	0.39	3.38	62.74	29.95
A	1+37	4+50.7	315	0.001	12	3	3	0.015	2.99	5.02	0.612	0.39	3.38	62.74	29.95
A	4+50.7	7+68.1	315	0.001	12	3	3	0.015	2.99	5.02	0.612	0.39	3.38	62.74	29.95
A	7+68.1	16+89.6	34	0.001	0	3	3	0.040	2.82	1.43	0.212	0.03	2.85	23.86	16.92
B	0+00	0+75.9	378	0.001	25	2	2	0.015	2.49	5.07	0.613	0.40	2.89	74.50	34.94
B	0+75.9	1+97.9	378	0.001	25	2	2	0.015	2.49	5.07	0.613	0.40	2.89	74.50	34.94
B	1+97.9	2+57.4	378	0.001	25	2	2	0.015	2.49	5.07	0.613	0.40	2.89	74.50	34.94
B	2+57.4	2+82.4	113	0.001	25	2	2	0.015	1.23	3.35	0.556	0.17	1.40	33.75	29.92
B	2+82.4	4+79.9	113	0.001	25	2	2	0.040	2.18	1.76	0.226	0.05	2.23	64.03	33.72
B	4+79.9	6+54.7	37	0.001	25	2	2	0.040	1.13	1.20	0.206	0.02	1.16	30.93	29.54
B	6+54.7	7+70.3	37	0.001	25	2	2	0.040	1.13	1.20	0.206	0.02	1.16	30.93	29.54
B	7+70.3	8+87.8	37	0.001	25	2	2	0.040	1.13	1.20	0.206	0.02	1.16	30.93	29.54
B	8+87.8	10+18.2	37	0.001	25	2	2	0.040	1.13	1.20	0.206	0.02	1.16	30.93	29.54
B	10+18.2	11+30.4	37	0.001	25	2	2	0.040	1.13	1.20	0.206	0.02	1.16	30.93	29.54
B	11+30.4	12+90.0	37	0.001	25	2	2	0.040	1.13	1.20	0.206	0.02	1.16	30.93	29.54
B	12+90.0	14+68.0	37	0.001	25	2	2	0.040	1.13	1.20	0.206	0.02	1.16	30.93	29.54
B	14+68.0	15+56.7	37	0.001	25	2	2	0.040	1.13	1.20	0.206	0.02	1.16	30.93	29.54
B	15+56.7	16+46.5	37	0.001	25	2	2	0.040	1.13	1.20	0.206	0.02	1.16	30.93	29.54
B	16+46.5	17+71.6	37	0.001	25	2	2	0.040	1.13	1.20	0.206	0.02	1.16	30.93	29.54
C	0+00	2+59.2	1090	0.002	25	2	2	0.040	6.38	4.53	0.366	0.32	6.70	240.78	50.51
C	2+59.2	9+02.7	1090	0.002	25	2	2	0.040	6.38	4.53	0.366	0.32	6.70	240.78	50.51
C	9+02.7	9+53.8	1090	0.002	25	2	2	0.040	6.38	4.53	0.366	0.32	6.70	240.78	50.51
C	9+53.8	13+23.4	654	0.001	25	2	2	0.040	5.84	3.05	0.256	0.14	5.98	214.22	48.36
C	13+23.4	15+88.8	654	0.001	15	2	2	0.015	4.29	6.46	0.642	0.65	4.94	101.26	32.17
C	15+88.8	18+16.4	654	0.001	15	2	2	0.015	4.29	6.46	0.642	0.65	4.94	101.26	32.17
C	18+16.4	19+38.4	654	0.001	15	2	2	0.015	4.29	6.46	0.624	0.65	4.94	101.26	32.17
C	19+38.4	20+20.0	654	0.001	15	2	2	0.015	4.29	6.46	0.624	0.65	4.94	101.26	32.17
C	20+20.0	20+92.2	375	0.001	15	2	2	0.040	5.35	2.72	0.247	0.12	5.47	137.62	36.41
C	20+92.2	21+86.1	375	0.001	15	2	2	0.040	5.35	2.72	0.247	0.12	5.47	137.62	36.41
C	21+86.1	33+48.8	375	0.001	15	2	2	0.040	5.35	2.72	0.247	0.12	5.47	137.62	36.41
C	33+48.8	39+47.8	29	0.001	15	2	2	0.040	1.31	1.26	0.207	0.02	1.33	23.09	20.24
D	0+00	3+55.8	452	0.001	15	3	3	0.040	5.41	2.67	0.250	0.11	5.52	169.07	47.48
D	3+55.8	8+50.2	265	0.001	10	3	3	0.040	4.68	2.36	0.242	0.09	4.77	112.51	38.08
D	8+50.2	13+08.8	29	0.001	15	3	3	0.040	1.28	1.21	0.207	0.02	1.30	24.04	22.66
E1	0+00	0+64.2	26	0.001	25	3	3	0.040	0.91	1.03	0.199	0.02	0.93	25.24	30.46
E1	0+64.2	1+72.1	26	0.001	30	3	3	0.040	0.82	0.98	0.197	0.01	0.84	26.63	34.92
E2	0+00	0+53.6	318	0.001	25	3	3	0.040	3.76	2.33	0.243	0.08	3.84	136.40	47.56
E2	0+53.6	1+90.3	318	0.001	35	3	3	0.040	3.21	2.22	0.240	0.08	3.29	143.46	54.28
E2	1+90.3	4+35.9	318	0.001	45	3	3	0.040	2.82	2.11	0.238	0.07	2.89	150.99	61.94

McCARTY ROAD LANDFILL
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PERIMETER CHANNEL HYDRAULIC ANALYSIS
25-YEAR NORMAL DEPTH CALCULATIONS

Channel[2]	Station[2]		Flow Rate[3] (cfs)	Bottom Slope (ft/ft)	Bottom Width (ft)	Left Side Slope (ft/ft)	Right Side Slope (ft/ft)	Manning's N-Value	Normal Depth[1] (ft)	Flow Vel.[1] (fps)	Froude No.[1]	Vel. Head[1] (ft)	Energy Head[1] (ft)	Flow Area[1] (sq.ft.)	Top width of Flow[1] (ft)
F	0+00	1+40	594	0.002	35	3	2	0.040	3.81	3.50	0.348	0.19	4.00	169.86	54.07
F	1+40	3+65.4	221	0.002	20	3	2	0.040	2.88	2.82	0.329	0.12	3.01	78.50	34.42
F	3+65.4	6+33.7	221	0.002	15	3	2	0.040	3.27	2.91	0.330	0.13	3.40	75.86	31.36
F	6+33.7	13+15.4	35	0.002	15	3	2	0.040	1.18	1.65	0.289	0.04	1.22	21.20	20.90
F	13+15.4	16+15.1	35	0.002	12	3	2	0.040	1.32	1.73	0.291	0.05	1.37	20.29	18.62
F	16+15.1	17+61.4	35	0.002	12	3	2	0.040	1.32	1.73	0.291	0.05	1.37	20.29	18.62
G	0+00	1+80.3	179	0.001	12	3	3	0.015	2.23	4.28	0.589	0.29	2.52	41.79	25.41
G	1+80.3	7+22.9	179	0.001	12	3	3	0.015	2.23	4.28	0.589	0.29	2.52	41.79	25.41
G	7+22.9	10+93.9	33	0.001	0	3	3	0.015	1.93	2.96	0.531	0.14	2.06	11.16	11.57
H	0+00	0+98.2	270	0.002	12	3	3	0.015	2.31	6.17	0.836	0.59	2.90	43.76	25.87
H	0+98.2	2+72.6	270	0.002	12	3	3	0.015	2.31	6.17	0.836	0.59	2.90	43.76	25.87
H	2+72.6	5+71.7	270	0.002	12	3	3	0.015	2.31	6.17	0.836	0.59	2.90	43.76	25.87
H	5+71.7	8+26.5	25	0.002	0	3	3	0.040	2.21	1.71	0.287	0.05	2.25	14.61	13.24
H	8+26.5	8+73.2	25	0.002	0	3	3	0.040	2.21	1.71	0.287	0.05	2.25	14.61	13.24
I	-1+16.0	0+00	41	0.001	0	3	3	0.015	2.09	3.12	0.538	0.15	2.24	13.13	12.55
I	0+00	0+25.6	41	0.001	0	3	3	0.015	2.09	3.12	0.538	0.15	2.24	13.13	12.55
I	0+25.6	4+55.3	41	0.001	0	3	3	0.015	2.09	3.12	0.538	0.15	2.24	13.13	12.55
I	4+55.3	6+14.9	41	0.001	0	3	3	0.015	2.09	3.12	0.538	0.15	2.24	13.13	12.55

Note:
1) Calculations were performed using the HYDROCALC HYDRAULIC FOR WINDOWS Computer Program developed by Dodson and Associates (Version 1.2a, 1996).
2) Refer to Attachment 6A.3 for channel locations.
3) Flow rates are taken from HEC-1 model. See HEC-1 Output-Post Development Conditions in Attachment 6A-A.

Example Calculation: Calculate the normal depth for Channel C between stations 2+59.2 and 9+02.7.

List of Symbols

Q_d = design flow rate for channel, cfs
R = hydraulic radius, ft
n = Manning's roughness coefficient
S = channel slope, ft/ft
b = bottom width of channel, ft
z = z-ratio (ratio of run to rise for channel sideslope)
A_f = flow area, sf
g = gravitational acceleration = 32.2 ft/s^2
T = top width of flow, ft
d = normal depth of channel, ft

The program uses an iterative process to calculate the normal depth of the channel to satisfy Manning's Equation

$$Q = \frac{1.486}{n} A R^{0.67} S^{0.5}$$

Design Inputs:

Q_d =	1090	cfs (from 25 year, 24-hour storm HEC-1 analysis, Attachment 6A-A)
S =	0.002	ft/ft
b =	25	ft
z =	2	(H) : 1 (V)
n =	0.04	

Step 1 - Based on the geometry of the channel cross-section, solve for R and A_f

$$R = \frac{bd + zd^2}{b + 2d(z^2 + 1)^{0.5}}$$

$$A_f = bd + zd^2$$

assume: d = 6.38 ft

R = 4.500 ft

A_f = 240.78 sf

solve for Q Q = 1090

if Q is not equal to Q_d, select a new d and repeat calculations

Step 2 - solve for velocity, T, Froude number, velocity head, and energy head

$Q = VA \Rightarrow \quad V = Q/A$

$V = \quad 4.53 \text{ ft/s}$

$T = b + 2(z \times d)$

$T = \quad 50.51 \text{ ft}$

$$F_r = \frac{V}{(gA/T)^{0.5}}$$

$F_r = \quad 0.366$

$$\text{Velocity Head} = \frac{V^2}{2g}$$

Velocity Head = 0.32 ft

Energy Head = water elevation + velocity head

Energy Head = d 6.70 ft

PERIMETER CHANNEL EROSION CONTROL DESIGN

Channel erosion controls have been designed for flow velocities resulted from the 25-year frequency flow rates. The 100-year flow rate was selected to provide a conservative design (i.e., if designed for the 100-year storm event, the channel erosion protection will be more than adequate for the 25-year storm event). As shown on pages 6A-B.1-2 and 6A-B.1-3 velocities in the perimeter channels range from 1.11 ft/s to 7.16 ft/s. The channel lining needed to protect against erosive velocities is shown on Attachments 6A.4 through 6A.12.

The following was used to select the type of channel lining material.

- Vegetation – used in all areas where velocities are less than 5 ft/s for channels.
- 2' Thick Gabions – used at chute discharges in channels and detention ponds (see Attachment 6A-C – Final Cover Erosion Control Structure Design).
- 4" Thick Concrete – used with 6x6xW4.5xW10 welded wire fabric or equivalent will be installed to certain channels. Locations of concrete channel lining are presented in Attachment 6A.

Channel lining details are presented on Attachment 6A.15.

Permitted Condition
Tailwater Depth at Low Level Outlet Summary

Outlet	Downstream Invert Elevation of Low Water Outlet	Flow in HCFCD Unit at Low Water Outlet	Tailwater Depth (ft)/Elevation (ft-msl) in HCFCD Unit Low Water Outlet
		Flow that Coincides With Pond Peak Flow	Depth/Elevation that Coincides with Pond Peak Flow
NWP (DCP-1)	36.1 ft-msl	77 cfs @ 16:05	2.33/37.25
NP (DCP-3)	34.0 ft-msl	1,522 cfs @ 16:05	9.58/41.53
NEP (DCP-4)	25.25 ft-msl	25,980 cfs @ 16:05	40.11/31.43
DCP-5	28.50 ft-msl	26,428 cfs @ 16:10	38.75/30.97
EP (DCP-6)	27.35 ft-msl	26,428 cfs @ 16:10	38.70/30.92
SEP (DCP-7)	23.0 ft-msl	26,428 cfs @ 16:10	40.22/30.69
SP-2 (DCP-8)	26.0 ft-msl	3,604 cfs @ 16:15	18.26/37.40
SP-1 (DCP-9)	28.0 ft-msl	3,604 cfs @ 16:10	17.61/37.80
SWP (DCP-10)	NA[1]		

[1] Low water outlets for the Southwest Pond have been removed as part of the approved HCFCD pond designs.
[2] Flow rates and elevations taken from HCFCD HEC-RAS model.
[3] Flow depth calculations performed using the HYDROCALC HYDRAULICS program developed by Dodson and Associates (Version 1.2a, 1996).

Proposed Condition
Tailwater Depth at Pond Low Level Outlet Summary

Outlet	Downstream Invert Elevation of Low Water Outlet	Flow in HCFCD Unit at Low Water Outlet	Tailwater Depth (ft)/Elevation (ft-msl) in HCFCD Unit Low Water Outlet
		Flow that Coincides With Pond Peak Flow	Depth/Elevation that Coincides with Pond Peak Flow
NWP (DCP-1)	36.1 ft-msl	77 cfs @ 16:05	1.58/36.50[3]
NP (DCP-3)	34.0 ft-msl	1,507 cfs @ 16:05	9.54/41.39
NEP (DCP-4)	25.25 ft-msl	25,968 cfs @ 16:05	40.30/31.62
DCP-5	27.50 ft-msl	26,416 cfs @ 16:10	38.76/30.98
EP (DCP-6)	27.35 ft-msl	26,416 cfs @ 16:10	38.76/30.98
SEP (DCP-7)	23.0 ft-msl	26,416 cfs @ 16:10	40.22/30.69
SP-2 (DCP-8)	26.0 ft-msl	3,525 cfs @ 16:15	17.49/37.17
SP-1 (DCP-9)	28.0 ft-msl	3,566 cfs @ 16:10	18.24/37.38

[4] Low water outlets for the Southwest Pond have been removed as part of the approved HCFCD pond designs.
[5] Flow rates and elevations taken from HCFCD HEC-RAS model.
[6] Flow depth calculations performed using the HYDROCALC HYDRAULICS program developed by Dodson and Associates (Version 1.2a, 1996).

Purpose: Demonstrate that the detention pond outlet structure designs are adequate to convey runoff from the various subbasins to their discharge points.

Method:
1. Use the 25-year and 100-year, 24-hour flow rates and water surface elevations for the drainage areas that will discharge to each detention pond from the HEC-1 analysis (see Attachment 6A-A).
2. Use the Weir Equation to calculate the flow rate over the spillways as appropriate.

Solution:

	NWPOND (DCP-1)	NPOND (DCP-3)	NEPOND (DCP-4)	NE V-DITCH (DCP-5)	EPOND (DCP-6)	SEPOND (DCP-7)	SPOND1 (DCP-8)	SPOND2 (DCP-9)
Bottom ELEV, ft	37.54	36.31	26.00	28.70	28.60	25.00	27.00	30.00
Spillway ELEV, ft	42.5	42.0	32.0	32.5	32.0	29.5	35.0	37.0
Spillway Length, ft	30	130	80	50	80	60	75	80
Top of Road/Berm, ft	46.0	42.0	35.0	33.0	33.0	30.0	38.0	36.0
Discharge Pipe Invert ELEV, ft	37.54	36.31	26.00	28.69	28.60	25.00	27.00	30.00
Peak Inflow Q_{25}, cfs	378	796	189	41	270	594	318	452
Peak Inflow Q_{100}, cfs	525	1126	263	50	374	817	442	649
Peak Outflow Q_{25}, cfs	312	723	43	27	246	393	82	210
Peak Outflow Q_{100}, cfs	415	942	194	42	203	564	75	415
Peak Stage in Pond Q_{25}, ft	44.3	43.1	32.2	32.7	32.6	30.3	34.2	37.2
Peak Stage in Pond Q_{100}, ft	45.1	43.9	32.9	32.9	32.8	33.6	39.6	39.3
Est. Flow (Q_{25}) over Spillway, cfs	191.3	395.9	18.9	11.8	98.2	113.3	--	18.9
Est. Flow (Q_{100}) over Spillway, cfs	332.0	898.8	180.3	33.4	151.1	564.0	75.0	415.0
Velocity (Q_{25}) over Spillway, fps	4.01	3.26	1.18	1.18	2.27	2.66	--	1.18
Velocity (Q_{100}) over Spillway, fps	4.84	4.47	2.87	1.77	2.68	4.85	2.09	3.94

Note:
1) Details of the pond outlet structure are presented on Attachments 6A.18 through 6A.30. As shown, gabions are provided for both upstream and downstream of the spillways.
2) The flow over the spillway is estimated either using the formula $Q = CLH^{3/2}$ where C = 2.64, L is the length of the spillway in feet, and H is the head on the spillway in feet, by subtracting the capacity of low level outlet from the peak flow. The flow over the spillway conservatively assumes no flow through the low water outlet.
3) Calculations for velocity over the spillway were performed using the HYDROCALC HYDRAULIC FOR WINDOWS Computer Program developed by Dodson and Associates (Version 1.2a, 1996).

Requried: Determine the minimum length and median diameter of riprap required at the detention pond outlet structures to control erosion in the detention pond outlet channels.

Reference:
1. Haan, Barfield, and Hayes, *Design Hydrology and Sedimentology for Small Catchments*, 1994.
2. Dodson's and Associates, Inc., *ProHec-1 Plus Program Documentation*, 1995.

Solution: The riprap will be designed for the 100-year flow rates at the detention pond outlet structures. The flow at the outlet stuctures can be divided into two categories:

1. Flow over the Spillway

As shown on page 6A-B-2, the following detention ponds are expected to have flow over their spillways. The expected flow rates over the spillway are calculated based on the pond water surface elevation provided in the HEC-1 analysis (see Attachment 6A-A) and the design of the outlet structure provided in Attachments 6A.26 through 6A.30. The flow rate, unit flow rate and flow velocity over the pond spillways are summarized below.

Flow Structure	25-Year Flow Rate (cfs)	100-Year Flow Rate (cfs)	25-Year Unit Flow Rate (cfs/ft)	100-Year Unit Flow Rate (cfs/ft)	25-Year Spillway Velocity (ft/s)	100-Year Spillway Velocity (ft/s)
NWPOND	191.3	332.0	3.83	6.64	4.01	4.84
NPOND	395.9	898.8	7.92	17.98	3.26	4.47
NEPOND	18.9	180.3	0.38	3.61	1.18	2.87
NE V-DITCH	11.8	33.4	0.24	0.67	1.18	1.77
EPOND	98.2	151.1	1.96	3.02	2.27	2.68
SEPOND	113.3	564.0	2.27	11.28	2.66	4.85
SPONDI	--	75.0	--	1.50	--	2.09
SPOND2	18.9	415.0	0.38	8.30	1.2	3.94

2. Flow through the Low Water Outlet

The flow rate through the low water outlet (LWO) is summarized below.
Actual tailwater depths for each outlet structure for the LWO was used (See Attachment 6A-B.2B for detailed tailwater calculations). All water above the spillway elevation was assumed to pass over the spillway.

Flow Structure	Pond Bottom Elev (ft-msl)	LWO Invert Elev. Upstream (ft-msl)	LWO Invert Elev. Downstream (ft-msl)	LWO[3] Diameter (in)	25-Year Flow Rate[2] (cfs)	100-Year Flow Rate[2] (cfs)	25-Year Outlet Velocity[1] (ft/s)	100-Year Outlet Velocity[1] (ft/s)
NWPOND	37.54	37.54	36.05	36	121	83	17.1	11.7
NPOND	36.31	36.31	34.00	36	327	43	46.3	6.1
NEPOND	26.00	26.00	25.25	18	24	13.70	13.6	7.8
NE V-DITCH	28.70	28.69	28.50	12	15	8.60	19.1	11.0
EPOND	28.60	28.59	27.35	(2) 30	148	51.90	10.9	8.4
SEPOND	25.00	25.00	23.00	(3) 48	280	0.00	14.8	0.0
SPONDI	30.00	30.00	28.00	36	82	0.00	11.6	0.0
SPOND2	27.00	27.00	26.00	(2) 36	191	0.00	6.8	0.0

[1] Velocities through the low water outlet was calculated using the HYDROCALC HYDRAULICS FOR WINDOWS program developed by Dodson and Associates (Version 1.2a, 1996).

[2] The flowrates were calculated using the HYDROCALC HYDRAULICS FOR WINDOWS program developed by Dodson and Associates (Version 1.2a, 1996).

[3] For multiple pipe Low Water Outlets (LOWs), spacing between pipes is 0.5 feet.

The flow through the LWO is greater than the flow over the spillway on a unit width basis. Therefore, the flow rate used for riprap design will be the flow passing through the LWO.

The nomograph used for design of the length of the riprap and the median diameter are shown on pages 6A-B.2A-5 through 6A-B.2A-7 (Figure 5.25).

The minimum riprap length and median rock diameter for each outlet is summarized below. The length of the riprap is increased by 20 percent to provide for a conservative design.

Pond	Total flow in LWO (cfs)	Riprap Length (ft)	Adjusted Length L x 1.2 (ft)	Median Rock Diameter (ft)
NWPOND	83	28	34	0.9
NPOND	43	10	12	0.4
NEPOND	13.7	10	12	0.5
NE V-DITCH	8.6	11	13	0.6
EPOND	51.9	20	24	1.8
SEPOND	N/A	55	66	2.3
SPOND1	N/A	30	36	1.0
SPOND2	N/A	43	52	1.9

[1] Erosion Protection for the Southwest Pond is provided by the existing concrete outlet structure.

Apron width (W) for ponds with signle pipe LWO:
W = LWO diameter + 0.4 * (Adjusted RipRap Length)

Apron width (W) for ponds with multiple pipe LOW:
W=(Number of LWOs * LWO diameter) + 0.5 *(Number of LWOs-1) + 0.4*(Adjusted RipRap Length)
Note: 0.5 feet is the spacing between LOW pipes.

Pond	W (ft)
NWPOND	16.4
NPOND	7.8
NEPOND	6.3
NE V-DITCH	6.3
EPOND	15.1
SEPOND	39.4
SPOND1	17.4
SPOND2	27.3

The riprap will be provided over the entire width of the spillway of all the ponds because of the expected 100-year flow over the spillway.

The median diameter of riprap is intended to determine the minimum diameter of the riprap that will be used. As alternative, 2-foot thick gabions can be used.

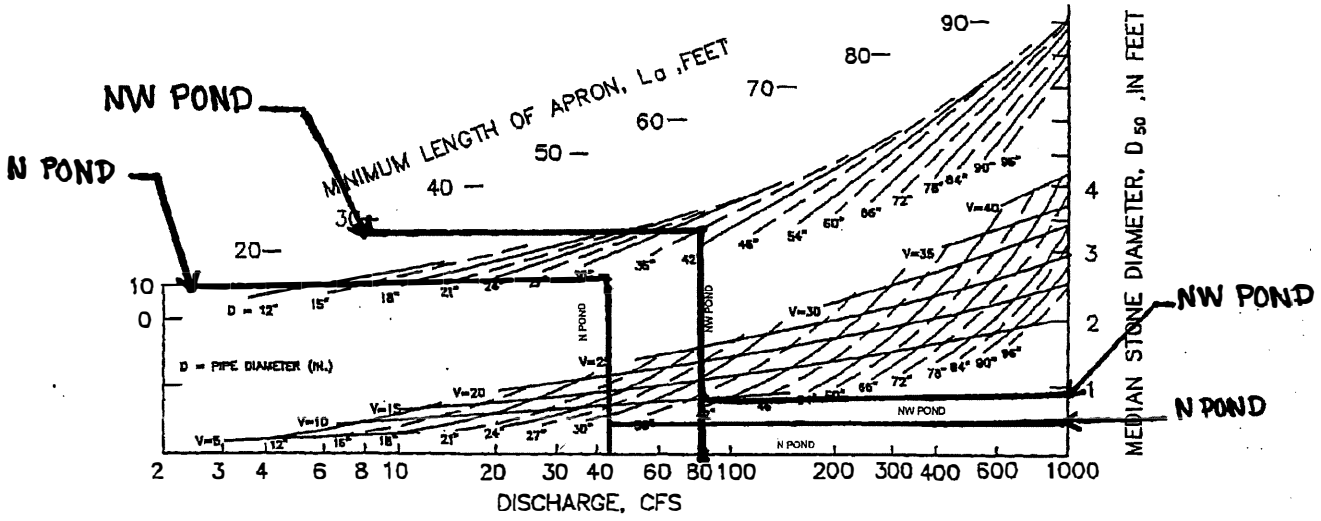


Figure 5.24 Design of outlet protection—minimum tailwater condition, $T_w < 0.5D$ (Environmental Protection Agency, 1976).

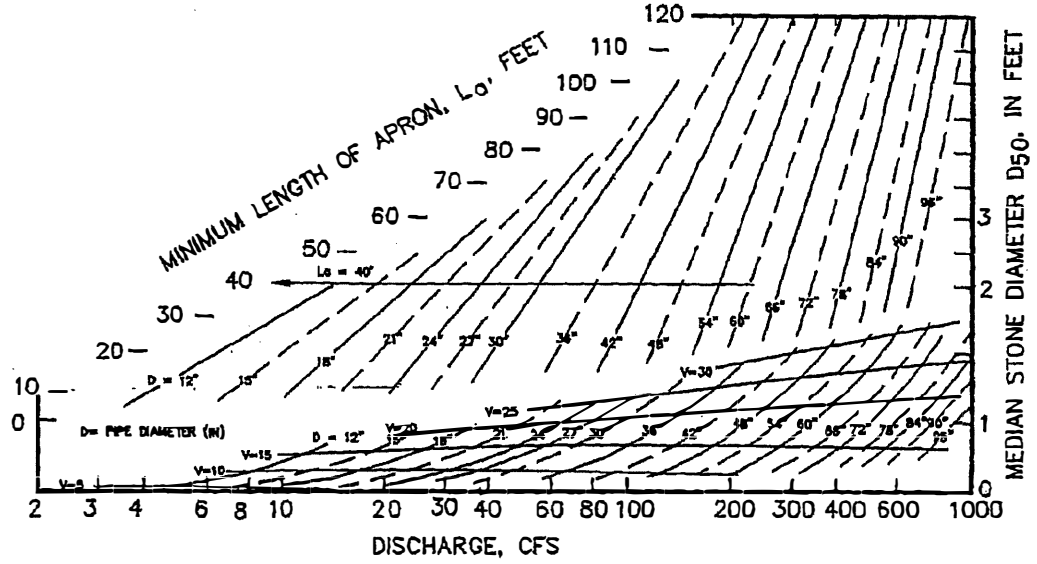


Figure 5.25 Design of outlet protection—maximum tailwater condition, $T_w \geq 0.5D$ (Environmental Protection Agency, 1976).

into the riser 3 ft below its top, what discharge will pass through the four holes with the water level at 1, 2, 4, and 8 ft above the riser? (c) What is the total discharge through the pipe? (d) How might the orifices be sized to provide better stormwater control? (e) Explain whether you would expect two rows (each consisting of four holes) of 8-in.-diameter holes to provide better results? Assume that one row is 2 ft below the riser invert and the other row is 4 ft below the riser invert.

(5.6) A gravel roadway is constructed in a low-lying area such that the roadway is frequently overtopped as a result of severe storms. The roadway is 40 ft wide, and its elevation is 36 ft. (a) If the water level upstream of the roadway is 2 ft above the crest of the roadway, what is the discharge across the roadway? (b) If the roadway is paved, what upstream depth would be required to carry the same flow? (c) Would paving reduce flooding problems?

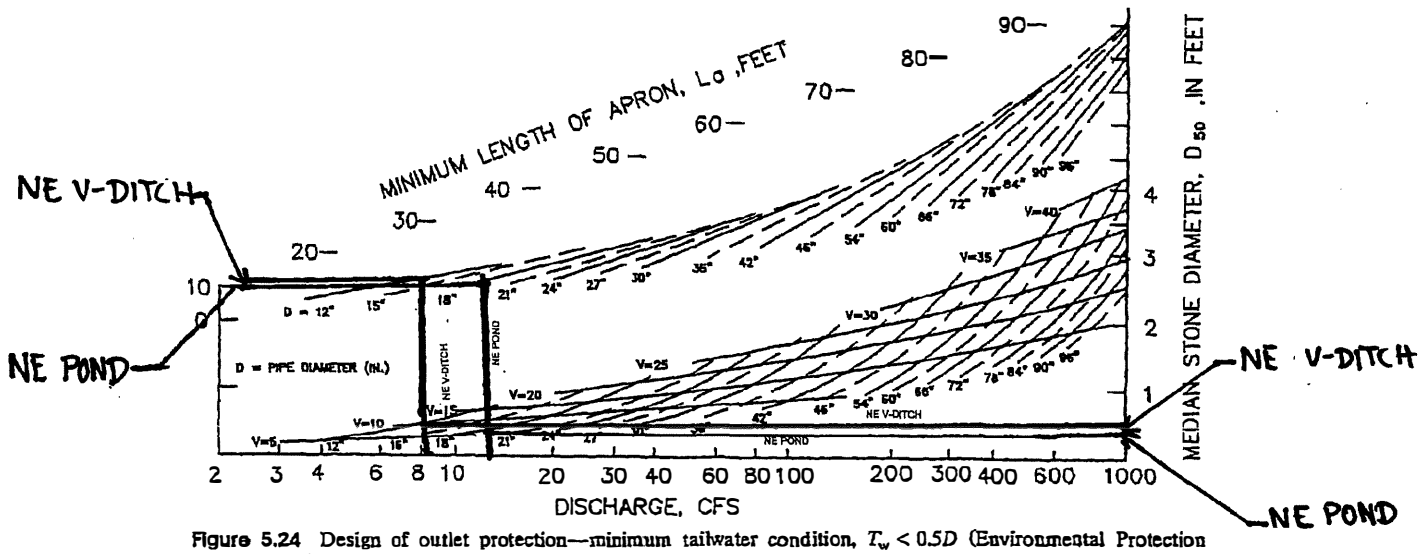


Figure 5.24 Design of outlet protection—minimum tailwater condition, $T_w < 0.5D$ (Environmental Protection Agency, 1976).

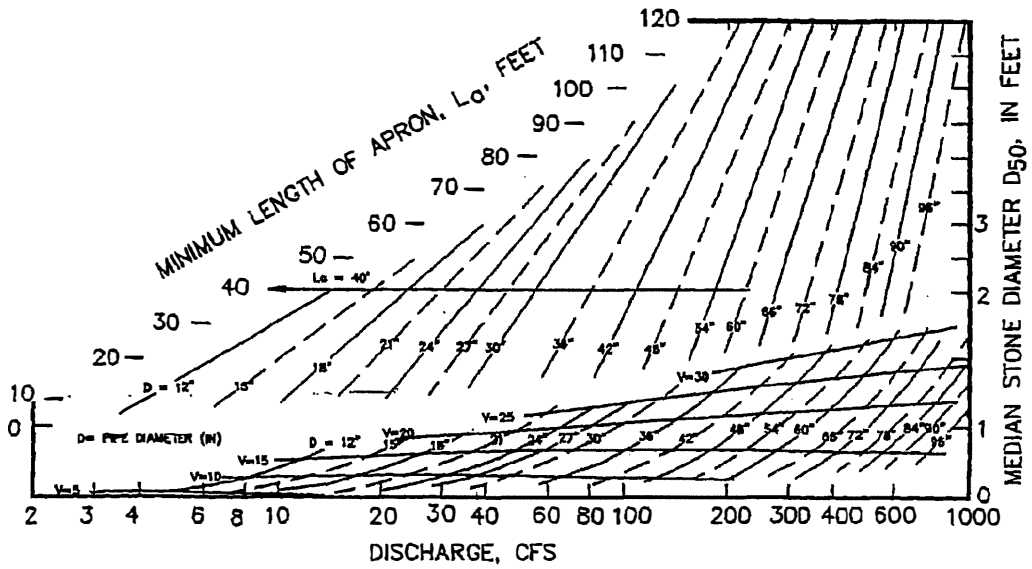


Figure 5.25 Design of outlet protection—maximum tailwater condition, $T_w \geq 0.5D$ (Environmental Protection Agency, 1976).

into the riser 3 ft below its top, what discharge will pass through the four holes with the water level at 1, 2, 4, and 8 ft above the riser? (c) What is the total discharge through the pipe? (d) How might the orifices be sized to provide better stormwater control? (e) Explain whether you would expect two rows (each consisting of four holes) of 8-in.-diameter holes to provide better results? Assume that one row is 2 ft below the riser invert and the other row is 4 ft below the riser invert.

(5.6) A gravel roadway is constructed in a low-lying area such that the roadway is frequently overtopped as a result of severe storms. The roadway is 40 ft wide, and its elevation is 36 ft. (a) If the water level upstream of the roadway is 2 ft above the crest of the roadway, what is the discharge across the roadway? (b) If the roadway is paved, what upstream depth would be required to carry the same flow? (c) Would paving reduce flooding problems?

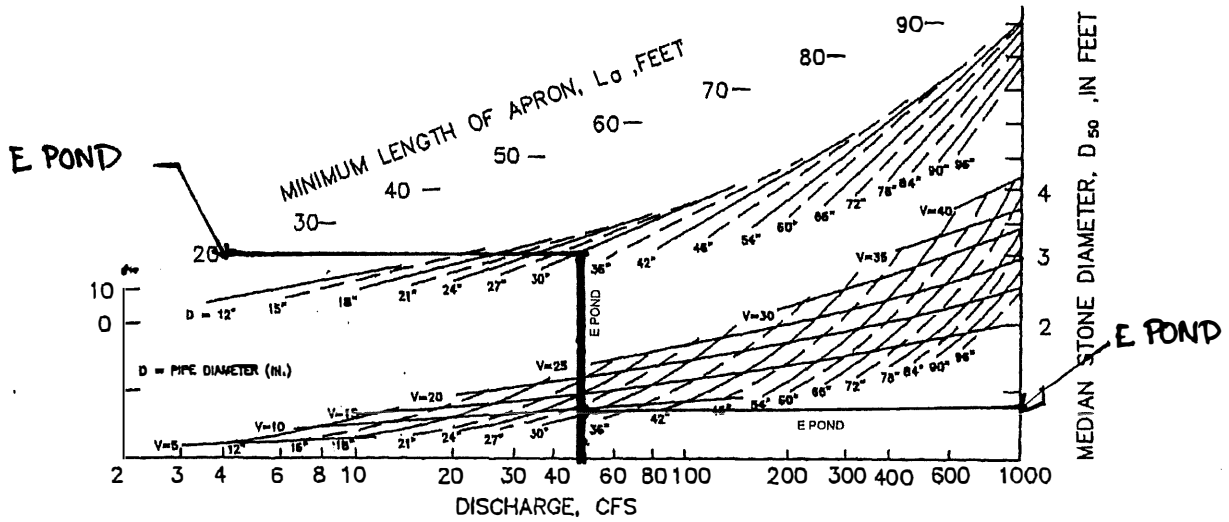


Figure 5.24 Design of outlet protection—minimum tailwater condition, $T_w < 0.5D$ (Environmental Protection Agency, 1976).

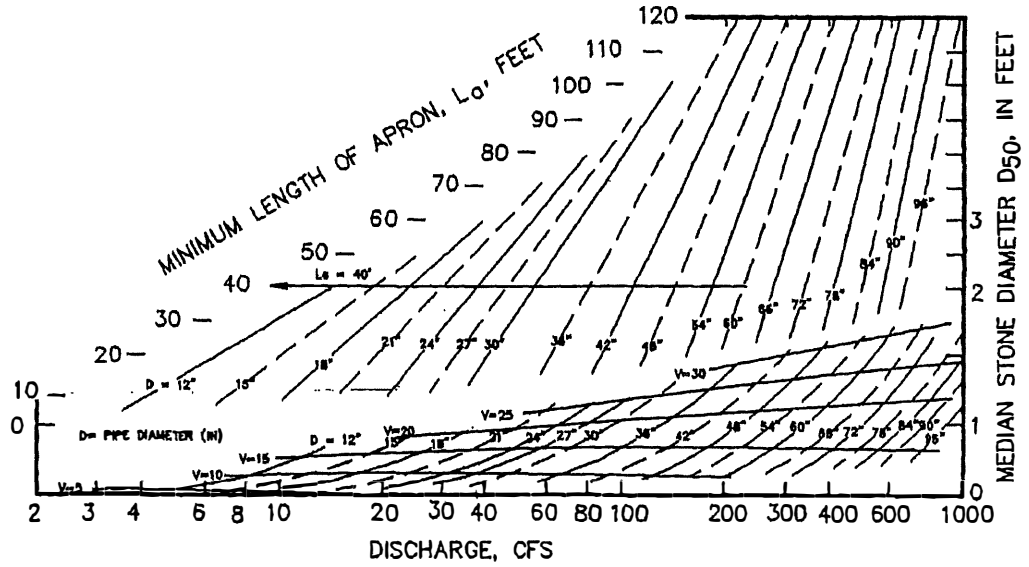


Figure 5.25 Design of outlet protection—maximum tailwater condition, $T_w \geq 0.5D$ (Environmental Protection Agency, 1976).

into the riser 3 ft below its top, what discharge will pass through the four holes with the water level at 1, 2, 4, and 8 ft above the riser? (c) What is the total discharge through the pipe? (d) How might the orifices be sized to provide better stormwater control? (e) Explain whether you would expect two rows (each consisting of four holes) of 8-in.-diameter holes to provide better results? Assume that one row is 2 ft below the riser invert and the other row is 4 ft below the riser invert.

(5.6) A gravel roadway is constructed in a low-lying area such that the roadway is frequently overtopped as a result of severe storms. The roadway is 40 ft wide, and its elevation is 36 ft. (a) If the water level upstream of the roadway is 2 ft above the crest of the roadway, what is the discharge across the roadway? (b) If the roadway is paved, what upstream depth would be required to carry the same flow? (c) Would paving reduce flooding problems?

DISCHARGE POINT DCP-1

Required: Determine the tailwater depth.

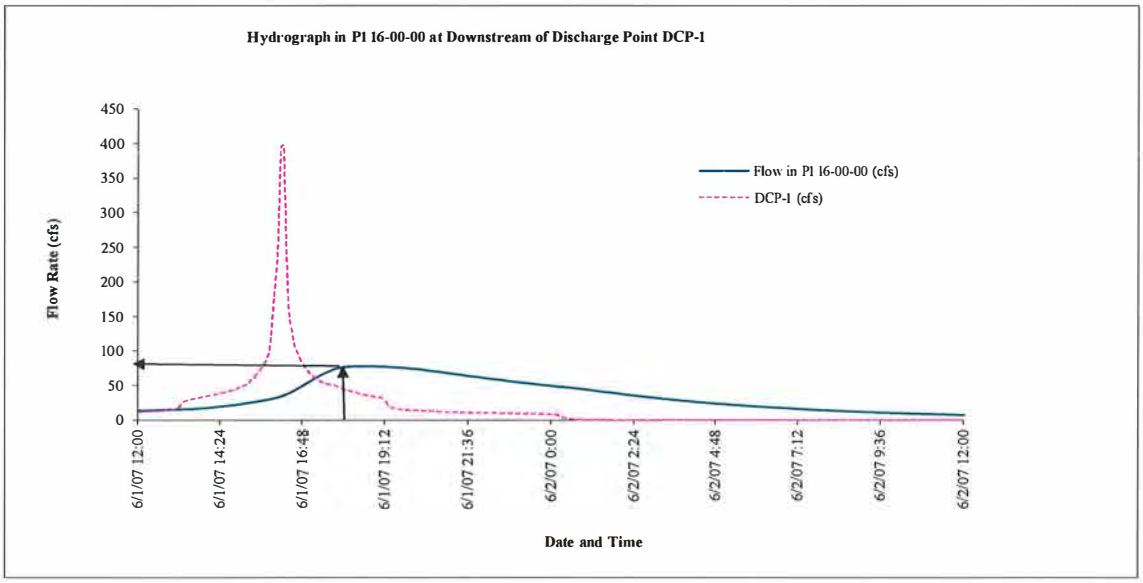
Solution:

1. Determine peak flow that is discharged from the site at DCP-1.

   Q= 396 cfs at Time= 6/1/07 16:10

   Peak discharge rate was determined from the hydrograph of this discharge point in the HEC-HMS file for the permitted conditions regional analysis (Attachment 6A-E).

2. The hydrograph in Pl 16-00-00 along with the pond discharge hydrograph at the DCP-1 are shown below.



   As shown above, the peak flow in Pl 16-00-00 at this discharge point is 77 cfs at 6/1/07 16:05. The corresponding flow rate in Pl 16-00-00 at 16:10 is 35 cfs. The water surface level in P116-00-00 at this location has been estimated for these flow rates.

3. Using Hydrocalc, the depth of the flow in P116-00-00 at this discharge point is 2.33 feet (Refer to page 6A-B.2B1).

McCARTY ROAD LANDFILL
0120-439-11-125-03
HYDRAULIC CALCULATIONS FOR HCFCD DITCH P116-00-00

PERMITTED CONDITION - P116 PEAK FLOW RATE

Station[2]		Flow Rate[3] (cfs)	Bottom Slope (ft/ft)	Manning's n-value	Side Slope (left)	Side Slope (right)	Bottom Width (ft)	Normal Depth (ft)	Flow Vel. (fps)	Froude No.	Velocity Head (ft	Energy Head (ft)	Flow Area (sq. ft.)	Top Width of Flow (ft)
15+97.6	23+50	1522	0.0010	0.03	3	3	6	9.58	4.58	0.353	0.33	9.90	332.49	63.45
23+50	25+00	396	0.0010	0.03	3	3	6	5.44	3.26	0.324	0.17	5.60	121.40	38.64
25+00	36+55	396	0.0016	0.03	3	3	6	4.91	3.89	0.404	0.23	5.15	101.87	35.47
36+55	44+54.3	77	0.0016	0.03	3	3	6	2.33	2.55	0.365	0.10	2.43	30.20	19.96

Notes: [1] Calculations were performed using the HYDROCALC HYDRAULICS program developed by Dodson and Associates (Version 1.2a, 1996).

[2] Refer to Sheet 6A-B.2B1-40 for channel station locations.

[3] Flow rates obtained from HEC-HMS hydraulic calculations given in Appendix 6A-A.

DISCHARGE POINT DCP-3

Required: Determine the tailwater depth.

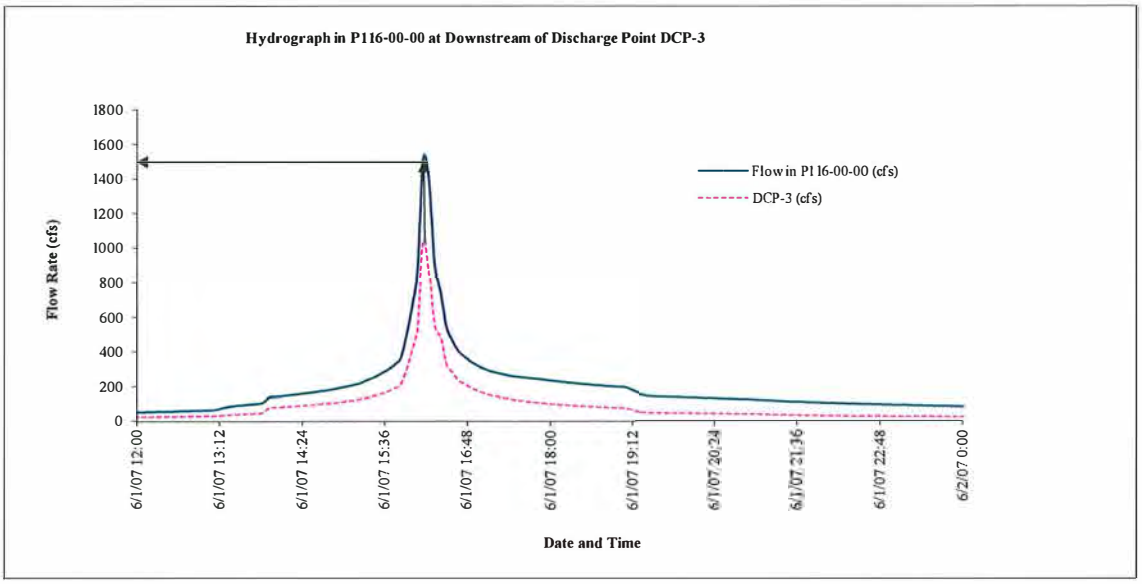
Solution:

1. Determine peak flow that is discharged from the site at DCP-3.

   Q= 1130 cfs at Time= 6/1/07 16:05

   Peak discharge rate was determined from the hydrograph of this discharge point in the HEC-HMS file for the permitted conditions regional analysis (Attachment 6A-E).

2. The hydrograph in P116-00-00 along with the pond discharge hydrograph at the DCP-3 are shown below.



   As shown above, the peak flow in P116-00-00 at this discharge point is 1,522 cfs at 6/1/07 16:05 The water surface level in P116-00-00 at this location has been estimated for this flow.

3. Using Hydrocalc, the depth of the flow in P116-00-00 at this discharge point is 9.58 feet (Refer to page 6A-B.2B1-4).

SUMMARY OF FLOW ELEVATIONS IN HCFCD UNIT P114-00-00 (SOUTH DITCH)

The following summarizes water surface elevations at discharge spillways that convey flow from the site to HCFCD Unit P114-00-00. Discharge flow rates are taken from the permitted condition HEC-HMS program output included in Attachment 6A-E (Regional Permitted Condition HEC-HMS). Flow elevations in HCFCD Unit P114-00-00 have been estimated by using HEC-RAS (see pages 6A-B.2B1-11 through 6A-B.2B1-26). HEC-RAS model was obtained from HCFCD in May 2024.

Discharge Point	Flow Line Elevation at Spillway (ft-msl)	Peak Discharge and Time (cfs @ hr)	Water Surface Elevation at Spillway at Pond Peak (ft-msl)	Flow in P114-00-00 (cfs) at Pond Peak	Peak Water Surface[1] Elevation in P114-00-00 (ft-msl)
DCP-8	26.0	180 @ 16:05	38.27	3,529 @ 16:15	37.37
DCP-9	28.0	461 @ 16:10	39.05	3,564 @ 16:10	37.76

[1] Refer to HEC-RAS output file stations 4258.749 and 5175.881 for water surface elevations for DCP-8 and DCP-9, respectively. Refer to Attachment 6C for the station locations.

HEC-RAS HEC-RAS 6.3.1 September 2022
U.S. Army Corps of Engineers
Hydrologic Engineering Center
609 Second Street
Davis, California

```
X     X  XXXXXX    XXXX        XXXX       XX      XXXX
X     X  X        X    X      X   X     X  X    X
X     X  X        X           X   X    X    X   X
XXXXXXX  XXXX     X       XXX  XXXX     XXXXXX    XXXX
X     X  X        X           X  X     X    X        X
X     X  X        X    X      X   X    X    X        X
X     X  XXXXXX    XXXX       X    X   X    X   XXXXX
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PROJECT DATA
Project Title: Updated Permitted P114-00-00
Project File : UpdatedPP114-00-00.prj
Run Date and Time: 7/5/2024 2:12:22 PM

Project in English units

Project Description:
& RHCFCD Unit P114-00-00
(Flood Hazard, Flood Way) Model
10, 2, 1, .2%
Event
Filename P114-00-00.prj
Prepared by: Jones & Carter, Inc.   Date:
7-10-02
Reviewed by: Date:
STATUS (Final RAS)

PLAN DATA

Plan Title: Updated Natural
Plan File : p:\Solid waste\Allied\McCarty Road\Flip MOD 2024\Drainage\TCEQ\HEC-RAS\UpdatedPP114-00-00.p03

Geometry Title: P114-00-00 June 2007
Geometry File : p:\Solid waste\Allied\McCarty Road\Flip MOD
2024\Drainage\TCEQ\HEC-RAS\UpdatedPP114-00-00.g01

Flow Title   : Updated Permitted Natural
Flow File   : p:\Solid waste\Allied\McCarty Road\Flip MOD
2024\Drainage\TCEQ\HEC-RAS\UpdatedPP114-00-00.f04

Plan Summary Information:
Number of: Cross Sections =   20   Multiple Openings =   0
            Culverts   =   1   Inline Structures =   0
            Bridges   =   3   Lateral Structures =   0

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

Computation Options
    Critical depth computed only where necessary
    Conveyance Calculation Method: At breaks in n values only

```
    Friction Slope Method:         Average Conveyance
    Computational Flow Regime:     Subcritical Flow

Encroachment Data
   Equal Conveyance = True
   Left Offset      =        0
   Right Offset     =        0

River = P1140000         Reach = 1
RS      Profile           Method  Value1  Value2
14614.86100yr                  1  227.78  294.75
14517.75100yr                  1  871.02  976.09
14292.71100yr                  1  891.43  963.39
13931.6 100yr                  1  871.48 1822.07
13888.14100yr                  1  885.92 1478.72
13593.44100yr                  1  902.97  949.06
13276.85100yr                  1  880.09  963.35
12695.9 100yr                  1 1094.63 1146.15
12036.8 100yr                  1  221.78  311.91
11935.8 100yr                  1  221.78  592.26
11883.54100yr                  1  484.49  592.26
10795.36100yr                  1  148.65  261.25
9778.381100yr                  1 2803.54 2948.92
8639.564100yr                  1 2884.08 3017.74
7456.247100yr                  1 2546.99 2685.52
7378.25 100yr                  1 2546.99 3083.73
7322.337100yr                  1 2941.53 3083.73
7254.24 100yr                  1 2942.49 3094.51
6574.37 100yr                  1 2376.17 2532.98
5940.168100yr                  1 2144.81 2303.21
5864.17 100yr                  1  2124.4 2303.21
5834.053100yr                  1  2124.4 2259.23
5175.881100yr                  1 2063.25 2209.23
4258.749100yr                  1 1973.42 2148.32
3645.18 100yr                  1   74.89  174.36
3614.18 100yr                  1    59.3  186.26
3591.3  100yr                  1    59.3  186.26
3570.41 100yr                  1    59.3  186.26
3549.434100yr                  1    59.3  186.26
3448.434100yr                  1    59.3  314.46
3349.25 100yr                  1  197.37  314.46
3325.375100yr                  1  197.37  314.46
2644.691100yr                  1  167.33  293.07
580.3   100yr                  1  204.92  340.64

River = P1140000         Reach = P114-00-00_0006
RS      Profile           Method  Value1  Value2
11883.54100yr                  1  484.49  592.26
10795.36100yr                  1  148.65  261.25
9778.381100yr                  1 2803.54 2948.92
8639.564100yr                  1 2884.08 3017.74
7456.247100yr                  1 2546.99 2685.52
7378.25 100yr                  1 2546.99 3083.73
7322.337100yr                  1 2941.53 3083.73
7254.24 100yr                  1 2942.49 3094.51
6574.37 100yr                  1 2376.17 2532.98
5940.168100yr                  1 2144.81 2303.21
5864.17 100yr                  1  2124.4 2303.21
5834.053100yr                  1  2124.4 2259.23
5175.881100yr                  1 2063.25 2209.23
4258.749100yr                  1 1973.42 2148.32
3645.18 100yr                  1   74.89  174.36
3614.18 100yr                  1    59.3  186.26
3591.3  100yr                  1    59.3  186.26
3570.41 100yr                  1    59.3  186.26
3549.434100yr                  1    59.3  186.26
3448.434100yr                  1    59.3  314.46
3349.25 100yr                  1  197.37  314.46
3325.375100yr                  1  197.37  314.46
```

2644.691100yr 1 167.33 293.07
580.3 100yr 1 204.92 340.64

FLOW DATA

Flow Title: Updated Permitted Natural
Flow File : p:\Solid waste\Allied\McCarty Road\Flip MOD 2024\Drainage\TCEQ\HEC-RAS\UpdatedPP114-00-00.f04

Flow Data (cfs)

River	Reach	RS	100yr at Pond Peak	100yr
P1140000	P114-00-00_0006	11883.54	751	1080
P1140000	P114-00-00_0006	7322.337	3564	3870
P1140000	P114-00-00_0006	3349.25	3529	4692

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
P1140000	P114-00-00_0006	100yr at Pond Peak		Normal S = 0.002

GEOMETRY DATA

Geometry Title: P114-00-00 June 2007
Geometry File : p:\Solid waste\Allied\McCarty Road\Flip MOD 2024\Drainage\TCEQ\HEC-RAS\UpdatedPP114-00-00.g01

CROSS SECTION

RIVER: P1140000
REACH: P114-00-00_0006 RS: 11883.54

INPUT
Description:
Station Elevation Data num= 145

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	41.43	4.52	41.04	17.12	41.92	24.8	42.87	34.56	43.77
40.71	43.97	49.59	43.83	52.33	43.86	54.98	43.83	77.05	44.03
103.27	43.42	120.23	43.26	143.68	43.26	165.89	44.88	169.77	45.01
183.85	45.6	185.23	45.57	200.91	45.86	213.45	45.94	215.66	45.92
244.89	45.51	258.32	44.91	271.05	44.38	296.02	43.98	322.61	43.11
335.03	42.76	346.57	43.76	356.45	44.7	360.64	44.67	380.21	44.39
399.01	44.96	405.46	45.17	440.34	45.41	446.46	45.27	461.96	44.18
484.49	44.24	485.58	43.93	495.84	42.94	500	41.19	509.13	37.35
509.46	37.21	509.92	36.98	514.16	34.85	514.8	34.56	515.74	34.24
518.97	33.86	522.79	33.5	528.09	33.09	530.77	32.02	544.09	33.3
545.25	33.39	546.31	33.44	547.28	33.31	558.15	31.6	558.18	31.65
560.57	35.48	562.99	33.03	566.18	33.71	567	33.76	567.23	33.85
567.67	33.98	588	43.21	590.88	44.52	592.26	44.5	596.52	44.13
597.61	44.04	599.43	44.1	599.84	44.11	600.61	44.14	604.7	44.27
606.39	44.24	620.9	43.8	642.96	43.5	655.39	43.58	680.95	43.15
692.99	43.63	704.59	43.81	712.64	43.68	751.89	43.27	753.93	43.31
760.28	43.55	771.02	42.39	781.34	42.38	795.96	43.78	801.04	44.34
805.73	44.8	814.14	44.81	834.63	44.51	846.07	44.09	858.44	43.72
863.53	43.15	876.1	43.27	877.98	43.21	891.11	42.12	899.14	42.8
906.88	43.04	970.81	43.51	981.17	43.38	982.1	43.39	1026.21	43.72
1028.59	43.65	1057.25	43.13	1071.24	43.29	1077.11	43.41	1089.43	43.44
1099.74	43.42	1112.39	42.71	1123.62	43.53	1131.29	44.03	1148.58	43.89
1158.32	43.31	1161.31	43.51	1166.96	43.95	1182.98	43.39	1236.68	43.33
1249.76	43.09	1251.38	43.2	1252.54	43.19	1255.77	43.19	1286.07	42.61
1304	42.37	1335.25	42.69	1362.11	42.76	1410.23	41.71	1469.22	41.17
1477.84	41.18	1482.05	41.17	1510.43	42.08	1564.98	42.23	1570.64	42.37

1588.08	41.64	1592.53	41.51	1596.64	41.42	1597.62	41.39	1599.52	41.36
1667.84	41.96	1712.38	41.34	1742.03	41.57	1746.75	41.57	1773.83	41.72
1813.07	42.09	1887.91	41.4	1911.44	41.41	1924.66	41.69	2024.42	41.48

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.06	484.49	.015	592.26	.06

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
484.49	592.26	1087.99	1088.18 1089.02	.3	.5

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
0	77.05	44	1131.29	2024.42	44

CROSS SECTION

RIVER: P1140000
REACH: P114-00-00_0006 RS: 10795.36

INPUT
Description:
Station Elevation Data num= 248

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	41.52	26.23	40.92	33.66	40.79	59.32	41.52	76.63	41.43
113.72	41.27	118.85	41.6	131.21	43.01	132.61	42.9	135.83	42.79
136.85	42.76	147.5	42.44	148.65	41.89	155.62	38.62	160.06	36.54
163.04	35.15	169.89	33.74	179.89	31.86	193.74	31.08	202.04	30.65
205.56	28.67	210.7	29.61	236.36	35.15	242.49	37.25	250.03	40.16
251.39	40.68	261.25	42.36	266.4	43.31	289.19	43.2	289.65	43.19
289.77	43.19	296.44	43.16	308.61	44.43	312.35	44.76	314.04	44.65
348.78	43.96	399.23	43.79	401.15	43.73	402.71	43.7	445.35	43.32
471.58	42.31	479.38	42.3	482.24	42.45	495.32	42.4	525.37	42.5
532.21	42.44	548.88	42.67	566.76	42.36	579.42	42.2	621.51	42.92
624.3	43.02	626.83	43.04	628	43.04	631.21	43.33	656.86	44.89
671.66	42.93	671.88	42.9	672.09	42.9	734.8	42.49	755.44	41.7
770.03	41.31	786.66	42.1	792.02	42.29	797.94	43.34	807.04	44.12
815.3	40.04	822.06	36.41	829.51	32.63	837.08	28.71	840.59	28.54
852.09	26.25	858.27	26.34	867.11	25.8	876.86	28.08	882.13	28.56
886.91	28.37	897.15	26.52	904.96	26.67	921.23	25.97	933.43	25.73
942.2	25.03	955.78	23.91	957.22	24.05	958.52	23.89	972.24	23.7
985.31	22.48	987.16	22.32	987.25	22.32	1014.46	20.75	1017.29	20.67
1018.92	20.44	1032.31	20.85	1044.45	19.22	1047.32	19.25	1048.87	19.33
1075.18	19	1082.06	19.69	1092.38	19.69	1101.74	19.57	1113.63	19.45
1122.41	19.45	1130.38	19.42	1145.2	18.41	1152.45	18.41	1160.99	18.39
1167.47	18.71	1176.09	18.68	1225.87	18.26	1227.54	18.15	1230.63	18.17
1255.69	17.72	1257.57	17.72	1259.28	18.14	1260.83	18.3	1294.34	17.4
1302.63	17.43	1316.56	17.38	1317.64	17.35	1342.95	17.67	1347.68	17.55
1350.4	17.39	1362.7	17.8	1373.85	18.1	1377.71	18.04	1381.97	18.02
1392.73	18.54	1402.49	19.26	1407.75	19.11	1413.54	19.05	1422.77	19.62
1433.66	19.28	1437.78	18.95	1449.05	18.61	1459.78	18.32	1482.84	17.87
1488.42	17.76	1497.86	17.59	1502.75	17.68	1512.87	17.43	1524.04	17.52
1527.89	17.34	1531.39	17.35	1542.91	17.5	1555.6	16.51	1557.93	16.45
1560.03	16.47	1587.17	16.68	1588.33	16.6	1589.33	16.66	1603.38	16.21
1617.32	16.12	1618	16.17	1618.74	16.07	1633.02	15.75	1634.53	15.94
1660.29	15.86	1663.05	15.73	1674.61	17.12	1681.88	15.97	1693.09	15.7
1703.02	15.27	1708.1	15.28	1726.2	17.04	1738.14	17.26	1746.22	17.65
1760.81	19.39	1774.86	19.19	1783.19	19.49	1792.38	25.14	1798.21	27.76
1803.5	28.82	1823.95	36.02	1828.25	38.62	1839.73	41.83	1843.26	42.91
1846.47	42.53	1858.28	40.77	1865.17	41.24	1903.33	42.01	1910.8	42.89
1933.37	39.51	1951.86	39.55	1970.96	40.46	2224.12	41.72	2286.15	42.05
2301.14	42.09	2315.34	42.1	2342.23	41.87	2558.99	41.67	2607.3	41.03
2613.18	41.08	2675.05	41.4	2814.73	42.19	2905.54	41.89	2960.06	41.55
3053.92	41.92	3070.23	42.08	3080.57	41.79	3086.73	40.97	3089.73	40.5
3092.46	40.6	3118.3	41.65	3133.3	42.75	3134.08	42.81	3135.11	42.79
3165.23	39.65	3179.84	39.96	3198.84	41.09	3225.65	41.74	3262.15	41.82
3280.66	41.12	3321.96	40.72	3368.69	41.54	3390.09	41.89	3409.08	41.27
3418.21	41.05	3443	40.53	3456.18	41.4	3502.98	41.57	3538.3	42.17
3542.32	41.98	3567.63	40.58	3582.43	41.58	3597.6	42.64	3611.63	43.01

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 3679.28   41.13 3690.44   40.91 3691.66   40.81 3693.97   40.91 3714.24   42.47
 3769.39   42.06 3787.55      42 3806.69    39.7 3809.54   39.35 3810.58   39.43
 3812.83   39.45  3825.6    39.7 3831.53   40.12 3840.62   38.01 3851.51   38.49
 3855.64   39.25 3865.22   39.22 3880.94   39.38 3885.67   39.54 3892.35   39.38
 3930.72   42.61 3951.76   44.41 3952.72   44.41

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0     .06  148.65     .04  261.25     .06  807.04     .99 1843.26     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        148.65  261.25          1020.21 1016.98 1012.36             .1       .3
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
  807.04 1843.26      43

CROSS SECTION


RIVER: P1140000
REACH: P114-00-00_0006    RS: 9778.381

INPUT
Description:
Station Elevation Data    num=     256
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   40.74   15.92    41.1   17.58   41.14    18.5   41.18  144.69   41.58
  279.29   41.42   288.9   41.24  369.54   41.06  384.89   41.08  436.02   41.34
  444.53   42.67  454.15   42.71   476.9   44.16  484.19   44.31  487.27   44.37
  505.68   43.12  514.23   42.21  518.79   42.21  584.88   42.92  589.35   42.98
  693.25   41.04  703.32   40.78  708.53    40.8  760.93   41.39  939.62   40.92
  960.76   40.97  967.35   40.95  973.74   40.93  977.54   41.16   986.9    40.9
   990.3   40.93  995.28   40.94 1113.38   41.85 1213.28   42.72 1265.35   43.17
 1370.31   42.92 1370.51   42.92 1370.53   42.92 1418.06   41.65 1431.97   41.66
 1466.34   41.89 1501.53   43.05 1559.81   42.97 1632.37   43.13  1640.9   43.46
 1641.51   43.45 1670.95   43.21 1677.63   44.07 1683.96   44.15 1706.34    44.3
 1719.98   44.21 1765.37   42.35 1783.53   42.43 1798.89   42.49  1819.9    43.4
 1836.19   44.25 1842.66   43.44 1857.84   42.54 1874.41   42.27 1900.47   43.13
 1943.59   42.38 1958.29   42.47 1961.71    42.5 1978.76   42.56 2135.84   43.02
 2137.59   43.02 2142.18   43.04 2271.83   43.59 2285.67   42.75 2301.88   41.79
 2330.71   43.63 2341.62   44.72 2403.14   42.76 2419.48   42.32  2425.6   42.58
 2538.82   42.97 2542.13   42.95 2550.92   42.78  2598.6   42.23 2639.56   41.73
 2679.67   41.56 2685.08   41.79 2785.48    41.8 2803.54   41.78 2821.47   38.94
 2827.88   39.05 2840.48    31.3  2842.6   30.64 2852.44   30.04 2858.35   29.77
 2865.09    29.8 2896.86   29.83  2906.3   30.69 2917.62   31.83 2925.81   34.12
 2931.27   35.65 2934.31   36.71 2935.46   37.11 2942.75   39.71 2943.44   39.96
 2947.22   41.31 2948.92   42.01 2950.12   41.92 2954.53   41.79 2963.48   41.48
 2964.07   41.46 2964.29   41.44 2964.55   41.46  3004.2   43.03 3014.77   43.05
 3029.62   42.84 3066.43    42.9 3067.73    42.9 3092.33   45.85 3099.73   46.21
 3120.65   48.85 3140.18   51.09 3146.63   51.33 3150.59   52.14 3157.74    53.4
 3164.66   53.76 3168.67   53.85 3179.43   54.15    3192   54.07 3202.75   53.98
 3213.31   55.83 3217.75   55.81 3255.99   55.57 3267.24   55.52 3277.76   54.92
 3282.76   53.88 3292.76   52.34 3297.88   51.46 3313.75   50.91 3322.76   50.11
 3327.05   49.23 3348.83   46.09 3352.77   46.08 3364.08   46.55 3367.77   45.81
 3371.34   45.34 3382.77   41.83 3419.41    42.9 3427.78    43.1 3430.39   42.84
 3471.81   39.56 3473.42   39.49  3475.6   39.43 3517.79   38.45 3533.72   39.86
 3555.44   41.32 3562.79   41.57 3612.23   42.02  3637.8   42.26 3652.47   40.92
 3652.81   40.82 3653.82   40.29 3667.81   34.86 3669.07   34.32 3682.81   30.45
 3696.11   29.46 3697.81   29.69 3699.57   29.58 3725.63   23.38 3727.82   22.77
 3730.07    22.3 3742.82   21.28 3745.32   20.14 3757.82   17.79  3773.9   11.98
 3782.55    9.06 3787.01    8.43 3788.64    8.34 3792.37    8.05 3804.65    7.56
 3847.51     .17  3847.7     .17 3847.87     .14 3848.04     .12 3848.19     .14
 3852.34      .3 3892.15    2.06 3905.89     .59 3907.22     .64 3907.92     .69
 3909.36     .57  3951.7   -2.96 3960.08   -3.02 3980.77   -3.23 4033.06   -4.13
 4124.64   -5.04 4134.98   -5.28 4155.45    -5.3 4159.08   -4.97 4332.87   -4.97
 4339.36   -5.02 4346.06   -4.53 4354.26   -1.57 4362.53     .04 4373.25     .68
 4401.03   11.53 4415.14   17.07 4418.28   18.21 4432.14   18.24  4448.3   18.23
  4455.5   19.73 4467.45   22.67 4501.53   33.96 4523.36   41.17 4531.97   41.26
 4547.73   41.27 4565.35   43.11 4568.39   43.33 4580.95   41.74 4584.18   41.56
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 4598.41   42.13 4599.29   41.95 4600.14   41.72 4613.42   38.23 4620.45   39.35
 4628.43   40.75 4632.31   40.73 4643.44   40.77 4682.12   41.09 4900.53   42.49
 5065.57   42.84 5097.69   42.76 5138.73   42.39 5236.38    40.8 5366.68   42.22
 5393.98   42.49 5409.55   41.58 5449.08   39.71 5525.38   39.54  5643.5   39.29
 5699.36    39.2 5708.19   39.16 5710.92   39.04 5719.83   37.73 5724.22   37.19
 5735.43   39.37 5739.23   40.06 5741.02   39.95 5767.96   40.56 5784.26   42.18
 5844.63   42.52    5880   42.59  5892.9   42.49 5898.55   42.26 5904.35   41.81
 5917.81    40.8 5919.36   40.94 5924.97   40.85 5943.87   41.14  5994.4    41.8
 6003.05   42.08

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0     .06 2803.54     .04 2948.92     .06 3682.81     .99 4568.39     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       2803.54 2948.92          1134.52    1139 1143.55             .1       .3
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
 3427.78 4568.39    43.5

CROSS SECTION


RIVER: P1140000
REACH: P114-00-00_0006    RS: 8639.564

INPUT
Description:
Station Elevation Data    num=     258
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   42.73    3.28   42.98    5.43   43.02   63.14   42.58   65.05   42.52
  132.04   42.78  163.81    42.4   349.6   42.79  361.49   42.84  365.19   42.81
  379.32   42.67  383.57   42.66  388.47   42.81  472.72   43.13  482.51    43.1
  488.01   42.07  493.49   40.93  497.51   40.05  508.44   39.64  510.47   39.58
  536.26   41.44  540.84   41.64  544.61    41.7   548.4    41.7  629.88   40.84
  681.36   40.83  767.52    40.9  814.45   41.53  905.03   42.08  1064.5   41.34
 1086.29   41.15 1223.34   40.72 1250.59   40.66 1262.51   40.53 1283.18   40.57
 1475.74   41.78 1486.95   41.66 1525.04   41.35 1577.52   40.64 1612.43   41.98
 1643.79   42.61 1670.77   42.42 1752.99   42.91 1795.35      43 1809.67   43.69
 1841.17   43.01 1855.42   42.12  1869.6   42.25 1876.66   42.03 1904.45   42.55
 1927.67   42.14 1983.62   40.73 1997.52   40.66 2001.68   41.11 2025.13   40.92
 2061.59   41.72 2106.66    42.6  2110.3   42.71 2118.19   42.89 2195.18   43.89
 2319.89   43.35 2332.17   43.21 2363.43   41.41 2372.52   40.82 2377.02   41.66
 2387.52   43.62 2396.38   43.91 2415.39   44.71 2428.25   43.07 2437.88   42.34
 2472.35   40.55 2511.56   41.53 2607.58   42.13 2621.43   42.15 2624.92    42.1
 2630.42    42.1 2632.17   42.08  2639.5   42.03 2763.58   40.97  2791.5   42.01
 2795.58    42.4 2807.52   43.36 2819.55   41.45 2825.48   40.78 2831.49   40.29
 2855.75   40.74 2874.16   41.33 2878.46   41.38 2884.08   41.49 2895.38   38.49
 2897.68   38.45 2902.33   36.96 2910.61   34.84 2915.03   33.65 2923.56   30.11
 2941.92   29.73 2942.59   29.72 2964.55   28.34 2968.45   28.44 2973.33   29.86
 2975.83   30.11 2994.49    32.2 3004.06   36.17 3017.74   42.62 3023.41   42.58
 3023.85   42.55 3028.98   42.49 3033.27   42.44 3034.81   42.42 3035.16   42.41
 3036.17    42.5 3042.19   43.04 3047.79   43.86 3060.61    44.2 3077.82   44.73
 3088.85   44.21 3118.07   42.57 3139.46   42.46 3152.89   42.98 3198.75   43.59
 3232.54   43.19 3283.17   43.05 3288.02   42.96 3289.51   42.83 3315.42   42.45
 3318.05   42.32 3320.93   42.28 3333.06   41.06 3356.03   41.45 3368.05   41.33
 3403.59   41.47 3416.08   40.71 3423.15   40.37 3437.18   38.37 3456.13   38.33
 3462.29   38.29 3551.56   38.79 3564.23   38.76 3587.95   40.78 3588.43   40.81
 3588.95   40.83 3596.22   41.43 3633.36   43.88 3635.07   43.91 3648.37    44.5
 3660.55   43.39  3664.9    43.8 3669.88   43.86 3693.41      45 3703.69   45.08
 3710.96   45.36 3723.44    45.6 3735.39   45.53 3741.66   45.53 3753.47   46.24
 3760.73   45.71 3768.49   44.62 3775.59   45.22  3783.5   45.56 3792.14   45.37
 3798.52    43.6 3804.35   43.81 3813.53   44.23 3827.93    43.7 3858.57   45.29
 3861.88   45.66 3873.59    45.7 3886.38   45.35  3888.6   45.15  3892.5   45.11
 3918.63   46.43  3933.5   44.16 3933.71   44.17 3936.74   44.04  3963.1   42.68
 3963.68   42.64 3977.79   43.71 3978.69   43.63 3992.48   43.45 3993.71   43.55
 3994.99   43.44 3999.22   43.32 4023.73   42.53 4044.28   43.95 4053.76   44.49
 4065.93   44.93 4077.58   44.72 4083.79   44.67 4090.58    44.9 4098.81   43.27
 4114.48   43.06 4125.49   43.63 4133.08   43.91 4146.18   43.14 4173.88   41.26
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 4178.25   41.78  4188.9    42.6 4200.53   42.05 4218.92    41.4 4246.22   41.86
 4248.32   41.78 4249.56   41.78 4277.27   41.71    4294   41.63 4294.77   41.55
 4317.83   40.38 4355.31    41.3 4363.38   41.45 4369.07   41.61 4377.95   41.61
  4417.2   40.96  4438.3   40.97 4448.64   41.44 4459.16   40.62 4469.93   40.13
 4490.12   39.93 4509.32   40.59 4514.67   39.87 4519.22    39.7 4523.38   39.75
 4534.23   39.55 4559.08    39.1 4563.05   38.59 4566.52   38.15 4572.76   35.51
 4608.48   39.03 4608.91   39.04  4609.3    39.2 4609.66   39.22 4617.79   39.51
 4653.95   40.81 4655.45   40.72 4684.38   37.82 4698.21   40.13 4699.39   40.31
 4704.15   40.25 4730.39   39.89    4785   40.06 4801.03   41.28 4847.44   43.69
 4867.84   44.03  4888.9    44.4 4985.77   43.53 5001.56   43.35  5045.7   43.52
 5190.08   42.33 5262.76    41.3  5370.2   40.94 5410.02   40.36 5462.46   39.83
 5480.15   39.99 5522.99   41.63 5526.44   41.72 5530.01   41.64 5551.34   37.76
 5555.22    37.6 5558.77   36.05 5565.15   35.44

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .06 2884.08     .04 3017.74     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       2884.08 3017.74          1181.19  1183.3 1187.01             .3       .5
Blocked Obstructions     num=       3
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
       0 2895.38      42    3380    3900      42    3900    8060      43

CROSS SECTION


RIVER: P1140000
REACH: P114-00-00_0006    RS: 7456.247

INPUT
Description:
Station Elevation Data    num=     295
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   54.37    2.13   54.31   21.44   54.48   35.25   53.76   45.59   53.21
   62.23   52.01   79.38   52.99   88.31   53.59   93.69   53.49  135.68   53.31
  138.14   53.32  143.17   53.37  162.98   54.02  186.75   54.69  206.42   54.52
  246.57   54.98  274.49    53.8  285.91   53.71  287.57   53.55  292.95   53.77
  305.64   54.34  328.95   55.08  349.69   53.33  382.89   52.24  392.73   51.84
  402.04    51.8  419.24   51.04  444.69   51.49  451.99   52.06  453.57   52.07
  467.01   51.99  467.85   51.99   467.9   51.98  482.87   50.51  508.34   50.74
  512.92   50.86  524.74   51.27  556.27   51.66  566.88   52.43  606.49   51.97
  623.87   52.78  636.22   53.26  659.59   53.94  670.67   53.89  702.23   53.97
  708.21   54.05  709.02   54.07  748.37   54.09  758.67   53.57  772.99   53.49
  784.79   53.13  819.41   54.57   828.4    54.9   832.3   55.07  894.05   54.81
  898.73   54.85  929.11   56.25  933.56   56.51  947.73   55.22  951.78   55.21
  954.66   55.28  978.63   55.78 1008.57   56.91 1008.67   56.91 1024.53   55.75
 1041.37   56.06 1082.62   56.12 1095.63   56.33 1099.81   56.57 1124.22   56.62
  1158.9   57.25 1172.73   57.66 1176.24   57.72 1189.15   57.61 1224.96   57.97
 1231.28   58.61 1234.02   58.62 1247.18    57.4 1250.71   57.31 1271.31    57.4
 1286.44   57.51 1294.11   57.18 1319.83   54.24 1322.99   53.87 1324.16   53.73
 1337.61   53.41  1342.6   52.81  1354.2   50.64 1358.51   50.24 1378.82   50.78
 1380.31   50.73 1399.37    50.1 1411.31   48.52 1435.54   45.64 1442.29   45.58
 1444.67   45.56 1446.56      45 1459.77   41.12 1462.87   40.65 1474.21   38.84
 1478.49   39.07 1505.07   41.31 1537.42   41.88  1576.2   42.51 1595.42   43.91
 1595.67   43.93 1596.39   43.89 1613.06   43.84 1636.02   43.46 1642.89   43.51
 1655.35   43.23 1672.65   42.34 1686.27   42.48 1693.31   42.51 1746.67   42.12
 1758.07   40.92 1766.83   41.83 1800.92   41.02 1807.08   41.07 1817.99   40.75
 1822.18   40.63 1828.18   40.58 1854.11    39.9 1901.82   40.06 1916.38   40.03
 1942.98   40.11 1950.41   39.64 1973.18   39.91 1983.29   39.86 2001.42   40.75
 2005.85   40.78 2038.93   41.95 2048.68    42.1 2074.16      43 2078.88   42.91
 2082.62   42.28 2100.71   41.36 2109.08   41.31 2123.22   40.12 2124.18   39.98
 2125.39   39.98 2150.29   43.02 2159.55   44.03 2169.48    44.3 2180.85   44.42
 2184.58   43.96 2186.84   43.89 2190.89   43.74 2200.25   43.33 2229.88   41.37
 2234.78   41.35 2280.69   41.07 2290.28   40.83 2313.24   40.89 2317.09   41.15
 2320.48   41.62 2326.22   41.34 2335.58   41.91  2347.4   42.69 2351.62   43.09
 2375.76   46.59 2380.88   47.32 2399.42   47.36 2426.18   46.37  2437.3   45.05
 2449.87   44.48 2458.23   43.52 2471.48   45.11 2473.38   44.99 2486.59   43.94
 2487.66   43.76 2488.62   43.76 2506.17   43.35 2546.99   42.15 2547.39   42.21
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 2557.63    37.4  2559.3    37.2 2561.65    36.9 2562.08   33.09 2569.24   31.46
 2571.79   31.42  2577.3   30.43  2581.4   29.56 2585.76   29.15 2590.17   28.99
 2618.09   27.52  2622.6   26.13 2625.25   26.47 2626.39   26.68 2626.54    26.7
 2649.67   28.52 2651.79   28.95 2656.16   29.81 2668.82   31.87 2677.31   36.48
 2678.63    37.2 2679.16   37.49 2679.71   37.79 2681.13   38.56 2685.52   40.61
 2702.55   40.17 2706.83   40.02 2706.96   40.01 2761.62   40.51 2772.89   40.62
 2782.23   40.66 2812.61   40.58 2817.93   41.36 2829.29   43.71 2831.16   44.44
 2833.81   44.71 2877.19   44.38 2920.34   44.63 2923.42   44.64 2949.61   44.42
 2975.16   44.04 2988.16   44.58 3032.72   44.61 3052.23   44.44 3058.15   44.55
 3064.61   44.34 3079.44   44.44 3102.33   44.28 3104.05   44.28 3191.33   43.07
 3196.18   43.05 3208.29    42.9 3212.68   42.83 3238.32   42.47 3252.86    41.7
 3295.64   41.74 3296.95   41.82 3298.38    41.7 3299.93    41.8 3313.39   41.63
 3322.15   41.41  3350.9   41.76 3371.13   41.69 3375.71   41.66 3403.47   40.77
 3460.61   40.65 3466.68   40.65 3480.62   40.48  3489.2   40.41 3508.57   40.43
 3519.56    40.6 3524.85   40.68 3533.82   40.56 3568.62   40.57 3589.62   39.63
    3606   39.53 3610.64   39.39 3673.84   38.36  3694.5   38.46 3731.29   38.06
 3738.59   37.81 3748.79   36.83 3763.09    37.3  3782.2   36.42 3793.83   36.19
  3807.2   36.51 3823.86   36.68 3843.66   36.32 3856.18   35.91 3883.92   35.59
 3895.35   35.91 3907.62   35.92 3928.96   35.01  3943.7   34.85 3944.74    34.9
 3962.73   34.79 3973.53   34.78    3974   34.78 3987.93   35.52 3989.01   35.53
 3991.48   35.49  4025.2    35.7 4034.05   35.85 4056.06   36.58 4061.95   36.96
 4064.08   36.88 4066.31   36.85  4079.1   36.71 4081.65   36.63 4094.11    36.6
 4100.01    36.6 4113.55   37.09 4141.59   37.13 4149.63   37.12 4168.29   36.92
 4190.39   37.13 4221.81   37.38 4229.23   37.41  4241.2   37.38 4243.45    37.4

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .06 2546.99     .04 2685.52     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       2546.99 2685.52           140.23   133.9   126.8             .3       .5
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
       0    2380      42 3068.04 4245.46      45

BRIDGE


RIVER: P1140000
REACH: P114-00-00_0006    RS: 7378.25

INPUT
Description: RailRoad Bridge
Distance from Upstream XS =       1
Deck/Roadway Width        =      77
Weir Coefficient          =     2.6
Upstream  Deck/Roadway Coordinates
    num=       6
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
 2506.17    44.8   43.35 2569.63    44.8   42.15 2627.84   44.75   40.75
 2666.09   44.72   40.72 2685.52    44.5   40.61 2706.83    44.4   40.02

Upstream Bridge Cross Section Data
Station Elevation Data    num=     295
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   54.37    2.13   54.31   21.44   54.48   35.25   53.76   45.59   53.21
   62.23   52.01   79.38   52.99   88.31   53.59   93.69   53.49  135.68   53.31
  138.14   53.32  143.17   53.37  162.98   54.02  186.75   54.69  206.42   54.52
  246.57   54.98  274.49    53.8  285.91   53.71  287.57   53.55  292.95   53.77
  305.64   54.34  328.95   55.08  349.69   53.33  382.89   52.24  392.73   51.84
  402.04    51.8  419.24   51.04  444.69   51.49  451.99   52.06  453.57   52.07
  467.01   51.99  467.85   51.99   467.9   51.98  482.87   50.51  508.34   50.74
  512.92   50.86  524.74   51.27  556.27   51.66  566.88   52.43  606.49   51.97
  623.87   52.78  636.22   53.26  659.59   53.94  670.67   53.89  702.23   53.97
  708.21   54.05  709.02   54.07  748.37   54.09  758.67   53.57  772.99   53.49
  784.79   53.13  819.41   54.57   828.4    54.9   832.3   55.07  894.05   54.81
  898.73   54.85  929.11   56.25  933.56   56.51  947.73   55.22  951.78   55.21
  954.66   55.28  978.63   55.78 1008.57   56.91 1008.67   56.91 1024.53   55.75
 1041.37   56.06 1082.62   56.12 1095.63   56.33 1099.81   56.57 1124.22   56.62
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  1158.9   57.25 1172.73   57.66 1176.24   57.72 1189.15   57.61 1224.96   57.97
 1231.28   58.61 1234.02   58.62 1247.18    57.4 1250.71   57.31 1271.31    57.4
 1286.44   57.51 1294.11   57.18 1319.83   54.24 1322.99   53.87 1324.16   53.73
 1337.61   53.41  1342.6   52.81  1354.2   50.64 1358.51   50.24 1378.82   50.78
 1380.31   50.73 1399.37    50.1 1411.31   48.52 1435.54   45.64 1442.29   45.58
 1444.67   45.56 1446.56      45 1459.77   41.12 1462.87   40.65 1474.21   38.84
 1478.49   39.07 1505.07   41.31 1537.42   41.88  1576.2   42.51 1595.42   43.91
 1595.67   43.93 1596.39   43.89 1613.06   43.84 1636.02   43.46 1642.89   43.51
 1655.35   43.23 1672.65   42.34 1686.27   42.48 1693.31   42.51 1746.67   42.12
 1758.07   40.92 1766.83   41.83 1800.92   41.02 1807.08   41.07 1817.99   40.75
 1822.18   40.63 1828.18   40.58 1854.11    39.9 1901.82   40.06 1916.38   40.03
 1942.98   40.11 1950.41   39.64 1973.18   39.91 1983.29   39.86 2001.42   40.75
 2005.85   40.78 2038.93   41.95 2048.68    42.1 2074.16      43 2078.88   42.91
 2082.62   42.28 2100.71   41.36 2109.08   41.31 2123.22   40.12 2124.18   39.98
 2125.39   39.98 2150.29   43.02 2159.55   44.03 2169.48    44.3 2180.85   44.42
 2184.58   43.96 2186.84   43.89 2190.89   43.74 2200.25   43.33 2229.88   41.37
 2234.78   41.35 2280.69   41.07 2290.28   40.83 2313.24   40.89 2317.09   41.15
 2320.48   41.62 2326.22   41.34 2335.58   41.91  2347.4   42.69 2351.62   43.09
 2375.76   46.59 2380.88   47.32 2399.42   47.36 2426.18   46.37  2437.3   45.05
 2449.87   44.48 2458.23   43.52 2471.48   45.11 2473.38   44.99 2486.59   43.94
 2487.66   43.76 2488.62   43.76 2506.17   43.35 2546.99   42.15 2547.39   42.21
 2557.63    37.4  2559.3    37.2 2561.65    36.9 2562.08   33.09 2569.24   31.46
 2571.79   31.42  2577.3   30.43  2581.4   29.56 2585.76   29.15 2590.17   28.99
 2618.09   27.52  2622.6   26.13 2625.25   26.47 2626.39   26.68 2626.54    26.7
 2649.67   28.52 2651.79   28.95 2656.16   29.81 2668.82   31.87 2677.31   36.48
 2678.63    37.2 2679.16   37.49 2679.71   37.79 2681.13   38.56 2685.52   40.61
 2702.55   40.17 2706.83   40.02 2706.96   40.01 2761.62   40.51 2772.89   40.62
 2782.23   40.66 2812.61   40.58 2817.93   41.36 2829.29   43.71 2831.16   44.44
 2833.81   44.71 2877.19   44.38 2920.34   44.63 2923.42   44.64 2949.61   44.42
 2975.16   44.04 2988.16   44.58 3032.72   44.61 3052.23   44.44 3058.15   44.55
 3064.61   44.34 3079.44   44.44 3102.33   44.28 3104.05   44.28 3191.33   43.07
 3196.18   43.05 3208.29    42.9 3212.68   42.83 3238.32   42.47 3252.86    41.7
 3295.64   41.74 3296.95   41.82 3298.38    41.7 3299.93    41.8 3313.39   41.63
 3322.15   41.41  3350.9   41.76 3371.13   41.69 3375.71   41.66 3403.47   40.77
 3460.61   40.65 3466.68   40.65 3480.62   40.48  3489.2   40.41 3508.57   40.43
 3519.56    40.6 3524.85   40.68 3533.82   40.56 3568.62   40.57 3589.62   39.63
    3606   39.53 3610.64   39.39 3673.84   38.36  3694.5   38.46 3731.29   38.06
 3738.59   37.81 3748.79   36.83 3763.09    37.3  3782.2   36.42 3793.83   36.19
  3807.2   36.51 3823.86   36.68 3843.66   36.32 3856.18   35.91 3883.92   35.59
 3895.35   35.91 3907.62   35.92 3928.96   35.01  3943.7   34.85 3944.74    34.9
 3962.73   34.79 3973.53   34.78    3974   34.78 3987.93   35.52 3989.01   35.53
 3991.48   35.49  4025.2    35.7 4034.05   35.85 4056.06   36.58 4061.95   36.96
 4064.08   36.88 4066.31   36.85  4079.1   36.71 4081.65   36.63 4094.11    36.6
 4100.01    36.6 4113.55   37.09 4141.59   37.13 4149.63   37.12 4168.29   36.92
 4190.39   37.13 4221.81   37.38 4229.23   37.41  4241.2   37.38 4243.45    37.4

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .06 2546.99     .04 2685.52     .06

Bank Sta: Left   Right    Coeff Contr.   Expan.
       2546.99 2685.52             .3       .5
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
       0    2380      42 3068.04 4245.46      45

Downstream  Deck/Roadway Coordinates
    num=       7
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
 2910.02   44.54    40.8 2934.38    44.8    40.8 2986.14   44.75   40.75
 3022.67   44.72   40.72 3056.16    44.5    40.5 3077.48    44.4    40.4
 3117.06    40.2    40.2

Downstream Bridge Cross Section Data
Station Elevation Data    num=     290
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   98.11   75.71      97   86.22    96.8   95.43   96.61   104.8   96.59
  112.14   96.42  136.98   96.45  161.89   96.88  199.21   95.64  227.21   95.43
  236.37   95.17  245.62   95.53   255.8   96.14  271.01   96.54  275.23   96.43
```

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  285.37   96.04  308.55   95.69  349.25   96.03   371.5   97.04  371.52   97.04
  386.53   96.61  432.02   94.91  468.07   94.52  503.64   95.37  525.67   95.33
  536.69   94.79   551.7   94.69  591.78    95.5  611.76   96.25  639.93   96.62
  644.39   96.66  658.12   97.14  701.33   97.71  716.87   97.87  718.43   97.82
  740.28   96.85  753.23   96.89  759.28   96.86  828.76   98.09  836.61   97.46
  869.48   98.29  914.91   98.64  927.09    98.7  940.74    98.6  990.45   99.29
 1000.81    99.6 1001.91   99.61 1003.64   99.64 1008.28    99.8 1064.65  101.08
 1087.85  101.37 1099.52   101.5 1133.37  100.25 1147.48   99.99 1204.46  101.83
 1215.67  102.13  1227.4  101.68 1252.54  101.73 1272.45  101.26 1282.83  101.35
 1296.42  101.51 1306.84  101.62  1328.4  101.85 1375.43  100.94 1376.79   100.9
 1378.11  100.93 1380.36  100.91 1414.25  101.11 1428.55  101.36 1447.12  101.18
 1467.78  100.55  1481.1   100.5 1495.62  100.53  1500.9  100.05 1527.62   98.44
 1545.08   96.68 1557.74   94.76 1562.36   93.32 1601.29   83.25 1617.81   79.45
 1623.83    78.7 1630.13   77.47 1632.82   77.03 1635.28   76.24 1647.84   72.62
 1649.64   72.58 1662.85   72.67 1663.44   72.56 1698.16   67.42  1707.9   66.93
 1721.44   64.53 1745.27   59.07 1753.68    57.2 1790.15    51.2 1811.73   48.64
 1828.03   47.12 1834.66   44.45 1850.69   39.74 1858.06   38.42 1871.46   38.35
 1883.65    38.4 1897.59   39.64  1903.1   40.41 1908.13   40.35  1938.1   40.35
 1984.06   40.79 2065.99   41.44 2204.63   42.81 2332.62   44.08 2362.86   42.12
 2371.37   41.49  2376.8   41.74 2465.17   40.66 2507.79   40.13 2510.27   40.11
 2521.38   40.28 2526.91   39.87 2535.05   39.72  2560.4   39.84 2570.41   40.04
 2583.09   39.84 2653.16   40.66 2653.53   40.68 2654.89   40.58 2692.48   39.42
 2713.95   40.48 2726.69   41.56  2756.4   42.23 2786.53    43.6 2789.02   43.59
 2806.78   44.35 2825.84    43.7 2837.91   43.36 2860.78   43.55  2864.1   43.58
  2870.3   44.51 2875.98   44.56 2894.13   44.58 2903.87   44.89 2912.42   44.86
 2913.89   44.49  2934.8   39.49 2941.53   43.17 2942.57   42.74 2954.15   31.35
 2960.16   31.32 2967.45   30.08 2973.81   28.88  2978.4   29.04  2986.2    28.1
 2996.84    27.5 2999.46   27.26 3000.82   25.55 3000.84   25.54 3002.68   25.28
 3002.84   25.33 3011.53   26.91 3021.16   27.71 3026.61   28.17 3027.52   28.47
 3028.85   28.73 3044.16   32.74 3053.95   38.79 3059.16    40.6 3065.34   40.67
 3068.21   40.71 3069.07   40.82 3073.52   40.98 3073.76   40.99 3073.79   40.99
 3073.81   40.99 3083.73   41.14 3135.35   41.49 3144.59   41.45 3149.16   41.44
 3167.11    40.9 3179.16   41.03 3182.22   41.23 3185.31   41.86 3201.25   44.28
 3255.84   44.14 3262.46   44.22 3273.69   44.17 3284.64   43.11 3286.43   42.94
 3296.84   41.55 3314.19   40.35 3334.88   40.06  3348.3   39.97 3359.23   39.58
 3384.26   39.35 3390.74   39.36 3393.46   39.28 3419.29    38.9 3433.98   38.78
 3434.46   38.77  3441.3    38.8 3463.37   39.16 3464.85   39.03 3479.35   39.03
  3480.2   39.03 3494.36   39.63 3507.92   39.33  3510.9    39.4  3537.3   39.49
 3541.61   39.37 3578.44   39.55 3581.38   39.65 3584.45   39.58 3628.12   39.58
 3649.06   39.61 3669.53   40.79 3696.97   41.58 3704.57   41.29 3716.64    41.6
 3720.95   41.97 3724.74   41.55 3763.75    39.8 3779.26    38.7 3779.64   38.71
  3780.1    38.7 3808.57   39.97 3833.28   40.28 3845.84   40.23 3862.78   39.24
 3873.67    39.4 3884.74   40.58 3894.87    39.4 3907.93   38.76 3933.06   38.53
 3936.49   38.51 3974.25   40.22 3989.84   40.32 4009.94   41.51 4019.87   41.71
 4030.71   41.32 4034.88   40.27 4038.71   40.38  4049.9   39.33 4055.87   39.31
 4064.91   39.64 4073.57   39.62 4093.52   38.68 4096.24    38.7 4109.96   39.03
 4125.91   38.93 4151.61    38.9    4155   38.93 4168.16    38.4 4172.04   38.41
 4185.03   38.79 4196.93   38.89 4200.04   38.95 4203.44   38.99 4220.49   40.22
 4230.07   40.01 4240.08   39.01 4245.08   39.04 4250.55   39.02 4268.84   38.85
 4275.11   38.94 4281.96   38.88 4289.46   39.31    4312   39.79 4329.07   39.61
 4335.17    39.5 4340.76   39.64 4350.19   39.08 4371.75    39.7 4387.31   39.54
 4404.14   38.65 4416.62   38.51 4425.26   38.57 4482.76   37.16 4484.95   37.09
 4485.32   37.08 4498.98   38.24  4501.8   38.28 4515.34   38.76 4539.15   37.43
 4545.37   36.78 4550.81   36.73 4590.42   37.92 4611.73   37.95 4628.43   37.77
 4635.78   37.34 4658.84   36.77 4665.49   35.97 4671.58   35.66 4672.43   35.65

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .06 2941.53     .04 3083.73     .06

Bank Sta: Left   Right    Coeff Contr.   Expan.
       2941.53 3083.73             .3       .5
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
 3228.06 4673.83      44

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
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Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Piers =  2

Pier Data
Pier Station     Upstream= 2585.76    Downstream= 2978.02
Upstream     num=       2
    Width   Elev    Width   Elev
       2    27.8       2      42
Downstream     num=       2
    Width   Elev    Width   Elev
       2    27.8       2      42

Pier Data
Pier Station     Upstream= 2646.31    Downstream= 3033.66
Upstream     num=       2
    Width   Elev    Width   Elev
       2    27.8       2      42
Downstream     num=       2
    Width   Elev    Width   Elev
       2    27.8       2      42

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Energy
       Momentum               Cd   =     1.2
       Yarnell                KVal =    1.05
Selected Low Flow Methods = Highest Energy Answer

High Flow Method
       Energy Only

Additional Bridge Parameters
       Add Friction component to Momentum
       Do not add Weight component to Momentum
       Class B flow critical depth computations use critical depth
           inside the bridge at the upstream end
       Criteria to check for pressure flow = Upstream energy grade line

CROSS SECTION


RIVER: P1140000
REACH: P114-00-00_0006    RS: 7322.337

INPUT
Description:
Station Elevation Data    num=     290
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   98.11   75.71      97   86.22    96.8   95.43   96.61   104.8   96.59
  112.14   96.42  136.98   96.45  161.89   96.88  199.21   95.64  227.21   95.43
  236.37   95.17  245.62   95.53   255.8   96.14  271.01   96.54  275.23   96.43
  285.37   96.04  308.55   95.69  349.25   96.03   371.5   97.04  371.52   97.04
  386.53   96.61  432.02   94.91  468.07   94.52  503.64   95.37  525.67   95.33
  536.69   94.79   551.7   94.69  591.78    95.5  611.76   96.25  639.93   96.62
  644.39   96.66  658.12   97.14  701.33   97.71  716.87   97.87  718.43   97.82
  740.28   96.85  753.23   96.89  759.28   96.86  828.76   98.09  836.61   97.46
  869.48   98.29  914.91   98.64  927.09    98.7  940.74    98.6  990.45   99.29
 1000.81    99.6 1001.91   99.61 1003.64   99.64 1008.28    99.8 1064.65  101.08
 1087.85  101.37 1099.52   101.5 1133.37  100.25 1147.48   99.99 1204.46  101.83
 1215.67  102.13  1227.4  101.68 1252.54  101.73 1272.45  101.26 1282.83  101.35
 1296.42  101.51 1306.84  101.62  1328.4  101.85 1375.43  100.94 1376.79   100.9
 1378.11  100.93 1380.36  100.91 1414.25  101.11 1428.55  101.36 1447.12  101.18
 1467.78  100.55  1481.1   100.5 1495.62  100.53  1500.9  100.05 1527.62   98.44
 1545.08   96.68 1557.74   94.76 1562.36   93.32 1601.29   83.25 1617.81   79.45
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 1623.83    78.7 1630.13   77.47 1632.82   77.03 1635.28   76.24 1647.84   72.62
 1649.64   72.58 1662.85   72.67 1663.44   72.56 1698.16   67.42  1707.9   66.93
 1721.44   64.53 1745.27   59.07 1753.68    57.2 1790.15    51.2 1811.73   48.64
 1828.03   47.12 1834.66   44.45 1850.69   39.74 1858.06   38.42 1871.46   38.35
 1883.65    38.4 1897.59   39.64  1903.1   40.41 1908.13   40.35  1938.1   40.35
 1984.06   40.79 2065.99   41.44 2204.63   42.81 2332.62   44.08 2362.86   42.12
 2371.37   41.49  2376.8   41.74 2465.17   40.66 2507.79   40.13 2510.27   40.11
 2521.38   40.28 2526.91   39.87 2535.05   39.72  2560.4   39.84 2570.41   40.04
 2583.09   39.84 2653.16   40.66 2653.53   40.68 2654.89   40.58 2692.48   39.42
 2713.95   40.48 2726.69   41.56  2756.4   42.23 2786.53    43.6 2789.02   43.59
 2806.78   44.35 2825.84    43.7 2837.91   43.36 2860.78   43.55  2864.1   43.58
  2870.3   44.51 2875.98   44.56 2894.13   44.58 2903.87   44.89 2912.42   44.86
 2913.89   44.49  2934.8   39.49 2941.53   43.17 2942.57   42.74 2954.15   31.35
 2960.16   31.32 2967.45   30.08 2973.81   28.88  2978.4   29.04  2986.2    28.1
 2996.84    27.5 2999.46   27.26 3000.82   25.55 3000.84   25.54 3002.68   25.28
 3002.84   25.33 3011.53   26.91 3021.16   27.71 3026.61   28.17 3027.52   28.47
 3028.85   28.73 3044.16   32.74 3053.95   38.79 3059.16    40.6 3065.34   40.67
 3068.21   40.71 3069.07   40.82 3073.52   40.98 3073.76   40.99 3073.79   40.99
 3073.81   40.99 3083.73   41.14 3135.35   41.49 3144.59   41.45 3149.16   41.44
 3167.11    40.9 3179.16   41.03 3182.22   41.23 3185.31   41.86 3201.25   44.28
 3255.84   44.14 3262.46   44.22 3273.69   44.17 3284.64   43.11 3286.43   42.94
 3296.84   41.55 3314.19   40.35 3334.88   40.06  3348.3   39.97 3359.23   39.58
 3384.26   39.35 3390.74   39.36 3393.46   39.28 3419.29    38.9 3433.98   38.78
 3434.46   38.77  3441.3    38.8 3463.37   39.16 3464.85   39.03 3479.35   39.03
  3480.2   39.03 3494.36   39.63 3507.92   39.33  3510.9    39.4  3537.3   39.49
 3541.61   39.37 3578.44   39.55 3581.38   39.65 3584.45   39.58 3628.12   39.58
 3649.06   39.61 3669.53   40.79 3696.97   41.58 3704.57   41.29 3716.64    41.6
 3720.95   41.97 3724.74   41.55 3763.75    39.8 3779.26    38.7 3779.64   38.71
  3780.1    38.7 3808.57   39.97 3833.28   40.28 3845.84   40.23 3862.78   39.24
 3873.67    39.4 3884.74   40.58 3894.87    39.4 3907.93   38.76 3933.06   38.53
 3936.49   38.51 3974.25   40.22 3989.84   40.32 4009.94   41.51 4019.87   41.71
 4030.71   41.32 4034.88   40.27 4038.71   40.38  4049.9   39.33 4055.87   39.31
 4064.91   39.64 4073.57   39.62 4093.52   38.68 4096.24    38.7 4109.96   39.03
 4125.91   38.93 4151.61    38.9    4155   38.93 4168.16    38.4 4172.04   38.41
 4185.03   38.79 4196.93   38.89 4200.04   38.95 4203.44   38.99 4220.49   40.22
 4230.07   40.01 4240.08   39.01 4245.08   39.04 4250.55   39.02 4268.84   38.85
 4275.11   38.94 4281.96   38.88 4289.46   39.31    4312   39.79 4329.07   39.61
 4335.17    39.5 4340.76   39.64 4350.19   39.08 4371.75    39.7 4387.31   39.54
 4404.14   38.65 4416.62   38.51 4425.26   38.57 4482.76   37.16 4484.95   37.09
 4485.32   37.08 4498.98   38.24  4501.8   38.28 4515.34   38.76 4539.15   37.43
 4545.37   36.78 4550.81   36.73 4590.42   37.92 4611.73   37.95 4628.43   37.77
 4635.78   37.34 4658.84   36.77 4665.49   35.97 4671.58   35.66 4672.43   35.65

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .06 2941.53     .04 3083.73     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       2941.53 3083.73             64.7    68.1   72.85             .3       .5
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
 3228.06 4673.83      44

CROSS SECTION


RIVER: P1140000
REACH: P114-00-00_0006    RS: 7254.24

INPUT
Description:
Station Elevation Data    num=     241
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  113.02   40.04   112.6   41.75  112.62   51.01  112.41  102.32  111.29
  114.99  110.86  126.25  110.17  135.86  110.23  151.68  109.88  167.23  109.76
  217.23   109.6  260.47  108.47  270.14  108.26  275.23  108.26  289.04   108.1
  324.57  107.99  334.41  108.15  358.96  108.41  361.87  108.35  364.87  108.43
  376.88  108.93  383.93  108.92  419.47  108.54  467.51  108.01  474.69  108.12
   512.2  108.11  552.79  108.12  557.05  108.55  568.86  108.58  606.36  108.94
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  625.09  108.85  646.36  109.78  666.52  109.81  692.85  110.35   722.2  110.11
  742.48  109.54  747.57  109.45  752.23  109.44  776.24  109.82  847.56   110.9
  884.34  111.22  932.39   111.4  974.05   111.1 1002.15  110.86 1007.46  110.85
 1053.23  110.96 1077.63  110.95 1092.58  110.61  1124.7   110.5  1133.5  110.73
 1166.95   110.7 1194.73  111.04 1210.18  111.49 1223.52  111.73 1254.97  112.54
 1277.71  112.39 1299.81  112.85 1304.95  112.94 1310.68  112.85 1350.73  111.37
 1352.77  111.47 1357.05  111.59 1366.39  111.94 1412.83   112.4 1419.81   112.3
 1444.62  111.65 1457.87  112.06 1470.38  111.64  1487.9  110.52 1490.78  110.28
 1495.89  109.19  1541.1   99.24 1563.42   94.31 1586.08   89.53 1589.58   88.44
 1601.76   85.62 1623.02   79.71 1627.04   79.26 1649.35    77.4 1658.41   76.31
 1673.23   74.46 1683.08   72.67 1700.89   69.03 1709.86   67.87 1720.03   65.33
  1748.7   59.02 1768.66   55.33 1782.77   52.47 1829.35    46.5 1833.21    46.6
 1845.51   40.92 1848.23   39.83 1850.72   39.58 1878.26   38.21 1897.96   39.63
 1908.28   40.32 1914.84   40.31 2012.82   41.26 2059.09   41.63 2293.48   43.94
 2331.36   44.31 2344.51   43.46 2383.78   41.03 2423.28   40.54 2446.11   40.35
 2483.55   40.92  2498.5   40.94 2504.86   40.99 2547.97   40.95 2567.01   40.87
 2586.27   40.61 2656.99   40.29 2658.97   40.36 2665.18   40.33 2753.11   40.39
 2779.08   40.21 2791.51   40.95 2806.67   40.92 2832.28      40 2858.56   39.58
 2880.71   40.82 2887.35   41.65 2902.42   41.53 2914.21   38.04    2921    38.3
 2937.01   38.64 2942.49   39.43 2947.81   38.87  2959.7   34.78 2974.31   27.87
 2983.49   27.76  2987.7   27.42 2990.32    27.4 3000.56   27.93 3001.25    27.2
 3006.53   24.75 3007.31   26.91 3007.64   27.81 3024.01   28.91 3025.26    29.1
 3052.13   33.06 3064.02   36.66 3069.36   36.67 3069.57   36.67 3071.77   36.67
 3074.99   37.11 3086.36   38.66 3087.01   38.77 3094.51   40.01 3103.67    40.2
 3109.54   40.21 3112.23   40.25 3137.63    42.1 3139.59   42.12 3143.18   42.12
  3146.4   42.96 3176.31   43.85 3188.17   44.11 3207.37   44.08 3229.74   44.16
 3242.62   43.86 3244.76   43.66 3245.93   43.54 3249.89   43.26 3274.81   40.37
 3283.85   40.11 3300.08   38.95 3304.86   39.02 3309.38   39.02 3317.69    39.1
 3335.07   38.85 3356.27   38.29 3372.17   38.14 3410.04   38.15 3433.51   39.01
 3454.44   38.35 3455.71   38.38 3470.14   39.42 3475.32   39.41 3494.63   38.82
 3525.13   38.13 3529.63   38.12 3557.65   37.99 3659.98   37.67 3679.32   37.69
 3755.04   39.11 3756.15   39.11 3756.42   39.11 3758.21   39.12 3780.44   38.77
 3852.51   37.54 3868.99   37.63 3875.81   37.64 3954.73   38.84 3965.65      39
  3980.8   39.03 3981.22   39.05  3987.2   38.87 4027.21   37.99 4078.28   39.03
 4086.16   38.89 4099.03   38.77 4104.57   38.88 4139.78   37.63    4177   37.57
 4191.33   37.83 4205.13   37.62 4208.62    37.6 4226.79   36.14 4251.05   38.23
 4251.43   38.27 4251.78   38.27 4296.51   37.88 4301.89   38.11 4316.09   37.95
 4379.21   38.24 4381.79   38.22 4386.66   38.28 4391.16   38.27 4393.29   38.28
 4401.99   38.29 4461.78    37.6 4472.15   38.24 4492.29   37.45 4521.14   36.31
 4541.75   36.43 4566.96   36.38 4570.54   36.26 4579.21    37.4 4602.43   39.39
 4620.58   41.29 4627.06   41.97 4634.32   42.19 4642.08   41.66 4648.99   40.29
 4660.02   38.72 4672.13   37.38 4682.15   36.08 4702.18   36.26 4712.64   35.83
 4713.96   35.86

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .06 2942.49     .04 3094.51     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       2942.49 3094.51           680.94  679.87  678.46             .1       .3
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
 3232.28    4715      44

CROSS SECTION


RIVER: P1140000
REACH: P114-00-00_0006    RS: 6574.37

INPUT
Description:
Station Elevation Data    num=     236
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  164.93   12.54  164.52   15.09  164.56    47.3  165.07  110.38  164.01
  165.98  163.44   176.2  163.34  182.97  163.25  237.61  163.74   270.8  163.91
  285.97  163.72  355.53  162.04   357.9     162   441.4  157.74  486.76  155.39
  541.01  152.49  579.73  150.52  607.14  148.96  641.91  146.29  668.63  145.06
  672.74  144.82  688.22  143.57  728.88   140.8  757.37  141.77  762.77  141.81
```

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  775.89  139.19  777.78  138.86  782.59  137.97  797.78  135.34  832.36  127.35
   852.8  122.11  894.53  115.91  912.82  113.21   958.8  103.84 1002.59   94.66
 1002.81   94.61 1002.94   94.59 1032.86   90.76 1057.62   84.75 1077.87   79.44
 1114.12   72.67 1122.26   71.26 1124.47   70.79 1138.77   67.36 1175.12   57.86
 1192.85   53.26 1212.91   49.82 1228.61   49.31    1280   46.24 1287.94   45.55
 1295.39   43.21 1310.55   37.75 1317.95   38.03 1325.22   37.56 1349.74   38.94
 1356.96   39.19 1362.96   39.53 1367.59   39.16 1382.22   39.92 1397.95   39.86
 1422.98   38.48 1449.29   39.51 1452.99    39.4 1489.97   39.51 1495.46    39.7
 1496.75   39.63  1511.4    39.7 1513.01   39.69 1520.65   39.79 1563.58   39.27
 1568.26   38.97  1587.8   39.31 1588.03   39.29 1603.19   38.58 1632.17   38.86
 1642.29   39.44  1673.7   39.21 1690.72   39.23 1693.06   39.08 1700.86   39.18
 1738.08   38.99  1741.7   39.29 1758.56   39.92 1774.22   39.22 1785.45   38.37
 1798.19   39.16 1826.56   39.61 1840.14   39.51 1853.83   39.28 1864.76   39.21
 1891.18   38.44 1918.13   39.49 1937.58   39.33 1954.21   39.35 1963.15   39.24
 1972.55   39.24 1980.85   39.63 1993.16   38.38 2001.53   39.49 2008.16   38.79
 2049.49   39.12 2051.97   39.14 2056.68   39.02 2068.18   38.89 2074.15   38.55
 2083.19   38.91  2108.8   38.95  2113.2   39.21 2126.44    39.5  2128.2   39.32
 2129.87   39.22  2143.2   39.33 2150.12   39.28 2168.68   39.62 2198.24   38.44
 2218.78   39.46 2237.89   39.29 2241.56   39.34 2253.67   39.58 2261.62   40.27
 2268.06   40.59 2293.25   42.84 2302.07   42.99 2308.26   43.81 2320.17   45.13
 2323.26   45.17 2326.51   44.99 2338.27   45.51  2341.9    45.3 2353.27   44.01
 2364.08   40.88 2368.28   40.55 2376.17    39.9 2377.34    39.8 2398.29   38.79
 2400.79   38.91 2412.34   38.33 2422.92   34.87 2424.66   34.25 2437.63   29.75
 2441.58   28.64 2448.28   24.15 2451.03   22.94 2460.44   26.16 2462.77   28.53
 2473.43   28.64 2488.35   30.26 2498.75   29.69 2501.26    30.1 2512.65   36.37
 2518.37   38.56 2526.04   38.47 2532.98   38.55 2538.53   38.62 2538.65   38.62
 2538.95   38.63 2548.06   38.78 2552.38   38.79  2567.2   38.83 2584.78    39.3
 2608.42   40.14  2639.7    38.8 2653.45   38.23 2683.33    39.4 2683.58    39.4
 2684.06    39.4 2720.76   39.06  2743.5    38.6 2753.73   38.65  2770.2   38.93
 2842.76   38.12 2888.02   37.61 2938.65   37.28 2960.36   38.69  2964.7   38.99
 2969.93   39.29 3050.77   37.64 3067.93   37.33  3080.8   37.18 3100.25   38.37
 3116.36      39 3133.83   40.05  3145.1    40.4 3167.09   40.47 3195.53   40.44
 3264.58   39.51 3268.95   39.44 3273.51   39.07 3298.97   37.23 3318.58   37.33
    3329   37.48 3347.17   39.02 3356.66   39.85 3359.03   40.06 3363.21   39.77
 3375.61   38.92 3396.22    38.4 3404.07   38.62 3418.82   38.57 3473.65   37.85
 3495.05   38.24 3514.31   38.03 3528.01   37.99 3545.29    38.6 3572.61   38.27
 3622.38   37.47 3675.64   38.06 3749.01   37.92 3764.37    37.4 3804.46   37.28
 3812.61   37.19 3828.86   37.12 3889.72   36.93 3917.95   36.96 3929.54   36.92
 4007.87   37.12 4055.57   37.05 4064.66   35.99 4071.65   35.46 4079.68   36.08
 4093.54   33.88 4094.69   33.83 4109.21   35.78  4109.7   35.65 4110.15   35.77
 4120.75    37.5 4139.47   40.49 4140.57   40.34 4161.39   37.52 4169.76      39
 4178.49   40.54 4190.79   42.54 4207.45   42.57  4214.8   42.23 4218.96   41.21
 4229.52   39.18

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .06 2376.17     .04 2532.98     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       2376.17 2532.98           634.09   634.2  634.32             .3       .5

CROSS SECTION


RIVER: P1140000
REACH: P114-00-00_0006    RS: 5940.168

INPUT
Description:
Station Elevation Data    num=     207
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   171.6    2.58  171.55   21.13  170.98    33.5  170.22  101.19  167.76
  112.72  167.41  115.61  167.96  126.23   168.6  131.89  168.81  158.78  166.72
     195  163.56  223.97  162.51  240.84  161.82  338.42  160.12  352.58  159.62
  360.26  159.58   503.6  154.59  561.55   150.7  561.66  150.69  561.74  150.69
  626.98  149.34  649.27  148.16  691.86  146.93  707.37  146.54     716  146.52
  727.67  146.12  734.44  145.97  745.08  146.73  755.17   146.8  765.53  145.69
  786.85  142.92  833.42  140.04   846.9  139.45  860.82  138.67  863.97  138.26
  881.51  136.82  891.95  135.76  906.76  135.52  907.14  135.49  926.76  133.08
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  936.99  132.19  973.91  129.57  982.03  129.24 1001.53  128.56 1061.36  126.24
 1083.34  125.45 1095.07   123.4 1147.84  119.38  1156.7  119.01 1160.07  118.75
 1163.84  118.73 1177.91  117.79 1252.06  114.58 1252.41  114.55 1288.17  113.07
 1297.32  112.38  1310.1     112 1317.44  111.81 1336.55  110.88 1353.28  109.93
 1357.38  109.83 1401.52  109.41 1432.45  108.32 1434.35  108.26  1460.3  106.77
 1466.99  106.67 1492.51  106.81 1521.71  106.52 1580.99  106.52 1582.39  106.53
 1582.98  106.51 1587.33  106.45 1672.67  105.28 1684.97  103.66 1709.09   99.97
 1717.72   99.18 1734.03   97.02 1764.06   91.28  1776.3   88.96 1785.56   88.05
 1814.79   84.89  1828.2    82.5 1848.33   78.44 1852.84   77.07 1876.26   72.95
 1879.71   72.45 1884.35   71.76 1885.77   71.61  1912.9   65.94 1942.48   59.86
 1957.94   56.19 1978.77   51.64 2002.98   46.59 2012.14   44.94    2018   43.96
 2027.11    42.9 2033.01   42.33 2072.37   39.67 2093.07   38.35 2096.17   38.77
 2099.41   38.35 2144.81   38.01 2155.19   37.43 2157.54    37.3 2168.61   34.72
  2171.8   33.97 2179.47   32.45 2185.73   31.19 2198.34   28.57 2200.23   27.98
 2206.05   27.26 2207.24   26.98 2208.45   26.81 2213.55   22.58 2213.61   22.54
 2213.65   22.53  2215.8   22.42  2216.2   22.26 2221.65   25.08  2225.5   26.97
 2225.57   27.01 2228.07   28.24 2228.35   28.37 2233.98   28.31 2239.83    30.3
 2243.31   31.49 2251.21   29.05 2271.36   35.71 2287.24   37.34 2289.74   37.34
 2290.56   37.42 2303.21   38.65 2309.97   38.49 2329.96   38.37 2383.36   37.82
  2401.4   37.27 2417.94   37.79 2487.78   38.18 2519.04   38.05 2550.23   37.28
 2580.12   36.81 2587.04   37.22 2610.42   37.99 2641.54   38.15 2670.44   38.12
 2709.24   38.02 2732.54   37.48 2758.37   36.35 2804.75   37.43 2828.21   37.71
 2852.56   37.78 2869.53   38.05 2938.47   37.79 3013.58   36.92 3098.01   36.76
 3104.09   36.82 3113.21   37.44 3131.43   36.71 3143.21   36.92 3172.69   37.07
 3173.38   37.08 3174.24    37.1 3195.95   38.75 3203.21   38.69 3217.74   38.08
 3218.36   38.11 3218.67   38.09 3233.43   38.11  3270.4   37.54 3303.33   36.96
 3337.55   38.72 3338.32   38.76  3339.2   38.74 3368.51   38.74 3375.85   38.72
 3390.57   39.02 3398.21   39.08 3427.75   38.48 3428.67   38.49 3465.61   38.15
 3487.88   37.96 3488.31   37.96 3488.43   37.96 3548.21   38.19 3548.26   38.19
 3548.31   38.19 3578.15   34.35 3578.27   34.33 3600.69   36.64 3613.22   39.53
 3623.22   38.86 3634.46   38.45 3660.75   40.28 3673.24   40.93 3679.47   41.31
 3686.95   42.25 3693.17   42.18 3713.04   38.16 3713.17   38.14 3713.21   38.14
  3713.3   38.13 3743.09   34.89 3743.21   34.89 3743.33    34.9 3758.21   37.91
 3758.35   37.91 3766.22   38.08

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .06 2144.81     .04 2303.21     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       2144.81 2303.21           106.99  106.14  104.72             .3       .5
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
 3648.67 3708.97    41.5

BRIDGE


RIVER: P1140000
REACH: P114-00-00_0006    RS: 5864.17

INPUT
Description: BFI Bridge

Distance from Upstream XS =       1
Deck/Roadway Width        =      75
Weir Coefficient          =     2.6
Upstream  Deck/Roadway Coordinates
    num=       4
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
 2144.81   34.68   31.25 2180.26   41.39   35.29 2231.25   41.12   35.29
 2289.66   38.15   35.29

Upstream Bridge Cross Section Data
Station Elevation Data    num=     207
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   171.6    2.58  171.55   21.13  170.98    33.5  170.22  101.19  167.76
  112.72  167.41  115.61  167.96  126.23   168.6  131.89  168.81  158.78  166.72
     195  163.56  223.97  162.51  240.84  161.82  338.42  160.12  352.58  159.62
```

360.26	159.58	503.6	154.59	561.55	150.7	561.66	150.69	561.74	150.69
626.98	149.34	649.27	148.16	691.86	146.93	707.37	146.54	716	146.52
727.67	146.12	734.44	145.97	745.08	146.73	755.17	146.8	765.53	145.69
786.85	142.92	833.42	140.04	846.9	139.45	860.82	138.67	863.97	138.26
881.51	136.82	891.95	135.76	906.76	135.52	907.14	135.49	926.76	133.08
936.99	132.19	973.91	129.57	982.03	129.24	1001.53	128.56	1061.36	126.24
1083.34	125.45	1095.07	123.4	1147.84	119.38	1156.7	119.01	1160.07	118.75
1163.84	118.73	1177.91	117.79	1252.06	114.58	1252.41	114.55	1288.17	113.07
1297.32	112.38	1310.1	112	1317.44	111.81	1336.55	110.88	1353.28	109.93
1357.38	109.83	1401.52	109.41	1432.45	108.32	1434.35	108.26	1460.3	106.77
1466.99	106.67	1492.51	106.81	1521.71	106.52	1580.99	106.52	1582.39	106.53
1582.98	106.51	1587.33	106.45	1672.67	105.28	1684.97	103.66	1709.09	99.97
1717.72	99.18	1734.03	97.02	1764.06	91.28	1776.3	88.96	1785.56	88.05
1814.79	84.89	1828.2	82.5	1848.33	78.44	1852.84	77.07	1876.26	72.95
1879.71	72.45	1884.35	71.76	1885.77	71.61	1912.9	65.94	1942.48	59.86
1957.94	56.19	1978.77	51.64	2002.98	46.59	2012.14	44.94	2018	43.96
2027.11	42.9	2033.01	42.33	2072.37	39.67	2093.07	38.35	2096.17	38.77
2099.41	38.35	2144.81	38.01	2155.19	37.43	2157.54	37.3	2168.61	34.72
2171.8	33.97	2179.47	32.45	2185.73	31.19	2198.34	28.57	2200.23	27.98
2206.05	27.26	2207.24	26.98	2208.45	26.81	2213.55	22.58	2213.61	22.54
2213.65	22.53	2215.8	22.42	2216.2	22.26	2221.65	25.08	2225.5	26.97
2225.57	27.01	2228.07	28.24	2228.35	28.37	2233.98	28.31	2239.83	30.3
2243.31	31.49	2251.21	29.05	2271.36	35.71	2287.24	37.34	2289.74	37.34
2290.56	37.42	2303.21	38.65	2309.97	38.49	2329.96	38.37	2383.36	37.82
2401.4	37.27	2417.94	37.79	2487.78	38.18	2519.04	38.05	2550.23	37.28
2580.12	36.81	2587.04	37.22	2610.42	37.99	2641.54	38.15	2670.44	38.12
2709.24	38.02	2732.54	37.48	2758.37	36.35	2804.75	37.43	2828.21	37.71
2852.56	37.78	2869.53	38.05	2938.47	37.79	3013.58	36.92	3098.01	36.76
3104.09	36.82	3113.21	37.44	3131.43	36.71	3143.21	36.92	3172.69	37.07
3173.38	37.08	3174.24	37.1	3195.95	38.75	3203.21	38.69	3217.74	38.08
3218.36	38.11	3218.67	38.09	3233.43	38.11	3270.4	37.54	3303.33	36.96
3337.55	38.72	3338.32	38.76	3339.2	38.74	3368.51	38.74	3375.85	38.72
3390.57	39.02	3398.21	39.08	3427.75	38.48	3428.67	38.49	3465.61	38.15
3487.88	37.96	3488.31	37.96	3488.43	37.96	3548.21	38.19	3548.26	38.19
3548.31	38.19	3578.15	34.35	3578.27	34.33	3600.69	36.64	3613.22	39.53
3623.22	38.86	3634.46	38.45	3660.75	40.28	3673.24	40.93	3679.47	41.31
3686.95	42.25	3693.17	42.18	3713.04	38.16	3713.17	38.14	3713.21	38.14
3713.3	38.13	3743.09	34.89	3743.21	34.89	3743.33	34.9	3758.21	37.91
3758.35	37.91	3766.22	38.08						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.06	2144.81	.04	2303.21	.06

Bank Sta: Left	Right	Coeff Contr.	Expan.
2144.81	2303.21	.3	.5

Blocked Obstructions num= 1

Sta L	Sta R	Elev
3648.67	3708.97	41.5

Downstream Deck/Roadway Coordinates
num= 4

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
2165.79	39.5	35	2174.16	41.39	35.29	2260.14	41.12	35.29
2304.67	37.98	35.29						

Downstream Bridge Cross Section Data
Station Elevation Data num= 221

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	174.71	19.37	174.61	42.77	174.42	54.07	172.81	64.97	170.52
69.07	170.32	79.71	174.02	84.07	174.22	88.6	174.08	99.07	173.49
119.15	170.15	133.91	167.62	138.66	167.2	144.08	166.53	179.85	164.85
186.99	164.4	191.21	164.35	198.83	164.21	292.06	161.78	296.17	161.68
305.31	161.56	345.14	161.23	397.8	159.53	423.11	159.63	444.13	158.9
455.22	158.25	464.76	157.92	494.5	155.96	502.61	155.47	504.14	155.53
507.13	155.32	534.14	155.14	542.82	154.53	551.71	154.74	571.08	154.61
619.27	154.8	623.25	154.77	624.75	154.75	673.88	153.53	698.09	152.9
699.26	152.87	750.99	151.32	775.17	150.18	786.09	149.53	794.91	149.55
815.49	149.55	888.62	148.94	904.71	149.17	930.74	149.26	949.24	147.98

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  989.48  146.66  999.22  146.37 1022.97  144.89 1057.08  140.81 1069.98  139.25
 1077.85  137.96 1096.96  134.12 1116.88  130.05 1132.81  128.06 1145.03  126.25
 1149.24  125.18 1157.91  124.01  1166.9  122.44 1176.24  120.99 1187.95  119.22
 1224.26  114.89 1229.31  114.32 1245.85  114.85 1267.07  114.81  1270.7  114.83
 1277.65  114.68 1306.82  113.22 1329.27   112.9 1353.61  111.84 1360.18  111.44
 1361.08  111.51 1400.03  111.68 1420.91  111.18 1434.29  110.01 1444.69  108.51
 1463.43     108  1479.3  107.71 1487.02  107.32 1523.66  108.17 1524.53  108.16
    1564  105.99 1569.31  106.52 1578.91  107.52 1611.64   106.5 1614.32  106.45
 1617.15  106.16 1659.32  104.46 1668.23  103.86 1674.33  104.38 1677.29  104.47
 1683.36  103.68 1712.16   97.57 1717.49   96.37 1730.42   93.62 1733.02   93.14
 1735.67   92.52 1738.39   92.14  1755.8   90.21  1783.2   85.38 1809.35   81.03
 1825.61    77.6 1839.35   74.52 1848.33   73.44 1862.27   71.79 1869.36   69.82
  1883.8   66.41 1910.79   59.14 1920.04   56.72 1936.76   52.58 1959.37   47.07
  1974.9   45.02 1994.72   42.84 2000.01   42.45 2025.92   41.32 2039.11   40.31
 2071.53   38.72 2103.92   38.71 2105.05   38.69  2124.4   38.53 2150.78   32.13
  2154.4   31.09 2162.83   36.06 2170.57   33.44 2170.64   33.74 2170.72   34.01
 2170.82   33.97 2170.89   33.86 2173.11   33.62 2186.84   21.73 2199.41   28.63
 2202.19   28.69 2214.41   28.55 2220.68   29.92 2232.31   31.35 2243.32   35.12
 2247.88   35.78 2250.18   36.11 2255.08   36.83 2255.56    36.9 2256.89   37.09
 2259.49   37.81 2260.22   37.82 2272.84   37.96  2281.1   38.05 2321.34   38.24
 2344.64   38.21 2349.43   38.17 2354.25   37.53 2364.04   38.17 2379.43   37.58
 2386.97   37.27 2394.43   36.42 2425.32   36.68 2456.79   36.86  2488.7   37.27
 2520.81   37.87 2528.53   38.02 2530.37   37.99 2532.26   37.93 2567.54   37.04
 2583.59    36.2 2589.45   36.15 2593.88   36.56 2620.18   37.84  2708.9   36.35
 2734.41   35.75 2769.41   35.87 2784.47   36.55 2797.65   36.31 2802.22   36.42
 2810.72   36.62 2824.88   37.27 2838.47   37.49 2903.63   37.49 3027.37   37.09
 3112.37   38.43  3114.5   38.53 3119.71   38.35 3169.96   38.49  3174.5    38.6
 3176.72   38.98  3189.5   39.45 3193.72   39.46 3248.35   39.73 3262.31    40.2
 3265.32   39.96 3279.51   40.05 3282.53   39.99  3310.4   39.15 3333.05   37.54
 3350.22   38.04  3386.2   37.86 3406.15   37.36 3422.93   37.33  3444.8   37.68
 3463.72   36.89  3467.3   36.77 3474.53   35.92 3489.29   33.72 3489.53   33.69
 3489.76   33.69 3489.99   33.75  3514.5    38.6 3519.53   38.23 3548.97   38.83
 3549.53   38.84 3549.82   38.91 3551.32   38.97 3594.54   42.05  3601.4      42
 3626.14    37.9 3639.54   36.95 3641.35   37.29 3654.54   35.46 3661.01   37.17
 3663.68   37.32

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .06 2162.83     .04 2259.49     .06

Bank Sta: Left   Right    Coeff Contr.   Expan.
        2124.4 2259.49             .3       .5
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
    3330 3650.78      40

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Piers =  2

Pier Data
Pier Station     Upstream= 2207.92    Downstream= 2191.29
Upstream     num=       2
    Width   Elev    Width   Elev
     1.5   27.76     1.5   47.76
Downstream     num=       2
    Width   Elev    Width   Elev
     1.5   27.76     1.5   47.76

Pier Data
Pier Station     Upstream= 2233.44    Downstream= 2224.15
Upstream     num=       2
    Width   Elev    Width   Elev
```

```
     1.5   27.76     1.5   47.76
Downstream     num=       2
    Width   Elev    Width   Elev
     1.5   27.76     1.5   47.76

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Energy
       Momentum               Cd   =     1.2
       Yarnell                KVal =    1.05
Selected Low Flow Methods = Highest Energy Answer

High Flow Method
       Energy Only

Additional Bridge Parameters
       Add Friction component to Momentum
       Do not add Weight component to Momentum
       Class B flow critical depth computations use critical depth
           inside the bridge at the upstream end
       Criteria to check for pressure flow = Upstream energy grade line

CROSS SECTION


RIVER: P1140000
REACH: P114-00-00_0006    RS: 5834.053

INPUT
Description:
Station Elevation Data    num=     221
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  174.71   19.37  174.61   42.77  174.42   54.07  172.81   64.97  170.52
   69.07  170.32   79.71  174.02   84.07  174.22    88.6  174.08   99.07  173.49
  119.15  170.15  133.91  167.62  138.66   167.2  144.08  166.53  179.85  164.85
  186.99   164.4  191.21  164.35  198.83  164.21  292.06  161.78  296.17  161.68
  305.31  161.56  345.14  161.23   397.8  159.53  423.11  159.63  444.13   158.9
  455.22  158.25  464.76  157.92   494.5  155.96  502.61  155.47  504.14  155.53
  507.13  155.32  534.14  155.14  542.82  154.53  551.71  154.74  571.08  154.61
  619.27   154.8  623.25  154.77  624.75  154.75  673.88  153.53  698.09   152.9
  699.26  152.87  750.99  151.32  775.17  150.18  786.09  149.53  794.91  149.55
  815.49  149.55  888.62  148.94  904.71  149.17  930.74  149.26  949.24  147.98
  989.48  146.66  999.22  146.37 1022.97  144.89 1057.08  140.81 1069.98  139.25
 1077.85  137.96 1096.96  134.12 1116.88  130.05 1132.81  128.06 1145.03  126.25
 1149.24  125.18 1157.91  124.01  1166.9  122.44 1176.24  120.99 1187.95  119.22
 1224.26  114.89 1229.31  114.32 1245.85  114.85 1267.07  114.81  1270.7  114.83
 1277.65  114.68 1306.82  113.22 1329.27   112.9 1353.61  111.84 1360.18  111.44
 1361.08  111.51 1400.03  111.68 1420.91  111.18 1434.29  110.01 1444.69  108.51
 1463.43     108  1479.3  107.71 1487.02  107.32 1523.66  108.17 1524.53  108.16
    1564  105.99 1569.31  106.52 1578.91  107.52 1611.64   106.5 1614.32  106.45
 1617.15  106.16 1659.32  104.46 1668.23  103.86 1674.33  104.38 1677.29  104.47
 1683.36  103.68 1712.16   97.57 1717.49   96.37 1730.42   93.62 1733.02   93.14
 1735.67   92.52 1738.39   92.14  1755.8   90.21  1783.2   85.38 1809.35   81.03
 1825.61    77.6 1839.35   74.52 1848.33   73.44 1862.27   71.79 1869.36   69.82
  1883.8   66.41 1910.79   59.14 1920.04   56.72 1936.76   52.58 1959.37   47.07
  1974.9   45.02 1994.72   42.84 2000.01   42.45 2025.92   41.32 2039.11   40.31
 2071.53   38.72 2103.92   38.71 2105.05   38.69  2124.4   38.53 2150.78   32.13
  2154.4   31.09 2162.83   36.06 2170.57   33.44 2170.64   33.74 2170.72   34.01
 2170.82   33.97 2170.89   33.86 2173.11   33.62 2186.84   21.73 2199.41   28.63
 2202.19   28.69 2214.41   28.55 2220.68   29.92 2232.31   31.35 2243.32   35.12
 2247.88   35.78 2250.18   36.11 2255.08   36.83 2255.56    36.9 2256.89   37.09
 2259.49   37.81 2260.22   37.82 2272.84   37.96  2281.1   38.05 2321.34   38.24
 2344.64   38.21 2349.43   38.17 2354.25   37.53 2364.04   38.17 2379.43   37.58
 2386.97   37.27 2394.43   36.42 2425.32   36.68 2456.79   36.86  2488.7   37.27
 2520.81   37.87 2528.53   38.02 2530.37   37.99 2532.26   37.93 2567.54   37.04
 2583.59    36.2 2589.45   36.15 2593.88   36.56 2620.18   37.84  2708.9   36.35
 2734.41   35.75 2769.41   35.87 2784.47   36.55 2797.65   36.31 2802.22   36.42
 2810.72   36.62 2824.88   37.27 2838.47   37.49 2903.63   37.49 3027.37   37.09
```

```
 3112.37   38.43  3114.5   38.53 3119.71   38.35 3169.96   38.49  3174.5    38.6
 3176.72   38.98  3189.5   39.45 3193.72   39.46 3248.35   39.73 3262.31    40.2
 3265.32   39.96 3279.51   40.05 3282.53   39.99  3310.4   39.15 3333.05   37.54
 3350.22   38.04  3386.2   37.86 3406.15   37.36 3422.93   37.33  3444.8   37.68
 3463.72   36.89  3467.3   36.77 3474.53   35.92 3489.29   33.72 3489.53   33.69
 3489.76   33.69 3489.99   33.75  3514.5    38.6 3519.53   38.23 3548.97   38.83
 3549.53   38.84 3549.82   38.91 3551.32   38.97 3594.54   42.05  3601.4      42
 3626.14    37.9 3639.54   36.95 3641.35   37.29 3654.54   35.46 3661.01   37.17
 3663.68   37.32

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .06 2162.83     .04 2259.49     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        2124.4 2259.49           657.14   658.2  659.64             .3       .5
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
    3330 3650.78      40

CROSS SECTION


RIVER: P1140000
REACH: P114-00-00_0006    RS: 5175.881

INPUT
Description:
Station Elevation Data    num=     173
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  175.06   12.04  174.86   43.37  169.56   78.41  163.02   81.72  162.46
  110.47   160.6  111.24  160.55  112.03  160.54  213.62  159.01  251.98  158.53
  278.06  158.29  320.56  157.25  410.42  155.08  434.44   154.6  498.73  153.34
  500.46  153.32  500.83  153.32  501.36  153.32  530.86  153.08  544.67  152.79
  548.44  152.89   572.3   153.3   575.9  153.12  596.64  153.81  605.93  153.11
  608.51  152.83  632.85  151.66  649.84  150.97  669.59  149.94     681  149.21
  684.29  149.23  708.25   148.1  711.03     148  723.59   147.3  726.04  147.19
  728.38  147.11  730.63  147.01  738.75  146.88  765.12  145.15  768.67  145.13
  781.05  144.55  788.68  144.18  791.31  144.16  805.89   142.9  874.55   142.9
  875.76  142.86  876.18  142.85  904.27  142.49  906.21  142.44  912.75  142.32
  930.75  141.45  936.23  141.29  946.52  140.74  962.05  139.26  978.31  136.62
 1003.48  131.52 1018.48  128.22 1041.33   123.6 1105.82  116.19 1130.59  113.57
 1160.39  113.31 1161.44   113.3 1176.08  116.93 1176.46     117  1176.8  117.18
 1184.84  120.87  1191.2  123.81 1191.47  123.91 1192.46  123.89 1227.74  123.18
 1239.68  123.12 1260.05  122.73 1266.54  122.65 1270.23  122.57 1296.83  122.21
  1326.6   121.4 1335.13   120.4 1341.61  119.43 1348.68  118.42 1356.63  115.77
 1363.91  114.49 1380.06  111.68 1389.74  112.05 1398.26  112.23 1411.78  112.61
 1427.14  112.37 1446.71  111.73 1464.66  107.49 1470.57  107.52 1476.74  105.32
 1485.38     105 1536.63  104.54 1536.71  104.55 1536.88  104.54 1536.98  104.52
  1580.8   98.82 1581.14    98.7 1582.92   98.41 1584.51   98.09 1694.61   75.61
 1701.95   74.43 1727.77   70.49 1734.88   69.75 1770.19   67.74 1777.02   67.23
 1788.35   67.37 1816.52   68.76 1822.06   69.02 1826.72   67.76 1852.09   61.22
 1866.49   61.43  1867.1   61.44 1867.66   61.44 1880.69   61.58 1882.11    61.6
 1896.45   59.76 1897.13   59.67 1897.87    59.4 1925.23   51.14 1926.17   50.92
 1927.16   50.69 1929.25   50.18 1934.07   49.18 1966.54   41.71 1977.61   40.04
 1987.21   38.68 2006.39   39.11 2017.24   39.33  2019.8   39.11 2049.19   36.56
 2051.42   36.44 2063.25    36.3 2064.05   35.98 2083.87   28.68 2092.29   26.64
 2095.57   26.33 2097.34   26.41  2107.3   26.97 2115.88   26.41 2121.07   25.14
 2125.99   21.03 2126.51   20.57 2128.24   20.24  2128.9   20.13 2128.91   20.14
 2132.18   21.27 2132.49   21.32 2147.21   27.49 2163.78   33.15 2167.35   34.26
 2170.65   34.88    2181   36.94 2186.14   37.07 2196.14    36.3 2196.33   36.28
 2196.34   36.28 2197.37    36.2 2199.58   36.38 2209.23   36.97 2239.26   38.81
 2268.44   37.99 2286.19    38.6 2286.82   38.66 2291.85    39.2 2311.58   41.33
 2328.54   42.51 2347.79   44.27 2362.56   46.16 2367.13   46.23 2400.08    46.9
 2414.45   48.59 2422.63   48.56 2424.36   48.55

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .06 2063.25     .04 2209.23     .06
```

```
Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       2063.25 2209.23           917.41  917.13  916.83             .1       .3

CROSS SECTION


RIVER: P1140000
REACH: P114-00-00_0006    RS: 4258.749

INPUT
Description:
Station Elevation Data    num=     171
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  170.46    1.54  170.22   29.97  165.71    30.3  165.64  107.08  151.85
  135.03  146.45  155.32  143.67  161.88  142.84  182.63  142.69  195.07  142.68
  217.81  140.96  228.41  140.38  238.47  139.52  241.74  139.05  278.09  134.31
  295.21  131.91  304.72  130.58  315.14  128.56  338.27  122.61  375.17  111.72
  389.34  109.39     391  109.12  393.29   108.7   420.2  102.96  430.01  102.07
  440.23  100.84  464.78  100.23  465.85   100.2  495.24  100.73  497.26  100.69
  503.87   99.59  531.66   96.26  555.28   92.35  567.65   89.42  572.89   88.18
  577.12   87.19  622.43   77.41  660.34   67.94     682   62.81  694.76    60.1
  699.32   59.17  705.37   58.12  711.02   58.28  720.38   58.68  725.53   57.23
  735.39   54.78  812.46    51.3  824.57   50.73  826.28   50.56  840.45   50.03
  841.61   49.82  855.46   47.86  870.29   45.51  870.63   45.45  893.29   39.48
  905.15   38.17  926.96   35.67   930.5   35.28  932.46   35.73  963.49   38.15
  990.54    37.4 1000.18   30.68 1005.55   27.82 1015.46   27.69 1020.55   26.83
 1032.36   22.84 1044.44   21.51  1056.8   21.39 1069.75    20.9 1077.67   21.31
 1122.35   21.29 1140.63   21.29 1153.35   21.26 1209.05   21.41 1229.25   21.58
  1231.6   21.47 1245.69   21.27 1249.97   20.37 1268.95   17.08 1319.72   13.21
 1320.73   13.13 1321.03   13.11 1362.33   13.16 1365.76   13.24 1366.69   13.27
 1380.77   13.86  1383.2    14.3 1395.78   16.44 1401.75   16.65 1410.78   17.06
 1422.03   16.24 1429.83   16.13 1455.81   17.25 1468.14   15.89 1470.82   15.58
 1476.46   15.55 1482.78   15.54 1517.66   15.69  1605.9   15.76 1625.17   14.54
 1635.92   14.02 1647.43   15.87 1650.93    16.4 1656.84   15.72 1665.93   14.81
 1676.95   14.55 1748.51   14.02 1808.86   13.83 1816.02   13.65 1824.51   15.76
 1865.03   29.52 1876.06   33.28 1886.36   34.92 1891.07   35.67 1900.87   35.74
 1906.08   35.78 1911.65   37.26 1921.09   39.69 1933.76   40.16  1951.1   40.75
 1962.27   40.04 1973.42   38.44 1981.12   36.92 1981.33    36.9 2005.15   35.22
 2020.52   33.97 2024.77   33.92 2029.24   33.69 2030.63   33.83 2034.87   32.27
 2041.15   27.74 2054.63   26.33 2056.71   26.12 2071.17   23.65 2078.83   24.23
 2087.55   19.49 2088.03   19.35 2092.31   19.14  2095.2   19.53  2096.4   20.01
 2104.15   27.57 2115.94    27.5 2122.34   30.16 2148.32   37.41 2148.52   37.42
 2158.94   38.29 2160.61    38.4 2161.74   38.48 2162.74   38.57    2187   40.32
 2191.27   40.63 2212.38   42.35 2237.74   45.05 2242.35   45.26 2251.27   46.73
 2284.31   47.64 2293.37   47.71 2300.11   48.24 2312.85   47.32 2338.02   45.44
 2361.93   44.59 2372.78   44.49 2386.34   44.48 2390.57    44.3  2412.5   42.46
 2423.71   41.57 2437.09   41.37 2463.63   41.05 2491.06   39.09 2506.41   37.69
 2512.93   37.57

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0     .06  990.54     .99 1933.76     .06 1973.42     .04 2148.32     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1973.42 2148.32           684.38  613.57  557.28             .3       .5
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
  990.54 1933.76    41.5       T

CROSS SECTION


RIVER: P1140000
REACH: P114-00-00_0006    RS: 3645.18

INPUT
Description:
Station Elevation Data    num=      68
```

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	35.98	4.18	35.58	12.89	34.54	29.8	35.5	31.45	35.48
39.48	34.92	60.45	33.32	64.03	33.6	66.32	33.14	74.89	33.56
84.06	28.8	84.13	28.76	87.66	29.2	94.2	32.89	102.18	28.96
115.13	25.97	117.71	24.97	120.22	24.47	130.51	22.74	139.81	20.93
142.11	21.38	150.23	19.68	151.23	20.65	156.63	22.8	158.88	24.26
159.43	24.55	159.82	24.61	172.7	32.25	172.79	32.31	174.36	33.3
175.84	33.67	186.79	34.69	200.08	34.92	210.45	35.33	217.61	35.64
217.67	35.64	246.54	37.47	247.94	37.51	264.58	37.22	271.71	37.55
287.99	37.49	294.87	37.6	318.71	38.26	323.64	38.53	331.01	38.97
334.45	38.79	336.76	38.76	348.37	39.3	354.8	39.44	357.99	39.46
372.85	38.93	388.52	39.94	435.32	40.25	445.03	40.24	465.93	40.18
488.74	39.96	499.16	39.72	519.9	39.87	539.91	40.03	570.06	40.08
571.34	40.04	572.35	40.08	581.39	40.06	603.04	39.65	604.79	39.6
610.73	39.71	625.47	38.99	637.05	39				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.06	94.2	.04	174.36	.06

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
74.89	174.36	33.4	32.75	32.2	.3	.5

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
0	34	38.75	581.39	637.05	41.5

BRIDGE

RIVER: P1140000
REACH: P114-00-00_0006 RS: 3614.18

INPUT
Description: Rail Road Bridge

Distance from Upstream XS = 1
Deck/Roadway Width = 30
Weir Coefficient = 2.6
Upstream Deck/Roadway Coordinates
num= 7

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
33.02	38.73	34.97	89.15	38.97	34.97	135.38	38.97	34.97
201.42	39.19	35.19	247.64	39.13	35.13	303.77	39.13	35.13
353.3	38.64	35.13						

Upstream Bridge Cross Section Data
Station Elevation Data num= 68

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	35.98	4.18	35.58	12.89	34.54	29.8	35.5	31.45	35.48
39.48	34.92	60.45	33.32	64.03	33.6	66.32	33.14	74.89	33.56
84.06	28.8	84.13	28.76	87.66	29.2	94.2	32.89	102.18	28.96
115.13	25.97	117.71	24.97	120.22	24.47	130.51	22.74	139.81	20.93
142.11	21.38	150.23	19.68	151.23	20.65	156.63	22.8	158.88	24.26
159.43	24.55	159.82	24.61	172.7	32.25	172.79	32.31	174.36	33.3
175.84	33.67	186.79	34.69	200.08	34.92	210.45	35.33	217.61	35.64
217.67	35.64	246.54	37.47	247.94	37.51	264.58	37.22	271.71	37.55
287.99	37.49	294.87	37.6	318.71	38.26	323.64	38.53	331.01	38.97
334.45	38.79	336.76	38.76	348.37	39.3	354.8	39.44	357.99	39.46
372.85	38.93	388.52	39.94	435.32	40.25	445.03	40.24	465.93	40.18
488.74	39.96	499.16	39.72	519.9	39.87	539.91	40.03	570.06	40.08
571.34	40.04	572.35	40.08	581.39	40.06	603.04	39.65	604.79	39.6
610.73	39.71	625.47	38.99	637.05	39				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.06	94.2	.04	174.36	.06

Bank Sta: Left	Right	Coeff Contr.	Expan.
74.89	174.36	.3	.5

```
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
       0      34   38.75  581.39  637.05    41.5

Downstream  Deck/Roadway Coordinates
    num=       7
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
   33.02   38.73   34.97   89.15   38.97   34.97  135.38   38.97   34.97
  201.42   39.19   35.19  247.64   39.13   35.13  303.77   39.13   35.13
   353.3   38.64   35.13

Downstream Bridge Cross Section Data
Station Elevation Data    num=      67
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   35.19   12.29   35.22   27.15   34.21   33.02    35.1   46.04   33.81
    58.4   33.74    59.3   33.75   86.74   29.61    88.9   29.66   93.47   32.96
   95.42   33.12   99.01   31.56  117.53   23.92  120.98   20.72  125.97   20.65
  136.71   19.53  144.04   19.87  161.51   29.11  161.68   29.25  161.81   29.27
  170.66   30.06  173.08   30.85  176.62   32.02  178.89   32.77  186.26   34.02
  193.02      33  205.99   32.73  213.06   33.35  216.01   33.51  224.36   33.95
  247.23   34.38  250.21   34.71  255.69   34.78  272.33   34.74  291.02   34.92
  298.48   35.06  308.85   35.15  318.37   35.33  332.65   35.39  349.71   36.01
  349.72   36.01  349.76   36.01  366.81    35.7  371.84   35.49  381.04   35.37
  418.07   34.95  427.12   34.64  435.15   35.49  438.17   35.87  443.72    35.6
  469.32   35.89  475.06   35.91  493.46   35.09  503.49   35.99  504.51   36.14
  506.39   36.05  537.66   36.38  537.68   36.39  537.73   36.38  538.54   36.39
  569.07   36.34  571.09   36.32  575.13   36.36  588.91   35.71  592.97   35.84
  618.49   36.51  635.55   36.49

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .06   95.42     .04  186.26     .06

Bank Sta: Left   Right    Coeff Contr.   Expan.
          59.3  186.26             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0   33.02      38       T
  349.71  635.55      38       T

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Piers =  3

Pier Data
Pier Station     Upstream=  103.17    Downstream=  103.17
Upstream     num=       2
    Width   Elev    Width   Elev
     1.5   27.76     1.5   35.19
Downstream     num=       2
    Width   Elev    Width   Elev
     1.5   23.43     1.5   35.19

Pier Data
Pier Station     Upstream=  141.98    Downstream=  141.98
Upstream     num=       2
    Width   Elev    Width   Elev
     1.5   27.76     1.5   35.19
Downstream     num=       2
    Width   Elev    Width   Elev
     1.5   23.43     1.5   35.19

Pier Data
```

```
Pier Station     Upstream=  180.79    Downstream=  180.79
Upstream     num=       2
    Width   Elev    Width   Elev
     1.5   27.76     1.5   35.19
Downstream     num=       2
    Width   Elev    Width   Elev
     1.5   23.43     1.5   35.19

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Energy
       Momentum               Cd   =     1.2
       Yarnell                KVal =    1.05
Selected Low Flow Methods = Highest Energy Answer

High Flow Method
       Energy Only

Additional Bridge Parameters
       Add Friction component to Momentum
       Do not add Weight component to Momentum
       Class B flow critical depth computations use critical depth
           inside the bridge at the upstream end
       Criteria to check for pressure flow = Upstream energy grade line

CROSS SECTION


RIVER: P1140000
REACH: P114-00-00_0006    RS: 3591.3

INPUT
Description:
Station Elevation Data    num=      67
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   35.19   12.29   35.22   27.15   34.21   33.02    35.1   46.04   33.81
    58.4   33.74    59.3   33.75   86.74   29.61    88.9   29.66   93.47   32.96
   95.42   33.12   99.01   31.56  117.53   23.92  120.98   20.72  125.97   20.65
  136.71   19.53  144.04   19.87  161.51   29.11  161.68   29.25  161.81   29.27
  170.66   30.06  173.08   30.85  176.62   32.02  178.89   32.77  186.26   34.02
  193.02      33  205.99   32.73  213.06   33.35  216.01   33.51  224.36   33.95
  247.23   34.38  250.21   34.71  255.69   34.78  272.33   34.74  291.02   34.92
  298.48   35.06  308.85   35.15  318.37   35.33  332.65   35.39  349.71   36.01
  349.72   36.01  349.76   36.01  366.81    35.7  371.84   35.49  381.04   35.37
  418.07   34.95  427.12   34.64  435.15   35.49  438.17   35.87  443.72    35.6
  469.32   35.89  475.06   35.91  493.46   35.09  503.49   35.99  504.51   36.14
  506.39   36.05  537.66   36.38  537.68   36.39  537.73   36.38  538.54   36.39
  569.07   36.34  571.09   36.32  575.13   36.36  588.91   35.71  592.97   35.84
  618.49   36.51  635.55   36.49

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .06   95.42     .04  186.26     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          59.3  186.26             21.2   22.88   26.34             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0   33.02      38       T
  349.71  635.55      38       T

CROSS SECTION


RIVER: P1140000
REACH: P114-00-00_0006    RS: 3570.41

INPUT
```

Description:
Station Elevation Data num= 67

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	35.19	12.29	35.22	27.15	34.21	34.13	34.72	46.04	33.81
58.4	33.74	59.3	33.75	86.74	29.61	88.9	29.66	93.47	32.96
95.42	33.12	99.01	31.56	117.53	23.92	120.98	20.72	125.97	20.65
136.71	19.53	144.04	19.87	161.51	29.11	161.68	29.25	161.81	29.27
170.66	30.06	173.08	30.85	176.62	32.02	178.89	32.77	186.26	34.02
193.02	33	205.99	32.73	213.06	33.35	216.01	33.51	224.36	33.95
247.23	34.38	250.21	34.71	255.69	34.78	272.33	34.74	291.02	34.92
298.48	35.06	308.85	35.15	318.37	35.33	332.65	35.39	349.71	36.01
349.72	36.01	349.76	36.01	366.81	35.7	371.84	35.49	381.04	35.37
418.07	34.95	427.12	34.64	435.15	35.49	438.17	35.87	443.72	35.6
469.32	35.89	475.06	35.91	493.46	35.09	503.49	35.99	504.51	36.14
506.39	36.05	537.66	36.38	537.68	36.39	537.73	36.38	538.54	36.39
569.07	36.34	571.09	36.32	575.13	36.36	588.91	35.71	592.97	35.84
618.49	36.51	635.55	36.49						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.06	95.42	.04	186.26	.06

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
59.3 186.26 19.94 20.89 25.31 .3 .5
Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	59.3	38	T
349.71	635.55	38	T

CROSS SECTION

RIVER: P1140000
REACH: P114-00-00_0006 RS: 3549.434

INPUT
Description:
Station Elevation Data num= 67

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	35.19	12.29	35.22	27.15	34.21	34.13	34.72	46.04	33.81
58.4	33.74	59.3	33.75	86.74	29.61	88.9	29.66	93.47	32.96
95.42	33.12	99.01	31.56	117.53	23.92	120.98	20.72	125.97	20.65
136.71	19.53	144.04	19.87	161.51	29.11	161.68	29.25	161.81	29.27
170.66	30.06	173.08	30.85	176.62	32.02	178.89	32.77	186.26	34.02
193.02	33	205.99	32.73	213.06	33.35	216.01	33.51	224.36	33.95
247.23	34.38	250.21	34.71	255.69	34.78	272.33	34.74	291.02	34.92
298.48	35.06	308.85	35.15	318.37	35.33	332.65	35.39	349.71	36.01
349.72	36.01	349.76	36.01	366.81	35.7	371.84	35.49	381.04	35.37
418.07	34.95	427.12	34.64	435.15	35.49	438.17	35.87	443.72	35.6
469.32	35.89	475.06	35.91	493.46	35.09	503.49	35.99	504.51	36.14
506.39	36.05	537.66	36.38	537.68	36.39	537.73	36.38	538.54	36.39
569.07	36.34	571.09	36.32	575.13	36.36	588.91	35.71	592.97	35.84
618.49	36.51	635.55	36.49						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.06	95.42	.04	186.26	.06

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
59.3 186.26 221 224 226.71 .3 .5
Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	59.3	38	T
349.71	635.55	38	T

CULVERT

RIVER: P1140000

REACH: P114-00-00_0006   RS: 3448.434

INPUT
Description: Highway 90
Distance from Upstream XS =   1
Deck/Roadway Width   =   100
Weir Coefficient   =   2.6
Upstream Deck/Roadway Coordinates
    num=   6
     Sta Hi Cord Lo Cord   Sta Hi Cord Lo Cord   Sta Hi Cord Lo Cord
   46.85   32.24   85.85   37.8   171.7   37.9
  188.21   36.5   214.62   36.7   350.21   35.63

Upstream Bridge Cross Section Data
Station Elevation Data   num=   67
     Sta   Elev   Sta   Elev   Sta   Elev   Sta   Elev   Sta   Elev
       0   35.19   12.29   35.22   27.15   34.21   34.13   34.72   46.04   33.81
    58.4   33.74   59.3   33.75   86.74   29.61   88.9   29.66   93.47   32.96
   95.42   33.12   99.01   31.56 117.53   23.92 120.98   20.72 125.97   20.65
  136.71   19.53 144.04   19.87 161.51   29.11 161.68   29.25 161.81   29.27
  170.66   30.06 173.08   30.85 176.62   32.02 178.89   32.77 186.26   34.02
  193.02   33 205.99   32.73 213.06   33.35 216.01   33.51 224.36   33.95
  247.23   34.38 250.21   34.71 255.69   34.78 272.33   34.74 291.02   34.92
  298.48   35.06 308.85   35.15 318.37   35.33 332.65   35.39 349.71   36.01
  349.72   36.01 349.76   36.01 366.81   35.7 371.84   35.49 381.04   35.37
  418.07   34.95 427.12   34.64 435.15   35.49 438.17   35.87 443.72   35.6
  469.32   35.89 475.06   35.91 493.46   35.09 503.49   35.99 504.51   36.14
  506.39   36.05 537.66   36.38 537.68   36.39 537.73   36.38 538.54   36.39
  569.07   36.34 571.09   36.32 575.13   36.36 588.91   35.71 592.97   35.84
  618.49   36.51 635.55   36.49

Manning's n Values   num=   3
     Sta   n Val   Sta   n Val   Sta   n Val
       0   .06   95.42   .04 186.26   .06

Bank Sta: Left   Right   Coeff Contr.   Expan.
          59.3 186.26   .3   .5
Ineffective Flow   num=   2
   Sta L   Sta R   Elev Permanent
       0   59.3   38   T
  349.71 635.55   38   T

Downstream Deck/Roadway Coordinates
    num=   6
     Sta Hi Cord Lo Cord   Sta Hi Cord Lo Cord   Sta Hi Cord Lo Cord
   46.85   32.24   85.85   37.8   171.7   37.9
  188.21   37.5   214.62   37.5   350.21   35.63

Downstream Bridge Cross Section Data
Station Elevation Data   num=   170
     Sta   Elev   Sta   Elev   Sta   Elev   Sta   Elev   Sta   Elev
       0   35.33   3.31   34.85   7.39   34.79   9.6   34.52   17.09   34.74
   28.39   35.4   34.73   35.74   43.74   36.17   54.46   34.73   59.63   34.01
   64.47   33.91   95.88   34.46   97.58   34.28 122.36   31.77 140.84   32.12
  151.19   32.31 160.44   32.31 183.11   30.26 197.37   28.86 203.93   26.57
   205.6   26.24   206.3   26.1   206.6   26.05 208.09   25.76 210.73   25.21
     220   20.66   222   20.46 231.82   21.6 239.47   21.35 249.11   20.73
  252.83   20.6 264.31   18.4 266.16   15.63 269.25   12 279.32   10
  279.33   10 279.37   9.8 283.69   10.5 288.42   11 289.92   11.83
  300.98   21.21 305.41   24.11 314.46   28.42 320.26   31.93 322.47   33.26
  327.39   36.24 330.57   36.33 335.56   36.35 349.03   36.05 366.45   35.66
  417.36   34.62 421.84   34.5 434.66   34.11 444.77   34.29 485.11   35.79
  509.61   36.52   521.8   36.6 611.98   35.74   614.1   35.74 627.27   35.66
  814.93   35.78 818.04   35.78 821.21   35.79 822.45   35.79 824.49   35.83
  825.48   35.81 827.29   35.83 1054.07   37.15   1095   37.09 1147.21   37.67
 1165.08   37.65 1247.43   36.76 1262.52   36.61 1359.39   35.62 1387.89   35.41
 1411.56   35.42 1426.16   36.33 1451.28   36.42 1479.61   36.39 1491.94   36.36
 1562.17   35.76 1614.58   35.4 1621.83   35.85 1680.23   35.76 1683.22   35.78
 1700.25   36.32 1709.96   36.1 1739.12   36.23 1769.48   36.07 1819.16   35.93

```
 1856.61   36.34 1922.55   36.13 1939.92   36.05 1983.29   35.96 2008.92   36.21
 2011.44   36.12 2043.42   34.74 2044.04    34.8 2048.54   35.19 2076.05   37.56
 2076.65   37.66 2077.93   37.71 2080.54   37.66 2118.72   36.77 2164.89   37.12
 2186.92   37.56  2245.9   38.09 2384.92   38.05 2420.15   37.87 2435.66   37.88
 2446.62   38.86 2469.23   37.89 2474.69    37.9 2487.94   38.48 2528.43   36.73
 2538.35   36.85 2665.97   37.21 2698.96   36.81 2710.05   36.47 2723.45   36.31
 2725.76   36.26 2780.01   35.88 2815.21    35.9  2817.1   36.08 2819.71   36.09
 2859.45   37.12  2873.6   37.12 2898.69   35.89 2904.97   35.66  2912.5   35.72
 3012.27   36.64 3171.63      38 3183.85   38.02 3185.85   38.06 3187.17   38.08
 3204.13   37.92  3393.5   36.93 3406.24    36.6 3407.42   36.58 3407.58   36.59
 3480.17   36.51 3536.57   36.61 3557.97   36.73  3763.3   37.94 3799.07   38.23
  3817.1   38.13 3819.52   38.15 3896.65   37.32 3951.36    36.6 3953.86   36.56
 3970.48   37.68 3984.95   38.54 4028.51    38.8 4045.54   38.82 4093.48   39.09
  4119.3   39.21 4200.09   38.78 4225.82    38.6 4332.02   40.61 4337.27   40.61
 4347.49   40.45 4431.21   39.52 4524.37   39.01 4551.05   38.62 4564.82   38.36
  4616.4   37.51 4625.57   37.84 4675.06   39.18 4707.84    39.3 4790.08   39.23

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .06  197.37     .04  314.46     .06

Bank Sta: Left   Right    Coeff Contr.   Expan.
        197.37  314.46             .3       .5

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Culverts =  2

Culvert Name     Shape      Rise    Span
Culvert #1           Box      10      10
FHWA Chart # 8 - flared wingwalls
FHWA Scale # 1 - Wingwall flared 30 to 75 deg.
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef   Exit Loss Coef
                .05     100     .013     .013        0                  .4               1
Upstream   Elevation =  19.57
           Centerline Station =  124.43
Downstream Elevation =  9.8
           Centerline Station =  275

Culvert Name     Shape      Rise    Span
Culvert #2      Circular       8
FHWA Chart # 1 - Concrete Pipe Culvert
FHWA Scale # 1 - Square edge entrance with headwall
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef   Exit Loss Coef
                .05     100     .013     .013        0                  .5               1
Upstream   Elevation =  19.57
           Centerline Station =  138.68
Downstream Elevation =  9.8
           Centerline Station =  288.52

CROSS SECTION


RIVER: P1140000
REACH: P114-00-00_0006    RS: 3349.25

INPUT
Description:
Station Elevation Data    num=     170
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   35.33    3.31   34.85    7.39   34.79     9.6   34.52   17.09   34.74
```

```
   28.39    35.4   34.73   35.74   43.74   36.17   54.46   34.73   59.63   34.01
   64.47   33.91   95.88   34.46   97.58   34.28  122.36   31.77  140.84   32.12
  151.19   32.31  160.44   32.31  183.11   30.26  197.37   28.86  203.93   26.57
   205.6   26.24   206.3    26.1   206.6   26.05  208.09   25.76  210.73   25.21
     220   20.66     222   20.46  231.82    21.6  239.47   21.35  249.11   20.73
  252.83    20.6  264.31    18.4  266.16   15.63  269.25      12  279.32      10
  279.33      10  279.37     9.8  283.69    10.5  288.42      11  289.92   11.83
  300.98   21.21  305.41   24.11  314.46   28.42  320.26   31.93  322.47   33.26
  327.39   36.24  330.57   36.33  335.56   36.35  349.03   36.05  366.45   35.66
  417.36   34.62  421.84    34.5  434.66   34.11  444.77   34.29  485.11   35.79
  509.61   36.52   521.8    36.6  611.98   35.74   614.1   35.74  627.27   35.66
  814.93   35.78  818.04   35.78  821.21   35.79  822.45   35.79  824.49   35.83
  825.48   35.81  827.29   35.83 1054.07   37.15    1095   37.09 1147.21   37.67
 1165.08   37.65 1247.43   36.76 1262.52   36.61 1359.39   35.62 1387.89   35.41
 1411.56   35.42 1426.16   36.33 1451.28   36.42 1479.61   36.39 1491.94   36.36
 1562.17   35.76 1614.58    35.4 1621.83   35.85 1680.23   35.76 1683.22   35.78
 1700.25   36.32 1709.96    36.1 1739.12   36.23 1769.48   36.07 1819.16   35.93
 1856.61   36.34 1922.55   36.13 1939.92   36.05 1983.29   35.96 2008.92   36.21
 2011.44   36.12 2043.42   34.74 2044.04    34.8 2048.54   35.19 2076.05   37.56
 2076.65   37.66 2077.93   37.71 2080.54   37.66 2118.72   36.77 2164.89   37.12
 2186.92   37.56  2245.9   38.09 2384.92   38.05 2420.15   37.87 2435.66   37.88
 2446.62   38.86 2469.23   37.89 2474.69    37.9 2487.94   38.48 2528.43   36.73
 2538.35   36.85 2665.97   37.21 2698.96   36.81 2710.05   36.47 2723.45   36.31
 2725.76   36.26 2780.01   35.88 2815.21    35.9  2817.1   36.08 2819.71   36.09
 2859.45   37.12  2873.6   37.12 2898.69   35.89 2904.97   35.66  2912.5   35.72
 3012.27   36.64 3171.63      38 3183.85   38.02 3185.85   38.06 3187.17   38.08
 3204.13   37.92  3393.5   36.93 3406.24    36.6 3407.42   36.58 3407.58   36.59
 3480.17   36.51 3536.57   36.61 3557.97   36.73  3763.3   37.94 3799.07   38.23
  3817.1   38.13 3819.52   38.15 3896.65   37.32 3951.36    36.6 3953.86   36.56
 3970.48   37.68 3984.95   38.54 4028.51    38.8 4045.54   38.82 4093.48   39.09
  4119.3   39.21 4200.09   38.78 4225.82    38.6 4332.02   40.61 4337.27   40.61
 4347.49   40.45 4431.21   39.52 4524.37   39.01 4551.05   38.62 4564.82   38.36
  4616.4   37.51 4625.57   37.84 4675.06   39.18 4707.84    39.3 4790.08   39.23

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .06  197.37     .04  314.46     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        197.37  314.46           23.875  23.875  23.875             .3       .5

CROSS SECTION


RIVER: P1140000
REACH: P114-00-00_0006    RS: 3325.375

INPUT
Description:
Station Elevation Data    num=     170
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   35.33    3.31   34.85    7.39   34.79     9.6   34.52   17.09   34.74
   28.39    35.4   34.73   35.74   43.74   36.17   54.46   34.73   59.63   34.01
   64.47   33.91   95.88   34.46   97.58   34.28  122.36   31.77  140.84   32.12
  151.19   32.31  160.44   32.31  183.11   30.26  197.37   28.86  203.93   26.57
   205.6   26.24   206.3    26.1   206.6   26.05  208.09   25.76  210.73   25.21
     220   20.66     222   20.46  231.82    21.6  239.47   21.35  249.11   20.73
  252.83    20.6  264.31    18.4  266.16   15.63  269.25      12  279.32      10
  279.33      10  279.37     9.8  283.69    10.5  288.42      11  289.92   11.83
  300.98   21.21  305.41   24.11  314.46   28.42  320.26   31.93  322.47   33.26
  327.39   36.24  330.57   36.33  335.56   36.35  349.03   36.05  366.45   35.66
  417.36   34.62  421.84    34.5  434.66   34.11  444.77   34.29  485.11   35.79
  509.61   36.52   521.8    36.6  611.98   35.74   614.1   35.74  627.27   35.66
  814.93   35.78  818.04   35.78  821.21   35.79  822.45   35.79  824.49   35.83
  825.48   35.81  827.29   35.83 1054.07   37.15    1095   37.09 1147.21   37.67
 1165.08   37.65 1247.43   36.76 1262.52   36.61 1359.39   35.62 1387.89   35.41
 1411.56   35.42 1426.16   36.33 1451.28   36.42 1479.61   36.39 1491.94   36.36
 1562.17   35.76 1614.58    35.4 1621.83   35.85 1680.23   35.76 1683.22   35.78
 1700.25   36.32 1709.96    36.1 1739.12   36.23 1769.48   36.07 1819.16   35.93
```

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 1856.61   36.34 1922.55   36.13 1939.92   36.05 1983.29   35.96 2008.92   36.21
 2011.44   36.12 2043.42   34.74 2044.04    34.8 2048.54   35.19 2076.05   37.56
 2076.65   37.66 2077.93   37.71 2080.54   37.66 2118.72   36.77 2164.89   37.12
 2186.92   37.56  2245.9   38.09 2384.92   38.05 2420.15   37.87 2435.66   37.88
 2446.62   38.86 2469.23   37.89 2474.69    37.9 2487.94   38.48 2528.43   36.73
 2538.35   36.85 2665.97   37.21 2698.96   36.81 2710.05   36.47 2723.45   36.31
 2725.76   36.26 2780.01   35.88 2815.21    35.9  2817.1   36.08 2819.71   36.09
 2859.45   37.12  2873.6   37.12 2898.69   35.89 2904.97   35.66  2912.5   35.72
 3012.27   36.64 3171.63      38 3183.85   38.02 3185.85   38.06 3187.17   38.08
 3204.13   37.92  3393.5   36.93 3406.24    36.6 3407.42   36.58 3407.58   36.59
 3480.17   36.51 3536.57   36.61 3557.97   36.73  3763.3   37.94 3799.07   38.23
  3817.1   38.13 3819.52   38.15 3896.65   37.32 3951.36    36.6 3953.86   36.56
 3970.48   37.68 3984.95   38.54 4028.51    38.8 4045.54   38.82 4093.48   39.09
  4119.3   39.21 4200.09   38.78 4225.82    38.6 4332.02   40.61 4337.27   40.61
 4347.49   40.45 4431.21   39.52 4524.37   39.01 4551.05   38.62 4564.82   38.36
  4616.4   37.51 4625.57   37.84 4675.06   39.18 4707.84    39.3 4790.08   39.23

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .06  197.37     .04  314.46     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        197.37  314.46           681.69  681.69  681.69             .1       .3

CROSS SECTION


RIVER: P1140000
REACH: P114-00-00_0006    RS: 2644.691

INPUT
Description:
Station Elevation Data    num=     233
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   34.58    4.59    34.1   22.33   33.35   36.78   33.36   80.77   33.51
   94.01    33.4  101.97   33.56  105.12   33.21  122.93   30.87  134.93   28.94
  157.27   29.49  163.42   29.68  167.33    28.7   193.5   18.38  193.71   18.34
  193.75   18.33  193.79   18.32  199.31   17.27  210.46   15.42  213.77   12.96
  216.53    14.8  225.36   13.71  233.75   17.36  235.37   17.12  242.16    15.1
  243.43   15.85  250.96   21.43  273.53   28.51  280.62   30.01  290.78   32.14
  291.41   32.27  293.07   32.32  302.29   32.57  302.68   32.58  313.39   34.56
  331.94   32.95  334.44   32.92  337.32   32.93  372.11   33.92  388.65   34.35
  390.26   34.41  409.11   33.97  423.48   33.64  423.93   33.61  436.92   34.88
  441.25   35.36  449.08   35.04  467.62   34.63  475.89   34.39  480.49   34.36
  500.37   35.55  614.98   35.32  621.65   35.45  648.82   35.59  753.02   37.23
  838.93   37.54  877.75   37.36  891.58   38.47  913.24   37.25  936.08   37.09
 1021.93   36.82 1047.47   37.22 1057.83   36.77 1068.63   36.67 1082.11   37.09
 1107.88   37.26 1255.89   36.77 1261.93   36.75 1432.25   35.41 1435.71    35.4
 1441.93   35.35 1460.25   35.22 1532.44   34.51 1544.83   34.51 1554.22   35.09
 1567.08    37.1 1576.18   35.91  1584.4   34.14 1591.93    34.1 1598.14    34.3
  1605.7   34.76 1619.05   36.13 1631.08   36.13 1651.93   35.94 1662.15   36.11
 1667.93   36.07 1671.01   35.79 1725.09   36.64 1759.92   37.24 1784.81   36.63
 1818.02    35.6  1868.1   36.39 1893.35   36.48 1925.18      37 1966.04   37.21
 1986.71   36.69 2068.88   37.02 2070.74   37.01 2118.82   37.11 2121.34   37.01
 2125.21   37.15 2177.01   36.71  2191.1   36.42 2213.27   36.38 2287.37   35.68
 2300.75   35.69 2372.15   35.62 2415.79    35.7 2464.06   35.45 2466.45   35.04
 2467.75   35.35  2476.6   35.75 2485.07    36.6 2498.56   36.65 2502.39   36.65
 2521.92   33.78  2531.5   32.42 2537.04   31.72 2551.92   33.82 2553.46   34.15
 2554.36   34.33 2555.34   34.27 2597.19   36.36 2611.92   35.62 2616.21    35.2
 2619.35   34.97 2621.75   35.21 2657.55   35.33 2689.27   34.71 2701.92    34.5
 2721.86   33.65 2731.92   35.34 2740.14   35.95 2744.88   36.09 2756.77   35.16
 2774.93    34.8 2806.02   33.15 2814.16   33.42    2817   32.81 2821.92   31.32
 2831.48   28.79 2838.96   27.97 2848.81   26.93 2859.72   26.05 2871.91   25.16
 2881.92   26.54  2883.1   26.81 2884.07   26.92 2909.99   30.31 2918.09    29.9
 2932.77   29.15 2937.79   29.77 2941.92   28.97 2952.73   28.81 2959.75   30.54
 2971.92   29.63 2981.71   30.21 2987.37   31.28 3001.91   33.65 3014.66   35.48
 3022.01   33.79 3031.91   33.31 3066.69   34.78 3073.97    34.5 3080.54    35.8
 3103.22   37.58 3108.61   38.31 3113.48    38.2 3121.91   36.96 3143.25   34.84
 3146.42   35.14 3151.91   35.77 3164.09   36.54  3177.9   36.21 3190.35   37.01
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 3211.91   38.15 3212.54   38.13 3219.12    36.1 3223.29   36.52 3231.16   35.06
 3252.72   34.41 3260.43   34.76 3271.91   35.18 3278.69   35.37 3281.82   35.29
  3333.3   36.22 3334.23   36.23 3336.33   36.19  3351.1   36.02 3353.52   35.74
 3357.95   35.52 3361.91   35.46 3376.68   35.33 3397.09   34.95 3410.04   35.08
  3437.7   36.14 3449.99   36.32 3453.88   36.44 3541.48   36.26 3541.59   36.27
 3541.67   36.26 3541.73   36.26 3541.78   36.26 3578.91    36.2  3629.9    36.9
 3672.92   36.57 3697.71   37.12 3712.98   36.31  3728.4   35.89 3762.44   36.46
 3796.08   36.99 3864.26   37.04 3876.35   37.13 3949.44   37.05 3965.68   37.17
 4030.69    37.6  4087.4   37.71 4091.08   37.76 4099.47    37.8  4111.9    38.9
 4113.73   38.97 4116.58   38.97 4190.94   38.35 4211.56   38.71  4231.9   38.61
 4282.76   39.24  4339.1   38.82 4350.36    38.8 4388.45   38.97 4495.21    39.9
 4539.62   40.15 4579.39   39.54 4631.34   38.71

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0      .9  167.33     .08  293.07     .11

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        167.33  293.07          2038.45 2041.38  2059.4             .1       .3

CROSS SECTION


RIVER: P1140000
REACH: P114-00-00_0006    RS: 580.3

INPUT
Description:
Station Elevation Data    num=      47
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   18.05   19.87   19.39   29.87   19.92   39.73    20.5   54.91   19.15
   69.56   16.73   70.64   16.83   85.37   18.68  114.29   19.73  115.54   19.56
  136.46   17.55  139.38   17.49     154   17.19  154.85    17.2  155.82   17.14
  159.03   16.94   159.4   16.91  182.39   15.48  189.92   14.99  190.99    14.9
  204.92   11.21  218.68    9.71  219.92    9.56  220.54    9.57  234.92    8.77
  236.26    8.47  237.61    8.37  251.34     6.9  271.64    6.21  280.46    6.05
  283.85     4.2  289.47    3.32  295.35    1.91  305.95    3.55  309.26    5.48
   311.7    6.53  336.87   10.62  337.98   10.75  339.57   10.84   339.6   10.84
  340.01   10.87  340.04   10.87  340.64   10.97  354.92    13.3  379.23   17.49
  386.44   18.88  404.56   21.06

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0      .9  204.92     .08  340.64      .9

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        204.92  340.64             3.87       0      .1             .1       .3
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HEC-RAS Plan: Updated Natural River: P1140000 Reach: P114-00-00_0006

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
P114-00-00_0006	11883.54	100yr at Pond Pe	751.00	31.60	39.48		39.53	0.000045	1.90	395.82	75.70	0.15
P114-00-00_0006	11883.54	100yr	1080.00	31.60	41.57		41.62	0.000033	1.91	564.18	85.28	0.13
P114-00-00_0006	10795.36	100yr at Pond Pe	751.00	28.67	39.42		39.45	0.000103	1.26	617.73	145.46	0.09
P114-00-00_0006	10795.36	100yr	1080.00	28.67	41.52		41.55	0.000093	1.34	804.50	106.92	0.09
P114-00-00_0006	9778.381	100yr at Pond Pe	751.00	29.77	39.37		39.38	0.000042	0.87	906.62	262.01	0.06
P114-00-00_0006	9778.381	100yr	1080.00	29.77	41.47		41.49	0.000042	0.95	1139.93	142.14	0.06
P114-00-00_0006	8639.564	100yr at Pond Pe	751.00	28.34	39.32		39.33	0.000040	0.88	856.05	115.36	0.06
P114-00-00_0006	8639.564	100yr	1080.00	28.34	41.43		41.44	0.000039	0.98	1104.00	119.83	0.06
P114-00-00_0006	7456.247	100yr at Pond Pe	751.00	26.13	39.29	29.51	39.30	0.000017	0.64	1165.90	129.09	0.04
P114-00-00_0006	7456.247	100yr	1080.00	26.13	41.40	29.94	41.41	0.000019	0.75	1446.82	136.40	0.04
P114-00-00_0006	7378.25		Bridge									
P114-00-00_0006	7322.337	100yr at Pond Pe	3604.00	25.28	39.28		39.48	0.000503	3.53	1045.62	149.64	0.20
P114-00-00_0006	7322.337	100yr	3870.00	25.28	41.38		41.53	0.000388	3.06	1265.90	139.78	0.18
P114-00-00_0006	7254.24	100yr at Pond Pe	3604.00	24.75	39.25		39.43	0.000645	3.42	1090.92	212.28	0.22
P114-00-00_0006	7254.24	100yr	3870.00	24.75	41.37		41.49	0.000336	2.83	1369.04	152.02	0.17
P114-00-00_0006	6574.37	100yr at Pond Pe	3604.00	22.94	38.92		39.01	0.000526	2.88	2448.98	1624.56	0.20
P114-00-00_0006	6574.37	100yr	3870.00	22.94	41.06		41.21	0.000509	3.16	1224.92	156.81	0.20
P114-00-00_0006	5940.168	100yr at Pond Pe	3604.00	22.26	38.58	32.45	38.68	0.000514	2.82	2329.35	1474.29	0.20
P114-00-00_0006	5940.168	100yr	3870.00	22.26	40.80	32.66	40.93	0.000369	2.85	1356.70	158.40	0.17
P114-00-00_0006	5864.17		Bridge									
P114-00-00_0006	5834.053	100yr at Pond Pe	3604.00	21.73	38.24		38.40	0.000794	3.44	1751.20	994.69	0.24
P114-00-00_0006	5834.053	100yr	3870.00	21.73	39.77		39.98	0.000712	3.62	1069.74	134.83	0.23
P114-00-00_0006	5175.881	100yr at Pond Pe	3604.00	20.13	37.80		37.96	0.000548	3.25	1136.33	187.84	0.21
P114-00-00_0006	5175.881	100yr	3870.00	20.13	39.50		39.63	0.000341	2.87	1350.30	145.98	0.17
P114-00-00_0006	4258.749	100yr at Pond Pe	3604.00	19.14	37.40		37.52	0.000398	2.78	1331.47	1133.52	0.18
P114-00-00_0006	4258.749	100yr	3870.00	19.14	39.27		39.36	0.000234	2.40	1613.36	174.90	0.14
P114-00-00_0006	3645.18	100yr at Pond Pe	3604.00	19.68	37.14	28.36	37.29	0.000336	3.16	1324.28	207.38	0.17

HEC-RAS Plan: Updated Natural River: P1140000 Reach: P114-00-00_0006 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
P114-00-00_0006	3645.18	100yr	3870.00	19.68	39.04	28.65	39.18	0.000287	3.06	1264.24	99.47	0.15
P114-00-00_0006	3614.18		Bridge									
P114-00-00_0006	3591.3	100yr at Pond Pe	3604.00	19.53	36.98		37.08	0.000301	2.74	1654.59	635.55	0.16
P114-00-00_0006	3591.3	100yr	3870.00	19.53	38.81		38.92	0.000266	2.74	1412.08	126.96	0.14
P114-00-00_0006	3570.41	100yr at Pond Pe	3604.00	19.53	36.96		37.08	0.000314	2.79	1574.87	635.55	0.16
P114-00-00_0006	3570.41	100yr	3870.00	19.53	38.80		38.92	0.000267	2.74	1411.28	126.96	0.15
P114-00-00_0006	3549.434	100yr at Pond Pe	3604.00	19.53	36.96	27.78	37.07	0.000315	2.80	1572.75	635.55	0.16
P114-00-00_0006	3549.434	100yr	3870.00	19.53	38.79	28.07	38.91	0.000267	2.74	1410.55	126.96	0.15
P114-00-00_0006	3448.434		Culvert									
P114-00-00_0006	3349.25	100yr at Pond Pe	3407.00	9.80	26.01		26.32	0.001144	4.49	759.53	102.59	0.29
P114-00-00_0006	3349.25	100yr	4692.00	9.80	27.76		28.14	0.001168	4.95	948.09	112.53	0.30
P114-00-00_0006	3325.375	100yr at Pond Pe	3407.00	9.80	25.98		26.29	0.001157	4.50	756.37	102.37	0.29
P114-00-00_0006	3325.375	100yr	4692.00	9.80	27.72		28.11	0.001181	4.97	944.52	112.38	0.30
P114-00-00_0006	2644.691	100yr at Pond Pe	3407.00	12.96	23.42		24.28	0.016144	7.41	459.88	76.60	0.53
P114-00-00_0006	2644.691	100yr	4692.00	12.96	25.15		26.09	0.014764	7.82	600.26	86.46	0.52
P114-00-00_0006	580.3	100yr at Pond Pe	3407.00	1.91	14.97	9.53	15.13	0.002002	3.22	1129.14	174.41	0.20
P114-00-00_0006	580.3	100yr	4692.00	1.91	16.93	10.38	17.13	0.002004	3.55	1320.83	135.72	0.20

SUMMARY OF FLOW ELEVATIONS IN HCFCD UNIT P100-00-00 (GREENS BAYOU)

The following summarizes water surface elevations at discharge spillways that convey flow from the site to HCFCD Unit P100-00-00. Discharge flow rates are taken from the permitted condition HEC-HMS program output included in Attachment 6A-E (Regional Permitted Condition HEC-HMS). Flow elevations in HCFCD Unit P100-00-00 have been estimated by using HEC-RAS (see pages 6A-B.2B1-29 through 6A-B.2B1-29). HEC-RAS model was obtained from HCFCD in May 2004.

Discharge Point	Flow Line Elevation at Spillway (ft-msl)	Peak Discharge and Time (cfs @ hr)	Water Surface Elevation at Spillway at Pond Peak (ft-msl)	Flow in P100-00-00 (cfs)	Peak Water Surface[1] Elevation in P100-00-00 (ft-msl)
DCP-4	23.25	194 @ 16:10	31.43	24,310 @ 16:10	35.30
DCP-5	28.50	42 @ 16:10	30.97	24,310 @ 16:10	34.34
DCP-6	27.35	203 @ 16:05	30.92	23,701 @ 6:05	34.34
DCP-7	23.00	589 @ 16: 10	30.65	24,310 @ 16:10	33.73

1Refer to HEC-RAS output file stations 61100.3, 60007.6 and 57991.2 for water surface elevations for DCP-4, DCP-5, DCP-6 and DCP-7, respectively. Refer to Attachment 6C for the station locations.

HEC-RAS HEC-RAS 6.3.1 September 2022
U.S. Army Corps of Engineers
Hydrologic Engineering Center
609 Second Street
Davis, California

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

PROJECT DATA
Project Title: Updated Permitted P100-00-00
Project File : UpdatedPP100-00-00.prj
Run Date and Time: 5/8/2024 1:02:19 PM

Project in English units

Project Description:
HCFCD Watershed Unit ID: P
M3 Study Identifier: 2007_Effective_P
Engineer:
HCFCD
Project Name: EffectiveFEMA Study for watershed Greens Bayou
(P)
Study Completion Date: 6/18/2007
FEMA Case Number: [No Data]
FEMA
Approval Date: [No Date in Database]
Vertical Datum: NAVD 1988
Datum Note:
2001 ADJ

HYDRAULICS
HCFCD Unit No.: P100-00-00
Hydraulic Program Name:
HEC-RAS
Hydraulic Program Version: 3.0.1
Steady Hydraulic Model:
Yes
Unsteady Hydraulic Model: No

Update1:
The effective FEMA hydraulic
model for unit number P100-00-00 has been updated by FEMA LOMR 07-06-1884P with
an effective date of 9/27/2007.

Update2:
The effective FEMA hydraulic model
for unit number P100-00-00 has been updated by FEMA LOMR 07-06-2076P with an
effective date of 11/21/2007.

Update3:
The effective FEMA hydraulic model
for unit number P100-00-00 has been updated by FEMA LOMR 08-06-2044P with an
effective date of 1/30/2009.

Update4:
The effective FEMA hydraulic model
for unit number P100-00-00 has been updated by FEMA LOMR 11-06-1098P with an
effective date of 7/20/2011.

Update5:
HCFCD Nomenclature Update 2014,
Effective date of 7/20/2011.

Update 6:
The effective FEMA hydraulic model
for unit number P100-00-00 has been updated by FEMA LOMR 13-06-2759P with an
effective date of 9/15/2014.

Update 7:
The effective FEMA hydraulic model
for unit number P100-00-00 has been updated by FEMA LOMR 20-06-2000P with an
effective date of xx/xx/2020.

PLAN DATA

Plan Title: Effective 100-Yr
Plan File : p:\Solid waste\Allied\McCarty Road\Flip MOD 2024\Drainage\TCEQ\HEC-RAS\UpdatedPP100-00-00.p05

Geometry Title: P100-00-00 2020
Geometry File : p:\Solid waste\Allied\McCarty Road\Flip MOD 2024\Drainage\TCEQ\HEC-RAS\UpdatedPP100-00-00.g01

Flow Title   : Effective 100-Yr
Flow File   : p:\Solid waste\Allied\McCarty Road\Flip MOD 2024\Drainage\TCEQ\HEC-RAS\UpdatedPP100-00-00.f05

Plan Description:
FEMA Effective Floodway June 2007 + ... + LOMR 13-06-2759P+ LOMR 20-06-2000P

Plan Summary Information:
Number of: Cross Sections = 401   Multiple Openings =   3
            Culverts   =   4   Inline Structures =   1
            Bridges   =   69   Lateral Structures =   0

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

```
    Flow tolerance factor               =  0.001

Computation Options
    Critical depth computed only where necessary
    Conveyance Calculation Method: At breaks in n values only
    Friction Slope Method:         Average Conveyance
    Computational Flow Regime:     Subcritical Flow



FLOW DATA

Flow Title: Effective 100-Yr
Flow File : p:\Solid waste\Allied\McCarty Road\Flip MOD 2024\Drainage\TCEQ\HEC-RAS\UpdatedPP100-00-00.f05

Flow Data (cfs)

  River           Reach           RS             1PCT_100yr
  P100-00-00      P100-00-00_0010 228675.4              357
  P100-00-00      P100-00-00_0010 228484.7              366
  P100-00-00      P100-00-00_0010 228436.2              389
  P100-00-00      P100-00-00_0010 227921                427
  P100-00-00      P100-00-00_0010 227282.4              466
  P100-00-00      P100-00-00_0010 226694.3              487
  P100-00-00      P100-00-00_0010 226400.3              522
  P100-00-00      P100-00-00_0010 225939.1              558
  P100-00-00      P100-00-00_0010 225480                587
  P100-00-00      P100-00-00_0010 225142.8              615
  P100-00-00      P100-00-00_0010 224949.2              664
  P100-00-00      P100-00-00_0010 224308.4              696
  P100-00-00      P100-00-00_0010 223997.9              800
  P100-00-00      P100-00-00_0010 223061.5              941
  P100-00-00      P100-00-00_0010 221964.2             1049
  P100-00-00      P100-00-00_0010 221230.4             1088
  P100-00-00      P100-00-00_0010 220984.2             1147
  P100-00-00      P100-00-00_0010 220631.9             1212
  P100-00-00      P100-00-00_0010 220257.4             1260
  P100-00-00      P100-00-00_0010 219998.9             1308
  P100-00-00      P100-00-00_0010 219744.4             1962
  P100-00-00      P100-00-00_0010 215936.4             2676
  P100-00-00      P100-00-00_0010 213673.1             2942
  P100-00-00      P100-00-00_0010 211630.6             3102
  P100-00-00      P100-00-00_0010 210022.7             3461
  P100-00-00      P100-00-00_0010 209411                4122
  P100-00-00      P100-00-00_0010 209281.4              4359
  P100-00-00      P100-00-00_0010 208303.8              4549
  P100-00-00      P100-00-00_0010 207557.1              4735
  P100-00-00      P100-00-00_0010 206854.1              4922
  P100-00-00      P100-00-00_0010 206174                5150
  P100-00-00      P100-00-00_0010 204744.1              5296
  P100-00-00      P100-00-00_0010 203825.7              5447
  P100-00-00      P100-00-00_0010 202904.2              5496
  P100-00-00      P100-00-00_0010 199501.1              5548
  P100-00-00      P100-00-00_0010 197172.9              5572
  P100-00-00      P100-00-00_0010 196097                5625
  P100-00-00      P100-00-00_0010 193896.3              5644
  P100-00-00      P100-00-00_0010 192935.6              5906
  P100-00-00      P100-00-00_0010 186609.7              5917
  P100-00-00      P100-00-00_0010 185578.7              5943
  P100-00-00      P100-00-00_0010 183348.2              7687
  P100-00-00      P100-00-00_0010 181739.5              7835
  P100-00-00      P100-00-00_0010 179921.2              7943
  P100-00-00      P100-00-00_0010 178661.5              8044
  P100-00-00      P100-00-00_0010 177406.7              8134
  P100-00-00      P100-00-00_0010 176342.1              8211
  P100-00-00      P100-00-00_0010 175549.5              8328
  P100-00-00      P100-00-00_0010 174086.8              8421
  P100-00-00      P100-00-00_0010 173023.1              9755
  P100-00-00      P100-00-00_0010 171583.6             10062
  P100-00-00      P100-00-00_0010 169319.2             18532
  P100-00-00      P100-00-00_0010 161801.4             19098
  P100-00-00      P100-00-00_0010 157981.7             18679
  P100-00-00      P100-00-00_0010 155378.8             19513
  P100-00-00      P100-00-00_0010 151806.5             20274
  P100-00-00      P100-00-00_0010 142362               21485
  P100-00-00      P100-00-00_0010 132316.5             22991
  P100-00-00      P100-00-00_0010 122757.9             22991
  P100-00-00      P100-00-00_0010 111431.6             23276
  P100-00-00      P100-00-00_0010 100298.8             31669
  P100-00-00      P100-00-00_0010 85105.8              32258
  P100-00-00      P100-00-00_0010 81700.8              32565
  P100-00-00      P100-00-00_0010 71993.7              33098
  P100-00-00      P100-00-00_0010 64048.7              44000
  P100-00-00      P100-00-00_0010 52958                44832
  P100-00-00      P100-00-00_0010 46018.3              45118
  P100-00-00      P100-00-00_0010 43183.7              45456
  P100-00-00      P100-00-00_0010 38132                48012
  P100-00-00      P100-00-00_0010 19924.3              48703


Boundary Conditions

  River           Reach           Profile                    Upstream              Downstream

  P100-00-00      P100-00-00_0010  1PCT_100yr                                     Normal S = 0.00005



GEOMETRY DATA

Geometry Title: P100-00-00 2020
Geometry File : p:\Solid waste\Allied\McCarty Road\Flip MOD 2024\Drainage\TCEQ\HEC-RAS\UpdatedPP100-00-00.g01

CROSS SECTION


RIVER: P100-00-00
REACH: P100-00-00_0010    RS: 228675.4

INPUT
Description: Cross Section 228675.4-Interpolated
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Station Elevation Data num= 16

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev

CROSS SECTION

RIVER: P100-00-00
REACH: P100-00-00_0010 RS: 64048.7

INPUT
Description: Cross Section 64048.7
Station Elevation Data num= 83

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
2480.2	41.2	2890.2	39.9	2920.2	39.2	3220.2	39.7	3500.2	39.6
3650.1	39.2	3670.1	39.2	3700.1	38.4	3730.1	39.3	3750.1	38.5
3770.1	39	3800.1	38.3	3820.1	38.4	3840.1	37.5	4010.1	35.2
4030.1	34.2	4060.1	31.3	4100.1	32.4	4190.1	29	4330.1	28.4
4360.1	27.4	4393.8	27.48	4400.1	27.5	4425.7	27.3	4445.7	26.6
4465.7	22.9	4475.7	20	4485.7	18.5	4545.7	17.3	4555.7	16.7
4565.7	16.5	4595.7	17.7	4615.7	19.4	4635.7	22.1	4685.7	18.1
4705.7	17	4725.7	17.4	4745.7	18.7	4755.7	19	4784.3	18.6
4794.3	18.8	4814.3	17.9	4834.3	18.8	4864.3	18.5	4872.5	21.08
4912.3	21.91	4966.2	4.9	4977.5	1.5	4980.5	-1.94	4987.8	-4.91
4995.4	-6.42	5006.5	-4.67	5014.1	-2.77	5019.8	-1.06	5022.4	1.6
5028.6	5.55	5059.2	14.4	5091.3	18.14	5124.3	19.4	5144.3	19
5164.3	20.9	5194.3	28.8	5214.3	31.6	5234.3	32.9	5248	33.3
5508	33.9	5628	34.3	5658	34.8	5708	33.9	5778	35.6
5888	36	5895.4	36.2	6115.4	36.9	6145.4	37.1	6705.4	38.2
6745.4	38.5	6875.4	39	7145.6	39.64	7553.2	40.6	7595.4	40.7
7625.4	41.4	7995.4	42.8	8015.4	43.5				

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
2480.2	.2	2480.2	.1	4393.8	.14	4912.3	.035	5059.2	.14
7145.6	.1	7553.2	.14						

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
4912.3	5059.2	197.1	516.2	867.9	.1	.3

CROSS SECTION

RIVER: P100-00-00
REACH: P100-00-00_0010 RS: 63532.5

INPUT
Description: Cross Section 63532.5-Interpolated
Station Elevation Data num= 83

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
2692	41.5	2818.9	39.8	2828.9	40.1	2858.9	39	3158.9	40
3178.9	39.1	3278.9	39.9	3298.6	39.5	3448.6	39	3598.6	38.8
3628.6	38.7	3639.8	38.2	3669.8	38.8	3749.8	37.9	3769.8	38
3869.8	36.4	3879.8	36.6	3936.7	35.2	3966.7	34.7	3996.7	32
4016.7	31.5	4036.7	32.7	4086.7	30.8	4126.7	28.8	4146.7	28.9
4176.7	28.2	4206.7	28.5	4269.9	28.3	4329.3	27.71	4359.9	27.4
4369.9	27.9	4409.9	27.6	4429.9	28.7	4449.9	28.3	4469.9	28.8
4479.9	29.8	4509.9	29.4	4589.9	31.1	4599.9	31	4605.8	30.6
4645.8	30.6	4665.8	31.5	4685.8	29.9	4689.8	29.3	4695.8	28.4
4715.8	27.2	4725.8	27.5	4755.8	27.1	4793.4	24.66	4795.8	24.5
4815.8	25.1	4835.8	23.7	4845.8	22.1	4855.8	21.1	4865.8	20.7
4875.8	19.4	4876.9	19.3	4906.9	17.1	4916.9	16.8	4926.9	17.5
4934.6	12.35	4965.7	.8	4973.7	-2	4999.8	-3	5028.8	-1.14
5034.4	.79	5058.3	11.76	5066.9	10	5086.9	12.2	5088.1	12.3
5118.1	13	5138.1	14.4	5148.1	16.1	5178.1	23.7	5188.1	26.7
5198.1	28.4	5308.1	31.9	5398.1	35.4	5490.3	38.5	5590.3	38.7
5620.3	39.8	5680.3	38.8	5830.7	41				

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
2692	.1	4329.3	.14	4689.8	.1	4793.4	.14	4934.6	.035
5058.3	.14	5830.7	.2						

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
4934.6	5058.3	129	178.1	179.2	.3	.5

CROSS SECTION

RIVER: P100-00-00
REACH: P100-00-00_0010 RS: 63354.4

INPUT
Description: Upstream Section of Bridge/Culvert/Weir
Station Elevation Data num= 104

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
2734.6	40.57	2874.6	39.97	2904.6	38.97	3204.6	39.37	3494.6	38.77
3537.2	38.81	3614.6	38.87	3664.6	38.47	3714.6	37.37	3734.6	38.47
3772.3	38.07	3812.3	36.47	3852.3	36.87	3872.3	35.47	3882.3	35.87
3892.3	35.17	3922.3	34.67	3932.3	33.47	3942.3	33.07	3952.3	33.47
3957.2	34.11	3962.3	34.77	3982.3	34.87	4002.3	34.17	4032.3	33.27
4052.3	31.67	4082.3	32.27	4102.3	32.37	4172.3	29.07	4180.5	29.07
4190.5	29.47	4205.9	28.39	4210.5	28.07	4350.5	26.67	4358.2	26.87
4418.2	27.87	4438.2	29.17	4473.3	29.59	4533.3	30.31	4538.2	30.37
4545.6	30.87	4568.1	32.7	4572.1	33.03	4600.1	33.63	4657.2	32.83
4674.2	32.59	4683.6	31.96	4698.2	30.98	4726.9	30.89	4742	30.85
4752.99	30.83	4753.1	30.83	4753.21	30.83	4831.9	30.71	4839.4	30.7
4840.8	30.7	4841	30.62	4841.11	30.57	4841.2	30.54	4841.8	30.29
4857.3	24	4879.1	15.16	4885.8	14.17	4900.4	14.75	4912.1	13.84
4934.6	12.95	4961.1	4.65	4965.7	1.4	4973.7	-1.4	4999.8	-2.4
5018.8	-1.35	5028.8	-.54	5034.4	1.39	5058.3	12.36	5076	11.14
5079	12.03	5108.1	21.62	5136.7	30.81	5136.79	30.84	5136.9	30.87
5137	30.9	5137.8	31.16	5149.3	29.81	5175.7	30.67	5217.3	32.02
5219.8	32.1	5227.3	32.34	5277.9	33.97	5307.3	34.91	5313.69	35.01
5313.8	35.01	5313.91	35.01	5333.2	35.3	5359.9	35.71	5391.7	36.65
5416.2	37.08	5470.9	37.67	5490.9	37.57	5495.1	37.78	5500.9	38.07
5538.4	38.37	5568.4	38.17	5668.4	38.87	5688.4	40.17		

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
2734.6	.14	4683.6	.1	4839.4	.14	4934.6	.035	5058.3	.14
5219.8	.1	5495.1	.14						

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.

```
       4934.6  5058.3                30      30      30             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R     Elev  Permanent
  2734.6    4831       32        F
    5147  5688.4       35        F

BRIDGE


RIVER: P100-00-00
REACH: P100-00-00_0010    RS: 63339.4

INPUT
Description: GREEN RIVER (LEY) ROAD
Structure ID: P00-16A
Distance from Upstream XS =      10
Deck/Roadway Width        =      10
Weir Coefficient          =     2.6
Upstream  Deck/Roadway Coordinates
    num=      104
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
  2734.6    40.6    40.6 2874.6      40      40 2904.6      39      39
  3204.6    39.4    39.4 3494.6    38.8    38.8 3537.2   38.85   38.84
  3614.6   38.91    38.9 3664.6   38.51    38.5 3714.6   37.41    37.4
  3734.6   38.51    38.5 3772.3   38.11    38.1 3812.3   36.51    36.5
  3852.3   36.91    36.9 3872.3   35.51    35.5 3882.3   35.91    35.9
  3892.3   35.21    35.2 3922.3   34.71    34.7 3932.3   33.51    33.5
  3942.3   33.11    33.1 3952.3   33.51    33.5 3957.2   34.15   34.14
  3962.3   34.81    34.8 3982.3   34.91    34.9 4002.3   34.21    34.2
  4032.3   33.31    33.3 4052.3   32.04    31.7 4082.3   32.31    32.3
  4102.3   32.41    32.4 4172.3   32.09    29.1 4180.5   32.09    29.1
  4190.5   32.09    29.5 4205.9    32.1   28.42 4210.5   32.11    28.1
  4350.5   32.26    26.7 4358.2   32.27    26.9 4418.2   32.34    27.9
  4438.2   32.36    29.2 4473.3    32.4   29.62 4533.3    32.3   30.34
  4538.2   32.37    30.4 4545.6   32.47    30.9 4568.1   32.78   32.73
  4572.1   33.07   33.06 4600.1   33.67   33.66 4657.2   33.73   32.86
  4674.2   33.93   32.62 4683.6   34.03   31.99 4698.2    34.2   31.01
  4726.9   34.53   30.92    4742   34.63   30.88 4752.99   34.71   30.86
  4753.1   37.21   30.86 4753.21   37.21   30.86 4831.9   37.74   30.74
  4839.4   37.82   30.73 4840.8   37.84   30.73    4841   37.84   30.65
 4841.11   37.84    30.6 4841.2   37.84   32.44 4841.8   37.84   32.44
  4857.3   37.84   32.44 4879.1   37.84   32.44 4885.8   37.84   32.44
  4900.4   37.84   32.44 4912.1   37.84   32.44 4934.6   37.84   32.44
  4961.1   37.84   32.44 4965.7   37.84   32.44 4973.7   37.84   32.44
  4999.8   37.83   32.43 5018.8   37.83   32.43 5028.8   37.83   32.43
  5034.4   37.83   32.43 5058.3   37.83   32.43    5076   37.83   32.43
    5079   37.83   32.43 5108.1   37.83   32.43 5136.7   37.83   32.43
 5136.79   37.83   32.43 5136.9   37.83    30.9    5137   37.83   30.93
  5137.8   37.83   31.19 5149.3   37.84   29.84 5175.7   37.87    30.7
  5217.3   37.68   32.05 5219.8   37.67   32.13 5227.3   37.64   32.37
  5277.9   37.29      34 5307.3   37.41   34.94 5313.69   37.43   35.04
  5313.8   37.43   35.04 5313.91   35.05   35.04 5333.2   35.34   35.33
  5359.9   35.74   35.74 5391.7   36.68   36.68 5416.2   37.11   37.11
  5470.9    37.7    37.7 5490.9    37.6    37.6 5495.1   37.81   37.81
  5500.9    38.1    38.1 5538.4    38.4    38.4 5568.4    38.2    38.2
  5668.4    38.9    38.9 5688.4    40.2    40.2

Upstream Bridge Cross Section Data
Station Elevation Data    num=      104
     Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev
  2734.6     40.6  2874.6       40  2904.6       39  3204.6     39.4  3494.6     38.8
  3537.2    38.84  3614.6     38.9  3664.6     38.5  3714.6     37.4  3734.6     38.5
  3772.3     38.1  3812.3     36.5  3852.3     36.9  3872.3     35.5  3882.3     35.9
  3892.3     35.2  3922.3     34.7  3932.3     33.5  3942.3     33.1  3952.3     33.5
  3957.2    34.14  3962.3     34.8  3982.3     34.9  4002.3     34.2  4032.3     33.3
  4052.3     31.7  4082.3     32.3  4102.3     32.4  4172.3     29.1  4180.5     29.1
  4190.5     29.5  4205.9    28.42  4210.5     28.1  4350.5     26.7  4358.2     26.9
  4418.2     27.9  4438.2     29.2  4473.3    29.62  4533.3    30.34  4538.2     30.4
  4545.6     30.9  4568.1    32.73  4572.1    33.06  4600.1    33.66  4657.2    32.86
  4674.2    32.62  4683.6    31.99  4698.2    31.01  4726.9    30.92    4742    30.88
 4752.99    30.86  4753.1    30.86 4753.21    30.86  4831.9    30.74  4839.4    30.73
  4840.8    30.73    4841    30.65 4841.11     30.6  4841.2    30.57  4841.8    30.32
  4857.3    24.03  4879.1    15.19  4885.8     14.2  4900.4    14.78  4912.1    13.87
  4934.6    12.98  4961.1     4.68  4965.7     1.43  4973.7    -1.37  4999.8    -2.37
  5018.8    -1.32  5028.8     -.51  5034.4     1.42  5058.3    12.39    5076    11.17
    5079    12.06  5108.1    21.65  5136.7    30.84 5136.79    30.87  5136.9     30.9
    5137    30.93  5137.8    31.19  5149.3    29.84  5175.7     30.7  5217.3    32.05
  5219.8    32.13  5227.3    32.37  5277.9       34  5307.3    34.94 5313.69    35.04
  5313.8    35.04 5313.91    35.04  5333.2    35.33  5359.9    35.74  5391.7    36.68
  5416.2    37.11  5470.9     37.7  5490.9     37.6  5495.1    37.81  5500.9     38.1
  5538.4     38.4  5568.4     38.2  5668.4     38.9  5688.4     40.2

Manning's n Values        num=       7
     Sta   n Val      Sta   n Val      Sta   n Val      Sta   n Val      Sta   n Val
  2734.6     .14  4683.6      .1  4839.4     .14  4934.6    .035  5058.3     .14
  5219.8      .1  5495.1     .14

Bank Sta: Lcft   Right    Coeff Contr.   Expan.
        4934.6  5058.3            .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R     Elev  Permanent
  2734.6    4831       32        F
    5147  5688.4       35        F

Downstream  Deck/Roadway Coordinates
    num=      104
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
  2734.6    40.6   40.54 2874.6      40   39.94 2904.6      39   38.94
  3204.6    39.4   39.34 3494.6    38.8   38.74 3537.2   38.85   38.78
  3614.6   38.91   38.84 3664.6   38.51   38.44 3714.6   37.41   37.34
  3734.6   38.51   38.44 3772.3   38.11   38.04 3812.3   36.51   36.44
  3852.3   36.91   36.84 3872.3   35.51   35.44 3882.3   35.91   35.84
  3892.3   35.21   35.14 3922.3   34.71   34.64 3932.3   33.51   33.44
  3942.3   33.11   33.04 3952.3   33.51   33.44 3957.2   34.15   34.08
  3962.3   34.81   34.74 3982.3   34.91   34.84 4002.3   34.21   34.14
  4032.3   33.31   33.24 4052.3   32.04   31.64 4082.3   32.31   32.24
  4102.3   32.41   32.34 4172.3   32.09   29.04 4180.5   32.09   29.04
  4190.5   32.09   29.44 4205.9    32.1   28.36 4210.5   32.11   28.04
  4350.5   32.26   26.64 4358.2   32.27   26.84 4418.2   32.34   27.84
  4438.2   32.36   29.14 4473.3    32.4   29.56 4533.3    32.3   30.28
  4538.2   32.37   30.34 4545.6   32.47   30.84 4568.1   32.78   32.67
  4572.1   33.07      33 4600.1   33.67    33.6 4657.2   33.73    32.8
  4674.2   33.93   32.56 4683.6   34.03   31.93 4698.2    34.2   30.95
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  4726.9   34.53   30.86    4742   34.63   30.82 4752.99   34.71    30.8
  4753.1   37.21    30.8 4753.21   37.21    30.8  4831.9   37.74   30.68
  4839.4   37.82   30.67  4840.8   37.84   30.67    4841   37.84   30.59
 4841.11   37.84   30.54  4841.2   37.84   32.38  4841.8   37.84   32.38
  4857.3   37.84   32.38  4879.1   37.84   32.38  4885.8   37.84   32.38
  4900.4   37.84   32.38  4912.1   37.84   32.38  4934.6   37.84   32.38
  4961.1   37.84   32.38  4965.7   37.84   32.38  4973.7   37.84   32.38
  4999.8   37.83   32.37  5018.8   37.83   32.37  5028.8   37.83   32.37
  5034.4   37.83   32.37  5058.3   37.83   32.37    5076   37.83   32.37
    5079   37.83   32.37  5108.1   37.83   32.37  5136.7   37.83   32.37
 5136.79   37.83   32.37  5136.9   37.83   30.84    5137   37.83   30.87
  5137.8   37.83   31.13  5149.3   37.84   29.78  5175.7   37.87   30.64
  5217.3   37.68   31.99  5219.8   37.67   32.07  5227.3   37.64   32.31
  5277.9   37.29   33.94  5307.3   37.41   34.88 5313.69   37.43   34.98
  5313.8   37.43   34.98 5313.91   35.05   34.98  5333.2   35.34   35.27
  5359.9   35.74   35.68  5391.7   36.68   36.62  5416.2   37.11   37.05
  5470.9    37.7   37.64  5490.9    37.6   37.54  5495.1   37.81   37.75
  5500.9    38.1   38.04  5538.4    38.4   38.34  5568.4    38.2   38.14
  5668.4    38.9   38.84  5688.4    40.2   40.14

Downstream Bridge Cross Section Data
Station Elevation Data    num=     104
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
  2734.6   40.54  2874.6   39.94  2904.6   38.94  3204.6   39.34  3494.6   38.74
  3537.2   38.78  3614.6   38.84  3664.6   38.44  3714.6   37.34  3734.6   38.44
  3772.3   38.04  3812.3   36.44  3852.3   36.84  3872.3   35.44  3882.3   35.84
  3892.3   35.14  3922.3   34.64  3932.3   33.44  3942.3   33.04  3952.3   33.44
  3957.2   34.08  3962.3   34.74  3982.3   34.84  4002.3   34.14  4032.3   33.24
  4052.3   31.64  4082.3   32.24  4102.3   32.34  4172.3   29.04  4180.5   29.04
  4190.5   29.44  4205.9   28.36  4210.5   28.04  4350.5   26.64  4358.2   26.84
  4418.2   27.84  4438.2   29.14  4473.3   29.56  4533.3   30.28  4538.2   30.34
  4545.6   30.84  4568.1   32.67  4572.1     33   4600.1    33.6  4657.2    32.8
  4674.2   32.56  4683.6   31.93  4698.2   30.95  4726.9   30.86    4742   30.82
 4752.99    30.8  4753.1    30.8 4753.21    30.8  4831.9   30.68  4839.4   30.67
  4840.8   30.67    4841   30.59 4841.11   30.54  4841.2   30.51  4841.8   30.26
  4857.3   23.97  4879.1   15.13  4885.8   14.14  4900.4   14.72  4912.1   13.81
  4934.6   12.92  4961.1    4.62  4965.7    1.37  4973.7   -1.43  4999.8   -2.43
  5018.8   -1.38  5028.8    -.57  5034.4    1.36  5058.3   12.33    5076   11.11
    5079      12  5108.1   21.59  5136.7   30.78 5136.79   30.81  5136.9   30.84
    5137   30.87  5137.8   31.13  5149.3   29.78  5175.7   30.64  5217.3   31.99
  5219.8   32.07  5227.3   32.31  5277.9   33.94  5307.3   34.88 5313.69   34.98
  5313.8   34.98 5313.91   34.98  5333.2   35.27  5359.9   35.68  5391.7   36.62
  5416.2   37.05  5470.9   37.64  5490.9   37.54  5495.1   37.75  5500.9   38.04
  5538.4   38.34  5568.4   38.14  5668.4   38.84  5688.4   40.14

Manning's n Values        num=       7
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
  2734.6     .14  4683.6      .1  4839.4     .14  4934.6    .035  5058.3     .14
  5219.8      .1  5495.1     .14

Bank Sta: Left   Right    Coeff Contr.   Expan.
        4934.6  5058.3           .3        .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
  2734.6    4831    31.8        F
    5147  5688.4    34.8        F

Upstream Embankment side slope              =       1 horiz. to 1.0 vertical
Downstream Embankment side slope            =       1 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Piers =  4

Pier Data
Pier Station     Upstream=  4900.4    Downstream=  4900.4
Upstream     num=       2
    Width   Elev    Width   Elev
      2.4  13.69      2.4  33.44
Downstream     num=       2
    Width   Elev    Width   Elev
      2.4  13.63      2.4  33.38

Pier Data
Pier Station     Upstream=  4961.1    Downstream=  4961.1
Upstream     num=       2
    Width   Elev    Width   Elev
      2.4   2.83      2.4  33.44
Downstream     num=       2
    Width   Elev    Width   Elev
      2.4   2.77      2.4  33.38

Pier Data
Pier Station     Upstream=  5018.8    Downstream=  5018.8
Upstream     num=       2
    Width   Elev    Width   Elev
      2.4  -2.39      2.4  33.43
Downstream     num=       2
    Width   Elev    Width   Elev
      2.4  -2.45      2.4  33.37

Pier Data
Pier Station     Upstream=    5079    Downstream=    5079
Upstream     num=       2
    Width   Elev    Width   Elev
      2.4   10.7      2.4  33.43
Downstream     num=       2
    Width   Elev    Width   Elev
      2.4  10.64      2.4  33.37

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Energy
       Momentum              Cd   =       2
Selected Low Flow Methods = Highest Energy Answer

High Flow Method
       Pressure and Weir flow
           Submerged Inlet Cd         =
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          Submerged Inlet + Outlet Cd =      .8
          Max Low Cord               =

Additional Bridge Parameters
       Add Friction component to Momentum
       Do not add Weight component to Momentum
       Class B flow critical depth computations use critical depth
           inside the bridge at the upstream end
       Criteria to check for pressure flow = Upstream energy grade line

CROSS SECTION


RIVER: P100-00-00
REACH: P100-00-00_0010    RS: 63324.4

INPUT
Description: Downstream Section of Bridge/Culvert/Weir
Station Elevation Data    num=     104
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
  2734.6    40.5  2874.6    39.9  2904.6    38.9  3204.6    39.3  3494.6    38.7
  3537.2   38.74  3614.6    38.8  3664.6    38.4  3714.6    37.3  3734.6    38.4
  3772.3      38  3812.3    36.4  3852.3    36.8  3872.3    35.4  3882.3    35.8
  3892.3    35.1  3922.3    34.6  3932.3    33.4  3942.3      33  3952.3    33.4
  3957.2   34.04  3962.3    34.7  3982.3    34.8  4002.3    34.1  4032.3    33.2
  4052.3    31.6  4082.3    32.2  4102.3    32.3  4172.3      29  4180.5      29
  4190.5    29.4  4205.9   28.32  4210.5      28  4350.5    26.6  4358.2    26.8
  4418.2    27.8  4438.2    29.1  4473.3   29.52  4533.3   30.24  4538.2    30.3
  4545.6    30.8  4568.1   32.63  4572.1   32.96  4600.1   33.56  4657.2   32.76
  4674.2   32.52  4683.6   31.89  4698.2   30.91  4726.9   30.82    4742   30.78
 4752.99   30.76  4753.1   30.76 4753.21   30.76  4831.9   30.64  4839.4   30.63
  4840.8   30.63    4841   30.55 4841.11    30.5  4841.2   30.47  4841.8   30.22
  4857.3   23.93  4879.1   15.09  4885.8    14.1  4900.4   14.68  4912.1   13.77
  4934.6   12.88  4961.1    4.58  4965.7    1.33  4973.7   -1.47  4999.8   -2.47
  5018.8   -1.42  5028.8    -.61  5034.4    1.32  5058.3   12.29    5076   11.07
    5079   11.96  5108.1   21.55  5136.7   30.74 5136.79   30.77  5136.9    30.8
    5137   30.83  5137.8   31.09  5149.3   29.74  5175.7    30.6  5217.3   31.95
  5219.8   32.03  5227.3   32.27  5277.9    33.9  5307.3   34.84 5313.69   34.94
  5313.8   34.94 5313.91   34.94  5333.2   35.23  5359.9   35.64  5391.7   36.58
  5416.2   37.01  5470.9    37.6  5490.9    37.5  5495.1   37.71  5500.9      38
  5538.4    38.3  5568.4    38.1  5668.4    38.8  5688.4    40.1

Manning's n Values        num=       7
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
  2734.6     .14  4683.6      .1  4839.4     .14  4934.6    .035  5058.3     .14
  5219.8      .1  5495.1     .14

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        4934.6  5058.3           1228.6  1228.6  1228.6             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
  2734.6    4831    31.8        F
    5147  5688.4    34.8        F

CROSS SECTION


RIVER: P100-00-00
REACH: P100-00-00_0010    RS: 62095.8

INPUT
Description: Cross Section 62095.8
Station Elevation Data    num=     130
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
  2797.8   41.22  2869.8   39.15  2877.8   39.28  3045.8   38.32  3421.8   38.64
  3445.8   37.61  3485.8   38.41  3533.8   37.91  3549.8   38.23  3757.8    37.7
  3765.8   37.99  3781.8   37.96  3789.8   37.56  3797.8   36.81  3805.8   36.45
  3885.8   36.91  3909.8    36.2  3957.8   36.95  3997.8   36.81  4005.8   37.39
  4013.8   37.55  4021.8   37.04  4045.8   37.75  4077.8   37.78  4093.8   37.12
  4213.8   36.57  4221.8    36.1  4229.8    36.3  4261.8   37.96  4269.8   37.94
  4277.8   37.28  4293.8   36.63  4301.8   36.65  4309.8   36.06  4325.8   36.77
  4333.8   36.84  4341.8   36.01  4349.8   36.08  4373.8   38.29  4381.8   38.33
  4389.8   37.36  4397.8   36.67  4405.8   38.11  4413.8   39.86  4421.8   39.98
  4429.8   40.59  4439.6   40.72  4445.8    40.8  4461.8   40.41  4477.8   39.46
  4493.8   36.67  4501.8   36.04  4517.8   36.85  4525.8   36.71  4541.8   35.72
  4549.8   35.74  4557.8   36.67  4565.8   38.26  4613.8   40.06  4629.8   39.75
  4637.8   38.41  4645.8   36.17  4661.8    32.8  4669.8   31.66  4695.7   31.44
  4727.7   29.59  4743.7   27.91  4751.7   27.59  4767.7    26.1  4775.7   25.61
  4783.7   24.22  4791.7   23.44  4799.7   23.38  4807.7   18.24  4815.7    14.5
  4823.7   12.24  4839.7   10.25  4847.7    9.95  4863.7   10.84  4871.7   11.71
  4903.7   16.79  4911.7   15.98  4919.7   15.99  4926.1   15.24  4926.2   15.24
  4938.3   15.36  4964.6    4.99  4971.4     .26  4976.5   -3.08  4981.2   -3.67
  4985.2   -6.18  4998.5   -7.67  5012.4   -7.23    5025   -7.77  5028.6     .33
  5050.8   12.76    5144   10.22  5177.1   17.57    5201   22.87    5217   22.47
  5217.1   22.47  5223.7   22.72  5229.8   23.11  5237.8   23.88  5245.8    25.4
  5253.8   26.41  5261.8   24.62  5269.8   19.79  5277.8   18.28  5285.8   17.05
  5301.8   13.79  5662.9   13.67  6749.8   13.29  6773.8   14.96  6789.8   16.75
  6797.8   16.86  6801.2   16.56  6809.2   16.92  6825.2    20.4  6833.2   22.58
  6841.2   24.33  6849.2   25.63  6865.2   29.57  6873.2   31.84  6889.2   36.93
  6905.2   39.62  6913.2   40.16  6977.2   40.45  7001.2    42.9  7017.2   44.96

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
  2797.8      .1  4439.6     .14  4938.3    .035  5050.8     .12  5177.1     .08
  5662.9      .2

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        4938.3  5050.8            997.7   995.5   867.1             .1       .3

CROSS SECTION


RIVER: P100-00-00
REACH: P100-00-00_0010    RS: 61100.3

INPUT
Description: Cross Section 61100.3
Station Elevation Data    num=     104
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
    2324   40.32  2577.3   38.39    2588   38.31    2596   37.88    2652   38.41
    2668   35.86    2676   35.62    2692   37.53    2716   38.55    2868    38.3
    2884   37.76    3100   38.39    3108   38.71    3180   37.01    3268   37.92
    3284    38.7    3316   38.64    3332    37.6    3340   37.62    3356   38.27
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   3372    37.9    3380   37.35    3388   37.18    3412   37.47  3420.2   37.32
 3460.2   36.41  3732.2   37.23  3900.2   34.83  3916.2   33.59  3932.2   34.22
 3948.2   34.15  3964.2   33.29  4036.2   32.25  4044.2   32.46  4196.1   30.24
 4204.1   30.65  4212.1    30.7  4220.1   30.03  4268.1   29.58  4292.1   29.78
 4380.1   28.16  4412.1      27  4439.5   27.06  4444.1   27.07  4476.1    25.8
 4484.1   26.17  4492.1   26.29  4500.1   24.99  4508.1   23.05  4524.1   22.09
 4556.1   20.89  4564.1   20.85  4580.1   20.07  4594.8   20.08  4666.8   18.11
 4682.8   18.32  4722.8   14.85  4730.8   13.86  4738.8   13.32  4749.4   13.29
 4757.4   13.29  4773.4   13.66  4797.4    12.5  4805.4   12.42  4821.4   10.44
 4829.4    9.85  4837.4    8.96  4845.4    9.15  4853.4    9.58  4861.4   10.34
 4877.4   10.57  4885.4   11.06  4893.4    11.8  4909.8   12.37  4910.3   12.72
 4940.4   13.12  4970.2     .28  4971.4   -2.62    4975   -4.22  4981.9   -6.11
 4990.9   -8.68  5003.8   -7.24  5017.5   -3.57  5027.6   -1.52  5029.8     .29
 5073.5   17.64  5168.2   10.23  5177.1   13.08  5228.7   29.58  5259.6   30.98
 5285.8   32.44  5294.7   33.23  5318.7   35.85  5326.7   37.02  5334.7   37.61
 5342.7   37.92  5358.7   40.64  5366.7    41.4  5374.7   42.42  5390.7   43.71
 5398.7   44.63  5406.7   45.82  5438.7   51.72  5446.7   52.45

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
    2324      .2  2577.3      .1  4439.5     .14  4940.4    .035  5073.5     .12
  5177.1     .08

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        4940.4  5073.5           1102.1  1092.7  1058.1             .1      .3

CROSS SECTION


RIVER: P100-00-00
REACH: P100-00-00_0010    RS: 60007.6

INPUT
Description: Cross Section 60007.6
Station Elevation Data    num=     128
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
  1190.6   39.21  1206.6   38.17  1214.6   37.37  1222.6   37.02  1350.6   38.19
  1358.6   37.97  1369.7   38.07  1414.6   38.45  1422.6   38.26  1430.6   38.43
  1454.6   38.02  1462.6   38.14  1478.6    37.8  1806.6   37.28  1814.6   37.59
  1838.6   37.74  1854.6   37.41  1974.6   37.47  1990.6   37.12  2222.6    37.2
  2270.6   36.72  2286.6   37.06  2302.6   37.72  2310.6   37.73  2310.9   37.72
  2326.9   36.96  2766.9   37.04  2918.9   36.34  2926.9   36.54  3190.9   35.99
  3206.9   36.41  3318.9    36.3  3326.9   36.84  3334.9   37.11  3462.9   35.58
  3494.9   36.62  3510.9   35.84  3526.9   36.27  3534.9   36.08  3782.9   34.76
  3790.9   35.05  3798.9      35  3846.9   36.12  3958.9   34.67  4006.9   35.16
  4014.9   35.68  4046.9   36.46  4054.9   36.39  4062.9   36.77  4071.4   38.58
  4079.4   40.24  4095.4   40.87  4103.4   40.29  4135.4   39.23  4143.4   38.23
  4159.4   37.72  4183.4   37.65  4191.4   37.37  4199.4   36.56  4203.7   36.32
  4207.4   36.12  4215.4   36.02  4223.4   36.62  4239.4   36.77  4255.4   36.22
  4279.4   36.81  4287.4   36.67  4295.4   36.16  4303.4   36.23  4319.4   37.11
  4335.4   35.89  4339.5   35.84  4355.5   35.36  4363.5   35.63  4379.5   35.57
  4395.5   34.66  4419.5   34.13  4427.5   34.45  4443.5   33.56  4467.5   33.14
  4475.5   33.63  4483.5   34.39  4491.5   34.46  4523.5   32.17  4539.5   31.55
  4578.5   31.75  4579.5   31.75  4758.7   29.81  4790.7   29.22  4798.7   28.59
  4800.7   27.94  4814.7   23.35  4822.7   20.43  4830.7   17.86  4854.7   12.13
  4862.7   10.66  4870.7    9.62  4878.7    9.25  4886.7    9.86  4902.7    10.4
  4918.7    9.16  4926.7     8.9  4934.7    8.97  4942.1    9.64  4955.7    9.23
  4972.6     .44  4974.6   -2.18  4983.6   -4.61  4995.1   -7.78  5010.9   -4.11
  5025.3    -1.1  5027.3     .38  5071.9   14.77    5101    13.5  5130.5   12.21
  5193.4   33.67  5218.3   33.67    5227   33.42    5235   33.89    5251   36.15
    5259      38    5267   40.36    5283    41.8    5291   42.84    5323   48.03
    5331   49.01    5339   50.53    5355   53.12

Manning's n Values        num=       8
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
  1190.6      .2  1369.7      .1  4203.7     .14  4578.5      .1  4800.7     .14
  4955.7    .035  5071.9     .12    5101     .08

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        4955.7  5071.9            1174  1126.4   990.9             .1      .3

CROSS SECTION


RIVER: P100-00-00
REACH: P100-00-00_0010    RS: 58881.2

INPUT
Description: Cross Section 58881.2
Station Elevation Data    num=     114
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
   367.1   38.77   447.1   38.73   471.1   39.32   487.1   38.55   543.1    38.3
   551.1   37.93   780.2   38.08   815.1    38.1   823.1   37.71   831.1   37.56
   927.1    38.1   959.1   37.19  1015.1    38.4  1303.1   37.69  1311.1   37.93
  1367.1   37.42  1375.1   36.61  1383.1   36.31  1423.1   38.38  1447.1   37.62
  1463.1   37.62  1471.1   37.37  1527.1   37.38  1535.1    36.9  1543.1   36.68
  1575.1    37.3  1623.1   37.31  1687.1    36.5  1828.8   36.51  2460.8   35.25
  2476.8   34.43  2484.8   34.64  2500.8   36.63  2540.8   35.57  2876.8   36.12
  2932.8   33.91  2948.8   35.48  2956.8    35.8  3004.8   35.63  3028.8   36.15
  3036.8   35.76  3044.8   36.14  3052.8   36.15  3060.8   35.82  3092.8   36.14
  3116.8   35.71  3156.8   36.23  3348.8    35.6  3364.8   36.62  3372.8   36.69
  3380.8   36.38  3396.8   37.48  3404.8   37.73  3412.8   37.56  3436.8   35.95
  3444.8   35.96  3516.8   36.82  3540.8   36.03  3556.8   36.09  3572.8   35.53
  3764.8   34.76  3772.8   34.31  3780.8   34.38  3788.8   34.78  3796.8   34.73
  3812.8   35.37  3820.8   35.24  3828.8   34.54  3836.8   34.67  3844.8   35.15
  3860.8   35.73  3916.8   35.82  4280.9   34.52  4432.9   33.04  4523.6   31.39
  4712.1   27.95  4760.1   25.73  4784.1    23.5  4792.1   21.82  4800.1   18.27
  4808.1   14.96  4816.1    15.8  4824.1   18.03  4832.1   18.93  4872.1   14.64
  4880.1    13.4  4888.1   11.87  4896.1   10.59    4923   11.57  4941.8   11.33
  4966.8    2.64  4970.5     .32    4972   -1.71  4975.1   -6.71  4985.7   -7.76
  4998.8   -9.53  5011.8   -6.17  5019.9   -3.38  5027.3   -1.79  5029.4     .43
  5039.6    6.76  5056.2    11.9  5129.7    9.05    5154   16.04  5204.9   30.67
  5220.9   30.66  5240.1   29.07  5248.1   30.23  5272.1   36.41  5288.1   37.53
  5304.1   40.89  5320.1   43.84  5344.1   49.68  5360.1   54.57

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
   367.1      .2   780.2      .1  4523.6     .14  4941.8    .035  5056.2     .12
    5154     .08

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        4941.8  5056.2            295.9   388.6   405.9             .1      .3
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CROSS SECTION

RIVER: P100-00-00
REACH: P100-00-00_0010 RS: 58492.6

INPUT
Description: Cross Section 58492.6-Interpolated
Station Elevation Data num= 149

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-328	38.94	-232	37.39	32	38.03	40	37.78	304	37.78
312	38.17	316.6	38.16	552	37.43	624	37.83	640	37.39
659.8	38.02	664	38.15	728	38.06	776	37.25	792	37.85
856	37.35	864	36.96	872	36.9	880	37.31	896	37.24
912	38.22	928	36.83	936	36.44	1136	37.32	1168	36.81
1304	36.7	1400	37.37	1575.9	36.86	1719.9	36.15	1735.9	35.25
1743.9	35.84	1751.9	36.82	1767.9	37.03	1775.9	36.44	1791.9	36.23
1831.9	36.55	2111.9	35.58	2119.9	35.21	2167.9	34.57	2175.9	34.7
2191.9	36.04	2199.9	36.28	2215.9	34.95	2223.9	34.81	2231.9	35.58
2239.9	36.03	2255.9	35.88	2263.9	35.48	2271.9	35.42	2295.9	36.3
2327.9	36.7	2343.9	35.88	2551.9	35.56	2575.9	34.73	2583.9	35.07
2599.9	36.66	2607.9	36.55	2615.9	36.13	2631.9	34.78	2663.9	36.47
2671.9	36.46	2687.9	35.79	2743.9	36.07	2775.9	35.07	2815.9	35.28
2831.9	35.77	2983.9	35.46	2991.9	35.2	3007.9	34.07	3023.9	33.86
3071.9	35.22	3095.9	35.07	3111.9	35.54	3125.4	35.56	3237.4	34.96
3245.4	35.22	3309.4	35.05	3317.4	35.41	3325.4	35.31	3333.4	34.94
3533.4	35.4	3541.4	36.11	3557.4	36.49	3605.4	35.17	3621.4	35.34
3637.4	34.96	3725.4	35.06	3733.4	34.82	3765.4	34.81	3789.4	34.4
3821.4	34.76	3829.4	34.51	3837.4	33.97	3845.4	33.72	3927.6	33.87
4037.4	34.08	4043.1	34.16	4085.4	34.74	4157.4	32.91	4189.4	32.88
4298	31.23	4639.8	26.02	4735.8	22.47	4751.8	20.93	4767.8	18.44
4783.8	13.73	4791.8	12.53	4799.8	11.86	4815.8	16.99	4823.8	17.09
4831.8	17.99	4839.8	17.8	4847.8	17	4855.8	15.75	4879.8	11.2
4887.8	10.7	4895.8	10.73	4905.4	9.97	4954.8	-1.14	4999.2	-8.35
5007.5	-9	5026	-8.68	5045.2	-.99	5053.1	8.2	5057.8	10.84
5065.8	9.59	5073.8	9.17	5097.8	8.87	5121.8	9.55	5124.6	9.67
5129.8	10.45	5145.8	14.73	5161.8	20.03	5177.8	24.6	5185.8	27.13
5193.8	29.28	5201.8	31.15	5209.8	31.02	5217.8	30.27	5219.8	30.16
5227.8	30.1	5235.8	30.76	5259.8	35.5	5267.8	36.13	5275.8	35.92
5283.8	36.68	5291.8	38.17	5339.8	50.15	5355.8	53.34		

Manning's n Values num= 9

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-328	.2	316.6	.14	659.8	.1	3927.6	.14	4043.1	.1
4298	.14	4905.4	.035	5053.1	.12	5124.6	.08		

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
4905.4	5053.1	439.9	501.4	529.6	.3	.5

CROSS SECTION

RIVER: P100-00-00
REACH: P100-00-00_0010 RS: 57991.2

INPUT
Description: Upstream Section of Bridge/Culvert/Weir
Station Elevation Data num= 183

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-964.4	38.62	-188.4	37.12	-124.4	37.71	-47.4	37.63	379.6	37.19
595.6	37.34	723.6	37.06	795.6	36.93	851.6	36.84	955.6	37.32
1003.6	36.99	1035.6	36.62	1059.6	37.39	1083.6	35.64	1130	36.49
1290	36.5	1346	36.32	1362	36.8	1378	37.22	1410	37.04
1434	36.66	1458	36.22	1474	36.94	1506	36.54	1538	34.83
1554	35.49	1930	35.48	1954	34.93	2042	35.67	2610	35.84
2674	35.55	2722	38.69	2738	38.31	2749.2	37.55	2770	36.13
2780.5	35.87	2836.5	35.83	2916.5	35.64	2972.5	36.86	3020.5	35.79
3036.5	36.56	3052.5	36.89	3092.5	35.94	3116.5	35.36	3148.5	34.23
3228.5	34.84	3348.5	35.23	3359.2	35.23	3444.5	35.19	3862.7	35.77
3894.7	34.99	3950.7	34.59	4006.7	33.15	4078.7	33.82	4094.7	33.05
4289	29.98	4401	27.94	4417	26.96	4433	25.27	4449	23.77
4473	22.82	4497	21.85	4521	23.21	4545	25.31	4546.5	22.85
4610.5	23.17	4613.7	23.15	4678.8	22.84	4783.8	22.33	4785.21	22.29
4785.3	22.29	4785.4	22.29	4799.5	21.94	4800.1	20.65	4815.5	16.64
4826.9	14.31	4830.8	13.2	4843.3	12.92	4843.5	12.92	4860.6	11.45
4873.7	11.21	4874.8	10.75	4894.4	10.56	4905.4	10.15	4905.5	10.15
4919.2	7.76	4954.7	1.55	4954.8	1.04	4999.2	-6.17	5007.3	-6.79
5007.5	-6.82	5026	-6.5	5032.2	-4.02	5045.2	1.19	5053.1	8.38
5053.6	8.38	5070.5	11.05	5073.8	11.2	5085.6	12.6	5100.7	13.11
5106.5	15.42	5115.5	14.29	5124.5	17.21	5129.9	18.96	5139.1	20.39
5144.3	20.88	5159.2	22.65	5159.29	22.66	5159.4	22.68	5176.4	24.7
5200.4	27.21	5214	27.65	5230	25.91	5246	26	5262	25.42
5278	26.69	5287.5	26.8	5294	26.88	5310	26.98	5326	26.89
5342	26.5	5390	27.39	5406	28.25	5430	28.72	5446	28.62
5462	28.85	5472.2	29.22	5488.2	28.04	5512.2	29.35	5518.4	29.49
5528.2	29.71	5544.2	29.85	5568.2	31.09	5584.2	31.31	5608.2	30.7
5624.2	31.6	5656.2	32.15	5672.2	31.34	5696.2	31.43	5720.2	32.14
5736.2	33.14	5752.2	32.58	5768.2	31.71	5800.2	32.5	5816.2	32.32
5872.2	33.33	5888.2	32.2	5920.2	32.26	5952.2	32.2	6008.2	33.04
6088.2	33.75	6104.2	33.51	6120.2	34.14	6152.2	33.57	6176.2	33.41
6200.2	33.64	6216.2	34.02	6240.2	33.62	6288.2	34.26	6328.2	33.87
6344.2	34.5	6376.2	33.86	6392.2	33.87	6416.2	34.09	6448.2	33.95
6472.2	33.97	6496.2	33.54	6528.2	33.73	6552.9	34.02	6560.2	34.1
6576.2	34.63	6592.2	34.82	6624.2	34.12	6640.2	35.09	6664.2	34.48
6688.2	34.45	6784.2	34.9	6864.2	35.6	6904.2	36.49	6928.2	36.32
6944.2	37.44	6949.6	37.66	6979.7	38.91				

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-964.4	.2	-47.4	.1	4905.4	.035	5053.1	.1	5518.4	.08

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
4905.4	5053.1	54	54	54	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
-964.4	4775	34.8	F
5169	6979.7	34.9	F

HEC-RAS River: P100-00-00 Reach: P100-00-00_0010 Profile: 1PCT_100yr (Continued)

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
P100-00-00_0010	65928.4	1PCT_100yr	Eff 100	33098.00	-1.10	37.02		38.01	0.000457	8.45	7810.24	890.80	0.27
P100-00-00_0010	65087.6	1PCT_100yr	16:05	26046.00	-4.00	32.13		32.72	0.000361	6.50	6813.57	490.20	0.23
P100-00-00_0010	65087.6	1PCT_100yr	16:10	26369.00	-4.00	32.21		32.80	0.000366	6.56	6850.39	493.09	0.23
P100-00-00_0010	65087.6	1PCT_100yr	Eff 100	33098.00	-4.00	37.01		37.59	0.000291	6.60	11297.04	1569.28	0.22
P100-00-00_0010	64048.7	1PCT_100yr	16:05	26046.00	-6.42	32.05		32.35	0.000206	5.10	12683.35	1146.99	0.18
P100-00-00_0010	64048.7	1PCT_100yr	16:10	26369.00	-6.42	32.13		32.43	0.000209	5.14	12770.49	1153.70	0.18
P100-00-00_0010	64048.7	1PCT_100yr	Eff 100	44000.00	-6.42	36.79		37.26	0.000279	6.64	20194.67	2188.12	0.21
P100-00-00_0010	63532.5	1PCT_100yr	16:05	26046.00	-3.00	31.75		32.23	0.000227	6.00	9742.59	1256.21	0.19
P100-00-00_0010	63532.5	1PCT_100yr	16:10	26369.00	-3.00	31.82		32.31	0.000230	6.05	9832.24	1264.34	0.19
P100-00-00_0010	63532.5	1PCT_100yr	Eff 100	44000.00	-3.00	36.39		37.10	0.000313	7.75	16226.18	1539.17	0.23
P100-00-00_0010	63354.4	1PCT_100yr	16:05	26046.00	-2.40	31.51	13.82	32.14	0.000294	6.66	5882.32	944.00	0.22
P100-00-00_0010	63354.4	1PCT_100yr	16:10	26369.00	-2.40	31.57	13.92	32.22	0.000299	6.73	5902.60	949.09	0.22
P100-00-00_0010	63354.4	1PCT_100yr	Eff 100	44000.00	-2.40	35.98	18.62	36.96	0.000418	8.74	12851.42	1504.00	0.27
P100-00-00_0010	63339.4			Bridge									
P100-00-00_0010	63324.4	1PCT_100yr	16:05	26046.00	-2.47	31.49	13.75	32.11	0.000292	6.65	5897.55	947.82	0.22
P100-00-00_0010	63324.4	1PCT_100yr	16:10	26369.00	-2.47	31.55	13.85	32.19	0.000297	6.71	5917.81	952.90	0.22
P100-00-00_0010	63324.4	1PCT_100yr	Eff 100	44000.00	-2.47	35.49	18.55	36.52	0.000446	8.95	12222.47	1466.59	0.27
P100-00-00_0010	62095.8	1PCT_100yr	16:05	26046.00	-7.77	31.66		31.70	0.000050	2.73	37797.60	2202.19	0.09
P100-00-00_0010	62095.8	1PCT_100yr	16:10	26369.00	-7.77	31.72		31.77	0.000051	2.76	37947.50	2203.43	0.09
P100-00-00_0010	62095.8	1PCT_100yr	Eff 100	44000.00	-7.77	35.78		35.85	0.000076	3.67	46962.63	2247.28	0.11
P100-00-00_0010	61100.3	1PCT_100yr	16:05	26046.00	-8.68	31.37		31.60	0.000147	4.66	14065.12	1147.46	0.15
P100-00-00_0010	61100.3	1PCT_100yr	16:10	26369.00	-8.68	31.43		31.67	0.000149	4.70	14137.99	1152.93	0.15
P100-00-00_0010	61100.3	1PCT_100yr	Eff 100	44000.00	-8.68	35.30		35.70	0.000231	6.34	19234.83	1446.28	0.19
P100-00-00_0010	60007.6	1PCT_100yr	16:05	26046.00	-7.78	30.92		31.38	0.000246	6.07	7827.14	528.93	0.20
P100-00-00_0010	60007.6	1PCT_100yr	16:10	26369.00	-7.78	30.97		31.44	0.000251	6.13	7856.14	534.13	0.20
P100-00-00_0010	60007.6	1PCT_100yr	Eff 100	44000.00	-7.78	34.34		35.31	0.000458	8.91	10139.52	813.77	0.27
P100-00-00_0010	58881.2	1PCT_100yr	16:05	26046.00	-9.53	30.65		31.11	0.000237	6.02	8809.06	669.29	0.19
P100-00-00_0010	58881.2	1PCT_100yr	16:10	26369.00	-9.53	30.69		31.17	0.000243	6.11	8837.71	687.97	0.19
P100-00-00_0010	58881.2	1PCT_100yr	Eff 100	44000.00	-9.53	33.87		34.79	0.000436	8.74	11341.75	914.96	0.26
P100-00-00_0010	58492.6	1PCT_100yr	16:05	26046.00	-9.00	30.71		30.99	0.000118	4.57	11089.52	890.26	0.14
P100-00-00_0010	58492.6	1PCT_100yr	16:10	26369.00	-9.00	30.76		31.04	0.000121	4.62	11131.68	894.63	0.14
P100-00-00_0010	58492.6	1PCT_100yr	Eff 100	44000.00	-9.00	34.01		34.57	0.000222	6.67	14490.49	1318.16	0.20

HEC-RAS River: P100-00-00 Reach: P100-00-00_0010 Profile: 1PCT_100yr (Continued)

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
P100-00-00_0010	57991.2	1PCT_100yr	16:05	26046.00	-6.82	30.61	9.75	30.92	0.000143	4.84	8306.43	1309.46	0.15
P100-00-00_0010	57991.2	1PCT_100yr	16:10	26369.00	-6.82	30.65	9.85	30.97	0.000145	4.89	8324.14	1313.17	0.16
P100-00-00_0010	57991.2	1PCT_100yr	Eff 100	44000.00	-6.82	33.73	14.46	34.41	0.000280	7.24	9538.45	2230.98	0.22
P100-00-00_0010	57964.2			Bridge									
P100-00-00_0010	57937.2	1PCT_100yr	16:05	26046.00	-7.11	30.53	9.46	30.84	0.000139	4.80	8392.68	1334.69	0.15
P100-00-00_0010	57937.2	1PCT_100yr	16:10	26369.00	-7.11	30.58	9.56	30.89	0.000142	4.85	8409.22	1340.55	0.15
P100-00-00_0010	57937.2	1PCT_100yr	Eff 100	44000.00	-7.11	33.31	14.17	34.00	0.000285	7.28	9487.78	2124.46	0.22
P100-00-00_0010	57897.1	1PCT_100yr	16:05	26046.00	-7.99	30.55	8.84	30.82	0.000135	4.39	8855.53	1986.53	0.14
P100-00-00_0010	57897.1	1PCT_100yr	16:10	26369.00	-7.99	30.59	8.92	30.86	0.000137	4.44	8876.62	2002.37	0.15
P100-00-00_0010	57897.1	1PCT_100yr	Eff 100	44000.00	-7.99	33.36	13.64	33.94	0.000266	6.58	10253.79	2599.80	0.21
P100-00-00_0010	57861.1			Bridge									
P100-00-00_0010	57825.1	1PCT_100yr	16:05	26046.00	-8.32	30.46	8.51	30.72	0.000130	4.34	8975.71	2041.84	0.14
P100-00-00_0010	57825.1	1PCT_100yr	16:10	26369.00	-8.32	30.50	8.59	30.76	0.000133	4.39	8995.16	2046.71	0.14
P100-00-00_0010	57825.1	1PCT_100yr	Eff 100	44000.00	-8.32	33.13	13.30	33.70	0.000263	6.55	10305.57	2633.65	0.21
P100-00-00_0010	56911.1	1PCT_100yr	16:05	26046.00	-10.20	30.42	8.34	30.57	0.000086	3.71	16820.46	954.90	0.12
P100-00-00_0010	56911.1	1PCT_100yr	16:10	26369.00	-10.20	30.46	8.46	30.61	0.000088	3.75	16854.76	955.78	0.12
P100-00-00_0010	56911.1	1PCT_100yr	Eff 100	44000.00	-10.20	33.05	13.13	33.40	0.000179	5.65	19224.05	1373.41	0.17
P100-00-00_0010	56116.0	1PCT_100yr	16:05	26046.00	-12.61	29.96		30.43	0.000284	6.08	9875.49	838.29	0.21
P100-00-00_0010	56116.0	1PCT_100yr	16:10	26369.00	-12.61	29.99		30.46	0.000289	6.14	9899.77	839.80	0.21
P100-00-00_0010	56116.0	1PCT_100yr	Eff 100	44000.00	-12.61	32.12		33.10	0.000566	9.03	12396.88	1705.48	0.29
P100-00-00_0010	55154.4	1PCT_100yr	16:05	26046.00	-10.25	29.90	9.57	30.17	0.000141	4.64	12787.70	2241.92	0.15
P100-00-00_0010	55154.4	1PCT_100yr	16:10	26369.00	-10.25	29.93	9.68	30.20	0.000144	4.69	12835.06	2247.01	0.15
P100-00-00_0010	55154.4	1PCT_100yr	Eff 100	44000.00	-10.25	32.08	14.88	32.58	0.000260	6.60	16960.20	3049.38	0.21
P100-00-00_0010	54063.3	1PCT_100yr	16:05	26046.00	-10.58	29.80		30.03	0.000121	4.40	16601.38	2645.86	0.14
P100-00-00_0010	54063.3	1PCT_100yr	16:10	26369.00	-10.58	29.82		30.06	0.000124	4.44	16670.50	2649.37	0.14
P100-00-00_0010	54063.3	1PCT_100yr	Eff 100	44000.00	-10.58	31.87		32.33	0.000237	6.42	22533.11	3218.03	0.20
P100-00-00_0010	52958.0	1PCT_100yr	16:05	21104.00	-9.82	29.71		29.90	0.000091	3.76	14035.93	3149.85	0.12
P100-00-00_0010	52958.0	1PCT_100yr	16:10	21529.00	-9.82	29.73		29.93	0.000094	3.83	14102.74	3158.44	0.12
P100-00-00_0010	52958.0	1PCT_100yr	Eff 100	44832.00	-9.82	31.41		32.03	0.000289	6.96	19776.13	3492.61	0.22
P100-00-00_0010	52205.4	1PCT_100yr	16:05	21104.00	-13.06	29.64		29.83	0.000112	3.99	15113.47	3250.83	0.13
P100-00-00_0010	52205.4	1PCT_100yr	16:10	21529.00	-13.06	29.65		29.86	0.000116	4.07	15172.94	3260.80	0.13

PROPOSED CONDITION - **P116 PEAK FLOW RATE**

Station[2]		Flow Rate[3] (cfs)	Bottom Slope (ft/ft)	Manning's n-value	Side Slope (left)	Side Slope (right)	Bottom Width (ft)	Normal Depth (ft)	Flow Vel. (fps)	Froude No.	Velocity Head (ft)	Energy Head (ft)	Flow Area (sq. ft.)	Top Width of Flow (ft)
15+97.6	23+50	1507	0.0010	0.03	3	3	6	9.54	4.57	0.352	0.32	9.86	330.04	63.22
23+50	25+00	396	0.0010	0.03	3	3	6	5.44	3.26	0.324	0.17	5.60	121.40	38.64
25+00	36+55	396	0.0016	0.03	3	3	6	4.91	3.86	0.404	0.23	5.15	101.87	35.47
36+55	44+54.3	77	0.0016	0.03	3	3	6	2.33	2.55	0.365	0.10	2.43	30.20	19.96

Notes: [1] Calculations were performed using the HYDROCALC HYDRAULICS program developed by Dodson and Associates (Version 1.2a, 1996).

[2] Refer to Sheet 6A-B.2B1-40 for channel station locations.

[3] Flow rates obtained from HEC-HMS hydraulic calculations given in Appendix 6A-A.

DISCHARGE POINT DCP-1

Required: Determine the tailwater depth.

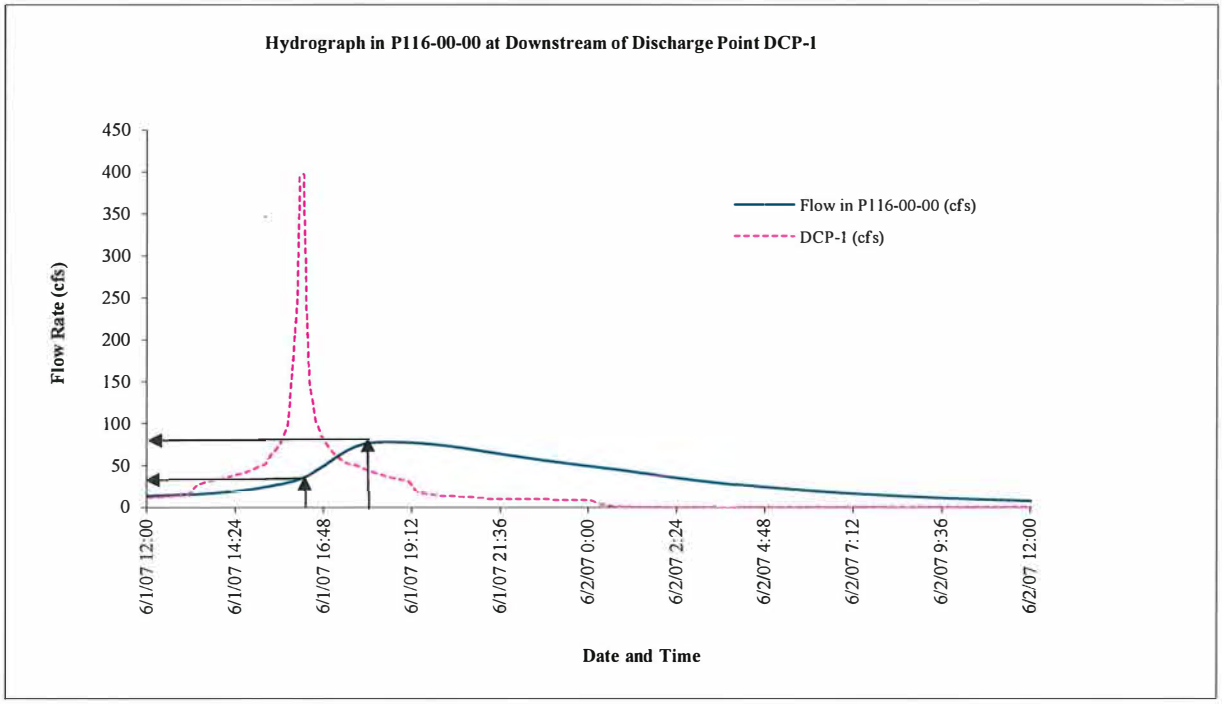
Solution:

1. Determine peak flow that is discharged from the site at DCP-1.

   Q= 415 cfs at Time= 6/1/07 16:10

   Peak discharge rate was determined from the hydrograph of this discharge point in the HEC-1 file for the permitted conditions regional analysis (Attachment 6A-E).

2. The hydrograph in Pl 16-00-00 along with the pond discharge hydrograph at the DCP-1 are shown below.



As shown above, the peak flow in P116-00-00 at this discharge point is 77 cfs. The peak flow in P116-00-00 that coincides with the peak discharge from DCP1 is 77 cfs. The water surface level in P116-00-00 at this location has been estimated for these flows.

3. Using Hydrocalc, the depth of the flow in P116-00-00 at this discharge point is 2.33 feet (Refer to page 6A-B.2B1- 4) resulting in a flow elevation of 37.25 ft-msl (Refer to Attachment 6A-B.2B2) for a flow of 77 cfs and 1.58 feet and a resulting elevation of 36.50 for a flow of 35 cfs.

TRAPEZOIDAL CHANNEL ANALYSIS
NORMAL DEPTH COMPUTATION
At the outfall of DCP-1
Proposed Conditions
November 30, 2011

PROGRAM INPUT DATA

DESCRIPTION	VALUE
Flow Rate (cfs)	77
Channel Bottom Slope (ft/ft)	0.0016
Manning's Roughness Coefficient (n-value)	0.03
Channel Left Side Slope (horizontal/vertical)	3.0
Channel Right Side Slope (horizontal/vertical)	3.0
Channel Bottom Width (ft)	6.0

COMPUTATION RESULTS

DESCRIPTION	VALUE
Normal Depth (ft)	2.33
Flow Velocity (fps)	2.55
Froude Number	0.365
Velocity Head (ft)	0.10
Energy Head (ft)	2.43
Cross-Sectional Area of Flow (sq ft)	30.20
Top Width of Flow (ft)	19.96

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TRAPEZOIDAL CHANNEL ANALYSIS
NORMAL DEPTH COMPUTATION
At the outfall of DCP-1
Proposed Conditions
November 30, 2011

PROGRAM INPUT DATA

DESCRIPTION	VALUE
Flow Rate (cfs)	35
Channel Bottom Slope (ft/ft)	0.0016
Manning's Roughness Coefficient (n-value)	0.03
Channel Left Side Slope (horizontal/vertical)	3.0
Channel Right Side Slope (horizontal/vertical)	3.0
Channel Bottom Width (ft)	6.0

COMPUTATION RESULTS

DESCRIPTION	VALUE
Normal Depth (ft)	1.58
Flow Velocity (fps)	2.06
Froude Number	0.347
Velocity Head (ft)	0.07
Energy Head (ft)	1.65
Cross-Sectional Area of Flow (sq ft)	16.98
Top Width of Flow (ft)	15.48

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DISCHARGE POINT DCP-3

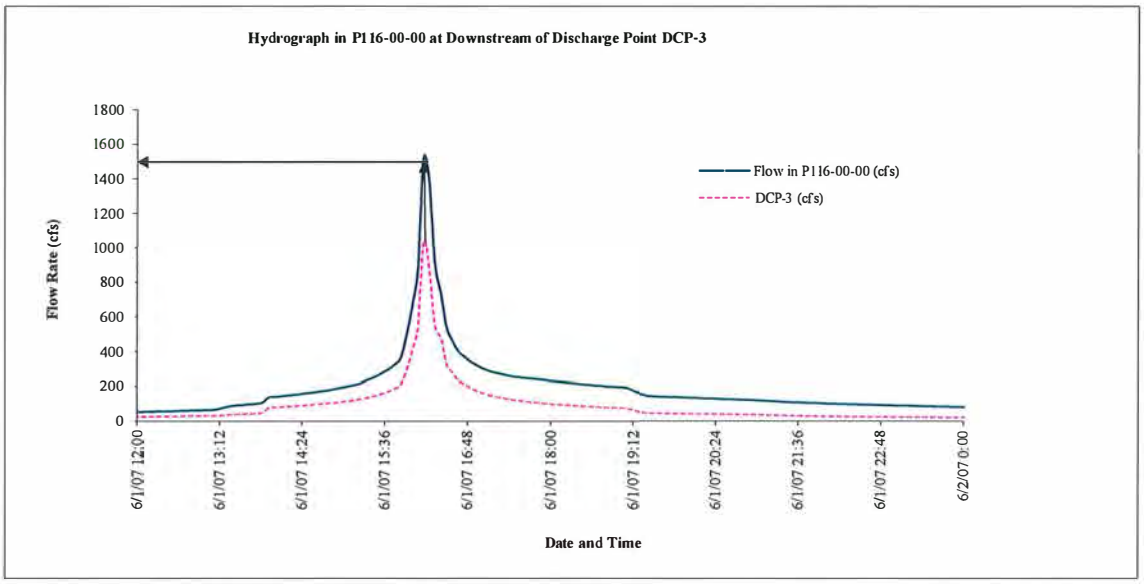
Required: Determine the tailwater depth.

Solution:

1. Determine peak flow that is discharged from the site at DCP-3.

   Q= 1018 cfs at Time= 6/1/07 16:05
   Peak discharge rate was determined from the hydrograph of this discharge point in the HEC-HMS file for the permitted conditions regional analysis (Attachment 6A-E).

2. The hydrograph in Pl 16-00-00 along with the pond discharge hydrograph at the DCP-3 are shown below.



   As shown above, the peak flow in P116-00-00 at this discharge point is 1,507 cfs at 6/1/07 16:05 The water surface level in Pl 16-00-00 at this location has been estimated for this flow.

3. Using HYDROCALC, the depth of the flow in Pl 16-00-00 at this discharge point is 9.54 ft (refer to page 6A-B.2B1-39) resulting in a flow elevation of 41.49 ft-msl. (Refer to Attachment 6A-B.2B2).

   Peak flow at this outlet occurs at the time of peak stage in the receiving Harris County ditch (Pl 16-00-00). Therefore, a separate stage/discharge rating for the 100-year flood conditions is not necessary for this outlet.

TRAPEZOIDAL CHANNEL ANALYSIS
NORMAL DEPTH COMPUTATION
At the outfall of DCP-3
Proposed Conditions
November 30, 2011

PROGRAM INPUT DATA

DESCRIPTION	VALUE
Flow Rate (cfs)	1507
Channel Bottom Slope (ft/ft)	0.001
Manning's Roughness Coefficient (n-value)	0.03
Channel Left Side Slope (horizontal/vertical)	3.0
Channel Right Side Slope (horizontal/vertical)	3.0
Channel Bottom Width (ft)	6.0

COMPUTATION RESULTS

DESCRIPTION	VALUE
Normal Depth (ft)	9.54
Flow Velocity (fps)	4.57
Froude Number	0.352
Velocity Head (ft)	0.32
Energy Head (ft)	9.86
Cross-Sectional Area of Flow (sq ft)	330.04
Top Width of Flow (ft)	63.22

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[redacted]

NORTHWEST OUTLET STRUCTURE (DCP-1)

DESIGN SUMMARY

Low Level Outlet Dia. (in.)=	36
Pipe Invert Elevation-Upstream (ft)=	37.54
Pipe Invert Elevation-Downstream (ft)=	36.05
Culvert Length (ft)=	87
Number of Culverts=	1
Spillway Elevetaion (ft-msl)=	42.5
Spillway Crest Length (ft)=	30
Depth of Spillway (ft)=	2

Outlet Structure Discharge Curve:

Tailwater impact when flow in HCFCD unit coincides with pond peak flow:

Depth of Flow in HCFCD Ditch[1]=	1.58	ft
ltom Elevation of HCFCD Ditch at Discharge Point=	34.92	ft-msl
Water Surface Elevation in the HCFCD Ditch=	36.50	ft-msl
Low Level Outlet Pipe Invert Elevation=	37.54	ft-msl
Tailwater depth =	0	ft

Elevation	Q^2_{LLO} (cfs)	Q^3_{spill} (cfs)	Qtotal
37.5	--	--	--
39	11	0	11
40	26		26
41	43		43
42	49		49
42.5	54		54
43	59	28	87
44	67	145	213
45	82	313	395
46	88	519	607

Tailwater impact assuming 100-YR peak flow in HCFCD unit coincides with pond peak flow:

2.33	ft	
34.92	ft-msl	
37.25	ft-msl	
37.54	ft-msl	
0	ft	

Elevation	Q^2_{LLO} (cfs)	Q^3_{spill} (cfs)	Q_{total}
37.5	--		
39	11	0	11
40	26		26
41	43		43
42	49		49
42.5	54		54
43	59	28	87
44	67	145	212
47	94	756	850

[1] Low Level Outlet (LLO) flow rate has been calculated by using HYDROCALC Hydraulics for Windows,

[2] Low Level Outlet (LLO) flow rate has been calculated by using HYDROCALC Hydraulics for Windows, (Version 1.2a - Copyright (c) 1996) Computer program developed by Dodson & Associates, Inc., Flow in low level outlet has been estimated by assuming the tail water depth estimated above.

[3] Flow over the spillway is calcuated by using [$Q=2.64*L*H^{3/2}$].

NORTH OUTLET STRUCTURE (DCP-3)

DESIGN SUMMARY

Low Level Outlet Dia. (in.)=	36
Pipe Invert Elevation-Upstream (ft)=	36.31
Pipe Invert Elevation-Downstream (ft)=	34.00
Culvert Length (ft)=	124
Number of Culverts=	1
Spillway Elevetaion (ft-msl)=	42
Spillway Crest Length (ft)=	130
Depth of Spillway (ft)=	2

Outlet Structure Discharge Curve:

Tailwater impact when flow in HCFCD unit coincides with pond peak flow:

Depth of Flow in HCFCD Ditch[1]=	9.2	ft
:om Elevation of HCFCD Ditch at Discharge Point=	31.95	ft-msl
Water Surface Elevation in the HCFCD Ditch=	41.15	ft-msl
Low Level Outlet Pipe Invert Elevation=	34.00	ft-msl
Tailwater depth =	7.15	ft

Elevation	Q^2_{LLO} (cfs)	Q^3_{spill} (cfs)	Qtotal
35	--	--	--
36	0		0
37	0		0
38	0		0
39	0		0
40	0		0
40.5	0		0
41	0		0
42	1	0	1
42.5	5	121	126
43	10	343	353
44	25	971	996

Tailwater impact assuming 100-YR peak flow in HCFCD unit coincides with pond peak flow:

	9.58	ft
	31.95	ft-msl
	41.53	ft-msl
	34.00	ft-msl
	7.53	ft

Elevation	Q^2_{LLO} (cfs)	Q^3_{spill} (cfs)	Q_{total}
35	--	--	--
36	0		0
37	0		0
38	0		0
39	0		0
40	0		0
40.5	0		0
41	0		0
42	1	0	1
42.5	5	121	126
43	10	343	353
44	25	971	996

[1] Low Level Outlet (LLO) flowrate has been calculated by using HYDROCALC Hydraulics for Windows,

[2] Low Level Outlet (LLO) flow rate has been calculated by using HYDROCALC Hydraulics for Windows, (Version 1.2a - Copyright (c) 1996) Computer program developed by Dodson & Associates, Inc., Flow in low level outlet has been estimated by assuming the tail water depth estimated above.

[3] Flow over the spillway is calcuated by using [$Q=2.64*L*H^{3/2}$].

PROPOSED NORTHEAST OUTLET STRUCTURE (DCP-4)

DESIGN SUMMARY

Low Level Outlet Dia. (in.)=	18
Pipe Invert Elevation-Upstream (ft)=	26.00
Pipe Invert Elevation-Downstream (ft)=	25.25
Culvert Length (ft)=	70
Number of Culverts=	1
Spillway Elevetaion (ft-msl)=	32
Spillway Crest Length (ft)=	80
Depth of Spillway (ft)=	1.0

Outlet Structure Discharge Curve:

Tailwater impact when flow in HCFCD unit coincides with pond peak flow:

Depth of Flow in HCFCD Ditch[1]=	40.11	ft
:tom Elevation of HCFCD Ditch at Discharge Point=	-8.68	ft-msl
Water Surface Elevation in the HCFCD Ditch=	31.43	ft-msl
Low Levcl Outlet Pipe Invert Elevation=	26.00	ft-msl
Tailwater depth =	5.43	ft

Elevation	Q^2_{LLO} (cfs)	Q^3_{spill} (cfs)	Q_{total}
26	--	--	--
27	0		0
28	0		0
29	0		0
30	0		0
31	0		0
32	1		1
32.5	4	75	78
33	7	211	218
33.5	8	388	396

Tailwater impact assuming 100-YR peak flow in HCFCD unit coincides with pond peak flow:

43.98	ft
-8.68	ft-msl
35.3	ft-msl
26.00	ft-msl
9.3	ft

Elevation	Q^2_{LLO} (cfs)	Q^3_{spill} (cfs)	Q_{total}
26	--	--	--
27	0		0
28	0		0
29	0		0
30	0		0
31	0		0
32	0		0
32.5	0	0	0
33	0	0	0
33.5	0	0	0
35	0	0	0
36	2	124	125
37	7	468	475

[1] Low Level Outlet (LLO) flow rate has been calculated by using HYDROCALC Hydraulics for Windows,

[2] Low Level Outlet (LLO) flow rate has been calculated by using HYDROCALC Hydraulics for Windows, (Version 1.2a - Copyright (c) 1996) Computer program developed by Dodson & Associates, Inc., Flow in low level outlet has been estimated by assuming the tail water depth estimated above.

[3] Flow over the spillway is calcuated by using [$Q=2.64*L*H^{3/2}$].

PROPOSED DCP-5 OUTLET STRUCTURE

DESIGN SUMMARY

Low Level Outlet Dia. (in.)=	12
Pipe Invert Elevation-Upstream (ft)=	28.69
Pipe Invert Elevation-Downstream (ft)=	28.50
Culvert Length (ft)=	70
Number of Culverts=	1
Spillway Elevetaion (ft-msl)=	32.5
Spillway Crest Length (ft)=	50
Depth of Spillway (ft)=	1.0

Outlet Structure Discharge Curve:

Tailwater impact when flow in HCFCD unit coincides with pond peak flow:

Depth of Flow in HCFCD Ditch[1]=	38.75	ft
tom Elevation of HCFCD Ditch at Discharge Point=	-7.78	ft-msl
Water Surface Elevation in the HCFCD Ditch=	30.97	ft-msl
Low Level Outlet Pipe Invert Elevation=	28.69	ft-msl
Tailwater depth =	2.28	ft

Elevation	Q^2_{LLO} (cfs)	Q^3_{spill} (cfs)	Q_{total}
28.69	--	--	--
29	0		0
30	0		0
31	0		0
32	2		2
32.5	3		3
33	4	47	51

Tailwater impact assuming 100-YR peak flow in HCFCD unit coincides with pond peak flow:

42.12	ft
-7.78	ft-msl
34.34	ft-msl
28.69	ft-msl
5.65	ft

Elevation	Q^2_{LLO} (cfs)	Q^3_{spill} (cfs)	Q_{total}
28.69	--	--	--
29	0		0
30	0		0
31	0		0
32	0		0
32.5	0		0
33	0	0	0
34	0	0	0
35	1	71	72
36	4	282	286

[1] Low Level Outlet (LLO) flow rate has been calculated by using HYDROCALC Hydraulics for Windows,

[2] Low Level Outlet (LLO) flow rate has been calculated by using HYDROCALC Hydraulics for Windows, (Version 1.2a - Copyright (c) 1996) Computer program developed by Dodson & Associates, Inc., Flow in low level outlet has been estimated by assuming the tail water depth estimated above.

[3] Flow over the spillway is calcuated by using [$Q=2.64*L*H^{3/2}$].

PROPOSED DCP-6 OUTLET STRUCTURE (East Pond)

DESIGN SUMMARY

Low Level Outlet Dia. (in.)=	30
Pipe Invert Elevation-Upstream (ft)=	28.59
Pipe Invert Elevation-Downstream (ft)=	27.35
Culvert Length (ft)=	65
Number of Culverts=	2
Spillway Elevetaion (ft-msl)=	32
Spillway Crest Length (ft)=	80
Depth of Spillway (ft)=	1.0

Outlet Structure Discharge Curve:

Tailwater impact when flow in HCFCD unit coincides with pond peak flow:

Depth of Flow in HCFCD Ditch[1]=	38.75	ft
Bottom Elevation of HCFCD Ditch at Discharge Point=	-7.78	ft-msl
Water Surface Elevation in the HCFCD Ditch=	30.97	ft-msl
Low Level Outlet Pipe Invert Elevation=	28.59	ft-msl
Tailwater depth =	2.38	ft

Elevation	Q^1_{LLO} (cfs)	Q^2_{spill} (cfs)	Q_{total}
28.59	--	--	--
29	0		0
30	0		0
31	0		0
32	9		9
32.1	10	7	17
33	30	211	241
34	54	597	651
36	80	1690	1770

Tailwater impact assuming 100-YR peak flow in HCFCD unit coincides with pond peak flow:

	42.12	ft
	-7.78	ft-msl
	34.34	ft-msl
	28.59	ft-msl
	5.75	ft

Elevation	Q^1_{LLO} (cfs)	Q^2_{spill} (cfs)	Q_{total}
28.59	--	--	--
29	0		0
30	0		0
31	0		0
32	0		0
33	0	0	0
34	0	0	0
35	4	113	117
36	22	452	474

[1] Low Level Outlet (LLO) flow rate has been calculated by using HYDROCALC Hydraulics for Windows,

[2] Low Level Outlet (LLO) flow rate has been calculated by using HYDROCALC Hydraulics for Windows, (Version 1.2a - Copyright (c) 1996) Computer program developed by Dodson & Associates, Inc., Flow in low level outlet has been estimated by assuming the tail water depth estimated above.

[3] Flow over the spillway is calcuated by using [$Q=2.64*L*H^{3/2}$].

PROPOSED SOUTHEAST OUTLET STRUCTURE (DCP-7)

DESIGN SUMMARY

Low Level Outlet Dia. (in.)=	48
Pipe Invert Elevation-Upstream (ft)=	25.00
Pipe Invert Elevation-Downstream (ft)=	23.00
Culvert Length (ft)=	65
Number of Culverts=	3
Spillway Elevetaion (ft-msl)=	29.5
Spillway Crest Length (ft)=	60
Depth of Spillway (ft)=	1.0

Outlet Structure Discharge Curve:

Tailwater impact when flow in HCFCD unit coincides with pond peak flow:

Depth of Flow in HCFCD Ditch[1]=	40.3	ft
ıttom Elevation of HCFCD Ditch at Discharge Point=	-8.68	ft-msl
Water Surface Elevation in the HCFCD Ditch=	31.62	ft-msl
Low Level Outlet Pipe Invert Elevation=	25.00	ft-msl
Tailwater depth =	6.62	ft

Elevation	Q^1_{LLO} (cfs)	Q^2_{spill} (cfs)	Q_{total}
25.00	--	--	--
26	0		0
27	0		0
28	0		0
29	0		0
29.5	0		0
30	0	0	0
31	0	0	0
31.5	0	0	0
32	28	37	65
33	82	257	339
34	153	582	735

Tailwater impact assuming 100-YR peak flow in HCFCD unit coincides with pond peak flow:

44.38	ft
-8.68	ft-msl
35.70	ft-msl
25.00	ft-msl
10.7	ft

Elevation	Q^1_{LLO} (cfs)	Q^2_{spill} (cfs)	Q_{total}
25.00	--	--	--
26	0		0
27	0		0
28	0		0
29	0		0
29.5	0		0
30	0	0	0
31	0	0	0
31.5	0	0	0
35	0	0	0
36	3	26	29
37	28	235	263
38	82	553	635

[1] Low Level Outlet (LLO) flow rate has been calculated by using HYDROCALC Hydraulics for Windows,

[2] Low Level Outlet (LLO) flow rate has been calculated by using HYDROCALC Hydraulics for Windows, (Version 1.2a - Copyright (c) 1996) Computer program developed by Dodson & Associates, Inc., Flow in low level outlet has been estimated by assuming the tail water depth estimated above.

[3] Flow over the spillway is calcuated by using [$Q=2.64*L*H^{3/2}$].

PROPOSED SP-2 OUTLET STRUCTURE (DCP-8)

DESIGN SUMMARY

Low Level Outlet Dia. (in.)=	36
Pipe Invert Elevation-Upstream (ft)=	27.00
Pipe Invert Elevation-Downstream (ft)=	26.00
Culvert Length (ft)=	100
Number of Culverts=	1
Spillway Elevetaion (ft-msl)=	35
Spillway Crest Length (ft)=	75
Depth of Spillway (ft)=	1.0

Outlet Structure Discharge Curve:

Tailwater impact when flow in HCFCD unit coincides with pond peak flow:

Depth of Flow in HCFCD Ditch[1]=	18.26	ft
:om Elevation of HCFCD Ditch at Discharge Point=	19.14	ft-msl
Water Surface Elevation in the HCFCD Ditch=	37.4	ft-msl
Low Level Outlet Pipe Invert Elevation=	27.00	ft-msl
Tailwater depth =	10.4	ft

Elevation	Q^2_{LLO} (cfs)	Q^3_{spill} (cfs)	Q_{total}
27	--	--	--
28	0		0
29	0		0
30	0		0
31	0		0
32	0		0
33	0		0
34	0		0
35	0		0
36	0	198	198
37	0	0	0
38	2	92	94
39	7	401	408

Tailwater impact assuming 100-YR peak flow in HCFCD unit coincides with pond peak flow:

	20.13	ft
	19.14	ft-msl
	39.27	ft-msl
	27.00	ft-msl
	12.27	ft

Elevation	Q^2_{LLO} (cfs)	Q^3_{spill} (cfs)	Q_{total}
27	--	--	--
28	0		0
29	0		0
30	0		0
31	0		0
32	0		0
33	0		0
34	0		0
35	0		0
36	0	0	0
39	0	0	0
40	2	123	125
41	14	451	465

[1] Low Level Outlet (LLO) flow rate has been calculated by using HYDROCALC Hydraulics for Windows,

[2] Low Level Outlet (LLO) flow rate has been calculated by using HYDROCALC Hydraulics for Windows, (Version 1.2a - Copyright (c) 1996) Computer program developed by Dodson & Associates, Inc., Flow in low level outlet has been estimated by assuming the tail water depth estimated above.

[3] Flow over the spillway is calcuated by using [$Q=2.64*L*H^{3/2}$].

PROPOSED SP-1 OUTLET STRUCTURE (DCP-9)

DESIGN SUMMARY

Low Level Outlet Dia. (in.)=	36
Pipe Invert Elevation-Upstream (ft)=	30.00
Pipe Invert Elevation-Downstream (ft)=	28.00
Culvert Length (ft)=	75
Number of Culverts=	2
Spillway Elevetaion (ft-msl)=	37
Spillway Crest Length (ft)=	80
Depth of Spillway (ft)=	1.0

Outlet Structure Discharge Curve:

Tailwater impact when flow in HCFCD unit coincides with pond peak flow:

Depth of Flow in HCFCD Ditch[1]=	18.26	ft
:om Elevation of HCFCD Ditch at Discharge Point=	19.14	ft-msl
Water Surface Elevation in the HCFCD Ditch=	37.76	ft-msl
Low Level Outlet Pipe Invert Elevation=	30.00	ft-msl
Tailwater depth =	7.40	ft

Elevation	Q^2_{LLO} (cfs)	Q^3_{spill} (cfs)	Q_{total}
30.00	--	--	--
31	0		0
32	0		0
33	0		0
34	0		0
35	0		0
36	0		0
37	0		0
38	2	25	27
39	12	292	304
40	27	708	735

Tailwater impact assuming 100-YR peak flow in HCFCD unit coincides with pond peak flow:

	20.13	ft
	19.14	ft-msl
	39.50	ft-msl
	30.00	ft-msl
	9.27	ft

Elevation	Q^2_{LLO} (cfs)	Q^3_{spill} (cfs)	Q_{total}
30.00	--	--	--
31			
32			
33			
34			
35			
36			
37			
38	0	0	0
39	0	0	0
40	3	75	78
41	13	388	401
42	29	835	864

[1] Low Level Outlet (LLO) flow rate has been calculated by using HYDROCALC Hydraulics for Windows,

[2] Low Level Outlet (LLO) flow rate has been calculated by using HYDROCALC Hydraulics for Windows, (Version 1.2a - Copyright (c) 1996) Computer program developed by Dodson & Associates, Inc., Flow in low level outlet has been estimated by assuming the tail water depth estimated above.

[3] Flow over the spillway is calcuated by using [$Q=2.64*L*H^{3/2}$].

NORTHWEST OUTLET STRUCTURE (DCP-1)

DESIGN SUMMARY

Low Level Outlet Dia. (in.)=	36
Pipe Invert Elevation-Upstream (ft)=	37.54
Pipe Invert Elevation-Downstream (ft)=	36.05
Culvert Length (ft)=	87
Number of Culverts=	1
Spillway Elevetaion (ft-msl)=	42.5
Spillway Crest Length (ft)=	30
Depth of Spillway (ft)=	2

Outlet Structure Discharge Curve:

Tailwater impact when flow in HCFCD unit coincides with pond peak flow:

Depth of Flow in HCFCD Ditch[1]=	1.58	ft
ttom Elevation of HCFCD Ditch at Discharge Point=	34.92	ft-msl
Water Surface Elevation in the HCFCD Ditch=	36.5	ft-msl
Low Level Outlet Pipe Invert Elevation=	37.54	ft-msl
Tailwater depth =	0	ft

Elevation	Q^2_{LLO} (cfs)	Q^3_{spill} (cfs)	Q_{total}
37.5	0		0
38.0	1		1
39.0	10		10
40.0	25		24
41.0	42		42
42.0	49		49
42.5	54	0	54
43	59	28	87
44	67	145	212
47	75	756	831

Tailwater impact assuming 100-YR peak flow in HCFCD unit coincides with pond peak flow:

2.33	ft
34.92	ft-msl
37.25	ft-msl
37.54	ft-msl
0	ft

Elevation	Q^2_{LLO} (cfs)	Q^3_{spill} (cfs)	Q_{total}
37.5	0		0
38.0	1		1
39.0	10		10
40.0	25		25
41.0	42		42
42.0	49		49
42.5	54	0	54
43	59	28	87
44	67	145	212
47	75	756	831

[1] Low Level Outlet (LLO) flow rate has been calculated by using HYDROCALC Hydraulics for Windows,

[2] Low Level Outlet (LLO) flow rate has been calculated by using HYDROCALC Hydraulics for Windows, (Version 1.2a - Copyright (c) 1996) Computer program developed by Dodson & Associates, Inc., Flow in low level outlet has been estimated by assuming the tail water depth estimated above.

[3] Flow over the spillway is calcuated by using [$Q=2.64*L*H^{3/2}$].

NORTH OUTLET STRUCTURE (DCP-3)

DESIGN SUMMARY

Low Level Outlet Dia. (in.)=	36
Pipe Invert Elevation-Upstream (ft)=	36.31
Pipe Invert Elevation-Downstream (ft)=	34.00
Culvert Length (ft)=	124
Number of Culverts=	1
Spillway Elevetaion (ft-msl)=	42
Spillway Crest Length (ft)=	130
Depth of Spillway (ft)=	2

Outlet Structure Discharge Curve:

Tailwater impact when flow in HCFCD unit coincides with pond peak flow:

Depth of Flow in HCFCD Ditch[1]=	9.54	ft
:om Elevation of HCFCD Ditch at Discharge Point=	31.95	ft-msl
Water Surface Elevation in the HCFCD Ditch=	41.49	ft-msl
Low Level Outlet Pipe Invert Elevation=	34.00	ft-msl
Tailwater depth =	7.49	ft

Elevation	Q^2_{LLO} (cfs)	Q^3_{spill} (cfs)	Q_{total}
36.0	0	0	0
37.0	0	0	0
38.0	0	0	0
39.0	0	0	0
40.0	0	0	0
41.0	0	0	0
42	1	0	1
42.5	5	121	126
43	10	343	353
44	25	971	996

Tailwater impact assuming 100-YR peak flow in HCFCD unit coincides with pond peak flow:

	9.54	ft
	31.95	ft-msl
	41.49	ft-msl
	34.00	ft-msl
	7.49	ft

Elevation	Q^2_{LLO} (cfs)	Q^3_{spill} (cfs)	Q_{total}
36.0	0	0	0
37.0	0	0	0
38.0	0	0	0
39.0	0	0	0
40.0	0	0	0
41.0	0	0	0
42	1	0	1
42.5	5	121	126
43	10	343	353
44	25	971	996

[1] Low Level Outlet (LLO) flow rate has been calculated by using HYDROCALC Hydraulics for Windows,

[2] Low Level Outlet (LLO) flow rate has been calculated by using HYDROCALC Hydraulics for Windows, (Version 1.2a - Copyright (c) 1996) Computer program developed by Dodson & Associates, Inc., Flow in low level outlet has been estimated by assuming the tail water depth estimated above.

[3] Flow over the spillway is calcuated by using [$Q=2.64*L*H^{3/2}$].

PROPOSED NORTHEAST OUTLET STRUCTURE (DCP-4)

DESIGN SUMMARY

Low Level Outlet Dia. (in.)=	18
Pipe Invert Elevation-Upstream (ft)=	26.00
Pipe Invert Elevation-Downstream (ft)=	25.25
Culvert Length (ft)=	70
Number of Culverts=	1
Spillway Elevetaion (ft-msl)=	32
Spillway Crest Length (ft)=	80
Depth of Spillway (ft)=	1.0

Outlet Structure Discharge Curve:

Tailwater impact when flow in HCFCD unit coincides with pond peak flow:

Depth of Flow in HCFCD Ditch[1]=	40.3	ft
:tom Elevation of HCFCD Ditch at Discharge Point=	-8.68	ft-msl
Water Surface Elevation in the HCFCD Ditch=	31.62	ft-msl
Low Level Outlet Pipe Invert Elevation=	26.00	ft-msl
Tailwater depth =	5.62	ft

Elevation	Q^2_{LLO} (cfs)	Q^3_{spill} (cfs)	Q_{total}
26	--	--	--
27	0		0
28	0		0
29	0		0
30	0		0
31	0		0
32	1		1
32.5	4	75	78
33	7	211	218
33.5	8	388	396

Tailwater impact assuming 100-YR peak flow in HCFCD unit coincides with pond peak flow:

43.98	ft
-8.68	ft-msl
35.3	ft-msl
26.00	ft-msl
9.3	ft

Elevation	Q^2_{LLO} (cfs)	Q^3_{spill} (cfs)	Q_{total}
26	--	--	--
27	0		0
28	0		0
29	0		0
30	0		0
31	0		0
32	0		0
32.5	0	0	0
33	0	0	0
33.5	0	0	0
35	0	0	0
36	2	124	125
37	7	468	475

[1] Low Level Outlet (LLO) flow rate has been calculated by using HYDROCALC Hydraulics for Windows,

[2] Low Level Outlet (LLO) flow rate has been calculated by using HYDROCALC Hydraulics for Windows, (Version 1.2a - Copyright (c) 1996) Computer program developed by Dodson & Associates, Inc., Flow in low level outlet has been estimated by assuming the tail water depth estimated above.

[3] Flow over the spillway is calcuated by using [$Q=2.64*L*H^{3/2}$].

PROPOSED DCP-5 OUTLET STRUCTURE

DESIGN SUMMARY

Low Level Outlet Dia. (in.)=	12
Pipe Invert Elevation-Upstream (ft)=	28.69
Pipe Invert Elevation-Downstream (ft)=	28.50
Culvert Length (ft)=	70
Number of Culverts=	1
Spillway Elevetaion (ft-msl)=	32.5
Spillway Crest Length (ft)=	50
Depth of Spillway (ft)=	1.0

Outlet Structure Discharge Curve:

Tailwater impact when flow in HCFCD unit coincides with pond peak flow:

Depth of Flow in HCFCD Ditch[1]=	38.75	ft
tom Elevation of HCFCD Ditch at Discharge Point=	-7.78	ft-msl
Water Surface Elevation in the HCFCD Ditch=	30.98	ft-msl
Low Level Outlet Pipe Invert Elevation=	28.69	ft-msl
Tailwater depth =	2.29	ft

Elevation	Q^2_{LLO} (cfs)	Q^3_{spill} (cfs)	Q_{total}
28.69	--	--	--
29	0		0
30	0		0
31	0		0
32	2		2
32.5	3		3
33	4	47	51

Tailwater impact assuming 100-YR peak flow in HCFCD unit coincides with pond peak flow:

	42.12	ft
	-7.78	ft-msl
	34.34	ft-msl
	28.69	ft-msl
	5.65	ft

Elevation	Q^2_{LLO} (cfs)	Q^3_{spill} (cfs)	Q_{total}
28.69	--	--	--
29	0		0
30	0		0
31	0		0
32	0		0
32.5	0		0
33	0	0	0
34	0	0	0
35	1	71	72
36	4	282	286

[1] Low Level Outlet (LLO) flow rate has been calculated by using HYDROCALC Hydraulics for Windows,

[2] Low Level Outlet (LLO) flow rate has been calculated by using HYDROCALC Hydraulics for Windows, (Version 1.2a - Copyright (c) 1996) Computer program developed by Dodson & Associates, Inc., Flow in low level outlet has been estimated by assuming the tail water depth estimated above.

[3] Flow over the spillway is calcuated by using [$Q=2.64*L*H^{3/2}$].

PROPOSED DCP-6 OUTLET STRUCTURE (East Pond)

DESIGN SUMMARY

Low Level Outlet Dia. (in.)=	30
Pipe Invert Elevation-Upstream (ft)=	28.59
Pipe Invert Elevation-Downstream (ft)=	27.35
Culvert Length (ft)=	65
Number of Culverts=	2
Spillway Elevetaion (ft-msl)=	32
Spillway Crest Length (ft)=	80
Depth of Spillway (ft)=	1.0

Outlet Structure Discharge Curve:

Tailwater impact when flow in HCFCD unit coincides with pond peak flow:

Depth of Flow in HCFCD Ditch[1]=	38.75	ft
Bottom Elevation of HCFCD Ditch at Discharge Point=	-7.78	ft-msl
Water Surface Elevation in the HCFCD Ditch=	30.98	ft-msl
Low Level Outlet Pipe Invert Elevation=	28.59	ft-msl
Tailwater depth =	2.38	ft

Elevation	Q^1_{LLO} (cfs)	Q^2_{spill} (cfs)	Q_{total}
28.59	--	--	--
29	0		0
30	0		0
31	0		0
32	9		9
32.1	10	7	17
33	30	211	241
34	54	597	651
36	80	1690	1770

Tailwater impact assuming 100-YR peak flow in HCFCD unit coincides with pond peak flow:

	42.12	ft
	-7.78	ft-msl
	34.34	ft-msl
	28.59	ft-msl
	5.75	ft

Elevation	Q^1_{LLO} (cfs)	Q^2_{spill} (cfs)	Q_{total}
28.59	--	--	--
29	0		0
30	0		0
31	0		0
32	0		0
33	0	0	0
34	0	0	0
35	4	113	117
36	22	452	474

[1] Low Level Outlet (LLO) flow rate has been calculated by using HYDROCALC Hydraulics for Windows,

[2] Low Level Outlet (LLO) flow rate has been calculated by using HYDROCALC Hydraulics for Windows, (Version 1.2a - Copyright (c) 1996) Computer program developed by Dodson & Associates, Inc., Flow in low level outlet has been estimated by assuming the tail water depth estimated above.

[3] Flow over the spillway is calcuated by using [$Q=2.64*L*H^{3/2}$].

PROPOSED SOUTHEAST OUTLET STRUCTURE (DCP-7)

DESIGN SUMMARY

Low Level Outlet Dia. (in.)=	48
Pipe Invert Elevation-Upstream (ft)=	25.00
Pipe Invert Elevation-Downstream (ft)=	23.00
Culvert Length (ft)=	65
Number of Culverts=	3
Spillway Elevetaion (ft-msl)=	29.5
Spillway Crest Length (ft)=	60
Depth of Spillway (ft)=	1.0

Outlet Structure Discharge Curve:

Tailwater impact when flow in HCFCD unit coincides with pond peak flow:

Depth of Flow in HCFCD Ditch[1]=	40.3	ft
ttom Elevation of HCFCD Ditch at Discharge Point=	-8.68	ft-msl
Water Surface Elevation in the HCFCD Ditch=	31.62	ft-msl
Low Level Outlet Pipe Invert Elevation=	25.00	ft-msl
Tailwater depth =	6.62	ft

Elevation	Q^1_{LLO} (cfs)	Q^2_{spill} (cfs)	Q_{total}
25.00	--	--	--
26	0		0
27	0		0
28	0		0
29	0		0
29.5	0		0
30	0	0	0
31	0	0	0
31.5	0	0	0
32	28	37	65
33	82	257	339
34	153	582	735

Tailwater impact assuming 100-YR peak flow in HCFCD unit coincides with pond peak flow:

	44.38	ft
	-8.68	ft-msl
	35.70	ft-msl
	25.00	ft-msl
	10.7	ft

Elevation	Q^1_{LLO} (cfs)	Q^2_{spill} (cfs)	Q_{total}
25.00	--	--	--
26	0		0
27	0		0
28	0		0
29	0		0
29.5	0		0
30	0	0	0
31	0	0	0
31.5	0	0	0
35	0	0	0
36	3	26	29
37	28	235	263
38	82	553	635

[1] Low Level Outlet (LLO) flowrate has been calculated by using HYDROCALC Hydraulics for Windows,

[2] Low Level Outlet (LLO) flow rate has been calculated by using HYDROCALC Hydraulics for Windows, (Version 1.2a - Copyright (c) 1996) Computer program developed by Dodson & Associates, Inc., Flow in low level outlet has been estimated by assuming the tail water depth estimated above.

[3] Flow over the spillway is calcuated by using [$Q=2.64*L*H^{3/2}$].

PROPOSED SP-2 OUTLET STRUCTURE (DCP-8)

DESIGN SUMMARY

Low Level Outlet Dia. (in.)=	36
Pipe Invert Elevation-Upstream (ft)=	27.00
Pipe Invert Elevation-Downstream (ft)=	26.00
Culvert Length (ft)=	100
Number of Culverts=	1
Spillway Elevetaion (ft-msl)=	35
Spillway Crest Length (ft)=	75
Depth of Spillway (ft)=	1.0

Outlet Structure Discharge Curve:

Tailwater impact when flow in HCFCD unit coincides with pond peak flow:

Depth of Flow in HCFCD Ditch[1]=	18.03	ft
:om Elevation of HCFCD Ditch at Discharge Point=	19.14	ft-msl
Water Surface Elevation in the HCFCD Ditch=	37.17	ft-msl
Low Level Outlet Pipe Invert Elevation=	27.00	ft-msl
Tailwater depth =	10.17	ft

Elevation	Q^2_{LLO} (cfs)	Q^3_{spill} (cfs)	Q_{total}
27.00	--	--	--
28.00	0		0
29.00	0		0
30.00	0		0
31.00	0		0
32.00	0		0
33.00	0		0
34.00	0		0
35.00	0		0
36.00	0	0	0
37.00	0	0	0
38.00	2	150	152
39.00	7	490	497

Tailwater impact assuming 100-YR peak flow in HCFCD unit coincides with pond peak flow:

20.13	ft	
19.14	ft-msl	
39.27	ft-msl	
27.00	ft-msl	
12.27	ft	

Elevation	Q^2_{LLO} (cfs)	Q^3_{spill} (cfs)	Q_{total}
27.00	--	--	--
28	0		0
29	0		0
30	0		0
31	0		0
32	0		0
33	0		0
34	0		0
35	0		0
36	0	0	0
39	0	0	0
40	2	123	125
41	14	451	465

[1] Low Level Outlet (LLO) flow rate has been calculated b y using HYDROCALC Hydraulics for Windows,

[2] Low Level Outlet (LLO) flow rate has been calculated by using HYDROCALC Hydraulics for Windows, (Version 1.2a - Copyright (c) 1996) Computer program developed by Dodson & Associates, Inc., Flow in low level outlet has been estimated by assuming the tail water depth estimated above.

[3] Flow over the spillway is calcuated by using [$Q=2.64*L*H^{3/2}$].

PROPOSED SP-1 OUTLET STRUCTURE (DCP-9)

DESIGN SUMMARY

Low Level Outlet Dia. (in.)=	36
Pipe Invert Elevation-Upstream (ft)=	30.00
Pipe Invert Elevation-Downstream (ft)=	28.00
Culvert Length (ft)=	75
Number of Culverts=	2
Spillway Elevetaion (ft-msl)=	37
Spillway Crest Length (ft)=	80
Depth of Spillway (ft)=	1.0

Outlet Structure Discharge Curve:

Tailwater impact when flow in HCFCD unit coincides with pond peak flow:

Depth of Flow in HCFCD Ditch[1]=	18.62	ft
:om Elevation of HCFCD Ditch at Discharge Point=	19.14	ft-msl
Water Surface Elevation in the HCFCD Ditch=	37.76	ft-msl
Low Level Outlet Pipe Invert Elevation=	30.00	ft-msl
Tailwater depth =	7.76	ft

Elevation	Q^2_{LLO} (cfs)	Q^3_{spill} (cfs)	Q_{total}
30.00	--	--	--
31	0		0
32	0		0
33	0		0
34	0		0
35	0		0
36	0		0
37	0		0
38	2	25	27
39	12	292	304
40	27	708	735

Tailwater impact assuming 100-YR peak flow in HCFCD unit coincides with pond peak flow:

20.13	ft	
19.14	ft-msl	
39.50	ft-msl	
30.00	ft-msl	
9.27	ft	

Elevation	Q^2_{LLO} (cfs)	Q^3_{spill} (cfs)	Q_{total}
30.00	--	--	--
31			
32			
33			
34			
35			
36			
37			
38	0	0	0
39	0	0	0
40	3	75	78
41	13	388	401
42	29	835	864

[1] Low Level Outlet (LLO) flow rate has been calculated by using HYDROCALC Hydraulics for Windows,

[2] Low Level Outlet (LLO) flow rate has been calculated by using HYDROCALC Hydraulics for Windows, (Version 1.2a - Copyright (c) 1996) Computer program developed by Dodson & Associates, Inc., Flow in low level outlet has been estimated by assuming the tail water depth estimated above.

[3] Flow over the spillway is calcuated by using [$Q=2.64*L*H^{3/2}$].

HEC-RAS HEC-RAS 6.3.1 September 2022
U.S. Army Corps of Engineers
Hydrologic Engineering Center
609 Second Street
Davis, California

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X     X  XXXXXX    XXXX        XXXX       XX      XXXX
X     X  X        X    X       X   X     X  X    X
X     X  X        X            X   X    X    X   X
XXXXXXX  XXXX     X       XXX  XXXX     XXXXXX    XXXX
X     X  X        X            X  X     X    X        X
X     X  X        X    X       X   X    X    X        X
X     X  XXXXXX    XXXX        X    X   X    X   XXXXX
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PROJECT DATA
Project Title: Proposed P114-00-00
Project File : ProposedP114-00-00.prj
Run Date and Time: 7/5/2024 2:54:47 PM

Project in English units

Project Description:
& RHCFCD Unit P114-00-00
(Flood Hazard, Flood Way) Model
10, 2, 1, .2%
Event
Filename P114-00-00.prj
Prepared by: Jones & Carter, Inc.   Date:
7-10-02
Reviewed by: Date:
STATUS (Final RAS)

PLAN DATA

Plan Title: Proposed Natural
Plan File : p:\Solid waste\Allied\McCarty Road\Flip MOD
2024\Drainage\TCEQ\HEC-RAS\ProposedP114-00-00.p03

Geometry Title: P114-00-00 June 2007
Geometry File : p:\Solid waste\Allied\McCarty Road\Flip MOD
2024\Drainage\TCEQ\HEC-RAS\ProposedP114-00-00.g01

Flow Title   : Proposed Natural
Flow File   : p:\Solid waste\Allied\McCarty Road\Flip MOD
2024\Drainage\TCEQ\HEC-RAS\ProposedP114-00-00.f04

```
Plan Summary Information:
Number of:  Cross Sections =   20    Multiple Openings  =    0
            Culverts       =    1    Inline Structures  =    0
            Bridges        =    3    Lateral Structures =    0

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

Computation Options
    Critical depth computed only where necessary
    Conveyance Calculation Method: At breaks in n values only
    Friction Slope Method:         Average Conveyance
    Computational Flow Regime:     Subcritical Flow

Encroachment Data
   Equal Conveyance = True
   Left Offset      =        0
   Right Offset     =        0

River = P1140000         Reach = 1
RS      Profile           Method  Value1  Value2
14614.86100yr                  1  227.78  294.75
14517.75100yr                  1  871.02  976.09
14292.71100yr                  1  891.43  963.39
13931.6 100yr                  1  871.48 1822.07
13888.14100yr                  1  885.92 1478.72
13593.44100yr                  1  902.97  949.06
13276.85100yr                  1  880.09  963.35
12695.9 100yr                  1 1094.63 1146.15
12036.8 100yr                  1  221.78  311.91
11935.8 100yr                  1  221.78  592.26
11883.54100yr                  1  484.49  592.26
10795.36100yr                  1  148.65  261.25
9778.381100yr                  1 2803.54 2948.92
8639.564100yr                  1 2884.08 3017.74
7456.247100yr                  1 2546.99 2685.52
7378.25 100yr                  1 2546.99 3083.73
7322.337100yr                  1 2941.53 3083.73
7254.24 100yr                  1 2942.49 3094.51
6574.37 100yr                  1 2376.17 2532.98
5940.168100yr                  1 2144.81 2303.21
5864.17 100yr                  1  2124.4 2303.21
5834.053100yr                  1  2124.4 2259.23
5175.881100yr                  1 2063.25 2209.23
4258.749100yr                  1 1973.42 2148.32
3645.18 100yr                  1   74.89  174.36
3614.18 100yr                  1    59.3  186.26
3591.3  100yr                  1    59.3  186.26
3570.41 100yr                  1    59.3  186.26
3549.434100yr                  1    59.3  186.26
3448.434100yr                  1    59.3  314.46
```

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3349.25 100yr                  1  197.37  314.46
3325.375100yr                  1  197.37  314.46
2644.691100yr                  1  167.33  293.07
580.3   100yr                  1  204.92  340.64

River = P1140000         Reach = P114-00-00_0006
RS      Profile           Method  Value1  Value2
11883.54100yr                  1  484.49  592.26
10795.36100yr                  1  148.65  261.25
9778.381100yr                  1 2803.54 2948.92
8639.564100yr                  1 2884.08 3017.74
7456.247100yr                  1 2546.99 2685.52
7378.25 100yr                  1 2546.99 3083.73
7322.337100yr                  1 2941.53 3083.73
7254.24 100yr                  1 2942.49 3094.51
6574.37 100yr                  1 2376.17 2532.98
5940.168100yr                  1 2144.81 2303.21
5864.17 100yr                  1  2124.4 2303.21
5834.053100yr                  1  2124.4 2259.23
5175.881100yr                  1 2063.25 2209.23
4258.749100yr                  1 1973.42 2148.32
3645.18 100yr                  1   74.89  174.36
3614.18 100yr                  1    59.3  186.26
3591.3  100yr                  1    59.3  186.26
3570.41 100yr                  1    59.3  186.26
3549.434100yr                  1    59.3  186.26
3448.434100yr                  1    59.3  314.46
3349.25 100yr                  1  197.37  314.46
3325.375100yr                  1  197.37  314.46
2644.691100yr                  1  167.33  293.07
580.3   100yr                  1  204.92  340.64
```

FLOW DATA

Flow Title: Proposed Natural
Flow File : p:\Solid waste\Allied\McCarty Road\Flip MOD 2024\Drainage\TCEQ\HEC-RAS\ProposedP114-00-00.f04

Flow Data (cfs)

River	Reach	RS	100yr at 16:15	100yr	100yr at 16:10
P1140000	P114-00-00_0006	11883.54	858	1080	751
P1140000	P114-00-00_0006	7322.337	3525.3	3870	3566
P1140000	P114-00-00_0006	3349.25	3852	4649	3490

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
P1140000	P114-00-00_0006	100yr at 16:15		Normal S = 0.002

GEOMETRY DATA

Geometry Title: P114-00-00 June 2007
Geometry File : p:\Solid waste\Allied\McCarty Road\Flip MOD 2024\Drainage\TCEQ\HEC-RAS\ProposedP114-00-00.g01

CROSS SECTION

RIVER: P1140000
REACH: P114-00-00_0006 RS: 11883.54

INPUT
Description:
Station Elevation Data num= 145

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	41.43	4.52	41.04	17.12	41.92	24.8	42.87	34.56	43.77
40.71	43.97	49.59	43.83	52.33	43.86	54.98	43.83	77.05	44.03
103.27	43.42	120.23	43.26	143.68	43.26	165.89	44.88	169.77	45.01
183.85	45.6	185.23	45.57	200.91	45.86	213.45	45.94	215.66	45.92
244.89	45.51	258.32	44.91	271.05	44.38	296.02	43.98	322.61	43.11
335.03	42.76	346.57	43.76	356.45	44.7	360.64	44.67	380.21	44.39
399.01	44.96	405.46	45.17	440.34	45.41	446.46	45.27	461.96	44.18
484.49	44.24	485.58	43.93	495.84	42.94	500	41.19	509.13	37.35
509.46	37.21	509.92	36.98	514.16	34.85	514.8	34.56	515.74	34.24
518.97	33.86	522.79	33.5	528.09	33.09	530.77	32.02	544.09	33.3
545.25	33.39	546.31	33.44	547.28	33.31	558.15	31.6	558.18	31.65
560.57	35.48	562.99	33.03	566.18	33.71	567	33.76	567.23	33.85
567.67	33.98	588	43.21	590.88	44.52	592.26	44.5	596.52	44.13
597.61	44.04	599.43	44.1	599.84	44.11	600.61	44.14	604.7	44.27
606.39	44.24	620.9	43.8	642.96	43.5	655.39	43.58	680.95	43.15
692.99	43.63	704.59	43.81	712.64	43.68	751.89	43.27	753.93	43.31
760.28	43.55	771.02	42.39	781.34	42.38	795.96	43.78	801.04	44.34
805.73	44.8	814.14	44.81	834.63	44.51	846.07	44.09	858.44	43.72
863.53	43.15	876.1	43.27	877.98	43.21	891.11	42.12	899.14	42.8
906.88	43.04	970.81	43.51	981.17	43.38	982.1	43.39	1026.21	43.72
1028.59	43.65	1057.25	43.13	1071.24	43.29	1077.11	43.41	1089.43	43.44
1099.74	43.42	1112.39	42.71	1123.62	43.53	1131.29	44.03	1148.58	43.89
1158.32	43.31	1161.31	43.51	1166.96	43.95	1182.98	43.39	1236.68	43.33
1249.76	43.09	1251.38	43.2	1252.54	43.19	1255.77	43.19	1286.07	42.61
1304	42.37	1335.25	42.69	1362.11	42.76	1410.23	41.71	1469.22	41.17

1477.84	41.18	1482.05	41.17	1510.43	42.08	1564.98	42.23	1570.64	42.37
1588.08	41.64	1592.53	41.51	1596.64	41.42	1597.62	41.39	1599.52	41.36
1667.84	41.96	1712.38	41.34	1742.03	41.57	1746.75	41.57	1773.83	41.72
1813.07	42.09	1887.91	41.4	1911.44	41.41	1924.66	41.69	2024.42	41.48

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.06	484.49	.015	592.26	.06

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
484.49	592.26	1087.99	1088.18 1089.02	.3	.5

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
0	77.05	44	1131.29	2024.42	44

CROSS SECTION

RIVER: P1140000
REACH: P114-00-00_0006 RS: 10795.36

INPUT
Description:
Station Elevation Data num= 248

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	41.52	26.23	40.92	33.66	40.79	59.32	41.52	76.63	41.43
113.72	41.27	118.85	41.6	131.21	43.01	132.61	42.9	135.83	42.79
136.85	42.76	147.5	42.44	148.65	41.89	155.62	38.62	160.06	36.54
163.04	35.15	169.89	33.74	179.89	31.86	193.74	31.08	202.04	30.65
205.56	28.67	210.7	29.61	236.36	35.15	242.49	37.25	250.03	40.16
251.39	40.68	261.25	42.36	266.4	43.31	289.19	43.2	289.65	43.19
289.77	43.19	296.44	43.16	308.61	44.43	312.35	44.76	314.04	44.65
348.78	43.96	399.23	43.79	401.15	43.73	402.71	43.7	445.35	43.32
471.58	42.31	479.38	42.3	482.24	42.45	495.32	42.4	525.37	42.5
532.21	42.44	548.88	42.67	566.76	42.36	579.42	42.2	621.51	42.92
624.3	43.02	626.83	43.04	628	43.04	631.21	43.33	656.86	44.89
671.66	42.93	671.88	42.9	672.09	42.9	734.8	42.49	755.44	41.7
770.03	41.31	786.66	42.1	792.02	42.29	797.94	43.34	807.04	44.12
815.3	40.04	822.06	36.41	829.51	32.63	837.08	28.71	840.59	28.54
852.09	26.25	858.27	26.34	867.11	25.8	876.86	28.08	882.13	28.56
886.91	28.37	897.15	26.52	904.96	26.67	921.23	25.97	933.43	25.73
942.2	25.03	955.78	23.91	957.22	24.05	958.52	23.89	972.24	23.7
985.31	22.48	987.16	22.32	987.25	22.32	1014.46	20.75	1017.29	20.67
1018.92	20.44	1032.31	20.85	1044.45	19.22	1047.32	19.25	1048.87	19.33
1075.18	19	1082.06	19.69	1092.38	19.69	1101.74	19.57	1113.63	19.45
1122.41	19.45	1130.38	19.42	1145.2	18.41	1152.45	18.41	1160.99	18.39
1167.47	18.71	1176.09	18.68	1225.87	18.26	1227.54	18.15	1230.63	18.17
1255.69	17.72	1257.57	17.72	1259.28	18.14	1260.83	18.3	1294.34	17.4
1302.63	17.43	1316.56	17.38	1317.64	17.35	1342.95	17.67	1347.68	17.55
1350.4	17.39	1362.7	17.8	1373.85	18.1	1377.71	18.04	1381.97	18.02
1392.73	18.54	1402.49	19.26	1407.75	19.11	1413.54	19.05	1422.77	19.62
1433.66	19.28	1437.78	18.95	1449.05	18.61	1459.78	18.32	1482.84	17.87
1488.42	17.76	1497.86	17.59	1502.75	17.68	1512.87	17.43	1524.04	17.52
1527.89	17.34	1531.39	17.35	1542.91	17.5	1555.6	16.51	1557.93	16.45
1560.03	16.47	1587.17	16.68	1588.33	16.6	1589.33	16.66	1603.38	16.21

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 1617.32   16.12    1618   16.17 1618.74   16.07 1633.02   15.75 1634.53   15.94
 1660.29   15.86 1663.05   15.73 1674.61   17.12 1681.88   15.97 1693.09    15.7
 1703.02   15.27  1708.1   15.28  1726.2   17.04 1738.14   17.26 1746.22   17.65
 1760.81   19.39 1774.86   19.19 1783.19   19.49 1792.38   25.14 1798.21   27.76
  1803.5   28.82 1823.95   36.02 1828.25   38.62 1839.73   41.83 1843.26   42.91
 1846.47   42.53 1858.28   40.77 1865.17   41.24 1903.33   42.01  1910.8   42.89
 1933.37   39.51 1951.86   39.55 1970.96   40.46 2224.12   41.72 2286.15   42.05
 2301.14   42.09 2315.34    42.1 2342.23   41.87 2558.99   41.67  2607.3   41.03
 2613.18   41.08 2675.05    41.4 2814.73   42.19 2905.54   41.89 2960.06   41.55
 3053.92   41.92 3070.23   42.08 3080.57   41.79 3086.73   40.97 3089.73    40.5
 3092.46    40.6  3118.3   41.65  3133.3   42.75 3134.08   42.81 3135.11   42.79
 3165.23   39.65 3179.84   39.96 3198.84   41.09 3225.65   41.74 3262.15   41.82
 3280.66   41.12 3321.96   40.72 3368.69   41.54 3390.09   41.89 3409.08   41.27
 3418.21   41.05    3443   40.53 3456.18    41.4 3502.98   41.57  3538.3   42.17
 3542.32   41.98 3567.63   40.58 3582.43   41.58  3597.6   42.64 3611.63   43.01
 3679.28   41.13 3690.44   40.91 3691.66   40.81 3693.97   40.91 3714.24   42.47
 3769.39   42.06 3787.55      42 3806.69    39.7 3809.54   39.35 3810.58   39.43
 3812.83   39.45  3825.6    39.7 3831.53   40.12 3840.62   38.01 3851.51   38.49
 3855.64   39.25 3865.22   39.22 3880.94   39.38 3885.67   39.54 3892.35   39.38
 3930.72   42.61 3951.76   44.41 3952.72   44.41

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0     .06  148.65     .04  261.25     .06  807.04     .99 1843.26     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        148.65  261.25          1020.21 1016.98 1012.36             .1       .3
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
  807.04 1843.26      43

CROSS SECTION


RIVER: P1140000
REACH: P114-00-00_0006    RS: 9778.381

INPUT
Description:
Station Elevation Data    num=     256
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   40.74   15.92    41.1   17.58   41.14    18.5   41.18  144.69   41.58
  279.29   41.42   288.9   41.24  369.54   41.06  384.89   41.08  436.02   41.34
  444.53   42.67  454.15   42.71   476.9   44.16  484.19   44.31  487.27   44.37
  505.68   43.12  514.23   42.21  518.79   42.21  584.88   42.92  589.35   42.98
  693.25   41.04  703.32   40.78  708.53    40.8  760.93   41.39  939.62   40.92
  960.76   40.97  967.35   40.95  973.74   40.93  977.54   41.16   986.9    40.9
   990.3   40.93  995.28   40.94 1113.38   41.85 1213.28   42.72 1265.35   43.17
 1370.31   42.92 1370.51   42.92 1370.53   42.92 1418.06   41.65 1431.97   41.66
 1466.34   41.89 1501.53   43.05 1559.81   42.97 1632.37   43.13  1640.9   43.46
 1641.51   43.45 1670.95   43.21 1677.63   44.07 1683.96   44.15 1706.34    44.3
 1719.98   44.21 1765.37   42.35 1783.53   42.43 1798.89   42.49  1819.9    43.4
 1836.19   44.25 1842.66   43.44 1857.84   42.54 1874.41   42.27 1900.47   43.13
 1943.59   42.38 1958.29   42.47 1961.71    42.5 1978.76   42.56 2135.84   43.02
 2137.59   43.02 2142.18   43.04 2271.83   43.59 2285.67   42.75 2301.88   41.79
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 2330.71   43.63 2341.62   44.72 2403.14   42.76 2419.48   42.32  2425.6   42.58
 2538.82   42.97 2542.13   42.95 2550.92   42.78  2598.6   42.23 2639.56   41.73
 2679.67   41.56 2685.08   41.79 2785.48    41.8 2803.54   41.78 2821.47   38.94
 2827.88   39.05 2840.48    31.3  2842.6   30.64 2852.44   30.04 2858.35   29.77
 2865.09    29.8 2896.86   29.83  2906.3   30.69 2917.62   31.83 2925.81   34.12
 2931.27   35.65 2934.31   36.71 2935.46   37.11 2942.75   39.71 2943.44   39.96
 2947.22   41.31 2948.92   42.01 2950.12   41.92 2954.53   41.79 2963.48   41.48
 2964.07   41.46 2964.29   41.44 2964.55   41.46  3004.2   43.03 3014.77   43.05
 3029.62   42.84 3066.43    42.9 3067.73    42.9 3092.33   45.85 3099.73   46.21
 3120.65   48.85 3140.18   51.09 3146.63   51.33 3150.59   52.14 3157.74    53.4
 3164.66   53.76 3168.67   53.85 3179.43   54.15    3192   54.07 3202.75   53.98
 3213.31   55.83 3217.75   55.81 3255.99   55.57 3267.24   55.52 3277.76   54.92
 3282.76   53.88 3292.76   52.34 3297.88   51.46 3313.75   50.91 3322.76   50.11
 3327.05   49.23 3348.83   46.09 3352.77   46.08 3364.08   46.55 3367.77   45.81
 3371.34   45.34 3382.77   41.83 3419.41    42.9 3427.78    43.1 3430.39   42.84
 3471.81   39.56 3473.42   39.49  3475.6   39.43 3517.79   38.45 3533.72   39.86
 3555.44   41.32 3562.79   41.57 3612.23   42.02  3637.8   42.26 3652.47   40.92
 3652.81   40.82 3653.82   40.29 3667.81   34.86 3669.07   34.32 3682.81   30.45
 3696.11   29.46 3697.81   29.69 3699.57   29.58 3725.63   23.38 3727.82   22.77
 3730.07    22.3 3742.82   21.28 3745.32   20.14 3757.82   17.79  3773.9   11.98
 3782.55    9.06 3787.01    8.43 3788.64    8.34 3792.37    8.05 3804.65    7.56
 3847.51     .17  3847.7     .17 3847.87     .14 3848.04     .12 3848.19     .14
 3852.34      .3 3892.15    2.06 3905.89     .59 3907.22     .64 3907.92     .69
 3909.36     .57  3951.7   -2.96 3960.08   -3.02 3980.77   -3.23 4033.06   -4.13
 4124.64   -5.04 4134.98   -5.28 4155.45    -5.3 4159.08   -4.97 4332.87   -4.97
 4339.36   -5.02 4346.06   -4.53 4354.26   -1.57 4362.53     .04 4373.25     .68
 4401.03   11.53 4415.14   17.07 4418.28   18.21 4432.14   18.24  4448.3   18.23
  4455.5   19.73 4467.45   22.67 4501.53   33.96 4523.36   41.17 4531.97   41.26
 4547.73   41.27 4565.35   43.11 4568.39   43.33 4580.95   41.74 4584.18   41.56
 4598.41   42.13 4599.29   41.95 4600.14   41.72 4613.42   38.23 4620.45   39.35
 4628.43   40.75 4632.31   40.73 4643.44   40.77 4682.12   41.09 4900.53   42.49
 5065.57   42.84 5097.69   42.76 5138.73   42.39 5236.38    40.8 5366.68   42.22
 5393.98   42.49 5409.55   41.58 5449.08   39.71 5525.38   39.54  5643.5   39.29
 5699.36    39.2 5708.19   39.16 5710.92   39.04 5719.83   37.73 5724.22   37.19
 5735.43   39.37 5739.23   40.06 5741.02   39.95 5767.96   40.56 5784.26   42.18
 5844.63   42.52    5880   42.59  5892.9   42.49 5898.55   42.26 5904.35   41.81
 5917.81    40.8 5919.36   40.94 5924.97   40.85 5943.87   41.14  5994.4    41.8
 6003.05   42.08

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0     .06 2803.54     .04 2948.92     .06 3682.81     .99 4568.39     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       2803.54 2948.92          1134.52    1139 1143.55             .1       .3
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
 3427.78 4568.39    43.5

CROSS SECTION


RIVER: P1140000
REACH: P114-00-00_0006    RS: 8639.564
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INPUT
Description:
Station Elevation Data num= 258

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	42.73	3.28	42.98	5.43	43.02	63.14	42.58	65.05	42.52
132.04	42.78	163.81	42.4	349.6	42.79	361.49	42.84	365.19	42.81
379.32	42.67	383.57	42.66	388.47	42.81	472.72	43.13	482.51	43.1
488.01	42.07	493.49	40.93	497.51	40.05	508.44	39.64	510.47	39.58
536.26	41.44	540.84	41.64	544.61	41.7	548.4	41.7	629.88	40.84
681.36	40.83	767.52	40.9	814.45	41.53	905.03	42.08	1064.5	41.34
1086.29	41.15	1223.34	40.72	1250.59	40.66	1262.51	40.53	1283.18	40.57
1475.74	41.78	1486.95	41.66	1525.04	41.35	1577.52	40.64	1612.43	41.98
1643.79	42.61	1670.77	42.42	1752.99	42.91	1795.35	43	1809.67	43.69
1841.17	43.01	1855.42	42.12	1869.6	42.25	1876.66	42.03	1904.45	42.55
1927.67	42.14	1983.62	40.73	1997.52	40.66	2001.68	41.11	2025.13	40.92
2061.59	41.72	2106.66	42.6	2110.3	42.71	2118.19	42.89	2195.18	43.89
2319.89	43.35	2332.17	43.21	2363.43	41.41	2372.52	40.82	2377.02	41.66
2387.52	43.62	2396.38	43.91	2415.39	44.71	2428.25	43.07	2437.88	42.34
2472.35	40.55	2511.56	41.53	2607.58	42.13	2621.43	42.15	2624.92	42.1
2630.42	42.1	2632.17	42.08	2639.5	42.03	2763.58	40.97	2791.5	42.01
2795.58	42.4	2807.52	43.36	2819.55	41.45	2825.48	40.78	2831.49	40.29
2855.75	40.74	2874.16	41.33	2878.46	41.38	2884.08	41.49	2895.38	38.49
2897.68	38.45	2902.33	36.96	2910.61	34.84	2915.03	33.65	2923.56	30.11
2941.92	29.73	2942.59	29.72	2964.55	28.34	2968.45	28.44	2973.33	29.86
2975.83	30.11	2994.49	32.2	3004.06	36.17	3017.74	42.62	3023.41	42.58
3023.85	42.55	3028.98	42.49	3033.27	42.44	3034.81	42.42	3035.16	42.41
3036.17	42.5	3042.19	43.04	3047.79	43.86	3060.61	44.2	3077.82	44.73
3088.85	44.21	3118.07	42.57	3139.46	42.46	3152.89	42.98	3198.75	43.59
3232.54	43.19	3283.17	43.05	3288.02	42.96	3289.51	42.83	3315.42	42.45
3318.05	42.32	3320.93	42.28	3333.06	41.06	3356.03	41.45	3368.05	41.33
3403.59	41.47	3416.08	40.71	3423.15	40.37	3437.18	38.37	3456.13	38.33
3462.29	38.29	3551.56	38.79	3564.23	38.76	3587.95	40.78	3588.43	40.81
3588.95	40.83	3596.22	41.43	3633.36	43.88	3635.07	43.91	3648.37	44.5
3660.55	43.39	3664.9	43.8	3669.88	43.86	3693.41	45	3703.69	45.08
3710.96	45.36	3723.44	45.6	3735.39	45.53	3741.66	45.53	3753.47	46.24
3760.73	45.71	3768.49	44.62	3775.59	45.22	3783.5	45.56	3792.14	45.37
3798.52	43.6	3804.35	43.81	3813.53	44.23	3827.93	43.7	3858.57	45.29
3861.88	45.66	3873.59	45.7	3886.38	45.35	3888.6	45.15	3892.5	45.11
3918.63	46.43	3933.5	44.16	3933.71	44.17	3936.74	44.04	3963.1	42.68
3963.68	42.64	3977.79	43.71	3978.69	43.63	3992.48	43.45	3993.71	43.55
3994.99	43.44	3999.22	43.32	4023.73	42.53	4044.28	43.95	4053.76	44.49
4065.93	44.93	4077.58	44.72	4083.79	44.67	4090.58	44.9	4098.81	43.27
4114.48	43.06	4125.49	43.63	4133.08	43.91	4146.18	43.14	4173.88	41.26
4178.25	41.78	4188.9	42.6	4200.53	42.05	4218.92	41.4	4246.22	41.86
4248.32	41.78	4249.56	41.78	4277.27	41.71	4294	41.63	4294.77	41.55
4317.83	40.38	4355.31	41.3	4363.38	41.45	4369.07	41.61	4377.95	41.61
4417.2	40.96	4438.3	40.97	4448.64	41.44	4459.16	40.62	4469.93	40.13
4490.12	39.93	4509.32	40.59	4514.67	39.87	4519.22	39.7	4523.38	39.75
4534.23	39.55	4559.08	39.1	4563.05	38.59	4566.52	38.15	4572.76	35.51
4608.48	39.03	4608.91	39.04	4609.3	39.2	4609.66	39.22	4617.79	39.51
4653.95	40.81	4655.45	40.72	4684.38	37.82	4698.21	40.13	4699.39	40.31
4704.15	40.25	4730.39	39.89	4785	40.06	4801.03	41.28	4847.44	43.69
4867.84	44.03	4888.9	44.4	4985.77	43.53	5001.56	43.35	5045.7	43.52
5190.08	42.33	5262.76	41.3	5370.2	40.94	5410.02	40.36	5462.46	39.83
5480.15	39.99	5522.99	41.63	5526.44	41.72	5530.01	41.64	5551.34	37.76

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 5555.22    37.6 5558.77   36.05 5565.15   35.44

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .06 2884.08     .04 3017.74     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       2884.08 3017.74          1181.19  1183.3 1187.01             .3       .5
Blocked Obstructions     num=       3
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
       0 2895.38      42    3380    3900      42    3900    8060      43

CROSS SECTION


RIVER: P1140000
REACH: P114-00-00_0006    RS: 7456.247

INPUT
Description:
Station Elevation Data    num=     295
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   54.37    2.13   54.31   21.44   54.48   35.25   53.76   45.59   53.21
   62.23   52.01   79.38   52.99   88.31   53.59   93.69   53.49  135.68   53.31
  138.14   53.32  143.17   53.37  162.98   54.02  186.75   54.69  206.42   54.52
  246.57   54.98  274.49    53.8  285.91   53.71  287.57   53.55  292.95   53.77
  305.64   54.34  328.95   55.08  349.69   53.33  382.89   52.24  392.73   51.84
  402.04    51.8  419.24   51.04  444.69   51.49  451.99   52.06  453.57   52.07
  467.01   51.99  467.85   51.99   467.9   51.98  482.87   50.51  508.34   50.74
  512.92   50.86  524.74   51.27  556.27   51.66  566.88   52.43  606.49   51.97
  623.87   52.78  636.22   53.26  659.59   53.94  670.67   53.89  702.23   53.97
  708.21   54.05  709.02   54.07  748.37   54.09  758.67   53.57  772.99   53.49
  784.79   53.13  819.41   54.57   828.4    54.9   832.3   55.07  894.05   54.81
  898.73   54.85  929.11   56.25  933.56   56.51  947.73   55.22  951.78   55.21
  954.66   55.28  978.63   55.78 1008.57   56.91 1008.67   56.91 1024.53   55.75
 1041.37   56.06 1082.62   56.12 1095.63   56.33 1099.81   56.57 1124.22   56.62
  1158.9   57.25 1172.73   57.66 1176.24   57.72 1189.15   57.61 1224.96   57.97
 1231.28   58.61 1234.02   58.62 1247.18    57.4 1250.71   57.31 1271.31    57.4
 1286.44   57.51 1294.11   57.18 1319.83   54.24 1322.99   53.87 1324.16   53.73
 1337.61   53.41  1342.6   52.81  1354.2   50.64 1358.51   50.24 1378.82   50.78
 1380.31   50.73 1399.37    50.1 1411.31   48.52 1435.54   45.64 1442.29   45.58
 1444.67   45.56 1446.56      45 1459.77   41.12 1462.87   40.65 1474.21   38.84
 1478.49   39.07 1505.07   41.31 1537.42   41.88  1576.2   42.51 1595.42   43.91
 1595.67   43.93 1596.39   43.89 1613.06   43.84 1636.02   43.46 1642.89   43.51
 1655.35   43.23 1672.65   42.34 1686.27   42.48 1693.31   42.51 1746.67   42.12
 1758.07   40.92 1766.83   41.83 1800.92   41.02 1807.08   41.07 1817.99   40.75
 1822.18   40.63 1828.18   40.58 1854.11    39.9 1901.82   40.06 1916.38   40.03
 1942.98   40.11 1950.41   39.64 1973.18   39.91 1983.29   39.86 2001.42   40.75
 2005.85   40.78 2038.93   41.95 2048.68    42.1 2074.16      43 2078.88   42.91
 2082.62   42.28 2100.71   41.36 2109.08   41.31 2123.22   40.12 2124.18   39.98
 2125.39   39.98 2150.29   43.02 2159.55   44.03 2169.48    44.3 2180.85   44.42
 2184.58   43.96 2186.84   43.89 2190.89   43.74 2200.25   43.33 2229.88   41.37
 2234.78   41.35 2280.69   41.07 2290.28   40.83 2313.24   40.89 2317.09   41.15
 2320.48   41.62 2326.22   41.34 2335.58   41.91  2347.4   42.69 2351.62   43.09
 2375.76   46.59 2380.88   47.32 2399.42   47.36 2426.18   46.37  2437.3   45.05
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 2449.87   44.48 2458.23   43.52 2471.48   45.11 2473.38   44.99 2486.59   43.94
 2487.66   43.76 2488.62   43.76 2506.17   43.35 2546.99   42.15 2547.39   42.21
 2557.63    37.4  2559.3    37.2 2561.65    36.9 2562.08   33.09 2569.24   31.46
 2571.79   31.42  2577.3   30.43  2581.4   29.56 2585.76   29.15 2590.17   28.99
 2618.09   27.52  2622.6   26.13 2625.25   26.47 2626.39   26.68 2626.54    26.7
 2649.67   28.52 2651.79   28.95 2656.16   29.81 2668.82   31.87 2677.31   36.48
 2678.63    37.2 2679.16   37.49 2679.71   37.79 2681.13   38.56 2685.52   40.61
 2702.55   40.17 2706.83   40.02 2706.96   40.01 2761.62   40.51 2772.89   40.62
 2782.23   40.66 2812.61   40.58 2817.93   41.36 2829.29   43.71 2831.16   44.44
 2833.81   44.71 2877.19   44.38 2920.34   44.63 2923.42   44.64 2949.61   44.42
 2975.16   44.04 2988.16   44.58 3032.72   44.61 3052.23   44.44 3058.15   44.55
 3064.61   44.34 3079.44   44.44 3102.33   44.28 3104.05   44.28 3191.33   43.07
 3196.18   43.05 3208.29    42.9 3212.68   42.83 3238.32   42.47 3252.86    41.7
 3295.64   41.74 3296.95   41.82 3298.38    41.7 3299.93    41.8 3313.39   41.63
 3322.15   41.41  3350.9   41.76 3371.13   41.69 3375.71   41.66 3403.47   40.77
 3460.61   40.65 3466.68   40.65 3480.62   40.48  3489.2   40.41 3508.57   40.43
 3519.56    40.6 3524.85   40.68 3533.82   40.56 3568.62   40.57 3589.62   39.63
    3606   39.53 3610.64   39.39 3673.84   38.36  3694.5   38.46 3731.29   38.06
 3738.59   37.81 3748.79   36.83 3763.09    37.3  3782.2   36.42 3793.83   36.19
  3807.2   36.51 3823.86   36.68 3843.66   36.32 3856.18   35.91 3883.92   35.59
 3895.35   35.91 3907.62   35.92 3928.96   35.01  3943.7   34.85 3944.74    34.9
 3962.73   34.79 3973.53   34.78    3974   34.78 3987.93   35.52 3989.01   35.53
 3991.48   35.49  4025.2    35.7 4034.05   35.85 4056.06   36.58 4061.95   36.96
 4064.08   36.88 4066.31   36.85  4079.1   36.71 4081.65   36.63 4094.11    36.6
 4100.01    36.6 4113.55   37.09 4141.59   37.13 4149.63   37.12 4168.29   36.92
 4190.39   37.13 4221.81   37.38 4229.23   37.41  4241.2   37.38 4243.45    37.4

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .06 2546.99     .04 2685.52     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       2546.99 2685.52           140.23   133.9   126.8             .3       .5
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
       0    2380      42 3068.04 4245.46      45

BRIDGE


RIVER: P1140000
REACH: P114-00-00_0006    RS: 7378.25

INPUT
Description: RailRoad Bridge
Distance from Upstream XS =       1
Deck/Roadway Width        =      77
Weir Coefficient          =     2.6
Upstream  Deck/Roadway Coordinates
    num=       6
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
 2506.17    44.8   43.35 2569.63    44.8   42.15 2627.84   44.75   40.75
 2666.09   44.72   40.72 2685.52    44.5   40.61 2706.83    44.4   40.02

Upstream Bridge Cross Section Data
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Station Elevation Data num= 295

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	54.37	2.13	54.31	21.44	54.48	35.25	53.76	45.59	53.21
62.23	52.01	79.38	52.99	88.31	53.59	93.69	53.49	135.68	53.31
138.14	53.32	143.17	53.37	162.98	54.02	186.75	54.69	206.42	54.52
246.57	54.98	274.49	53.8	285.91	53.71	287.57	53.55	292.95	53.77
305.64	54.34	328.95	55.08	349.69	53.33	382.89	52.24	392.73	51.84
402.04	51.8	419.24	51.04	444.69	51.49	451.99	52.06	453.57	52.07
467.01	51.99	467.85	51.99	467.9	51.98	482.87	50.51	508.34	50.74
512.92	50.86	524.74	51.27	556.27	51.66	566.88	52.43	606.49	51.97
623.87	52.78	636.22	53.26	659.59	53.94	670.67	53.89	702.23	53.97
708.21	54.05	709.02	54.07	748.37	54.09	758.67	53.57	772.99	53.49
784.79	53.13	819.41	54.57	828.4	54.9	832.3	55.07	894.05	54.81
898.73	54.85	929.11	56.25	933.56	56.51	947.73	55.22	951.78	55.21
954.66	55.28	978.63	55.78	1008.57	56.91	1008.67	56.91	1024.53	55.75
1041.37	56.06	1082.62	56.12	1095.63	56.33	1099.81	56.57	1124.22	56.62
1158.9	57.25	1172.73	57.66	1176.24	57.72	1189.15	57.61	1224.96	57.97
1231.28	58.61	1234.02	58.62	1247.18	57.4	1250.71	57.31	1271.31	57.4
1286.44	57.51	1294.11	57.18	1319.83	54.24	1322.99	53.87	1324.16	53.73
1337.61	53.41	1342.6	52.81	1354.2	50.64	1358.51	50.24	1378.82	50.78
1380.31	50.73	1399.37	50.1	1411.31	48.52	1435.54	45.64	1442.29	45.58
1444.67	45.56	1446.56	45	1459.77	41.12	1462.87	40.65	1474.21	38.84
1478.49	39.07	1505.07	41.31	1537.42	41.88	1576.2	42.51	1595.42	43.91
1595.67	43.93	1596.39	43.89	1613.06	43.84	1636.02	43.46	1642.89	43.51
1655.35	43.23	1672.65	42.34	1686.27	42.48	1693.31	42.51	1746.67	42.12
1758.07	40.92	1766.83	41.83	1800.92	41.02	1807.08	41.07	1817.99	40.75
1822.18	40.63	1828.18	40.58	1854.11	39.9	1901.82	40.06	1916.38	40.03
1942.98	40.11	1950.41	39.64	1973.18	39.91	1983.29	39.86	2001.42	40.75
2005.85	40.78	2038.93	41.95	2048.68	42.1	2074.16	43	2078.88	42.91
2082.62	42.28	2100.71	41.36	2109.08	41.31	2123.22	40.12	2124.18	39.98
2125.39	39.98	2150.29	43.02	2159.55	44.03	2169.48	44.3	2180.85	44.42
2184.58	43.96	2186.84	43.89	2190.89	43.74	2200.25	43.33	2229.88	41.37
2234.78	41.35	2280.69	41.07	2290.28	40.83	2313.24	40.89	2317.09	41.15
2320.48	41.62	2326.22	41.34	2335.58	41.91	2347.4	42.69	2351.62	43.09
2375.76	46.59	2380.88	47.32	2399.42	47.36	2426.18	46.37	2437.3	45.05
2449.87	44.48	2458.23	43.52	2471.48	45.11	2473.38	44.99	2486.59	43.94
2487.66	43.76	2488.62	43.76	2506.17	43.35	2546.99	42.15	2547.39	42.21
2557.63	37.4	2559.3	37.2	2561.65	36.9	2562.08	33.09	2569.24	31.46
2571.79	31.42	2577.3	30.43	2581.4	29.56	2585.76	29.15	2590.17	28.99
2618.09	27.52	2622.6	26.13	2625.25	26.47	2626.39	26.68	2626.54	26.7
2649.67	28.52	2651.79	28.95	2656.16	29.81	2668.82	31.87	2677.31	36.48
2678.63	37.2	2679.16	37.49	2679.71	37.79	2681.13	38.56	2685.52	40.61
2702.55	40.17	2706.83	40.02	2706.96	40.01	2761.62	40.51	2772.89	40.62
2782.23	40.66	2812.61	40.58	2817.93	41.36	2829.29	43.71	2831.16	44.44
2833.81	44.71	2877.19	44.38	2920.34	44.63	2923.42	44.64	2949.61	44.42
2975.16	44.04	2988.16	44.58	3032.72	44.61	3052.23	44.44	3058.15	44.55
3064.61	44.34	3079.44	44.44	3102.33	44.28	3104.05	44.28	3191.33	43.07
3196.18	43.05	3208.29	42.9	3212.68	42.83	3238.32	42.47	3252.86	41.7
3295.64	41.74	3296.95	41.82	3298.38	41.7	3299.93	41.8	3313.39	41.63
3322.15	41.41	3350.9	41.76	3371.13	41.69	3375.71	41.66	3403.47	40.77
3460.61	40.65	3466.68	40.65	3480.62	40.48	3489.2	40.41	3508.57	40.43
3519.56	40.6	3524.85	40.68	3533.82	40.56	3568.62	40.57	3589.62	39.63
3606	39.53	3610.64	39.39	3673.84	38.36	3694.5	38.46	3731.29	38.06
3738.59	37.81	3748.79	36.83	3763.09	37.3	3782.2	36.42	3793.83	36.19
3807.2	36.51	3823.86	36.68	3843.66	36.32	3856.18	35.91	3883.92	35.59

3895.35	35.91	3907.62	35.92	3928.96	35.01	3943.7	34.85	3944.74	34.9
3962.73	34.79	3973.53	34.78	3974	34.78	3987.93	35.52	3989.01	35.53
3991.48	35.49	4025.2	35.7	4034.05	35.85	4056.06	36.58	4061.95	36.96
4064.08	36.88	4066.31	36.85	4079.1	36.71	4081.65	36.63	4094.11	36.6
4100.01	36.6	4113.55	37.09	4141.59	37.13	4149.63	37.12	4168.29	36.92
4190.39	37.13	4221.81	37.38	4229.23	37.41	4241.2	37.38	4243.45	37.4

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.06	2546.99	.04	2685.52	.06

Bank Sta: Left	Right	Coeff Contr.	Expan.
2546.99	2685.52	.3	.5

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
0	2380	42	3068.04	4245.46	45

Downstream Deck/Roadway Coordinates num= 7

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
2910.02	44.54	40.8	2934.38	44.8	40.8	2986.14	44.75	40.75
3022.67	44.72	40.72	3056.16	44.5	40.5	3077.48	44.4	40.4
3117.06	40.2	40.2						

Downstream Bridge Cross Section Data

Station Elevation Data num= 290

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	98.11	75.71	97	86.22	96.8	95.43	96.61	104.8	96.59
112.14	96.42	136.98	96.45	161.89	96.88	199.21	95.64	227.21	95.43
236.37	95.17	245.62	95.53	255.8	96.14	271.01	96.54	275.23	96.43
285.37	96.04	308.55	95.69	349.25	96.03	371.5	97.04	371.52	97.04
386.53	96.61	432.02	94.91	468.07	94.52	503.64	95.37	525.67	95.33
536.69	94.79	551.7	94.69	591.78	95.5	611.76	96.25	639.93	96.62
644.39	96.66	658.12	97.14	701.33	97.71	716.87	97.87	718.43	97.82
740.28	96.85	753.23	96.89	759.28	96.86	828.76	98.09	836.61	97.46
869.48	98.29	914.91	98.64	927.09	98.7	940.74	98.6	990.45	99.29
1000.81	99.6	1001.91	99.61	1003.64	99.64	1008.28	99.8	1064.65	101.08
1087.85	101.37	1099.52	101.5	1133.37	100.25	1147.48	99.99	1204.46	101.83
1215.67	102.13	1227.4	101.68	1252.54	101.73	1272.45	101.26	1282.83	101.35
1296.42	101.51	1306.84	101.62	1328.4	101.85	1375.43	100.94	1376.79	100.9
1378.11	100.93	1380.36	100.91	1414.25	101.11	1428.55	101.36	1447.12	101.18
1467.78	100.55	1481.1	100.5	1495.62	100.53	1500.9	100.05	1527.62	98.44
1545.08	96.68	1557.74	94.76	1562.36	93.32	1601.29	83.25	1617.81	79.45
1623.83	78.7	1630.13	77.47	1632.82	77.03	1635.28	76.24	1647.84	72.62
1649.64	72.58	1662.85	72.67	1663.44	72.56	1698.16	67.42	1707.9	66.93
1721.44	64.53	1745.27	59.07	1753.68	57.2	1790.15	51.2	1811.73	48.64
1828.03	47.12	1834.66	44.45	1850.69	39.74	1858.06	38.42	1871.46	38.35
1883.65	38.4	1897.59	39.64	1903.1	40.41	1908.13	40.35	1938.1	40.35
1984.06	40.79	2065.99	41.44	2204.63	42.81	2332.62	44.08	2362.86	42.12
2371.37	41.49	2376.8	41.74	2465.17	40.66	2507.79	40.13	2510.27	40.11
2521.38	40.28	2526.91	39.87	2535.05	39.72	2560.4	39.84	2570.41	40.04
2583.09	39.84	2653.16	40.66	2653.53	40.68	2654.89	40.58	2692.48	39.42
2713.95	40.48	2726.69	41.56	2756.4	42.23	2786.53	43.6	2789.02	43.59
2806.78	44.35	2825.84	43.7	2837.91	43.36	2860.78	43.55	2864.1	43.58
2870.3	44.51	2875.98	44.56	2894.13	44.58	2903.87	44.89	2912.42	44.86

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 2913.89   44.49  2934.8   39.49 2941.53   43.17 2942.57   42.74 2954.15   31.35
 2960.16   31.32 2967.45   30.08 2973.81   28.88  2978.4   29.04  2986.2    28.1
 2996.84    27.5 2999.46   27.26 3000.82   25.55 3000.84   25.54 3002.68   25.28
 3002.84   25.33 3011.53   26.91 3021.16   27.71 3026.61   28.17 3027.52   28.47
 3028.85   28.73 3044.16   32.74 3053.95   38.79 3059.16    40.6 3065.34   40.67
 3068.21   40.71 3069.07   40.82 3073.52   40.98 3073.76   40.99 3073.79   40.99
 3073.81   40.99 3083.73   41.14 3135.35   41.49 3144.59   41.45 3149.16   41.44
 3167.11    40.9 3179.16   41.03 3182.22   41.23 3185.31   41.86 3201.25   44.28
 3255.84   44.14 3262.46   44.22 3273.69   44.17 3284.64   43.11 3286.43   42.94
 3296.84   41.55 3314.19   40.35 3334.88   40.06  3348.3   39.97 3359.23   39.58
 3384.26   39.35 3390.74   39.36 3393.46   39.28 3419.29    38.9 3433.98   38.78
 3434.46   38.77  3441.3    38.8 3463.37   39.16 3464.85   39.03 3479.35   39.03
  3480.2   39.03 3494.36   39.63 3507.92   39.33  3510.9    39.4  3537.3   39.49
 3541.61   39.37 3578.44   39.55 3581.38   39.65 3584.45   39.58 3628.12   39.58
 3649.06   39.61 3669.53   40.79 3696.97   41.58 3704.57   41.29 3716.64    41.6
 3720.95   41.97 3724.74   41.55 3763.75    39.8 3779.26    38.7 3779.64   38.71
  3780.1    38.7 3808.57   39.97 3833.28   40.28 3845.84   40.23 3862.78   39.24
 3873.67    39.4 3884.74   40.58 3894.87    39.4 3907.93   38.76 3933.06   38.53
 3936.49   38.51 3974.25   40.22 3989.84   40.32 4009.94   41.51 4019.87   41.71
 4030.71   41.32 4034.88   40.27 4038.71   40.38  4049.9   39.33 4055.87   39.31
 4064.91   39.64 4073.57   39.62 4093.52   38.68 4096.24    38.7 4109.96   39.03
 4125.91   38.93 4151.61    38.9    4155   38.93 4168.16    38.4 4172.04   38.41
 4185.03   38.79 4196.93   38.89 4200.04   38.95 4203.44   38.99 4220.49   40.22
 4230.07   40.01 4240.08   39.01 4245.08   39.04 4250.55   39.02 4268.84   38.85
 4275.11   38.94 4281.96   38.88 4289.46   39.31    4312   39.79 4329.07   39.61
 4335.17    39.5 4340.76   39.64 4350.19   39.08 4371.75    39.7 4387.31   39.54
 4404.14   38.65 4416.62   38.51 4425.26   38.57 4482.76   37.16 4484.95   37.09
 4485.32   37.08 4498.98   38.24  4501.8   38.28 4515.34   38.76 4539.15   37.43
 4545.37   36.78 4550.81   36.73 4590.42   37.92 4611.73   37.95 4628.43   37.77
 4635.78   37.34 4658.84   36.77 4665.49   35.97 4671.58   35.66 4672.43   35.65

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .06 2941.53     .04 3083.73     .06

Bank Sta: Left   Right    Coeff Contr.   Expan.
       2941.53 3083.73             .3       .5
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
 3228.06 4673.83      44

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Piers =  2

Pier Data
Pier Station     Upstream= 2585.76    Downstream= 2978.02
Upstream     num=       2
    Width   Elev    Width   Elev
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       2    27.8       2      42
Downstream     num=       2
    Width   Elev    Width   Elev
       2    27.8       2      42

Pier Data
Pier Station     Upstream= 2646.31    Downstream= 3033.66
Upstream     num=       2
    Width   Elev    Width   Elev
       2    27.8       2      42
Downstream     num=       2
    Width   Elev    Width   Elev
       2    27.8       2      42

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Energy
       Momentum               Cd   =     1.2
       Yarnell                KVal =    1.05
Selected Low Flow Methods = Highest Energy Answer

High Flow Method
       Energy Only

Additional Bridge Parameters
       Add Friction component to Momentum
       Do not add Weight component to Momentum
       Class B flow critical depth computations use critical depth
           inside the bridge at the upstream end
       Criteria to check for pressure flow = Upstream energy grade line

CROSS SECTION


RIVER: P1140000
REACH: P114-00-00_0006    RS: 7322.337

INPUT
Description:
Station Elevation Data    num=     290
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   98.11   75.71      97   86.22    96.8   95.43   96.61   104.8   96.59
  112.14   96.42  136.98   96.45  161.89   96.88  199.21   95.64  227.21   95.43
  236.37   95.17  245.62   95.53   255.8   96.14  271.01   96.54  275.23   96.43
  285.37   96.04  308.55   95.69  349.25   96.03   371.5   97.04  371.52   97.04
  386.53   96.61  432.02   94.91  468.07   94.52  503.64   95.37  525.67   95.33
  536.69   94.79   551.7   94.69  591.78    95.5  611.76   96.25  639.93   96.62
  644.39   96.66  658.12   97.14  701.33   97.71  716.87   97.87  718.43   97.82
  740.28   96.85  753.23   96.89  759.28   96.86  828.76   98.09  836.61   97.46
  869.48   98.29  914.91   98.64  927.09    98.7  940.74    98.6  990.45   99.29
 1000.81    99.6 1001.91   99.61 1003.64   99.64 1008.28    99.8 1064.65  101.08
 1087.85  101.37 1099.52   101.5 1133.37  100.25 1147.48   99.99 1204.46  101.83
 1215.67  102.13  1227.4  101.68 1252.54  101.73 1272.45  101.26 1282.83  101.35
 1296.42  101.51 1306.84  101.62  1328.4  101.85 1375.43  100.94 1376.79   100.9
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 1378.11  100.93 1380.36  100.91 1414.25  101.11 1428.55  101.36 1447.12  101.18
 1467.78  100.55  1481.1   100.5 1495.62  100.53  1500.9  100.05 1527.62   98.44
 1545.08   96.68 1557.74   94.76 1562.36   93.32 1601.29   83.25 1617.81   79.45
 1623.83    78.7 1630.13   77.47 1632.82   77.03 1635.28   76.24 1647.84   72.62
 1649.64   72.58 1662.85   72.67 1663.44   72.56 1698.16   67.42  1707.9   66.93
 1721.44   64.53 1745.27   59.07 1753.68    57.2 1790.15    51.2 1811.73   48.64
 1828.03   47.12 1834.66   44.45 1850.69   39.74 1858.06   38.42 1871.46   38.35
 1883.65    38.4 1897.59   39.64  1903.1   40.41 1908.13   40.35  1938.1   40.35
 1984.06   40.79 2065.99   41.44 2204.63   42.81 2332.62   44.08 2362.86   42.12
 2371.37   41.49  2376.8   41.74 2465.17   40.66 2507.79   40.13 2510.27   40.11
 2521.38   40.28 2526.91   39.87 2535.05   39.72  2560.4   39.84 2570.41   40.04
 2583.09   39.84 2653.16   40.66 2653.53   40.68 2654.89   40.58 2692.48   39.42
 2713.95   40.48 2726.69   41.56  2756.4   42.23 2786.53    43.6 2789.02   43.59
 2806.78   44.35 2825.84    43.7 2837.91   43.36 2860.78   43.55  2864.1   43.58
  2870.3   44.51 2875.98   44.56 2894.13   44.58 2903.87   44.89 2912.42   44.86
 2913.89   44.49  2934.8   39.49 2941.53   43.17 2942.57   42.74 2954.15   31.35
 2960.16   31.32 2967.45   30.08 2973.81   28.88  2978.4   29.04  2986.2    28.1
 2996.84    27.5 2999.46   27.26 3000.82   25.55 3000.84   25.54 3002.68   25.28
 3002.84   25.33 3011.53   26.91 3021.16   27.71 3026.61   28.17 3027.52   28.47
 3028.85   28.73 3044.16   32.74 3053.95   38.79 3059.16    40.6 3065.34   40.67
 3068.21   40.71 3069.07   40.82 3073.52   40.98 3073.76   40.99 3073.79   40.99
 3073.81   40.99 3083.73   41.14 3135.35   41.49 3144.59   41.45 3149.16   41.44
 3167.11    40.9 3179.16   41.03 3182.22   41.23 3185.31   41.86 3201.25   44.28
 3255.84   44.14 3262.46   44.22 3273.69   44.17 3284.64   43.11 3286.43   42.94
 3296.84   41.55 3314.19   40.35 3334.88   40.06  3348.3   39.97 3359.23   39.58
 3384.26   39.35 3390.74   39.36 3393.46   39.28 3419.29    38.9 3433.98   38.78
 3434.46   38.77  3441.3    38.8 3463.37   39.16 3464.85   39.03 3479.35   39.03
  3480.2   39.03 3494.36   39.63 3507.92   39.33  3510.9    39.4  3537.3   39.49
 3541.61   39.37 3578.44   39.55 3581.38   39.65 3584.45   39.58 3628.12   39.58
 3649.06   39.61 3669.53   40.79 3696.97   41.58 3704.57   41.29 3716.64    41.6
 3720.95   41.97 3724.74   41.55 3763.75    39.8 3779.26    38.7 3779.64   38.71
  3780.1    38.7 3808.57   39.97 3833.28   40.28 3845.84   40.23 3862.78   39.24
 3873.67    39.4 3884.74   40.58 3894.87    39.4 3907.93   38.76 3933.06   38.53
 3936.49   38.51 3974.25   40.22 3989.84   40.32 4009.94   41.51 4019.87   41.71
 4030.71   41.32 4034.88   40.27 4038.71   40.38  4049.9   39.33 4055.87   39.31
 4064.91   39.64 4073.57   39.62 4093.52   38.68 4096.24    38.7 4109.96   39.03
 4125.91   38.93 4151.61    38.9    4155   38.93 4168.16    38.4 4172.04   38.41
 4185.03   38.79 4196.93   38.89 4200.04   38.95 4203.44   38.99 4220.49   40.22
 4230.07   40.01 4240.08   39.01 4245.08   39.04 4250.55   39.02 4268.84   38.85
 4275.11   38.94 4281.96   38.88 4289.46   39.31    4312   39.79 4329.07   39.61
 4335.17    39.5 4340.76   39.64 4350.19   39.08 4371.75    39.7 4387.31   39.54
 4404.14   38.65 4416.62   38.51 4425.26   38.57 4482.76   37.16 4484.95   37.09
 4485.32   37.08 4498.98   38.24  4501.8   38.28 4515.34   38.76 4539.15   37.43
 4545.37   36.78 4550.81   36.73 4590.42   37.92 4611.73   37.95 4628.43   37.77
 4635.78   37.34 4658.84   36.77 4665.49   35.97 4671.58   35.66 4672.43   35.65

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .06 2941.53     .04 3083.73     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       2941.53 3083.73             64.7    68.1   72.85             .3       .5
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
 3228.06 4673.83      44
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CROSS SECTION

RIVER: P1140000
REACH: P114-00-00_0006   RS: 7254.24

INPUT
Description:
Station Elevation Data   num=   241

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	113.02	40.04	112.6	41.75	112.62	51.01	112.41	102.32	111.29
114.99	110.86	126.25	110.17	135.86	110.23	151.68	109.88	167.23	109.76
217.23	109.6	260.47	108.47	270.14	108.26	275.23	108.26	289.04	108.1
324.57	107.99	334.41	108.15	358.96	108.41	361.87	108.35	364.87	108.43
376.88	108.93	383.93	108.92	419.47	108.54	467.51	108.01	474.69	108.12
512.2	108.11	552.79	108.12	557.05	108.55	568.86	108.58	606.36	108.94
625.09	108.85	646.36	109.78	666.52	109.81	692.85	110.35	722.2	110.11
742.48	109.54	747.57	109.45	752.23	109.44	776.24	109.82	847.56	110.9
884.34	111.22	932.39	111.4	974.05	111.1	1002.15	110.86	1007.46	110.85
1053.23	110.96	1077.63	110.95	1092.58	110.61	1124.7	110.5	1133.5	110.73
1166.95	110.7	1194.73	111.04	1210.18	111.49	1223.52	111.73	1254.97	112.54
1277.71	112.39	1299.81	112.85	1304.95	112.94	1310.68	112.85	1350.73	111.37
1352.77	111.47	1357.05	111.59	1366.39	111.94	1412.83	112.4	1419.81	112.3
1444.62	111.65	1457.87	112.06	1470.38	111.64	1487.9	110.52	1490.78	110.28
1495.89	109.19	1541.1	99.24	1563.42	94.31	1586.08	89.53	1589.58	88.44
1601.76	85.62	1623.02	79.71	1627.04	79.26	1649.35	77.4	1658.41	76.31
1673.23	74.46	1683.08	72.67	1700.89	69.03	1709.86	67.87	1720.03	65.33
1748.7	59.02	1768.66	55.33	1782.77	52.47	1829.35	46.5	1833.21	46.6
1845.51	40.92	1848.23	39.83	1850.72	39.58	1878.26	38.21	1897.96	39.63
1908.28	40.32	1914.84	40.31	2012.82	41.26	2059.09	41.63	2293.48	43.94
2331.36	44.31	2344.51	43.46	2383.78	41.03	2423.28	40.54	2446.11	40.35
2483.55	40.92	2498.5	40.94	2504.86	40.99	2547.97	40.95	2567.01	40.87
2586.27	40.61	2656.99	40.29	2658.97	40.36	2665.18	40.33	2753.11	40.39
2779.08	40.21	2791.51	40.95	2806.67	40.92	2832.28	40	2858.56	39.58
2880.71	40.82	2887.35	41.65	2902.42	41.53	2914.21	38.04	2921	38.3
2937.01	38.64	2942.49	39.43	2947.81	38.87	2959.7	34.78	2974.31	27.87
2983.49	27.76	2987.7	27.42	2990.32	27.4	3000.56	27.93	3001.25	27.2
3006.53	24.75	3007.31	26.91	3007.64	27.81	3024.01	28.91	3025.26	29.1
3052.13	33.06	3064.02	36.66	3069.36	36.67	3069.57	36.67	3071.77	36.67
3074.99	37.11	3086.36	38.66	3087.01	38.77	3094.51	40.01	3103.67	40.2
3109.54	40.21	3112.23	40.25	3137.63	42.1	3139.59	42.12	3143.18	42.12
3146.4	42.96	3176.31	43.85	3188.17	44.11	3207.37	44.08	3229.74	44.16
3242.62	43.86	3244.76	43.66	3245.93	43.54	3249.89	43.26	3274.81	40.37
3283.85	40.11	3300.08	38.95	3304.86	39.02	3309.38	39.02	3317.69	39.1
3335.07	38.85	3356.27	38.29	3372.17	38.14	3410.04	38.15	3433.51	39.01
3454.44	38.35	3455.71	38.38	3470.14	39.42	3475.32	39.41	3494.63	38.82
3525.13	38.13	3529.63	38.12	3557.65	37.99	3659.98	37.67	3679.32	37.69
3755.04	39.11	3756.15	39.11	3756.42	39.11	3758.21	39.12	3780.44	38.77
3852.51	37.54	3868.99	37.63	3875.81	37.64	3954.73	38.84	3965.65	39
3980.8	39.03	3981.22	39.05	3987.2	38.87	4027.21	37.99	4078.28	39.03
4086.16	38.89	4099.03	38.77	4104.57	38.88	4139.78	37.63	4177	37.57
4191.33	37.83	4205.13	37.62	4208.62	37.6	4226.79	36.14	4251.05	38.23
4251.43	38.27	4251.78	38.27	4296.51	37.88	4301.89	38.11	4316.09	37.95
4379.21	38.24	4381.79	38.22	4386.66	38.28	4391.16	38.27	4393.29	38.28

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 4401.99   38.29 4461.78    37.6 4472.15   38.24 4492.29   37.45 4521.14   36.31
 4541.75   36.43 4566.96   36.38 4570.54   36.26 4579.21    37.4 4602.43   39.39
 4620.58   41.29 4627.06   41.97 4634.32   42.19 4642.08   41.66 4648.99   40.29
 4660.02   38.72 4672.13   37.38 4682.15   36.08 4702.18   36.26 4712.64   35.83
 4713.96   35.86

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .06 2942.49     .04 3094.51     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       2942.49 3094.51           680.94  679.87  678.46             .1       .3
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
 3232.28    4715      44

CROSS SECTION


RIVER: P1140000
REACH: P114-00-00_0006    RS: 6574.37

INPUT
Description:
Station Elevation Data    num=     236
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  164.93   12.54  164.52   15.09  164.56    47.3  165.07  110.38  164.01
  165.98  163.44   176.2  163.34  182.97  163.25  237.61  163.74   270.8  163.91
  285.97  163.72  355.53  162.04   357.9     162   441.4  157.74  486.76  155.39
  541.01  152.49  579.73  150.52  607.14  148.96  641.91  146.29  668.63  145.06
  672.74  144.82  688.22  143.57  728.88   140.8  757.37  141.77  762.77  141.81
  775.89  139.19  777.78  138.86  782.59  137.97  797.78  135.34  832.36  127.35
   852.8  122.11  894.53  115.91  912.82  113.21   958.8  103.84 1002.59   94.66
 1002.81   94.61 1002.94   94.59 1032.86   90.76 1057.62   84.75 1077.87   79.44
 1114.12   72.67 1122.26   71.26 1124.47   70.79 1138.77   67.36 1175.12   57.86
 1192.85   53.26 1212.91   49.82 1228.61   49.31    1280   46.24 1287.94   45.55
 1295.39   43.21 1310.55   37.75 1317.95   38.03 1325.22   37.56 1349.74   38.94
 1356.96   39.19 1362.96   39.53 1367.59   39.16 1382.22   39.92 1397.95   39.86
 1422.98   38.48 1449.29   39.51 1452.99    39.4 1489.97   39.51 1495.46    39.7
 1496.75   39.63  1511.4    39.7 1513.01   39.69 1520.65   39.79 1563.58   39.27
 1568.26   38.97  1587.8   39.31 1588.03   39.29 1603.19   38.58 1632.17   38.86
 1642.29   39.44  1673.7   39.21 1690.72   39.23 1693.06   39.08 1700.86   39.18
 1738.08   38.99  1741.7   39.29 1758.56   39.92 1774.22   39.22 1785.45   38.37
 1798.19   39.16 1826.56   39.61 1840.14   39.51 1853.83   39.28 1864.76   39.21
 1891.18   38.44 1918.13   39.49 1937.58   39.33 1954.21   39.35 1963.15   39.24
 1972.55   39.24 1980.85   39.63 1993.16   38.38 2001.53   39.49 2008.16   38.79
 2049.49   39.12 2051.97   39.14 2056.68   39.02 2068.18   38.89 2074.15   38.55
 2083.19   38.91  2108.8   38.95  2113.2   39.21 2126.44    39.5  2128.2   39.32
 2129.87   39.22  2143.2   39.33 2150.12   39.28 2168.68   39.62 2198.24   38.44
 2218.78   39.46 2237.89   39.29 2241.56   39.34 2253.67   39.58 2261.62   40.27
 2268.06   40.59 2293.25   42.84 2302.07   42.99 2308.26   43.81 2320.17   45.13
 2323.26   45.17 2326.51   44.99 2338.27   45.51  2341.9    45.3 2353.27   44.01
 2364.08   40.88 2368.28   40.55 2376.17    39.9 2377.34    39.8 2398.29   38.79
 2400.79   38.91 2412.34   38.33 2422.92   34.87 2424.66   34.25 2437.63   29.75
 2441.58   28.64 2448.28   24.15 2451.03   22.94 2460.44   26.16 2462.77   28.53
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 2473.43   28.64 2488.35   30.26 2498.75   29.69 2501.26    30.1 2512.65   36.37
 2518.37   38.56 2526.04   38.47 2532.98   38.55 2538.53   38.62 2538.65   38.62
 2538.95   38.63 2548.06   38.78 2552.38   38.79  2567.2   38.83 2584.78    39.3
 2608.42   40.14  2639.7    38.8 2653.45   38.23 2683.33    39.4 2683.58    39.4
 2684.06    39.4 2720.76   39.06  2743.5    38.6 2753.73   38.65  2770.2   38.93
 2842.76   38.12 2888.02   37.61 2938.65   37.28 2960.36   38.69  2964.7   38.99
 2969.93   39.29 3050.77   37.64 3067.93   37.33  3080.8   37.18 3100.25   38.37
 3116.36      39 3133.83   40.05  3145.1    40.4 3167.09   40.47 3195.53   40.44
 3264.58   39.51 3268.95   39.44 3273.51   39.07 3298.97   37.23 3318.58   37.33
    3329   37.48 3347.17   39.02 3356.66   39.85 3359.03   40.06 3363.21   39.77
 3375.61   38.92 3396.22    38.4 3404.07   38.62 3418.82   38.57 3473.65   37.85
 3495.05   38.24 3514.31   38.03 3528.01   37.99 3545.29    38.6 3572.61   38.27
 3622.38   37.47 3675.64   38.06 3749.01   37.92 3764.37    37.4 3804.46   37.28
 3812.61   37.19 3828.86   37.12 3889.72   36.93 3917.95   36.96 3929.54   36.92
 4007.87   37.12 4055.57   37.05 4064.66   35.99 4071.65   35.46 4079.68   36.08
 4093.54   33.88 4094.69   33.83 4109.21   35.78  4109.7   35.65 4110.15   35.77
 4120.75    37.5 4139.47   40.49 4140.57   40.34 4161.39   37.52 4169.76      39
 4178.49   40.54 4190.79   42.54 4207.45   42.57  4214.8   42.23 4218.96   41.21
 4229.52   39.18

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .06 2376.17     .04 2532.98     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       2376.17 2532.98           634.09   634.2  634.32             .3       .5

CROSS SECTION


RIVER: P1140000
REACH: P114-00-00_0006    RS: 5940.168

INPUT
Description:
Station Elevation Data    num=     207
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   171.6    2.58  171.55   21.13  170.98    33.5  170.22  101.19  167.76
  112.72  167.41  115.61  167.96  126.23   168.6  131.89  168.81  158.78  166.72
     195  163.56  223.97  162.51  240.84  161.82  338.42  160.12  352.58  159.62
  360.26  159.58   503.6  154.59  561.55   150.7  561.66  150.69  561.74  150.69
  626.98  149.34  649.27  148.16  691.86  146.93  707.37  146.54     716  146.52
  727.67  146.12  734.44  145.97  745.08  146.73  755.17   146.8  765.53  145.69
  786.85  142.92  833.42  140.04   846.9  139.45  860.82  138.67  863.97  138.26
  881.51  136.82  891.95  135.76  906.76  135.52  907.14  135.49  926.76  133.08
  936.99  132.19  973.91  129.57  982.03  129.24 1001.53  128.56 1061.36  126.24
 1083.34  125.45 1095.07   123.4 1147.84  119.38  1156.7  119.01 1160.07  118.75
 1163.84  118.73 1177.91  117.79 1252.06  114.58 1252.41  114.55 1288.17  113.07
 1297.32  112.38  1310.1     112 1317.44  111.81 1336.55  110.88 1353.28  109.93
 1357.38  109.83 1401.52  109.41 1432.45  108.32 1434.35  108.26  1460.3  106.77
 1466.99  106.67 1492.51  106.81 1521.71  106.52 1580.99  106.52 1582.39  106.53
 1582.98  106.51 1587.33  106.45 1672.67  105.28 1684.97  103.66 1709.09   99.97
 1717.72   99.18 1734.03   97.02 1764.06   91.28  1776.3   88.96 1785.56   88.05
 1814.79   84.89  1828.2    82.5 1848.33   78.44 1852.84   77.07 1876.26   72.95
 1879.71   72.45 1884.35   71.76 1885.77   71.61  1912.9   65.94 1942.48   59.86
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 1957.94   56.19 1978.77   51.64 2002.98   46.59 2012.14   44.94    2018   43.96
 2027.11    42.9 2033.01   42.33 2072.37   39.67 2093.07   38.35 2096.17   38.77
 2099.41   38.35 2144.81   38.01 2155.19   37.43 2157.54    37.3 2168.61   34.72
  2171.8   33.97 2179.47   32.45 2185.73   31.19 2198.34   28.57 2200.23   27.98
 2206.05   27.26 2207.24   26.98 2208.45   26.81 2213.55   22.58 2213.61   22.54
 2213.65   22.53  2215.8   22.42  2216.2   22.26 2221.65   25.08  2225.5   26.97
 2225.57   27.01 2228.07   28.24 2228.35   28.37 2233.98   28.31 2239.83    30.3
 2243.31   31.49 2251.21   29.05 2271.36   35.71 2287.24   37.34 2289.74   37.34
 2290.56   37.42 2303.21   38.65 2309.97   38.49 2329.96   38.37 2383.36   37.82
  2401.4   37.27 2417.94   37.79 2487.78   38.18 2519.04   38.05 2550.23   37.28
 2580.12   36.81 2587.04   37.22 2610.42   37.99 2641.54   38.15 2670.44   38.12
 2709.24   38.02 2732.54   37.48 2758.37   36.35 2804.75   37.43 2828.21   37.71
 2852.56   37.78 2869.53   38.05 2938.47   37.79 3013.58   36.92 3098.01   36.76
 3104.09   36.82 3113.21   37.44 3131.43   36.71 3143.21   36.92 3172.69   37.07
 3173.38   37.08 3174.24    37.1 3195.95   38.75 3203.21   38.69 3217.74   38.08
 3218.36   38.11 3218.67   38.09 3233.43   38.11  3270.4   37.54 3303.33   36.96
 3337.55   38.72 3338.32   38.76  3339.2   38.74 3368.51   38.74 3375.85   38.72
 3390.57   39.02 3398.21   39.08 3427.75   38.48 3428.67   38.49 3465.61   38.15
 3487.88   37.96 3488.31   37.96 3488.43   37.96 3548.21   38.19 3548.26   38.19
 3548.31   38.19 3578.15   34.35 3578.27   34.33 3600.69   36.64 3613.22   39.53
 3623.22   38.86 3634.46   38.45 3660.75   40.28 3673.24   40.93 3679.47   41.31
 3686.95   42.25 3693.17   42.18 3713.04   38.16 3713.17   38.14 3713.21   38.14
  3713.3   38.13 3743.09   34.89 3743.21   34.89 3743.33    34.9 3758.21   37.91
 3758.35   37.91 3766.22   38.08

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .06 2144.81     .04 2303.21     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       2144.81 2303.21           106.99  106.14  104.72             .3       .5
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
 3648.67 3708.97    41.5

BRIDGE


RIVER: P1140000
REACH: P114-00-00_0006    RS: 5864.17

INPUT
Description: BFI Bridge

Distance from Upstream XS =       1
Deck/Roadway Width        =      75
Weir Coefficient          =     2.6
Upstream  Deck/Roadway Coordinates
    num=       4
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
 2144.81   34.68   31.25 2180.26   41.39   35.29 2231.25   41.12   35.29
 2289.66   38.15   35.29

Upstream Bridge Cross Section Data
Station Elevation Data    num=     207
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Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	171.6	2.58	171.55	21.13	170.98	33.5	170.22	101.19	167.76
112.72	167.41	115.61	167.96	126.23	168.6	131.89	168.81	158.78	166.72
195	163.56	223.97	162.51	240.84	161.82	338.42	160.12	352.58	159.62
360.26	159.58	503.6	154.59	561.55	150.7	561.66	150.69	561.74	150.69
626.98	149.34	649.27	148.16	691.86	146.93	707.37	146.54	716	146.52
727.67	146.12	734.44	145.97	745.08	146.73	755.17	146.8	765.53	145.69
786.85	142.92	833.42	140.04	846.9	139.45	860.82	138.67	863.97	138.26
881.51	136.82	891.95	135.76	906.76	135.52	907.14	135.49	926.76	133.08
936.99	132.19	973.91	129.57	982.03	129.24	1001.53	128.56	1061.36	126.24
1083.34	125.45	1095.07	123.4	1147.84	119.38	1156.7	119.01	1160.07	118.75
1163.84	118.73	1177.91	117.79	1252.06	114.58	1252.41	114.55	1288.17	113.07
1297.32	112.38	1310.1	112	1317.44	111.81	1336.55	110.88	1353.28	109.93
1357.38	109.83	1401.52	109.41	1432.45	108.32	1434.35	108.26	1460.3	106.77
1466.99	106.67	1492.51	106.81	1521.71	106.52	1580.99	106.52	1582.39	106.53
1582.98	106.51	1587.33	106.45	1672.67	105.28	1684.97	103.66	1709.09	99.97
1717.72	99.18	1734.03	97.02	1764.06	91.28	1776.3	88.96	1785.56	88.05
1814.79	84.89	1828.2	82.5	1848.33	78.44	1852.84	77.07	1876.26	72.95
1879.71	72.45	1884.35	71.76	1885.77	71.61	1912.9	65.94	1942.48	59.86
1957.94	56.19	1978.77	51.64	2002.98	46.59	2012.14	44.94	2018	43.96
2027.11	42.9	2033.01	42.33	2072.37	39.67	2093.07	38.35	2096.17	38.77
2099.41	38.35	2144.81	38.01	2155.19	37.43	2157.54	37.3	2168.61	34.72
2171.8	33.97	2179.47	32.45	2185.73	31.19	2198.34	28.57	2200.23	27.98
2206.05	27.26	2207.24	26.98	2208.45	26.81	2213.55	22.58	2213.61	22.54
2213.65	22.53	2215.8	22.42	2216.2	22.26	2221.65	25.08	2225.5	26.97
2225.57	27.01	2228.07	28.24	2228.35	28.37	2233.98	28.31	2239.83	30.3
2243.31	31.49	2251.21	29.05	2271.36	35.71	2287.24	37.34	2289.74	37.34
2290.56	37.42	2303.21	38.65	2309.97	38.49	2329.96	38.37	2383.36	37.82
2401.4	37.27	2417.94	37.79	2487.78	38.18	2519.04	38.05	2550.23	37.28
2580.12	36.81	2587.04	37.22	2610.42	37.99	2641.54	38.15	2670.44	38.12
2709.24	38.02	2732.54	37.48	2758.37	36.35	2804.75	37.43	2828.21	37.71
2852.56	37.78	2869.53	38.05	2938.47	37.79	3013.58	36.92	3098.01	36.76
3104.09	36.82	3113.21	37.44	3131.43	36.71	3143.21	36.92	3172.69	37.07
3173.38	37.08	3174.24	37.1	3195.95	38.75	3203.21	38.69	3217.74	38.08
3218.36	38.11	3218.67	38.09	3233.43	38.11	3270.4	37.54	3303.33	36.96
3337.55	38.72	3338.32	38.76	3339.2	38.74	3368.51	38.74	3375.85	38.72
3390.57	39.02	3398.21	39.08	3427.75	38.48	3428.67	38.49	3465.61	38.15
3487.88	37.96	3488.31	37.96	3488.43	37.96	3548.21	38.19	3548.26	38.19
3548.31	38.19	3578.15	34.35	3578.27	34.33	3600.69	36.64	3613.22	39.53
3623.22	38.86	3634.46	38.45	3660.75	40.28	3673.24	40.93	3679.47	41.31
3686.95	42.25	3693.17	42.18	3713.04	38.16	3713.17	38.14	3713.21	38.14
3713.3	38.13	3743.09	34.89	3743.21	34.89	3743.33	34.9	3758.21	37.91
3758.35	37.91	3766.22	38.08						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.06	2144.81	.04	2303.21	.06

Bank Sta: Left Right Coeff Contr. Expan.

Left	Right	Coeff Contr.	Expan.
2144.81	2303.21	.3	.5

Blocked Obstructions num= 1

Sta L	Sta R	Elev
3648.67	3708.97	41.5

Downstream Deck/Roadway Coordinates

num= 4

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
2165.79	39.5	35	2174.16	41.39	35.29	2260.14	41.12	35.29
2304.67	37.98	35.29						

Downstream Bridge Cross Section Data

Station Elevation Data num= 221

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	174.71	19.37	174.61	42.77	174.42	54.07	172.81	64.97	170.52
69.07	170.32	79.71	174.02	84.07	174.22	88.6	174.08	99.07	173.49
119.15	170.15	133.91	167.62	138.66	167.2	144.08	166.53	179.85	164.85
186.99	164.4	191.21	164.35	198.83	164.21	292.06	161.78	296.17	161.68
305.31	161.56	345.14	161.23	397.8	159.53	423.11	159.63	444.13	158.9
455.22	158.25	464.76	157.92	494.5	155.96	502.61	155.47	504.14	155.53
507.13	155.32	534.14	155.14	542.82	154.53	551.71	154.74	571.08	154.61
619.27	154.8	623.25	154.77	624.75	154.75	673.88	153.53	698.09	152.9
699.26	152.87	750.99	151.32	775.17	150.18	786.09	149.53	794.91	149.55
815.49	149.55	888.62	148.94	904.71	149.17	930.74	149.26	949.24	147.98
989.48	146.66	999.22	146.37	1022.97	144.89	1057.08	140.81	1069.98	139.25
1077.85	137.96	1096.96	134.12	1116.88	130.05	1132.81	128.06	1145.03	126.25
1149.24	125.18	1157.91	124.01	1166.9	122.44	1176.24	120.99	1187.95	119.22
1224.26	114.89	1229.31	114.32	1245.85	114.85	1267.07	114.81	1270.7	114.83
1277.65	114.68	1306.82	113.22	1329.27	112.9	1353.61	111.84	1360.18	111.44
1361.08	111.51	1400.03	111.68	1420.91	111.18	1434.29	110.01	1444.69	108.51
1463.43	108	1479.3	107.71	1487.02	107.32	1523.66	108.17	1524.53	108.16
1564	105.99	1569.31	106.52	1578.91	107.52	1611.64	106.5	1614.32	106.45
1617.15	106.16	1659.32	104.46	1668.23	103.86	1674.33	104.38	1677.29	104.47
1683.36	103.68	1712.16	97.57	1717.49	96.37	1730.42	93.62	1733.02	93.14
1735.67	92.52	1738.39	92.14	1755.8	90.21	1783.2	85.38	1809.35	81.03
1825.61	77.6	1839.35	74.52	1848.33	73.44	1862.27	71.79	1869.36	69.82
1883.8	66.41	1910.79	59.14	1920.04	56.72	1936.76	52.58	1959.37	47.07
1974.9	45.02	1994.72	42.84	2000.01	42.45	2025.92	41.32	2039.11	40.31
2071.53	38.72	2103.92	38.71	2105.05	38.69	2124.4	38.53	2150.78	32.13
2154.4	31.09	2162.83	36.06	2170.57	33.44	2170.64	33.74	2170.72	34.01
2170.82	33.97	2170.89	33.86	2173.11	33.62	2186.84	21.73	2199.41	28.63
2202.19	28.69	2214.41	28.55	2220.68	29.92	2232.31	31.35	2243.32	35.12
2247.88	35.78	2250.18	36.11	2255.08	36.83	2255.56	36.9	2256.89	37.09
2259.49	37.81	2260.22	37.82	2272.84	37.96	2281.1	38.05	2321.34	38.24
2344.64	38.21	2349.43	38.17	2354.25	37.53	2364.04	38.17	2379.43	37.58
2386.97	37.27	2394.43	36.42	2425.32	36.68	2456.79	36.86	2488.7	37.27
2520.81	37.87	2528.53	38.02	2530.37	37.99	2532.26	37.93	2567.54	37.04
2583.59	36.2	2589.45	36.15	2593.88	36.56	2620.18	37.84	2708.9	36.35
2734.41	35.75	2769.41	35.87	2784.47	36.55	2797.65	36.31	2802.22	36.42
2810.72	36.62	2824.88	37.27	2838.47	37.49	2903.63	37.49	3027.37	37.09
3112.37	38.43	3114.5	38.53	3119.71	38.35	3169.96	38.49	3174.5	38.6
3176.72	38.98	3189.5	39.45	3193.72	39.46	3248.35	39.73	3262.31	40.2
3265.32	39.96	3279.51	40.05	3282.53	39.99	3310.4	39.15	3333.05	37.54
3350.22	38.04	3386.2	37.86	3406.15	37.36	3422.93	37.33	3444.8	37.68
3463.72	36.89	3467.3	36.77	3474.53	35.92	3489.29	33.72	3489.53	33.69
3489.76	33.69	3489.99	33.75	3514.5	38.6	3519.53	38.23	3548.97	38.83
3549.53	38.84	3549.82	38.91	3551.32	38.97	3594.54	42.05	3601.4	42
3626.14	37.9	3639.54	36.95	3641.35	37.29	3654.54	35.46	3661.01	37.17
3663.68	37.32								

Manning's n Values num= 3

```
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .06 2162.83     .04 2259.49     .06

Bank Sta: Left   Right    Coeff Contr.   Expan.
        2124.4 2259.49            .3       .5
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
    3330 3650.78      40

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Piers =  2

Pier Data
Pier Station     Upstream= 2207.92    Downstream= 2191.29
Upstream     num=       2
    Width   Elev    Width   Elev
     1.5   27.76     1.5   47.76
Downstream     num=       2
    Width   Elev    Width   Elev
     1.5   27.76     1.5   47.76

Pier Data
Pier Station     Upstream= 2233.44    Downstream= 2224.15
Upstream     num=       2
    Width   Elev    Width   Elev
     1.5   27.76     1.5   47.76
Downstream     num=       2
    Width   Elev    Width   Elev
     1.5   27.76     1.5   47.76

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Energy
       Momentum               Cd   =     1.2
       Yarnell                KVal =    1.05
Selected Low Flow Methods = Highest Energy Answer

High Flow Method
       Energy Only

Additional Bridge Parameters
       Add Friction component to Momentum
       Do not add Weight component to Momentum
       Class B flow critical depth computations use critical depth
           inside the bridge at the upstream end
       Criteria to check for pressure flow = Upstream energy grade line
```

CROSS SECTION

RIVER: P1140000
REACH: P114-00-00_0006   RS: 5834.053

INPUT
Description:
Station Elevation Data   num=   221

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	174.71	19.37	174.61	42.77	174.42	54.07	172.81	64.97	170.52
69.07	170.32	79.71	174.02	84.07	174.22	88.6	174.08	99.07	173.49
119.15	170.15	133.91	167.62	138.66	167.2	144.08	166.53	179.85	164.85
186.99	164.4	191.21	164.35	198.83	164.21	292.06	161.78	296.17	161.68
305.31	161.56	345.14	161.23	397.8	159.53	423.11	159.63	444.13	158.9
455.22	158.25	464.76	157.92	494.5	155.96	502.61	155.47	504.14	155.53
507.13	155.32	534.14	155.14	542.82	154.53	551.71	154.74	571.08	154.61
619.27	154.8	623.25	154.77	624.75	154.75	673.88	153.53	698.09	152.9
699.26	152.87	750.99	151.32	775.17	150.18	786.09	149.53	794.91	149.55
815.49	149.55	888.62	148.94	904.71	149.17	930.74	149.26	949.24	147.98
989.48	146.66	999.22	146.37	1022.97	144.89	1057.08	140.81	1069.98	139.25
1077.85	137.96	1096.96	134.12	1116.88	130.05	1132.81	128.06	1145.03	126.25
1149.24	125.18	1157.91	124.01	1166.9	122.44	1176.24	120.99	1187.95	119.22
1224.26	114.89	1229.31	114.32	1245.85	114.85	1267.07	114.81	1270.7	114.83
1277.65	114.68	1306.82	113.22	1329.27	112.9	1353.61	111.84	1360.18	111.44
1361.08	111.51	1400.03	111.68	1420.91	111.18	1434.29	110.01	1444.69	108.51
1463.43	108	1479.3	107.71	1487.02	107.32	1523.66	108.17	1524.53	108.16
1564	105.99	1569.31	106.52	1578.91	107.52	1611.64	106.5	1614.32	106.45
1617.15	106.16	1659.32	104.46	1668.23	103.86	1674.33	104.38	1677.29	104.47
1683.36	103.68	1712.16	97.57	1717.49	96.37	1730.42	93.62	1733.02	93.14
1735.67	92.52	1738.39	92.14	1755.8	90.21	1783.2	85.38	1809.35	81.03
1825.61	77.6	1839.35	74.52	1848.33	73.44	1862.27	71.79	1869.36	69.82
1883.8	66.41	1910.79	59.14	1920.04	56.72	1936.76	52.58	1959.37	47.07
1974.9	45.02	1994.72	42.84	2000.01	42.45	2025.92	41.32	2039.11	40.31
2071.53	38.72	2103.92	38.71	2105.05	38.69	2124.4	38.53	2150.78	32.13
2154.4	31.09	2162.83	36.06	2170.57	33.44	2170.64	33.74	2170.72	34.01
2170.82	33.97	2170.89	33.86	2173.11	33.62	2186.84	21.73	2199.41	28.63
2202.19	28.69	2214.41	28.55	2220.68	29.92	2232.31	31.35	2243.32	35.12
2247.88	35.78	2250.18	36.11	2255.08	36.83	2255.56	36.9	2256.89	37.09
2259.49	37.81	2260.22	37.82	2272.84	37.96	2281.1	38.05	2321.34	38.24
2344.64	38.21	2349.43	38.17	2354.25	37.53	2364.04	38.17	2379.43	37.58
2386.97	37.27	2394.43	36.42	2425.32	36.68	2456.79	36.86	2488.7	37.27
2520.81	37.87	2528.53	38.02	2530.37	37.99	2532.26	37.93	2567.54	37.04
2583.59	36.2	2589.45	36.15	2593.88	36.56	2620.18	37.84	2708.9	36.35
2734.41	35.75	2769.41	35.87	2784.47	36.55	2797.65	36.31	2802.22	36.42
2810.72	36.62	2824.88	37.27	2838.47	37.49	2903.63	37.49	3027.37	37.09
3112.37	38.43	3114.5	38.53	3119.71	38.35	3169.96	38.49	3174.5	38.6
3176.72	38.98	3189.5	39.45	3193.72	39.46	3248.35	39.73	3262.31	40.2
3265.32	39.96	3279.51	40.05	3282.53	39.99	3310.4	39.15	3333.05	37.54
3350.22	38.04	3386.2	37.86	3406.15	37.36	3422.93	37.33	3444.8	37.68
3463.72	36.89	3467.3	36.77	3474.53	35.92	3489.29	33.72	3489.53	33.69
3489.76	33.69	3489.99	33.75	3514.5	38.6	3519.53	38.23	3548.97	38.83
3549.53	38.84	3549.82	38.91	3551.32	38.97	3594.54	42.05	3601.4	42
3626.14	37.9	3639.54	36.95	3641.35	37.29	3654.54	35.46	3661.01	37.17
3663.68	37.32								

```
Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .06 2162.83     .04 2259.49     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        2124.4 2259.49           657.14   658.2  659.64             .3       .5
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
    3330 3650.78      40

CROSS SECTION


RIVER: P1140000
REACH: P114-00-00_0006    RS: 5175.881

INPUT
Description:
Station Elevation Data    num=     173
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  175.06   12.04  174.86   43.37  169.56   78.41  163.02   81.72  162.46
  110.47   160.6  111.24  160.55  112.03  160.54  213.62  159.01  251.98  158.53
  278.06  158.29  320.56  157.25  410.42  155.08  434.44   154.6  498.73  153.34
  500.46  153.32  500.83  153.32  501.36  153.32  530.86  153.08  544.67  152.79
  548.44  152.89   572.3   153.3   575.9  153.12  596.64  153.81  605.93  153.11
  608.51  152.83  632.85  151.66  649.84  150.97  669.59  149.94     681  149.21
  684.29  149.23  708.25   148.1  711.03     148  723.59   147.3  726.04  147.19
  728.38  147.11  730.63  147.01  738.75  146.88  765.12  145.15  768.67  145.13
  781.05  144.55  788.68  144.18  791.31  144.16  805.89   142.9  874.55   142.9
  875.76  142.86  876.18  142.85  904.27  142.49  906.21  142.44  912.75  142.32
  930.75  141.45  936.23  141.29  946.52  140.74  962.05  139.26  978.31  136.62
 1003.48  131.52 1018.48  128.22 1041.33   123.6 1105.82  116.19 1130.59  113.57
 1160.39  113.31 1161.44   113.3 1176.08  116.93 1176.46     117  1176.8  117.18
 1184.84  120.87  1191.2  123.81 1191.47  123.91 1192.46  123.89 1227.74  123.18
 1239.68  123.12 1260.05  122.73 1266.54  122.65 1270.23  122.57 1296.83  122.21
  1326.6   121.4 1335.13   120.4 1341.61  119.43 1348.68  118.42 1356.63  115.77
 1363.91  114.49 1380.06  111.68 1389.74  112.05 1398.26  112.23 1411.78  112.61
 1427.14  112.37 1446.71  111.73 1464.66  107.49 1470.57  107.52 1476.74  105.32
 1485.38     105 1536.63  104.54 1536.71  104.55 1536.88  104.54 1536.98  104.52
  1580.8   98.82 1581.14    98.7 1582.92   98.41 1584.51   98.09 1694.61   75.61
 1701.95   74.43 1727.77   70.49 1734.88   69.75 1770.19   67.74 1777.02   67.23
 1788.35   67.37 1816.52   68.76 1822.06   69.02 1826.72   67.76 1852.09   61.22
 1866.49   61.43  1867.1   61.44 1867.66   61.44 1880.69   61.58 1882.11    61.6
 1896.45   59.76 1897.13   59.67 1897.87    59.4 1925.23   51.14 1926.17   50.92
 1927.16   50.69 1929.25   50.18 1934.07   49.18 1966.54   41.71 1977.61   40.04
 1987.21   38.68 2006.39   39.11 2017.24   39.33  2019.8   39.11 2049.19   36.56
 2051.42   36.44 2063.25    36.3 2064.05   35.98 2083.87   28.68 2092.29   26.64
 2095.57   26.33 2097.34   26.41  2107.3   26.97 2115.88   26.41 2121.07   25.14
 2125.99   21.03 2126.51   20.57 2128.24   20.24  2128.9   20.13 2128.91   20.14
 2132.18   21.27 2132.49   21.32 2147.21   27.49 2163.78   33.15 2167.35   34.26
 2170.65   34.88    2181   36.94 2186.14   37.07 2196.14    36.3 2196.33   36.28
 2196.34   36.28 2197.37    36.2 2199.58   36.38 2209.23   36.97 2239.26   38.81
 2268.44   37.99 2286.19    38.6 2286.82   38.66 2291.85    39.2 2311.58   41.33
 2328.54   42.51 2347.79   44.27 2362.56   46.16 2367.13   46.23 2400.08    46.9
```

```
 2414.45   48.59 2422.63   48.56 2424.36   48.55

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .06 2063.25     .04 2209.23     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       2063.25 2209.23           917.41  917.13  916.83             .1       .3

CROSS SECTION


RIVER: P1140000
REACH: P114-00-00_0006    RS: 4258.749

INPUT
Description:
Station Elevation Data    num=     171
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  170.46    1.54  170.22   29.97  165.71    30.3  165.64  107.08  151.85
  135.03  146.45  155.32  143.67  161.88  142.84  182.63  142.69  195.07  142.68
  217.81  140.96  228.41  140.38  238.47  139.52  241.74  139.05  278.09  134.31
  295.21  131.91  304.72  130.58  315.14  128.56  338.27  122.61  375.17  111.72
  389.34  109.39     391  109.12  393.29   108.7   420.2  102.96  430.01  102.07
  440.23  100.84  464.78  100.23  465.85   100.2  495.24  100.73  497.26  100.69
  503.87   99.59  531.66   96.26  555.28   92.35  567.65   89.42  572.89   88.18
  577.12   87.19  622.43   77.41  660.34   67.94     682   62.81  694.76    60.1
  699.32   59.17  705.37   58.12  711.02   58.28  720.38   58.68  725.53   57.23
  735.39   54.78  812.46    51.3  824.57   50.73  826.28   50.56  840.45   50.03
  841.61   49.82  855.46   47.86  870.29   45.51  870.63   45.45  893.29   39.48
  905.15   38.17  926.96   35.67   930.5   35.28  932.46   35.73  963.49   38.15
  990.54    37.4 1000.18   30.68 1005.55   27.82 1015.46   27.69 1020.55   26.83
 1032.36   22.84 1044.44   21.51  1056.8   21.39 1069.75    20.9 1077.67   21.31
 1122.35   21.29 1140.63   21.29 1153.35   21.26 1209.05   21.41 1229.25   21.58
  1231.6   21.47 1245.69   21.27 1249.97   20.37 1268.95   17.08 1319.72   13.21
 1320.73   13.13 1321.03   13.11 1362.33   13.16 1365.76   13.24 1366.69   13.27
 1380.77   13.86  1383.2    14.3 1395.78   16.44 1401.75   16.65 1410.78   17.06
 1422.03   16.24 1429.83   16.13 1455.81   17.25 1468.14   15.89 1470.82   15.58
 1476.46   15.55 1482.78   15.54 1517.66   15.69  1605.9   15.76 1625.17   14.54
 1635.92   14.02 1647.43   15.87 1650.93    16.4 1656.84   15.72 1665.93   14.81
 1676.95   14.55 1748.51   14.02 1808.86   13.83 1816.02   13.65 1824.51   15.76
 1865.03   29.52 1876.06   33.28 1886.36   34.92 1891.07   35.67 1900.87   35.74
 1906.08   35.78 1911.65   37.26 1921.09   39.69 1933.76   40.16  1951.1   40.75
 1962.27   40.04 1973.42   38.44 1981.12   36.92 1981.33    36.9 2005.15   35.22
 2020.52   33.97 2024.77   33.92 2029.24   33.69 2030.63   33.83 2034.87   32.27
 2041.15   27.74 2054.63   26.33 2056.71   26.12 2071.17   23.65 2078.83   24.23
 2087.55   19.49 2088.03   19.35 2092.31   19.14  2095.2   19.53  2096.4   20.01
 2104.15   27.57 2115.94    27.5 2122.34   30.16 2148.32   37.41 2148.52   37.42
 2158.94   38.29 2160.61    38.4 2161.74   38.48 2162.74   38.57    2187   40.32
 2191.27   40.63 2212.38   42.35 2237.74   45.05 2242.35   45.26 2251.27   46.73
 2284.31   47.64 2293.37   47.71 2300.11   48.24 2312.85   47.32 2338.02   45.44
 2361.93   44.59 2372.78   44.49 2386.34   44.48 2390.57    44.3  2412.5   42.46
 2423.71   41.57 2437.09   41.37 2463.63   41.05 2491.06   39.09 2506.41   37.69
 2512.93   37.57
```

```
Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0     .06  990.54     .99 1933.76     .06 1973.42     .04 2148.32     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1973.42 2148.32           684.38  613.57  557.28             .3       .5
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
  990.54 1933.76    41.5       T

CROSS SECTION


RIVER: P1140000
REACH: P114-00-00_0006    RS: 3645.18

INPUT
Description:
Station Elevation Data    num=      68
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   35.98    4.18   35.58   12.89   34.54    29.8    35.5   31.45   35.48
   39.48   34.92   60.45   33.32   64.03    33.6   66.32   33.14   74.89   33.56
   84.06    28.8   84.13   28.76   87.66    29.2    94.2   32.89  102.18   28.96
  115.13   25.97  117.71   24.97  120.22   24.47  130.51   22.74  139.81   20.93
  142.11   21.38  150.23   19.68  151.23   20.65  156.63    22.8  158.88   24.26
  159.43   24.55  159.82   24.61   172.7   32.25  172.79   32.31  174.36    33.3
  175.84   33.67  186.79   34.69  200.08   34.92  210.45   35.33  217.61   35.64
  217.67   35.64  246.54   37.47  247.94   37.51  264.58   37.22  271.71   37.55
  287.99   37.49  294.87    37.6  318.71   38.26  323.64   38.53  331.01   38.97
  334.45   38.79  336.76   38.76  348.37    39.3   354.8   39.44  357.99   39.46
  372.85   38.93  388.52   39.94  435.32   40.25  445.03   40.24  465.93   40.18
  488.74   39.96  499.16   39.72   519.9   39.87  539.91   40.03  570.06   40.08
  571.34   40.04  572.35   40.08  581.39   40.06  603.04   39.65  604.79    39.6
  610.73   39.71  625.47   38.99  637.05      39

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .06    94.2     .04  174.36     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         74.89  174.36            33.4   32.75    32.2             .3       .5
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
       0      34   38.75  581.39  637.05    41.5

BRIDGE


RIVER: P1140000
REACH: P114-00-00_0006    RS: 3614.18

INPUT
Description: Rail Road Bridge

Distance from Upstream XS =       1
```

Deck/Roadway Width = 30
Weir Coefficient = 2.6
Upstream Deck/Roadway Coordinates
num= 7

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
33.02	38.73	34.97	89.15	38.97	34.97	135.38	38.97	34.97
201.42	39.19	35.19	247.64	39.13	35.13	303.77	39.13	35.13
353.3	38.64	35.13						

Upstream Bridge Cross Section Data
Station Elevation Data num= 68

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	35.98	4.18	35.58	12.89	34.54	29.8	35.5	31.45	35.48
39.48	34.92	60.45	33.32	64.03	33.6	66.32	33.14	74.89	33.56
84.06	28.8	84.13	28.76	87.66	29.2	94.2	32.89	102.18	28.96
115.13	25.97	117.71	24.97	120.22	24.47	130.51	22.74	139.81	20.93
142.11	21.38	150.23	19.68	151.23	20.65	156.63	22.8	158.88	24.26
159.43	24.55	159.82	24.61	172.7	32.25	172.79	32.31	174.36	33.3
175.84	33.67	186.79	34.69	200.08	34.92	210.45	35.33	217.61	35.64
217.67	35.64	246.54	37.47	247.94	37.51	264.58	37.22	271.71	37.55
287.99	37.49	294.87	37.6	318.71	38.26	323.64	38.53	331.01	38.97
334.45	38.79	336.76	38.76	348.37	39.3	354.8	39.44	357.99	39.46
372.85	38.93	388.52	39.94	435.32	40.25	445.03	40.24	465.93	40.18
488.74	39.96	499.16	39.72	519.9	39.87	539.91	40.03	570.06	40.08
571.34	40.04	572.35	40.08	581.39	40.06	603.04	39.65	604.79	39.6
610.73	39.71	625.47	38.99	637.05	39				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.06	94.2	.04	174.36	.06

Bank Sta: Left	Right	Coeff Contr.	Expan.
74.89	174.36	.3	.5

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
0	34	38.75	581.39	637.05	41.5

Downstream Deck/Roadway Coordinates
num= 7

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
33.02	38.73	34.97	89.15	38.97	34.97	135.38	38.97	34.97
201.42	39.19	35.19	247.64	39.13	35.13	303.77	39.13	35.13
353.3	38.64	35.13						

Downstream Bridge Cross Section Data
Station Elevation Data num= 67

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	35.19	12.29	35.22	27.15	34.21	33.02	35.1	46.04	33.81
58.4	33.74	59.3	33.75	86.74	29.61	88.9	29.66	93.47	32.96
95.42	33.12	99.01	31.56	117.53	23.92	120.98	20.72	125.97	20.65
136.71	19.53	144.04	19.87	161.51	29.11	161.68	29.25	161.81	29.27
170.66	30.06	173.08	30.85	176.62	32.02	178.89	32.77	186.26	34.02
193.02	33	205.99	32.73	213.06	33.35	216.01	33.51	224.36	33.95
247.23	34.38	250.21	34.71	255.69	34.78	272.33	34.74	291.02	34.92
298.48	35.06	308.85	35.15	318.37	35.33	332.65	35.39	349.71	36.01

```
  349.72   36.01  349.76   36.01  366.81    35.7  371.84   35.49  381.04   35.37
  418.07   34.95  427.12   34.64  435.15   35.49  438.17   35.87  443.72    35.6
  469.32   35.89  475.06   35.91  493.46   35.09  503.49   35.99  504.51   36.14
  506.39   36.05  537.66   36.38  537.68   36.39  537.73   36.38  538.54   36.39
  569.07   36.34  571.09   36.32  575.13   36.36  588.91   35.71  592.97   35.84
  618.49   36.51  635.55   36.49

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .06   95.42     .04  186.26     .06

Bank Sta: Left   Right    Coeff Contr.   Expan.
          59.3  186.26            .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0   33.02      38       T
  349.71  635.55      38       T

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Piers =  3

Pier Data
Pier Station     Upstream=  103.17    Downstream=  103.17
Upstream     num=       2
    Width   Elev    Width   Elev
     1.5   27.76     1.5   35.19
Downstream     num=       2
    Width   Elev    Width   Elev
     1.5   23.43     1.5   35.19

Pier Data
Pier Station     Upstream=  141.98    Downstream=  141.98
Upstream     num=       2
    Width   Elev    Width   Elev
     1.5   27.76     1.5   35.19
Downstream     num=       2
    Width   Elev    Width   Elev
     1.5   23.43     1.5   35.19

Pier Data
Pier Station     Upstream=  180.79    Downstream=  180.79
Upstream     num=       2
    Width   Elev    Width   Elev
     1.5   27.76     1.5   35.19
Downstream     num=       2
    Width   Elev    Width   Elev
     1.5   23.43     1.5   35.19
```

```
Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Energy
       Momentum               Cd   =     1.2
       Yarnell                KVal =    1.05
Selected Low Flow Methods = Highest Energy Answer

High Flow Method
       Energy Only

Additional Bridge Parameters
       Add Friction component to Momentum
       Do not add Weight component to Momentum
       Class B flow critical depth computations use critical depth
           inside the bridge at the upstream end
       Criteria to check for pressure flow = Upstream energy grade line

CROSS SECTION


RIVER: P1140000
REACH: P114-00-00_0006    RS: 3591.3

INPUT
Description:
Station Elevation Data    num=      67
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   35.19   12.29   35.22   27.15   34.21   33.02    35.1   46.04   33.81
    58.4   33.74    59.3   33.75   86.74   29.61    88.9   29.66   93.47   32.96
   95.42   33.12   99.01   31.56  117.53   23.92  120.98   20.72  125.97   20.65
  136.71   19.53  144.04   19.87  161.51   29.11  161.68   29.25  161.81   29.27
  170.66   30.06  173.08   30.85  176.62   32.02  178.89   32.77  186.26   34.02
  193.02      33  205.99   32.73  213.06   33.35  216.01   33.51  224.36   33.95
  247.23   34.38  250.21   34.71  255.69   34.78  272.33   34.74  291.02   34.92
  298.48   35.06  308.85   35.15  318.37   35.33  332.65   35.39  349.71   36.01
  349.72   36.01  349.76   36.01  366.81    35.7  371.84   35.49  381.04   35.37
  418.07   34.95  427.12   34.64  435.15   35.49  438.17   35.87  443.72    35.6
  469.32   35.89  475.06   35.91  493.46   35.09  503.49   35.99  504.51   36.14
  506.39   36.05  537.66   36.38  537.68   36.39  537.73   36.38  538.54   36.39
  569.07   36.34  571.09   36.32  575.13   36.36  588.91   35.71  592.97   35.84
  618.49   36.51  635.55   36.49

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .06   95.42     .04  186.26     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          59.3  186.26             21.2   22.88   26.34             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0   33.02      38       T
  349.71  635.55      38       T

CROSS SECTION
```

RIVER: P1140000
REACH: P114-00-00_0006   RS: 3570.41

INPUT
Description:
Station Elevation Data   num=   67

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	35.19	12.29	35.22	27.15	34.21	34.13	34.72	46.04	33.81
58.4	33.74	59.3	33.75	86.74	29.61	88.9	29.66	93.47	32.96
95.42	33.12	99.01	31.56	117.53	23.92	120.98	20.72	125.97	20.65
136.71	19.53	144.04	19.87	161.51	29.11	161.68	29.25	161.81	29.27
170.66	30.06	173.08	30.85	176.62	32.02	178.89	32.77	186.26	34.02
193.02	33	205.99	32.73	213.06	33.35	216.01	33.51	224.36	33.95
247.23	34.38	250.21	34.71	255.69	34.78	272.33	34.74	291.02	34.92
298.48	35.06	308.85	35.15	318.37	35.33	332.65	35.39	349.71	36.01
349.72	36.01	349.76	36.01	366.81	35.7	371.84	35.49	381.04	35.37
418.07	34.95	427.12	34.64	435.15	35.49	438.17	35.87	443.72	35.6
469.32	35.89	475.06	35.91	493.46	35.09	503.49	35.99	504.51	36.14
506.39	36.05	537.66	36.38	537.68	36.39	537.73	36.38	538.54	36.39
569.07	36.34	571.09	36.32	575.13	36.36	588.91	35.71	592.97	35.84
618.49	36.51	635.55	36.49						

Manning's n Values   num=   3

Sta	n Val	Sta	n Val	Sta	n Val
0	.06	95.42	.04	186.26	.06

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
59.3	186.26	19.94	20.89	25.31	.3	.5

Ineffective Flow   num=   2

Sta L	Sta R	Elev	Permanent
0	59.3	38	T
349.71	635.55	38	T

CROSS SECTION

RIVER: P1140000
REACH: P114-00-00_0006   RS: 3549.434

INPUT
Description:
Station Elevation Data   num=   67

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	35.19	12.29	35.22	27.15	34.21	34.13	34.72	46.04	33.81
58.4	33.74	59.3	33.75	86.74	29.61	88.9	29.66	93.47	32.96
95.42	33.12	99.01	31.56	117.53	23.92	120.98	20.72	125.97	20.65
136.71	19.53	144.04	19.87	161.51	29.11	161.68	29.25	161.81	29.27
170.66	30.06	173.08	30.85	176.62	32.02	178.89	32.77	186.26	34.02
193.02	33	205.99	32.73	213.06	33.35	216.01	33.51	224.36	33.95
247.23	34.38	250.21	34.71	255.69	34.78	272.33	34.74	291.02	34.92
298.48	35.06	308.85	35.15	318.37	35.33	332.65	35.39	349.71	36.01
349.72	36.01	349.76	36.01	366.81	35.7	371.84	35.49	381.04	35.37
418.07	34.95	427.12	34.64	435.15	35.49	438.17	35.87	443.72	35.6

```
  469.32   35.89  475.06   35.91  493.46   35.09  503.49   35.99  504.51   36.14
  506.39   36.05  537.66   36.38  537.68   36.39  537.73   36.38  538.54   36.39
  569.07   36.34  571.09   36.32  575.13   36.36  588.91   35.71  592.97   35.84
  618.49   36.51  635.55   36.49

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .06   95.42     .04  186.26     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          59.3  186.26              221     224  226.71              .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0    59.3      38       T
  349.71  635.55      38       T

CULVERT


RIVER: P1140000
REACH: P114-00-00_0006    RS: 3448.434

INPUT
Description: Highway 90
Distance from Upstream XS =       1
Deck/Roadway Width        =     100
Weir Coefficient          =     2.6
Upstream  Deck/Roadway Coordinates
    num=       6
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
   46.85   32.24           85.85    37.8           171.7    37.9
  188.21    36.5          214.62    36.7          350.21   35.63

Upstream Bridge Cross Section Data
Station Elevation Data    num=      67
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   35.19   12.29   35.22   27.15   34.21   34.13   34.72   46.04   33.81
    58.4   33.74    59.3   33.75   86.74   29.61    88.9   29.66   93.47   32.96
   95.42   33.12   99.01   31.56  117.53   23.92  120.98   20.72  125.97   20.65
  136.71   19.53  144.04   19.87  161.51   29.11  161.68   29.25  161.81   29.27
  170.66   30.06  173.08   30.85  176.62   32.02  178.89   32.77  186.26   34.02
  193.02      33  205.99   32.73  213.06   33.35  216.01   33.51  224.36   33.95
  247.23   34.38  250.21   34.71  255.69   34.78  272.33   34.74  291.02   34.92
  298.48   35.06  308.85   35.15  318.37   35.33  332.65   35.39  349.71   36.01
  349.72   36.01  349.76   36.01  366.81    35.7  371.84   35.49  381.04   35.37
  418.07   34.95  427.12   34.64  435.15   35.49  438.17   35.87  443.72    35.6
  469.32   35.89  475.06   35.91  493.46   35.09  503.49   35.99  504.51   36.14
  506.39   36.05  537.66   36.38  537.68   36.39  537.73   36.38  538.54   36.39
  569.07   36.34  571.09   36.32  575.13   36.36  588.91   35.71  592.97   35.84
  618.49   36.51  635.55   36.49

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .06   95.42     .04  186.26     .06
```

Bank Sta: Left Right Coeff Contr. Expan.

59.3	186.26	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	59.3	38	T
349.71	635.55	38	T

Downstream Deck/Roadway Coordinates

num= 6

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
46.85	32.24		85.85	37.8		171.7	37.9	
188.21	37.5		214.62	37.5		350.21	35.63	

Downstream Bridge Cross Section Data

Station Elevation Data num= 170

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	35.33	3.31	34.85	7.39	34.79	9.6	34.52	17.09	34.74
28.39	35.4	34.73	35.74	43.74	36.17	54.46	34.73	59.63	34.01
64.47	33.91	95.88	34.46	97.58	34.28	122.36	31.77	140.84	32.12
151.19	32.31	160.44	32.31	183.11	30.26	197.37	28.86	203.93	26.57
205.6	26.24	206.3	26.1	206.6	26.05	208.09	25.76	210.73	25.21
220	20.66	222	20.46	231.82	21.6	239.47	21.35	249.11	20.73
252.83	20.6	264.31	18.4	266.16	15.63	269.25	12	279.32	10
279.33	10	279.37	9.8	283.69	10.5	288.42	11	289.92	11.83
300.98	21.21	305.41	24.11	314.46	28.42	320.26	31.93	322.47	33.26
327.39	36.24	330.57	36.33	335.56	36.35	349.03	36.05	366.45	35.66
417.36	34.62	421.84	34.5	434.66	34.11	444.77	34.29	485.11	35.79
509.61	36.52	521.8	36.6	611.98	35.74	614.1	35.74	627.27	35.66
814.93	35.78	818.04	35.78	821.21	35.79	822.45	35.79	824.49	35.83
825.48	35.81	827.29	35.83	1054.07	37.15	1095	37.09	1147.21	37.67
1165.08	37.65	1247.43	36.76	1262.52	36.61	1359.39	35.62	1387.89	35.41
1411.56	35.42	1426.16	36.33	1451.28	36.42	1479.61	36.39	1491.94	36.36
1562.17	35.76	1614.58	35.4	1621.83	35.85	1680.23	35.76	1683.22	35.78
1700.25	36.32	1709.96	36.1	1739.12	36.23	1769.48	36.07	1819.16	35.93
1856.61	36.34	1922.55	36.13	1939.92	36.05	1983.29	35.96	2008.92	36.21
2011.44	36.12	2043.42	34.74	2044.04	34.8	2048.54	35.19	2076.05	37.56
2076.65	37.66	2077.93	37.71	2080.54	37.66	2118.72	36.77	2164.89	37.12
2186.92	37.56	2245.9	38.09	2384.92	38.05	2420.15	37.87	2435.66	37.88
2446.62	38.86	2469.23	37.89	2474.69	37.9	2487.94	38.48	2528.43	36.73
2538.35	36.85	2665.97	37.21	2698.96	36.81	2710.05	36.47	2723.45	36.31
2725.76	36.26	2780.01	35.88	2815.21	35.9	2817.1	36.08	2819.71	36.09
2859.45	37.12	2873.6	37.12	2898.69	35.89	2904.97	35.66	2912.5	35.72
3012.27	36.64	3171.63	38	3183.85	38.02	3185.85	38.06	3187.17	38.08
3204.13	37.92	3393.5	36.93	3406.24	36.6	3407.42	36.58	3407.58	36.59
3480.17	36.51	3536.57	36.61	3557.97	36.73	3763.3	37.94	3799.07	38.23
3817.1	38.13	3819.52	38.15	3896.65	37.32	3951.36	36.6	3953.86	36.56
3970.48	37.68	3984.95	38.54	4028.51	38.8	4045.54	38.82	4093.48	39.09
4119.3	39.21	4200.09	38.78	4225.82	38.6	4332.02	40.61	4337.27	40.61
4347.49	40.45	4431.21	39.52	4524.37	39.01	4551.05	38.62	4564.82	38.36
4616.4	37.51	4625.57	37.84	4675.06	39.18	4707.84	39.3	4790.08	39.23

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.06	197.37	.04	314.46	.06

```
Bank Sta: Left   Right    Coeff Contr.   Expan.
        197.37  314.46            .3       .5

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Culverts =  2

Culvert Name     Shape      Rise    Span
Culvert #1           Box      10      10
FHWA Chart # 8 - flared wingwalls
FHWA Scale # 1 - Wingwall flared 30 to 75 deg.
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef   Exit
Loss Coef
                .05     100     .013     .013        0                   .4               1
Upstream   Elevation =  19.57
           Centerline Station =  124.43
Downstream Elevation =  9.8
           Centerline Station =  275

Culvert Name     Shape      Rise    Span
Culvert #2      Circular       8
FHWA Chart # 1 - Concrete Pipe Culvert
FHWA Scale # 1 - Square edge entrance with headwall
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef   Exit
Loss Coef
                .05     100     .013     .013        0                   .5               1
Upstream   Elevation =  19.57
           Centerline Station =  138.68
Downstream Elevation =  9.8
           Centerline Station =  288.52

CROSS SECTION


RIVER: P1140000
REACH: P114-00-00_0006    RS: 3349.25

INPUT
Description:
Station Elevation Data    num=     170
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   35.33    3.31   34.85    7.39   34.79     9.6   34.52   17.09   34.74
   28.39    35.4   34.73   35.74   43.74   36.17   54.46   34.73   59.63   34.01
   64.47   33.91   95.88   34.46   97.58   34.28  122.36   31.77  140.84   32.12
  151.19   32.31  160.44   32.31  183.11   30.26  197.37   28.86  203.93   26.57
   205.6   26.24   206.3    26.1   206.6   26.05  208.09   25.76  210.73   25.21
     220   20.66     222   20.46  231.82    21.6  239.47   21.35  249.11   20.73
```

252.83	20.6	264.31	18.4	266.16	15.63	269.25	12	279.32	10
279.33	10	279.37	9.8	283.69	10.5	288.42	11	289.92	11.83
300.98	21.21	305.41	24.11	314.46	28.42	320.26	31.93	322.47	33.26
327.39	36.24	330.57	36.33	335.56	36.35	349.03	36.05	366.45	35.66
417.36	34.62	421.84	34.5	434.66	34.11	444.77	34.29	485.11	35.79
509.61	36.52	521.8	36.6	611.98	35.74	614.1	35.74	627.27	35.66
814.93	35.78	818.04	35.78	821.21	35.79	822.45	35.79	824.49	35.83
825.48	35.81	827.29	35.83	1054.07	37.15	1095	37.09	1147.21	37.67
1165.08	37.65	1247.43	36.76	1262.52	36.61	1359.39	35.62	1387.89	35.41
1411.56	35.42	1426.16	36.33	1451.28	36.42	1479.61	36.39	1491.94	36.36
1562.17	35.76	1614.58	35.4	1621.83	35.85	1680.23	35.76	1683.22	35.78
1700.25	36.32	1709.96	36.1	1739.12	36.23	1769.48	36.07	1819.16	35.93
1856.61	36.34	1922.55	36.13	1939.92	36.05	1983.29	35.96	2008.92	36.21
2011.44	36.12	2043.42	34.74	2044.04	34.8	2048.54	35.19	2076.05	37.56
2076.65	37.66	2077.93	37.71	2080.54	37.66	2118.72	36.77	2164.89	37.12
2186.92	37.56	2245.9	38.09	2384.92	38.05	2420.15	37.87	2435.66	37.88
2446.62	38.86	2469.23	37.89	2474.69	37.9	2487.94	38.48	2528.43	36.73
2538.35	36.85	2665.97	37.21	2698.96	36.81	2710.05	36.47	2723.45	36.31
2725.76	36.26	2780.01	35.88	2815.21	35.9	2817.1	36.08	2819.71	36.09
2859.45	37.12	2873.6	37.12	2898.69	35.89	2904.97	35.66	2912.5	35.72
3012.27	36.64	3171.63	38	3183.85	38.02	3185.85	38.06	3187.17	38.08
3204.13	37.92	3393.5	36.93	3406.24	36.6	3407.42	36.58	3407.58	36.59
3480.17	36.51	3536.57	36.61	3557.97	36.73	3763.3	37.94	3799.07	38.23
3817.1	38.13	3819.52	38.15	3896.65	37.32	3951.36	36.6	3953.86	36.56
3970.48	37.68	3984.95	38.54	4028.51	38.8	4045.54	38.82	4093.48	39.09
4119.3	39.21	4200.09	38.78	4225.82	38.6	4332.02	40.61	4337.27	40.61
4347.49	40.45	4431.21	39.52	4524.37	39.01	4551.05	38.62	4564.82	38.36
4616.4	37.51	4625.57	37.84	4675.06	39.18	4707.84	39.3	4790.08	39.23

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.06	197.37	.04	314.46	.06

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
197.37	314.46	23.875	23.875	.3	.5

CROSS SECTION

RIVER: P1140000
REACH: P114-00-00_0006
RS: 3325.375

INPUT
Description:
Station Elevation Data num= 170

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	35.33	3.31	34.85	7.39	34.79	9.6	34.52	17.09	34.74
28.39	35.4	34.73	35.74	43.74	36.17	54.46	34.73	59.63	34.01
64.47	33.91	95.88	34.46	97.58	34.28	122.36	31.77	140.84	32.12
151.19	32.31	160.44	32.31	183.11	30.26	197.37	28.86	203.93	26.57
205.6	26.24	206.3	26.1	206.6	26.05	208.09	25.76	210.73	25.21
220	20.66	222	20.46	231.82	21.6	239.47	21.35	249.11	20.73
252.83	20.6	264.31	18.4	266.16	15.63	269.25	12	279.32	10
279.33	10	279.37	9.8	283.69	10.5	288.42	11	289.92	11.83
300.98	21.21	305.41	24.11	314.46	28.42	320.26	31.93	322.47	33.26

```
  327.39   36.24  330.57   36.33  335.56   36.35  349.03   36.05  366.45   35.66
  417.36   34.62  421.84    34.5  434.66   34.11  444.77   34.29  485.11   35.79
  509.61   36.52   521.8    36.6  611.98   35.74   614.1   35.74  627.27   35.66
  814.93   35.78  818.04   35.78  821.21   35.79  822.45   35.79  824.49   35.83
  825.48   35.81  827.29   35.83 1054.07   37.15    1095   37.09 1147.21   37.67
 1165.08   37.65 1247.43   36.76 1262.52   36.61 1359.39   35.62 1387.89   35.41
 1411.56   35.42 1426.16   36.33 1451.28   36.42 1479.61   36.39 1491.94   36.36
 1562.17   35.76 1614.58    35.4 1621.83   35.85 1680.23   35.76 1683.22   35.78
 1700.25   36.32 1709.96    36.1 1739.12   36.23 1769.48   36.07 1819.16   35.93
 1856.61   36.34 1922.55   36.13 1939.92   36.05 1983.29   35.96 2008.92   36.21
 2011.44   36.12 2043.42   34.74 2044.04    34.8 2048.54   35.19 2076.05   37.56
 2076.65   37.66 2077.93   37.71 2080.54   37.66 2118.72   36.77 2164.89   37.12
 2186.92   37.56  2245.9   38.09 2384.92   38.05 2420.15   37.87 2435.66   37.88
 2446.62   38.86 2469.23   37.89 2474.69    37.9 2487.94   38.48 2528.43   36.73
 2538.35   36.85 2665.97   37.21 2698.96   36.81 2710.05   36.47 2723.45   36.31
 2725.76   36.26 2780.01   35.88 2815.21    35.9  2817.1   36.08 2819.71   36.09
 2859.45   37.12  2873.6   37.12 2898.69   35.89 2904.97   35.66  2912.5   35.72
 3012.27   36.64 3171.63      38 3183.85   38.02 3185.85   38.06 3187.17   38.08
 3204.13   37.92  3393.5   36.93 3406.24    36.6 3407.42   36.58 3407.58   36.59
 3480.17   36.51 3536.57   36.61 3557.97   36.73  3763.3   37.94 3799.07   38.23
  3817.1   38.13 3819.52   38.15 3896.65   37.32 3951.36    36.6 3953.86   36.56
 3970.48   37.68 3984.95   38.54 4028.51    38.8 4045.54   38.82 4093.48   39.09
  4119.3   39.21 4200.09   38.78 4225.82    38.6 4332.02   40.61 4337.27   40.61
 4347.49   40.45 4431.21   39.52 4524.37   39.01 4551.05   38.62 4564.82   38.36
  4616.4   37.51 4625.57   37.84 4675.06   39.18 4707.84    39.3 4790.08   39.23

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .06  197.37     .04  314.46     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        197.37  314.46           681.69  681.69  681.69             .1       .3

CROSS SECTION


RIVER: P1140000
REACH: P114-00-00_0006    RS: 2644.691

INPUT
Description:
Station Elevation Data    num=     233
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   34.58    4.59    34.1   22.33   33.35   36.78   33.36   80.77   33.51
   94.01    33.4  101.97   33.56  105.12   33.21  122.93   30.87  134.93   28.94
  157.27   29.49  163.42   29.68  167.33    28.7   193.5   18.38  193.71   18.34
  193.75   18.33  193.79   18.32  199.31   17.27  210.46   15.42  213.77   12.96
  216.53    14.8  225.36   13.71  233.75   17.36  235.37   17.12  242.16    15.1
  243.43   15.85  250.96   21.43  273.53   28.51  280.62   30.01  290.78   32.14
  291.41   32.27  293.07   32.32  302.29   32.57  302.68   32.58  313.39   34.56
  331.94   32.95  334.44   32.92  337.32   32.93  372.11   33.92  388.65   34.35
  390.26   34.41  409.11   33.97  423.48   33.64  423.93   33.61  436.92   34.88
  441.25   35.36  449.08   35.04  467.62   34.63  475.89   34.39  480.49   34.36
  500.37   35.55  614.98   35.32  621.65   35.45  648.82   35.59  753.02   37.23
  838.93   37.54  877.75   37.36  891.58   38.47  913.24   37.25  936.08   37.09
```

```
 1021.93   36.82 1047.47   37.22 1057.83   36.77 1068.63   36.67 1082.11   37.09
 1107.88   37.26 1255.89   36.77 1261.93   36.75 1432.25   35.41 1435.71    35.4
 1441.93   35.35 1460.25   35.22 1532.44   34.51 1544.83   34.51 1554.22   35.09
 1567.08    37.1 1576.18   35.91  1584.4   34.14 1591.93    34.1 1598.14    34.3
  1605.7   34.76 1619.05   36.13 1631.08   36.13 1651.93   35.94 1662.15   36.11
 1667.93   36.07 1671.01   35.79 1725.09   36.64 1759.92   37.24 1784.81   36.63
 1818.02    35.6  1868.1   36.39 1893.35   36.48 1925.18      37 1966.04   37.21
 1986.71   36.69 2068.88   37.02 2070.74   37.01 2118.82   37.11 2121.34   37.01
 2125.21   37.15 2177.01   36.71  2191.1   36.42 2213.27   36.38 2287.37   35.68
 2300.75   35.69 2372.15   35.62 2415.79    35.7 2464.06   35.45 2466.45   35.04
 2467.75   35.35  2476.6   35.75 2485.07    36.6 2498.56   36.65 2502.39   36.65
 2521.92   33.78  2531.5   32.42 2537.04   31.72 2551.92   33.82 2553.46   34.15
 2554.36   34.33 2555.34   34.27 2597.19   36.36 2611.92   35.62 2616.21    35.2
 2619.35   34.97 2621.75   35.21 2657.55   35.33 2689.27   34.71 2701.92    34.5
 2721.86   33.65 2731.92   35.34 2740.14   35.95 2744.88   36.09 2756.77   35.16
 2774.93    34.8 2806.02   33.15 2814.16   33.42    2817   32.81 2821.92   31.32
 2831.48   28.79 2838.96   27.97 2848.81   26.93 2859.72   26.05 2871.91   25.16
 2881.92   26.54  2883.1   26.81 2884.07   26.92 2909.99   30.31 2918.09    29.9
 2932.77   29.15 2937.79   29.77 2941.92   28.97 2952.73   28.81 2959.75   30.54
 2971.92   29.63 2981.71   30.21 2987.37   31.28 3001.91   33.65 3014.66   35.48
 3022.01   33.79 3031.91   33.31 3066.69   34.78 3073.97    34.5 3080.54    35.8
 3103.22   37.58 3108.61   38.31 3113.48    38.2 3121.91   36.96 3143.25   34.84
 3146.42   35.14 3151.91   35.77 3164.09   36.54  3177.9   36.21 3190.35   37.01
 3211.91   38.15 3212.54   38.13 3219.12    36.1 3223.29   36.52 3231.16   35.06
 3252.72   34.41 3260.43   34.76 3271.91   35.18 3278.69   35.37 3281.82   35.29
  3333.3   36.22 3334.23   36.23 3336.33   36.19  3351.1   36.02 3353.52   35.74
 3357.95   35.52 3361.91   35.46 3376.68   35.33 3397.09   34.95 3410.04   35.08
  3437.7   36.14 3449.99   36.32 3453.88   36.44 3541.48   36.26 3541.59   36.27
 3541.67   36.26 3541.73   36.26 3541.78   36.26 3578.91    36.2  3629.9    36.9
 3672.92   36.57 3697.71   37.12 3712.98   36.31  3728.4   35.89 3762.44   36.46
 3796.08   36.99 3864.26   37.04 3876.35   37.13 3949.44   37.05 3965.68   37.17
 4030.69    37.6  4087.4   37.71 4091.08   37.76 4099.47    37.8  4111.9    38.9
 4113.73   38.97 4116.58   38.97 4190.94   38.35 4211.56   38.71  4231.9   38.61
 4282.76   39.24  4339.1   38.82 4350.36    38.8 4388.45   38.97 4495.21    39.9
 4539.62   40.15 4579.39   39.54 4631.34   38.71

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0      .9  167.33     .08  293.07     .11

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        167.33  293.07          2038.45 2041.38  2059.4             .1       .3
CROSS SECTION


RIVER: P1140000
REACH: P114-00-00_0006
                         RS: 580.3

INPUT
Description:
Station Elevation Data
                         num=      47
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   18.05   19.87   19.39   29.87   19.92   39.73    20.5   54.91   19.15
   69.56   16.73   70.64   16.83   85.37   18.68  114.29   19.73  115.54   19.56
```

136.46	17.55	139.38	17.49	154	17.19	154.85	17.2	155.82	17.14
159.03	16.94	159.4	16.91	182.39	15.48	189.92	14.99	190.99	14.9
204.92	11.21	218.68	9.71	219.92	9.56	220.54	9.57	234.92	8.77
236.26	8.47	237.61	8.37	251.34	6.9	271.64	6.21	280.46	6.05
283.85	4.2	289.47	3.32	295.35	1.91	305.95	3.55	309.26	5.48
311.7	6.53	336.87	10.62	337.98	10.75	339.57	10.84	339.6	10.84
340.01	10.87	340.04	10.87	340.64	10.97	354.92	13.3	379.23	17.49
386.44	18.88	404.56	21.06						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.9	204.92	.08	340.64	.9

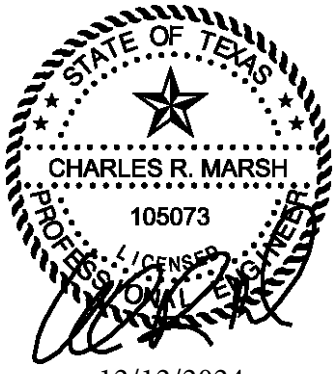
Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
204.92	340.64	3.87	0	.1	.1	.3

ATTACHMENT 6A

APPENDIX 6A-C

FINAL COVER EROSION CONTROL STRUCTURE DESIGN

Includes pages 6A-C-1 through 6A-C-32



12/12/2024

DRAINAGE SWALE DESIGN

- Drainage swale layout is shown on Attachment 6A.1 - Drainage Structure Plan. A swale detail is provided on Attachment 6A.14 - Drainage Details.

- A few representative swales were analyzed to demonstrate that the proposed design is adequate to convey the run-off generated from a 25-year and 100-year storm event. This Swale Design Summary includes the following:

  – Drainage areas analyzed are shown on sheet 6A-C-2.

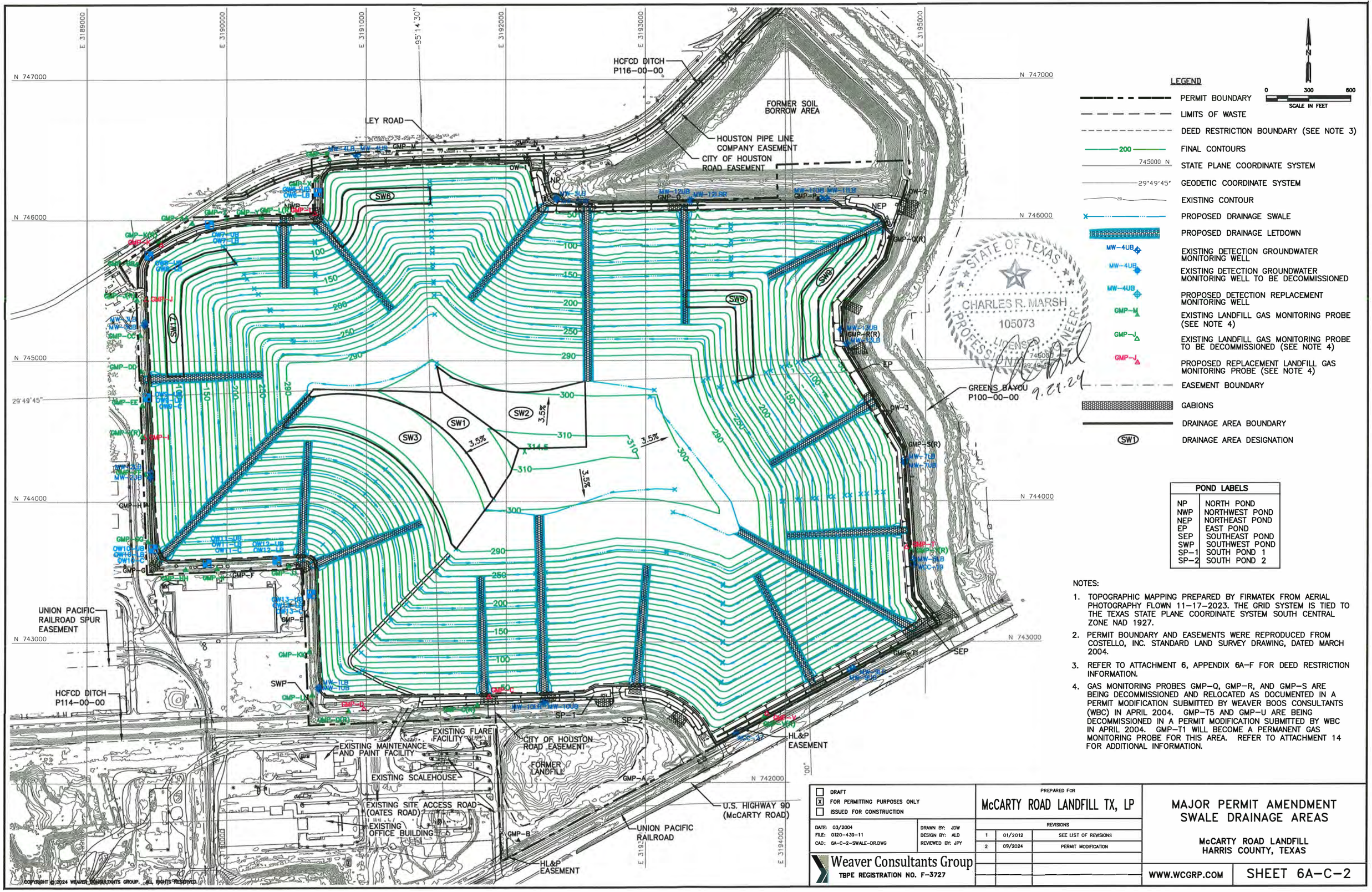
  – Hydraulic calculations for the 25-year storm are summarized on pages 6A-C-6 and 6A-C-7.

  – Maximum normal depth is 2.66 feet (SW3) for the 25-year, 24 hour storm and 2.92 feet (SW3) for the 100-year, 24-hour storm.

  – Maximum flow velocity is 4.08 fps (SW3) for the 25-year, 24 hour storm and 4.33 fps (SW3) for the 100-year, 24-hour storm.

  – Vegetation will be established on the swales to protect against erosion.

  – Hydraulic calculations for the 100-year storm are summarized on pages 6A-C-11 and 6A-C-12.



POND LABELS	
NP	NORTH POND
NWP	NORTHWEST POND
NEP	NORTHEAST POND
EP	EAST POND
SEP	SOUTHEAST POND
SWP	SOUTHWEST POND
SP-1	SOUTH POND 1
SP-2	SOUTH POND 2

NOTES:

1. TOPOGRAPHIC MAPPING PREPARED BY FIRMATEK FROM AERIAL PHOTOGRAPHY FLOWN 11-17-2023. THE GRID SYSTEM IS TIED TO THE TEXAS STATE PLANE COORDINATE SYSTEM SOUTH CENTRAL ZONE NAD 1927.
2. PERMIT BOUNDARY AND EASEMENTS WERE REPRODUCED FROM COSTELLO, INC. STANDARD LAND SURVEY DRAWING, DATED MARCH 2004.
3. REFER TO ATTACHMENT 6, APPENDIX 6A-F FOR DEED RESTRICTION INFORMATION.
4. GAS MONITORING PROBES GMP-Q, GMP-R, AND GMP-S ARE BEING DECOMMISSIONED AND RELOCATED AS DOCUMENTED IN A PERMIT MODIFICATION SUBMITTED BY WEAVER BOOS CONSULTANTS (WBC) IN APRIL 2004. GMP-T5 AND GMP-U ARE BEING DECOMMISSIONED IN A PERMIT MODIFICATION SUBMITTED BY WBC IN APRIL 2004. GMP-T1 WILL BECOME A PERMANENT GAS MONITORING PROBE FOR THIS AREA. REFER TO ATTACHMENT 14 FOR ADDITIONAL INFORMATION.

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- [ ] DRAFT
- [x] FOR PERMITTING PURPOSES ONLY
- [ ] ISSUED FOR CONSTRUCTION

DATE: 03/2004
FILE: 0120-439-11
CAD: 6A-C-2-SWALE-DR.DWG

DRAWN BY: JDW
DESIGN BY: ALD
REVIEWED BY: JPY

Weaver Consultants Group
TBPE REGISTRATION NO. F-3727

PREPARED FOR
McCARTY ROAD LANDFILL TX, LP

REVISIONS		
1	01/2012	SEE LIST OF REVISIONS
2	09/2024	PERMIT MODIFICATION

MAJOR PERMIT AMENDMENT
SWALE DRAINAGE AREAS

McCARTY ROAD LANDFILL
HARRIS COUNTY, TEXAS

WWW.WCGRP.COM

SHEET 6A-C-2

O:\0120\439\FIP MOD 2024\ATT 6\6AC\CLEAN\6A-C-2-SWALE-DR.dwg, tarrington, 1:2

McCARTY ROAD LANDFILL
0120-439-11-03-11
SWALE ANALYSIS
25-YEAR, 24 HOUR STORM

Required: Analyze swales to determine the adequacy of the swale design.

Method:

1. Determine the 25-year, 24-hour flow rates for the swale drainage areas (see sheet 6A-C-2) by the Rational Method.

Reference:

1. NOAA Atlas 14 Point Precipitation Frequency Estimates, *National Weather Service,* 2017.

Solution:

1. Determine the 25-year intensity flow rates.

$$Q = CIA$$

Where:
C= 0.7 (runoff coefficient, Ref 1)
I = intensity in/hr
A= drainage area, ac

I = 9.89 in/hr (Ref 1, Page 6A-C-4)

Swale	Area (ac)	Flow Rate (cfs)
SW1	5.71	39.5
SW2	7.86	54.4
SW3	12.57	87.0
SW6	2.47	17.1
SW8	2.64	18.3
SW9	2.66	18.4
SW17	3.02	20.9

NOAA Atlas 14, Volume 11, Version 2
Location name: Houston, Texas, USA*
Latitude: 29.8268°, Longitude: -95.2386°
Elevation: 186 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sandra Pavlovic, Michael St. Laurent, Carl Trypaluk, Dale Unruh, Orlan Wilhite

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

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

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	5.92 (4.49-7.82)	7.03 (5.35-9.16)	8.81 (6.70-11.6)	10.3 (7.73-13.7)	12.4 (9.01-17.0)	14.0 (9.94-19.8)	15.7 (10.9-22.8)	17.6 (11.8-26.1)	20.1 (13.0-31.0)	22.1 (14.0-34.9)
10-min	4.69 (3.55-6.19)	5.57 (4.24-7.26)	7.00 (5.32-9.18)	8.20 (6.16-10.9)	9.89 (7.21-13.6)	11.2 (7.96-15.9)	12.6 (8.68-18.2)	14.0 (9.38-20.8)	15.8 (10.3-24.3)	17.2 (10.9-27.2)
15-min	3.98 (3.02-5.26)	4.71 (3.59-6.14)	5.88 (4.48-7.72)	6.87 (5.16-9.16)	8.25 (6.00-11.3)	9.32 (6.60-13.2)	10.4 (7.20-15.1)	11.6 (7.81-17.3)	13.3 (8.62-20.4)	14.6 (9.22-23.0)
30-min	2.86 (2.17-3.78)	3.36 (2.57-4.39)	4.18 (3.18-5.49)	4.86 (3.65-6.48)	5.81 (4.21-7.96)	6.54 (4.62-9.21)	7.30 (5.04-10.6)	8.16 (5.49-12.2)	9.41 (6.11-14.5)	10.4 (6.60-16.5)
60-min	1.88 (1.43-2.49)	2.24 (1.70-2.91)	2.80 (2.13-3.68)	3.28 (2.46-4.37)	3.95 (2.86-5.40)	4.46 (3.15-6.28)	5.01 (3.46-7.27)	5.66 (3.81-8.43)	6.62 (4.30-10.2)	7.43 (4.70-11.7)
2-hr	1.14 (0.869-1.50)	1.41 (1.06-1.80)	1.81 (1.38-2.36)	2.17 (1.64-2.88)	2.70 (1.97-3.68)	3.12 (2.22-4.39)	3.61 (2.50-5.21)	4.18 (2.82-6.19)	5.04 (3.28-7.76)	5.78 (3.67-9.10)
3-hr	0.834 (0.636-1.10)	1.06 (0.793-1.33)	1.38 (1.05-1.79)	1.68 (1.27-2.22)	2.13 (1.56-2.91)	2.51 (1.79-3.53)	2.95 (2.05-4.25)	3.46 (2.34-5.12)	4.25 (2.78-6.52)	4.93 (3.14-7.74)
6-hr	0.485 (0.371-0.634)	0.636 (0.474-0.786)	0.847 (0.648-1.09)	1.05 (0.798-1.39)	1.37 (1.01-1.86)	1.64 (1.18-2.30)	1.96 (1.36-2.81)	2.33 (1.58-3.43)	2.90 (1.90-4.44)	3.40 (2.17-5.31)
12-hr	0.279 (0.215-0.364)	0.372 (0.277-0.456)	0.501 (0.385-0.643)	0.628 (0.478-0.825)	0.824 (0.611-1.12)	0.996 (0.718-1.40)	1.20 (0.838-1.71)	1.44 (0.976-2.10)	1.80 (1.18-2.74)	2.11 (1.35-3.29)
24-hr	0.161 (0.124-0.209)	0.218 (0.162-0.264)	0.295 (0.227-0.376)	0.372 (0.284-0.486)	0.491 (0.366-0.667)	0.598 (0.433-0.834)	0.722 (0.506-1.03)	0.864 (0.589-1.26)	1.08 (0.712-1.64)	1.26 (0.813-1.96)
2-day	0.091 (0.071-0.118)	0.125 (0.093-0.150)	0.171 (0.132-0.217)	0.217 (0.167-0.283)	0.290 (0.218-0.394)	0.356 (0.260-0.497)	0.432 (0.304-0.612)	0.513 (0.351-0.745)	0.630 (0.416-0.949)	0.725 (0.468-1.12)
3-day	0.066 (0.051-0.085)	0.091 (0.068-0.108)	0.124 (0.096-0.157)	0.157 (0.121-0.205)	0.210 (0.158-0.285)	0.258 (0.189-0.360)	0.312 (0.220-0.442)	0.369 (0.253-0.534)	0.449 (0.297-0.674)	0.513 (0.332-0.791)
4-day	0.053 (0.041-0.068)	0.072 (0.054-0.086)	0.098 (0.076-0.124)	0.124 (0.096-0.161)	0.165 (0.125-0.224)	0.202 (0.148-0.281)	0.244 (0.172-0.344)	0.287 (0.197-0.415)	0.348 (0.231-0.522)	0.396 (0.257-0.610)
7-day	0.035 (0.027-0.044)	0.046 (0.035-0.056)	0.062 (0.048-0.078)	0.078 (0.060-0.100)	0.102 (0.077-0.137)	0.124 (0.091-0.172)	0.148 (0.105-0.209)	0.173 (0.119-0.250)	0.208 (0.139-0.312)	0.236 (0.154-0.363)
10-day	0.027 (0.021-0.034)	0.035 (0.027-0.043)	0.047 (0.036-0.059)	0.058 (0.045-0.075)	0.075 (0.057-0.101)	0.091 (0.067-0.126)	0.108 (0.077-0.152)	0.126 (0.087-0.181)	0.150 (0.100-0.224)	0.170 (0.110-0.261)
20-day	0.018 (0.014-0.022)	0.022 (0.017-0.027)	0.028 (0.022-0.036)	0.034 (0.027-0.044)	0.043 (0.032-0.057)	0.050 (0.037-0.069)	0.058 (0.042-0.082)	0.067 (0.046-0.096)	0.079 (0.053-0.118)	0.089 (0.058-0.135)
30-day	0.014 (0.011-0.018)	0.017 (0.013-0.021)	0.022 (0.017-0.027)	0.026 (0.020-0.033)	0.032 (0.024-0.042)	0.036 (0.027-0.050)	0.041 (0.029-0.058)	0.047 (0.033-0.067)	0.055 (0.037-0.081)	0.061 (0.040-0.093)
45-day	0.012 (0.009-0.015)	0.014 (0.011-0.017)	0.017 (0.014-0.022)	0.020 (0.016-0.026)	0.025 (0.018-0.032)	0.028 (0.020-0.038)	0.031 (0.022-0.043)	0.034 (0.024-0.050)	0.039 (0.026-0.059)	0.043 (0.028-0.066)
60-day	0.010 (0.008-0.013)	0.012 (0.010-0.015)	0.015 (0.012-0.019)	0.018 (0.014-0.023)	0.021 (0.016-0.028)	0.023 (0.017-0.032)	0.026 (0.018-0.036)	0.028 (0.020-0.041)	0.032 (0.021-0.047)	0.034 (0.022-0.052)

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

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

Please refer to NOAAAtlas 14 document for more information.

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PF graphical

McCARTY ROAD LANDFILL
0120-439-11-03-11
SWALE ANALYSIS
25-YEAR, 24 HOUR STORM

Swale	Flow Rate (cfs)	Bottom Slope (ft/ft)	n-value	Side Slope (left)	Side Slope (right)	Bottom Width (ft)	Normal Depth (ft)	Flow Vel. (fps)	Froude No.	Velocity Head (ft)	Energy Head (ft)	Flow Area (sq. ft.)	Top Width of Flow (ft)
SW1	39.5	0.005	0.03	2	29	0	1.06	2.27	0.551	0.08	1.14	17.38	32.83
SW2	54.4	0.005	0.03	2	29	0	1.19	2.47	0.563	0.09	1.29	22.06	36.98
SW3	87.0	0.005	0.03	2	4	0	2.67	4.08	0.623	0.26	2.93	21.33	16.00
SW6	17.1	0.005	0.03	2	4	0	1.45	2.71	0.562	0.11	1.56	6.30	8.70
SW8	18.3	0.005	0.03	2	4	0	1.49	2.77	0.566	0.12	1.60	6.62	8.91
SW9	18.4	0.005	0.03	2	4	0	1.49	2.77	0.566	0.12	1.61	6.65	8.93
SW17	20.9	0.005	0.03	2	4	0	1.56	2.86	0.570	0.13	1.69	7.31	9.37

Note: Calculations were performed using the HYDROCALC HYDRAULICS program developed by Dodson and Associates (Version- 2.0.1, 1996).

Maximum flow is 2.67 ft < 3.0 ft (swale height).

Design is okay.

McCARTY ROAD LANDFILL
0120-439-11-03-11
SWALE ANALYSIS
25-YEAR, 24 HOUR STORM

Example Calculation: Calculate the normal depth for the swale for drainage area SW17 (see sheet 6A-C-2).

List of Symbols

Q_d = design flow rate for channel, cfs
R = hydraulic radius, ft
n = Manning's roughness coefficient
S = channel slope, ft/ft
b = bottom width of channel, ft
z_r = z-ratio (ratio of run to rise for channel sideslope) for right sideslope of swale
z_l = z-ratio (ratio of run to rise for channel sideslope) for left sideslope of swale
A_f = flow area, sf
g = gravitational acceleration = 32.2 ft/s^2
T = top width of flow, ft
d = normal depth of swale, ft

The program uses an iterative process to calculate the normal depth of the swale to satisfy Manning's Equation

$$Q = \frac{1.486}{n} A R^{0.67} S^{0.5}$$

Design Inputs:

Q_d =	20.9	cfs (from page 6A-C-3)
S =	0.005	ft/ft
b =	0	ft
z_r =	4	(H) : 1 (V)
z_l =	2	(H) : 1 (V)
n =	0.03	

Step 1 - Based on the geometry of the swale cross-section, solve for R and A_f

$$R = \frac{bd + 1/2d^2(z_r + z_l)}{b + d((z_l^2 + 1)^{0.5} + (z_r^2 + 1))}$$

A_f = bd + 1/2d2(zr + zl)

assume: d = 1.56 ft

R = 0.737 ft

A_f = 7.32 sf

solve for Q: Q = 20.9

if Q is not equal to Qd, select a new d and repeat calculations

Step 2 - solve for velocity, T, Froude number, velocity head, and energy head

$Q = VA \Rightarrow \quad V = Q/A$

V = 2.86 ft/s

$T = b + d(zl + zr)$

T = 9.37 ft

$$Fr = \frac{V}{(gA/T)0.5}$$

Fr = 0.570

$$\text{Velocity Head} = \frac{V2}{2g}$$

Velocity Head = 0.13 ft

Energy Head = water elevation + velocity head

Energy Head = 1.69 ft

Prep By: VG
Date: 9/4/2024

McCARTY ROAD LANDFILL
0120-439-11-03-11
SWALE ANALYSIS
100-YEAR, 24-HOUR STORM

Chkd By: CRM
Date: 9/4/2024

Required: Analyze swales to determine the adequacy of the swale design.

Method:

1. Determine the 100-year, 24-hour flow rates for the swale drainage areas (see sheet 6A-C-2) by the Rational Method.

Reference:

1. NOAA Atlas 14 Point Precipitation Frequency Estimates, *National Weather Service,* 2017.

Solution:

1. Determine the 100-year intensity flow rates.

$$Q = CIA$$

Where:
C= 0.7 (runoff coefficient, Ref 1)
I = intensity in/hr
A= drainage area, ac

I = 12.6 in/hr (Ref 1, Page 6A-C-9)

Swale	Area (ac)	Flow Rate (cfs)
SW1	5.71	50.4
SW2	7.86	69.3
SW3	12.57	110.9
SW6	2.47	21.8
SW8	2.64	23.3
SW9	2.66	23.5
SW17	3.02	26.6

NOAA Atlas 14, Volume 11, Version 2
Location name: Houston, Texas, USA*
Latitude: 29.8268°, Longitude: -95.2386°
Elevation: 186 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sandra Pavlovic, Michael St. Laurent, Carl Trypaluk, Dale Unruh, Orlan Wilhite

NOAA, National Weather Service, Silver Spring, Maryland

PF tabular | PF graphical | Maps & aerials

PF tabular

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

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	5.92 (4.49-7.82)	7.03 (5.35-9.16)	8.81 (6.70-11.6)	10.3 (7.73-13.7)	12.4 (9.01-17.0)	14.0 (9.94-19.8)	15.7 (10.9-22.8)	17.6 (11.8-26.1)	20.1 (13.0-31.0)	22.1 (14.0-34.9)
10-min	4.69 (3.55-6.19)	5.57 (4.24-7.26)	7.00 (5.32-9.18)	8.20 (6.16-10.9)	9.89 (7.21-13.6)	11.2 (7.96-15.9)	12.6 (8.68-18.2)	14.0 (9.38-20.8)	15.8 (10.3-24.3)	17.2 (10.9-27.2)
15-min	3.98 (3.02-5.26)	4.71 (3.59-6.14)	5.88 (4.48-7.72)	6.87 (5.16-9.16)	8.25 (6.00-11.3)	9.32 (6.60-13.2)	10.4 (7.20-15.1)	11.6 (7.81-17.3)	13.3 (8.62-20.4)	14.6 (9.22-23.0)
30-min	2.86 (2.17-3.78)	3.36 (2.57-4.39)	4.18 (3.18-5.49)	4.86 (3.65-6.48)	5.81 (4.21-7.96)	6.54 (4.62-9.21)	7.30 (5.04-10.6)	8.16 (5.49-12.2)	9.41 (6.11-14.5)	10.4 (6.60-16.5)
60-min	1.88 (1.43-2.49)	2.24 (1.70-2.91)	2.80 (2.13-3.68)	3.28 (2.46-4.37)	3.95 (2.86-5.40)	4.46 (3.15-6.28)	5.01 (3.46-7.27)	5.66 (3.81-8.43)	6.62 (4.30-10.2)	7.43 (4.70-11.7)
2-hr	1.14 (0.869-1.50)	1.41 (1.06-1.80)	1.81 (1.38-2.36)	2.17 (1.64-2.88)	2.70 (1.97-3.68)	3.12 (2.22-4.39)	3.61 (2.50-5.21)	4.18 (2.82-6.19)	5.04 (3.28-7.76)	5.78 (3.67-9.10)
3-hr	0.834 (0.636-1.10)	1.06 (0.793-1.33)	1.38 (1.05-1.79)	1.68 (1.27-2.22)	2.13 (1.56-2.91)	2.51 (1.79-3.53)	2.95 (2.05-4.25)	3.46 (2.34-5.12)	4.25 (2.78-6.52)	4.93 (3.14-7.74)
6-hr	0.485 (0.371-0.634)	0.636 (0.474-0.786)	0.847 (0.648-1.09)	1.05 (0.798-1.39)	1.37 (1.01-1.86)	1.64 (1.18-2.30)	1.96 (1.36-2.81)	2.33 (1.58-3.43)	2.90 (1.90-4.44)	3.40 (2.17-5.31)
12-hr	0.279 (0.215-0.364)	0.372 (0.277-0.456)	0.501 (0.385-0.643)	0.628 (0.478-0.825)	0.824 (0.611-1.12)	0.996 (0.718-1.40)	1.20 (0.838-1.71)	1.44 (0.976-2.10)	1.80 (1.18-2.74)	2.11 (1.35-3.29)
24-hr	0.161 (0.124-0.209)	0.218 (0.162-0.264)	0.295 (0.227-0.376)	0.372 (0.284-0.486)	0.491 (0.366-0.667)	0.598 (0.433-0.834)	0.722 (0.506-1.03)	0.864 (0.589-1.26)	1.08 (0.712-1.64)	1.26 (0.813-1.96)
2-day	0.091 (0.071-0.118)	0.125 (0.093-0.150)	0.171 (0.132-0.217)	0.217 (0.167-0.283)	0.290 (0.218-0.394)	0.356 (0.260-0.497)	0.432 (0.304-0.612)	0.513 (0.351-0.745)	0.630 (0.416-0.949)	0.725 (0.468-1.12)
3-day	0.066 (0.051-0.085)	0.091 (0.068-0.108)	0.124 (0.096-0.157)	0.157 (0.121-0.205)	0.210 (0.158-0.285)	0.258 (0.189-0.360)	0.312 (0.220-0.442)	0.369 (0.253-0.534)	0.449 (0.297-0.674)	0.513 (0.332-0.791)
4-day	0.053 (0.041-0.068)	0.072 (0.054-0.086)	0.098 (0.076-0.124)	0.124 (0.096-0.161)	0.165 (0.125-0.224)	0.202 (0.148-0.281)	0.244 (0.172-0.344)	0.287 (0.197-0.415)	0.348 (0.231-0.522)	0.396 (0.257-0.610)
7-day	0.035 (0.027-0.044)	0.046 (0.035-0.056)	0.062 (0.048-0.078)	0.078 (0.060-0.100)	0.102 (0.077-0.137)	0.124 (0.091-0.172)	0.148 (0.105-0.209)	0.173 (0.119-0.250)	0.208 (0.139-0.312)	0.236 (0.154-0.363)
10-day	0.027 (0.021-0.034)	0.035 (0.027-0.043)	0.047 (0.036-0.059)	0.058 (0.045-0.075)	0.075 (0.057-0.101)	0.091 (0.067-0.126)	0.108 (0.077-0.152)	0.126 (0.087-0.181)	0.150 (0.100-0.224)	0.170 (0.110-0.261)
20-day	0.018 (0.014-0.022)	0.022 (0.017-0.027)	0.028 (0.022-0.036)	0.034 (0.027-0.044)	0.043 (0.032-0.057)	0.050 (0.037-0.069)	0.058 (0.042-0.082)	0.067 (0.046-0.096)	0.079 (0.053-0.118)	0.089 (0.058-0.135)
30-day	0.014 (0.011-0.018)	0.017 (0.013-0.021)	0.022 (0.017-0.027)	0.026 (0.020-0.033)	0.032 (0.024-0.042)	0.036 (0.027-0.050)	0.041 (0.029-0.058)	0.047 (0.033-0.067)	0.055 (0.037-0.081)	0.061 (0.040-0.093)
45-day	0.012 (0.009-0.015)	0.014 (0.011-0.017)	0.017 (0.014-0.022)	0.020 (0.016-0.026)	0.025 (0.018-0.032)	0.028 (0.020-0.038)	0.031 (0.022-0.043)	0.034 (0.024-0.050)	0.039 (0.026-0.059)	0.043 (0.028-0.066)
60-day	0.010 (0.008-0.013)	0.012 (0.010-0.015)	0.015 (0.012-0.019)	0.018 (0.014-0.023)	0.021 (0.016-0.028)	0.023 (0.017-0.032)	0.026 (0.018-0.036)	0.028 (0.020-0.041)	0.032 (0.021-0.047)	0.034 (0.022-0.052)

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

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

Please refer to NOAA Atlas 14 document for more information.

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PF graphical

McCARTY ROAD LANDFILL
0120-439-11-03-11
SWALE ANALYSIS
100-YEAR, 24 HOUR STORM

Swale	Flow Rate (cfs)	Bottom Slope (ft/ft)	n-value	Side Slope (left)	Side Slope (right)	Bottom Width (ft)	Normal Depth (ft)	Flow Vel. (fps)	Froude No.	Velocity Head (ft)	Energy Head (ft)	Flow Area (sq. ft.)	Top Width of Flow (ft)
SW1	50.4	0.005	0.03	2	29	0	1.16	2.43	0.562	0.09	1.25	20.77	35.89
SW2	69.3	0.005	0.03	2	29	0	1.31	2.62	0.571	0.11	1.41	26.47	40.51
SW3	110.9	0.005	0.03	2	4	0	2.92	4.33	0.632	0.29	3.21	25.59	17.52
SW6	21.8	0.005	0.03	2	4	0	1.59	2.89	0.572	0.13	1.72	7.55	9.52
SW8	23.3	0.005	0.03	2	4	0	1.63	2.94	0.574	0.13	1.76	7.93	9.76
SW9	23.5	0.005	0.03	2	4	0	1.63	2.94	0.575	0.13	1.77	7.98	9.79
SW17	26.6	0.005	0.03	2	4	0	1.71	3.04	0.579	0.14	1.85	8.76	10.25

Note: Calculations were performed using the HYDROCALC HYDRAULICS program developed by Dodson and Associates (Version 2.0.1, 1996).

Maximum flow depth is 2.92 ft < 3.0 ft (swale height).

Design is okay.

Example Calculation: Calculate the normal depth for the swale for drainage area SW17 (see sheet 6A-C-2).

List of Symbols

Q_d = design flow rate for channel, cfs
R = hydraulic radius, ft
n = Manning's roughness coefficient
S = channel slope, ft/ft
b = bottom width of channel, ft
z_r = z-ratio (ratio of run to rise for channel sideslope) for right sideslope of swale
z_l = z-ratio (ratio of run to rise for channel sideslope) for left sideslope of swale
A_f = flow area, sf
g = gravitational acceleration = 32.2 ft/s^2
T = top width of flow, ft
d = normal depth of swale, ft

The program uses an iterative process to calculate the normal depth of the swale to satisfy Manning's Equation

$$Q = \frac{1.486}{n} A R^{0.67} S^{0.5}$$

Design Inputs:

Q_d =	26.6	cfs (from page 6A-C-8)
S =	0.005	ft/ft
b =	0	ft
z_r =	4	(H) : 1 (V)
z_l =	2	(H) : 1 (V)
n =	0.03	

Step 1 - Based on the geometry of the swale cross-section, solve for R and A_f

$$R = \frac{bd + 1/2d^2(z_r + z_l)}{b + d((z_l^2 + 1)^{0.5} + (z_r^2 + 1))}$$

$$A_f = bd + 1/2d^2(z_r + z_l)$$

assume: d = 1.71 ft

R = 0.807 ft

A_f = 8.77 sf

solve for Q: Q = 26.6

if Q is not equal to Q_d, select a new d and repeat calculations

Step 2 - solve for velocity, T, Froude number, velocity head, and energy head

$Q = VA \Rightarrow \quad V = Q/A$

$V = 3.04$ ft/s

$T = b + d(zl + zr)$

$T = 10.25$ ft

$$Fr = \frac{V}{(gA/T)0.5}$$

$Fr = 0.579$

$$\text{Velocity Head} = \frac{V^2}{2g}$$

Velocity Head = 0.14 ft

Energy Head = water elevation + velocity head

Energy Head = 1.85 ft

Prep By: VG
Date: 9/4/2024

McCARTY ROAD LANDFILL
0120-439-11-03-11
CHUTE DESIGN
NORMAL DEPTH CALCULATIONS
100-YEAR, 24 HOUR STORM

Chkd By: CRM
Date: 9/4/2024

Drainage Area	Flow Rate (cfs)	Bottom Slope (ft/ft)	Manning's n	Side Slope (left)	Side Slope (right)	Bottom Width (ft)	Normal Depth (ft)	Flow Vel. (fps)	Froude Number	Velocity Head (ft)	Energy Head (ft)	Flow Area (sf)	Flow Top Width (ft)
DA1	345	0.25	0.04	4.0	4.0	24.0	0.83	15.17	3.104	3.57	4.41	22.75	30.66
DA2	301	0.25	0.04	4.0	4.0	24.0	0.77	14.46	3.068	3.25	4.02	20.81	30.15
DA3	210	0.25	0.04	4.0	4.0	24.0	0.62	12.73	2.976	2.52	3.14	16.49	28.98
DA4	252	0.25	0.04	4.0	4.0	24.0	0.69	13.58	3.022	2.87	3.56	18.55	29.54
DA5	92	0.25	0.04	4.0	4.0	12.0	0.38	9.41	2.759	1.38	1.76	9.78	27.06
DA6	341	0.25	0.04	4.0	4.0	12.0	1.18	17.37	3.198	4.69	5.87	19.63	21.40
DA6	341	0.25	0.04	4.0	4.0	24.0	0.83	15.10	3.101	3.55	4.37	22.58	30.61
DA7	365	0.25	0.04	4.0	4.0	12.0	1.22	17.73	3.214	4.89	6.11	20.58	21.76
DA7	365	0.25	0.04	4.0	4.0	24.0	0.86	15.46	3.118	3.72	4.58	23.60	30.88
DA8	342	0.25	0.04	4.0	4.0	12.0	1.18	17.39	3.199	4.70	5.88	19.67	21.42
DA8	342	0.25	0.04	4.0	4.0	24.0	0.83	15.12	3.101	3.55	4.38	22.62	30.63
DA9	250	0.25	0.04	4.0	4.0	24.0	0.69	13.55	3.020	2.85	3.54	18.45	29.52
DA10	292	0.25	0.04	4.0	4.0	12.0	1.08	16.56	3.160	4.26	5.34	17.63	20.64
DA10	292	0.25	0.04	4.0	4.0	24.0	0.76	14.31	3.060	3.18	3.94	20.41	30.04
DA11	176	0.25	0.04	4.0	4.0	12.0	0.82	14.15	3.043	3.11	3.93	12.44	18.52
DA11	176	0.25	0.04	4.0	4.0	24.0	0.56	11.95	2.930	2.22	2.78	14.73	28.49
DA12	257	0.25	0.04	4.0	4.0	12.0	1.01	15.92	3.130	3.94	4.95	16.14	20.06
DA12	257	0.25	0.04	4.0	4.0	24.0	0.70	13.68	3.027	2.91	3.61	18.79	29.61
DA13	394	0.25	0.04	4.0	4.0	12.0	1.27	18.15	3.232	5.12	6.39	21.71	22.17
DA13	394	0.25	0.04	4.0	4.0	24.0	0.90	15.88	3.138	3.92	4.82	24.82	31.19
DA14	306	0.25	0.04	4.0	4.0	12.0	1.11	16.80	3.170	4.39	5.49	18.22	20.87
DA14	306	0.25	0.04	4.0	4.0	24.0	0.78	14.54	3.073	3.29	4.06	21.04	30.21
DA15	272	0.25	0.04	4.0	4.0	12.0	1.04	16.21	3.144	4.08	5.12	16.78	20.31
DA15	272	0.25	0.04	4.0	4.0	24.0	0.72	13.96	3.042	3.03	3.75	19.49	29.80
DA16	254	0.25	0.04	4.0	4.0	12.0	1.00	15.88	3.130	3.92	4.92	16.00	20.00
DA16	254	0.25	0.04	4.0	4.0	24.0	0.70	13.62	3.024	2.88	3.58	18.65	29.57
DA17	431	0.25	0.04	4.0	4.0	12.0	1.33	18.64	3.253	5.40	6.73	23.13	22.67
DA17	431	0.25	0.04	4.0	4.0	24.0	0.95	16.39	3.165	4.17	5.12	26.30	31.57

Note: Calculations were performed using the HYDROCALC HYDRAULICS program developed by Dodson and Associates (Version 2.0.1, 1996).

McCARTY ROAD LANDFILL
0120-439-11-03-11
CHUTE DESIGN
NORMAL DEPTH CALCULATIONS
100-YEAR, 24 HOUR STORM

Example Calculation: Calculate the normal depth for the chute for DA4.

List of Symbols

Q_d = design flow rate for channel, cfs
R = hydraulic radius, ft
n = Manning's roughness coefficient
S = channel slope, ft/ft
b = bottom width of channel, ft
z = z-ratio (ratio of run to rise for channel sideslope)
A_f = flow area, sf
g = gravitational acceleration = 32.2 ft/s^2
T = top width of flow, ft
d = normal depth of chute, ft

The program uses an iterative process to calculate the normal depth of the chute to satisfy Manning's Equation

$$Q = \frac{1.486}{n} A R^{0.67} S^{0.5}$$

Design Inputs:

Q_d =	252	cfs (from HEC-HMS analysis, Attachment 6A-A)
S =	0.25	ft/ft
b =	24	ft
z =	4	(H) : 1 (V)
n =	0.04	

Step 1 - Based on the geometry of the chute cross-section, solve for R and A_f

$$R = \frac{bd + zd^2}{b + 2d(z^2 + 1)^{0.5}}$$

$$A_f = bd + zd^2$$

assume: d = 0.69 ft

R = 0.622 ft

A_f = 18.55 sf

solve for Q: Q = 251 cfs

if Q is not equal to Q_d, select a new d and repeat calculations

Step 2 - solve for velocity, T, Froude number, velocity head, and energy head

$Q = VA \Rightarrow \quad V = Q/A$

$V =$ 13.58 ft/s

$T = b + 2(z \times d)$

$T =$ 29.54 ft

$$F_r = \frac{V}{(gA/T)0.5}$$

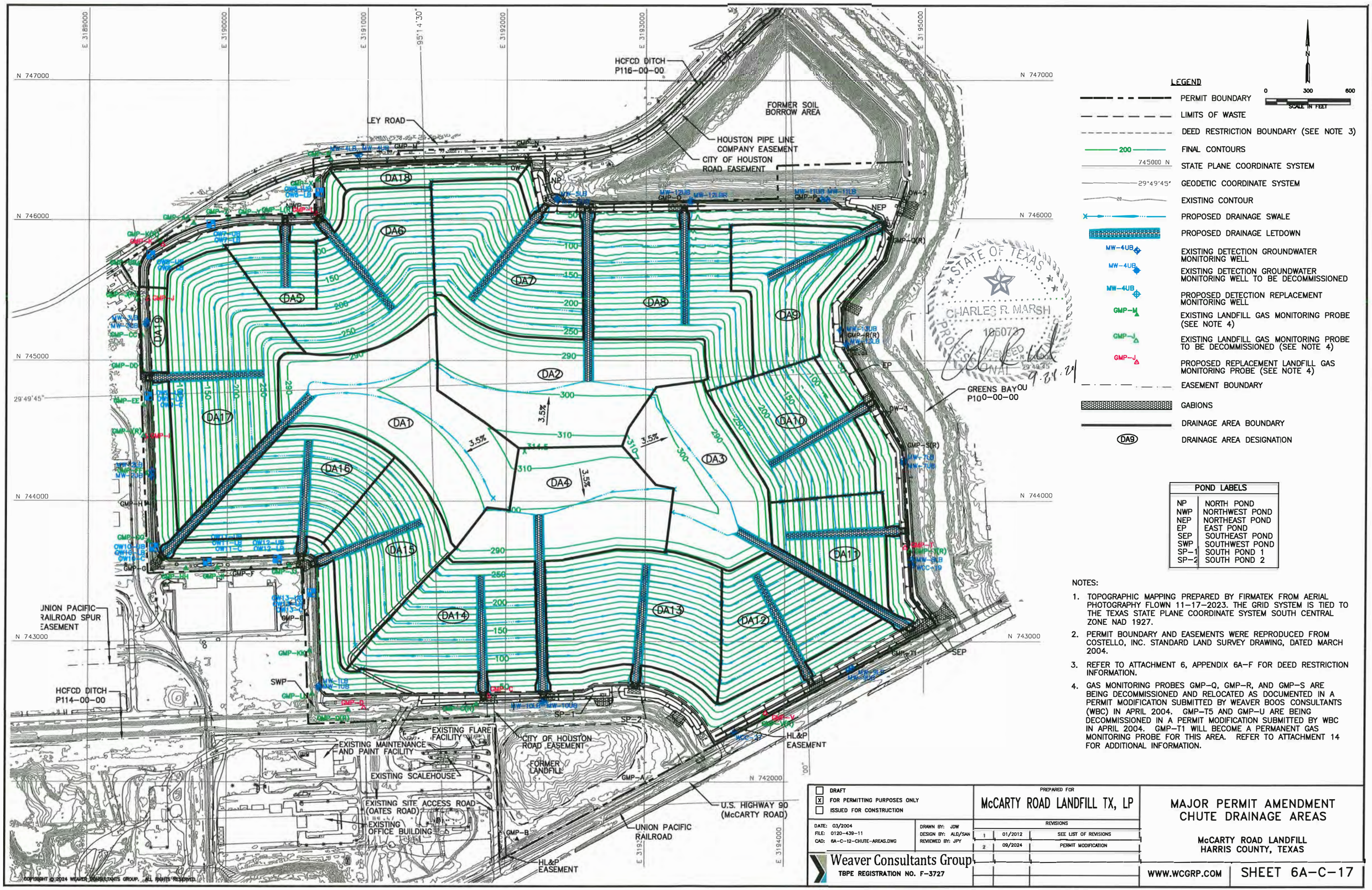
$F_r =$ 3.022

$$\text{Velocity Head} = \frac{V^2}{2g}$$

Velocity Head = 2.87 ft

Energy Head = water elevation + velocity head

Energy Head = 3.56 ft



LEGEND

- PERMIT BOUNDARY
- LIMITS OF WASTE
- DEED RESTRICTION BOUNDARY (SEE NOTE 3)
- 200 — FINAL CONTOURS
- 745000 N — STATE PLANE COORDINATE SYSTEM
- 29°49'45" — GEODETIC COORDINATE SYSTEM
- EXISTING CONTOUR
- PROPOSED DRAINAGE SWALE
- PROPOSED DRAINAGE LETDOWN
- MW-4UB — EXISTING DETECTION GROUNDWATER MONITORING WELL
- MW-4UB — EXISTING DETECTION GROUNDWATER MONITORING WELL TO BE DECOMMISSIONED
- MW-4UB — PROPOSED DETECTION REPLACEMENT MONITORING WELL
- GMP-M — EXISTING LANDFILL GAS MONITORING PROBE (SEE NOTE 4)
- GMP-J — EXISTING LANDFILL GAS MONITORING PROBE TO BE DECOMMISSIONED (SEE NOTE 4)
- GMP-J — PROPOSED REPLACEMENT LANDFILL GAS MONITORING PROBE (SEE NOTE 4)
- EASEMENT BOUNDARY
- GABIONS
- DRAINAGE AREA BOUNDARY
- (DA9) — DRAINAGE AREA DESIGNATION

POND LABELS	
NP	NORTH POND
NWP	NORTHWEST POND
NEP	NORTHEAST POND
EP	EAST POND
SEP	SOUTHEAST POND
SWP	SOUTHWEST POND
SP-1	SOUTH POND 1
SP-2	SOUTH POND 2

NOTES:

1. TOPOGRAPHIC MAPPING PREPARED BY FIRMATEK FROM AERIAL PHOTOGRAPHY FLOWN 11-17-2023. THE GRID SYSTEM IS TIED TO THE TEXAS STATE PLANE COORDINATE SYSTEM SOUTH CENTRAL ZONE NAD 1927.
2. PERMIT BOUNDARY AND EASEMENTS WERE REPRODUCED FROM COSTELLO, INC. STANDARD LAND SURVEY DRAWING, DATED MARCH 2004.
3. REFER TO ATTACHMENT 6, APPENDIX 6A-F FOR DEED RESTRICTION INFORMATION.
4. GAS MONITORING PROBES GMP-Q, GMP-R, AND GMP-S ARE BEING DECOMMISSIONED AND RELOCATED AS DOCUMENTED IN A PERMIT MODIFICATION SUBMITTED BY WEAVER BOOS CONSULTANTS (WBC) IN APRIL 2004. GMP-T5 AND GMP-U ARE BEING DECOMMISSIONED IN A PERMIT MODIFICATION SUBMITTED BY WBC IN APRIL 2004. GMP-T1 WILL BECOME A PERMANENT GAS MONITORING PROBE FOR THIS AREA. REFER TO ATTACHMENT 14 FOR ADDITIONAL INFORMATION.

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O:\0120\439\FIP MOD 2024\ATT 6\6AC\CLEAN\6A-C-17-CHUTE-AREAS.dwg, rarrington, 1:2

- [ ] DRAFT
- [X] FOR PERMITTING PURPOSES ONLY
- [ ] ISSUED FOR CONSTRUCTION

DATE: 03/2004
FILE: 0120-439-11
CAD: 6A-C-12-CHUTE-AREAS.DWG

DRAWN BY: JDW
DESIGN BY: ALD/SAN
REVIEWED BY: JPY

Weaver Consultants Group
TBPE REGISTRATION NO. F-3727

PREPARED FOR
McCARTY ROAD LANDFILL TX, LP

REVISIONS		
1	01/2012	SEE LIST OF REVISIONS
2	09/2024	PERMIT MODIFICATION

MAJOR PERMIT AMENDMENT
CHUTE DRAINAGE AREAS

McCARTY ROAD LANDFILL
HARRIS COUNTY, TEXAS

WWW.WCGRP.COM

SHEET 6A-C-17

McCARTY ROAD LANDFILL
0120-439-11-03-11
EROSION CONTROL STRUCTURE DESIGN
GABION-LINED CHUTE DESIGN
100-YEAR, 24 HOUR STORM

Required: Provide design for a gabion-lined letdown structure (or chute).

Method:
1. Design the energy dissipator system at the downstream end of the proposed "tumbling flow" chutes.

Assump
1. The gabion-lined chute will transition to its maximum width for the energy dissipator design where maximum total flow for chute is expected to occur.
2. Concrete retaining wall will be designed for a maximum height of 3 1/2 feet.
3. Proposed chutes will convey runoff from the following chute drainage area:

Proposed Chute	Chute Drainage Areas	100-Year Total Flow (cfs)[1]
1	D1	345
2	D2	301
3	D3	210
4	D4	252
5	D5	92
6	D6	341
7	D7	365
8	D8	342
9	D9	250
10	D10	292
11	D11	176
12	D12	257
13	D13	394
14	D14	306
15	D15	272
16	D16	254
17	D17	431

[1] From HEC-HMS Analysis, Appendix 6A.A

Referen
1. Gamelsky, S.G., *Innovations in Stormwater Management for Landfill Closure* Technical Paper
2. Koerner, R.M., *Designing with Geosynthetics*, 3rd Edition, Prentice-Hall, Inc, 1994.
3. Morris, H.M., *Hydraulics of Energy Dissipators in Steep Rough Channels*, Bulletin 19, Research Division, Virginia Polytechnic Institute, Blacksburg, Virginia.

McCARTY ROAD LANDFILL
0120-439-11-03-11
EROSION CONTROL STRUCTURE DESIGN
GABION-LINED CHUTE DESIGN
100-YEAR, 24 HOUR STORM

Chute	Q^1	W	q	Y_C	Y_O	y_1	K_1	K_2
1	345	30	11.50	1.60	0.75	1.78	3.52	0.98
2	301	30	10.03	1.46	0.69	1.63	3.20	0.90
3	210	25	8.40	1.30	0.62	1.45	2.82	0.80
4	252	25	10.08	1.47	0.69	1.63	3.21	0.90
5	92	20	4.60	0.87	0.43	0.97	1.84	0.53
6	341	40	8.53	1.31	0.62	1.46	2.85	0.81
7	365	40	9.13	1.37	0.65	1.53	2.99	0.84
8	342	35	9.77	1.44	0.68	1.60	3.14	0.88
9	250	30	8.34	1.29	0.62	1.44	2.81	0.79
10	292	30	9.72	1.43	0.67	1.59	3.13	0.88
11	176	20	8.80	1.34	0.64	1.49	2.92	0.82
12	257	30	8.56	1.31	0.62	1.46	2.86	0.81
13	394	40	9.85	1.44	0.68	1.61	3.16	0.89
14	306	35	8.75	1.33	0.63	1.49	2.90	0.82
15	272	30	9.07	1.37	0.65	1.52	2.98	0.84
16	254	30	8.47	1.31	0.62	1.45	2.84	0.80
17	431	40	10.78	1.53	0.72	1.71	3.37	0.94

Chute	L_1	L_2	L Used
1	4.94	9.11	9.1
2	4.47	8.31	8.3
3	3.92	7.39	7.4
4	4.48	8.34	8.3
5	2.51	4.94	4.9
6	3.96	7.46	7.5
7	4.16	7.80	7.8
8	4.38	8.17	8.2
9	3.90	7.35	7.4
10	4.36	8.14	8.1
11	4.05	7.62	7.6
12	3.97	7.48	7.5
13	4.41	8.21	8.2
14	4.04	7.59	7.6
15	4.15	7.77	7.8
16	3.94	7.42	7.4
17	4.71	8.72	8.7

Design Summary

Chute	Height of Concrete (ft)	Secondary Element (ft)	Length Between Elements (L used) (ft)
1	3.5	1.0	9.1
2	3.2	0.9	8.3
3	2.8	0.8	7.4
4	3.2	0.9	8.3
5	1.8	0.5	4.9
6	2.9	0.8	7.5
7	3.0	0.8	7.8
8	3.1	0.9	8.2
9	2.8	0.8	7.4
10	3.1	0.9	8.1
11	2.9	0.8	7.6
12	2.9	0.8	7.5
13	3.2	0.9	8.2
14	2.9	0.8	7.6
15	3.0	0.8	7.8
16	2.8	0.8	7.4
17	3.4	0.9	8.7

Prep By: VG
Date: 9/18/2024

McCARTY ROAD LANDFILL
0120-439-11-03-11
EROSION CONTROL STRUCTURE DESIGN
GABION-LINED CHUTE DESIGN
100-YEAR, 24 HOUR STORM

Chkd By: CRM
Date: 9/18/2024

Chute	Flow Rate (cfs)	Bottom Slope (ft/ft)	Manning's n	Side Slope (left)	Side Slope (right)	Bottom Width (ft)	Normal Depth (ft)	Flow Vel. (fps)	Froude Number	Velocity Head (ft)	Energy Head (ft)	Flow Area (sf)	Flow Top Width (ft)
DA1	345	0.25	0.04	2	2	30	0.74	14.71	3.076	3.36	4.11	23.45	32.98
DA2	301	0.25	0.04	2	2	30	0.69	13.98	3.039	3.04	3.72	21.53	32.75
DA3	210	0.25	0.04	2	2	25	0.62	12.97	2.978	2.61	3.23	16.19	27.47
DA4	252	0.25	0.04	2	2	25	0.69	13.90	3.032	3.00	3.69	18.13	27.75
DA5	92	0.25	0.04	2	2	20	0.43	10.25	2.810	1.63	2.060	8.980	21.72
DA6	341	0.25	0.04	2	2	40	0.62	13.24	2.999	2.73	3.35	25.75	42.50
DA7	365	0.25	0.04	2	2	40	0.65	13.59	3.019	2.87	3.52	26.85	42.60
DA8	342	0.25	0.04	2	2	35	0.68	13.91	3.038	3.010	3.68	24.58	37.70
DA9	250	0.25	0.04	2	2	30	0.61	13.02	2.984	2.63	3.25	19.20	32.46
DA10	292	0.25	0.04	2	2	30	0.67	13.82	3.031	2.97	3.64	21.13	32.70
DA11	176	0.25	0.04	2	2	20	0.63	13.08	2.985	2.66	3.29	13.45	22.53
DA12	257	0.25	0.04	2	2	30	0.63	13.15	2.991	2.69	3.31	19.54	32.50
DA13	394	0.25	0.04	2	2	40	0.68	14.01	3.045	3.05	3.73	28.12	42.72
DA14	306	0.25	0.04	2	2	35	0.63	13.32	3.002	2.76	3.39	22.97	37.53
DA15	272	0.25	0.04	2	2	30	0.65	13.46	3.012	2.81	3.46	20.22	32.58
DA16	254	0.25	0.04	2	2	30	0.62	13.10	2.988	2.67	3.29	19.39	32.48
DA17	431	0.25	0.04	2	2	40	0.72	14.50	3.069	3.27	3.98	29.73	42.87

Conclusions: - Maximum normal depth is 0.74 feet. Chute design depth is 2.5 feet.

Note: Calculations were performed using the HYDROCALC HYDRAULICS program developed by Dodson and Associates (Version–2.0.1, 1996).

McCARTY ROAD LANDFILL
0120-439-11-03-11
CHUTE ANALYSIS
NORMAL DEPTH CALCULATIONS
25-YEAR, 24 HOUR STORM

Drainage Area	Flow Rate (cfs)	Bottom Slope (ft/ft)	Manning's n	Side Slope (left)	Side Slope (right)	Bottom Width (ft)	Normal Depth (ft)	Flow Vel. (fps)	Froude Number	Velocity Head (ft)	Energy Head (ft)	Flow Area (sf)	Flow Top Width (ft)
DA1	227	0.25	0.04	4.0	4.0	24.0	0.65	13.09	3.00	2.66	3.31	17.34	29.21
DA2	214	0.25	0.04	4.0	4.0	24.0	0.63	12.82	2.980	2.55	3.18	16.69	29.04
DA3	162	0.25	0.04	4.0	4.0	24.0	0.53	11.60	2.909	2.09	2.62	13.97	28.28
DA4	169	0.25	0.04	4.0	4.0	24.0	0.55	11.78	2.920	2.16	2.70	14.35	28.38
DA5	66	0.25	0.04	4.0	4.0	12.0	0.47	10.23	2.815	1.63	2.09	6.45	15.72
DA5	66	0.25	0.04	4.0	4.0	24.0	0.31	8.31	2.675	1.07	1.39	7.95	26.52
DA6	247	0.25	0.04	4.0	4.0	12.0	0.98	15.74	3.123	3.85	4.84	15.69	19.88
DA6	247	0.25	0.04	4.0	4.0	24.0	0.68	13.49	3.017	2.83	3.51	18.31	29.48
DA7	273	0.25	0.04	4.0	4.0	12.0	1.04	16.23	3.145	4.09	5.13	16.82	20.33
DA7	273	0.25	0.04	4.0	4.0	24.0	0.73	13.97	3.043	3.03	3.76	19.54	29.81
DA8	246	0.25	0.04	4.0	4.0	12.0	0.98	15.72	3.122	3.84	4.82	15.65	19.86
DA8	246	0.25	0.04	4.0	4.0	24.0	0.68	13.47	3.016	2.82	3.50	18.26	29.47
DA9	180	0.25	0.04	4.0	4.0	12.0	0.83	14.25	3.049	3.16	3.98	12.63	18.60
DA9	180	0.25	0.04	4.0	4.0	24.0	0.57	12.05	2.936	2.26	2.82	14.94	28.55
DA10	211	0.25	0.04	4.0	4.0	12.0	0.90	15.00	3.090	3.50	4.40	14.07	19.21
DA10	211	0.25	0.04	4.0	4.0	24.0	0.62	12.75	2.977	2.53	3.15	16.54	28.99
DA11	127	0.25	0.04	4.0	4.0	12.0	0.68	12.73	2.967	2.52	3.20	9.97	17.42
DA11	127	0.25	0.04	4.0	4.0	24.0	0.46	10.60	2.841	1.75	2.21	11.98	27.71
DA12	185	0.25	0.04	4.0	4.0	12.0	0.84	14.37	3.055	3.21	4.05	12.87	18.71
DA12	185	0.25	0.04	4.0	4.0	24.0	0.58	12.17	2.943	2.30	2.88	15.20	28.62
DA13	285	0.25	0.04	4.0	4.0	12.0	1.07	16.44	3.154	4.20	5.27	17.33	20.53
DA13	285	0.25	0.04	4.0	4.0	24.0	0.74	14.19	3.054	3.13	3.87	20.09	29.96
DA14	220	0.25	0.04	4.0	4.0	12.0	0.92	15.19	3.098	3.59	4.51	14.48	19.38
DA14	220	0.25	0.04	4.0	4.0	24.0	0.64	12.95	2.987	2.60	3.24	16.99	29.12
DA15	196	0.25	0.04	4.0	4.0	12.0	0.87	14.64	3.069	3.33	4.20	13.39	18.93
DA15	196	0.25	0.04	4.0	4.0	24.0	0.60	12.42	2.958	2.40	3.00	15.78	28.78
DA16	187	0.25	0.04	4.0	4.0	12.0	0.84	14.42	3.058	3.23	4.08	12.97	18.75
DA16	187	0.25	0.04	4.0	4.0	24.0	0.58	12.21	2.946	2.32	2.90	15.31	28.65
DA17	308	0.25	0.04	4.0	4.0	12.0	1.11	16.83	3.171	4.40	5.51	18.30	20.90
DA17	308	0.25	0.04	4.0	4.0	24.0	0.78	14.58	3.074	3.30	4.08	21.13	30.23

Note: Calculations were performed using the HYDROCALC HYDRAULICS program developed by Dodson and Associates (Version 2.0.1, 1996).

Example Calculation: Calculate the normal depth for the chute for DA10.

List of Symbols

Q_d = design flow rate for channel, cfs
R = hydraulic radius, ft
n = Manning's roughness coefficient
S = channel slope, ft/ft
b = bottom width of channel, ft
z = z-ratio (ratio of run to rise for channel sideslope)
A_f = flow area, sf
g = gravitational acceleration = 32.2 ft/s^2
T = top width of flow, ft
d = normal depth of chute, ft

The program uses an iterative process to calculate the normal depth of the chute to satisfy Manning's Equation

$$Q = \frac{1.486}{n} A R^{0.67} S^{0.5}$$

Design Inputs:			
	Q_d =	211	cfs (from HEC-HMS analysis, Attachment 6A-A)
	S =	0.25	ft/ft
	b =	12	ft
	z =	4	(H) : 1 (V)
	n =	0.04	

Step 1 - Based on the geometry of the chute cross-section, solve for R and A_f

$$R = \frac{bd + zd^2}{b + 2d(z^2 + 1)^{0.5}}$$

$$A_f = bd + zd^2$$

assume: d = 0.90 ft

R = 0.724 ft

A_f = 14.07 sf

solve for Q: Q = 211 cfs

if Q is not equal to Q_d, select a new d and repeat calculations

Step 2 - solve for velocity, T, Froude number, velocity head, and energy head

$Q = VA \Rightarrow \quad V = Q/A$

$V =$ 15.00 ft/s

$T = b + 2(z \times d)$

$T =$ 19.21 ft

$$F_r = \frac{V}{(gA/T)^{0.5}}$$

$F_r =$ 3.090 ft

$$\text{Velocity Head} = \frac{V^2}{2g}$$

Velocity Head = 3.50 ft

Energy Head = water elevation + velocity head

Energy Head = 4.40 ft

McCARTY ROAD LANDFILL
0120-439-11-03-11
EROSION CONTROL STRUCTURE MODIFICATION
GABION-LINED CHUTE DESIGN
25-YEAR, 24 HOUR STORM

Required: Provide design for a gabion-lined letdown structure (or chute).

Method:

1. Design the energy dissipator system at the downstream end of the proposed "tumbling flow" chutes.

Assumptions:

1. The gabion-lined chute will transition to its maximum width for the energy dissipator design where maximum total flow for chute is expected to occur.
2. Concrete block will be designed for a maximum height of 3 1/2 feet.
3. Proposed chutes will convey runoff from the following chute drainage area:

Proposed Chute	Chute Drainage Areas	100-Year Total Flow (cfs)[1]
1	D1	227
2	D2	214
3	D3	162
4	D4	169
5	D5	66
6	D6	247
7	D7	273
8	D8	246
9	D9	180
10	D10	211
11	D11	127
12	D12	185
13	D13	285
14	D14	220
15	D15	196
16	D16	187
17	D17	308

[1] From HEC-HMS Analysis, Appendix 6A.A

References:

1. Gamelsky, S.G., *Innovations in Stormwater Management for Landfill Closure* Technical Paper
2. Koerner, R.M., *Designing with Geosynthetics*, 3rd Edition, Prentice-Hall, Inc, 1994.
3. Morris, H.M., *Hydraulics of Energy Dissipators in Steep Rough Channels*, Bulletin 19, Research Division, Virginia Polytechnic Institute, Blacksburg, Virginia.

McCARTY ROAD LANDFILL
0120-439-11-03-11
EROSION CONTROL STRUCTURE MODIFICATION
GABION-LINED CHUTE DESIGN
25-YEAR, 24 HOUR STORM

Chute	Q^1	W	q	Y_C	Y_O	y_1	K_1	K_2
1	227	30	7.57	1.21	0.58	1.35	2.62	0.74
2	214	30	7.13	1.16	0.56	1.30	2.51	0.72
3	162	25	6.48	1.09	0.53	1.22	2.35	0.67
4	169	25	6.76	1.12	0.54	1.25	2.42	0.69
5	66	20	3.32	0.70	0.35	0.78	1.46	0.43
6	247	40	6.18	1.06	0.51	1.18	2.27	0.65
7	273	40	6.83	1.13	0.55	1.26	2.44	0.70
8	246	35	7.03	1.15	0.56	1.28	2.49	0.71
9	180	30	6.00	1.04	0.50	1.16	2.22	0.64
10	211	30	7.02	1.15	0.55	1.28	2.48	0.71
11	127	20	6.36	1.08	0.52	1.20	2.32	0.66
12	185	30	6.18	1.06	0.51	1.18	2.27	0.65
13	285	40	7.11	1.16	0.56	1.29	2.51	0.71
14	220	35	6.29	1.07	0.52	1.19	2.30	0.66
15	196	30	6.53	1.10	0.53	1.22	2.36	0.67
16	187	30	6.24	1.07	0.52	1.19	2.29	0.65
17	308	40	7.69	1.22	0.59	1.36	2.65	0.75

McCARTY ROAD LANDFILL
0120-439-11-03-11
EROSION CONTROL STRUCTURE MODIFICATION
GABION-LINED CHUTE DESIGN
25-YEAR, 24 HOUR STORM

Chute	L_1	L_2	L Used
1	3.63	6.89	6.9
2	3.47	6.62	6.6
3	3.23	6.21	6.2
4	3.34	6.39	6.4
5	1.98	3.98	4.0
6	3.12	6.02	6.0
7	3.36	6.44	6.4
8	3.43	6.56	6.6
9	3.05	5.90	5.9
10	3.43	6.55	6.6
11	3.19	6.13	6.1
12	3.12	6.02	6.0
13	3.46	6.61	6.6
14	3.16	6.09	6.1
15	3.25	6.24	6.2
16	3.14	6.06	6.1
17	3.67	6.96	7.0

Design Summary

Chute	Height of Concrete (ft)	Height of Secondary Element (ft)	Length Between Elements (L used) (ft)
1	2.6	0.7	6.9
2	2.5	0.7	6.6
3	2.3	0.7	6.2
4	2.4	0.7	6.4
5	1.5	0.4	4.0
6	2.3	0.7	6.0
7	2.4	0.7	6.4
8	2.5	0.7	6.6
9	2.2	0.6	5.9
10	2.5	0.7	6.6
11	2.3	0.7	6.1
12	2.3	0.7	6.0
13	2.5	0.7	6.6
14	2.3	0.7	6.1
15	2.4	0.7	6.2
16	2.3	0.7	6.1
17	2.6	0.8	7.0

McCARTY ROAD LANDFILL
0120-439-11-03-11
EROSION CONTROL STRUCTURE DESIGN
GABION-LINED CHUTE DESIGN
25-YEAR, 24 HOUR STORM

Chute	Flow Rate (cfs)	Bottom Slope (ft/ft)	Manning's n	Side Slope (left)	Side Slope (right)	Bottom Width (ft)	Normal Depth (ft)	Flow Vel. (fps)	Froude Number	Velocity Head (ft)	Energy Head (ft)	Flow Area (sf)	Flow Top Width (ft)
DA1	227	0.25	0.04	2	2	30	0.58	12.55	2.957	2.45	3.03	18.09	32.32
DA2	214	0.25	0.04	2	2	30	0.56	12.27	2.941	2.34	2.90	17.44	32.24
DA3	162	0.25	0.04	2	2	25	0.53	11.76	2.909	2.15	2.68	13.78	27.11
DA4	169	0.25	0.04	2	2	25	0.54	11.95	2.920	2.22	2.76	14.14	27.17
DA5	66	0.25	0.04	2	2	20	0.35	9.03	2.725	1.27	1.62	7.31	21.41
DA6	247	0.25	0.04	2	2	40	0.51	11.70	2.910	2.13	2.64	21.12	42.06
DA7	273	0.25	0.04	2	2	40	0.55	12.16	2.937	2.30	2.84	22.46	42.19
DA8	246	0.25	0.04	2	2	35	0.56	12.25	2.942	2.33	2.89	20.07	37.22
DA9	180	0.25	0.04	2	2	30	0.51	11.48	2.894	2.05	2.56	15.67	32.02
DA10	211	0.25	0.04	2	2	30	0.56	12.20	2.937	2.31	2.87	17.29	32.22
DA11	127	0.25	0.04	2	2	20	0.52	11.57	2.894	2.08	2.60	10.97	22.09
DA12	185	0.25	0.04	2	2	30	0.51	11.61	2.901	2.09	2.61	15.94	32.05
DA13	285	0.25	0.04	2	2	40	0.56	12.36	2.949	2.37	2.93	23.06	42.24
DA14	220	0.25	0.04	2	2	35	0.52	11.74	2.911	2.14	2.66	18.74	37.08
DA15	196	0.25	0.04	2	2	30	0.53	11.87	2.917	2.19	2.72	16.52	32.13
DA16	187	0.25	0.04	2	2	30	0.52	11.65	2.904	2.11	2.63	16.05	32.07
DA17	308	0.25	0.04	2	2	40	0.59	12.74	2.971	2.52	3.11	24.19	42.35

Conclusions: - Maximum normal depth is 0.59 feet. Chute design depth is 2.5 feet.

Note: Calculations were performed using the HYDROCALC HYDRAULICS program developed by Dodson and Associates (Version 2.0.1, 1996).

ATTACHMENT 6A

APPENDIX 6A-C-A

FLEXIBLE MEMBRANE-LINED (FML) LETDOWN DESIGN

Includes Pages 6a-C-A-1 Through 6A-C-A-21



Prep By: VG
Date: 9/3/2024

McCARTY ROAD LANDFILL
0120-439-11-102-01
CHUTE ANALYSIS
NORMAL DEPTH CALCULATIONS
25-YEAR, 24 HOUR STORM

Chkd By: CRM
Date: 9/3/2024

Drainage Area	Peak Flow Rate (cfs)	Bottom Slope (ft/ft)	Manning's n	Side Slope (left)	Side Slope (right)	Bottom Width (ft)	Normal Depth (ft)	Chute Depth (ft)	Flow Vel. (fps)	Froude Number	Velocity Head (ft)	Energy Head (ft)	Flow Area (sf)	Flow Contained In Chute?	Freeboard Provided (ft)	Flow Top Width (ft)
DA1	227	0.035	0.01	2	2	8	0.97	2.00	23.58	4.617	8.64	9.61	9.63	Yes	1.03	11.87
	227	0.25	0.01	2	2	8	0.55	2.00	45.48	11.458	32.14	32.69	4.99	Yes	1.45	10.19
DA2	214	0.035	0.01	2	2	8	0.94	2.00	23.15	4.600	8.33	9.26	9.24	Yes	1.06	11.75
	214	0.25	0.01	2	2	8	0.53	2.00	44.56	11.405	30.86	31.39	4.80	Yes	1.47	10.12
DA3	162	0.035	0.01	2	2	8	0.80	2.00	21.14	4.503	6.94	7.74	7.66	Yes	1.20	11.19
	162	0.25	0.01	2	2	8	0.45	2.00	40.45	11.155	25.43	25.88	4.00	Yes	1.55	9.80
DA4	169	0.035	0.01	2	2	8	0.82	2.00	21.43	4.517	7.14	7.96	7.89	Yes	1.18	11.27
	169	0.25	0.01	2	2	8	0.46	2.00	41.05	11.193	26.19	26.65	4.12	Yes	1.54	9.85
DA5	66	0.25	0.01	2	2	8	0.26	2.00	29.20	10.307	13..25	13.52	2.26	Yes	1.74	9.06
DA6	247	0.25	0.01	2	2	8	0.58	2.00	46.81	11.534	34.06	34.63	5.28	Yes	1.42	10.31
DA7	273	0.25	0.01	2	2	8	0.61	2.00	48.44	11.624	36.46	37.07	5.46	Yes	1.39	10.44
DA8	246	0.25	0.01	2	2	8	0.58	2.00	46.75	11.530	33.96	34.54	5.26	Yes	1.42	10.30
DA9	180	0.25	0.01	2	2	8	0.48	2.00	41.97	11.250	27.37	27.85	4.29	Yes	1.52	9.92
DA10	211	0.25	0.01	2	2	8	0.53	2.00	44.35	11.393	30.56	31.09	4.76	Yes	1.47	10.10
DA11	127	0.25	0.01	2	2	8	0.39	2.00	37.11	10.936	21.41	21.80	3.42	Yes	1.61	9.56
DA12	185	0.25	0.01	2	2	8	0.49	2.00	42.37	11.274	27.90	28.39	4.37	Yes	1.51	9.95
DA13	285	0.25	0.01	2	2	8	0.63	2.00	49.15	11.662	37.53	38.16	5.80	Yes	1.37	10.51
DA14	220	0.25	0.01	2	2	8	0.54	2.00	44.99	11.430	31.46	31.99	4.89	Yes	1.46	10.15
DA15	196	0.25	0.01	2	2	8	0.50	2.00	43.23	11.326	29.04	29.55	4.53	Yes	1.50	10.01
DA16	187	0.25	0.01	2	2	8	0.49	2.00	42.53	11.284	28.11	28.60	4.40	Yes	1.51	9.96
DA17	308	0.25	0.01	2	2	8	0.66	2.00	5.45	11.732	39.55	40.21	6.11	Yes	1.34	10.62

Notes:
1. Calculations were performed using the HYDROCALC HYDRAULICS for Windows program developed by Dodson and Associates (Version 2.0.1, 1996).
2. Drainage areas and flow rates are obtained from the 25-year, 24-hour storm HEC-HMS analysis included in Appendix 6A-A.
3. Maximum calculated normal depth is 0.97 ft. Chute design depth is 2.0 ft.

McCARTY ROAD LANDFILL
0120-439-11-102-01
CHUTE ANALYSIS
NORMAL DEPTH CALCULATIONS
25-YEAR, 24 HOUR STORM

Example Calculation: Calculate the normal depth for the chute for DA10.

List of Symbols

Q_d = design flow rate for channel, cfs
R = hydraulic radius, ft
n = Manning's roughness coefficient
S = channel slope, ft/ft
b = bottom width of channel, ft
z = z-ratio (ratio of run to rise for channel sideslope)
A_f = flow area, sf
g = gravitational acceleration = 32.2 ft/s^2
T = top width of flow, ft
d = normal depth of chute, ft

The program uses an iterative process to calculate the normal depth of the chute to satisfy Manning's Equation

$$Q = \frac{1.486}{n} A R^{0.67} S^{0.5}$$

Design Inputs:			
	Q_d =	211	cfs (from HEC-HMS analysis, Attachment 6A-A)
	S =	0.25	ft/ft
	b =	8	ft
	z =	2	(H) : 1 (V)
	n =	0.01	

Step 1 - Based on the geometry of the chute cross-section, solve for R and A_f

$$R = \frac{bd + zd^2}{b + 2d(z^2 + 1)^{0.5}}$$

$$A_f = bd + zd^2$$

assume: d = 0.53 ft

R = 0.460 ft

A_f = 4.76 sf

solve for Q: Q = 211 cfs

if Q is not equal to Q_d, select a new d and repeat calculations

McCARTY ROAD LANDFILL
0120-439-11-102-01
CHUTE ANALYSIS
NORMAL DEPTH CALCULATIONS
25-YEAR, 24 HOUR STORM

Step 2 - solve for velocity, T, Froude number, velocity head, and energy head

$Q = VA \Rightarrow \quad V = Q/A$

$V = \quad 44.35 \quad ft/s$

$T = b + 2(z \times d)$

$T = \quad 10.10 \quad ft$

$$F_r = \frac{V}{(gA/T)^{0.5}}$$

$F_r = \quad 11.393$

$$\text{Velocity Head} = \frac{V^2}{2g}$$

Velocity Head = 30.56 ft

Energy Head = water elevation + velocity head

Energy Head = 31.09 ft

McCARTY ROAD LANDFILL
0120-439-11-102-01
EROSION CONTROL STRUCTURE MODIFICATION
FML-LINED CHUTE DESIGN
25-YEAR, 24 HOUR STORM

Required: Provide design for a FML-lined letdown structure (or chute).

Method:

1. Design the energy dissipator system at the downstream end of the proposed "tumbling flow" chutes.

Assumptions

1. The FML-lined chute will transition to its maximum width for the energy dissipator design where maximum total flow for chute is expected to occur.
2. Concrete block will be designed for a maximum height of 3 1/2 feet.
3. Proposed chutes will convey runoff from the following chute drainage area:

Proposed Chute	Chute Drainage Areas	25-Year Total Flow (cfs)[1]
1	D1	227
2	D2	214
3	D3	162
4	D4	169
5	D5	66
6	D6	247
7	D7	273
8	D8	246
9	D9	180
10	D10	211
11	D11	127
12	D12	185
13	D13	285
14	D14	220
15	D15	196
16	D16	187
17	D17	308

[1] From HEC-HMS Analysis, Appendix 6A.A

References:

1. Gamelsky, S.G., *Innovations in Stormwater Management for Landfill Closure* Technical Paper
2. Koerner, R.M., *Designing with Geosynthetics*, 3rd Edition, Prentice-Hall, Inc, 1994.
3. Morris, H.M., *Hydraulics of Energy Dissipators in Steep Rough Channels*, Bulletin 19, Research Division, Virginia Polytechnic Institute, Blacksburg, Virginia.

McCARTY ROAD LANDFILL
0120-439-11-102-01
EROSION CONTROL STRUCTURE MODIFICATION
FML-LINED CHUTE DESIGN
25-YEAR, 24 HOUR STORM

Chute	Q^1	W	q	Y_C	Y_O	y_1	K_1	K_2
1	227	45	5.04	0.92	0.20	1.03	3.25	0.57
2	214	40	5.35	0.96	0.21	1.07	3.38	0.59
3	162	35	4.63	0.87	0.19	0.97	3.06	0.54
4	169	35	4.83	0.90	0.19	1.00	3.15	0.55
5	66	20	3.32	0.70	0.15	0.78	2.42	0.43
6	247	50	4.94	0.91	0.20	1.02	3.20	0.56
7	273	50	5.47	0.98	0.21	1.09	3.44	0.60
8	246	45	5.47	0.98	0.21	1.09	3.44	0.60
9	180	35	5.14	0.94	0.20	1.04	3.29	0.58
10	211	40	5.27	0.95	0.20	1.06	3.35	0.58
11	127	25	5.09	0.93	0.20	1.03	3.27	0.57
12	185	35	5.30	0.96	0.20	1.06	3.36	0.59
13	285	55	5.17	0.94	0.20	1.05	3.31	0.58
14	220	40	5.51	0.98	0.21	1.09	3.45	0.60
15	196	40	4.90	0.91	0.19	1.01	3.18	0.56
16	187	40	4.68	0.88	0.19	0.98	3.08	0.54
17	308	60	5.13	0.93	0.20	1.04	3.28	0.57

Chute	L_1	L_2	L Used
1	4.36	5.26	5.3
2	4.55	5.47	5.5
3	4.09	4.96	5.0
4	4.22	5.11	5.1
5	3.22	3.98	4.0
6	4.29	5.19	5.2
7	4.62	5.55	5.5
8	4.62	5.55	5.5
9	4.42	5.32	5.3
10	4.50	5.41	5.4
11	4.38	5.29	5.3
12	4.52	5.43	5.4
13	4.44	5.35	5.3
14	4.64	5.57	5.6
15	4.26	5.15	5.2
16	4.13	5.00	5.0
17	4.41	5.31	5.3

Design Summary

Chute	Height of Concrete (ft)	Height of Secondary Element (ft)	Length Between Elements (L used) (ft)
1	3.2	0.6	5.3
2	3.4	0.6	5.5
3	3.1	0.5	5.0
4	3.1	0.6	5.1
5	2.4	0.4	4.0
6	3.2	0.6	5.2
7	3.4	0.6	5.5
8	3.4	0.6	5.5
9	3.3	0.6	5.3
10	3.3	0.6	5.4
11	3.3	0.6	5.3
12	3.4	0.6	5.4
13	3.3	0.6	5.3
14	3.5	0.6	5.6
15	3.2	0.6	5.2
16	3.1	0.5	5.0
17	3.3	0.6	5.3

Prep By: VG
Date: 9/3/2024

McCARTY ROAD LANDFILL
0120-439-11-102-01
EROSION CONTROL STRUCTURE MODIFICATION
FML-LINED CHUTE DESIGN
25-YEAR, 24 HOUR STORM

Chkd By: CRM
Date: 9/3/2024

Chute	Flow Rate (cfs)	Bottom Slope (ft/ft)	Manning's n	Side Slope (left)	Side Slope (right)	Bottom Width (ft)	Normal Depth (ft)	Flow Vel. (fps)	Froude Number	Velocity Head (ft)	Energy Head (ft)	Flow Area (sf)	Flow Top Width (ft)
DA1	227	0.25	0.01	2	2	45	0.20	25.16	9.991	9.83	10.03	9.02	45.80
DA2	214	0.25	0.01	2	2	40	0.21	25.72	10.045	10.28	10.49	8.32	40.82
DA3	162	0.25	0.01	2	2	35	0.19	24.26	9.900	9.15	9.34	6.68	35.75
DA4	169	0.25	0.01	2	2	35	0.19	24.67	9.940	9.45	9.65	6.85	35.77
DA5	66	0.25	0.01	2	2	20	0.15	21.11	9.557	6.93	7.08	3.13	20.62
DA6	247	0.25	0.01	2	2	50	0.20	24.97	9.974	9.69	9.88	9.89	50.79
DA7	273	0.25	0.01	2	2	50	0.21	25.98	10.072	10.49	10.69	10.51	50.83
DA8	246	0.25	0.01	2	2	45	0.21	25.97	10.070	10.48	10.69	9.47	45.83
DA9	180	0.25	0.01	2	2	35	0.20	25.29	10.002	9.94	10.14	7.12	35.80
DA10	211	0.25	0.01	2	2	40	0.20	25.58	10.031	10.17	10.37	8.25	40.82
DA11	127	0.25	0.01	2	2	25	0.20	25.07	9.975	9.77	9.97	5.07	25.80
DA12	185	0.25	0.01	2	2	35	0.20	25.57	10.028	10.16	10.36	7.24	35.82
DA13	285	0.25	0.01	2	2	55	0.20	25.46	10.023	10.07	10.28	11.19	55.81
DA14	220	0.25	0.01	2	2	40	0.21	26.00	10.072	10.51	10.72	8.46	40.84
DA15	196	0.25	0.01	2	2	40	0.20	24.85	9.959	9.59	9.79	7.89	40.78
DA16	187	0.25	0.01	2	2	40	0.19	24.39	9.914	9.24	9.43	7.67	40.76
DA17	308	0.25	0.01	2	2	60	0.20	25.38	10.016	10.01	10.21	12.14	60.80

Conclusions: - Maximum normal depth is 0.21 feet. Chute design depth is 2.5 feet.

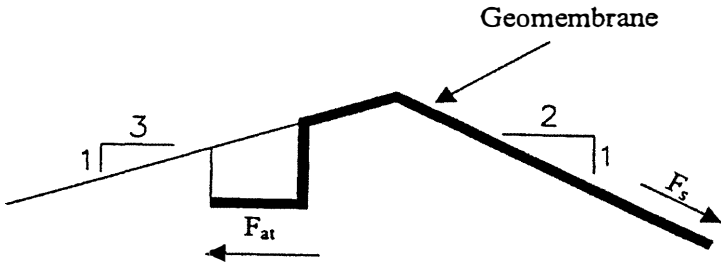
Note: Calculations were performed using the HYDROCALC HYDRAULICS program developed by Dodson and Associates (Version 2.0.1, 1996).

Chute	Maximum Water Depth (ft)[1]	Hydraulic Gradient (ft/ft)	T (lb/sf)	a (ft)	F_{s1} (lb/ft)
DA1	0.97	0.035	2.12	1.94	26
DA2	0.94	0.035	2.05	1.88	25
DA3	0.80	0.035	1.75	1.6	20
DA4	0.82	0.035	1.79	1.64	21

[1] See design depths on page 6A-C-A-2.

Pullout Resistance from Edges, F_{at}[2]

Assuming pullout only opposed by trench (conservative assumption)



$$F_{at} = 2[\{K_o\gamma(D/2)\}\{\tan\zeta\}\{D\} + \{\gamma D\}\{\tan\zeta\}\{w\}] \quad \text{(Ref 1)}$$

where:
- ζ = interface friction angle
- $K_o = 1 - \sin\zeta$
- γ = unit weight of soil (lb/cf)
- D = depth of anchor trench (ft)
- w = bottom width of anchor trench (ft)

soil friction angle =	15	degrees
soil/geomembrane friction angle =	15	degrees
unit weight =	120	lb/ft^3
depth of anchor trench =	1	ft
bottom width of anchor trench =	1	ft

[2] See detail D27 - Anchor Trench Type 2 on Attachment 6A.17B (Attachment 6) for dimensions.

K_o = 0.74

F_{at1} = 88 lb/ft width on one side

Factor of Safety = $2F_{at1}/F_{s1}$ = $\frac{176}{26}$ FS = 6.7

2. Upstream End Anchor Trench Design

Shear force pulling on geomembrane due to water:

$$F_{s2} = T \times A$$

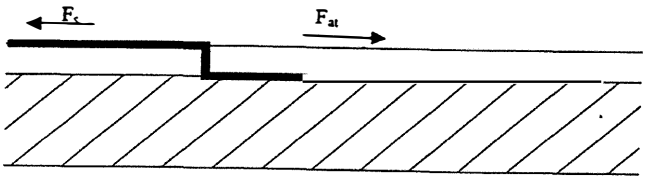
where:
- T = Maximum shear force acting on the geomembrane per square foot of water in the chute (lb/sf)
- A = area of geomembrane at the top of the chute (ft^2)

Area of geomembrane at top of chute = 16 ft x 16 ft = 256 sf

Conservatively, use the maximum shear force per square foot calculated in Part 2

F_{s2} = 542 lbs

Pullout resistance of upstream end, F_{at2}[3]



[3] See detail D27 - Anchor Trench Type 1 on Attachment 6A.17B (Attachment 6) for dimensions.

$$F_{at} = 2[\{K_o\gamma(D/2)\}\{\tan\zeta\}\{D\} + \{\gamma D\}\{\tan\zeta\}\{w\}] \quad \text{(Ref 1)}$$

where:
- ζ = interface friction angle
- K_o = 1 - sin ζ
- γ = unit weight of soil (lb/cf)
- D = depth of anchor trench (ft)
- w = bottom width of anchor trench (ft)

friction angle =	15	degrees
anchor trench soil unit weight =	120	lb/ft^3
depth of anchor trench =	0.5	ft
bottom width of anchor trench =	3	ft

K_o = 0.74

F_{at2} = 102 lb/ft width

Total End Anchor Length $(L_T)^4$ = 50 ft

F_{pr} = Pullout Resistance (End) = $F_{at2} \times L_T$ =	5,121	lbs

Factor of Safety = F_{pr}/F_{s2} =	5,121 / 542	FS =	9.4

Summary of Results

Side Anchor Trench Pullout resistance:

$$FS = \frac{2F_{AT2}}{F_{S1}} \Longrightarrow FS = 6.7$$

Upstream End Anchor Trench Pullout resistance:

$$FS = \frac{F_{pr}}{F_{s2}} \Longrightarrow FS = 9.4$$

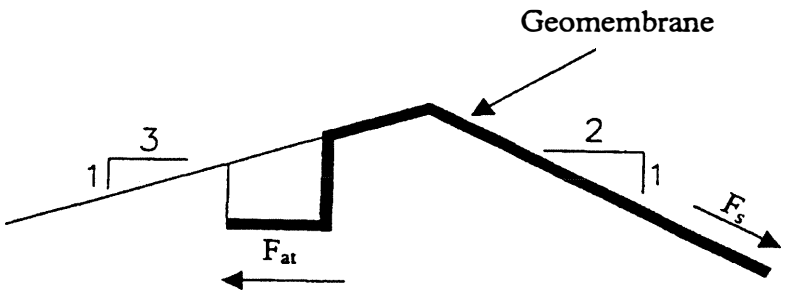
As it is stated on page 562 of Reference 1, the factors of safety of 6.7 and 9.4 listed above are acceptable.

Chute	Maximum Water Depth (ft)[1]	Hydraulic Gradient (ft/ft)	T (lb/sf)	a (ft)	F_{s1} (lb/ft)
DA1	0.55	0.25	8.58	1.10	90
DA2	0.53	0.25	8.27	1.06	86
DA3	0.45	0.25	7.02	0.90	70
DA4	0.46	0.25	7.18	0.92	72
DA5	0.26	0.25	4.06	0.52	37
DA6	0.58	0.25	9.05	1.16	96
DA7	0.61	0.25	9.52	1.22	102
DA8	0.58	0.25	9.05	1.16	96
DA9	0.48	0.25	7.49	0.96	76
DA10	0.53	0.25	8.27	1.06	86
DA11	0.39	0.25	6.08	0.78	59
DA12	0.49	0.25	7.64	0.98	78
DA13	0.63	0.25	9.83	1.26	106
DA14	0.54	0.25	8.42	1.08	88
DA15	0.5	0.25	7.80	1.00	80
DA16	0.49	0.25	7.64	0.98	78
DA17	0.66	0.25	10.30	1.32	113

[1] See design depths on page 6A-C-A-2.

Pullout Resistance from Edges, F_{at1}[2]

Assuming pullout only opposed by trench (conservative assumption)



ATTACHMENT 6A

APPENDIX 6A-C-B

FLEXAMAT LETDOWN DESIGN

Includes Pages 6a-C-B-1 through 6A-C-B-10



McCARTY ROAD LANDFILL
0120-439-11-03-11
CHUTE ANALYSIS
NORMAL DEPTH CALCULATIONS
25-YEAR, 24 HOUR STORM

Drainage Area	Flow Rate (cfs)	Bottom Slope (ft/ft)	Manning's n	Side Slope (left)	Side Slope (right)	Bottom Width (ft)	Normal Depth (ft)	Chute Depth (ft)	Flow Vel. (fps)	Froude Number	Velocity Head (ft)	Energy Head (ft)	Flow Area (sf)	Flow Contained In Chute?	Freeboard Provided (ft)	Flow Top Width (ft)
DA1	227	0.25	0.05	4.00	4.00	24.00	0.74	2.00	11.33	2.442	2.00	2.74	20.03	YES	1.26	29.94
DA2	214	0.25	0.05	4.00	4.00	24.00	0.72	2.00	11.10	2.430	1.91	2.63	19.28	YES	1.28	29.74
DA3	162	0.25	0.05	4.00	4.00	24.00	0.61	2.00	10.05	2.373	1.57	2.18	16.11	YES	1.39	28.88
DA4	169	0.25	0.05	4.00	4.00	24.00	0.62	2.00	10.21	2.382	1.62	2.24	17.56	YES	1.38	29.00
DA5	66	0.25	0.05	4.00	4.00	12.00	0.53	2.00	8.83	2.393	1.21	1.74	7.48	YES	1.47	16.24
DA5	66	0.25	0.05	4.00	4.00	24.00	0.36	2.00	7.23	2.185	0.81	1.17	9.13	YES	1.64	26.87
DA6	247	0.25	0.05	4.00	4.00	12.00	1.11	2.00	13.48	2.537	2.82	3.94	18.33	YES	0.89	20.91
DA6	247	0.25	0.05	4.00	4.00	24.00	0.78	2.00	11.67	2.460	2.12	2.90	21.16	YES	1.22	30.24
DA7	273	0.25	0.05	4.00	4.00	12.00	1.18	2.00	13.90	2.559	3.00	4.18	19.64	YES	0.82	21.41
DA7	273	0.25	0.05	4.00	4.00	24.00	0.83	2.00	12.09	2.481	2.27	3.10	22.59	YES	1.17	30.62
DA8	246	0.25	0.05	4.00	4.00	12.00	1.11	2.00	13.46	2.537	2.81	3.93	18.28	YES	0.89	20.89
DA8	246	0.25	0.05	4.00	4.00	24.00	0.78	2.00	11.66	2.459	2.11	2.89	21.11	YES	1.22	30.23
DA9	180	0.25	0.05	4.00	4.00	12.00	0.93	2.00	12.24	2.483	2.33	3.26	14.71	YES	1.07	19.48
DA9	180	0.25	0.05	4.00	4.00	24.00	0.65	2.00	10.44	2.395	1.69	2.34	17.24	YES	1.35	29.19
DA10	211	0.25	0.05	4.00	4.00	12.00	1.02	2.00	12.85	2.510	2.56	3.59	16.42	YES	0.98	20.17
DA10	211	0.25	0.05	4.00	4.00	24.00	0.71	2.00	11.04	2.427	1.90	2.61	19.11	YES	1.29	29.69
DA11	127	0.25	0.05	4.00	4.00	12.00	0.77	2.00	10.95	2.415	1.86	2.63	11.60	YES	1.23	18.15
DA11	127	0.25	0.05	4.00	4.00	24.00	0.53	2.00	9.21	2.323	1.32	1.85	13.79	YES	1.47	28.22
DA12	185	0.25	0.05	4.00	4.00	12.00	0.95	2.00	12.34	2.487	2.37	3.32	14.99	YES	1.05	19.59
DA12	185	0.25	0.05	4.00	4.00	24.00	0.66	2.00	10.54	2.400	1.73	2.39	17.55	YES	1.34	29.27
DA13	285	0.25	0.05	4.00	4.00	12.00	1.20	2.00	14.08	2.567	3.08	4.29	20.24	YES	0.80	21.63
DA13	285	0.25	0.05	4.00	4.00	24.00	0.85	2.00	12.27	2.490	2.34	3.19	23.23	YES	1.15	30.78
DA14	220	0.25	0.05	4.00	4.00	12.00	1.04	2.00	13.01	2.517	2.63	3.68	16.91	YES	0.96	2.36
DA14	220	0.25	0.05	4.00	4.00	24.00	0.73	2.00	11.21	2.436	1.95	2.68	19.63	YES	1.27	29.83
DA15	196	0.25	0.05	4.00	4.00	12.00	0.98	2.00	12.56	2.497	2.45	3.43	15.60	YES	1.02	19.84
DA15	196	0.25	0.05	4.00	4.00	24.00	0.68	2.00	10.76	2.412	1.80	2.48	18.22	YES	1.32	29.45
DA16	187	0.25	0.05	4.00	4.00	12.00	0.95	2.00	12.38	2.489	2.38	3.34	15.10	YES	1.05	19.64
DA16	187	0.25	0.05	4.00	4.00	24.00	0.66	2.00	10.58	2.402	1.74	2.40	17.67	YES	1.34	29.30
DA17	308	0.25	0.05	4.00	4.00	12.00	1.26	2.00	14.42	2.581	3.23	4.48	21.36	YES	0.74	22.04
DA17	308	0.25	0.05	4.00	4.00	24.00	0.89	2.00	12.60	2.506	2.47	3.35	24.44	YES	1.11	31.10

Notes:
1. Calculations were performed using the HYDROCALC HYDRAULICS for Windows program developed by Dodson and Associates (Version 2.0.1, 1996).
2. Drainage areas and flow rates are obtained from the 25-year, 24-hour storm-HEC-HMS analysis included in Appendix 6A-A.
3. Maximum calculated normal depth is 1.26 ft. Chute design depth is 2.0 ft.

Example Calculation: Calculate the normal depth for the chute for DA10.

List of Symbols

Q_d = design flow rate for channel, cfs
R = hydraulic radius, ft
n = Manning's roughness coefficient
S = channel slope, ft/ft
b = bottom width of channel, ft
z = z-ratio (ratio of run to rise for channel sideslope)
A_f = flow area, sf
g = gravitational acceleration = 32.2 ft/s^2
T = top width of flow, ft
d = normal depth of chute, ft

The program uses an iterative process to calculate the normal depth of the chute to satisfy Manning's Equation

$$Q = \frac{1.486}{n} A R^{0.67} S^{0.5}$$

Design Inputs:

Q_d =	211	cfs (from HEC-HMS analysis, Attachment 6A-A)
S =	0.25	ft/ft
b =	12	ft
z =	4	(H) : 1 (V)
n =	0.05	

Step 1 - Based on the geometry of the chute cross-section, solve for R and A_f

$$R = \frac{bd + zd^2}{b + 2d(z^2 + 1)^{0.5}}$$

$$A_f = bd + zd^2$$

assume: d = 1.02 ft

R = 0.804 ft

A_f = 16.42 sf

solve for Q: Q = 211 cfs

if Q is not equal to Q_d, select a new d and repeat calculations

Step 2 - solve for velocity, T, Froude number, velocity head, and energy head

$Q = VA \Rightarrow \quad V = Q/A$

$V =$ 12.85 ft/s

$T = b + 2(z \times d)$

$T =$ 20.17 ft

$$F_r = \frac{V}{(gA/T)^{0.5}}$$

$F_r =$ 2.510

$$\text{Velocity Head} = \frac{V^2}{2g}$$

Velocity Head = 2.56 ft

Energy Head = water elevation + velocity head

Energy Head = 3.59 ft

Required: Provide design for a flexamat-lined letdown structure (or chute).

Method:

1. Design the energy dissipator system at the downstream end of the proposed "tumbling flow" chutes.

Assumptio

1. The flexamat-lined chute will transition to its maximum width for the energy dissipator design where maximum total flow for chute is expected to occur.
2. Concrete block will be designed for a maximum height of 3 1/2 feet.
3. Proposed chutes will convey runoff from the following chute drainage area:

Proposed Chute	Chute Drainage Areas	25-Year Total Flow (cfs)[1]
1	D1	227
2	D2	214
3	D3	162
4	D4	169
5	D5	66
6	D6	247
7	D7	273
8	D8	246
9	D9	180
10	D10	211
11	D11	127
12	D12	185
13	D13	285
14	D14	220
15	D15	196
16	D16	187
17	D17	308

[1] From HEC-HMS Analysis, Appendix 6A.A

References

1. Gamelsky, S.G., *Innovations in Stormwater Management for Landfill Closure* Technical Paper
2. Koerner, R.M., *Designing with Geosynthetics*, 3rd Edition, Prentice-Hall, Inc, 1994.
3. Morris, H.M., *Hydraulics of Energy Dissipators in Steep Rough Channels*, Bulletin 19, Research Division, Virginia Polytechnic Institute, Blacksburg, Virginia.

McCARTY ROAD LANDFILL
0120-439-11-03-11
EROSION CONTROL STRUCTURE MODIFICATION
FLEXAMAT-LINED CHUTE DESIGN
25-YEAR, 24 HOUR STORM

Chute	Q^1	W	q	Y_C	Y_O	y_1	K_1	K_2
1	227	35	6.49	1.09	0.60	1.22	2.16	0.67
2	214	35	6.11	1.05	0.58	1.17	2.07	0.65
3	162	30	5.40	0.97	0.54	1.08	1.89	0.59
4	169	30	5.63	1.00	0.56	1.11	1.95	0.61
5	66	15	4.43	0.85	0.48	0.94	1.65	0.52
6	247	40	6.18	1.06	0.59	1.18	2.08	0.65
7	273	45	6.07	1.05	0.58	1.17	2.06	0.64
8	246	40	6.15	1.06	0.59	1.17	2.08	0.65
9	180	30	6.00	1.04	0.58	1.16	2.04	0.64
10	211	35	6.02	1.04	0.58	1.16	2.05	0.64
11	127	25	5.09	0.93	0.52	1.03	1.81	0.57
12	185	30	6.18	1.06	0.59	1.18	2.08	0.65
13	285	50	5.69	1.00	0.56	1.12	1.97	0.62
14	220	35	6.29	1.07	0.59	1.19	2.11	0.66
15	196	35	5.60	0.99	0.55	1.10	1.94	0.61
16	187	35	5.35	0.96	0.54	1.07	1.88	0.59
17	308	50	6.15	1.06	0.59	1.17	2.08	0.65

McCARTY ROAD LANDFILL
0120-439-11-03-11
EROSION CONTROL STRUCTURE MODIFICATION
FLEXAMAT-LINED CHUTE DESIGN
25-YEAR, 24 HOUR STORM

Chute	L_1	L_2	L Used
1	2.98	6.22	6.2
2	2.86	5.98	6.0
3	2.61	5.50	5.5
4	2.69	5.66	5.7
5	2.25	4.82	4.8
6	2.88	6.02	6.0
7	2.84	5.95	6.0
8	2.87	6.00	6.0
9	2.82	5.90	5.9
10	2.82	5.91	5.9
11	2.49	5.29	5.3
12	2.88	6.02	6.0
13	2.71	5.70	5.7
14	2.92	6.09	6.1
15	2.68	5.63	5.6
16	2.59	5.47	5.5
17	2.87	6.00	6.0

Design Summary

Chute	Height of Concrete (ft)	Secondary Element (ft)	Length Between Elements (L used) (ft)
1	2.2	0.7	6.2
2	2.1	0.6	6.0
3	1.9	0.6	5.5
4	2.0	0.6	5.7
5	1.6	0.5	4.8
6	2.1	0.7	6.0
7	2.1	0.6	6.0
8	2.1	0.6	6.0
9	2.0	0.6	5.9
10	2.0	0.6	5.9
11	1.8	0.6	5.3
12	2.1	0.7	6.0
13	2.0	0.6	5.7
14	2.1	0.7	6.1
15	1.9	0.6	5.6
16	1.9	0.6	5.5
17	2.1	0.6	6.0

Prep By: VG
Date: 9/4/2024

McCARTY ROAD LANDFILL
0120-439-11-03-11
EROSION CONTROL STRUCTURE DESIGN
FLEXAMAT-LINED CHUTE DESIGN
25-YEAR, 24 HOUR STORM

Chkd By: CRM
Date: 9/4/2024

Chute	Flow Rate (cfs)	Bottom Slope (ft/ft)	Manning's n	Side Slope (left)	Side Slope (right)	Bottom Width (ft)	Normal Depth (ft)	Flow Vel. (fps)	Froude Number	Velocity Head (ft)	Energy Head (ft)	Flow Area (sf)	Flow Top Width (ft)
DA1	227	0.25	0.05	2	2	35	0.61	10.35	2.385	1.67	2.27	21.92	37.42
DA2	214	0.25	0.05	2	2	35	0.58	10.12	2.372	1.59	2.18	21.14	37.34
DA3	162	0.25	0.05	2	2	30	0.54	9.61	2.341	1.44	1.98	16.86	32.17
DA4	169	0.25	0.05	2	2	30	0.56	9.77	2.350	1.48	2.04	17.30	32.22
DA5	66	0.25	0.05	2	2	15	0.48	8.66	2.275	1.17	1.64	7.62	16.91
DA6	247	0.25	0.05	2	2	40	0.59	10.20	2.377	1.62	2.20	24.22	42.35
DA7	273	0.25	0.05	2	2	45	0.58	10.16	2.376	1.60	2.19	26.88	47.33
DA8	246	0.25	0.05	2	2	40	0.59	20.18	2.376	1.61	2.20	24.16	42.35
DA9	180	0.25	0.05	2	2	30	0.58	10.01	2.364	1.56	2.13	17.99	32.31
DA10	211	0.25	0.05	2	2	35	0.58	10.07	2.369	1.58	2.16	20.96	37.32
DA11	127	0.25	0.05	2	2	25	0.52	9.34	2.323	1.35	1.88	13.60	27.09
DA12	185	0.25	0.05	2	2	30	0.59	10.11	2.370	1.59	2.18	18.30	32.35
DA13	285	0.25	0.05	2	2	50	0.56	9.93	2.364	1.53	2.09	28.69	52.24
DA14	220	0.25	0.05	2	2	35	0.59	10.23	2.378	1.63	2.22	21.50	37.38
DA15	196	0.25	0.05	2	2	35	0.55	9.79	2.353	1.49	2.04	20.02	37.22
DA16	187	0.25	0.05	2	2	35	0.54	9.61	2.342	1.44	1.98	19.45	37.16
DA17	308	0.25	0.05	2	2	50	0.59	10.24	2.381	1.63	2.22	30.08	52.35

Conclusions: - Maximum normal depth is 0.61 feet. Chute design depth is 2.5 feet.

Note: Calculations were performed using the HYDROCALC HYDRAULICS program developed by Dodson and Associates (Version 2.0.1, 1996).

ATTACHMENT 6A

APPENDIX 6A-D

EROSION LAYER EVALUATION

Includes pages 6A-D-1 through 6A-D-36



Required: Determine expected soil loss and minimum thickness for the erosion layer.

Method: Expected soil loss is calculated using the Universal Soil Loss Equation. Minimum erosion layer thickness is determined by adding the minimum thickness allowed by TCEQ to the expected soil loss.

References:

1. SCS National Engineering Handbook, Chapter 3 - Erosion.
2. TNRCC, *Use of the USLE in Final Cover/Configuration Design*, 1993.
3. United States Department of Agriculture, Soil Conservation Service, *Soil Survey of Harris County, Texas*, 1992.
4. United States Environmental Protection Agency, *Solid Waste Disposal Facility Criteria Technical Manual*, 1993.

Solution:

1. Soil Loss Equation: $A=RKL_SCP$

Where:

A= Soil loss (tons/ac/yr)
R= Rainfall factor
K= Soil erodibility factor
L_S= Slope length/slope gradient factor
C= Plant cover or cropping management factor
P= Erosion practice factor

The rainfall factor, R, represents the average intensity for the maximum intensity, 30 minute storms over a 22 year period of record compiled by the SCS. Using Figure 1 (Ref 2), Average Annual Values of the R Factor, the R factor for Harris County is:

R = 425

The soil erodibility factor, K, factor represents the resistance of a soil surface to erosion as a function of the soil's physical and chemical properties. Assume an organic matter content of 2% to determine the K factor. The site top soil will consists of sandy clay with high organic content. Clean compost as a soil amendment maybe added to final cover top soil as necessary to protect against erosion. Therefore, the following is a K value for the site.

K = 0.13

The slope length/slope gradient factor, L_s, represents the erosion of the soil due to both slope length and degree of slope. The slopes of interest are the typical sideslope and topslope conditions.
See attached drawing for the locations of the slopes analyzed.

Case 1. Typical sideslope
slope = 25 %
length = 120 ft

Case 2. Longest sideslope
slope = 25 %
length = 143 ft

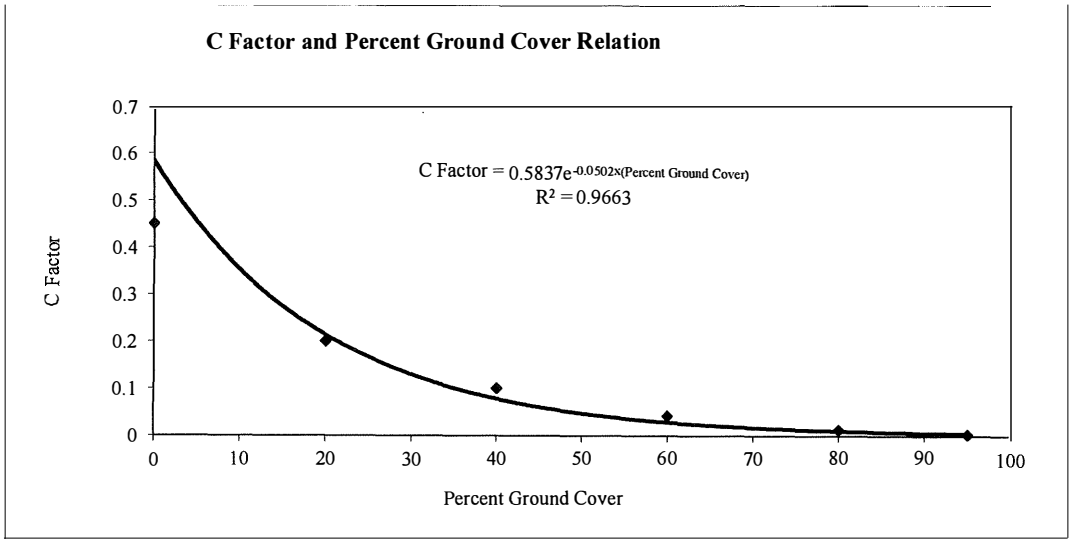
Case 3. Longest topslope
slope = 3.5 %
length = 460 ft

Using the above information and Figure 2 (Ref 2, p.9), the L_s factors are determined.

Case	Slope (%)	Slope Length (ft)	L_s
1. Typical sideslope	25	120	6.50
2. Longest sideslope	25	143	7.00
3. Longest topslope	3.5	460	0.58

The plant cover or cropping management factor, C, represents the percentage of soil loss that would occur if the surface were partially protected by some combination of cover and management practices. C Factor for Permanent Pasture, Range, and Idle Land with No Appreciable Canopy has the following relation with percent ground cover (GC) (from Ref 2, p.7) .

% GC	C Factor:
0	0.45
20	0.2
40	0.1
60	0.042
80	0.013
95	0.003



C Factor= $0.5837e^{(-0.0502x90)}$
C Factor= 0.0064

The erosion control practice factor, P, measures the effect of control practices that reduce the erosion potential of the runoff by influencing drainage patterns, runoff concentration , and runoff velocity. Contouring for this site will be done only to establish vegetation.

P = 1.00

2. Soil loss calculations

Slope Condition	R	K	L_s	C	P	A (tons/ac/yr)
1. Typical Sideslope 25% slope 120 ft length	425	0.13	6.50	0.0064	1.0	2.3
2. Longest Sideslope 25% slope 143 ft length	425	0.13	7.00	0.0064	1.0	2.5
3. Longest Topslope 5% slope 400 ft length	425	0.13	0.58	0.0064	1.0	0.2

Note: Erosion layer will be maintained to provide 90% ground cover.

3. Erosion layer thickness calculations:

$$T_{el} = 6in + \frac{AYF(2000lb/ton)(12in/ft)}{w(43{,}560sf/ac)}$$

Where:
T_{el} = Erosion layer thickness
A = Soil loss (ton/ac/yr)
Y = Postclosure period (yr)
F = Factor of Safety
w = Specific weight of soil (pcf)

Y = 30 yr
F = 2
w = 110 pcf

1. Typical Sideslope Thickness:

Required thickness[1] = 6.7
Specified thickness = 12" and 24"

2. Longest Sideslope Thickness:

Required thickness[1] = 6.7
Specified thickness = 12" and 24"

3. Longest Topslope Thickness:

Required thickness[1] = 6.1
Specified thickness = 12" and 24"

Note: [1]Required thicknesses include 6 inch minimum required and estimated soil loss.

4. Summary:

Calculated erosion losses are shown Step 2 above.
The erosion layer will be a minimum of 12 inches thick. As shown above, this is a conservative design considering the maximum expected soil loss for a 30 year period is 0.7 inches.

POND LABELS	
NP	NORTH POND
NWP	NORTHWEST POND
NEP	NORTHEAST POND
EP	EAST POND
SEP	SOUTHEAST POND
SWP	SOUTHWEST POND
SP-1	SOUTH POND 1
SP-2	SOUTH POND 2

N

0 300 600

SCALE IN FEET

LEGEND

- PERMIT BOUNDARY
- LIMITS OF WASTE
- DEED RESTRICTION BOUNDARY (SEE NOTE 7)
- 200 FINAL CONTOUR
- 745000 N STATE PLANE COORDINATE SYSTEM
- 29°49'45" GEODETIC COORDINATE SYSTEM
- EXISTING CONTOUR
- PROPOSED DRAINAGE SWALE
- PROPOSED DRAINAGE LETDOWN
- MW-4UB EXISTING DETECTION GROUNDWATER MONITORING WELL
- MW-4UB EXISTING DETECTION GROUNDWATER MONITORING WELL TO BE DECOMMISSIONED
- MW-4UB PROPOSED DETECTION REPLACEMENT MONITORING WELL
- GMP-M EXISTING LANDFILL GAS MONITORING PROBE (SEE NOTE 8)
- GMP-J EXISTING LANDFILL GAS MONITORING PROBE TO BE DECOMMISSIONED (SEE NOTE 8)
- GMP-J PROPOSED REPLACEMENT LANDFILL GAS MONITORING PROBE (SEE NOTE 8)
- EASEMENT BOUNDARY
- GABIONS

NOTES:

1. TOPOGRAPHIC MAPPING PREPARED BY FIRMATEK, LLC. FROM AERIAL PHOTOGRAPHY FLOWN 11-17-2023. THE GRID SYSTEM IS TIED TO THE TEXAS STATE PLANE COORDINATE SYSTEM SOUTH CENTRAL ZONE NAD 1927.
2. PERMIT BOUNDARY AND EASEMENTS WERE REPRODUCED FROM COSTELLO, INC. STANDARD LAND SURVEY DRAWING, DATED MARCH 2004.
3. TYPICAL SIDE SLOPES ARE 4(H):1(V), AND THE TYPICAL TOP SLOPE IS 3.5%.
4. EROSION LAYER WILL CONSIST OF A MINIMUM OF 18 INCHES THICK SOIL IN PRE-SUBTITLE D LINER AREAS AND MINIMUM OF 24 INCHES THICK FOR SUBTITLE D AREAS. TOP 6 INCHES OF EROSION LAYER WILL BE CAPABLE OF MAINTAINING SELECTED VEGETATIVE GROWTH WITH A MINIMUM 90% GROUND COVER.
5. SEE ATTACHMENT 6D FOR FINAL COVER DETAILS.
6. REFER TO ATTACHMENT 4F FOR SLOPE STABILITY ANALYSIS.
7. REFER TO ATTACHMENT 6, APPENDIX 6A-F FOR DEED RESTRICTION INFORMATION.
8. GAS MONITORING PROBES GMP-Q, GMP-R, AND GMP-S ARE BEING DECOMMISSIONED AND RELOCATED AS DOCUMENTED IN A PERMIT MODIFICATION SUBMITTED BY WEAVER BOOS CONSULTANTS (WBC) IN APRIL 2004. GMP-T5 AND GMP-U ARE BEING DECOMMISSIONED IN A PERMIT MODIFICATION SUBMITTED BY WBC IN APRIL 2004. GMP-T1 WILL BECOME A PERMANENT GAS MONITORING PROBE FOR THIS AREA. REFER TO ATTACHMENT 14 FOR ADDITIONAL INFORMATION.

STATE OF TEXAS
CHARLES R. MARSH
105073
LICENSED PROFESSIONAL ENGINEER
9.24.24

☐ DRAFT
☒ FOR PERMITTING PURPOSES ONLY
☐ ISSUED FOR CONSTRUCTION

DATE: 03/2004
FILE: 0120-439-11
CAD: 6A-D-5-ERO-SEC.DWG

DRAWN BY: JDW
DESIGN BY: ALD
REVIEWED BY: JPY

Weaver Consultants Group
TBPE REGISTRATION NO. F-3727

PREPARED FOR
McCARTY ROAD LANDFILL TX, LP

REVISIONS		
1	08/2024	SEE LIST OF REVISIONS
2	09/2024	PERMIT MODIFICATION

MAJOR PERMIT AMENDMENT
EROSION LAYER ANALYSIS SECTION LOCATIONS

McCARTY ROAD LANDFILL
HARRIS COUNTY, TEXAS

WWW.WCGRP.COM

SHEET 6A-D-5a

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O:\0120\439\FIP MOD 2024\ATT 6\DAD\CLEAN\6A-D-5-ERO-SEC.dwg, rarrington, 1:2

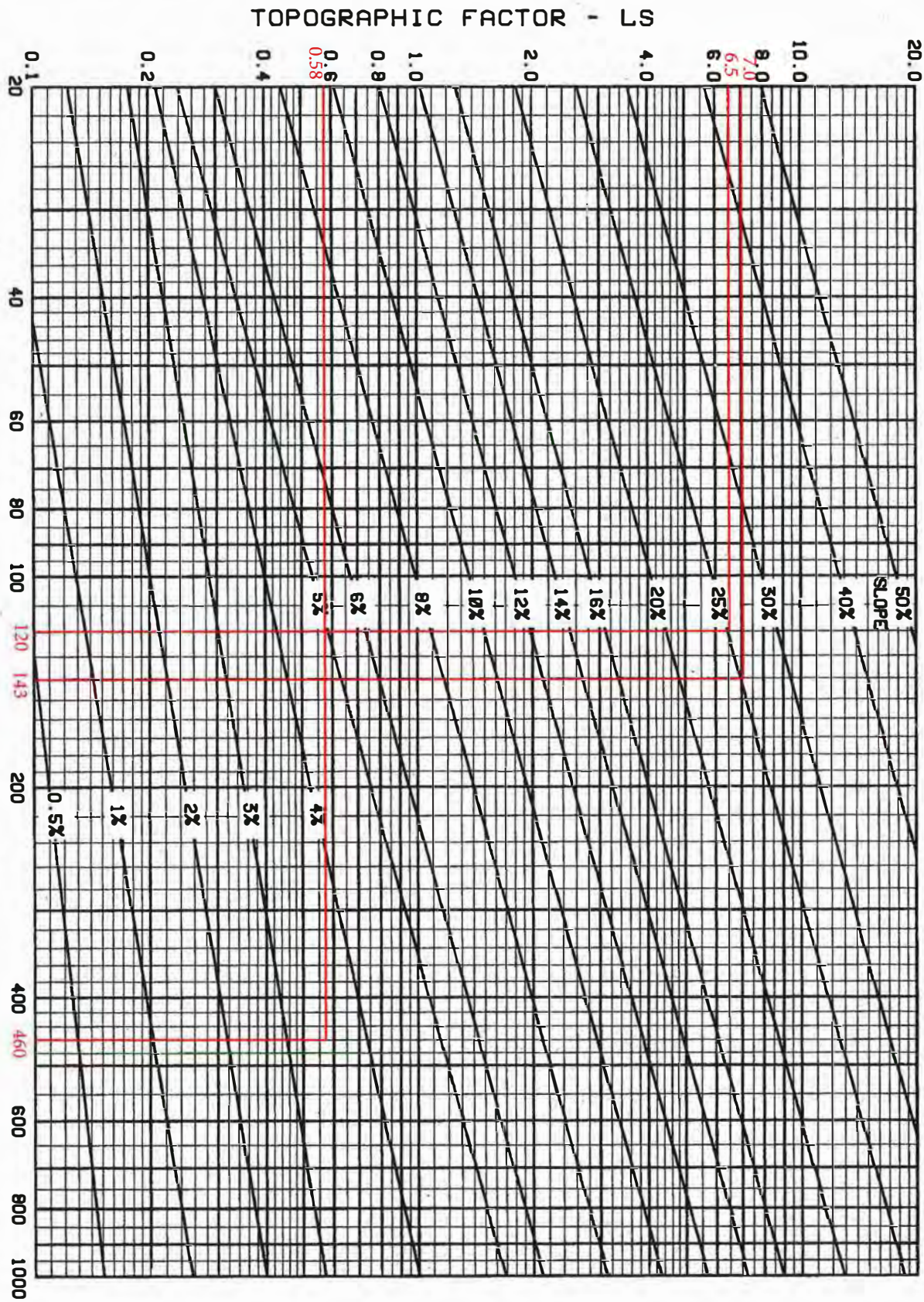


FIGURE 4.—Slope-effect chart (topographic factor, LS). LS = $(\lambda/72.6)^m$ (65.41 $\sin^2\theta + 4.56 \sin\theta + 0.065$) where λ = slope length in feet; θ = angle of slope; and m = 0.2 for gradients < 1 percent, 0.3 for 1 to 3 percent slopes, 0.4 for 3.5 to 4.5 percent slopes, and 0.5 for slopes of 5 percent or steeper.

Required: Determine the sheet flow velocity for the final cover system design and compare to the permissible non-erodible flow velocity.

Method:
1. Determine the flow using the Rational Method.
2. Calculate flow depth using Kinematic Wave procedures.
3. Compute flow velocity and compare to permissible non-erodibility velocity.

References:
1. Raudkivi, A.J., *Hydrology - An Advanced Introduction to Hydrological Processes and Modeling*, 1979.
2. NOAA Atlas 14 Point Precipitation Frequency Estimates, *National Weather Service,* 2017.
3. United States Soil Conservation Service, *TR-55 Hydrology for Small Watersheds*, December 1989.

Solution: Use the typical case scenarios from the USLE calculation to determine the expected sheet flow velocity.

Case 1. Typical sideslope

slope =	0.25	ft/ft
length =	120	ft

Case 2. Longest sideslope

slope =	0.25	ft/ft
length =	143	ft

Case 3. Longest topslope

slope =	0.035	ft/ft
length =	460	ft

Time of Concentration:

$$t_c = \frac{0.007(nL)^{0.8}}{(P_{2,24})^{0.5}S^{0.4}}$$

Where:
- t_c = time of concentration (hr)
- n = Manning's roughness coefficient
- L = slope length
- $P_{2,24}$ = 2-year, 24-hour rainfall depth (in)
- S = slope (ft/ft)

Determine $P_{2,24}$:

$P_{2,24}$ = 5.23 in (Ref 2, Page 6A-D-20)

Calculate t_c:

Case 1:

n =	0.24	
L =	120	
$P_{2,24}$ =	5.2	
S =	0.25	
t_c =	0.08	hr
	4.70	min

Case 2:

n =	0.24	
L =	143	
$P_{2,24}$ =	5.2	
S =	0.25	
t_c =	0.09	hr
	5.41	min

Case 3:

n =	0.24	
L =	460	
$P_{2,24}$ =	5.2	
S =	0.035	
t_c =	0.50	hr
	30.25	min

Sheet flow

Sheet flow is flow over plane surfaces. It usually occurs in the headwater of streams. With sheet flow, the friction value (Manning's n) is an effective roughness coefficient that includes the effect of raindrop impact; drag over the plane surface; obstacles such as litter, crop ridges, and rocks; and erosion and transportation of sediment. These n values are for very shallow flow depths of about 0.1 foot or so. Table 3-1 gives Manning's n values for sheet flow for various surface conditions.

Table 3-1 Roughness coefficients (Manning's n) for sheet flow

Surface description	n [1]
Smooth surfaces (concrete, asphalt, gravel, or bare soil)	0.011
Fallow (no residue)	0.05
Cultivated soils:	
Residue cover ≤20%	0.06
Residue cover >20%	0.17
Grass:	
Short grass prairie	0.15
Dense grasses [2]	0.24
Bermudagrass	0.41
Range (natural)	0.13
Woods: [3]	
Light underbrush	0.40
Dense underbrush	0.80

[1] The n values are a composite of information compiled by Engman (1986).

[2] Includes species such as weeping lovegrass, bluegrass, buffalo grass, blue grama grass, and native grass mixtures.

[3] When selecting n, consider cover to a height of about 0.1 ft. This is the only part of the plant cover that will obstruct sheet flow.

For sheet flow of less than 300 feet, use Manning's kinematic solution (Overtop and Meadows 1976) to compute T_t:

$$T_t = \frac{0.007(nL)^{0.8}}{(P_2)^{0.5} s^{0.4}} \qquad \text{[eq. 3-3]}$$

where:

T_t = travel time (hr),
n = Manning's roughness coefficient (table 3-1)
L = flow length (ft)
P_2 = 2-year, 24-hour rainfall (in)
s = slope of hydraulic grade line (land slope, ft/ft)

This simplified form of the Manning's kinematic solution is based on the following: (1) shallow steady uniform flow, (2) constant intensity of rainfall excess (that part of a rain available for runoff), (3) rainfall duration of 24 hours, and (4) minor effect of infiltration on travel time. Rainfall depth can be obtained from appendix B.

Shallow concentrated flow

After a maximum of 300 feet, sheet flow usually becomes shallow concentrated flow. The average velocity for this flow can be determined from figure 3-1, in which average velocity is a function of watercourse slope and type of channel. For slopes less than 0.005 ft/ft, use equations given in appendix F for figure 3-1. Tillage can affect the direction of shallow concentrated flow. Flow may not always be directly down the watershed slope if tillage runs across the slope.

After determining average velocity in figure 3-1, use equation 3-1 to estimate travel time for the shallow concentrated flow segment.

Open channels

Open channels are assumed to begin where surveyed cross section information has been obtained, where channels are visible on aerial photographs, or where blue lines (indicating streams) appear on United States Geological Survey (USGS) quadrangle sheets. Manning's equation or water surface profile information can be used to estimate average flow velocity. Average flow velocity is usually determined for bankfull elevation.

NOAA Atlas 14, Volume 11, Version 2
Location name: Houston, Texas, USA*
Latitude: 29.8268°, Longitude: -95.2386°
Elevation: 186 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sandra Pavlovic, Michael St. Laurent, Carl Trypaluk, Dale Unruh, Orlan Wilhite

NOAA, National Weather Service, Silver Spring, Maryland

PF tabular | PF graphical | Maps & aerials

PF tabular

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

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.493 (0.374-0.652)	0.586 (0.446-0.763)	0.734 (0.558-0.963)	0.859 (0.644-1.14)	1.03 (0.751-1.42)	1.17 (0.828-1.65)	1.31 (0.905-1.90)	1.46 (0.984-2.18)	1.67 (1.09-2.58)	1.84 (1.16-2.91)
10-min	0.781 (0.591-1.03)	0.929 (0.707-1.21)	1.17 (0.887-1.53)	1.37 (1.03-1.82)	1.65 (1.20-2.27)	1.87 (1.33-2.64)	2.10 (1.45-3.04)	2.33 (1.56-3.46)	2.63 (1.71-4.06)	2.87 (1.82-4.53)
15-min	0.996 (0.754-1.32)	1.18 (0.898-1.54)	1.47 (1.12-1.93)	1.72 (1.29-2.29)	2.06 (1.50-2.83)	2.33 (1.65-3.29)	2.61 (1.80-3.78)	2.90 (1.95-4.32)	3.32 (2.15-5.11)	3.64 (2.30-5.75)
30-min	1.43 (1.08-1.89)	1.68 (1.28-2.20)	2.09 (1.59-2.74)	2.43 (1.82-3.24)	2.91 (2.11-3.98)	3.27 (2.31-4.60)	3.65 (2.52-5.30)	4.08 (2.75-6.08)	4.70 (3.06-7.26)	5.21 (3.30-8.24)
60-min	1.88 (1.43-2.49)	2.24 (1.70-2.91)	2.80 (2.13-3.68)	3.28 (2.46-4.37)	3.95 (2.86-5.40)	4.46 (3.15-6.28)	5.01 (3.46-7.27)	5.66 (3.81-8.43)	6.62 (4.30-10.2)	7.43 (4.70-11.7)
2-hr	2.29 (1.74-3.01)	2.82 (2.13-3.60)	3.62 (2.76-4.72)	4.34 (3.27-5.76)	5.40 (3.93-7.37)	6.25 (4.44-8.79)	7.21 (5.00-10.4)	8.35 (5.63-12.4)	10.1 (6.57-15.5)	11.6 (7.34-18.2)
3-hr	2.51 (1.91-3.29)	3.17 (2.38-4.00)	4.14 (3.16-5.37)	5.05 (3.81-6.68)	6.40 (4.69-8.75)	7.55 (5.38-10.6)	8.86 (6.14-12.8)	10.4 (7.03-15.4)	12.8 (8.33-19.6)	14.8 (9.42-23.2)
6-hr	2.91 (2.23-3.80)	3.81 (2.84-4.71)	5.08 (3.88-6.54)	6.30 (4.78-8.31)	8.18 (6.03-11.2)	9.82 (7.05-13.8)	11.7 (8.17-16.8)	14.0 (9.46-20.6)	17.4 (11.4-26.6)	20.3 (13.0-31.8)
12-hr	3.37 (2.59-4.39)	4.49 (3.35-5.50)	6.05 (4.64-7.75)	7.58 (5.77-9.94)	9.94 (7.36-13.5)	12.0 (8.66-16.8)	14.4 (10.1-20.6)	17.3 (11.8-25.4)	21.7 (14.2-33.0)	25.4 (16.3-39.7)
24-hr	3.88 (2.99-5.02)	5.23 (3.90-6.35)	7.09 (5.47-9.04)	8.94 (6.84-11.7)	11.8 (8.80-16.0)	14.4 (10.4-20.0)	17.3 (12.2-24.7)	20.8 (14.2-30.3)	25.9 (17.1-39.3)	30.3 (19.5-47.1)
2-day	4.40 (3.41-5.68)	6.03 (4.49-7.23)	8.23 (6.37-10.4)	10.5 (8.03-13.6)	13.9 (10.5-18.9)	17.1 (12.5-23.9)	20.7 (14.6-29.4)	24.7 (16.9-35.8)	30.3 (20.0-45.6)	34.8 (22.5-53.9)
3-day	4.79 (3.72-6.16)	6.56 (4.90-7.85)	8.96 (6.94-11.3)	11.4 (8.75-14.8)	15.1 (11.4-20.6)	18.6 (13.6-25.9)	22.5 (15.9-31.9)	26.6 (18.2-38.5)	32.3 (21.4-48.6)	36.9 (23.9-57.0)
4-day	5.12 (3.98-6.57)	6.95 (5.22-8.34)	9.46 (7.36-12.0)	12.0 (9.23-15.5)	15.9 (12.0-21.5)	19.4 (14.3-27.0)	23.4 (16.6-33.1)	27.6 (19.0-39.9)	33.4 (22.2-50.1)	38.1 (24.7-58.6)
7-day	5.89 (4.60-7.54)	7.82 (5.92-9.41)	10.5 (8.19-13.2)	13.1 (10.2-17.0)	17.2 (13.0-23.2)	20.9 (15.4-28.9)	25.0 (17.7-35.1)	29.2 (20.1-42.1)	35.1 (23.4-52.5)	39.8 (25.9-61.1)
10-day	6.55 (5.12-8.36)	8.54 (6.52-10.3)	11.3 (8.88-14.3)	14.1 (10.9-18.1)	18.2 (13.8-24.5)	21.9 (16.2-30.2)	26.0 (18.5-36.6)	30.3 (20.9-43.6)	36.2 (24.1-54.0)	40.9 (26.6-62.7)
20-day	8.65 (6.80-11.0)	10.7 (8.37-13.2)	13.8 (10.9-17.4)	16.7 (13.0-21.4)	20.9 (15.8-27.8)	24.4 (18.0-33.4)	28.3 (20.2-39.5)	32.4 (22.5-46.4)	38.1 (25.6-56.7)	42.7 (28.0-65.3)
30-day	10.5 (8.25-13.3)	12.6 (9.96-15.7)	16.0 (12.7-20.1)	18.9 (14.8-24.2)	23.2 (17.5-30.6)	26.5 (19.5-36.1)	30.2 (21.6-42.1)	34.1 (23.8-48.9)	39.7 (26.7-59.0)	44.2 (29.0-67.4)
45-day	13.2 (10.4-16.6)	15.5 (12.4-19.4)	19.4 (15.4-24.4)	22.6 (17.7-28.9)	27.1 (20.5-35.6)	30.5 (22.4-41.2)	34.0 (24.4-47.3)	37.8 (26.4-54.0)	43.0 (29.0-63.7)	47.2 (31.0-71.7)
60-day	15.6 (12.4-19.7)	18.2 (14.6-22.9)	22.6 (18.0-28.4)	26.1 (20.5-33.3)	30.8 (23.3-40.4)	34.3 (25.3-46.3)	37.8 (27.1-52.5)	41.4 (29.0-59.1)	46.3 (31.3-68.5)	50.1 (32.9-76.0)

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

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

Please refer to NOAA Atlas 14 document for more information.

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PF graphical

McCARTY ROAD LANDFILL
0120-439-11-03-11
SHEET FLOW VELOCITY

Calculate the design 25-year frequency for each condition:

$Q = CiA$

Where:
- Q = flow rate (cfs)
- C = runoff coefficient
- i = rainfall intensity (in/hr) (Ref 2, Page 6A-D-24)
- A = drainage area (ac)

For a unit width of final cover, the flow lengths shown on sheet 6A-D-5a for each case is used.

A=[Length (ft) x Width (ft)] / 43560 = acres

Case 1:

C =	0.7	
t_c =	4.70	min
i =	12.4	in/hr
Length:	120.00	ft
A	0.0028	ac
Q =	0.024	cfs

Case 2:

C =	0.7	
t_c =	5.41	min
i =	12.4	in/hr
Length:	143.00	ft
A	0.0033	ac
Q =	0.028	cfs

Case 3:

C =	0.7	
t_c =	30.25	min
i =	5.81	in/hr
Length:	460.00	ft
A	0.0106	ac
Q =	0.043	cfs

Approximate depth of flow:

Using Manning's Equation

$V = 1.49/n\ y^{0.67}\ S^{0.5}$

$Q = VA \quad => \quad V = Q/A$

$A = y \times 1$ (assuming unit width of flow)

substituting for V

$Q/y = 1.49/n\ y^{0.67}\ S^{0.5}$

$Q = 1.49/n\ y^{1.67}\ S^{0.5}$

solve for y

$y = (Qn/1.49\ S^{0.5})^{1/1.67}$

$y = (Qn/1.49S^{0.5})^{0.6}$

Case 1:

Q =	0.024	cfs
n =	0.24	
S =	0.25	ft/ft
y =	0.054	ft

Case 2:

Q =	0.028	cfs
n =	0.24	
S =	0.25	ft/ft
y =	0.060	ft

Case 3:

Q =	0.043	cfs
n =	0.24	
S =	0.035	ft/ft
y =	0.138	ft

Determine sheet flow velocity:

$V = Q/A$ (assume unit flow width for the flow area, A)

Case 1:

Q =	0.024	cfs
A =	0.054	sf
V =	0.44	ft/s

Case 2:

Q =	0.028	cfs
A =	0.060	sf
V =	0.48	ft/s

Case 3:

Q =	0.043	cfs
A =	0.138	sf
V =	0.31	ft/s

Permissible non-erodible velocity is 5.0 ft/s. Therefore, expected sheet flow velocity is acceptable on the final cover system top and side slopes.

NOAA Atlas 14, Volume 11, Version 2
Location name: Houston, Texas, USA*
Latitude: 29.8268°, Longitude: -95.2386°
Elevation: 186 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sandra Pavlovic, Michael St. Laurent, Carl Trypaluk, Dale Unruh, Orlan Wilhite

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

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

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	5.92 (4.49-7.82)	7.03 (5.35-9.16)	8.81 (6.70-11.6)	10.3 (7.73-13.7)	12.4 (9.01-17.0)	14.0 (9.94-19.8)	15.7 (10.9-22.8)	17.6 (11.8-26.1)	20.1 (13.0-31.0)	22.1 (14.0-34.9)
10-min	4.69 (3.55-6.19)	5.57 (4.24-7.26)	7.00 (5.32-9.18)	8.20 (6.16-10.9)	9.89 (7.21-13.6)	11.2 (7.96-15.9)	12.6 (8.68-18.2)	14.0 (9.38-20.8)	15.8 (10.3-24.3)	17.2 (10.9-27.2)
15-min	3.98 (3.02-5.26)	4.71 (3.59-6.14)	5.88 (4.48-7.72)	6.87 (5.16-9.16)	8.25 (6.00-11.3)	9.32 (6.60-13.2)	10.4 (7.20-15.1)	11.6 (7.81-17.3)	13.3 (8.62-20.4)	14.6 (9.22-23.0)
30-min	2.86 (2.17-3.78)	3.36 (2.57-4.39)	4.18 (3.18-5.49)	4.86 (3.65-6.48)	5.81 (4.21-7.96)	6.54 (4.62-9.21)	7.30 (5.04-10.6)	8.16 (5.49-12.2)	9.41 (6.11-14.5)	10.4 (6.60-16.5)
60-min	1.88 (1.43-2.49)	2.24 (1.70-2.91)	2.80 (2.13-3.68)	3.28 (2.46-4.37)	3.95 (2.86-5.40)	4.46 (3.15-6.28)	5.01 (3.46-7.27)	5.66 (3.81-8.43)	6.62 (4.30-10.2)	7.43 (4.70-11.7)
2-hr	1.14 (0.869-1.50)	1.41 (1.06-1.80)	1.81 (1.38-2.36)	2.17 (1.64-2.88)	2.70 (1.97-3.68)	3.12 (2.22-4.39)	3.61 (2.50-5.21)	4.18 (2.82-6.19)	5.04 (3.28-7.76)	5.78 (3.67-9.10)
3-hr	0.834 (0.636-1.10)	1.06 (0.793-1.33)	1.38 (1.05-1.79)	1.68 (1.27-2.22)	2.13 (1.56-2.91)	2.51 (1.79-3.53)	2.95 (2.05-4.25)	3.46 (2.34-5.12)	4.25 (2.78-6.52)	4.93 (3.14-7.74)
6-hr	0.485 (0.371-0.634)	0.636 (0.474-0.786)	0.847 (0.648-1.09)	1.05 (0.798-1.39)	1.37 (1.01-1.86)	1.64 (1.18-2.30)	1.96 (1.36-2.81)	2.33 (1.58-3.43)	2.90 (1.90-4.44)	3.40 (2.17-5.31)
12-hr	0.279 (0.215-0.364)	0.372 (0.277-0.456)	0.501 (0.385-0.643)	0.628 (0.478-0.825)	0.824 (0.611-1.12)	0.996 (0.718-1.40)	1.20 (0.838-1.71)	1.44 (0.976-2.10)	1.80 (1.18-2.74)	2.11 (1.35-3.29)
24-hr	0.161 (0.124-0.209)	0.218 (0.162-0.264)	0.295 (0.227-0.376)	0.372 (0.284-0.486)	0.491 (0.366-0.667)	0.598 (0.433-0.834)	0.722 (0.506-1.03)	0.864 (0.589-1.26)	1.08 (0.712-1.64)	1.26 (0.813-1.96)
2-day	0.091 (0.071-0.118)	0.125 (0.093-0.150)	0.171 (0.132-0.217)	0.217 (0.167-0.283)	0.290 (0.218-0.394)	0.356 (0.260-0.497)	0.432 (0.304-0.612)	0.513 (0.351-0.745)	0.630 (0.416-0.949)	0.725 (0.468-1.12)
3-day	0.066 (0.051-0.085)	0.091 (0.068-0.108)	0.124 (0.096-0.157)	0.157 (0.121-0.205)	0.210 (0.158-0.285)	0.258 (0.189-0.360)	0.312 (0.220-0.442)	0.369 (0.253-0.534)	0.449 (0.297-0.674)	0.513 (0.332-0.791)
4-day	0.053 (0.041-0.068)	0.072 (0.054-0.086)	0.098 (0.076-0.124)	0.124 (0.096-0.161)	0.165 (0.125-0.224)	0.202 (0.148-0.281)	0.244 (0.172-0.344)	0.287 (0.197-0.415)	0.348 (0.231-0.522)	0.396 (0.257-0.610)
7-day	0.035 (0.027-0.044)	0.046 (0.035-0.056)	0.062 (0.048-0.078)	0.078 (0.060-0.100)	0.102 (0.077-0.137)	0.124 (0.091-0.172)	0.148 (0.105-0.209)	0.173 (0.119-0.250)	0.208 (0.139-0.312)	0.236 (0.154-0.363)
10-day	0.027 (0.021-0.034)	0.035 (0.027-0.043)	0.047 (0.036-0.059)	0.058 (0.045-0.075)	0.075 (0.057-0.101)	0.091 (0.067-0.126)	0.108 (0.077-0.152)	0.126 (0.087-0.181)	0.150 (0.100-0.224)	0.170 (0.110-0.261)
20-day	0.018 (0.014-0.022)	0.022 (0.017-0.027)	0.028 (0.022-0.036)	0.034 (0.027-0.044)	0.043 (0.032-0.057)	0.050 (0.037-0.069)	0.058 (0.042-0.082)	0.067 (0.046-0.096)	0.079 (0.053-0.118)	0.089 (0.058-0.135)
30-day	0.014 (0.011-0.018)	0.017 (0.013-0.021)	0.022 (0.017-0.027)	0.026 (0.020-0.033)	0.032 (0.024-0.042)	0.036 (0.027-0.050)	0.041 (0.029-0.058)	0.047 (0.033-0.067)	0.055 (0.037-0.081)	0.061 (0.040-0.093)
45-day	0.012 (0.009-0.015)	0.014 (0.011-0.017)	0.017 (0.014-0.022)	0.020 (0.016-0.026)	0.025 (0.018-0.032)	0.028 (0.020-0.038)	0.031 (0.022-0.043)	0.034 (0.024-0.050)	0.039 (0.026-0.059)	0.043 (0.028-0.066)
60-day	0.010 (0.008-0.013)	0.012 (0.010-0.015)	0.015 (0.012-0.019)	0.018 (0.014-0.023)	0.021 (0.016-0.028)	0.023 (0.017-0.032)	0.026 (0.018-0.036)	0.028 (0.020-0.041)	0.032 (0.021-0.047)	0.034 (0.022-0.052)

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

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

Please refer to NOAA Atlas 14 document for more information.

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PF graphical

ATTACHMENT 6A

APPENDIX 6A-E

EXISTING PERMITTED CONDITIONS HYDROLOGIC CALCULATIONS

Includes pages 6A-E-1 through 6A-E-86



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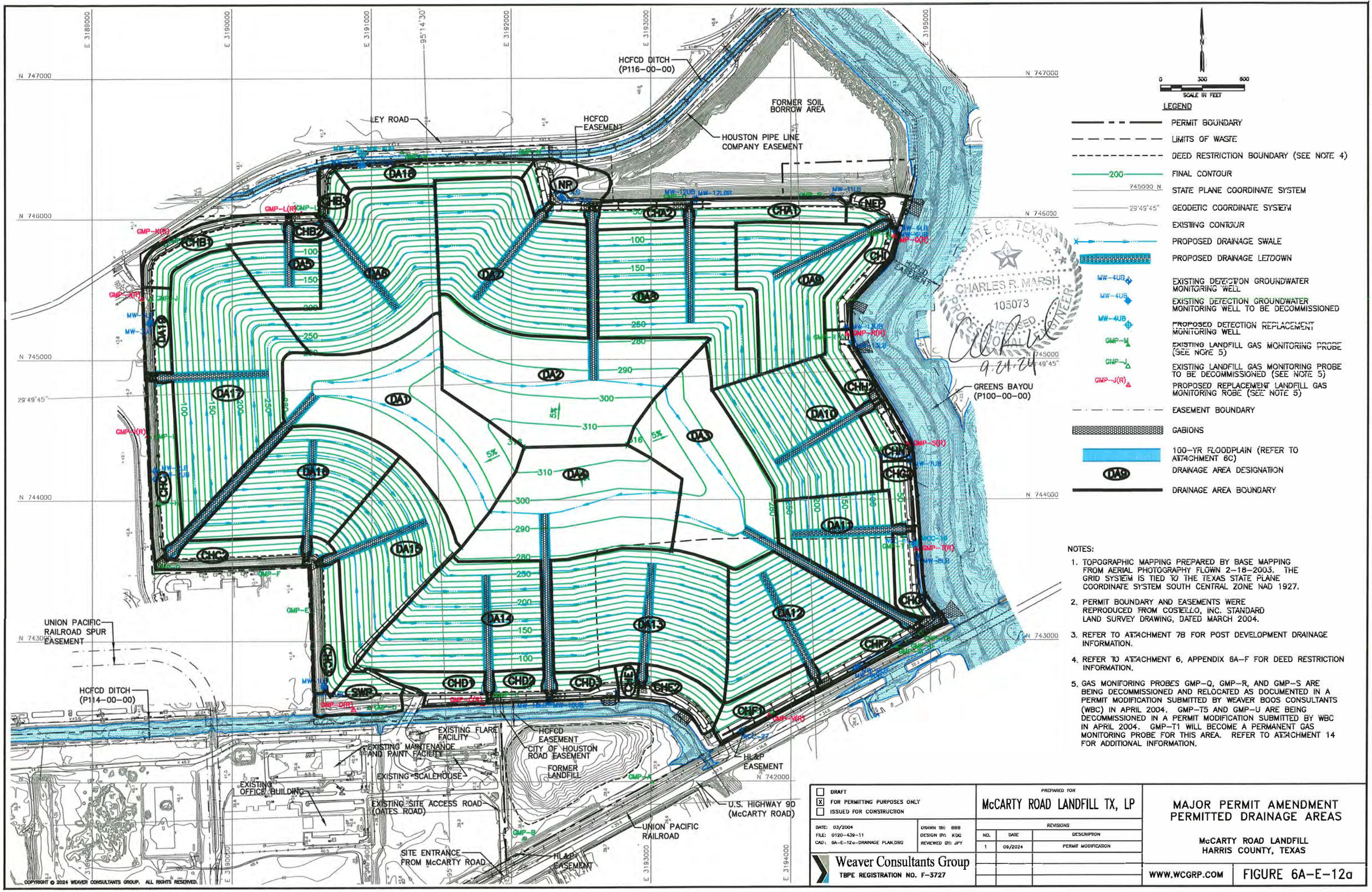
Hypothetical Storm Data	6A-E-1
Precipitation Loss Data	6A-E-3
Hydrograph Development Information	6A-E-6
Regional Permitted Information	6A-E-11
HEC-1 Output - Permitted 25-Year Storm Event	6A-E-13
HEC-1 Outpost – Permitted 100-Year Storm Event	6A-E-51



Hypothetical Storm Data

25 Year storm data taken from the NOAA Atlas 14 Point Precipitation Frequency Estimates. 100 Year storm data is equivalent to effective 500 Year storm data taken from Harris County Flood Control District Drainage Criteria Manual.

Time	5 min	15 min	60 min	2 hr	3 hr	6 hr	12 hr	24 hr
25 Year Event	1.03 in.	2.06 in.	3.95 in.	5.40 in.	6.40 in.	8.18 in.	9.94 in.	11.8 in.
100 Year Event	1.4	2.60 in.	5.5 in.	7.6 in.	9.2 in.	12.8 in.	15.5 in.	18.9 in.



NOTES:

1. TOPOGRAPHIC MAPPING PREPARED BY BASE MAPPING FROM AERIAL PHOTOGRAPHY FLOWN 2-18-2003. THE GRID SYSTEM IS TIED TO THE TEXAS STATE PLANE COORDINATE SYSTEM SOUTH CENTRAL ZONE NAD 1927.
2. PERMIT BOUNDARY AND EASEMENTS WERE REPRODUCED FROM COSTELLO, INC. STANDARD LAND SURVEY DRAWING, DATED MARCH 2004.
3. REFER TO ATTACHMENT 7B FOR POST DEVELOPMENT DRAINAGE INFORMATION.
4. REFER TO ATTACHMENT 6, APPENDIX 6A-F FOR DEED RESTRICTION INFORMATION.
5. GAS MONITORING PROBES GMP-Q, GMP-R, AND GMP-S ARE BEING DECOMMISSIONED AND RELOCATED AS DOCUMENTED IN A PERMIT MODIFICATION SUBMITTED BY WEAVER BOOS CONSULTANTS (WBC) IN APRIL 2004. GMP-T5 AND GMP-U ARE BEING DECOMMISSIONED IN A PERMIT MODIFICATION SUBMITTED BY WBC IN APRIL 2004. GMP-T1 WILL BECOME A PERMANENT GAS MONITORING PROBE FOR THIS AREA. REFER TO ATTACHMENT 14 FOR ADDITIONAL INFORMATION.

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- [ ] DRAFT
- [x] FOR PERMITTING PURPOSES ONLY
- [ ] ISSUED FOR CONSTRUCTION

DATE: 03/2004
FILE: 0120-439-11
CAD: 6A-E-12a-DRAINAGE PLAN.DWG
DRAWN BY: BBB
DESIGN BY: KDG
REVIEWED BY: JPT

Weaver Consultants Group
TBPE REGISTRATION NO. F-3727

PREPARED FOR
McCARTY ROAD LANDFILL TX, LP

REVISIONS		
NO.	DATE	DESCRIPTION
1	09/2024	PERMIT MODIFICATION

MAJOR PERMIT AMENDMENT PERMITTED DRAINAGE AREAS

McCARTY ROAD LANDFILL
HARRIS COUNTY, TEXAS

WWW.WCGRP.COM

FIGURE 6A-E-12a

O:\0120\439\FLIP MOD 2024\ATT 6\6AE\CLEAN\6A-E-12A-PERMITTED DRAINAGE AREAS.dwg, rarrington, 1:2

Project: Permitted_Conditions
Simulation Run: 4%_24HR
Simulation Start: 31 May 2007, 24:00
Simulation End: 4 June 2007, 02:45

HMS Version: 4.11
Executed: 15 May 2024, 20:06

Global Parameter Summary - Subbasin

	Area (MI2)
Element Name	Area (MI2)
P100a	1.72
P161a	0.55
P100b	0.38
P151a	2.07
P100c	1.33
P100d	1.85
P100e	1.78
P100f	1.09
P100g	1.43
P152a	4.29
P100h	1.38
P148a	2.13
P100i	2.14
P147a	1.47
P147b	1.04
P146a	0.55
P145a	1.03
P145b	0.98
P145c	0.61
P145d	1.06
P245a	1.47
P14503a	1.7
P14503b	2.4
P14503c	0.93
P145e	1.87

P100j	5.89
P156a	1.31
P156b	0.91
P155a	1.47
P100k	1.64
P140a	0.97
P140b	1.31
P140c	1.27
P140d	3.87
P100l	2.72
P138a	2.73
P138b	3.58
P100m	4.34
P100n	3.01
P133a	2.99
P133b	1.25
P1000	3.08
P130a	2.91
P130b	1.02
P130c	2.63
P13008a	1.89
P13009a	1.45
P130d	0.67
P13007a	0.84
P130e	1.04
P13005a	1.2
P13005b	0.93
P13005c	0.64
P1300502a	0.92
P1300502b	0.14
P13005d	2.67
P130f	1.21
P1300301a	0.68
P13003a	1.58
P130g	1.69
P13002a	2.49
P1300202a	2.27
P13002b	2.65
P130h	2.37
P100p	5.38
P127a	5.06
P126a	3.71

P100q	2.63
P125a	2.35
P125b	1.86
P121a	3.82
P100r	2.97
P118a	1.67
P118b	5.51
P11831a	1.1
P11831b	1.25
P11831c	0.72
P118c	6.03
P11823a	1.57
P118d	6.33
P11818a	3.51
P118e	1.02
P11814a	2.87
P118f	5.7
P118g	7.32
Cha1	0.01
Da8	0.03
Cha2	0
Da2	0.05
Da7	0.04
Np	0.01
Chb1	0.01
Da5	0.01
Chb2	0
Da6	0.03
Chb3	0
Da18	0.01
P10001	0.08
P100s	1.49
Da12	0.03
Chf1	0.01
Da11	0.02
Chg1	0
Chg2	0
Da3	0.03
Chf2	0.01
Da10	0.03
Chh2	0
Chh1	0

Da9	0.02
Nep	0
Ch1	0.01
P114b	1.47
P114a	0.68
Da17	0.04
Chc1	0.01
Da19	0
Da1	0.05
Chc2	0.01
Da15	0.03
Da16	0.03
Chc3	0.01
Swp	0.01
Da14	0.03
Chd1	0
Chd2	0
Da4	0.04
Chd3	0
Da13	0.04
Che2	0.01
Che1	0
Fil1	0.02
Fil2	0.02
P114c	0.47
P100t	1.95
P110a	1.99
P109a	1.42
P100u	0.5
P107a	2.57
P107b	2.4
P100v	3.81
P100w	5.56

Element Name	Downstream
	Downstream
P100a	P1000000 2203 J
P161a	P1000000 2197 J
P100b	P1000000 2159 J
P151a	P1000000 2137 J
P100c	P1000000 2105 J
P100d	P1000000 2083 J
P100e	P1000000 2047 J
P100f	P1000000 2020 J
P100g	P1000000 1929 J
P152a	P1000000 1918 D
P100h	P1000000 1856 J
P148a	P1480000 0073 J
P100i	P1000000 1741 J
P147a	P1470000 0055 J
P147b	P1470000 0018 J
P146a	P1000000 1709 J
P145a	P1450000 0232 J
P145b	P1450000 0208 J
P145c	P1450000 0188 J
P145d	P1450000 0139 J
P245a	P1450000 0119 J
P14503a	P1450300 0103 J
P14503b	P1450300 0037 J
P14503c	P1450300 0014 J
P145e	P1450000 0010 J
P100j	P1000000 1557 J
P156a	P1560000 0048 J
P156b	P1560000 0019 J
P155a	P1550000 0008 J
P100k	P1000000 1433 J
P140a	P1400403 0259 J
P140b	P1400400 0172 J
P140c	P1400000 0112 J
P140d	P1400000 0020 J
P100l	P1000000 1334 J
P138a	P1380000 0141 D
P138b	P1380000 0013 J
P100m	P1000000 1226 J
P100n	P1000000 1123 J
P133a	P1330000 0092 J

P133b	P1330000 0017 J
P1000	P1000000 1038 J
P130a	P530 15 01
P130b	P1300000 0447 J
P130c	P1300000 0361 J
P13008a	P530 08 01
P13009a	P1300000 0342 J
P130d	P1300000 0302 J
P13007a	P1300000 0294 J
P130e	P1300000 0257 J
P13005a	P1300500 0195 J
P13005b	P1300500 0162 J
P13005c	P1300500 0144 J
P1300502a	P1300502 0144 J
P1300502b	P1300502 0126 J
P13005d	P1300500 0016 J
P130f	P1300000 0195 J
P1300301a	P1300300 0032 J
P13003a	P1300300 0008 J
P130g	P1300000 0107 J
P13002a	P1300200 0115 J
P1300202a	P1300200 0100 J
P13002b	P1300200 0023 J
P130h	P1300000 0043 J
P100p	P1000000 0860 J
P127a	P1000000 0851 J
P126a	P1260000 0127 D
P100q	P1000000 0795 J
P125a	P1250000 0129 J
P125b	P1250000 0027 J
P121a	P1000000 0720 J
P100r	P1000000 0640 J
P118a	P1180000 1036 J
P118b	P1180000 0846 J
P11831a	P1183100 9903 J
P11831b	P1183100 9902 J
P11831c	P1183100 9901 J
P118c	P1180000 0643 J
P11823a	P1180000 0641 J
P118d	P1180000 0441 J
P11818a	P1180000 0432 J
P118e	P1180000 0382 J

P11814a	P1180000 0361 J
P118f	P1180000 0233 J
P118g	P1180000 0036 J
Cha1	C/cha2
Da8	C/cha2
Cha2	C/cha2
Da2	C/np
Da7	C/np
Np	C/np
Chb1	C/chb2
Da5	C/chb2
Chb2	C/chb2
Da6	C/chb3
Chb3	C/chb3
Da18	Ndisc
P10001	Ndcp
P100s	P1000000 0580 J
Da12	C/da12
Chf1	C/da12
Da11	C/chg2
Chg1	C/chg2
Chg2	C/chg2
Da3	C/d4
Chf2	C/d4
Da10	C/chh2
Chh2	C/chh2
Chh1	C/chh2
Da9	C/nep
Nep	C/nep
Ch1	DCP - 5
P114b	P1140000 0036 J
P114a	P1140000 0119 J
Da17	C/chc1
Chc1	C/chc1
Da19	C/chc1
Da1	C/chc2
Chc2	C/chc2
Da15	C/da15
Da16	C/da15
Chc3	C/swp
Swp	C/swp
Da14	C/chd2

Chd1	C/chd2
Chd2	C/chd2
Da4	C/chd3
Chd3	C/chd3
Da13	C/che2
Che2	C/che2
Che1	C/che2
Fil1	C/fill
Fil2	C/fill
P114c	P1140000 0026 J
P100t	P1000000 0472 J
P110a	P1000000 0460 J
P109a	P1000000 0432 J
P100u	P1000000 0390 J
P107a	P1070000 0198 J
P107b	P1070000 0026 J
P100v	P1000000 0181 J
P100w	P1000000 0010 J

Loss Rate: Green and Ampt

Element Name	Percent Impervious Area	Initial Variable	Initial Content	Saturated Content	Wetting Front Suction	Hydraulic Conductivity
P100a	37.72	Water Content	0.02	0.46	3.5	0.02
P161a	40.04	Water Content	0.02	0.46	3.5	0.02
P100b	40.52	Water Content	0.02	0.46	3.5	0.02
P151a	26.03	Water Content	0.02	0.46	3.5	0.02
P100c	20.72	Water Content	0.02	0.46	3.5	0.02
P100d	37.11	Water Content	0.02	0.46	3.5	0.02
P100e	26.21	Water Content	0.02	0.46	3.5	0.02
P100f	18.78	Water Content	0.02	0.46	3.5	0.02
P100g	19.06	Water Content	0.02	0.46	3.5	0.02
P152a	43.55	Water Content	0.02	0.46	3.5	0.02
P100h	37.32	Water Content	0.02	0.46	3.5	0.02
P148a	34.29	Water Content	0.02	0.46	3.5	0.02
P100i	31.68	Water Content	0.02	0.46	3.5	0.02
P147a	42.76	Water Content	0.02	0.46	3.5	0.02
P147b	22.65	Water Content	0.02	0.46	3.5	0.02
P146a	16.03	Water Content	0.02	0.46	3.5	0.02
P145a	39.28	Water Content	0.02	0.46	3.5	0.02
P145b	20.53	Water Content	0.02	0.46	3.5	0.02
P145c	8.52	Water Content	0.02	0.46	3.5	0.02
P145d	20.33	Water Content	0.02	0.46	3.5	0.02

P245a	3.49	Water Content	0.02	0.46	3.5	0.02
P14503a	20.09	Water Content	0.02	0.46	3.5	0.02
P14503b	26.48	Water Content	0.02	0.46	3.5	0.02
P14503c	7.88	Water Content	0.02	0.46	3.5	0.02
P145e	38.26	Water Content	0.02	0.46	3.5	0.02
P100j	40.85	Water Content	0.02	0.46	3.5	0.02
P156a	18.11	Water Content	0.02	0.46	3.5	0.02
P156b	41.88	Water Content	0.02	0.46	3.5	0.02
P155a	46.09	Water Content	0.02	0.46	3.5	0.02
P100k	38.52	Water Content	0.02	0.46	3.5	0.02
P140a	33.04	Water Content	0.02	0.46	3.5	0.02
P140b	9.44	Water Content	0.02	0.46	3.5	0.02
P140c	29.56	Water Content	0.02	0.46	3.5	0.02
P140d	35.91	Water Content	0.02	0.46	3.5	0.02
P100l	41.05	Water Content	0.02	0.46	3.5	0.02
P138a	41.6	Water Content	0.02	0.46	3.5	0.02
P138b	38.31	Water Content	0.02	0.46	3.5	0.02
P100m	29.61	Water Content	0.02	0.46	3.5	0.02
P100n	26.56	Water Content	0.02	0.46	3.5	0.02
P133a	32.38	Water Content	0.02	0.46	3.5	0.02
P133b	12.85	Water Content	0.02	0.46	3.5	0.02
P100o	3.64	Water Content	0.02	0.46	3.5	0.02

P130a	15.04	Water Content	0.02	0.46	3.5	0.02
P130b	44.11	Water Content	0.02	0.46	3.5	0.02
P130c	22.94	Water Content	0.02	0.46	3.5	0.02
P13008a	41.52	Water Content	0.02	0.46	3.5	0.02
P13009a	34.74	Water Content	0.02	0.46	3.5	0.02
P130d	31.04	Water Content	0.02	0.46	3.5	0.02
P13007a	7.83	Water Content	0.02	0.46	3.5	0.02
P130e	20.22	Water Content	0.02	0.46	3.5	0.02
P13005a	37.53	Water Content	0.02	0.46	3.5	0.02
P13005b	17.88	Water Content	0.02	0.46	3.5	0.02
P13005c	10.81	Water Content	0.02	0.46	3.5	0.02
P1300502a	1.2	Water Content	0.02	0.46	3.5	0.02
P1300502b	36.34	Water Content	0.02	0.46	3.5	0.02
P13005d	18.64	Water Content	0.02	0.46	3.5	0.02
P130f	26.91	Water Content	0.02	0.46	3.5	0.02
P1300301a	13.33	Water Content	0.02	0.46	3.5	0.02
P13003a	21.98	Water Content	0.02	0.46	3.5	0.02
P130g	17.74	Water Content	0.02	0.46	3.5	0.02
P13002a	10.39	Water Content	0.02	0.46	3.5	0.02
P1300202a	16.98	Water Content	0.02	0.46	3.5	0.02
P13002b	5.68	Water Content	0.02	0.46	3.5	0.02
P130h	14.74	Water Content	0.02	0.46	3.5	0.02

P100p	5.21	Water Content	0.02	0.46	3.5	0.02
P127a	12.41	Water Content	0.02	0.46	3.5	0.02
P126a	23.46	Water Content	0.02	0.46	3.5	0.02
P100q	5.62	Water Content	0.02	0.46	3.5	0.02
P125a	30.66	Water Content	0.02	0.46	3.5	0.02
P125b	7.01	Water Content	0.02	0.46	3.5	0.02
P121a	13	Water Content	0.02	0.46	3.5	0.02
P100r	20.89	Water Content	0.02	0.46	3.5	0.02
P118a	32.54	Water Content	0.02	0.46	3.5	0.02
P118b	24.05	Water Content	0.02	0.46	3.5	0.02
P11831a	10.86	Water Content	0.02	0.46	3.5	0.02
P11831b	20.45	Water Content	0.02	0.46	3.5	0.02
P11831c	27.41	Water Content	0.02	0.46	3.5	0.02
P118c	40.94	Water Content	0.02	0.46	3.5	0.02
P11823a	32.95	Water Content	0.02	0.46	3.5	0.02
P118d	35.76	Water Content	0.02	0.46	3.5	0.02
P11818a	43.13	Water Content	0.02	0.46	3.5	0.02
P118e	43	Water Content	0.02	0.46	3.5	0.02
P11814a	40.21	Water Content	0.02	0.46	3.5	0.02
P118f	39.45	Water Content	0.02	0.46	3.5	0.02
P118g	29.31	Water Content	0.02	0.46	3.5	0.02
P100s	36.73	Water Content	0.02	0.46	3.5	0.02

P114b	47.78	Water Content	0.02	0.46	3.5	0.02
P114a	29.31	Water Content	0.02	0.46	3.5	0.02
P114c	40.41	Water Content	0.02	0.46	3.5	0.02
P100t	20.26	Water Content	0.02	0.46	3.5	0.02
P110a	36.45	Water Content	0.02	0.46	3.5	0.02
P109a	19.91	Water Content	0.02	0.46	3.5	0.02
P100u	25.39	Water Content	0.02	0.46	3.5	0.02
P107a	34.16	Water Content	0.02	0.46	3.5	0.02
P107b	27.84	Water Content	0.02	0.46	3.5	0.02
P100v	33.23	Water Content	0.02	0.46	3.5	0.02
P100w	46.81	Water Content	0.02	0.46	3.5	0.02

Canopy: Simple

Element Name	Allow Simultaneous Precip Et	Plant Uptake Method	Initial Canopy Storage Percent	Canopy Storage Capacity	Crop Coefficient
P100a	No	None	0	0.1	1
P161a	No	None	0	0.1	1
P100b	No	None	0	0.1	1
P151a	No	None	0	0.1	1
P100c	No	None	0	0.1	1
P100d	No	None	0	0.1	1
P100e	No	None	0	0.1	1
P100f	No	None	0	0.1	1
P100g	No	None	0	0.1	1
P152a	No	None	0	0.1	1
P100h	No	None	0	0.1	1
P148a	No	None	0	0.1	1
P100i	No	None	0	0.1	1
P147a	No	None	0	0.1	1
P147b	No	None	0	0.1	1
P146a	No	None	0	0.1	1
P145a	No	None	0	0.1	1
P145b	No	None	0	0.1	1
P145c	No	None	0	0.1	1
P145d	No	None	0	0.1	1
P245a	No	None	0	0.1	1
P14503a	No	None	0	0.1	1
P14503b	No	None	0	0.1	1
P14503c	No	None	0	0.1	1
P145e	No	None	0	0.1	1
P100j	No	None	0	0.1	1
P156a	No	None	0	0.1	1
P156b	No	None	0	0.1	1
P155a	No	None	0	0.1	1
P100k	No	None	0	0.1	1
P140a	No	None	0	0.1	1
P140b	No	None	0	0.1	1
P140c	No	None	0	0.1	1
P140d	No	None	0	0.1	1
P100l	No	None	0	0.1	1
P138a	No	None	0	0.1	1
P138b	No	None	0	0.1	1

P100m	No	None	0	0.1	1
P100n	No	None	0	0.1	1
P133a	No	None	0	0.1	1
P133b	No	None	0	0.1	1
P1000	No	None	0	0.1	1
P130a	No	None	0	0.1	1
P130b	No	None	0	0.1	1
P130c	No	None	0	0.1	1
P13008a	No	None	0	0.1	1
P13009a	No	None	0	0.1	1
P130d	No	None	0	0.1	1
P13007a	No	None	0	0.1	1
P130e	No	None	0	0.1	1
P13005a	No	None	0	0.1	1
P13005b	No	None	0	0.1	1
P13005c	No	None	0	0.1	1
P1300502a	No	None	0	0.1	1
P1300502b	No	None	0	0.1	1
P13005d	No	None	0	0.1	1
P130f	No	None	0	0.1	1
P1300301a	No	None	0	0.1	1
P13003a	No	None	0	0.1	1
P130g	No	None	0	0.1	1
P13002a	No	None	0	0.1	1
P1300202a	No	None	0	0.1	1
P13002b	No	None	0	0.1	1
P130h	No	None	0	0.1	1
P100p	No	None	0	0.1	1
P127a	No	None	0	0.1	1
P126a	No	None	0	0.1	1
P100q	No	None	0	0.1	1
P125a	No	None	0	0.1	1
P125b	No	None	0	0.1	1
P121a	No	None	0	0.1	1
P100r	No	None	0	0.1	1
P118a	No	None	0	0.1	1
P118b	No	None	0	0.1	1
P11831a	No	None	0	0.1	1
P11831b	No	None	0	0.1	1
P11831c	No	None	0	0.1	1
P118c	No	None	0	0.1	1
P11823a	No	None	0	0.1	1

P118d	No	None	0	0.1	1
P11818a	No	None	0	0.1	1
P118e	No	None	0	0.1	1
P11814a	No	None	0	0.1	1
P118f	No	None	0	0.1	1
P118g	No	None	0	0.1	1
P100s	No	None	0	0.1	1
P114b	No	None	0	0.1	1
P114a	No	None	0	0.1	1
P114c	No	None	0	0.1	1
P100t	No	None	0	0.1	1
P110a	No	None	0	0.1	1
P109a	No	None	0	0.1	1
P100u	No	None	0	0.1	1
P107a	No	None	0	0.1	1
P107b	No	None	0	0.1	1
P100v	No	None	0	0.1	1
P100w	No	None	0	0.1	1

Transform: Clark				
Element Name	Clark Method	Time of Concentration	Storage Coefficient	Time Area Method
P100a	Specified	0.71	5.09	Default
P161a	Specified	0.57	2.48	Default
P100b	Specified	0.13	2.13	Default
P151a	Specified	1.19	9.37	Default
P100c	Specified	0.7	5.79	Default
P100d	Specified	0.6	6.41	Default
P100e	Specified	0.96	7.37	Default
P100f	Specified	0.44	6.24	Default
P100g	Specified	0.92	8.4	Default
P152a	Specified	1.68	4.83	Default
P100h	Specified	0.5	3.59	Default
P148a	Specified	1.02	5.51	Default
P100i	Specified	0.74	5.29	Default
P147a	Specified	0.44	5.33	Default
P147b	Specified	1.01	6.19	Default
P146a	Specified	0.75	4.35	Default
P145a	Specified	0.33	3.33	Default
P145b	Specified	0.44	5.34	Default
P145c	Specified	1	6.48	Default
P145d	Specified	0.29	5.84	Default
P245a	Specified	1.13	6.66	Default
P14503a	Specified	0.6	7.58	Default
P14503b	Specified	0.37	5.65	Default
P14503c	Specified	0.89	7.64	Default
P145e	Specified	0.66	3.77	Default
P100j	Specified	0.86	6.87	Default
P156a	Specified	0.95	5.18	Default
P156b	Specified	0.39	2.1	Default
P155a	Specified	0.54	2.57	Default
P100k	Specified	0.64	4.15	Default
P140a	Specified	0.36	4.51	Default
P140b	Specified	0.94	4.99	Default
P140c	Specified	0.67	6.66	Default
P140d	Specified	0.75	9.71	Default
P100l	Specified	0.86	5.66	Default
P138a	Specified	0.94	9.4	Default
P138b	Specified	0.83	8.1	Default
P100m	Specified	1.12	11.35	Default
P100n	Specified	1.27	7.54	Default

P133a	Specified	1.31	11.01	Default
P133b	Specified	0.57	6.14	Default
P1000	Specified	1.11	9.91	Default
P130a	Specified	0.53	6.37	Default
P130b	Specified	0.42	3.34	Default
P130c	Specified	0.68	8.68	Default
P13008a	Specified	0.97	3.07	Default
P13009a	Specified	0.65	4.63	Default
P130d	Specified	0.32	3.08	Default
P13007a	Specified	0.77	5.24	Default
P130e	Specified	0.5	4.02	Default
P13005a	Specified	1.09	2.93	Default
P13005b	Specified	1.21	5.32	Default
P13005c	Specified	0.33	3.63	Default
P1300502a	Specified	1.24	5.57	Default
P1300502b	Specified	0.17	1.98	Default
P13005d	Specified	0.91	7.24	Default
P130f	Specified	0.34	4.34	Default
P1300301a	Specified	0.6	4.43	Default
P13003a	Specified	0.74	4.45	Default
P130g	Specified	0.54	6.68	Default
P13002a	Specified	1.29	9.83	Default
P1300202a	Specified	1.27	7.37	Default
P13002b	Specified	0.79	9.84	Default
P130h	Specified	2	8.56	Default
P100p	Specified	1.44	11.4	Default
P127a	Specified	2.18	14.75	Default
P126a	Specified	2.06	9.79	Default
P100q	Specified	1.19	9.02	Default
P125a	Specified	0.78	8.08	Default
P125b	Specified	1.06	5.08	Default
P121a	Specified	1.3	13.64	Default
P100r	Specified	0.81	7.24	Default
P118a	Specified	0.25	6.11	Default
P118b	Specified	0.89	6.62	Default
P11831a	Specified	0.67	6	Default
P11831b	Specified	0.2	5.79	Default
P11831c	Specified	0.42	4.18	Default
P118c	Specified	1.8	6.02	Default
P11823a	Specified	0.37	5.61	Default
P118d	Specified	1.81	6.51	Default
P11818a	Specified	0.73	8.9	Default

P118e	Specified	0.88	4.87	Default
P11814a	Specified	0.91	6.78	Default
P118f	Specified	1.29	4.33	Default
P118g	Specified	3.05	6.03	Default
P10001	Specified	1.91	6.1	Default
P100s	Specified	0.62	4.37	Default
P114b	Specified	0.74	2.13	Default
P114a	Specified	0.4	2.61	Default
P114c	Specified	0.36	1.51	Default
P100t	Specified	3.84	10.36	Default
P110a	Specified	1.2	3.05	Default
P109a	Specified	0.69	3.99	Default
P100u	Specified	0.4	2.82	Default
P107a	Specified	0.34	6.58	Default
P107b	Specified	1.21	4.25	Default
P100v	Specified	4.31	3.95	Default
P100w	Specified	5.51	2.76	Default

Transform: Kinematic Wave

Element Name	Transform
Cha1	Kinematic Wave
Da8	Kinematic Wave
Cha2	Kinematic Wave
Da2	Kinematic Wave
Da7	Kinematic Wave
Chb1	Kinematic Wave
Da5	Kinematic Wave
Chb2	Kinematic Wave
Da6	Kinematic Wave
Chb3	Kinematic Wave
Da12	Kinematic Wave
Chf1	Kinematic Wave
Da11	Kinematic Wave
Chg1	Kinematic Wave
Chg2	Kinematic Wave
Da3	Kinematic Wave
Chf2	Kinematic Wave
Da10	Kinematic Wave
Chh2	Kinematic Wave
Chh1	Kinematic Wave
Da9	Kinematic Wave
Ch1	Kinematic Wave
Da17	Kinematic Wave
Chc1	Kinematic Wave
Da19	Kinematic Wave
Da1	Kinematic Wave
Chc2	Kinematic Wave
Da15	Kinematic Wave
Da16	Kinematic Wave
Chc3	Kinematic Wave
Da14	Kinematic Wave
Chd1	Kinematic Wave
Chd2	Kinematic Wave
Da4	Kinematic Wave
Chd3	Kinematic Wave
Da13	Kinematic Wave
Che2	Kinematic Wave
Che1	Kinematic Wave

Loss Rate: Scs			
Element Name	Percent Impervious Area	Curve Number	Initial Abstraction
Np	0	99	0
Da18	0	88	0
Nep	0	99	0
Swp	0	99	0
Fil1	0	83	0
Fil2	0	83	0

Transform: Snyder			
Element Name	Snyder Method	Snyder Tp	Snyder Cp
Np	Standard	0.2	0.69
Da18	Standard	0.16	0.65
Nep	Standard	0.21	0.71
Swp	Standard	0.16	0.68
Fil1	Standard	0.36	0.71
Fil2	Standard	0.54	0.7

Global Parameter Summary - Reach

Downstream	
Element Name	Downstream
P1000000 2159 R	P1000000 2159 J
P1000000 2105 R	P1000000 2105 J
P1000000 2083 R	P1000000 2083 J
P1000000 2048 R	P1000000 2047 J
P1000000 2020 R	P1000000 2020 J
P1000000 1929 R	P1000000 1929 J
P1000000 1856 R	P1000000 1856 J
P1000000 1741 R	P1000000 1741 J
P1470000 0018 R	P1470000 0018 J
P1000000 1716 R	P1000000 1716 J
P1000000 1690 R	P1000000 1690 J
P1450000 0208 R	P1450000 0208 J
P1450000 0188 R	P1450000 0188 J
P1450000 0139 R	P1450000 0139 J
P1450000 0096 R	P1450000 0096 J
P1450300 0037 R	P1450300 0037 J
P1450300 0014 R	P1450300 0014 J
P1450000 0010 R	P1450000 0010 J
P1000000 1557 R	P1000000 1557 J

P1560000 0019 R
P1000000 1498 R
P1000000 1433 R
P1400000 0172 R
P1400000 0112 R
P1400000 0020 R
P1000000 1334 R
P1380000 0013 R
P1000000 1226 R
P1000000 1123 R
P1330000 0017 R
P1000000 1038 R
P1300000 0447 R
P1300000 0361 R
P1300000 0302 R
P1300000 0257 R
P1300500 0144 R
P1300502 0126 R
P1300500 0016 R
P1300000 0195 R
P1300300 0008 R
P1300000 0107 R
P1300200 0012 R
P1300000 0043 R
P1000000 0860 R
P1000000 0817 R
P1000000 0734 R
P1250000 0027 R
P1000000 0640 R
P1180000 1036 R
P1180000 0846 R
P1180000 9902 R
P1180000 9901 R
P1180000 0660 R
P1180000 0643 R
P1180000 0441 R
P1180000 0382 R
P1180000 0233 R
P1180000 0036 R
P1000000 0580 R
P1000000 0541 R
P1140000 0036 R

P1560000 0019 J
P1000000 1498 J
P1000000 1433 J
P1400400 0172 J
P1400000 0112 J
P1400000 0020 J
P1000000 1334 J
P1380000 0013 J
P1000000 1226 J
P1000000 1123 J
P1330000 0017 J
P1000000 1038 J
P1300000 0447 J
P1300000 0361 J
P1300000 0302 J
P1300000 0257 J
P1300500 0144 J
P1300502 0126 J
P1300500 0016 J
P1300000 0195 J
P1300300 0008 J
P1300000 0107 J
P1300200 0023 J
P1300000 0043 J
P1000000 0860 J
P1000000 0817 J
P1000000 0735 J
P1250000 0027 J
P1000000 0640 J
P1180000 1036 J
P1180000 0846 J
P1183100 9902 J
P1183100 9901 J
P1180000 0643 J
P1180000 0643 J
P1180000 0441 J
P1180000 0382 J
P1180000 0233 J
P1180000 0036 J
P1000000 0580 J
P1000000 0541 J
P1140000 0036 J

P1140000 0026 R
P1000000 0472 R
P1000000 0445 R
P1000000 3901 R
P1070000 0026 R
P1000000 0181 R
P1000000 0010 R

P1140000 0026 J
P1000000 0472 J
P1000000 0445 J
P1000000 0390 J
P1070000 0026 J
P1000000 0181 J
P1000000 0010 J

Route: Modified Puls

Element Name	Method	Initial Variable	Number of Reaches	Storage Outflow Table Name
P1000000 2159 R	Modified Puls	Combined Inflow	14	P1000000 2159 R
P1000000 2105 R	Modified Puls	Combined Inflow	16	P1000000 2105 R
P1000000 2083 R	Modified Puls	Combined Inflow	4	P1000000 2083 R
P1000000 2048 R	Modified Puls	Combined Inflow	6	P1000000 2048 R
P1000000 2020 R	Modified Puls	Combined Inflow	6	P1000000 2020 R
P1000000 1929 R	Modified Puls	Combined Inflow	21	P1000000 1929 R
P1000000 1856 R	Modified Puls	Combined Inflow	21	P1000000 1856 R
P1000000 1741 R	Modified Puls	Combined Inflow	17	P1000000 1741 R
P1470000 0018 R	Modified Puls	Combined Inflow	10	P1470000 0018 R
P1000000 1716 R	Modified Puls	Combined Inflow	3	P1000000 1716 R
P1000000 1690 R	Modified Puls	Combined Inflow	8	P1000000 1690 R
P1450000 0208 R	Modified Puls	Combined Inflow	2	P1450000 0208 R
P1450000 0188 R	Modified Puls	Combined Inflow	3	P1450000 0188 R
P1450000 0139 R	Modified Puls	Combined Inflow	8	P1450000 0139 R
P1450000 0096 R	Modified Puls	Combined Inflow	3	P1450000 0096 R
P1450300 0037 R	Modified Puls	Combined Inflow	11	P1450300 0037 R
P1450300 0014 R	Modified Puls	Combined Inflow	7	P1450300 0014 R
P1450000 0010 R	Modified Puls	Combined Inflow	10	P1450000 0010 R
P1000000 1557 R	Modified Puls	Combined Inflow	24	P1000000 1557 R
P1560000 0019 R	Modified Puls	Combined Inflow	2	P1560000 0019 R
P1000000 1498 R	Modified Puls	Combined Inflow	7	P1000000 1498 R

P1000000 1433 R	Modified Puls	Combined Inflow	20	P1000000 1433 R
P1400000 0172 R	Modified Puls	Combined Inflow	33	P1400000 0172 R
P1400000 0112 R	Modified Puls	Combined Inflow	12	P1400000 0112 R
P1400000 0020 R	Modified Puls	Combined Inflow	10	P1400000 0020 R
P1000000 1334 R	Modified Puls	Combined Inflow	17	P1000000 1334 R
P1380000 0013 R	Modified Puls	Combined Inflow	25	P1380000 0013 R
P1000000 1226 R	Modified Puls	Combined Inflow	17	P1000000 1226 R
P1000000 1123 R	Modified Puls	Combined Inflow	23	P1000000 1123 R
P1330000 0017 R	Modified Puls	Combined Inflow	12	P1330000 0017 R
P1000000 1038 R	Modified Puls	Combined Inflow	28	P1000000 1038 R
P1300000 0447 R	Modified Puls	Combined Inflow	17	P1300000 0447 R
P1300000 0361 R	Modified Puls	Combined Inflow	31	P1300000 0361 R
P1300000 0302 R	Modified Puls	Combined Inflow	8	P1300000 0302 R
P1300000 0257 R	Modified Puls	Combined Inflow	9	P1300000 0257 R
P1300500 0144 R	Modified Puls	Combined Inflow	1	P1300500 0144 R
P1300500 0016 R	Modified Puls	Combined Inflow	28	P1300500 0016 R
P1300000 0195 R	Modified Puls	Combined Inflow	8	P1300000 0195 R
P1300300 0008 R	Modified Puls	Combined Inflow	3	P1300300 0008 R
P1300000 0107 R	Modified Puls	Combined Inflow	16	P1300000 0107 R
P1300200 0012 R	Modified Puls	Combined Inflow	12	P1300200 0012 R
P1300000 0043 R	Modified Puls	Combined Inflow	20	P1300000 0043 R
P1000000 0860 R	Modified Puls	Combined Inflow	27	P1000000 0860 R

P1000000 0817 R	Modified Puls	Combined Inflow	9	P1000000 0817 R
P1000000 0734 R	Modified Puls	Combined Inflow	9	P1000000 0734 R
P1250000 0027 R	Modified Puls	Combined Inflow	19	P1250000 0027 R
P1000000 0640 R	Modified Puls	Combined Inflow	10	P1000000 0640 R
P1180000 0846 R	Modified Puls	Combined Inflow	51	P1180000 0846 R
P1180000 9902 R	Modified Puls	Combined Inflow	1	P1180000 9902 R
P1180000 9901 R	Modified Puls	Combined Inflow	18	P1180000 9901 R
P1180000 0660 R	Modified Puls	Combined Inflow	70	P1180000 0660 R
P1180000 0441 R	Modified Puls	Combined Inflow	45	P1180000 0441 R
P1180000 0382 R	Modified Puls	Combined Inflow	25	P1180000 0382 R
P1180000 0233 R	Modified Puls	Combined Inflow	20	P1180000 0233 R
P1180000 0036 R	Modified Puls	Combined Inflow	21	P1180000 0036 R
P1000000 0580 R	Modified Puls	Combined Inflow	8	P1000000 0580 R
P1000000 0541 R	Modified Puls	Combined Inflow	7	P1000000 0541 R
P1140000 0036 R	Modified Puls	Combined Inflow	15	P1140000 0036 R
P1140000 0026 R	Modified Puls	Combined Inflow	2	P1140000 0026 R
P1000000 0472 R	Modified Puls	Combined Inflow	9	P1000000 0472 R
P1000000 0445 R	Modified Puls	Combined Inflow	3	P1000000 0445 R
P1000000 3901 R	Modified Puls	Combined Inflow	5	P1000000 3901 R
P1070000 0026 R	Modified Puls	Combined Inflow	28	P1070000 0026 R
P1000000 0181 R	Modified Puls	Combined Inflow	21	P1000000 0181 R
P1000000 0010 R	Modified Puls	Combined Inflow	18	P1000000 0010 R

Route: Lag

Element Name	Method	Initial Variable	Lag
P1300502 0126 R	Lag	Combined Inflow	9.8
P1180000 1036 R	Lag	Combined Inflow	277.78
P1180000 0643 R	Lag	Combined Inflow	138.89

Global Results Summary

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (IN)
P100a	1.72	1212.24	01Jun2007, 17:30	10.68
P1000000 2203 J	1.72	1212.24	01Jun2007, 17:30	10.68
P161a	0.55	622.34	01Jun2007, 16:50	10.72
P1000000 2197 J	2.27	1815.09	01Jun2007, 17:10	10.69
P1000000 2159 R	2.27	1449.41	02Jun2007, 00:15	10.69
P100b	0.38	475.07	01Jun2007, 16:30	10.72
P1000000 2159 J	2.66	1514.78	02Jun2007, 00:05	10.69
P151a	2.07	936.02	01Jun2007, 18:20	10.49
P1000000 2137 J	4.72	2207.51	01Jun2007, 18:30	10.6
P1000000 2105 R	4.72	2188.28	02Jun2007, 01:15	10.6
P100c	1.33	848.63	01Jun2007, 17:35	10.4
P1000000 2105 J	6.05	2898.95	01Jun2007, 19:50	10.56
P1000000 2083 R	6.05	2886.6	01Jun2007, 20:30	10.56
P100d	1.85	1113.93	01Jun2007, 17:35	10.67
P1000000 2083 J	7.9	3819.46	01Jun2007, 20:00	10.58
P1000000 2048 R	7.9	3811.35	01Jun2007, 20:45	10.58
P100e	1.78	964.25	01Jun2007, 17:55	10.49
P1000000 2047 J	9.68	4646.75	01Jun2007, 20:15	10.57
P1000000 2020 R	9.68	4627.44	01Jun2007, 21:35	10.57
P100f	1.09	659.51	01Jun2007, 17:30	10.37
P1000000 2020 J	10.77	5107.26	01Jun2007, 21:10	10.55
P1000000 1929 R	10.77	4930.37	02Jun2007, 03:30	9.71
P100g	1.43	701.1	01Jun2007, 18:05	10.37
P1000000 1929 J	12.21	5251.37	02Jun2007, 03:15	9.79
P152a	4.29	3110	01Jun2007, 18:00	10.77
P1000000 1856 R	16.49	5557.53	02Jun2007, 06:50	9.41
P100h	1.38	1227.22	01Jun2007, 17:05	10.67
P1000000 1856 J	17.88	5761.11	01Jun2007, 18:50	9.51
P148a	2.13	1421.13	01Jun2007, 17:40	10.62
P1480000 0073 J	2.13	1893.14	01Jun2007, 17:50	15.48
P1000000 1741 R	20.01	7079.41	01Jun2007, 22:00	9.92
P100i	2.14	1463.17	01Jun2007, 17:30	10.58

P1000000 1741 J	22.15	8022.9	01Jun2007, 21:40	9.98
P147a	1.47	1011.74	01Jun2007, 17:20	10.76
P1470000 0055 J	1.47	1011.74	01Jun2007, 17:20	10.76
P1470000 0018 R	1.47	1007.77	01Jun2007, 18:05	10.76
P147b	1.04	636.23	01Jun2007, 17:50	10.43
P1470000 0018 J	2.52	1641.58	01Jun2007, 18:00	10.62
P1000000 1730 J	24.66	9330.96	01Jun2007, 19:50	10.05
P1000000 1716 R	24.66	9311.54	01Jun2007, 20:15	10.05
P1000000 1716 J	24.66	9311.54	01Jun2007, 20:15	10.05
P146a	0.55	427.5	01Jun2007, 17:20	10.32
P1000000 1709 J	25.22	9622.67	01Jun2007, 20:10	10.05
P1000000 1690 R	25.22	9580.28	01Jun2007, 21:20	10.05
P1000000 1690 J	25.22	9580.28	01Jun2007, 21:20	10.05
P145a	1.03	964.27	01Jun2007, 16:55	10.7
P1450000 0232 J	1.03	964.27	01Jun2007, 16:55	10.7
P1450000 0208 R	1.03	960.91	01Jun2007, 17:10	10.7
P145b	0.98	663.31	01Jun2007, 17:20	10.4
P1450000 0208 J	2.01	1622.53	01Jun2007, 17:10	10.55
P1450000 0188 R	2.01	1618.79	01Jun2007, 17:30	10.55
P145c	0.61	354.7	01Jun2007, 17:50	10.2
P1450000 0188 J	2.62	1970.76	01Jun2007, 17:30	10.47
P1450000 0139 R	2.62	1966.3	01Jun2007, 17:55	10.47
P145d	1.06	675.69	01Jun2007, 17:20	10.39
P1450000 0139 J	3.68	2631.11	01Jun2007, 17:50	10.45
P245a	1.47	838.43	01Jun2007, 17:55	10.12
P1450000 0119 J	5.15	3469.08	01Jun2007, 17:55	10.35
P1450000 0096 R	5.15	3428.67	01Jun2007, 18:35	10.35
P1450000 0096 J	5.15	3428.67	01Jun2007, 18:35	10.35
P14503a	1.7	897	01Jun2007, 17:45	10.39
P1450300 0103 J	1.7	897	01Jun2007, 17:45	10.39
P1450300 0037 R	1.7	894.91	01Jun2007, 18:30	10.39
P14503b	2.4	1566.13	01Jun2007, 17:20	10.49
P1450300 0037 J	4.09	2417.56	01Jun2007, 17:50	10.45
P1450300 0014 R	4.09	2409.29	01Jun2007, 18:30	10.45
P14503c	0.93	482.46	01Jun2007, 17:55	10.19
P1450300 0014 J	5.02	2886.91	01Jun2007, 18:25	10.4
P1450000 0074 J	10.17	6314.08	01Jun2007, 18:30	10.38
P1450000 0010 R	10.17	6299.56	01Jun2007, 19:05	10.38
P145e	1.87	1609.86	01Jun2007, 17:10	10.69
P1450000 0010 J	12.04	7633.9	01Jun2007, 18:55	10.43
P1000000 1686 J	37.26	16180.08	01Jun2007, 20:20	10.17
P1000000 1557 R	37.26	15881.76	02Jun2007, 00:15	10.17

P100j	5.89	3380.92	01Jun2007, 17:50	10.73
P1000000 1557 J	43.14	17870.87	02Jun2007, 00:05	10.25
P156a	1.31	902.21	01Jun2007, 17:35	10.36
P1560000 0048 J	1.31	902.21	01Jun2007, 17:35	10.36
P1560000 0019 R	1.31	901.66	01Jun2007, 17:45	10.36
P156b	0.91	1137.74	01Jun2007, 16:40	10.75
P1560000 0019 J	2.22	1947.52	01Jun2007, 17:10	10.52
P1000000 1540 J	45.37	17791.63	02Jun2007, 00:05	10.13
P1000000 1498 R	45.37	17542.93	02Jun2007, 01:35	10.13
P1000000 1498 J	45.37	17542.93	02Jun2007, 01:35	10.13
P1550000 0063 J	0	1042.28	01Jun2007, 20:05	Not specified
P155a	1.47	1619.16	01Jun2007, 16:50	10.82
P1550000 0008 J	1.47	2581.22	01Jun2007, 17:05	24.41
P1000000 1488 J	46.84	18426.46	02Jun2007, 01:20	10.58
P1000000 1433 R	46.84	18196.09	02Jun2007, 04:00	10.58
P100k	1.64	1325.89	01Jun2007, 17:15	10.69
P1000000 1433 J	48.48	18391.03	02Jun2007, 04:00	10.58
P140a	0.97	738.4	01Jun2007, 17:10	10.6
P1400403 0259 J	0.97	738.4	01Jun2007, 17:10	10.6
P1400000 0172 R	0.97	672.93	01Jun2007, 23:40	10.6
P140b	1.31	921.87	01Jun2007, 17:35	10.21
P1400400 0172 J	2.28	1222.42	01Jun2007, 20:05	10.38
P1400400 0150 J	2.28	180.13	01Jun2007, 20:05	1.61
P1400000 0112 R	2.28	180.05	01Jun2007, 20:35	1.61
P140c	1.27	742.36	01Jun2007, 17:40	10.54
P1400000 0112 J	3.55	920	01Jun2007, 17:45	4.81
P1400000 0020 R	3.55	914.85	01Jun2007, 18:45	4.81
P140d	3.87	1724.3	01Jun2007, 18:05	10.65
P1400000 0020 J	7.42	2628.54	01Jun2007, 18:30	7.86
P1000000 1424 J	55.9	19651.1	02Jun2007, 03:55	10.22
P1000000 1334 R	55.9	18886.5	02Jun2007, 08:15	10.22
P100l	2.72	1786.13	01Jun2007, 17:40	10.73
P1000000 1334 J	58.62	19106.12	02Jun2007, 08:15	10.24
P138a	2.73	1249.62	01Jun2007, 18:10	10.74
P1380000 0130 J	2.73	1255.58	01Jun2007, 23:50	11.55
P1380000 0013 R	2.73	1207.03	02Jun2007, 03:55	11.55
P138b	3.58	1824.9	01Jun2007, 17:55	10.69
P1380000 0013 J	6.31	2699.14	01Jun2007, 19:45	11.06
P1000000 1308 J	64.93	19969.23	02Jun2007, 08:10	10.32
P1000000 1226 R	64.93	19818.46	02Jun2007, 10:45	10.32
P100m	4.34	1708.42	01Jun2007, 18:35	10.53
P1000000 1226 J	69.27	20349.61	02Jun2007, 10:40	10.33

P1000000 1123 R	69.27	20194.7	02Jun2007, 14:10	10.33
P100n	3.01	1599.82	01Jun2007, 18:10	10.49
P1000000 1123 J	72.29	20357.68	02Jun2007, 14:05	10.34
P133a	2.99	1205.04	01Jun2007, 18:40	10.58
P1330000 0092 J	2.99	1205.04	01Jun2007, 18:40	10.58
P1330000 0017 R	2.99	1200.33	01Jun2007, 20:10	10.58
P133b	1.25	765.77	01Jun2007, 17:35	10.27
P1330000 0017 J	4.24	1864.94	01Jun2007, 19:25	10.49
P1000000 1114 J	76.53	20684.05	02Jun2007, 14:00	10.35
P1000000 1038 R	76.53	20546.29	02Jun2007, 18:10	10.35
P1000	3.08	1314.33	01Jun2007, 18:20	10.12
P1000000 1038 J	79.61	20703.6	02Jun2007, 18:10	10.34
P130a	2.91	1734.95	01Jun2007, 17:35	10.31
P530 15 01	2.91	1203.03	01Jun2007, 22:00	10.28
P1300000 0447 R	2.91	1199.65	02Jun2007, 00:15	10.28
P130b	1.02	951.61	01Jun2007, 16:55	10.78
P1300000 0447 J	3.93	1529.09	01Jun2007, 22:10	10.41
P1300000 0361 R	3.93	1521.26	02Jun2007, 01:25	10.4
P130c	2.63	1261.11	01Jun2007, 17:55	10.44
P1300000 0361 J	6.56	2336.89	01Jun2007, 23:55	10.42
P13008a	1.89	1844.52	01Jun2007, 17:15	10.74
P530 08 01	1.89	859.7	01Jun2007, 21:30	10.74
P13009a	1.45	1086.05	01Jun2007, 17:20	10.63
P1300000 0342 J	9.89	3930.81	01Jun2007, 19:05	10.51
P1300000 0302 R	9.89	3914.93	01Jun2007, 20:30	10.51
P130d	0.67	655.03	01Jun2007, 16:50	10.57
P1300000 0302 J	10.56	4284.39	01Jun2007, 20:00	10.51
P13007a	0.84	574.35	01Jun2007, 17:30	10.19
P1300000 0294 J	11.41	4755.96	01Jun2007, 19:45	10.49
P1300000 0257 R	11.41	4733.8	01Jun2007, 21:10	10.49
P130e	1.04	849.49	01Jun2007, 17:10	10.39
P1300000 0257 J	12.44	5248.13	01Jun2007, 20:45	10.48
P13005a	1.2	1201.76	01Jun2007, 17:15	10.67
P1300500 0195 J	1.2	1201.76	01Jun2007, 17:15	10.67
P13005b	0.93	626.28	01Jun2007, 17:45	10.35
P1300500 0162 J	2.13	1816.49	01Jun2007, 17:25	10.53
P530 05 01	2.13	1070	01Jun2007, 17:30	10.53
P1300500 0144 R	2.13	1023.67	02Jun2007, 01:30	10.53
P13005c	0.64	557.86	01Jun2007, 17:00	10.24
P1300500 0144 J	2.77	1144.09	02Jun2007, 00:30	10.46
P1300502a	0.92	596.87	01Jun2007, 17:50	10.08
P1300502 0144 J	0.92	596.87	01Jun2007, 17:50	10.08

P1300502 0126 R	0.92	596.82	01Jun2007, 18:00	10.08
P1300502b	0.14	175.03	01Jun2007, 16:30	10.65
P1300502 0126 J	1.06	734.5	01Jun2007, 17:40	10.15
P1300500 0114 J	3.82	1753.52	01Jun2007, 18:10	10.38
P1300500 0016 R	3.82	1733.04	01Jun2007, 21:35	10.38
P13005d	2.67	1457.12	01Jun2007, 17:55	10.36
P1300500 0016 J	6.5	2909.55	01Jun2007, 20:55	10.37
P1300000 0227 J	18.94	8155.5	01Jun2007, 20:50	10.44
P1300000 0195 R	18.94	8115.96	01Jun2007, 22:10	10.44
P130f	1.21	942.01	01Jun2007, 17:05	10.5
P1300000 0195 J	20.15	8617.22	01Jun2007, 21:50	10.45
P1300301a	0.68	517.79	01Jun2007, 17:15	10.28
P1300300 0032 J	0.68	517.79	01Jun2007, 17:15	10.28
P1300300 0008 R	0.68	517.6	01Jun2007, 17:25	10.28
P13003a	1.58	1205.86	01Jun2007, 17:20	10.42
P1300300 0008 J	2.25	1723.37	01Jun2007, 17:20	10.38
P1300000 0166 J	22.4	9697.01	01Jun2007, 20:30	10.44
P1300000 0107 R	22.4	9660.55	01Jun2007, 23:05	10.44
P130g	1.69	977.98	01Jun2007, 17:40	10.35
P1300000 0107 J	24.09	10287.79	01Jun2007, 22:50	10.43
P13002a	2.49	1073.35	01Jun2007, 18:30	10.23
P1300200 0115 J	2.49	1073.35	01Jun2007, 18:30	10.23
P1300202a	2.27	1216.48	01Jun2007, 18:05	10.34
P1300200 0100 J	4.76	2287.44	01Jun2007, 18:15	10.28
P1300200 0012 R	4.76	2284.13	01Jun2007, 18:55	10.28
P13002b	2.65	1137.25	01Jun2007, 18:10	10.15
P1300200 0023 J	7.41	3409.85	01Jun2007, 18:50	10.23
P1300000 0093 J	31.5	13095.52	01Jun2007, 22:15	10.39
P1300000 0043 R	31.5	13013.8	02Jun2007, 01:05	10.38
P130h	2.37	1130.39	01Jun2007, 18:45	10.3
P1300000 0043 J	33.87	13757.81	02Jun2007, 00:50	10.38
P1000000 1003 J	113.48	28614.13	02Jun2007, 09:00	10.35
P1000000 0860 R	113.48	27815.72	02Jun2007, 15:00	10.35
P100p	5.38	2060.29	01Jun2007, 18:45	10.13
P1000000 0860 J	118.86	28464.74	02Jun2007, 08:35	10.34
P127a	5.06	1592.74	01Jun2007, 19:40	10.11
P1000000 0851 J	123.92	29269.36	02Jun2007, 08:25	10.33
P1000000 0817 R	123.92	29223.21	02Jun2007, 10:00	10.33
P126a	3.71	1615.74	01Jun2007, 18:55	10.44
P1000000 0817 J	127.63	29688.03	02Jun2007, 09:50	10.31
P100q	2.63	1203.84	01Jun2007, 18:15	10.15
P1000000 0795 J	130.25	29980.91	02Jun2007, 09:45	10.31

P1000000 0734 R	130.25	29967.47	02Jun2007, 10:35	10.31
P125a	2.35	1193.33	01Jun2007, 17:55	10.56
P1250000 0129 J	2.35	1425.95	01Jun2007, 18:15	11.47
P1250000 0027 R	2.35	1392.72	01Jun2007, 21:30	11.47
P125b	1.86	1291.41	01Jun2007, 17:40	10.17
P1250000 0027 J	4.21	2304.46	01Jun2007, 20:50	10.9
P1000000 0735 J	134.47	30289.8	02Jun2007, 10:25	10.33
P121a	3.82	1284.54	01Jun2007, 19:05	10.18
P1000000 0720 J	138.29	30800.35	02Jun2007, 10:20	10.32
P1000000 0640 R	138.29	30759.46	02Jun2007, 11:45	10.32
P100r	2.97	1620.11	01Jun2007, 17:50	10.4
P1000000 0640 J	141.26	30958.54	02Jun2007, 11:40	10.32
P1180000 1036 R	0	356.38	01Jun2007, 23:20	Not specified
P118a	1.67	1038.83	01Jun2007, 17:25	10.59
P1180000 1036 J	1.67	1038.83	01Jun2007, 17:25	13.36
P1180000 0846 R	1.67	960.25	02Jun2007, 03:05	13.36
P118b	5.51	3213.08	01Jun2007, 17:50	10.45
P1180000 0846 J	7.18	3963.5	01Jun2007, 18:35	11.13
P11831a	1.1	679.65	01Jun2007, 17:35	10.24
P1183100 9903 J	1.1	679.65	01Jun2007, 17:35	10.24
P1180000 9902 R	1.1	598.95	01Jun2007, 19:35	10.24
P11831b	1.25	800.89	01Jun2007, 17:20	10.39
P1183100 9902 J	2.35	1344.77	01Jun2007, 18:15	10.32
P1180000 9901 R	2.35	1314.38	01Jun2007, 21:30	10.32
P11831c	0.72	575.37	01Jun2007, 17:10	10.51
P1183100 9901 J	3.06	1652.99	01Jun2007, 20:55	10.36
P1180000 0835 J	10.25	5551	01Jun2007, 18:30	10.9
P1180000 0660 R	10.25	4934.07	02Jun2007, 12:25	10.9
P1180000 0643 R	0	324.5	02Jun2007, 02:10	Not specified
P118c	6.03	3765.1	01Jun2007, 18:15	10.73
P1180000 0643 J	16.28	6140.24	01Jun2007, 20:00	11.07
P11823a	1.57	1038.15	01Jun2007, 17:20	10.6
P1180000 0641 J	17.86	6990.69	01Jun2007, 19:55	11.03
P1180000 0441 R	17.86	6603.06	02Jun2007, 04:15	11.03
P118d	6.33	3732.86	01Jun2007, 18:20	10.65
P1180000 0441 J	24.19	7910.71	02Jun2007, 03:30	10.93
P11818a	3.51	1676.7	01Jun2007, 18:00	10.77
P1180000 0432 J	27.7	9037.06	01Jun2007, 22:05	10.91
P1180000 0382 R	27.7	8788.24	02Jun2007, 04:30	10.91
P118e	1.02	740.09	01Jun2007, 17:30	10.76
P1180000 0382 J	28.71	8929.65	02Jun2007, 04:15	10.91
P11814a	2.87	1663.92	01Jun2007, 17:50	10.72

P1180000 0361 J	31.59	9529.6	02Jun2007, 01:00	10.89
P1180000 0233 R	31.59	9500.2	02Jun2007, 06:05	10.89
P118f	5.7	4452.81	01Jun2007, 17:40	10.71
P1180000 0233 J	37.28	10884	01Jun2007, 23:50	10.86
P1180000 0036 R	37.28	10840.84	02Jun2007, 01:25	10.86
P118g	7.32	4439.31	01Jun2007, 19:10	10.54
P1180000 0036 J	44.6	14651.15	01Jun2007, 19:50	10.81
Cha1	0.01	33.91	01Jun2007, 16:05	10.44
Da8	0.03	246.99	01Jun2007, 16:05	8.35
Cha2	0	33.98	01Jun2007, 16:05	9.88
C/cha2	0.05	314.89	01Jun2007, 16:05	8.83
Da2	0.05	210.16	01Jun2007, 16:10	8.54
Da7	0.04	273.36	01Jun2007, 16:05	9.49
Np	0.01	31.43	01Jun2007, 16:15	11.7
C/np	0.13	804.82	01Jun2007, 16:05	9.06
Dcp3	0.13	729.93	01Jun2007, 16:05	8.88
Chb1	0.01	37.15	01Jun2007, 16:05	10.05
Da5	0.01	66.44	01Jun2007, 16:05	9.46
Chb2	0	9.51	01Jun2007, 16:05	10.19
C/chb2	0.02	113.1	01Jun2007, 16:05	9.78
Da6	0.03	247.15	01Jun2007, 16:05	9.17
Chb3	0	17.88	01Jun2007, 16:05	9.54
C/chb3	0.05	378.13	01Jun2007, 16:05	9.4
DCP - 1	0.05	311.93	01Jun2007, 16:05	9.4
Da18	0.01	59.31	01Jun2007, 16:10	10.58
Ndisc	0.2	1084.73	01Jun2007, 16:05	9.13
P10001	0.08	51.3	01Jun2007, 18:20	11.8
Ndcp	0.28	1104.24	01Jun2007, 16:05	9.89
P1000000 0635 J	186.14	41299.69	02Jun2007, 00:50	10.44
P1000000 0580 R	186.14	41228.89	02Jun2007, 01:45	10.44
P100s	1.49	1166.56	01Jun2007, 17:15	10.66
Da12	0.03	185.43	01Jun2007, 16:05	8.66
Chf1	0.01	35.31	01Jun2007, 16:05	8.63
C/da12	0.03	220.74	01Jun2007, 16:05	8.65
Da11	0.02	127.13	01Jun2007, 16:05	8.72
Chg1	0	33.23	01Jun2007, 16:05	9.82
Chg2	0	18.57	01Jun2007, 16:05	10.56
C/chg2	0.03	178.94	01Jun2007, 16:05	9.18
Da3	0.03	167.82	01Jun2007, 16:10	8.59
Chf2	0.01	38.09	01Jun2007, 16:05	9.26
C/d4	0.1	601.75	01Jun2007, 16:05	8.81
DCP - 7	0.1	398.49	01Jun2007, 16:10	8.81

Da10	0.03	210.65	01Jun2007, 16:05	8.75
Chh2	0	33.9	01Jun2007, 16:05	8.75
Chh1	0	25.05	01Jun2007, 16:05	9.94
C/chh2	0.04	269.6	01Jun2007, 16:05	8.86
DCP - 6	0.04	245.85	01Jun2007, 16:05	8.86
Da9	0.02	179.97	01Jun2007, 16:05	9.07
Nep	0	13.61	01Jun2007, 16:15	11.7
C/nep	0.03	188.59	01Jun2007, 16:05	9.37
DCP - 4	0.03	43.04	01Jun2007, 16:25	9.37
Ch1	0.01	40.49	01Jun2007, 16:05	10.42
DCP - 5	0.01	26.96	01Jun2007, 16:10	10.42
Edcp	0.17	637.37	01Jun2007, 16:10	8.97
P1000000 0580 J	187.8	41554.85	02Jun2007, 01:40	10.44
P1000000 0541 R	187.8	41489.69	02Jun2007, 02:30	10.44
P1000000 0541 J	187.8	41489.69	02Jun2007, 02:30	10.44
P114b	1.47	1805.92	01Jun2007, 16:55	10.84
P114a	0.68	733.19	01Jun2007, 16:45	10.54
P1140000 0119 J	0.68	733.19	01Jun2007, 16:45	10.54
P1140000 0036 R	0.68	720.02	01Jun2007, 17:55	10.54
Da17	0.04	307.5	01Jun2007, 16:05	8.12
Chc1	0.01	38.94	01Jun2007, 16:05	9.98
Da19	0	28.71	01Jun2007, 16:05	8.89
C/chc1	0.06	375.15	01Jun2007, 16:05	8.47
Da1	0.05	227.39	01Jun2007, 16:05	9.38
Chc2	0.01	51.46	01Jun2007, 16:05	8.76
C/chc2	0.11	654	01Jun2007, 16:05	8.88
Da15	0.03	195.89	01Jun2007, 16:05	8.77
Da16	0.03	187.21	01Jun2007, 16:05	9.24
C/da15	0.16	1037.09	01Jun2007, 16:05	8.92
Chc3	0.01	33.93	01Jun2007, 16:05	7.79
Swp	0.01	26.64	01Jun2007, 16:10	11.7
C/swp	0.17	1090.36	01Jun2007, 16:05	8.96
Da14	0.03	220.24	01Jun2007, 16:05	8.93
Chd1	0	28.74	01Jun2007, 16:05	9.76
Chd2	0	15.88	01Jun2007, 16:05	10.34
C/chd2	0.04	264.86	01Jun2007, 16:05	9.15
Da4	0.04	176.96	01Jun2007, 16:10	8.71
Chd3	0	19.96	01Jun2007, 16:05	10.62
C/chd3	0.08	451.96	01Jun2007, 16:05	9
DCP - 9	0.08	217.15	01Jun2007, 16:15	9
Da13	0.04	284.55	01Jun2007, 16:05	8.6
Che2	0.01	25.95	01Jun2007, 16:05	9.01

Che1	0	7.89	01Jun2007, 16:05	10.6
C/che2	0.04	318.4	01Jun2007, 16:05	8.7
DCP - 8	0.04	82.18	01Jun2007, 16:20	8.7
Sdcp	0.3	1291.96	01Jun2007, 16:05	8.93
Fil1	0.02	73.47	01Jun2007, 16:25	10.05
Fil2	0.02	53.28	01Jun2007, 16:35	10.05
C/fill	0.04	121.96	01Jun2007, 16:25	10.05
P1140000 0036 J	2.48	2586.47	01Jun2007, 17:30	10.52
P1140000 0026 R	2.48	2559.59	01Jun2007, 17:40	10.52
P114c	0.47	717.6	01Jun2007, 16:30	10.72
P1140000 0026 J	2.95	3105.32	01Jun2007, 17:35	10.55
P1000000 0530 J	190.76	41759.07	02Jun2007, 02:30	10.44
P1000000 0472 R	190.76	41706.85	02Jun2007, 03:30	10.44
P100t	1.95	798.52	01Jun2007, 20:10	10.39
P1000000 0472 J	192.71	42219.32	02Jun2007, 03:25	10.44
P110a	1.99	1942.34	01Jun2007, 17:20	10.66
P1000000 0460 J	194.7	42410.03	02Jun2007, 03:20	10.44
P1000000 0445 R	194.7	42403.58	02Jun2007, 03:35	10.44
P1000000 0445 J	194.7	42403.58	02Jun2007, 03:35	10.44
P109a	1.42	1163.21	01Jun2007, 17:15	10.39
P1000000 0432 J	196.11	42580.52	02Jun2007, 03:30	10.44
P1000000 3901 R	196.11	42570.21	02Jun2007, 03:55	10.44
P100u	0.5	516.49	01Jun2007, 16:50	10.48
P1000000 0390 J	196.61	42599.29	02Jun2007, 03:55	10.44
P107a	2.57	1519.98	01Jun2007, 17:30	10.62
P1070000 0198 J	2.57	1519.98	01Jun2007, 17:30	10.62
P1070000 0026 R	2.57	1467.11	01Jun2007, 22:15	10.62
P107b	2.4	1891.29	01Jun2007, 17:35	10.52
P1070000 0026 J	4.98	3119.22	01Jun2007, 18:20	10.57
P1000000 0381 J	201.59	43763.11	02Jun2007, 02:15	10.44
P1000000 0181 R	201.59	43714.7	02Jun2007, 04:10	10.43
P100v	3.81	2827.61	01Jun2007, 20:00	10.6
P1000000 0181 J	205.4	44408.95	02Jun2007, 03:50	10.44
P1000000 0010 R	205.4	44338.39	02Jun2007, 06:05	10.43
P100w	5.56	4513.46	01Jun2007, 20:30	10.83
P1000000 0010 J	210.97	44783.8	02Jun2007, 05:40	10.44

HEC-1 OUTPUT – PERMITTED
100-YEAR 24-HOUR STORM EVENT

Project: Permitted_Conditions
Simulation Run: 1%_24HR
Simulation Start: 31 May 2007, 24:00
Simulation End: 4 June 2007, 02:45

HMS Version: 4.11
Executed: 15 May 2024, 20:20

Global Parameter Summary - Subbasin

	Area (MI2)
Element Name	**Area (MI2)**
P100a	1.72
P161a	0.55
P100b	0.38
P151a	2.07
P100c	1.33
P100d	1.85
P100e	1.78
P100f	1.09
P100g	1.43
P152a	4.29
P100h	1.38
P148a	2.13
P100i	2.14
P147a	1.47
P147b	1.04
P146a	0.55
P145a	1.03
P145b	0.98
P145c	0.61
P145d	1.06
P245a	1.47
P14503a	1.7
P14503b	2.4
P14503c	0.93
P145e	1.87

P100j	5.89
P156a	1.31
P156b	0.91
P155a	1.47
P100k	1.64
P140a	0.97
P140b	1.31
P140c	1.27
P140d	3.87
P100l	2.72
P138a	2.73
P138b	3.58
P100m	4.34
P100n	3.01
P133a	2.99
P133b	1.25
P1000	3.08
P130a	2.91
P130b	1.02
P130c	2.63
P13008a	1.89
P13009a	1.45
P130d	0.67
P13007a	0.84
P130e	1.04
P13005a	1.2
P13005b	0.93
P13005c	0.64
P1300502a	0.92
P1300502b	0.14
P13005d	2.67
P130f	1.21
P1300301a	0.68
P13003a	1.58
P130g	1.69
P13002a	2.49
P1300202a	2.27
P13002b	2.65
P130h	2.37
P100p	5.38
P127a	5.06
P126a	3.71

P100q	2.63
P125a	2.35
P125b	1.86
P121a	3.82
P100r	2.97
P118a	1.67
P118b	5.51
P11831a	1.1
P11831b	1.25
P11831c	0.72
P118c	6.03
P11823a	1.57
P118d	6.33
P11818a	3.51
P118e	1.02
P11814a	2.87
P118f	5.7
P118g	7.32
Cha1	0.01
Da8	0.03
Cha2	0
Da2	0.05
Da7	0.04
Np	0.01
Chb1	0.01
Da5	0.01
Chb2	0
Da6	0.03
Chb3	0
Da18	0.01
P10001	0.08
P100s	1.49
Da12	0.03
Chf1	0.01
Da11	0.02
Chg1	0
Chg2	0
Da3	0.03
Chf2	0.01
Da10	0.03
Chh2	0
Chh1	0

Da9	0.02
Nep	0
Ch1	0.01
P114b	1.47
P114a	0.68
Da17	0.04
Chc1	0.01
Da19	0
Da1	0.05
Chc2	0.01
Da15	0.03
Da16	0.03
Chc3	0.01
Swp	0.01
Da14	0.03
Chd1	0
Chd2	0
Da4	0.04
Chd3	0
Da13	0.04
Che2	0.01
Che1	0
Fil1	0.02
Fil2	0.02
P114c	0.47
P100t	1.95
P110a	1.99
P109a	1.42
P100u	0.5
P107a	2.57
P107b	2.4
P100v	3.81
P100w	5.56

Element Name	Downstream
	Downstream
P100a	P1000000 2203 J
P161a	P1000000 2197 J
P100b	P1000000 2159 J
P151a	P1000000 2137 J
P100c	P1000000 2105 J
P100d	P1000000 2083 J
P100e	P1000000 2047 J
P100f	P1000000 2020 J
P100g	P1000000 1929 J
P152a	P1000000 1918 D
P100h	P1000000 1856 J
P148a	P1480000 0073 J
P100i	P1000000 1741 J
P147a	P1470000 0055 J
P147b	P1470000 0018 J
P146a	P1000000 1709 J
P145a	P1450000 0232 J
P145b	P1450000 0208 J
P145c	P1450000 0188 J
P145d	P1450000 0139 J
P245a	P1450000 0119 J
P14503a	P1450300 0103 J
P14503b	P1450300 0037 J
P14503c	P1450300 0014 J
P145e	P1450000 0010 J
P100j	P1000000 1557 J
P156a	P1560000 0048 J
P156b	P1560000 0019 J
P155a	P1550000 0008 J
P100k	P1000000 1433 J
P140a	P1400403 0259 J
P140b	P1400400 0172 J
P140c	P1400000 0112 J
P140d	P1400000 0020 J
P100l	P1000000 1334 J
P138a	P1380000 0141 D
P138b	P1380000 0013 J
P100m	P1000000 1226 J
P100n	P1000000 1123 J
P133a	P1330000 0092 J

P133b	P1330000 0017 J
P1000	P1000000 1038 J
P130a	P530 15 01
P130b	P1300000 0447 J
P130c	P1300000 0361 J
P13008a	P530 08 01
P13009a	P1300000 0342 J
P130d	P1300000 0302 J
P13007a	P1300000 0294 J
P130e	P1300000 0257 J
P13005a	P1300500 0195 J
P13005b	P1300500 0162 J
P13005c	P1300500 0144 J
P1300502a	P1300502 0144 J
P1300502b	P1300502 0126 J
P13005d	P1300500 0016 J
P130f	P1300000 0195 J
P1300301a	P1300300 0032 J
P13003a	P1300300 0008 J
P130g	P1300000 0107 J
P13002a	P1300200 0115 J
P1300202a	P1300200 0100 J
P13002b	P1300200 0023 J
P130h	P1300000 0043 J
P100p	P1000000 0860 J
P127a	P1000000 0851 J
P126a	P1260000 0127 D
P100q	P1000000 0795 J
P125a	P1250000 0129 J
P125b	P1250000 0027 J
P121a	P1000000 0720 J
P100r	P1000000 0640 J
P118a	P1180000 1036 J
P118b	P1180000 0846 J
P11831a	P1183100 9903 J
P11831b	P1183100 9902 J
P11831c	P1183100 9901 J
P118c	P1180000 0643 J
P11823a	P1180000 0641 J
P118d	P1180000 0441 J
P11818a	P1180000 0432 J
P118e	P1180000 0382 J

P11814a	P1180000 0361 J
P118f	P1180000 0233 J
P118g	P1180000 0036 J
Cha1	C/cha2
Da8	C/cha2
Cha2	C/cha2
Da2	C/np
Da7	C/np
Np	C/np
Chb1	C/chb2
Da5	C/chb2
Chb2	C/chb2
Da6	C/chb3
Chb3	C/chb3
Da18	Ndisc
P10001	Ndcp
P100s	P1000000 0580 J
Da12	C/da12
Chf1	C/da12
Da11	C/chg2
Chg1	C/chg2
Chg2	C/chg2
Da3	C/d4
Chf2	C/d4
Da10	C/chh2
Chh2	C/chh2
Chh1	C/chh2
Da9	C/nep
Nep	C/nep
Ch1	DCP - 5
P114b	P1140000 0036 J
P114a	P1140000 0119 J
Da17	C/chc1
Chc1	C/chc1
Da19	C/chc1
Da1	C/chc2
Chc2	C/chc2
Da15	C/da15
Da16	C/da15
Chc3	C/swp
Swp	C/swp
Da14	C/chd2

Chd1	C/chd2
Chd2	C/chd2
Da4	C/chd3
Chd3	C/chd3
Da13	C/che2
Che2	C/che2
Che1	C/che2
Fil1	C/fill
Fil2	C/fill
P114c	P1140000 0026 J
P100t	P1000000 0472 J
P110a	P1000000 0460 J
P109a	P1000000 0432 J
P100u	P1000000 0390 J
P107a	P1070000 0198 J
P107b	P1070000 0026 J
P100v	P1000000 0181 J
P100w	P1000000 0010 J

Loss Rate: Green and Ampt

Element Name	Percent Impervious Area	Initial Variable	Initial Content	Saturated Content	Wetting Front Suction	Hydraulic Conductivity
P100a	37.72	Water Content	0.02	0.46	3.5	0.02
P161a	40.04	Water Content	0.02	0.46	3.5	0.02
P100b	40.52	Water Content	0.02	0.46	3.5	0.02
P151a	26.03	Water Content	0.02	0.46	3.5	0.02
P100c	20.72	Water Content	0.02	0.46	3.5	0.02
P100d	37.11	Water Content	0.02	0.46	3.5	0.02
P100e	26.21	Water Content	0.02	0.46	3.5	0.02
P100f	18.78	Water Content	0.02	0.46	3.5	0.02
P100g	19.06	Water Content	0.02	0.46	3.5	0.02
P152a	43.55	Water Content	0.02	0.46	3.5	0.02
P100h	37.32	Water Content	0.02	0.46	3.5	0.02
P148a	34.29	Water Content	0.02	0.46	3.5	0.02
P100i	31.68	Water Content	0.02	0.46	3.5	0.02
P147a	42.76	Water Content	0.02	0.46	3.5	0.02
P147b	22.65	Water Content	0.02	0.46	3.5	0.02
P146a	16.03	Water Content	0.02	0.46	3.5	0.02
P145a	39.28	Water Content	0.02	0.46	3.5	0.02
P145b	20.53	Water Content	0.02	0.46	3.5	0.02
P145c	8.52	Water Content	0.02	0.46	3.5	0.02
P145d	20.33	Water Content	0.02	0.46	3.5	0.02

P245a	3.49	Water Content	0.02	0.46	3.5	0.02
P14503a	20.09	Water Content	0.02	0.46	3.5	0.02
P14503b	26.48	Water Content	0.02	0.46	3.5	0.02
P14503c	7.88	Water Content	0.02	0.46	3.5	0.02
P145e	38.26	Water Content	0.02	0.46	3.5	0.02
P100j	40.85	Water Content	0.02	0.46	3.5	0.02
P156a	18.11	Water Content	0.02	0.46	3.5	0.02
P156b	41.88	Water Content	0.02	0.46	3.5	0.02
P155a	46.09	Water Content	0.02	0.46	3.5	0.02
P100k	38.52	Water Content	0.02	0.46	3.5	0.02
P140a	33.04	Water Content	0.02	0.46	3.5	0.02
P140b	9.44	Water Content	0.02	0.46	3.5	0.02
P140c	29.56	Water Content	0.02	0.46	3.5	0.02
P140d	35.91	Water Content	0.02	0.46	3.5	0.02
P100l	41.05	Water Content	0.02	0.46	3.5	0.02
P138a	41.6	Water Content	0.02	0.46	3.5	0.02
P138b	38.31	Water Content	0.02	0.46	3.5	0.02
P100m	29.61	Water Content	0.02	0.46	3.5	0.02
P100n	26.56	Water Content	0.02	0.46	3.5	0.02
P133a	32.38	Water Content	0.02	0.46	3.5	0.02
P133b	12.85	Water Content	0.02	0.46	3.5	0.02
P100o	3.64	Water Content	0.02	0.46	3.5	0.02

P130a	15.04	Water Content	0.02	0.46	3.5	0.02
P130b	44.11	Water Content	0.02	0.46	3.5	0.02
P130c	22.94	Water Content	0.02	0.46	3.5	0.02
P13008a	41.52	Water Content	0.02	0.46	3.5	0.02
P13009a	34.74	Water Content	0.02	0.46	3.5	0.02
P130d	31.04	Water Content	0.02	0.46	3.5	0.02
P13007a	7.83	Water Content	0.02	0.46	3.5	0.02
P130e	20.22	Water Content	0.02	0.46	3.5	0.02
P13005a	37.53	Water Content	0.02	0.46	3.5	0.02
P13005b	17.88	Water Content	0.02	0.46	3.5	0.02
P13005c	10.81	Water Content	0.02	0.46	3.5	0.02
P1300502a	1.2	Water Content	0.02	0.46	3.5	0.02
P1300502b	36.34	Water Content	0.02	0.46	3.5	0.02
P13005d	18.64	Water Content	0.02	0.46	3.5	0.02
P130f	26.91	Water Content	0.02	0.46	3.5	0.02
P1300301a	13.33	Water Content	0.02	0.46	3.5	0.02
P13003a	21.98	Water Content	0.02	0.46	3.5	0.02
P130g	17.74	Water Content	0.02	0.46	3.5	0.02
P13002a	10.39	Water Content	0.02	0.46	3.5	0.02
P1300202a	16.98	Water Content	0.02	0.46	3.5	0.02
P13002b	5.68	Water Content	0.02	0.46	3.5	0.02
P130h	14.74	Water Content	0.02	0.46	3.5	0.02

P100p	5.21	Water Content	0.02	0.46	3.5	0.02
P127a	12.41	Water Content	0.02	0.46	3.5	0.02
P126a	23.46	Water Content	0.02	0.46	3.5	0.02
P100q	5.62	Water Content	0.02	0.46	3.5	0.02
P125a	30.66	Water Content	0.02	0.46	3.5	0.02
P125b	7.01	Water Content	0.02	0.46	3.5	0.02
P121a	13	Water Content	0.02	0.46	3.5	0.02
P100r	20.89	Water Content	0.02	0.46	3.5	0.02
P118a	32.54	Water Content	0.02	0.46	3.5	0.02
P118b	24.05	Water Content	0.02	0.46	3.5	0.02
P11831a	10.86	Water Content	0.02	0.46	3.5	0.02
P11831b	20.45	Water Content	0.02	0.46	3.5	0.02
P11831c	27.41	Water Content	0.02	0.46	3.5	0.02
P118c	40.94	Water Content	0.02	0.46	3.5	0.02
P11823a	32.95	Water Content	0.02	0.46	3.5	0.02
P118d	35.76	Water Content	0.02	0.46	3.5	0.02
P11818a	43.13	Water Content	0.02	0.46	3.5	0.02
P118e	43	Water Content	0.02	0.46	3.5	0.02
P11814a	40.21	Water Content	0.02	0.46	3.5	0.02
P118f	39.45	Water Content	0.02	0.46	3.5	0.02
P118g	29.31	Water Content	0.02	0.46	3.5	0.02
P100s	36.73	Water Content	0.02	0.46	3.5	0.02

P114b	47.78	Water Content	0.02	0.46	3.5	0.02
P114a	29.31	Water Content	0.02	0.46	3.5	0.02
P114c	40.41	Water Content	0.02	0.46	3.5	0.02
P100t	20.26	Water Content	0.02	0.46	3.5	0.02
P110a	36.45	Water Content	0.02	0.46	3.5	0.02
P109a	19.91	Water Content	0.02	0.46	3.5	0.02
P100u	25.39	Water Content	0.02	0.46	3.5	0.02
P107a	34.16	Water Content	0.02	0.46	3.5	0.02
P107b	27.84	Water Content	0.02	0.46	3.5	0.02
P100v	33.23	Water Content	0.02	0.46	3.5	0.02
P100w	46.81	Water Content	0.02	0.46	3.5	0.02

Canopy: Simple

Element Name	Allow Simultaneous Precip Et	Plant Uptake Method	Initial Canopy Storage Percent	Canopy Storage Capacity	Crop Coefficient
P100a	No	None	0	0.1	1
P161a	No	None	0	0.1	1
P100b	No	None	0	0.1	1
P151a	No	None	0	0.1	1
P100c	No	None	0	0.1	1
P100d	No	None	0	0.1	1
P100e	No	None	0	0.1	1
P100f	No	None	0	0.1	1
P100g	No	None	0	0.1	1
P152a	No	None	0	0.1	1
P100h	No	None	0	0.1	1
P148a	No	None	0	0.1	1
P100i	No	None	0	0.1	1
P147a	No	None	0	0.1	1
P147b	No	None	0	0.1	1
P146a	No	None	0	0.1	1
P145a	No	None	0	0.1	1
P145b	No	None	0	0.1	1
P145c	No	None	0	0.1	1
P145d	No	None	0	0.1	1
P245a	No	None	0	0.1	1
P14503a	No	None	0	0.1	1
P14503b	No	None	0	0.1	1
P14503c	No	None	0	0.1	1
P145e	No	None	0	0.1	1
P100j	No	None	0	0.1	1
P156a	No	None	0	0.1	1
P156b	No	None	0	0.1	1
P155a	No	None	0	0.1	1
P100k	No	None	0	0.1	1
P140a	No	None	0	0.1	1
P140b	No	None	0	0.1	1
P140c	No	None	0	0.1	1
P140d	No	None	0	0.1	1
P100l	No	None	0	0.1	1
P138a	No	None	0	0.1	1
P138b	No	None	0	0.1	1

P100m	No	None	0	0.1	1
P100n	No	None	0	0.1	1
P133a	No	None	0	0.1	1
P133b	No	None	0	0.1	1
P1000	No	None	0	0.1	1
P130a	No	None	0	0.1	1
P130b	No	None	0	0.1	1
P130c	No	None	0	0.1	1
P13008a	No	None	0	0.1	1
P13009a	No	None	0	0.1	1
P130d	No	None	0	0.1	1
P13007a	No	None	0	0.1	1
P130e	No	None	0	0.1	1
P13005a	No	None	0	0.1	1
P13005b	No	None	0	0.1	1
P13005c	No	None	0	0.1	1
P1300502a	No	None	0	0.1	1
P1300502b	No	None	0	0.1	1
P13005d	No	None	0	0.1	1
P130f	No	None	0	0.1	1
P1300301a	No	None	0	0.1	1
P13003a	No	None	0	0.1	1
P130g	No	None	0	0.1	1
P13002a	No	None	0	0.1	1
P1300202a	No	None	0	0.1	1
P13002b	No	None	0	0.1	1
P130h	No	None	0	0.1	1
P100p	No	None	0	0.1	1
P127a	No	None	0	0.1	1
P126a	No	None	0	0.1	1
P100q	No	None	0	0.1	1
P125a	No	None	0	0.1	1
P125b	No	None	0	0.1	1
P121a	No	None	0	0.1	1
P100r	No	None	0	0.1	1
P118a	No	None	0	0.1	1
P118b	No	None	0	0.1	1
P11831a	No	None	0	0.1	1
P11831b	No	None	0	0.1	1
P11831c	No	None	0	0.1	1
P118c	No	None	0	0.1	1
P11823a	No	None	0	0.1	1

P118d	No	None	0	0.1	1
P11818a	No	None	0	0.1	1
P118e	No	None	0	0.1	1
P11814a	No	None	0	0.1	1
P118f	No	None	0	0.1	1
P118g	No	None	0	0.1	1
P100s	No	None	0	0.1	1
P114b	No	None	0	0.1	1
P114a	No	None	0	0.1	1
P114c	No	None	0	0.1	1
P100t	No	None	0	0.1	1
P110a	No	None	0	0.1	1
P109a	No	None	0	0.1	1
P100u	No	None	0	0.1	1
P107a	No	None	0	0.1	1
P107b	No	None	0	0.1	1
P100v	No	None	0	0.1	1
P100w	No	None	0	0.1	1

Element Name	Transform: Clark			
	Clark Method	Time of Concentration	Storage Coefficient	Time Area Method
P100a	Specified	0.71	5.09	Default
P161a	Specified	0.57	2.48	Default
P100b	Specified	0.13	2.13	Default
P151a	Specified	1.19	9.37	Default
P100c	Specified	0.7	5.79	Default
P100d	Specified	0.6	6.41	Default
P100e	Specified	0.96	7.37	Default
P100f	Specified	0.44	6.24	Default
P100g	Specified	0.92	8.4	Default
P152a	Specified	1.68	4.83	Default
P100h	Specified	0.5	3.59	Default
P148a	Specified	1.02	5.51	Default
P100i	Specified	0.74	5.29	Default
P147a	Specified	0.44	5.33	Default
P147b	Specified	1.01	6.19	Default
P146a	Specified	0.75	4.35	Default
P145a	Specified	0.33	3.33	Default
P145b	Specified	0.44	5.34	Default
P145c	Specified	1	6.48	Default
P145d	Specified	0.29	5.84	Default
P245a	Specified	1.13	6.66	Default
P14503a	Specified	0.6	7.58	Default
P14503b	Specified	0.37	5.65	Default
P14503c	Specified	0.89	7.64	Default
P145e	Specified	0.66	3.77	Default
P100j	Specified	0.86	6.87	Default
P156a	Specified	0.95	5.18	Default
P156b	Specified	0.39	2.1	Default
P155a	Specified	0.54	2.57	Default
P100k	Specified	0.64	4.15	Default
P140a	Specified	0.36	4.51	Default
P140b	Specified	0.94	4.99	Default
P140c	Specified	0.67	6.66	Default
P140d	Specified	0.75	9.71	Default
P100l	Specified	0.86	5.66	Default
P138a	Specified	0.94	9.4	Default
P138b	Specified	0.83	8.1	Default
P100m	Specified	1.12	11.35	Default
P100n	Specified	1.27	7.54	Default

P133a	Specified	1.31	11.01	Default
P133b	Specified	0.57	6.14	Default
P1000	Specified	1.11	9.91	Default
P130a	Specified	0.53	6.37	Default
P130b	Specified	0.42	3.34	Default
P130c	Specified	0.68	8.68	Default
P13008a	Specified	0.97	3.07	Default
P13009a	Specified	0.65	4.63	Default
P130d	Specified	0.32	3.08	Default
P13007a	Specified	0.77	5.24	Default
P130e	Specified	0.5	4.02	Default
P13005a	Specified	1.09	2.93	Default
P13005b	Specified	1.21	5.32	Default
P13005c	Specified	0.33	3.63	Default
P1300502a	Specified	1.24	5.57	Default
P1300502b	Specified	0.17	1.98	Default
P13005d	Specified	0.91	7.24	Default
P130f	Specified	0.34	4.34	Default
P1300301a	Specified	0.6	4.43	Default
P13003a	Specified	0.74	4.45	Default
P130g	Specified	0.54	6.68	Default
P13002a	Specified	1.29	9.83	Default
P1300202a	Specified	1.27	7.37	Default
P13002b	Specified	0.79	9.84	Default
P130h	Specified	2	8.56	Default
P100p	Specified	1.44	11.4	Default
P127a	Specified	2.18	14.75	Default
P126a	Specified	2.06	9.79	Default
P100q	Specified	1.19	9.02	Default
P125a	Specified	0.78	8.08	Default
P125b	Specified	1.06	5.08	Default
P121a	Specified	1.3	13.64	Default
P100r	Specified	0.81	7.24	Default
P118a	Specified	0.25	6.11	Default
P118b	Specified	0.89	6.62	Default
P11831a	Specified	0.67	6	Default
P11831b	Specified	0.2	5.79	Default
P11831c	Specified	0.42	4.18	Default
P118c	Specified	1.8	6.02	Default
P11823a	Specified	0.37	5.61	Default
P118d	Specified	1.81	6.51	Default
P11818a	Specified	0.73	8.9	Default

P118e	Specified	0.88	4.87	Default
P11814a	Specified	0.91	6.78	Default
P118f	Specified	1.29	4.33	Default
P118g	Specified	3.05	6.03	Default
P10001	Specified	1.91	6.1	Default
P100s	Specified	0.62	4.37	Default
P114b	Specified	0.74	2.13	Default
P114a	Specified	0.4	2.61	Default
P114c	Specified	0.36	1.51	Default
P100t	Specified	3.84	10.36	Default
P110a	Specified	1.2	3.05	Default
P109a	Specified	0.69	3.99	Default
P100u	Specified	0.4	2.82	Default
P107a	Specified	0.34	6.58	Default
P107b	Specified	1.21	4.25	Default
P100v	Specified	4.31	3.95	Default
P100w	Specified	5.51	2.76	Default

Transform: Kinematic Wave

Element Name	Transform
Cha1	Kinematic Wave
Da8	Kinematic Wave
Cha2	Kinematic Wave
Da2	Kinematic Wave
Da7	Kinematic Wave
Chb1	Kinematic Wave
Da5	Kinematic Wave
Chb2	Kinematic Wave
Da6	Kinematic Wave
Chb3	Kinematic Wave
Da12	Kinematic Wave
Chf1	Kinematic Wave
Da11	Kinematic Wave
Chg1	Kinematic Wave
Chg2	Kinematic Wave
Da3	Kinematic Wave
Chf2	Kinematic Wave
Da10	Kinematic Wave
Chh2	Kinematic Wave
Chh1	Kinematic Wave
Da9	Kinematic Wave
Ch1	Kinematic Wave
Da17	Kinematic Wave
Chc1	Kinematic Wave
Da19	Kinematic Wave
Da1	Kinematic Wave
Chc2	Kinematic Wave
Da15	Kinematic Wave
Da16	Kinematic Wave
Chc3	Kinematic Wave
Da14	Kinematic Wave
Chd1	Kinematic Wave
Chd2	Kinematic Wave
Da4	Kinematic Wave
Chd3	Kinematic Wave
Da13	Kinematic Wave
Che2	Kinematic Wave
Che1	Kinematic Wave

Loss Rate: Scs			
Element Name	Percent Impervious Area	Curve Number	Initial Abstraction
Np	0	99	0
Da18	0	88	0
Nep	0	99	0
Swp	0	99	0
Fil1	0	83	0
Fil2	0	83	0

Transform: Snyder			
Element Name	Snyder Method	Snyder Tp	Snyder Cp
Np	Standard	0.2	0.69
Da18	Standard	0.16	0.65
Nep	Standard	0.21	0.71
Swp	Standard	0.16	0.68
Fil1	Standard	0.36	0.71
Fil2	Standard	0.54	0.7

Global Parameter Summary - Reach

Downstream	
Element Name	Downstream
P1000000 2159 R	P1000000 2159 J
P1000000 2105 R	P1000000 2105 J
P1000000 2083 R	P1000000 2083 J
P1000000 2048 R	P1000000 2047 J
P1000000 2020 R	P1000000 2020 J
P1000000 1929 R	P1000000 1929 J
P1000000 1856 R	P1000000 1856 J
P1000000 1741 R	P1000000 1741 J
P1470000 0018 R	P1470000 0018 J
P1000000 1716 R	P1000000 1716 J
P1000000 1690 R	P1000000 1690 J
P1450000 0208 R	P1450000 0208 J
P1450000 0188 R	P1450000 0188 J
P1450000 0139 R	P1450000 0139 J
P1450000 0096 R	P1450000 0096 J
P1450300 0037 R	P1450300 0037 J
P1450300 0014 R	P1450300 0014 J
P1450000 0010 R	P1450000 0010 J
P1000000 1557 R	P1000000 1557 J

P1560000 0019 R
P1000000 1498 R
P1000000 1433 R
P1400000 0172 R
P1400000 0112 R
P1400000 0020 R
P1000000 1334 R
P1380000 0013 R
P1000000 1226 R
P1000000 1123 R
P1330000 0017 R
P1000000 1038 R
P1300000 0447 R
P1300000 0361 R
P1300000 0302 R
P1300000 0257 R
P1300500 0144 R
P1300502 0126 R
P1300500 0016 R
P1300000 0195 R
P1300300 0008 R
P1300000 0107 R
P1300200 0012 R
P1300000 0043 R
P1000000 0860 R
P1000000 0817 R
P1000000 0734 R
P1250000 0027 R
P1000000 0640 R
P1180000 1036 R
P1180000 0846 R
P1180000 9902 R
P1180000 9901 R
P1180000 0660 R
P1180000 0643 R
P1180000 0441 R
P1180000 0382 R
P1180000 0233 R
P1180000 0036 R
P1000000 0580 R
P1000000 0541 R
P1140000 0036 R

P1560000 0019 J
P1000000 1498 J
P1000000 1433 J
P1400400 0172 J
P1400000 0112 J
P1400000 0020 J
P1000000 1334 J
P1380000 0013 J
P1000000 1226 J
P1000000 1123 J
P1330000 0017 J
P1000000 1038 J
P1300000 0447 J
P1300000 0361 J
P1300000 0302 J
P1300000 0257 J
P1300500 0144 J
P1300502 0126 J
P1300500 0016 J
P1300000 0195 J
P1300300 0008 J
P1300000 0107 J
P1300200 0023 J
P1300000 0043 J
P1000000 0860 J
P1000000 0817 J
P1000000 0735 J
P1250000 0027 J
P1000000 0640 J
P1180000 1036 J
P1180000 0846 J
P1183100 9902 J
P1183100 9901 J
P1180000 0643 J
P1180000 0643 J
P1180000 0441 J
P1180000 0382 J
P1180000 0233 J
P1180000 0036 J
P1000000 0580 J
P1000000 0541 J
P1140000 0036 J

P1140000 0026 R
P1000000 0472 R
P1000000 0445 R
P1000000 3901 R
P1070000 0026 R
P1000000 0181 R
P1000000 0010 R

P1140000 0026 J
P1000000 0472 J
P1000000 0445 J
P1000000 0390 J
P1070000 0026 J
P1000000 0181 J
P1000000 0010 J

Route: Modified Puls

Element Name	Method	Initial Variable	Number of Reaches	Storage Outflow Table Name
P1000000 2159 R	Modified Puls	Combined Inflow	14	P1000000 2159 R
P1000000 2105 R	Modified Puls	Combined Inflow	16	P1000000 2105 R
P1000000 2083 R	Modified Puls	Combined Inflow	4	P1000000 2083 R
P1000000 2048 R	Modified Puls	Combined Inflow	6	P1000000 2048 R
P1000000 2020 R	Modified Puls	Combined Inflow	6	P1000000 2020 R
P1000000 1929 R	Modified Puls	Combined Inflow	21	P1000000 1929 R
P1000000 1856 R	Modified Puls	Combined Inflow	21	P1000000 1856 R
P1000000 1741 R	Modified Puls	Combined Inflow	17	P1000000 1741 R
P1470000 0018 R	Modified Puls	Combined Inflow	10	P1470000 0018 R
P1000000 1716 R	Modified Puls	Combined Inflow	3	P1000000 1716 R
P1000000 1690 R	Modified Puls	Combined Inflow	8	P1000000 1690 R
P1450000 0208 R	Modified Puls	Combined Inflow	2	P1450000 0208 R
P1450000 0188 R	Modified Puls	Combined Inflow	3	P1450000 0188 R
P1450000 0139 R	Modified Puls	Combined Inflow	8	P1450000 0139 R
P1450000 0096 R	Modified Puls	Combined Inflow	3	P1450000 0096 R
P1450300 0037 R	Modified Puls	Combined Inflow	11	P1450300 0037 R
P1450300 0014 R	Modified Puls	Combined Inflow	7	P1450300 0014 R
P1450000 0010 R	Modified Puls	Combined Inflow	10	P1450000 0010 R
P1000000 1557 R	Modified Puls	Combined Inflow	24	P1000000 1557 R
P1560000 0019 R	Modified Puls	Combined Inflow	2	P1560000 0019 R
P1000000 1498 R	Modified Puls	Combined Inflow	7	P1000000 1498 R

P1000000 1433 R	Modified Puls	Combined Inflow	20	P1000000 1433 R
P1400000 0172 R	Modified Puls	Combined Inflow	33	P1400000 0172 R
P1400000 0112 R	Modified Puls	Combined Inflow	12	P1400000 0112 R
P1400000 0020 R	Modified Puls	Combined Inflow	10	P1400000 0020 R
P1000000 1334 R	Modified Puls	Combined Inflow	17	P1000000 1334 R
P1380000 0013 R	Modified Puls	Combined Inflow	25	P1380000 0013 R
P1000000 1226 R	Modified Puls	Combined Inflow	17	P1000000 1226 R
P1000000 1123 R	Modified Puls	Combined Inflow	23	P1000000 1123 R
P1330000 0017 R	Modified Puls	Combined Inflow	12	P1330000 0017 R
P1000000 1038 R	Modified Puls	Combined Inflow	28	P1000000 1038 R
P1300000 0447 R	Modified Puls	Combined Inflow	17	P1300000 0447 R
P1300000 0361 R	Modified Puls	Combined Inflow	31	P1300000 0361 R
P1300000 0302 R	Modified Puls	Combined Inflow	8	P1300000 0302 R
P1300000 0257 R	Modified Puls	Combined Inflow	9	P1300000 0257 R
P1300500 0144 R	Modified Puls	Combined Inflow	1	P1300500 0144 R
P1300500 0016 R	Modified Puls	Combined Inflow	28	P1300500 0016 R
P1300000 0195 R	Modified Puls	Combined Inflow	8	P1300000 0195 R
P1300300 0008 R	Modified Puls	Combined Inflow	3	P1300300 0008 R
P1300000 0107 R	Modified Puls	Combined Inflow	16	P1300000 0107 R
P1300200 0012 R	Modified Puls	Combined Inflow	12	P1300200 0012 R
P1300000 0043 R	Modified Puls	Combined Inflow	20	P1300000 0043 R
P1000000 0860 R	Modified Puls	Combined Inflow	27	P1000000 0860 R

P1000000 0817 R	Modified Puls	Combined Inflow	9	P1000000 0817 R
P1000000 0734 R	Modified Puls	Combined Inflow	9	P1000000 0734 R
P1250000 0027 R	Modified Puls	Combined Inflow	19	P1250000 0027 R
P1000000 0640 R	Modified Puls	Combined Inflow	10	P1000000 0640 R
P1180000 0846 R	Modified Puls	Combined Inflow	51	P1180000 0846 R
P1180000 9902 R	Modified Puls	Combined Inflow	1	P1180000 9902 R
P1180000 9901 R	Modified Puls	Combined Inflow	18	P1180000 9901 R
P1180000 0660 R	Modified Puls	Combined Inflow	70	P1180000 0660 R
P1180000 0441 R	Modified Puls	Combined Inflow	45	P1180000 0441 R
P1180000 0382 R	Modified Puls	Combined Inflow	25	P1180000 0382 R
P1180000 0233 R	Modified Puls	Combined Inflow	20	P1180000 0233 R
P1180000 0036 R	Modified Puls	Combined Inflow	21	P1180000 0036 R
P1000000 0580 R	Modified Puls	Combined Inflow	8	P1000000 0580 R
P1000000 0541 R	Modified Puls	Combined Inflow	7	P1000000 0541 R
P1140000 0036 R	Modified Puls	Combined Inflow	15	P1140000 0036 R
P1140000 0026 R	Modified Puls	Combined Inflow	2	P1140000 0026 R
P1000000 0472 R	Modified Puls	Combined Inflow	9	P1000000 0472 R
P1000000 0445 R	Modified Puls	Combined Inflow	3	P1000000 0445 R
P1000000 3901 R	Modified Puls	Combined Inflow	5	P1000000 3901 R
P1070000 0026 R	Modified Puls	Combined Inflow	28	P1070000 0026 R
P1000000 0181 R	Modified Puls	Combined Inflow	21	P1000000 0181 R
P1000000 0010 R	Modified Puls	Combined Inflow	18	P1000000 0010 R

Route: Lag

Element Name	Method	Initial Variable	Lag
P1300502 0126 R	Lag	Combined Inflow	9.8
P1180000 1036 R	Lag	Combined Inflow	277.78
P1180000 0643 R	Lag	Combined Inflow	138.89

Global Results Summary

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (IN)
P100a	1.72	1830.02	01Jun2007, 17:30	17.74
P1000000 2203 J	1.72	1830.02	01Jun2007, 17:30	17.74
P161a	0.55	913.91	01Jun2007, 16:50	17.78
P1000000 2197 J	2.27	2713.25	01Jun2007, 17:10	17.75
P1000000 2159 R	2.27	2353.78	01Jun2007, 22:55	17.75
P100b	0.38	693.74	01Jun2007, 16:30	17.79
P1000000 2159 J	2.66	2504.17	01Jun2007, 22:50	17.76
P151a	2.07	1474.56	01Jun2007, 19:05	17.54
P1000000 2137 J	4.72	3717.62	01Jun2007, 22:30	17.66
P1000000 2105 R	4.72	3379.48	02Jun2007, 04:55	17.66
P100c	1.33	1293.63	01Jun2007, 17:45	17.45
P1000000 2105 J	6.05	3787.89	01Jun2007, 21:40	17.62
P1000000 2083 R	6.05	3771.52	01Jun2007, 22:45	17.62
P100d	1.85	1701.07	01Jun2007, 17:50	17.73
P1000000 2083 J	7.9	5232.24	01Jun2007, 19:40	17.64
P1000000 2048 R	7.9	5143.8	01Jun2007, 22:10	17.64
P100e	1.78	1490.9	01Jun2007, 18:20	17.55
P1000000 2047 J	9.68	6354.15	01Jun2007, 21:20	17.63
P1000000 2020 R	9.68	6336.56	01Jun2007, 22:40	17.63
P100f	1.09	1009.59	01Jun2007, 17:45	17.42
P1000000 2020 J	10.77	7036.03	01Jun2007, 22:00	17.61
P1000000 1929 R	10.77	6968.84	02Jun2007, 02:10	16.77
P100g	1.43	1096.42	01Jun2007, 18:35	17.43
P1000000 1929 J	12.21	7588.32	02Jun2007, 01:55	16.85
P152a	4.29	4696.34	01Jun2007, 18:05	17.84
P1000000 1856 R	16.49	7607.7	02Jun2007, 07:00	15.2
P100h	1.38	1826.36	01Jun2007, 17:00	17.74
P1000000 1856 J	17.88	7700.74	02Jun2007, 06:55	15.4
P148a	2.13	2156.75	01Jun2007, 17:50	17.68
P1480000 0073 J	2.13	3355.59	01Jun2007, 19:15	32.39
P1000000 1741 R	20.01	8661.13	01Jun2007, 23:20	16.17
P100i	2.14	2215.4	01Jun2007, 17:35	17.64

P1000000 1741 J	22.15	10041.38	01Jun2007, 21:00	16.32
P147a	1.47	1528.19	01Jun2007, 17:25	17.83
P1470000 0055 J	1.47	1528.19	01Jun2007, 17:25	17.83
P1470000 0018 R	1.47	1512.82	01Jun2007, 19:05	17.83
P147b	1.04	974.06	01Jun2007, 18:00	17.49
P1470000 0018 J	2.52	2468.13	01Jun2007, 18:50	17.69
P1000000 1730 J	24.66	12207.27	01Jun2007, 20:25	16.46
P1000000 1716 R	24.66	12099.21	01Jun2007, 21:35	16.45
P1000000 1716 J	24.66	12099.21	01Jun2007, 21:35	16.45
P146a	0.55	643.5	01Jun2007, 17:20	17.37
P1000000 1709 J	25.22	12506.66	01Jun2007, 21:30	16.48
P1000000 1690 R	25.22	12310.82	02Jun2007, 00:55	16.47
P1000000 1690 J	25.22	12310.82	02Jun2007, 00:55	16.47
P145a	1.03	1430.74	01Jun2007, 16:55	17.77
P1450000 0232 J	1.03	1430.74	01Jun2007, 16:55	17.77
P1450000 0208 R	1.03	1404.11	01Jun2007, 17:30	17.77
P145b	0.98	1006.56	01Jun2007, 17:25	17.45
P1450000 0208 J	2.01	2410.62	01Jun2007, 17:30	17.61
P1450000 0188 R	2.01	2386.62	01Jun2007, 18:10	17.61
P145c	0.61	546.31	01Jun2007, 18:05	17.25
P1450000 0188 J	2.62	2932.84	01Jun2007, 18:10	17.53
P1450000 0139 R	2.62	2902.51	01Jun2007, 19:25	17.53
P145d	1.06	1030.24	01Jun2007, 17:30	17.45
P1450000 0139 J	3.68	3872.36	01Jun2007, 19:05	17.51
P245a	1.47	1295.92	01Jun2007, 18:15	17.16
P1450000 0119 J	5.15	5151.27	01Jun2007, 19:00	17.41
P1450000 0096 R	5.15	5045.87	01Jun2007, 20:15	17.41
P1450000 0096 J	5.15	5045.87	01Jun2007, 20:15	17.41
P14503a	1.7	1390.28	01Jun2007, 18:10	17.44
P1450300 0103 J	1.7	1390.28	01Jun2007, 18:10	17.44
P1450300 0037 R	1.7	1388.57	01Jun2007, 19:05	17.44
P14503b	2.4	2380.62	01Jun2007, 17:30	17.55
P1450300 0037 J	4.09	3709.97	01Jun2007, 18:10	17.51
P1450300 0014 R	4.09	3579.91	01Jun2007, 21:00	17.51
P14503c	0.93	751.32	01Jun2007, 18:25	17.24
P1450300 0014 J	5.02	4239.66	01Jun2007, 20:45	17.46
P1450000 0074 J	10.17	9260.46	01Jun2007, 20:25	17.43
P1450000 0010 R	10.17	9199.5	01Jun2007, 21:50	17.43
P145e	1.87	2400.22	01Jun2007, 17:10	17.75
P1450000 0010 J	12.04	10553.53	01Jun2007, 21:25	17.48
P1000000 1686 J	37.26	22365.8	01Jun2007, 21:55	16.8
P1000000 1557 R	37.26	22031.31	02Jun2007, 02:05	16.8

P100j	5.89	5182.74	01Jun2007, 18:05	17.8
P1000000 1557 J	43.14	24580.68	02Jun2007, 01:40	16.94
P156a	1.31	1369.23	01Jun2007, 17:40	17.41
P1560000 0048 J	1.31	1369.23	01Jun2007, 17:40	17.41
P1560000 0019 R	1.31	1368.8	01Jun2007, 17:50	17.41
P156b	0.91	1660.05	01Jun2007, 16:40	17.81
P1560000 0019 J	2.22	2900.1	01Jun2007, 17:10	17.57
P1000000 1540 J	45.37	23762.66	02Jun2007, 01:15	16.49
P1000000 1498 R	45.37	23724.48	02Jun2007, 02:25	16.49
P1000000 1498 J	45.37	23724.48	02Jun2007, 02:25	16.49
P1550000 0063 J	0	1593.45	01Jun2007, 19:10	Not specified
P155a	1.47	2379.11	01Jun2007, 16:50	17.88
P1550000 0008 J	1.47	3801.94	01Jun2007, 17:05	41.35
P1000000 1488 J	46.84	25235.78	02Jun2007, 01:55	17.27
P1000000 1433 R	46.84	25086.02	02Jun2007, 06:05	17.27
P100k	1.64	1983.84	01Jun2007, 17:15	17.76
P1000000 1433 J	48.48	25282.11	02Jun2007, 06:00	17.28
P140a	0.97	1108.89	01Jun2007, 17:10	17.66
P1400403 0259 J	0.97	1108.89	01Jun2007, 17:10	17.66
P1400000 0172 R	0.97	982.45	02Jun2007, 02:25	17.66
P140b	1.31	1398.84	01Jun2007, 17:40	17.26
P1400400 0172 J	2.28	1784.46	01Jun2007, 19:10	17.43
P1400400 0150 J	2.28	191.01	01Jun2007, 19:10	2.29
P1400000 0112 R	2.28	190.97	01Jun2007, 19:40	2.29
P140c	1.27	1138.31	01Jun2007, 17:55	17.6
P1400000 0112 J	3.55	1327.69	01Jun2007, 18:00	7.78
P1400000 0020 R	3.55	1325.76	01Jun2007, 18:50	7.78
P140d	3.87	2713.53	01Jun2007, 18:55	17.71
P1400000 0020 J	7.42	4039.07	01Jun2007, 18:55	12.96
P1000000 1424 J	55.9	26951.48	02Jun2007, 05:25	16.71
P1000000 1334 R	55.9	26615.72	02Jun2007, 10:45	16.71
P100l	2.72	2708.9	01Jun2007, 17:45	17.8
P1000000 1334 J	58.62	26848.08	02Jun2007, 10:40	16.76
P138a	2.73	1958.7	01Jun2007, 18:55	17.81
P1380000 0130 J	2.73	1621.41	01Jun2007, 22:35	18.68
P1380000 0013 R	2.73	1611.98	02Jun2007, 05:05	18.68
P138b	3.58	2830.13	01Jun2007, 18:30	17.75
P1380000 0013 J	6.31	3956.64	01Jun2007, 19:20	18.15
P1000000 1308 J	64.93	28660.19	02Jun2007, 09:40	16.89
P1000000 1226 R	64.93	28382	02Jun2007, 13:45	16.89
P100m	4.34	2727	01Jun2007, 19:15	17.58
P1000000 1226 J	69.27	29048.52	02Jun2007, 13:40	16.94

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P100n	3.01	2480.15	01Jun2007, 18:35	17.55
P1000000 1123 J	72.29	29324.88	02Jun2007, 10:25	16.96
P133a	2.99	1917.47	01Jun2007, 19:20	17.64
P1330000 0092 J	2.99	1917.47	01Jun2007, 19:20	17.64
P1330000 0017 R	2.99	1895.56	01Jun2007, 21:45	17.63
P133b	1.25	1173	01Jun2007, 17:45	17.32
P1330000 0017 J	4.24	2819.76	01Jun2007, 20:30	17.54
P1000000 1114 J	76.53	30118.26	02Jun2007, 10:00	16.99
P1000000 1038 R	76.53	30090.38	02Jun2007, 12:40	16.99
P1000	3.08	2094.33	01Jun2007, 19:05	17.16
P1000000 1038 J	79.61	30548.11	02Jun2007, 12:30	17
P130a	2.91	2661.62	01Jun2007, 17:50	17.36
P530 15 01	2.91	1829.35	01Jun2007, 22:35	17.33
P1300000 0447 R	2.91	1826.28	02Jun2007, 00:20	17.32
P130b	1.02	1411.53	01Jun2007, 16:55	17.85
P1300000 0447 J	3.93	2354.33	01Jun2007, 22:10	17.46
P1300000 0361 R	3.93	2330.65	02Jun2007, 03:25	17.45
P130c	2.63	1973.67	01Jun2007, 18:35	17.49
P1300000 0361 J	6.56	3610.85	01Jun2007, 22:35	17.47
P13008a	1.89	2729.44	01Jun2007, 17:15	17.81
P530 08 01	1.89	1774.28	01Jun2007, 20:20	17.81
P13009a	1.45	1633.18	01Jun2007, 17:25	17.69
P1300000 0342 J	9.89	6516.34	01Jun2007, 20:00	17.56
P1300000 0302 R	9.89	6439.42	01Jun2007, 21:50	17.56
P130d	0.67	970.44	01Jun2007, 16:50	17.63
P1300000 0302 J	10.56	6870.69	01Jun2007, 21:35	17.57
P13007a	0.84	873.56	01Jun2007, 17:35	17.23
P1300000 0294 J	11.41	7492.16	01Jun2007, 21:25	17.54
P1300000 0257 R	11.41	7432.99	01Jun2007, 23:05	17.54
P130e	1.04	1273	01Jun2007, 17:10	17.45
P1300000 0257 J	12.44	8022.7	01Jun2007, 22:50	17.53
P13005a	1.2	1776.52	01Jun2007, 17:15	17.74
P1300500 0195 J	1.2	1776.52	01Jun2007, 17:15	17.74
P13005b	0.93	952.73	01Jun2007, 17:55	17.41
P1300500 0162 J	2.13	2710.92	01Jun2007, 17:25	17.59
P530 05 01	2.13	2512.35	01Jun2007, 19:15	17.59
P1300500 0144 R	2.13	1611.3	01Jun2007, 22:10	17.59
P13005c	0.64	833.84	01Jun2007, 16:55	17.29
P1300500 0144 J	2.77	2033.99	01Jun2007, 21:25	17.52
P1300502a	0.92	913.55	01Jun2007, 18:00	17.12
P1300502 0144 J	0.92	913.55	01Jun2007, 18:00	17.12

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P1300500 0114 J	3.82	2875	01Jun2007, 20:20	17.43
P1300500 0016 R	3.82	2799.18	02Jun2007, 01:55	17.43
P13005d	2.67	2254.27	01Jun2007, 18:15	17.42
P1300500 0016 J	6.5	4362.13	01Jun2007, 21:10	17.43
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P1300300 0032 J	0.68	780.17	01Jun2007, 17:20	17.33
P1300300 0008 R	0.68	780.06	01Jun2007, 17:25	17.33
P13003a	1.58	1814.99	01Jun2007, 17:25	17.47
P1300300 0008 J	2.25	2595.06	01Jun2007, 17:25	17.43
P1300000 0166 J	22.4	14241.09	01Jun2007, 22:00	17.49
P1300000 0107 R	22.4	14206.77	02Jun2007, 00:20	17.49
P130g	1.69	1503.83	01Jun2007, 17:55	17.4
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P13002a	2.49	1706.05	01Jun2007, 19:10	17.28
P1300200 0115 J	2.49	1706.05	01Jun2007, 19:10	17.28
P1300202a	2.27	1887.76	01Jun2007, 18:30	17.39
P1300200 0100 J	4.76	3586.61	01Jun2007, 18:50	17.33
P1300200 0012 R	4.76	3584.78	01Jun2007, 19:25	17.33
P13002b	2.65	1808.96	01Jun2007, 19:00	17.2
P1300200 0023 J	7.41	5388.61	01Jun2007, 19:15	17.28
P1300000 0093 J	31.5	19344.88	01Jun2007, 23:00	17.44
P1300000 0043 R	31.5	19295.47	02Jun2007, 01:25	17.44
P130h	2.37	1779.21	01Jun2007, 19:15	17.35
P1300000 0043 J	33.87	20484.64	02Jun2007, 01:05	17.43
P1000000 1003 J	113.48	44896.67	02Jun2007, 05:10	17.13
P1000000 0860 R	113.48	44579.83	02Jun2007, 09:10	17.13
P100p	5.38	3315.59	01Jun2007, 19:25	17.17
P1000000 0860 J	118.86	45811.82	02Jun2007, 09:05	17.13
P127a	5.06	2587.56	01Jun2007, 20:05	17.06
P1000000 0851 J	123.92	47090.63	02Jun2007, 09:05	17.13
P1000000 0817 R	123.92	46213.66	02Jun2007, 12:40	17.12
P126a	3.71	2559.08	01Jun2007, 19:25	17.5
P1000000 0817 J	127.63	46789.99	02Jun2007, 12:35	17.08
P100q	2.63	1902.51	01Jun2007, 19:00	17.2
P1000000 0795 J	130.25	47145.16	02Jun2007, 12:35	17.08

P1000000 0734 R	130.25	46754.52	02Jun2007, 15:05	17.08
P125a	2.35	1853.8	01Jun2007, 18:25	17.62
P1250000 0129 J	2.35	2323.36	01Jun2007, 18:50	20.51
P1250000 0027 R	2.35	2299.82	01Jun2007, 21:30	20.51
P125b	1.86	1963.12	01Jun2007, 17:45	17.22
P1250000 0027 J	4.21	3817.39	01Jun2007, 20:25	19.06
P1000000 0735 J	134.47	47032.12	02Jun2007, 15:00	17.14
P121a	3.82	2083.42	01Jun2007, 19:35	17.17
P1000000 0720 J	138.29	47633.69	02Jun2007, 15:00	17.14
P1000000 0640 R	138.29	47495.23	02Jun2007, 16:35	17.14
P100r	2.97	2504.01	01Jun2007, 18:15	17.46
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P1180000 1036 R	0	905.19	01Jun2007, 22:45	Not specified
P118a	1.67	1583.31	01Jun2007, 17:35	17.65
P1180000 1036 J	1.67	1951.89	01Jun2007, 22:25	30.06
P1180000 0846 R	1.67	1704.37	02Jun2007, 09:45	30.06
P118b	5.51	4935.21	01Jun2007, 18:05	17.51
P1180000 0846 J	7.18	5774.9	01Jun2007, 18:15	20.43
P11831a	1.1	1040.35	01Jun2007, 17:45	17.29
P1183100 9903 J	1.1	1040.35	01Jun2007, 17:45	17.29
P1180000 9902 R	1.1	874.69	01Jun2007, 20:30	17.29
P11831b	1.25	1220.47	01Jun2007, 17:25	17.45
P1183100 9902 J	2.35	1989.23	01Jun2007, 19:00	17.37
P1180000 9901 R	2.35	1884.74	02Jun2007, 00:55	17.37
P11831c	0.72	862.42	01Jun2007, 17:10	17.57
P1183100 9901 J	3.06	2198.1	02Jun2007, 00:20	17.42
P1180000 0835 J	10.25	7721.63	01Jun2007, 19:05	19.53
P1180000 0660 R	10.25	6837.33	02Jun2007, 18:20	19.53
P1180000 0643 R	0	1300.49	02Jun2007, 00:55	Not specified
P118c	6.03	5753.85	01Jun2007, 18:25	17.8
P1180000 0643 J	16.28	8721.54	01Jun2007, 19:25	20.08
P11823a	1.57	1575.24	01Jun2007, 17:30	17.66
P1180000 0641 J	17.86	10176.12	01Jun2007, 19:20	19.87
P1180000 0441 R	17.86	9476.99	02Jun2007, 06:05	19.87
P118d	6.33	5736.23	01Jun2007, 18:35	17.71
P1180000 0441 J	24.19	11067.86	02Jun2007, 05:30	19.3
P11818a	3.51	2614.3	01Jun2007, 18:40	17.83
P1180000 0432 J	27.7	12188.93	01Jun2007, 20:50	19.12
P1180000 0382 R	27.7	11977.05	02Jun2007, 09:25	19.12
P118e	1.02	1114.32	01Jun2007, 17:35	17.83
P1180000 0382 J	28.71	12333.75	02Jun2007, 01:20	19.07
P11814a	2.87	2548.02	01Jun2007, 18:05	17.78

P1180000 0361 J	31.59	13696.31	02Jun2007, 01:10	18.95
P1180000 0233 R	31.59	13066.07	02Jun2007, 07:25	18.95
P118f	5.7	6684.31	01Jun2007, 17:40	17.77
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P1180000 0036 R	37.28	13770.86	01Jun2007, 21:50	18.77
P118g	7.32	6864.98	01Jun2007, 19:15	17.6
P1180000 0036 J	44.6	20329.08	01Jun2007, 19:55	18.58
Cha1	0.01	47.91	01Jun2007, 16:05	17.4
Da8	0.03	343.52	01Jun2007, 16:05	14.4
Cha2	0	42.08	01Jun2007, 16:05	13.99
C/cha2	0.05	433.52	01Jun2007, 16:05	14.84
Da2	0.05	303.38	01Jun2007, 16:05	14.75
Da7	0.04	364.47	01Jun2007, 16:05	14.31
Np	0.01	41.68	01Jun2007, 16:15	18.8
C/np	0.13	1129.93	01Jun2007, 16:05	14.87
Dcp3	0.13	1031.62	01Jun2007, 16:05	14.69
Chb1	0.01	53.51	01Jun2007, 16:05	15.59
Da5	0.01	92.19	01Jun2007, 16:05	15.92
Chb2	0	13.07	01Jun2007, 16:05	16.88
C/chb2	0.02	158.78	01Jun2007, 16:05	15.86
Da6	0.03	341.38	01Jun2007, 16:05	15.8
Chb3	0	24.75	01Jun2007, 16:05	16.06
C/chb3	0.05	524.91	01Jun2007, 16:05	15.83
DCP - 1	0.05	396.33	01Jun2007, 16:10	15.83
Da18	0.01	79.57	01Jun2007, 16:10	17.63
Ndisc	0.2	1487.92	01Jun2007, 16:05	15.19
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Ndcp	0.28	1521.53	01Jun2007, 16:05	16.24
P1000000 0635 J	186.14	60359.17	02Jun2007, 16:25	17.49
P1000000 0580 R	186.14	60308.12	02Jun2007, 17:15	17.49
P10os	1.49	1749.37	01Jun2007, 17:20	17.73
Da12	0.03	256.7	01Jun2007, 16:05	14.87
Chf1	0.01	50.27	01Jun2007, 16:05	14.5
C/da12	0.03	306.97	01Jun2007, 16:05	14.8
Da11	0.02	176.06	01Jun2007, 16:05	14.88
Chg1	0	46.51	01Jun2007, 16:05	16.29
Chg2	0	23.12	01Jun2007, 16:05	17.03
C/chg2	0.03	245.69	01Jun2007, 16:05	15.44
Da3	0.03	246.15	01Jun2007, 16:05	14.82
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C/d4	0.1	853.25	01Jun2007, 16:05	15.03
DCP - 7	0.1	631.24	01Jun2007, 16:10	15.03

Da10	0.03	291.66	01Jun2007, 16:05	15.07
Chh2	0	47.39	01Jun2007, 16:05	14.33
Chh1	0	34.93	01Jun2007, 16:05	16.52
C/chh2	0.04	373.98	01Jun2007, 16:05	15.11
DCP - 6	0.04	314.51	01Jun2007, 16:05	15.11
Da9	0.02	250.28	01Jun2007, 16:05	15.53
Nep	0	18.06	01Jun2007, 16:15	18.8
C/nep	0.03	262.47	01Jun2007, 16:05	15.9
DCP - 4	0.03	189.13	01Jun2007, 16:10	15.9
Ch1	0.01	49.98	01Jun2007, 16:05	15.61
DCP - 5	0.01	41.67	01Jun2007, 16:10	15.61
Edcp	0.17	1122.61	01Jun2007, 16:10	15.21
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P114b	1.47	2634.03	01Jun2007, 16:55	17.91
P114a	0.68	1080.05	01Jun2007, 16:45	17.6
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P1140000 0036 R	0.68	1061.8	01Jun2007, 17:50	17.6
Da17	0.04	431.02	01Jun2007, 16:05	14.06
Chc1	0.01	56.13	01Jun2007, 16:05	15.41
Da19	0	43.99	01Jun2007, 16:05	14.62
C/chc1	0.06	531.14	01Jun2007, 16:05	14.31
Da1	0.05	343.53	01Jun2007, 16:05	16.07
Chc2	0.01	73.3	01Jun2007, 16:05	14.57
C/chc2	0.11	947.96	01Jun2007, 16:05	15.08
Da15	0.03	272.17	01Jun2007, 16:05	15.05
Da16	0.03	253.98	01Jun2007, 16:05	14.71
C/da15	0.16	1474.12	01Jun2007, 16:05	15.01
Chc3	0.01	49.06	01Jun2007, 16:05	12.98
Swp	0.01	34.93	01Jun2007, 16:10	18.8
C/swp	0.17	1549.61	01Jun2007, 16:05	15.06
Da14	0.03	306.11	01Jun2007, 16:05	15.34
Chd1	0	39.94	01Jun2007, 16:05	16.27
Chd2	0	24.6	01Jun2007, 16:05	16.84
C/chd2	0.04	370.66	01Jun2007, 16:05	15.58
Da4	0.04	255.89	01Jun2007, 16:05	15
Chd3	0	27.29	01Jun2007, 16:05	17.67
C/chd3	0.08	653.85	01Jun2007, 16:05	15.39
DCP - 9	0.08	469.82	01Jun2007, 16:10	15.39
Da13	0.04	393.75	01Jun2007, 16:05	14.84
Che2	0.01	36.93	01Jun2007, 16:05	15.14

Che1	0	10.96	01Jun2007, 16:05	17.67
C/che2	0.04	441.64	01Jun2007, 16:05	14.96
DCP - 8	0.04	208.15	01Jun2007, 16:10	14.96
Sdcp	0.3	1867.4	01Jun2007, 16:05	15.13
Fil1	0.02	103.28	01Jun2007, 16:25	17.05
Fil2	0.02	76.07	01Jun2007, 16:35	17.05
C/fill	0.04	173.42	01Jun2007, 16:25	17.05
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P114c	0.47	1032.85	01Jun2007, 16:30	17.79
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P1000000 0472 R	190.76	59934.62	02Jun2007, 20:30	17.49
P100t	1.95	1272.65	01Jun2007, 20:30	17.44
P1000000 0472 J	192.71	60096.96	02Jun2007, 20:30	17.48
P110a	1.99	2876.73	01Jun2007, 17:20	17.72
P1000000 0460 J	194.7	60096.96	02Jun2007, 20:30	17.49
P1000000 0445 R	194.7	60059.03	02Jun2007, 21:00	17.49
P1000000 0445 J	194.7	60059.03	02Jun2007, 21:00	17.49
P109a	1.42	1743.32	01Jun2007, 17:15	17.44
P1000000 0432 J	196.11	60059.2	02Jun2007, 21:00	17.49
P1000000 3901 R	196.11	60016.2	02Jun2007, 21:40	17.48
P100u	0.5	763.22	01Jun2007, 16:50	17.53
P1000000 0390 J	196.61	60016.2	02Jun2007, 21:40	17.48
P107a	2.57	2325.26	01Jun2007, 17:45	17.68
P1070000 0198 J	2.57	2325.26	01Jun2007, 17:45	17.68
P1070000 0026 R	2.57	2221.08	02Jun2007, 00:35	17.68
P107b	2.4	2841.64	01Jun2007, 17:35	17.57
P1070000 0026 J	4.98	4142.17	01Jun2007, 18:00	17.63
P1000000 0381 J	201.59	60552.84	02Jun2007, 02:40	17.49
P1000000 0181 R	201.59	60410.92	02Jun2007, 04:40	17.47
P100v	3.81	4353.35	01Jun2007, 20:00	17.67
P1000000 0181 J	205.4	61394.42	02Jun2007, 04:30	17.48
P1000000 0010 R	205.4	61162.45	02Jun2007, 07:05	17.46
P100w	5.56	6925.5	01Jun2007, 20:30	17.9
P1000000 0010 J	210.97	61660.18	02Jun2007, 06:55	17.47

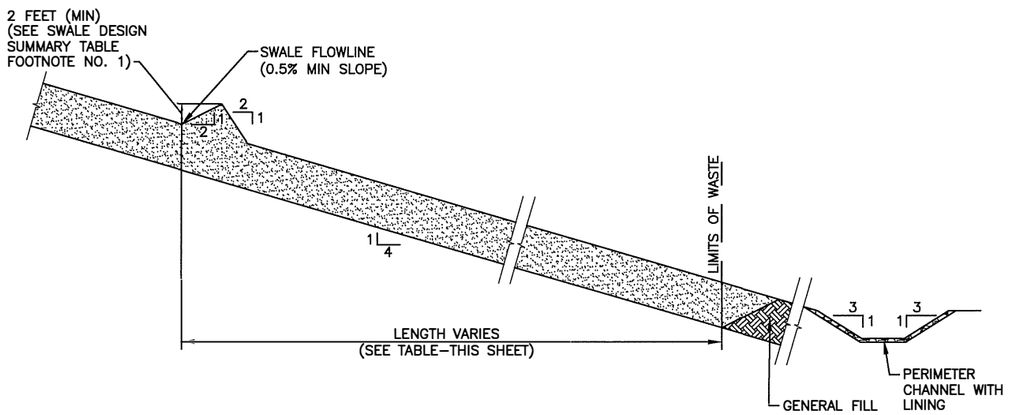
ATTACHMENT 6A

APPENDIX 6A-G

EROSION CONTROL PLAN FOR ALL PHASES OF LANDFILL OPERATION

Includes Pages 6A-G-1 through 6A-G-7



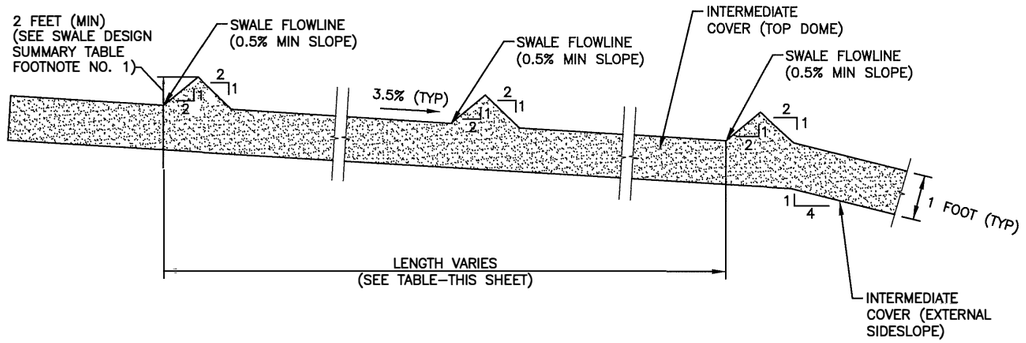


A
1 2 SIDE SLOPE DRAINAGE SWALE

SWALE DESIGN SUMMARY[1]							
SIDE SLOPE (4H:1V)				TOP SLOPE (3.5%)			
VEGETATIVE COVER PERCENTAGE	DISTANCE BETWEEN SWALES (FT)	ESTIMATED SOIL LOSS (TONS/ACRE/YEAR)	ADDITIONAL SEDIMENT CAPTURE REQUIRED[2]	VEGETATIVE COVER PERCENTAGE	DISTANCE BETWEEN SWALES (FT)	ESTIMATED SOIL LOSS (TONS/ACRE/YEAR)	ADDITIONAL SEDIMENT CAPTURE REQUIRED[2]
60	300	23.9	NO	60	500	1.4	NO
70	300	9.7	NO	70	500	0.6	NO
80	300	7.4	NO	80	500	0.4	NO
90	300	3.6	NO	90	500	0.2	NO
70	400	11.2	NO	60	600	1.5	NO
80	400	8.5	NO	70	600	0.6	NO
90	400	4.2	NO	80	600	0.5	NO
70	500	12.2	NO	90	600	0.2	NO
80	500	9.3	NO	60	700	1.6	NO
90	500	4.6	NO	70	700	0.6	NO
70	600	13.6	NO	80	700	0.5	NO
80	600	10.4	NO	90	700	0.2	NO
90	600	5.1	NO				
70	700	14.7	NO				
80	700	11.2	NO				
90	700	5.5	NO				
70	800	15.8	NO				
80	800	12.1	NO				
90	800	5.9	NO				

[1] REFER TO APPENDIX 6A–G–1 FOR SUPPORTING CALCULATIONS.

[2] IF SITE SPECIFIC CONDITIONS YIELD A MAXIMUM HORIZONTAL DISTANCE BETWEEN THE TOE OF THE SLOPE AND GRADE BREAK OF LESS THAN 300 FEET FOR SIDE SLOPES AND A DISTANCE OF 500 FEET FROM THE GRADE BREAK TO THE PEAK OF THE TOP SLOPES, ESTABLISHMENT OF 60% VEGETATION WILL BE SUFFICIENT MEANS OF EROSION CONTROL WITHOUT THE ADDITION OF TEMPORARY SWALES AND LETDOWNS GIVEN THAT THE TOTAL SOIL LOSS FOR THE SIDE SLOPE IS LESS THAN 50 TONS/ACRE/YEAR AND THE TOP SLOPE IS LESS THAN 50 TONS/ACRE/YEAR.



A
1 2 TOP DOME SURFACE DRAINAGE SWALE

SWALE DRAINAGE AREA SUMMARY			
CONDITION (SWALE HEIGHT)	MAXIMUM DRAINAGE AREA (ACRES)	MINIMUM SWALE SPACING[1] (FEET)	MAXIMUM SWALE LENGTH[2] (FEET)
TOP SLOPE (2 FT SWALE)	26.9	500	2,343
TOP SLOPE (1.5 FT SWALE)	12.5	500	1,089
TOP SLOPE (1 FT SWALE)	4.5	500	392
SIDE SLOPE (2 FT SWALE)	5.0	300	726

[1] MINIMUM SWALE SPACING IS OBTAINED FROM THE CALCULATIONS PROVIDED ON PAGE 6A–G–1–9.

[2] MAXIMUM SWALE LENGTH CALCULATED USING THE FOLLOWING EQUATION:

MAXIMUM DRAINAGE AREA x (43,560 SF/ACRE)/MINIMUM SWALE SPACING

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DATE: 01/2010
FILE: 0120–439–11
CAD: FIG 2–SWALE DESIGN.DWG
DRAWN BY: SRF
DESIGN BY: BJL
REVIEWED BY: JPY

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PREPARED FOR
McCARTY ROAD LANDFILL TX, LP

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EROSION CONTROL PLAN
SWALE DESIGN SUMMARY

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FIGURE 2

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O:\0120\439\FLIP MOD 2024\ECP\CLEAN\FIG 2–SWALE DESIGN.dwg, vguzman, 1:2

OPEN CHANNEL GEOMEMBRANE LETDOWN DESIGN SUMMARY

DESIGN IS APPLICABLE FOR A DRAINAGE AREA UP TO 35 ACRES (TOP DECK AND SIDE SLOPE).

25% SLOPE
MAXIMUM FLOW DEPTH = 0.62 FT.
BOTTOM WIDTH = 8 FT.

3.5% SLOPE
MAXIMUM FLOW DEPTH = 1.08 FT.
BOTTOM WIDTH = 8 FT.

OPEN CHANNEL GABION LETDOWN DESIGN SUMMARY

DESIGN IS APPLICABLE FOR A DRAINAGE AREA UP TO 25 ACRES (TOP DECK AND SIDE SLOPE).

25% SLOPE
MAXIMUM FLOW DEPTH = 1.36 FT.
BOTTOM WIDTH = 8 FT.

3.5% SLOPE
MAXIMUM FLOW DEPTH = 1.94 FT.
BOTTOM WIDTH = 8 FT.

OPEN CHANNEL ROCK RIPRAP LETDOWN DESIGN SUMMARY

DESIGN IS APPLICABLE FOR A DRAINAGE AREA UP TO 25 ACRES (TOP DECK ONLY).

3.5% SLOPE
MAXIMUM FLOW DEPTH = 1.94 FT.
BOTTOM WIDTH = 8 FT.

OPEN CHANNEL GROUTED RIPRAP LETDOWN DESIGN SUMMARY

DESIGN IS APPLICABLE FOR A DRAINAGE AREA UP TO 25 ACRES (TOP DECK) AND 35 ACRES (SIDE SLOPE).

25% SLOPE
MAXIMUM FLOW DEPTH = 1.36 FT.
BOTTOM WIDTH = 8 FT.

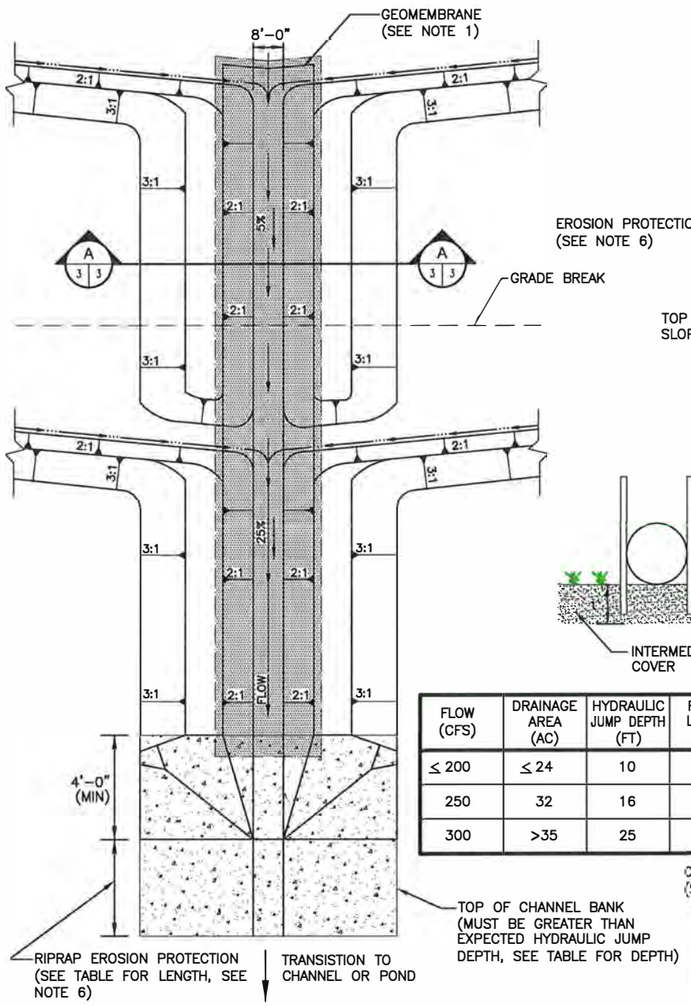
3.5% SLOPE
MAXIMUM FLOW DEPTH = 1.94 FT.
BOTTOM WIDTH = 8 FT.

OPEN CHANNEL TURF REINFORCEMENT LETDOWN DESIGN SUMMARY

DESIGN IS APPLICABLE FOR A DRAINAGE AREA UP TO 35 ACRES (TOP DECK AND SIDE SLOPE).

25% SLOPE
MAXIMUM FLOW DEPTH = 1.36 FT.
BOTTOM WIDTH = 8 FT.

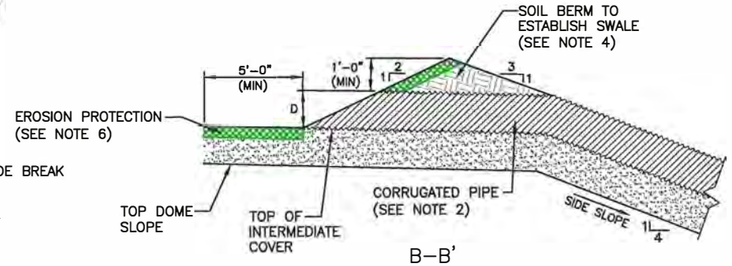
3.5% SLOPE
MAXIMUM FLOW DEPTH = 1.99 FT.
BOTTOM WIDTH = 8 FT.



TEMPORARY OPEN CHANNEL LETDOWN B (1 3)

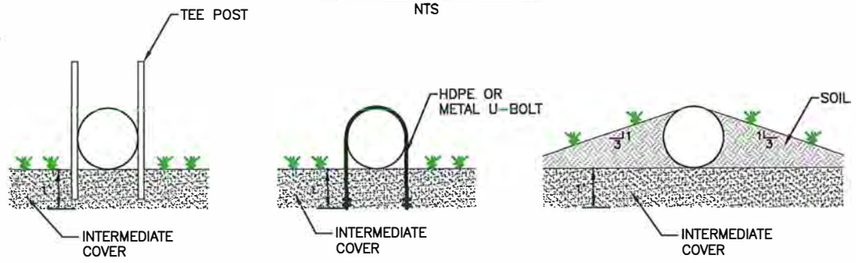
0 20 40
SCALE IN FEET

FLOW (CFS)	DRAINAGE AREA (AC)	HYDRAULIC JUMP DEPTH (FT)	RIPRAP LENGTH (FT)
≤ 200	≤ 24	10	10
250	32	16	16
300	>35	25	25



B–B'

PIPE INLET PROFILE
NTS

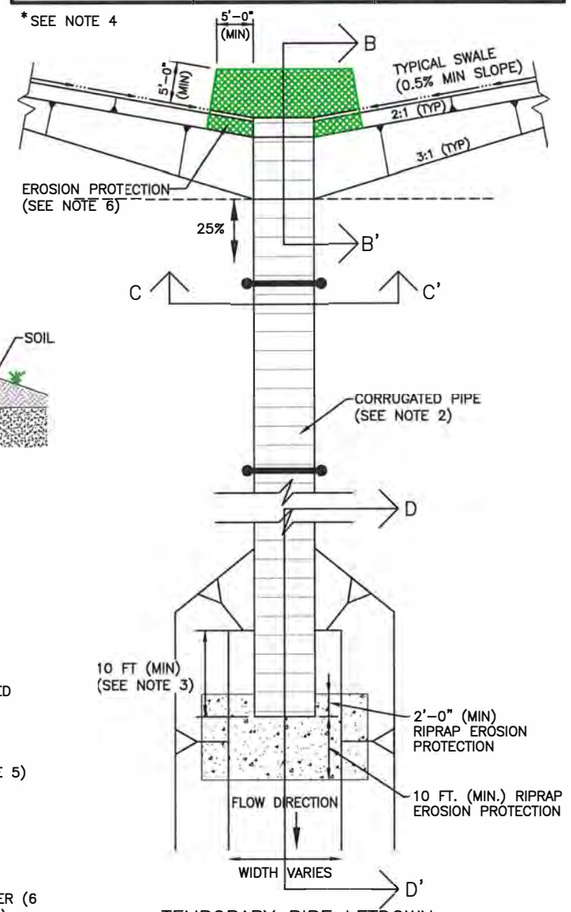


C–C'

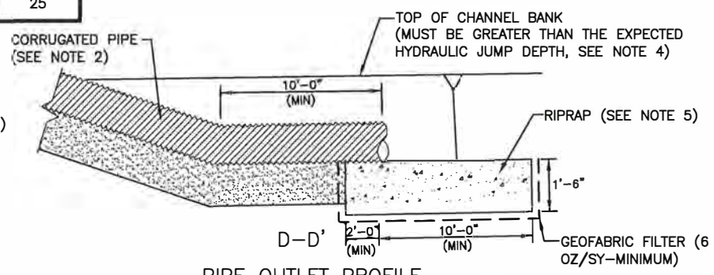
ANCHORING DETAILS
NTS

PIPE LETDOWN DESIGN SUMMARY* (USE OF PIPE LETDOWN IS LIMITED TO 1–INLET)		
DRAINAGE AREA (ACRE)	DESIGN FLOW RATE (CFS)	REQUIRED PIPE DIAMETER (FT)
2.0	16.0	2
2.7	21.0	3

*SEE NOTE 4

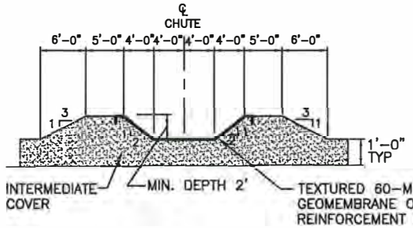


TEMPORARY PIPE LETDOWN
NTS



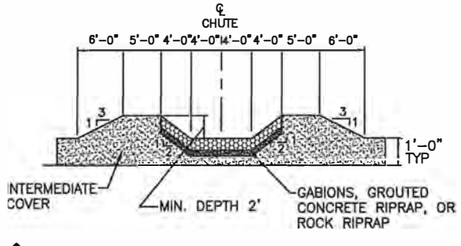
D–D'

PIPE OUTLET PROFILE (SEE NOTE 3)
NTS



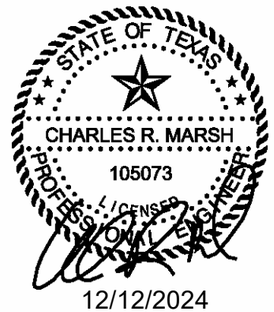
A1 (3 3) TEMPORARY GEOMEMBRANE OR TURF REINFORCEMENT LETDOWN OPTION

0 10 20
SCALE IN FEET



A2 (3 3) TEMPORARY GABION LETDOWN OPTION

0 10 20
SCALE IN FEET



12/12/2024

NOTES:
1. GEOMEMBRANE TEXTURED ON BOTH SIDES WILL BE USED FOR GEOMEMBRANE LETDOWN LINING. AS AN ALTERNATIVE, TEMPORARY LETDOWN CAN BE LINED WITH GABIONS, GROUTED CONCRETE RIPRAP, TURF REINFORCEMENT MAT, OR ROCK RIPRAP.
2. PIPE DRAINAGE LETDOWN WILL BE ANCHORED BY USING SOIL BERM AT THE INLET LOCATED WITHIN THE SWALE. ADDITIONAL ANCHORING ON THE SIDE SLOPE MAY BE PROVIDED USING SOIL, HDPE, METAL U–BOLTS, T–POSTS OR EQUIVALENT MATERIALS.
3. PIPE WILL BE EXTENDED INTO THE CHANNEL TO MINIMIZE EROSION.
4. PIPE LETDOWNS WILL BE LIMITED TO 1 INLET PER LETDOWN. SOIL BERMS AROUND THE PIPE INLET WILL BE EXTENDED A MINIMUM 1–FOOT ABOVE THE LETDOWN PIPE INLET. REFER TO PAGE 6A–G–2–9 FOR HYDRAULIC ANALYSIS.
5. RIPRAP APRON DESIGN IS PROVIDED ON PAGES 6A–G–2–19 AND 20. D_{50} FOR RIPRAP IS 5–INCHES MINIMUM.
6. RIPRAP, GROUTED RIPRAP, GABIONS, GEOMEMBRANE, EXISTING VEGETATION, OR TURF REINFORCEMENT MAY BE USED FOR INLET EROSION PROTECTION.
7. REFER TO PAGE 6A–G–2–5A FOR EROSION PROTECTION DESIGN. IF LETDOWN DISCHARGES TO A POND, 10 FEET OF RIPRAP WILL BE SUFFICIENT.

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DATE: 05/2010
FILE: 0120–439–11
CAD: FIG 3–LETDOWN DESIGN.DWG
DRAWN BY: SRF
DESIGN BY: BJL
REVIEWED BY: JPY

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EROSION CONTROL PLAN LETDOWN DESIGN SUMMARY

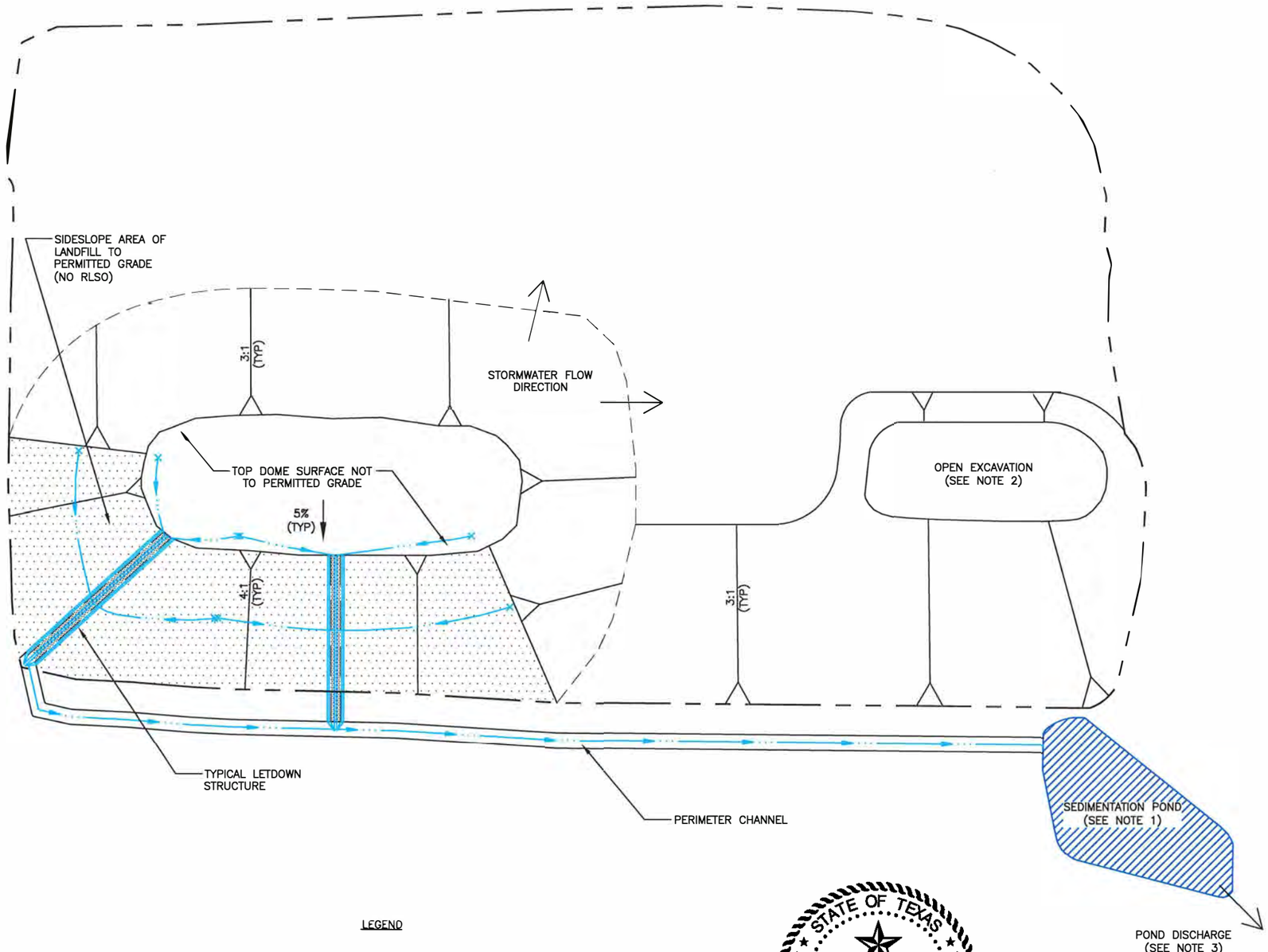
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FIGURE 3

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G:\0120\439\FIP MOD 2024\ECP\CLEAN\FIG 3-LETDOWN DETAILS.dwg, vgutman, 1:2



LEGEND

- EXTERNAL SIDE SLOPE TO PERMITTED GRADE
- LETDOWN
- DRAINAGE SWALE
- STORMWATER FLOW DIRECTION

EXAMPLE CALCULATION

REQUIRED POND SIZE = EXTERNAL EMBANKMENT AREA (ACRES) X POND AREA REQUIRED/ UNIT DRAINAGE AREA FACTOR

EXTERNAL EMBANKMENT AREA DRAINING TO POND = 50 ACRES

ADDITIONAL UPLAND AREA DRAINING TO POND = 0 ACRES (SEE NOTE 1)

REQUIRED SEDIMENT REMOVAL FROM EXTERNAL SIDE SLOPE AREA = 80 TONS/ACRE/YEAR TO 50 TONS/ACRE/YEAR

POND AREA REQUIRED/UNIT DRAINAGE AREA FACTOR = 0.105 (FROM TABLE BELOW)

REQUIRED POND SIZE = 50 ACRES X 0.105 = 5.25 ACRES

SIZE OF POND REQUIRED[1]		
REQUIRED SEDIMENT REMOVAL (TONS/ACRE/YEAR)	POND AREA REQUIRED/ UNIT DRAINAGE AREA FACTOR	EFFICIENCY OF POND (DYNAMIC AND QUIESCENT)
60 TO 50	0.040	18.0%
70 TO 50	0.070	29.3%
80 TO 50	0.105	37.3%
90 TO 50	0.125	43.8%
100 TO 50	0.140	51.9%
200 TO 50	0.375	75.3%

[1] REFER TO APPENDIX 6A–G–3 FOR MORE INFORMATION. THE POND DESIGN AND DEMONSTRATION ARE PROVIDED TO ENSURE THAT SEDIMENT DISCHARGE FROM THE SITE WILL BE PREVENTED DURING INITIAL ESTABLISHMENT OF VEGETATION OVER THE SIDESLOPES AND TOP DOME SURFACES.

NOTES:

1. EXAMPLE POND CONFIGURATION IS SHOWN. THE POND WILL BE LOCATED WITHIN THE PERMIT BOUNDARY. A DEMONSTRATION WILL BE INCLUDED IN THE SITE OPERATING RECORD TO SHOW THAT THE POND HAS THE CAPABILITY TO CAPTURE SEDIMENT SUCH THAT DISCHARGE IS LESS THAN OR EQUAL TO 50 TONS/ACRE/YEAR FROM THE EXTERNAL SIDE SLOPE AND TOP DOME AREA. THE DEMONSTRATION WILL ACCOUNT FOR THE ADDITIONAL SEDIMENT CREATED BY THE UPLAND AREA THAT FLOWS TO THE POND. FOR DEMONSTRATION PURPOSES, THE POND DEPTH WILL BE AN AVERAGE OF 4 FEET. OVERALL SEDIMENT DISCHARGE FROM THE SITE MUST COMPLY WITH THE CURRENT TPDES PERMIT FOR THE SITE.
2. EXCAVATED FUTURE CELL AREAS OR SOIL BORROW AREAS CAN ALSO BE USED AS SEDIMENTATION PONDS. IF THESE AREAS ARE USED FOR PONDS, A DEMONSTRATION NOTING THAT THE EXCAVATED FUTURE CELL AREA OR SOIL BORROW AREA HAS MORE CAPACITY THAN THE VOLUME PRODUCED BY THE 25–YEAR, 24–HOUR STORM WILL BE DOCUMENTED AND MAINTAINED IN THE SITE OPERATING RECORD.
3. AS STATED IN SECTION 2.2, A STATEMENT WILL BE ADDED TO THE SITE OPERATING RECORD EACH TIME A SEDIMENTATION POND IS INSTALLED TO NOTE HOW THE TEMPORARY SEDIMENTATION POND AND THE POND OUTLET WERE CONSTRUCTED CONSISTENT WITH THE REQUIREMENTS OF THE SITE DEVELOPMENT PLAN.

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CAD: FIG 4-RETENTION POND PLAN.DWG
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DESIGN BY: BJL
REVIEWED BY: JPY

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EROSION CONTROL PLAN SEDIMENT CONTROL POND PLAN

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FIGURE 4

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O:\0120\439\FIP MOD 2024\ECP\CLEAN\FIG 4-SED CAPTURE DET POND DESIGN.dwg, vguzman, 1:2

APPENDIX 6A-G-1

TEMPORARY ADD-ON SWALE DESIGN

Includes Pages 6A-G-1-1 through 6A-G-1-12



Required: Determine the required spacing of the drainage swales for different percentages of vegetative cover for top dome surfaces and external embankment side slopes.

Method:

1. Estimate soil loss per acre based on percent ground cover and swale spacing for top dome surface and external side slope.
2. Estimate soil loss given percent ground cover and swale spacing.
3. For a summary of soil loss rates for various percentages of ground cover, see Figure 2 in Appendix 6A-G and page 6A-G-1-5.

Notes:

1. The following example calculation procedure has been developed for 60 percent ground cover.
2. The table on page 6A-G-1-5 includes the results of the following procedure for 60, 70, 80, and 90 percent ground cover and various swale spacing. The results are also summarized on Figure 2 of Appendix 6A-G.

References:

1. SCS National Engineering Handbook, Chapter 3 - Erosion.
2. TNRCC, *Use of the USLE in Final Cover/Configuration Design*, 1993.
3. United States Environmental Protection Agency, *Solid Waste Disposal Facility Criteria Technical Manual*, 1993.

Solution:

1. Estimate soil loss per acre based on percent ground cover and swale spacing for top dome surface and external side slope.

Soil Loss Equation: $A=RKL_SCP$

Where:

A= Soil loss (tons/ac/yr)
R= Rainfall factor
K= Soil erodibility factor
L_S= Slope length/slope gradient factor
C= Plant cover or cropping management factor
P= Erosion practice factor

The rainfall factor, R, represents the average intensity for the maximum intensity, 30 minute storms over a 22 year period of record compiled by the SCS. Using Figure 1 (Ref 2), Average Annual Values of the R Factor, the R factor for Harris County is:

R = 425

The soil erodibility factor, K, factor represents the resistance of a soil surface to erosion as a function of the soil's physical and chemical properties. Assume an organic matter content of 2% to determine the K factor. The site top soil will consist of sandy clay with high organic content. Additionally, clean compost will be added to intermediate cover as necessary to protect against erosion. Therefore, the following is a conservative K value for the site (Table 1 on page 6, Ref. 2).

K = 0.13

The slope length/slope gradient factor, L_s, represents the erosion of the soil due to both slope length and degree of slope.

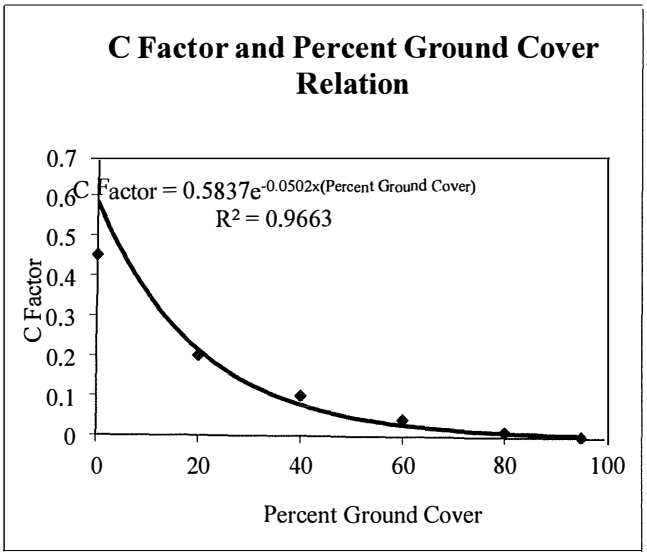
Case 1. Topslope			Case 2. Side Slope		
slope =	3.5	%	slope =	25	
length =	500	ft	length =	300	
Case 3. Topslope			Case 4. Top Slope		
slope =	3.5	%	slope =	3.5	
length =	600	ft	length =	700	

Using the above information and Figure 2 (Ref 2, p.9), the L_s factors are determined.

Case	Slope (%)	Slope Length (ft)	L_s
1. Top Slope	3.5	500	0.6
2. Side Slope	25	300	10.30
3. Top Slope	3.5	600	0.64
4.Top Slope	3.5	700	0.67

The plant cover or cropping management factor, C, represents the percentage of soil loss that would occur if the surface were partially protected by some combination of cover and management practices. C Factor for Permanent Pasture, Range, and Idle Land with No Appreciable Canopy has the following relation with percent ground cover (GC) (from Ref 2, p.7) .

% GC	C Factor:
0	0.45
20	0.2
40	0.1
60	0.042
80	0.013
95	0.003



C Factor= $0.5837e^{(-0.0502x60)}$
C Factor= 0.0420

The erosion control practice factor, P, measures the effect of control practices that reduce the erosion potential of the runoff by influencing drainage patterns, runoff concentration , and runoff velocity. Contouring for this site will be done only to establish vegetation.

P = 1.00

2. Estimate soil loss given percent ground cover and swale spacing.

Slope Condition	R	K	L_s	C	P	A (tons/ac/yr)
1. Top Slope ~~5%~~ 3.5% slope 500 ft length	425	0.13	0.60	0.0420	1.0	1.39
2. Side Slope 25% slope 300 ft length	425	0.13	10.30	0.0420	1.0	23.90
3. Top Slope ~~5%~~ 3.5% slope 600 ft length	425	0.13	0.64	0.0420	1.0	1.49
4. Top Slope ~~5%~~ 3.5% slope 700 ft length	425	0.13	0.67	0.0420	1.0	1.55

3. Summary
For a summary of soil loss rates for various percentages of ground cover, see Figure 2 in Appendix 6A-G and page 6A-G-1-5.

SOIL LOSS ESTIMATE SUMMARY TABLE

Case	Slope (%)	Length (ft)	L_s	Percent Ground Cover	C Factor	A (tons/ac/yr)
Top Slope	3.5	500	0.6	60	0.042	1.4
Top Slope	3.5	500	0.6	70	0.017	0.6
Top Slope	3.5	500	0.6	80	0.013	0.4
Top Slope	3.5	500	0.6	90	0.0064	0.2
Top Slope	3.5	600	0.64	60	0.042	1.5
Top Slope	3.5	600	0.64	70	0.017	0.6
Top Slope	3.5	600	0.64	80	0.013	0.5
Top Slope	3.5	600	0.64	90	0.0064	0.2
Top Slope	3.5	700	0.67	60	0.042	1.6
Top Slope	3.5	700	0.67	70	0.017	0.6
Top Slope	3.5	700	0.67	80	0.013	0.5
Top Slope	3.5	700	0.67	90	0.0064	0.2
Side Slope	25	300	10.3	60	0.042	23.9
Side Slope	25	300	10.3	70	0.017	9.7
Side Slope	25	300	10.3	80	0.013	7.4
Side Slope	25	300	10.3	90	0.0064	3.6
Side Slope	25	400	11.9	70	0.017	11.2
Side Slope	25	400	11.9	80	0.013	8.5
Side Slope	25	400	11.9	90	0.0064	4.2
Side Slope	25	500	13	70	0.017	12.2
Side Slope	25	500	13	80	0.013	9.3
Side Slope	25	500	13	90	0.0064	4.6
Side Slope	25	600	14.5	70	0.0170	13.6
Side Slope	25	600	14.5	80	0.013	10.4
Side Slope	25	600	14.5	90	0.0064	5.1
Side Slope	25	700	15.65	70	0.0170	14.7
Side Slope	25	700	15.65	80	0.013	11.2
Side Slope	25	700	15.65	90	0.0064	5.5
Side Slope	25	800	16.85	70	0.0170	15.8
Side Slope	25	800	16.85	80	0.0130	12.1
Side Slope	25	800	16.85	90	0.0064	5.9

Required: Determine the sheet flow velocity for the top dome surfaces and external embankment side slopes and compare to the permissible non-erodible flow velocity.

Method:
1. Determine the peak velocities for the cases listed on page 6A-G-1-5.
2. Compare to permissible velocities.
3. Conclusion.

References:
1. SCS National Engineering Handbook, Section 4, Hydrology. *Chapter 15 - Travel Time, Time of Concentration and Lag.*

Solution: Use the typical case scenarios from the USLE calculation to determine the expected peak sheet flow velocity.

Case 1.	Topslope			Case 2.	Side Slope		
	slope =	0.035	ft/ft		slope =	0.25	ft/ft
	length =	500	ft		length =	300	ft
Case 3.	Topslope			Case 4.	Side Slope		
	slope =	0.035	ft/ft		slope =	0.25	ft/ft
	length =	600	ft		length =	400	ft
Case 5.	Topslope			Case 6.	Topslope		
	slope =	0.035	ft/ft		slope =	0.25	ft/ft
	length =	700	ft		length =	500	ft
Case 7.	Topslope			Case 8.	Side Slope		
	slope =	0.25	ft/ft		slope =	0.25	ft/ft
	length =	600	ft		length =	700	ft
Case 9.	Topslope						
	slope =	0.25	ft/ft				
	length =	800	ft				

1. Determine the peak velocities for the cases listed on page 6A-G-1-5.

Cultivated Straight Row (Overland Flow)

From Figure 15.2 (page 15-8 in Ref. 1, Page 6A-G-1-8), determine the velocities for all cases.

Case 1.	V =	1.7	ft/s
Case 2.	V =	4.5	ft/s
Case 3.	V =	1.7	ft/s
Case 4.	V =	4.5	ft/s
Case 5.	V =	1.7	ft/s
Case 6.	V =	4.5	ft/s
Case 7.	V =	4.5	ft/s
Case 8.	V =	4.5	ft/s
Case 9.	V =	4.5	ft/s

Note: Figure 15.2 is reproduced on page 6A-G-1-8.

2. Compare to permissible velocities.

Summary of Velocities

	Condition	Percent Ground Coverage	Peak Velocity (ft/s)	Permissible Velocity[1] (ft/s)
Cultivated Straight Row	5%, 500 ft	>60%	1.7	5.0
	25%, 300 ft	>60%	4.5	5.0
	5%, 600 ft	>60%	1.7	5.0
	25%, 400 ft	>70%	4.5	5.0
	5%, 700 ft	>60%	1.7	5.0
	25%, 500 ft	>70%	4.5	5.0
	25%, 600 ft	>70%	4.5	5.0
	25%, 700 ft	>70%	4.5	5.0
	25%, 800 ft	>70%	4.5	5.0

[1] Permissible velocity information is from USACE EM 1110-0-1418, Chapter 5 - Evaluation of Stability.

3. Conclusion.

The peak velocities for each case are listed in the above summary table. As shown peak velocities are below permissible velocities for the conditions analyzed. After 180 days, vegetation listed as "Percent Ground Coverage" in the above table will be established in order to maintain permissible non-erodible velocities.

Required: Analyze swales to determine the adequacy of the swale design.

Method:
1. Determine the 25-year, 24-hour flow rates for a maximum swale drainage area for top slopes and side slopes using the Rational Method.
2. Determine maximum swale length that corresponds to the maximum swale drainage area.

Reference:
1. NOAA Atlas 14 Point Precipitation Frequency Estimates, *National Weather Service*, 2017.

Solution:

1. Determine the 25-year, 24-hour flow rates for a maximum swale drainage area for top slopes and side slopes using the Rational Method.

$$Q = CIA$$

Where:
C= 0.8 (runoff coefficient, Ref 1.)
I = intensity, in/hr
A= drainage area, ac

9.89 in/hr (Ref 1, Page 6A-G-1-?)

For Top Slope:

Maximum Drainage Area (2 ft swale) =	26.9	acres
Maximum Drainage Area (1.5 ft swale) =	12.5	acres
Maximum Drainage Area (1 ft swale) =	4.5	acres
		acres
Flow Rate (2 ft swale) =	213	cfs
Flow Rate (1.5 ft swale) =	98.9	cfs
Flow Rate (1 ft swale) =	35.5	cfs

For Side Slope:

Maximum Drainage Area =	5.0	acres
Flow Rate (2 ft swale) =	39.6	cfs

2. Determine maximum swale length that corresponds to the maximum swale drainage area.

Condition (swaleheight)	Maximum Drainage Area (acres)	Minimum Swale Spacing[1] (ft)	Maximum Swale Length[2] (ft)
Top Slope (2 ft swale)	26.9	500	2,344
Top Slope (1.5 ft swale)	12.5	500	1,089
Top Slope (1 ft swale)	4.5	500	392
Side Slope (2ft swale)	5.0	300	726

[1] Minimum swale spacing is taken from calculations provided on page 6A-G-1-2.

[2] Maximum swale length calculated using the following equation:

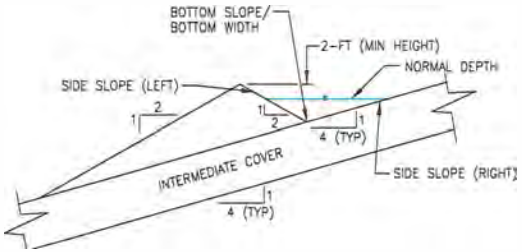
Maximum Drainage Area x (43,560 sf/acre) / Minimum Swale Spacing

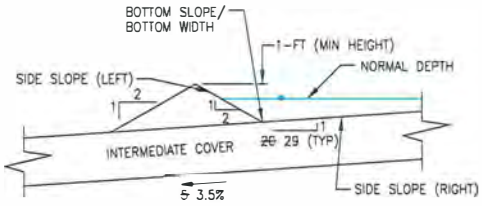
Flow Rate (cfs)	Bottom Slope (ft/ft)	n-value	Side Slope (left)	Side Slope (right)	Bottom Width (ft)	Normal Depth (ft)	Flow Vel. (fps)	Froude No.	Velocity Head (ft)	Energy Head (ft)	Flow Area (sq. ft.)	Top Width of Flow (ft)
2 ft Top Slope and Side Slope Swale												
213	0.005	0.03	2	29	0	2.00	3.48	0.614	0.19	2.19	61.14	61.14
39.6	0.005	0.03	2	4	0	1.98	3.36	0.594	0.17	2.16	11.80	11.90
1.5 ft Top Slope Swale												
98.9	0.005	0.03	2	29	0	1.50	2.88	0.585	0.13	1.63	34.39	45.86
1 ft Top Slope Swale												
35.5	0.005	0.03	2	29	0	1.00	2.19	0.547	0.08	1.075	15.29	30.57

Note: Calculations were performed using the HYDROCALC HYDRAULICS program developed by Dodson and Associates (Version ~~1.2a~~ 2.0.1, 1996).

Maximum flow depth is ~~1.95~~ 1.98 ft < 2.0 ft (swale height).

Design is acceptable.





Example Calculation: Calculate the normal depth for the swale for the maximum size side slope drainage area.

List of Symbols

Q_d = design flow rate for channel, cfs
R = hydraulic radius, ft
n = Manning's roughness coefficient
S = channel slope, ft/ft
b = bottom width of channel, ft
z_r = z-ratio (ratio of run to rise for channel sideslope) for right side slope of swale
z_l = z-ratio (ratio of run to rise for channel sideslope) for left side slope of swale
A_f = flow area, sf
g = gravitational acceleration = 32.2 ft/s^2
T = top width of flow, ft
d = normal depth of swale, ft

The program uses an iterative process to calculate the normal depth of the swale to satisfy Manning's Equation

$$Q = \frac{1.486}{n} A R^{0.67} S^{0.5}$$

Design Inputs:			
	Q_d =	39.6	cfs
	S =	0.005	ft/ft
	b =	0	ft
	z_r =	4	(H) : 1 (V)
	z_l =	2	(H) : 1 (V)
	n =	0.03	

Step 1 - Based on the geometry of the swale cross-section, solve for R and A_f

$$R = \frac{bd + 1/2d^2(z_r + z_l)}{b + d((z_l^2 + 1)^{0.5} + (z_r^2 + 1))}$$

$$A_f = bd + 1/2d^2(z_r + z_l)$$

assume:			
	d =	1.98	ft
	R =	0.935	ft
	A_f =	11.80	sf

solve for Q: $Q =$ 39.6 cfs

if Q is not equal to Q_d, select a new d and repeat calculations

Step 2 - solve for velocity, T, Froude number, velocity head, and energy head

$Q = VA \Rightarrow \quad V = Q/A$

$V =$ 3.36 ft/s

$T = b + d(z_l + z_r)$

$T =$ 11.9 ft

$$F_r = \frac{V}{(gA/T)^{0.5}}$$

$F_r =$ 0.594

$$\text{Velocity Head} = \frac{V^2}{2g}$$

Velocity Head = 0.17 ft

Energy Head = water elevation + velocity head

Energy Head = 2.16 ft

APPENDIX 6A-G-2

TEMPORARY LETDOWN DESIGN

Includes Pages 6A-G-2-1 through 6A-G-2-20



Required: Analyze chutes to determine size of chute for drainage area that ranges from 5 acres to 35 acres.

Method:

1. Determine the 25-year, 24-hour flow rates for various sizes of chute drainage areas using the Rational Method.

Reference:

1. NOAA Atlas 14 Point Precipitation Frequency Estimates, *National Weather Service,* 2017.

Solution:

1. Determine the 25-year intensity flow rates.

$$Q = CIA$$

Where: C= 0.8 (runoff coefficient, Ref 1.)
I = intensity, in/hr
A= drainage area, ac

t_c is assumed to be 10 min.

I = 9.89 in/hr (Ref 1)

Area (ac)	Flow (cfs)
5.0	39.6
10.0	79.1
15.0	118.7
20.0	158.2
25.0	197.8
30.0	237.4
35.0	276.9

McCARTY ROAD LANDFILL
0120-439-11-71-01
EROSION CONTROL STRUCTURE DESIGN
GEOMEMBRANE-LINED CHUTE

Uniform flow design for the geomembrane-lined chutes on 3.5% slope.

Flow Rate (cfs)	Bottom Slope (ft/ft)	Manning's n	Side Slope (left)	Side Slope (right)	Bottom Width (ft)	Normal Depth (ft)	Flow Vel (fps)	Froude Number	Velocity Head (ft)	Energy Head (ft)	Flow Area (sf)	Flow Top Width (ft)
39.6	0.035	0.01	2	2	8	0.35	12.98	4.018	2.62	2.97	3.05	9.40
79.1	0.035	0.01	2	2	8	0.53	16.60	4.263	4.28	4.81	4.76	10.10
118.7	0.035	0.01	2	2	8	0.67	19.06	4.400	5.64	6.32	6.23	10.67
158.2	0.035	0.01	2	2	8	0.79	20.97	4.495	6.84	7.62	7.54	11.15
197.8	0.035	0.01	2	2	8	0.90	22.55	4.570	7.90	8.80	8.77	11.58
237.4	0.035	0.01	2	2	8	0.99	23.93	4.634	8.90	9.89	9.92	11.97
276.9	0.035	0.01	2	2	8	1.08	25.10	4.681	9.79	10.88	11.03	12.34

Uniform flow design for the geomembrane-lined chutes on 25% slope.

Flow Rate (cfs)	Bottom Slope (ft/ft)	Manning's n	Side Slope (left)	Side Slope (right)	Bottom Width (ft)	Normal Depth (ft)	Flow Vel (fps)	Froude Number	Velocity Head (ft)	Energy Head (ft)	Flow Area (sf)	Flow Top Width (ft)
39.6	0.25	0.01	2	2	8	0.20	24.14	9.845	9.05	9.25	1.64	8.78
79.1	0.25	0.01	2	2	8	0.30	31.21	10.472	15.14	15.43	2.53	9.18
118.7	0.25	0.01	2	2	8	0.38	36.16	10.844	20.32	20.69	3.28	9.50
158.2	0.25	0.01	2	2	8	0.44	40.11	11.134	25.01	25.45	3.94	9.77
197.8	0.25	0.01	2	2	8	0.51	43.37	11.335	29.23	29.73	4.56	10.02
237.4	0.25	0.01	2	2	8	0.56	46.18	11.498	33.14	33.71	5.14	10.25
276.9	0.25	0.01	2	2	8	0.62	48.67	11.636	36.81	37.42	5.69	10.46

Conclusions: Maximum normal depth is 1.08 feet. Chute design depth is 2.0 feet; therefore, design is acceptable.

1. Calculations were performed using the HYDROCALC Hydraulics for Windows program developed by Dodson and Associates (Version 2.01, 1996).

Chute flow design for the gabion and rock riprap-lined chutes on 3.5% slope.

Flow Rate (cfs)	Bottom Slope (ft/ft)	Manning's n	Side Slope (left)	Side Slope (right)	Bottom Width (ft)	Normal Depth (ft)	Flow Vel. (fps)	Froude Number	Velocity Head (ft)	Energy Head (ft)	Flow Area (sf)	Flow Top Width (ft)
39.6	0.035	0.04	2	2	8	0.79	5.25	1.124	0.43	1.22	7.55	11.15
79.1	0.035	0.04	2	2	8	1.17	6.54	1.181	0.67	1.83	12.09	12.68
118.7	0.035	0.04	2	2	8	1.47	7.41	1.214	0.85	2.32	16.03	13.86
158.2	0.035	0.04	2	2	8	1.72	8.07	1.238	1.01	2.73	19.61	14.86
197.8	0.035	0.04	2	2	8	1.94	8.61	1.256	1.15	3.09	22.98	15.74
237.4	0.035	0.04	2	2	8	2.13	9.07	1.271	1.28	3.41	26.17	16.53
276.9	0.035	0.04	2	2	8	2.31	9.47	1.284	1.40	3.71	29.22	17.26

Chute flow design for the gabion and rock riprap-lined chutes on 25% slope.

Flow Rate (cfs)	Bottom Slope (ft/ft)	Manning's n	Side Slope (left)	Side Slope (right)	Bottom Width (ft)	Normal Depth (ft)	Flow Vel. (fps)	Froude Number	Velocity Head (ft)	Energy Head (ft)	Flow Area (sf)	Flow Top Width (ft)
39.6	0.25	0.04	2	2	8	0.44	10.03	2.784	1.56	2.01	3.95	9.78
79.1	0.25	0.04	2	2	8	0.67	12.73	2.939	2.52	3.18	6.22	10.66
118.7	0.25	0.04	2	2	8	0.84	14.55	3.029	3.29	4.13	8.16	11.37
158.2	0.25	0.04	2	2	8	0.99	15.98	3.096	3.97	4.96	9.90	11.97
197.8	0.25	0.04	2	2	8	1.13	17.13	3.142	4.56	5.69	11.55	12.51
237.4	0.25	0.04	2	2	8	1.25	18.12	3.182	5.10	6.35	13.10	12.99
276.9	0.25	0.04	2	2	8	1.36	19.00	3.216	5.61	6.97	14.58	13.44

Conclusions: Maximum normal depth is 1.93 feet. Chute design depth is 2.0 feet; therefore, design is acceptable.
Maximum velocity is 19.00 fps. As noted in footnote No. 2 below, the lining material will be selected so that the permissible velocity is not exceeded for erosion control.

1. Calculations were performed using the HYDROCALC Hydraulics for Windows program developed by Dodson and Associates (Version 2.0.1, 1996).
2. Permissible velocities are listed below, and lining material will be selected so that these are not exceeded.

Description	
Turf Reinforcement Mat (based on Pyramat or equivalent. Refer to Sheet 6A-G-2-6.)	25
Rock Riprap (based on Sheet 6A-G-2-7 and a D_{50} of 12 inches. If other riprap is used, it will meet the D_{50} requirements listed on Sheet 6A-G-2-7.)	9
Gabion/Concrete Grouted Riprap (based on Sheet 6A-G-2-8 and a D_{50} of 0.62 ft. If other gabion is used, it will meet the D_{50} requirements listed on Sheet 6A-G-2-8. The permissible velocity for concrete grouted riprap will actually be greater than 21 fps because it is classified as a rigid channel lining material.)	21

Chute flow design for the grouted riprap and turf reinforcement-lined chutes on 3.5% slope.

Flow Rate (cfs)	Bottom Slope (ft/ft)	Manning's n	Side Slope (left)	Side Slope (right)	Bottom Width (ft)	Normal Depth (ft)	Flow Vel. (fps)	Froude Number	Velocity Head (ft)	Energy Head (ft)	Flow Area (sf)	Flow Top Width (ft)
39.6	0.035	0.03	2	2	8	0.67	6.36	1.467	0.63	1.30	6.23	10.67
79.1	0.035	0.03	2	2	8	0.99	7.97	1.545	0.99	1.98	9.92	11.97
118.7	0.035	0.03	2	2	8	1.25	9.05	1.588	1.27	2.52	13.12	13.00
158.2	0.035	0.03	2	2	8	1.47	9.87	1.619	1.52	2.98	16.02	13.86
197.8	0.035	0.03	2	2	8	1.66	10.55	1.643	1.73	3.99	18.74	14.63
237.4	0.035	0.03	2	2	8	1.83	11.13	1.663	1.93	3.74	21.32	15.32
276.9	0.035	0.03	2	2	8	1.99	11.64	1.680	2.11	4.09	23.79	15.95

Chute flow design for the grouted riprap and turf reinforcement-lined chutes on 25% slope.

Flow Rate (cfs)	Bottom Slope (ft/ft)	Manning's n	Side Slope (left)	Side Slope (right)	Bottom Width (ft)	Normal Depth (ft)	Flow Vel. (fps)	Froude Number	Velocity Head (ft)	Energy Head (ft)	Flow Area (sf)	Flow Top Width (ft)
39.6	0.25	0.03	2	2	8	0.38	12.06	3.615	2.26	2.63	3.28	9.50
79.1	0.25	0.03	2	2	8	0.56	15.39	3.833	3.68	4.24	5.14	10.25
118.7	0.25	0.03	2	2	8	0.71	17.65	3.954	4.84	5.56	6.72	10.85
158.2	0.25	0.03	2	2	8	0.84	19.40	4.039	5.85	6.69	8.15	11.37
197.8	0.25	0.03	2	2	8	0.96	20.86	4.108	6.76	7.72	9.48	11.83
237.4	0.25	0.03	2	2	8	1.06	22.08	4.155	7.58	8.64	10.75	12.25
276.9	0.25	0.03	2	2	8	1.16	23.19	4.204	8.35	9.51	11.94	12.63

Conclusions: Maximum normal depth is 1.80 feet. Chute design depth is 2.0 feet; therefore, design is acceptable.
Maximum velocity is 23.19 fps. As noted in footnote No. 2 below, the lining material will be selected so that the permissible velocity is not exceeded for erosion control.

1. Calculations were performed using the HYDROCALC Hydraulics for Windows program developed by Dodson and Associates (Version 2.0.1, 1996).
2. Permissible velocities are listed below, and lining material will be selected so that these are not exceeded.

Description	Permissible Velocity (fps)
Turf Reinforcement Mat (based on Pyramat or equivalent. Refer to Sheet 6A-G-2-6.)	25
Rock Riprap (based on Sheet 6A-G-2-7 and a D_{50} of 12 inches. If other riprap is used, it will meet the D_{50} requirements listed on Sheet 6A-G-2-7.)	9
Gabion/Concrete Grouted Riprap (based on Sheet 6A-G-2-8 and a D_{50} of 0.62 ft. If other gabion is used, it will meet the D_{50} requirements listed on Sheet 6A-G-2-8. The permissible velocity for concrete grouted riprap will actually be greater than 21 fps because it is classified as a rigid channel lining material.)	21

McCARTY ROAD LANDFILL
0120-439-11-71-01
OPEN CHANNEL LETDOWN
RIPRAP EROSION PROTECTION DESIGN

Required: Design the riprap erosion protection at the downstream end of the open channel letdown.

Method: Use HEC-RAS to model the open channel geomembrane-lined letdown to determine the hydraulic characteristics of the hydraulic jump that will occur at the downstream end of the letdown. Based on the results, design the riprap erosion protection area.

Note: This example calculation is shown for geomembrane-lined letdowns to conservatively estimate the length of riprap needed. As seen on pages 6A-G-2-3 through 6A-G-2-5, the geomembrane-lined letdowns have the highest velocities and represent the worst-case scenario. Therefore, this riprap design is applicable to all lined letdowns.

Solution:

Page 6A-G-2-5B shows the water surface profile for incremental flows up to 300 cfs for the geomembrane letdown into a channel, as modeled in HEC-RAS. The modeling output is presented on pages 6A-G-2-5C through 6A-G-2-5M. The following table summarizes the erosion protection design for the various flows.

Flow (cfs)	Drainage Area* (ac)	Length of Hydraulic Jump (ft)	Specified Runout of Riprap (ft)
50	5	2	10
100	12	6	10
150	14	8	10
200	24	10	10
250	32	16	16
300	> 35	25	25

* Drainage areas are approximated based on corresponding flows/drainage areas listed on page 6A-G-2-2.

The values listed in the above table are specified riprap lengths for letdowns terminating into a perimeter channel. If the letdown terminates into a pond, 10 feet of riprap erosion control will be sufficient because the water in the pond will provide additional energy dissipation.

2. Determine the maximum drainage areas for the flows calculated in Step 1.

$Q = CIA$

Where: C= 0.8 (runoff coefficient, Ref 1.)
I = intensity, in/hr
A= drainage area, ac

t_c is assumed to be 10 min.

I = 9.89 in/hr (Ref 1)

$A = Q / (CI)$

Pipe Diameter (in)	Flow (cfs)	Area (ac)
24	16.0	2.0
36	21.0	2.7

Conclusion: The maximum allowable drainage area for a 24-inch diameter letdown pipe is 2.0 acres for each inlet and for a 36-inch diameter letdown pipe is 2.7 acres for each inlet. The minimum berm height is 3 feet for a 24-inch diameter pipe and 4 feet for 36-inch diameter pipe. (Figure 3 details indicate 1 foot berm above the pipe).

APPENDIX 6A-G-3

SEDIMENT CONTROL POND DESIGN

Includes Pages 6A-G-3-1 through 6A-G-3-7



Required: Develop a procedure to size a sedimentation pond to reduce sediment discharge from the external embankment area to 50 tons/acre/year or less.

Method:

1. Determine the 25-year frequency peak flow rate upstream of the sediment control pond using the Rational Method.
2. Calculate the settling velocity of sediment particles using Stokes equation.
3. Calculate the fraction of sediment trapped under dynamic conditions.
4. Calculate the fraction of sediment trapped under quiescent conditions.
5. Calculate the total fraction of sediment trapped under combined conditions.
6. Verify that pond design is adequate to reduce given soil loss to 50 tons/acre/year or less.

Reference:

1. NOAA Atlas 14 Point Precipitation Frequency Estimates, *National Weather Service,* 2017.
2. Chin, David. A. Water-Resources Engineering. Prentice Hall, Inc., 2000.
3. Haan, C.T., et al. Design Hydrology and Sedimentology for Small Catchments, 1994.
4. Cooperative Studies Section, Hydrologic Serices Division. U.S. Department of Commerence. *Technical Paper No. 40.*

Solution:

1. Determine the 25-year frequency peak flow rate upstream of the sediment control pond.

$$Q = CIA$$

Where: C= 0.8 (runoff coefficient, Ref. 1)
I = intensity (in/hr)
A= upstream drainage area (ac)

Note: A runoff coefficient of 0.8 is used for all areas regardless of slope.

t_c is assumed to be 10 min.

I = 9.89 in/hr (Ref 1)

A = 20.0 acres

Q = 158.24 cfs

2. Calculate the settling velocity, V_s (ft/hr), of sediment particles using Stokes equation.

$$V_s = \frac{\alpha (\rho_s/\rho_w - 1) g\phi^2}{18 v_w} \quad \text{(Ref. 2)}$$

Where:

α = factor that measures the effect of particle shape (assume spherical, $\alpha = 1$)
ρ_s = density of sediment particle (pcf)
ρ_w = density of ambient water (62.4 pcf)
g = gravity (32.2 ft/s^2)
ϕ = particle diameter (ft)
v_w = kinematic viscosity of the ambient water (ft^2/s)

α = 1
ρ_s = 165 pcf
v_w = 1.08E-05 ft^2/s

Particle Class[1]	Percent in Class	Particle Diameter[2] (ft)	Settling Velocity, V_s (ft/hr)
1	10	1.31E-05	0.17
2	20	1.97E-05	0.38
3	30	2.62E-05	0.68
4	20	3.28E-05	1.06
5	20	3.94E-05	1.52
Total	**100**		

[1] Particle class corresponds to particle diameter.

[2] Particle diameter ranges from 4µm to 12µm, which is typical for clay and silt particles.

3. Calculate the fraction of sediment trapped under dynamic conditions.

a. Determine the overflow rate.

$V_c = Q/A_p$ (EPA Pond Performance Model from Ref. 3)

Where:

V_c = overflow rate
A_p = area of sediment control pond (ac)

$Q =$ 158.24 cfs (from Step 2)
$A_p =$ 0.80 acre
$V_c =$ 16.35 ft/hr

b. Determine the fraction of sediment removed.

$F = 1 - (1 + 1/\beta * V_s/V_c)^{-\beta}$ (Ref. 3)

Where:

F = single-storm trapping of sediment
β = turbulence or short-circuiting parameter reflecting non-ideal performance of pond (assume good performance, $\beta = 3$)

$\beta =$ 3

$D_R = L_F [(1/CV_Q^2) / (1/CV_Q^2 - \ln (E_m/L_F))]^{(1/CVQ^2) + 1}$ (Ref. 3)

Where:

D_R = long-term dynamic removal fraction for stormwater
L_F = removal ratio for very low flow rates
E_m = mean storm removal fraction
CV_Q = coefficient of variation of flows

$L_F =$ 1
$E_m =$ assume equals single-storm trapping, F
$CV_Q =$ 1.46 (from Table 9B.1, p. 570, Ref. 3)

Table 1 - Summary for Dynamic Conditions

Particle Class	Percent in Class	Particle Diameter (ft)	Settling Velocity, V_s (ft/hr)	Single-storm Trapping, F	Fraction Removed Over All Storms, D_R	Fraction Captured Under Dynamic Conditions, E_D[1]
1	10	1.31E-05	0.17	0.010	0.030	0.30
2	20	1.97E-05	0.38	0.023	0.039	0.79
3	30	2.62E-05	0.68	0.040	0.048	1.45
4	20	3.28E-05	1.06	0.062	0.058	1.16
5	20	3.94E-05	1.52	0.087	0.069	1.37
Total	**100**					**5.1**

[1] E_D is the product of percent in class and D_R.

4. Calculate the fraction of sediment trapped under quiescent conditions.

$$RR = \frac{T_{IA} V_s A_Q}{V_R} \qquad \text{(Ref. 3)}$$

$$V_R = RA$$

Where:

RR = removal ratio
T_{IA} = average time interval between storms (hr)
V_s = settling velocity (ft/hr) from Step 2
A_Q = average surface area under quiescent conditions (ft^2)
V_R = mean runoff volume (ft^3)
R = runoff depth for 25-year, 24-hour storm (ft)
A = upstream drainage area (ac)

A_Q =	34,848	ft^2	(assume equal to A_p)
T_{IA} =	99	hrs	(from Table 9B.1, p. 570 of Ref. 3)
R =	0.84	ft	(Ref. 4)
A =	20.0	ac	(from Step 1)

V_R = 731,808 ft^3

Table 2 - Summary for Quiescent Conditions

Particle Class	Percent in Class	Settling Velocity, V_s (ft/hr)	Removal Ratio, RR (ft^3/hr)	Effective Volume Ratio, V_E/V_R[1]	ion Removed Under Quie	Fraction Captured Under Quiescent Conditions, E_Q
1	10	0.17	0.80	0.140	0.10	1.00
2	20	0.38	1.79	0.170	0.13	2.60
3	30	0.68	3.18	0.170	0.14	4.20
4	20	1.06	4.98	0.180	0.14	2.80
5	20	1.52	7.16	0.190	0.15	3.00
Total	**100**					**13.6**

[1] Based on Figure 9.29 from Ref. 3, using RR and V_B/V_R.

V_B = reservoir volume = 139,392 ft^3, assuming a 0.8-acre pond with an average depth of 4 feet.
V_B/V_R = 0.190

[2] Based on Figure 9.30 from Ref. 3 with CV_R = 1.46.

5. Calculate the total fraction of sediment trapped under combined conditions, E_T.

$$E_T = 1 - (1 - E_D) * (1 - E_Q) \qquad \text{(Ref. 3)}$$

E_T = 18.0 %

Refer to page 6A-G-3-7 for the total efficiency of ponds for different soil loss reduction amounts.

6. Verify that pond design is adequate to reduce given soil loss to 50 tons/acre/year or less.

a. Calculate net soil loss (i.e., sediment not captured by pond).

Total Soil Loss =	60.0	tons/ac/yr	
E_T =	**18.0**	**%**	(from Step 5)

Net Soil Loss = Total Soil Loss x (1 - E_T/100)

Net Soil Loss =	**49.2**	**tons/ac/yr**

Refer to page 6A-G-3-7 for the net soil loss for different soil loss reduction amounts.

b. Calculate the required pond size per unit drainage area factor.

Drainge Area =	20.0	acres	(from Step 1)
Pond Area =	0.8	acres	(from Step 3)
Required Pond Size / Unit Drainage Area Factor =	**0.040**		

This factor was calculated using a drainage area of 20 acres and a pond area of 0.8 acres. If a 40-acre drainage area drains to the pond, then a 1.6-acre pond will be required to achieve the above efficiency and net soil loss estimate (40 acres x 0.04 = 1.6 acre). Refer to page 6A-G-3-7 for the required pond size/unit drainage area factor for different soil loss reduction amounts.

Conclusion:

A 0.8-acre pond will sufficiently capture enough sediment from a 20-acre drainage area so that no more than 50 tons/acre/year of net soil loss occurs on external embankment slopes. If the size of the drainage area changes, this procedure will need to be updated. Refer to the table on page 6A-G-3-7 for a summary of the pond efficiencies and net soil loss estimates for different soil loss reduction amounts.

McCARTY ROAD LANDFILL
CITY OF HOUSTON, HARRIS COUNTY, TEXAS
TCEQ PERMIT NO. MSW-261B

PART III – SITE DEVELOPMENT PLAN
ATTACHMENT 6D
LINER SYSTEM, SEPARATORY OVERLINER SYSTEM, AND FINAL COVER SYSTEM DETAILS

Prepared for

McCarty Road Landfill TX, LP

Approved Site Development Plan August 2008
Revised October 2009
Revised December 2010
Revised February 2012
Revised October 2014
Revised March 2024

Revised September 2024



Prepared by

Weaver Consultants Group, LLC
TBPE Registration No. F-3727
6420 Southwest Boulevard, Suite 206
Fort Worth, Texas 76109
817-735-9770

WCG Project No. 0120-439-11-259

STATE OF TEXAS
KYLE D. GOULD
106018
LICENSED
PROFESSIONAL ENGINEER
9.24.24

ALTERNATIVE FINAL COVER SIDESLOPE FC6A
ALTERNATIVE FINAL COVER TOPSLOPE FC5A
HCFCD DITCH (P116-00-00)
PRE-SUBTITLE D TIE-IN W/ROAD FC13A
LEY ROAD
FORMER SOIL BORROW AREA
PRE SUBTITLE D TIE-IN FC14A
GCL/PRE SUBTITLE D FINAL COVER TRANSITION FC15
PRE-SUBTITLE D TIE-IN W/ROAD FC13
ALTERNATIVE FINAL COVER TOPSLOPE/SIDESLOPE TRANSITION FC7A
PRE-SUBTITLE D AREA
GREENS BAYOU (P100-00-00)
ALTERNATIVE FINAL COVER-SIDESLOPE FC2A
ALTERNATIVE FINAL COVER TOPSLOPE/SIDESLOPE TRANSITION FC3A
SUBTITLE D AREA
SUBTITLE D TIE-IN FC12A
UNION PACIFIC RAILROAD SPUR
SIDESLOPE SWALE (PRE-SUBTITLE D AREA) FC8A
SEP SIDESLOPE SWALE (SUBTITLE D AREA) FC9A
HCFCD DITCH (P114-00-00)
COMPOSITE FINAL COVER-TOPSLOPE FC1A
EXISTING FLARE FACILITY
CITY OF HOUSTON ROAD EASEMENT
EXISTING MAINTENANCE AND PAINT FACILITY
EXISTING SCALEHOUSE
EXISTING OFFICE BUILDING
EXISTING SITE ACCESS ROAD (GATES ROAD)
SUBTITLE D TIE-IN W/ROAD FC1A
PRE-SUBTITLE D FINAL COVER TIE-IN FC4A
U.S. HIGHWAY 90 (McCARTY ROAD)
UNION PACIFIC RAILROAD
H&L&P EASEMENT
NP
NWP
NEP
EP
SEP
SWP
SP-1
SP-2

N 747000
N 746000
N 745000
N 744000
N 743000
N 742000
E 3189000
E 3190000
E 3191000
E 3192000
E 3193000
E 3194000
E 3195000
95°14'30"
29°49'45"

0 300 600
SCALE IN FEET

LEGEND

- PERMIT BOUNDARY
- LIMITS OF WASTE
- DEED RESTRICTION BOUNDARY (SEE NOTE 4)
- 200 GCL FINAL CONTOUR
- N 745000 STATE PLANE COORDINATE SYSTEM
- 29°49'45" GEODETIC COORDINATE SYSTEM
- EXISTING CONTOUR
- PROPOSED DRAINAGE SWALE
- PROPOSED DRAINAGE LETDOWN
- MW-11UB EXISTING GROUNDWATER MONITORING WELL
- MW-4UB EXISTING GROUNDWATER MONITORING WELL TO BE DECOMMISSIONED
- MW-4UB PROPOSED REPLACEMENT MONITORING WELL
- GMP-M EXISTING LANDFILL GAS MONITORING PROBE (SEE NOTE 5)
- GMP-J EXISTING LANDFILL GAS MONITORING PROBE TO BE DECOMMISSIONED (SEE NOTE 5)
- GMP-J PROPOSED REPLACEMENT LANDFILL GAS PROBE (SEE NOTE 5)
- EASEMENT BOUNDARY
- GABIONS
- LIMIT OF SUBTITLE D FINAL COVER
- CONSTRUCTED FINAL COVER

POND LABELS	
NP	NORTH POND
NWP	NORTHWEST POND
NEP	NORTHEAST POND
EP	EAST POND
SEP	SOUTHEAST POND
SWP	SOUTHWEST POND
SP-1	SOUTH POND 1
SP-2	SOUTH POND 2

NOTES:

1. TOPOGRAPHIC MAPPING PREPARED BY FIRMATEK FROM AERIAL PHOTOGRAPHY FLOWN 11-17-2023. THE GRID SYSTEM IS TIED TO THE TEXAS STATE PLANE COORDINATE SYSTEM SOUTH CENTRAL ZONE NAD 1927.
2. PERMIT BOUNDARY AND EASEMENTS WERE REPRODUCED FROM COSTELLO, INC. STANDARD LAND SURVEY DRAWING, DATED MARCH 2004.
3. TYPICAL SIDESLOPES ARE 4H:1V; TYPICAL TOPSLOPE IS 3.5%.
4. REFER TO ATTACHMENT 6, APPENDIX 6A-F FOR DEED RESTRICTION INFORMATION.
5. GAS MONITORING PROBES GMP-Q, GMP-R, AND GMP-S ARE BEING DECOMMISSIONED AND RELOCATED AS DOCUMENTED IN A PERMIT MODIFICATION SUBMITTED BY WEAVER BOOS CONSULTANTS (WBC) IN APRIL 2004. GMP-T5 AND GMP-U ARE BEING DECOMMISSIONED IN A PERMIT MODIFICATION SUBMITTED BY WBC IN APRIL 2004. GMP-T1 WILL BECOME A PERMANENT GAS MONITORING PROBE FOR THIS AREA. REFER TO ATTACHMENT 14 FOR ADDITIONAL INFORMATION.

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FILE: 0120-439-11
CAD: 6D-1 LANDFILL COMP.DWG
DRAWN BY: JDW
DESIGN BY: SAN/ALD
REVIEWED BY: JPY

Weaver Consultants Group
TBPE REGISTRATION NO. F-3727

PREPARED FOR
McCARTY ROAD LANDFILL TX, LP

REVISIONS		
NO.	DATE	DESCRIPTION
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2	02/2024	PERMIT MODIFICATION
3	09/2024	PERMIT MODIFICATION

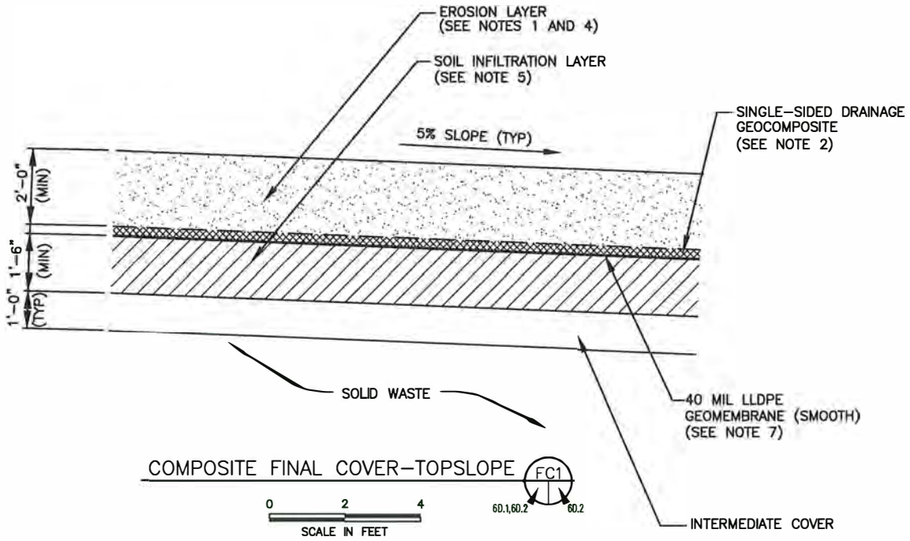
GCL LANDFILL COMPLETION PLAN

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HARRIS COUNTY, TEXAS

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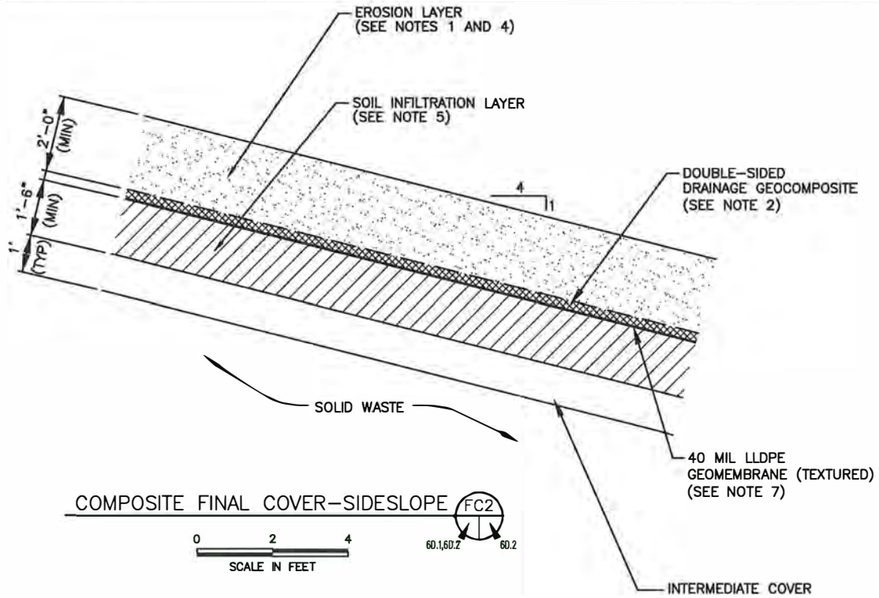
ATTACHMENT 6D.1C

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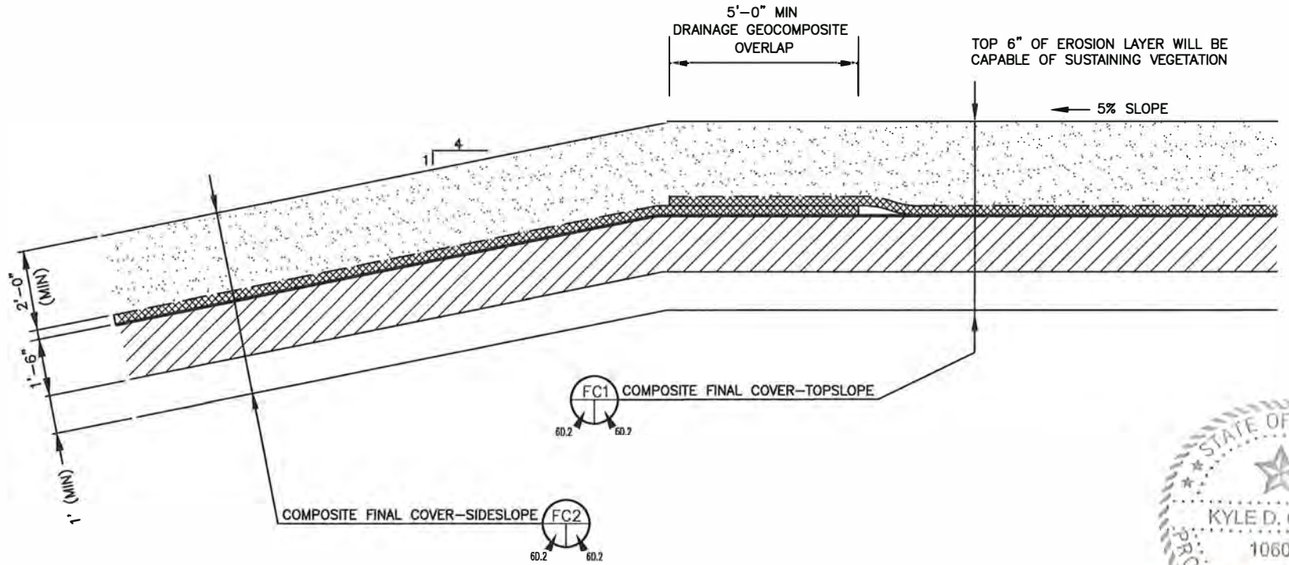
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SCALE IN FEET



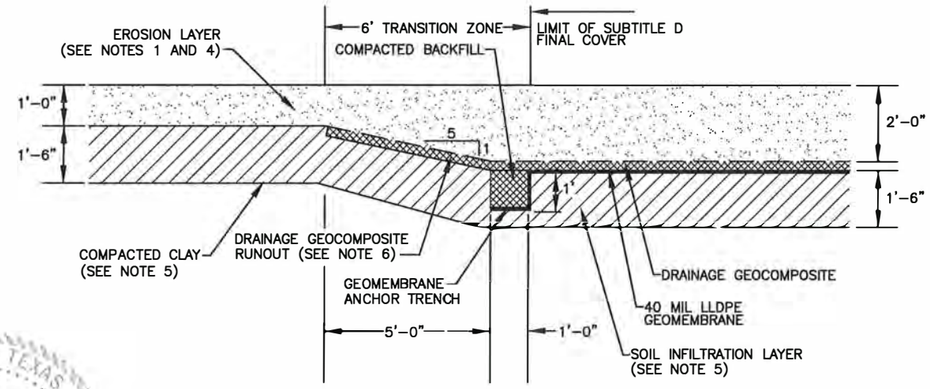
COMPOSITE FINAL COVER–SIDESLOPE FC2 (60.1, 60.2, 60.2)

0 2 4
SCALE IN FEET



COMPOSITE FINAL COVER
SIDESLOPE/TOPSLOPE TRANSITION FC3 (60.1, 60.2)

0 2 4
SCALE IN FEET



PRE–SUBTITLE D/SUBTITLE D FINAL COVER TIE–IN FC4 (60.1, 60.2)

0 2 4
SCALE IN FEET

STATE OF TEXAS
KYLE D. GOULD
106018
LICENSED
PROFESSIONAL ENGINEER
9.24.24

NOTES:

1. TOP 6" OF EROSION LAYER WILL BE CAPABLE OF SUSTAINING VEGETATION CONSISTENT WITH THE COVER SPECIFICATION. (REFER TO ATTACHMENT 6A, APPENDIX 6A–D)
2. DRAINAGE GEOCOMPOSITE–HDPE GEONET OVERLAIN BY A GEOTEXTILE LAYER, OR ENGINEER APPROVED EQUIVALENT. DRAINAGE GEOCOMPOSITE WILL CONSIST OF A 200 MIL GEONET WITH 6 OZ/SY GEOFABRIC ON UPPER SIDE OVER TOPSLOPE AREAS AND ON BOTH SIDES OVER SIDESLOPE AREAS. MATERIAL SPECIFICATIONS ARE INCLUDED IN ATTACHMENT 12, FCSQCP.
3. FINAL COVER COMPONENTS WILL BE CONSTRUCTED ACCORDING TO FCSQCP INCLUDED IN ATTACHMENT 12.
4. EROSION LAYER MAY CONSIST OF BOTH ONSITE AND OFF–SITE SOILS.
5. HYDRAULIC CONDUCTIVITY OF COMPACTED CLAY INFILTRATION LAYER IS $1X10^{-5}$ cm/sec IN SUBTITLE D AREAS. FOR PRE–SUBTITLE D FINAL COVER, THE INFILTRATION LAYER SHALL CONSIST OF 18" OF COMPACTED CLAY WITH A COEFFICIENT OF PERMEABILITY LESS THAN OR EQUAL TO THE PERMEABILITY OF THE UNDERLYING LINER SYSTEM. IF NO INFORMATION IS AVAILABLE FOR THE BOTTOM LINER, THAN INFILTRATION LAYER WILL HAVE A HYDRAULIC CONDUCTIVITY OF $1x10^{-5}$ CM/SEC OR LESS.
6. DRAINAGE LAYER RUNOUT LENGTH IS A MINIMUM OF 5 FEET.
7. GEOMEMBRANE LINER WILL BE SMOOTH ON BOTH SIDES ON SLOPES LESS THAT 7H:1V AND TEXTURED ON BOTH SIDES OF SLOPES EQUAL TO OR STEEPER THAN 7H:1V. BOTH TEXTURED AND SMOOTH LLDPE GEOMEMBRANE WILL BE 40 MIL.
8. FLOW IN DRAINAGE GEOCOMPOSITE WILL BE INTERCEPTED BY A 3 IN DIAMETER COLLECTION PIPE AS SPECIFIED IN ATTACHMENT 12–FCSQCP.
9. THICKNESSES OF GEOSYNTHETIC MATERIALS ARE SHOWN NOT TO SCALE.
10. FOR ALTERNATIVE FINAL COVER DETAILS SEE ATTACHMENTS 6D.4A THROUGH 6D.4C.

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FILE: 0120-439-11
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DESIGN BY: MDM
REVIEWED BY: JPY

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TBPE REGISTRATION NO. F-3727

PREPARED FOR
McCARTY ROAD LANDFILL TX, LP

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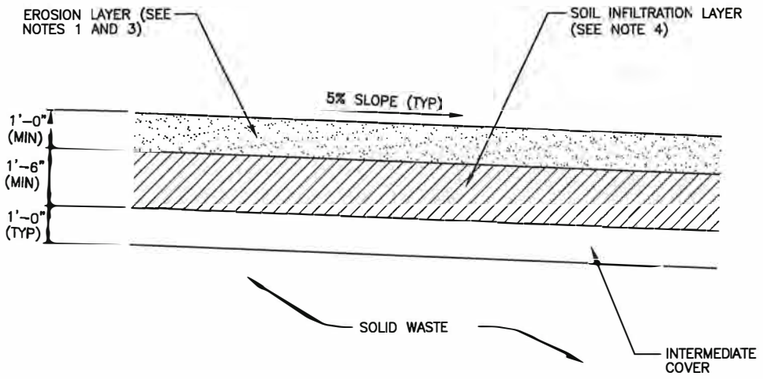
MAJOR PERMIT AMENDMENT
FINAL COVER DETAILS

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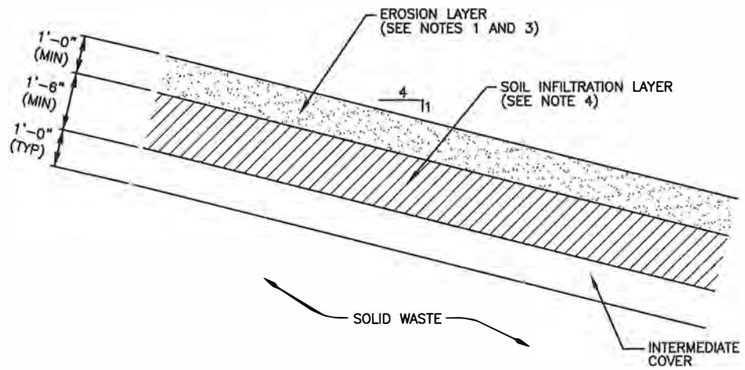
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SOIL FINAL COVER–TOPSLOPE FC5 (60.1, 60.3)

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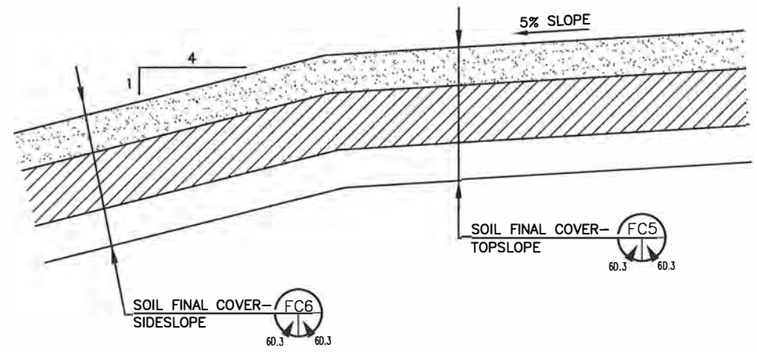
SCALE IN FEET



SOIL FINAL COVER–SIDESLOPE FC6 (60.1, 60.3)

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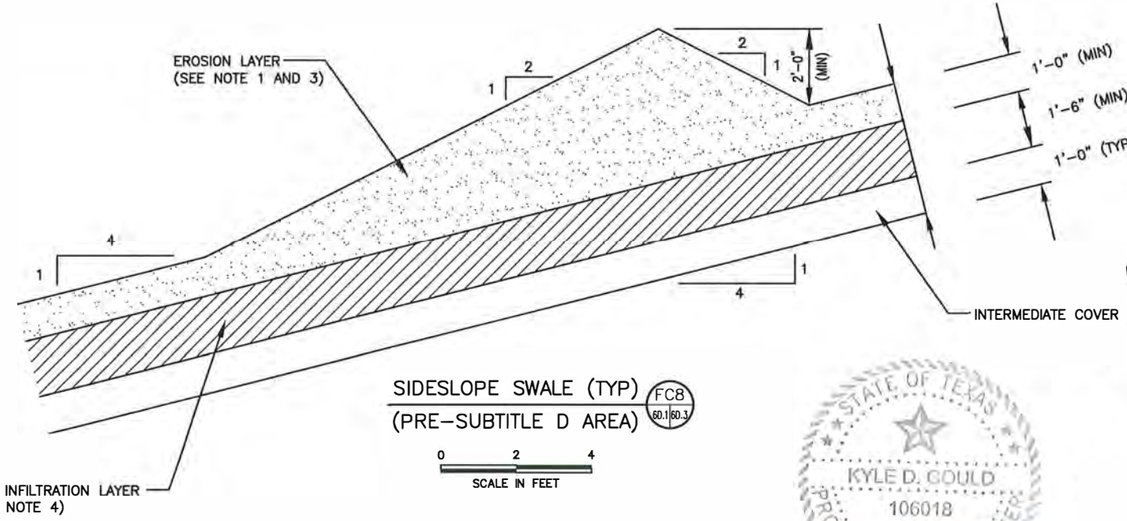
SCALE IN FEET



PRE–SUBTITLE D FINAL COVER– TOP/SIDESLOPE TRANSITION FC7 (60.1, 60.3)

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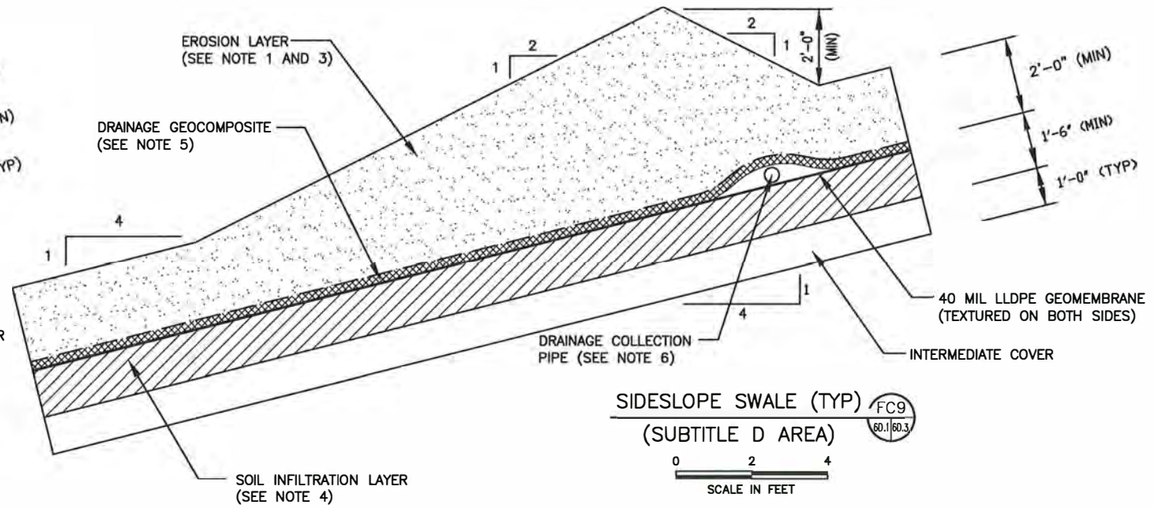
SCALE IN FEET



SIDESLOPE SWALE (TYP) (PRE–SUBTITLE D AREA) FC8 (60.1, 60.3)

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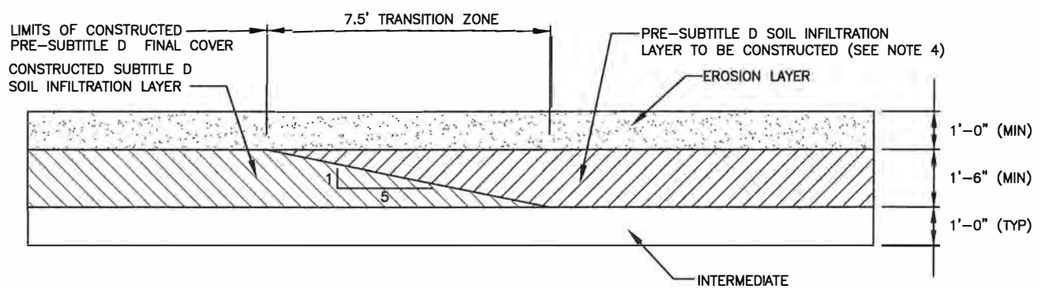
SCALE IN FEET



SIDESLOPE SWALE (TYP) (SUBTITLE D AREA) FC9 (60.1, 60.3)

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SCALE IN FEET



PRE–SUBTITLE D FINAL COVER TIE–IN FC10 (60.1, 60.3)

0 2 4

SCALE IN FEET

NOTES:

1. TOP 6" OF EROSION LAYER WILL BE CAPABLE OF SUSTAINING VEGETATION CONSISTENT WITH THE COVER SPECIFICATION. (REFER TO ATTACHMENT 6A, APPENDIX 6A–D)
2. FINAL COVER COMPONENTS WILL BE CONSTRUCTED ACCORDING TO FCSQCP INCLUDED IN ATTACHMENT 12.
3. EROSION LAYER MAY CONSIST OF BOTH ONSITE AND OFF–SITE SOILS.
4. FOR PRE–SUBTITLE D FINAL COVER, THE SOIL INFILTRATION LAYER SHALL CONSIST OF 18" OF COMPACTED CLAY WITH A COEFFICIENT OF PERMEABILITY LESS THAN OR EQUAL TO THE PERMEABILITY OF THE UNDERLYING LINER SYSTEM. IF NO INFORMATION IS AVAILABLE FOR THE BOTTOM LINER THAN INFILTRATION LAYER WILL HAVE A HYDRAULIC CONDUCTIVITY OF 1×10^{-5} cm/sec OR LESS.
5. DRAINAGE GEOCOMPOSITE–HDPE GEONET OVERLAIN BY A GEOTEXTILE LAYER, OR ENGINEER APPROVED EQUIVALENT. SIDESLOPE DRAINAGE GEOCOMPOSITE WILL CONSIST OF A 200 MIL GEONET WITH 6 oz/sy GEOFABRIC ON BOTH SIDES. MATERIAL SPECIFICATIONS ARE INCLUDED IN ATTACHMENT 12–FCSQCP.
6. FLOW IN DRAINAGE GEOCOMPOSITE WILL BE INTERCEPTED BY A 3 IN DIAMETER COLLECTION PIPE AS SPECIFIED IN ATTACHMENT 12–FCSQCP.
7. THICKNESSES OF GEOSYNTHETIC MATERIALS ARE NOT SHOWN TO SCALE.
8. FOR ALTERNATIVE FINAL COVER DETAILS SEE ATTACHMENTS 6D.4A THROUGH 6D.4C.

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REVIEWED BY: JPY

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PREPARED FOR
McCARTY ROAD LANDFILL TX, LP

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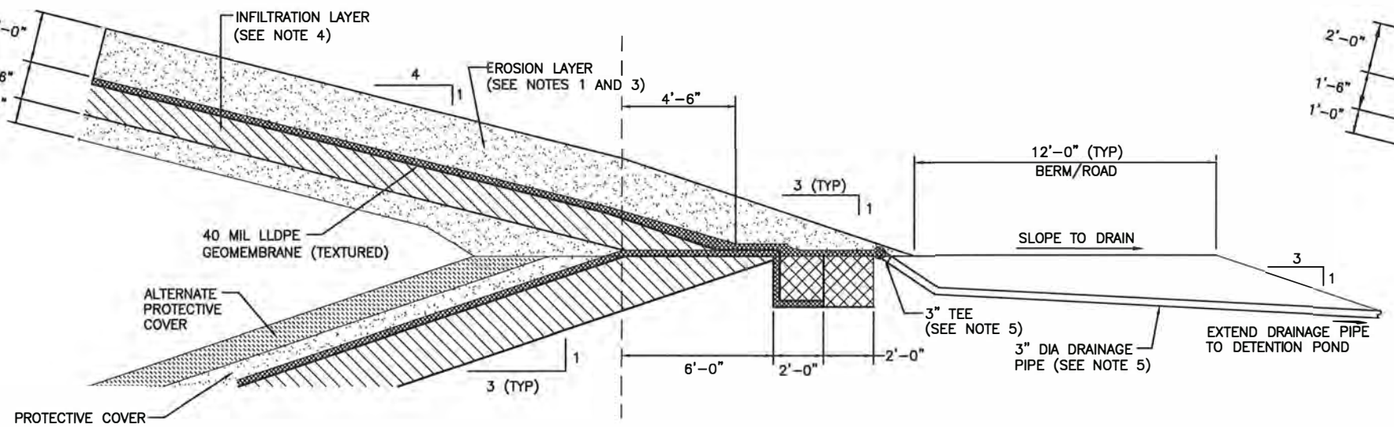
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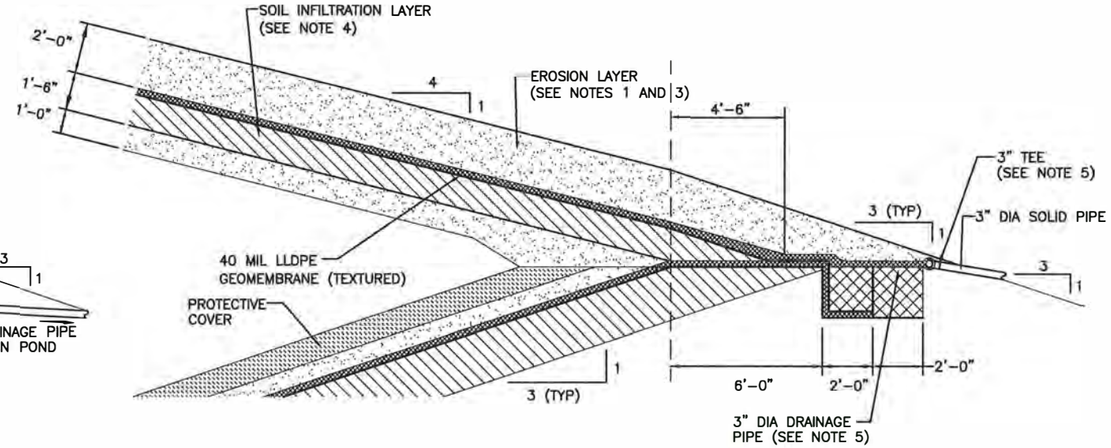
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SUBTITLE D TIE-IN W/ROAD FC11

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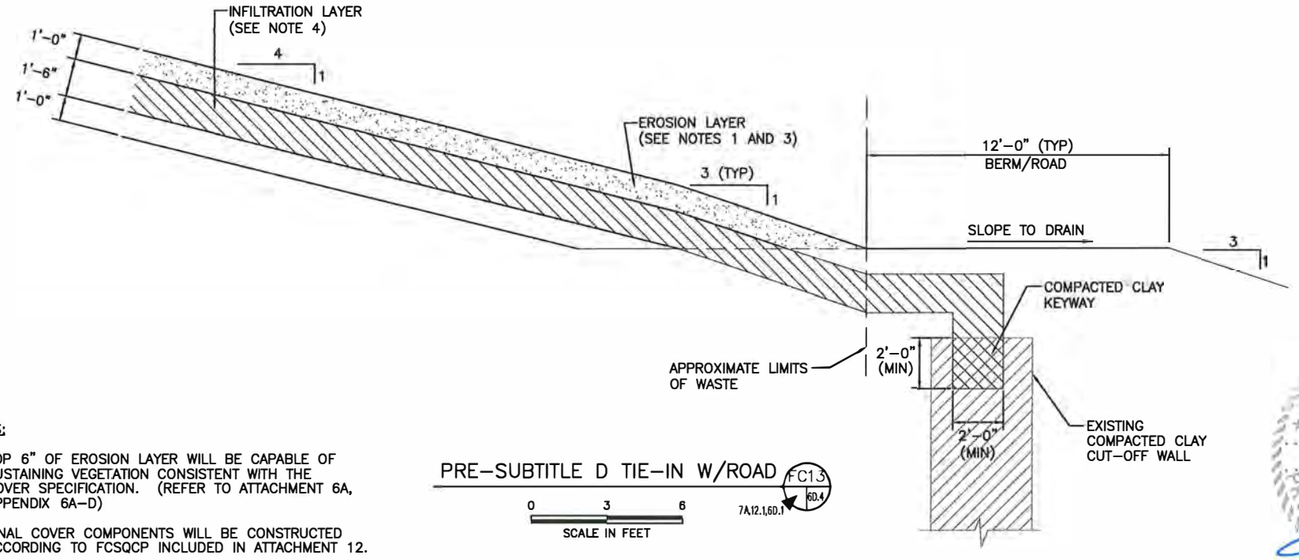
SCALE IN FEET



SUBTITLE D TIE-IN W/OUT ROAD FC12

0 3 6

SCALE IN FEET

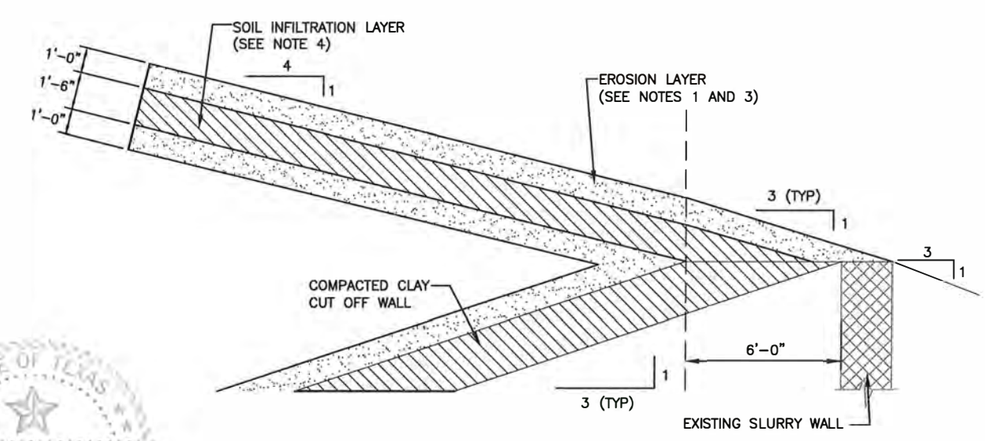


PRE-SUBTITLE D TIE-IN W/ROAD FC13

0 3 6

SCALE IN FEET

7A12.1,6D.1



PRE-SUBTITLE D TIE-IN FC14

0 3 6

SCALE IN FEET

NOTES:

1. TOP 6" OF EROSION LAYER WILL BE CAPABLE OF SUSTAINING VEGETATION CONSISTENT WITH THE COVER SPECIFICATION. (REFER TO ATTACHMENT 6A, APPENDIX 6A-D)
2. FINAL COVER COMPONENTS WILL BE CONSTRUCTED ACCORDING TO FCSQCP INCLUDED IN ATTACHMENT 12.
3. EROSION LAYER MAY CONSIST OF BOTH ONSITE AND OFF-SITE SOILS. BORROW SOURCE TO BE SELECTED BY OWNER PRIOR TO CONSTRUCTION.
4. HYDRAULIC CONDUCTIVITY OF COMPACTED CLAY INFILTRATION LAYER IS $1X10^{-5}$ cm/sec IN SUBTITLE D AREAS. FOR PRE-SUBTITLE D FINAL COVER, THE INFILTRATION LAYER SHALL CONSIST OF 18" OF COMPACTED CLAY WITH A COEFFICIENT OF PERMEABILITY LESS THAN OR EQUAL TO THE PERMEABILITY OF THE UNDERLYING LINER SYSTEM. IF NO INFORMATION IS AVAILABLE FOR THE BOTTOM LINER THAN INFILTRATION LAYER WILL HAVE A HYDRAULIC CONDUCTIVITY OF $1x10^{-5}$ cm/sec.
5. FLOW IN DRAINAGE GEOCOMPOSITE WILL BE INTERCEPTED BY A 3 IN DIAMETER COLLECTION PIPE AS SPECIFIED IN ATTACHMENT 12-FCSQCP.
6. THICKNESSES OF GEOSYNTHETIC MATERIALS ARE NOT SHOWN TO SCALE.
7. FOR ALTERNATIVE FINAL COVER DETAILS SEE ATTACHMENTS 6D.4A THROUGH 6D.4C.

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KYLE D. GOULD
106018
LICENSED
ENGINEER
9.24.24

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CAD: 6D.4 FC DETAILS.DWG

DRAWN BY: JDW
DESIGN BY: MQM
REVIEWED BY: JPY

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TBPE REGISTRATION NO. F-3727

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2	09/2024	PERMIT MODIFICATION

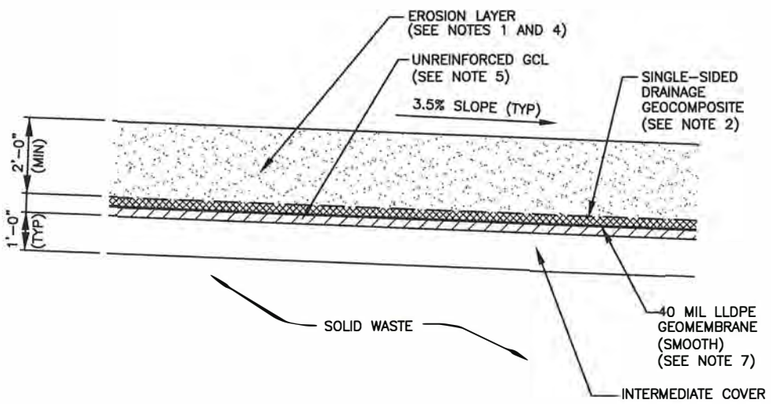
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HARRIS COUNTY, TEXAS

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ATTACHMENT 6D.4

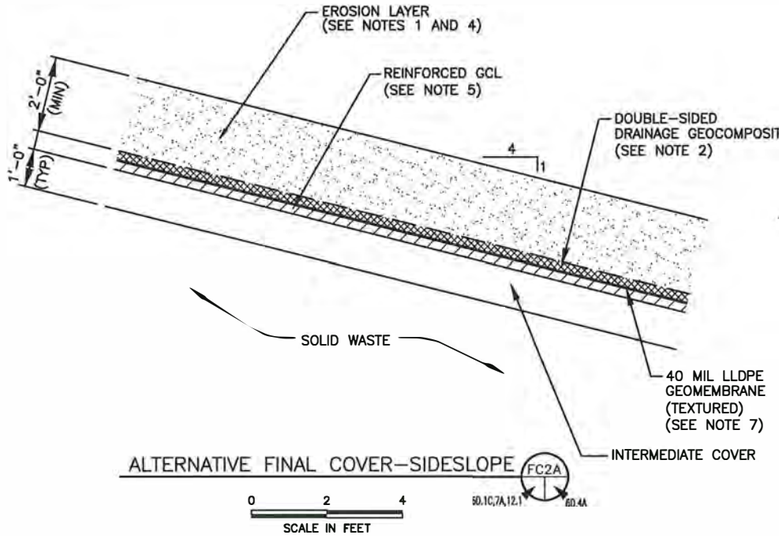
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ALTERNATIVE FINAL COVER–TOPSLOPE FC1A

0 2 4 60.1C,7A,12.1 60.4A

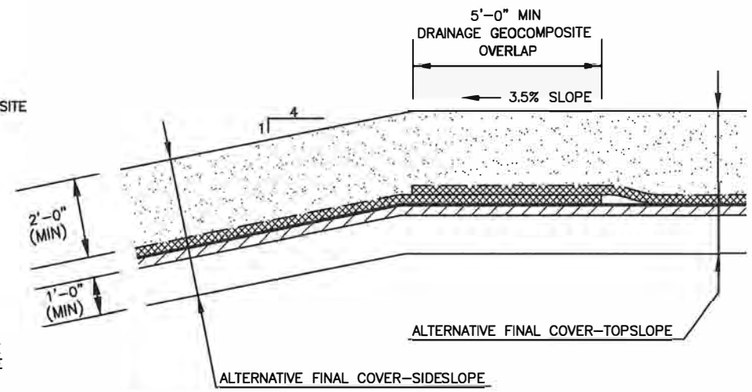
SCALE IN FEET



ALTERNATIVE FINAL COVER–SIDESLOPE FC2A

0 2 4 60.1C,7A,12.1 60.4A

SCALE IN FEET

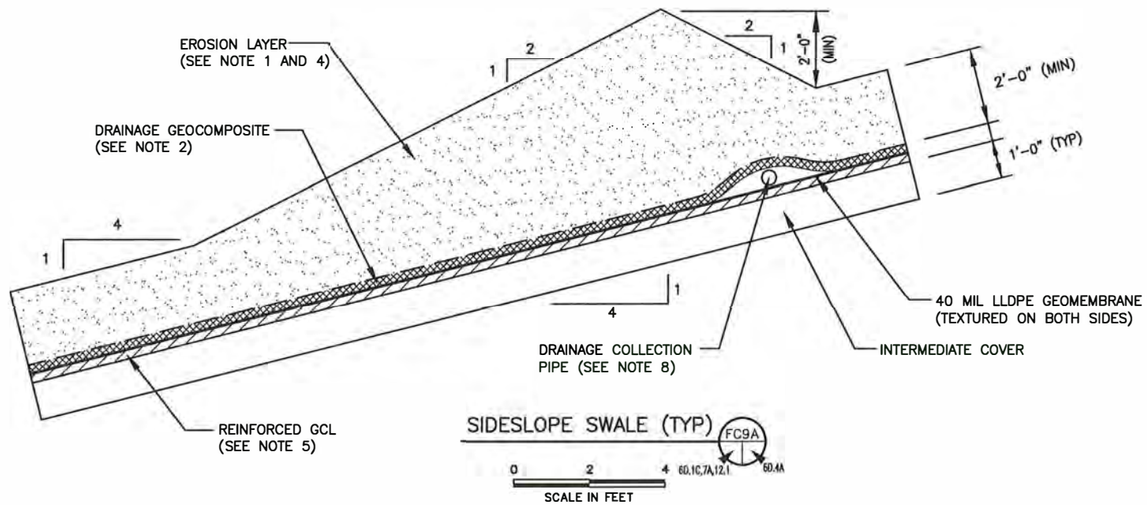


ALTERNATIVE FINAL COVER
SIDESLOPE/TOPSLOPE TRANSITION FC3A

60.1C,7A,12.1 60.4A

0 2 4

SCALE IN FEET



SIDESLOPE SWALE (TYP) FC9A

0 2 4 60.1C,7A,12.1 60.4A

SCALE IN FEET

NOTES:

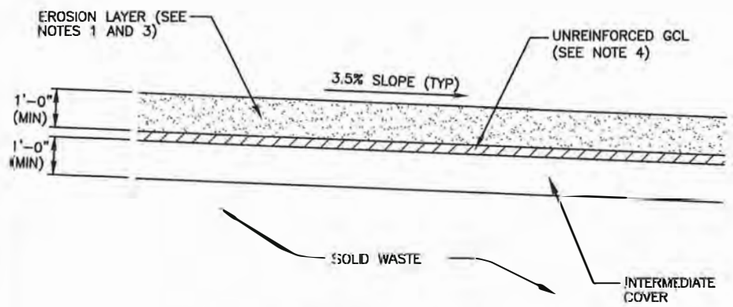
1. TOP 6" OF EROSION LAYER WILL BE CAPABLE OF SUSTAINING VEGETATION CONSISTENT WITH THE COVER SPECIFICATION. (REFER TO ATTACHMENT 6A, APPENDIX 6A–D)
2. DRAINAGE GEOCOMPOSITE–HDPE GEONET OVERLAIN BY A GEOTEXTILE LAYER, OR ENGINEER APPROVED EQUIVALENT. DRAINAGE GEOCOMPOSITE WILL CONSIST OF A 200 MIL GEONET WITH 6 OZ/SY GEOFABRIC ON UPPER SIDE OVER TOPSLOPE AREAS AND ON BOTH SIDES OVER SIDESLOPE AREAS. MATERIAL SPECIFICATIONS ARE INCLUDED IN ATTACHMENT 12, FCSQCP.
3. FINAL COVER COMPONENTS WILL BE CONSTRUCTED ACCORDING TO FCSQCP INCLUDED IN ATTACHMENT 12.
4. EROSION LAYER MAY CONSIST OF BOTH ONSITE AND OFF–SITE SOILS.
5. GCL WILL ACT AS AN INFILTRATION LAYER AND WILL HAVE A HYDRAULIC CONDUCTIVITY OF $3X10^{-9}$cm/sec OR LESS.
6. DRAINAGE LAYER RUNOUT LENGTH IS A MINIMUM OF 5 FEET.
7. GEOMEMBRANE LINER WILL BE SMOOTH ON BOTH SIDES ON SLOPES LESS THAN 7H:1V AND TEXTURED ON BOTH SIDES OF SLOPES EQUAL TO OR STEEPER THAN 7H:1V. BOTH TEXTURED AND SMOOTH LLDPE GEOMEMBRANE WILL BE 40 MIL.
8. FLOW IN DRAINAGE GEOCOMPOSITE WILL BE INTERCEPTED BY A 3 IN DIAMETER COLLECTION PIPE AS SPECIFIED IN ATTACHMENT 12–FCSQCP.
9. THICKNESSES OF GEOSYNTHETIC MATERIALS ARE SHOWN NOT TO SCALE.



☐ DRAFT ☒ FOR PERMITTING PURPOSES ONLY ☐ ISSUED FOR CONSTRUCTION	PREPARED FOR McCARTY ROAD LANDFILL TX, LP	GCL ALTERNATIVE FINAL COVER DETAILS SUBTITLE D AREA McCARTY ROAD LANDFILL HARRIS COUNTY, TEXAS
DATE: 08/2010 FILE: 0120–439–11 CAD: 6D.4A SUB D FC DETAILS.DWG DRAWN BY: JDW DESIGN BY: MDM REVIEWED BY: JPY	REVISIONS NO. 1 DATE 01/2012 DESCRIPTION PERMIT MODIFICATION NO. 2 DATE 09/2024 DESCRIPTION PERMIT MODIFICATION	
Weaver Consultants Group TBPE REGISTRATION NO. F–3727		WWW.WCGRP.COM ATTACHMENT 6D.4A

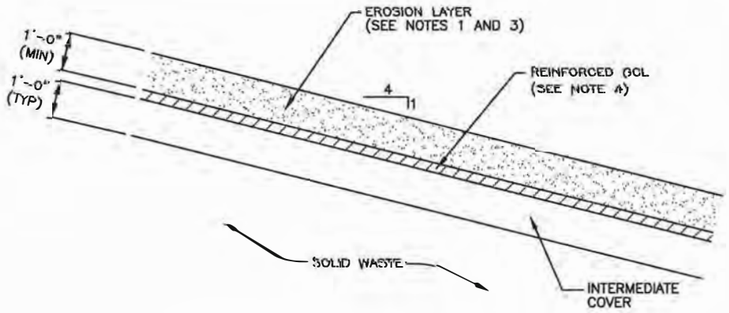
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O:\0120\439\FLP MOD 2024\ATT 6\6D\CLEAN\6D.4A SUB D FCDETAILS.dwg, tarrington, 1:2



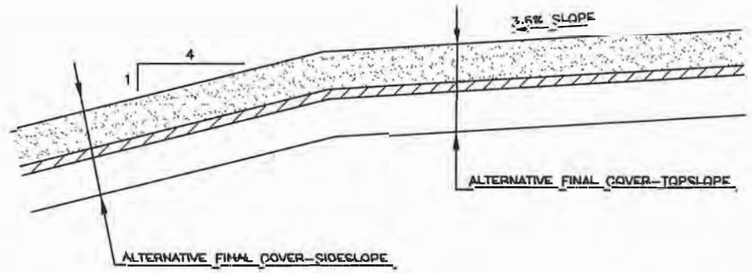
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0 2 4
SCALE IN FEET



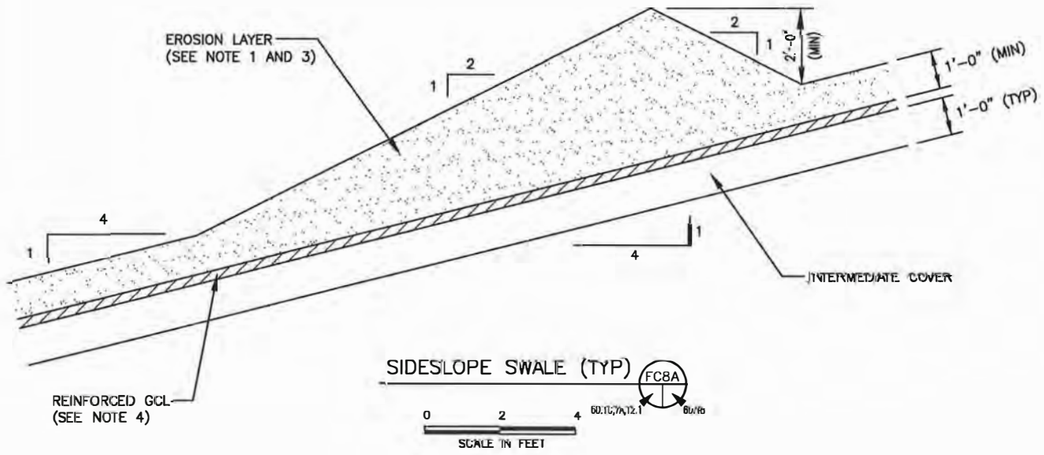
ALTERNATIVE FINAL COVER-SIDESLOPE FC6A 60.1C,7A,12.1 60.4B

0 2 4
SCALE IN FEET



ALTERNATIVE FINAL COVER-TOP/SIDESLOPE TRANSITION FC7A 60.1C,7A,12.1 60.4B

0 2 4
SCALE IN FEET



SIDESLOPE SWALE (TYP) FC8A 60.1C,7A,12.1 60.4B

0 2 4
SCALE IN FEET

NOTES:

1. TOP 6" OF EROSION LAYER WILL BE CAPABLE OF SUSTAINING VEGETATION CONSISTENT WITH THE COVER SPECIFICATION. (REFER TO ATTACHMENT 6A, APPENDIX 6A-13)
2. FINAL COVER COMPONENTS WILL BE CONSTRUCTED ACCORDING TO FOSGOP INCLUDED IN ATTACHMENT 12.
3. EROSION LAYER MAY CONSIST OF BOTH ONSITE AND OFF-SITE SOILS.
4. GCL WILL ACT AS AN INFILTRATION LAYER AND WILL HAVE A HYDRAULIC CONDUCTIVITY OF $3X10^{-9}$ cm/sec OR LESS.

STATE OF TEXAS
KYLE D. GOULD
106018
LICENSED
PROFESSIONAL ENGINEER
6.24.24

- [ ] BASIS
- [x] FOR PERMITTING PURPOSES ONLY
- [ ] ISSUED FOR CONSTRUCTION

DATE: 06/2024
SCALE: HORZ. 1"=, VERT. AS FC DETAILS
DRAWN BY: KW
DESIGN BY: JGM
REVIEWED BY: KK

PREPARED FOR
McCARTY ROAD LANDFILL TX, LP

REVISIONS		
NO.	DATE	DESCRIPTION
1	01/2012	PERMIT MODIFICATION
2	09/2024	PERMIT MODIFICATION

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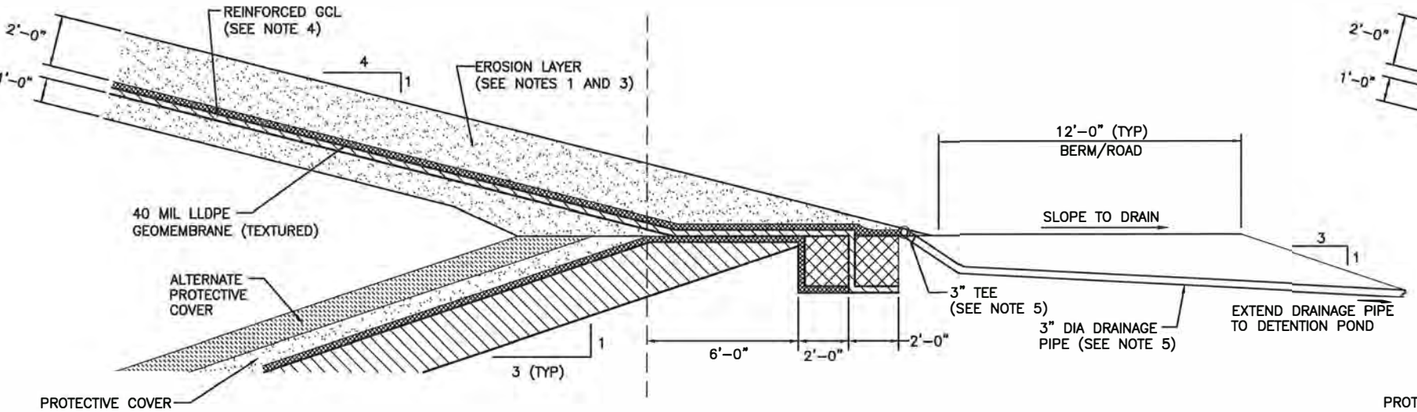
GCL ALTERNATIVE
FINAL COVER DETAILS
PRE-SUBTITLE D AREA

McCARTY ROAD LANDFILL
HARRIS COUNTY, TEXAS

ATTACHMENT 6D.4B

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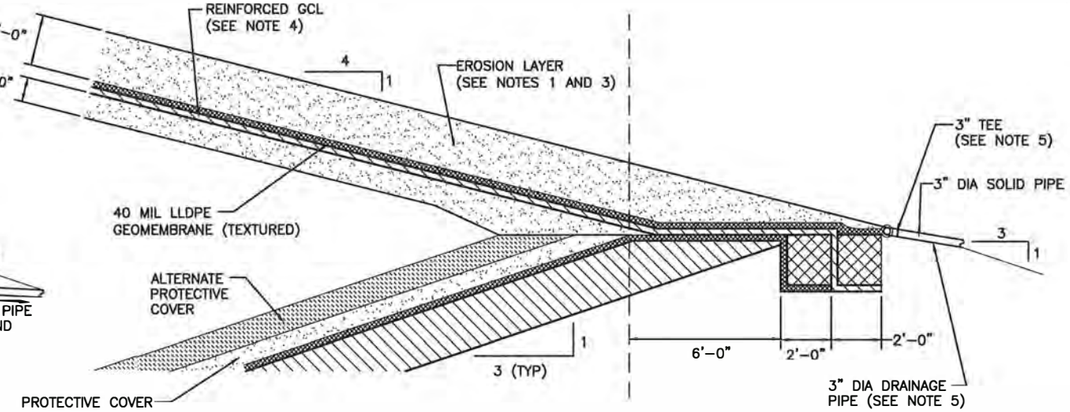
O:\0120\439\FLIP MOD 2024\ATT 6\6D\CLEAN\6D.4B PRE SUB D FCDETAILS.dwg, ratrington, 1:2



SUBTITLE D AFC TIE-IN W/ROAD FC11A

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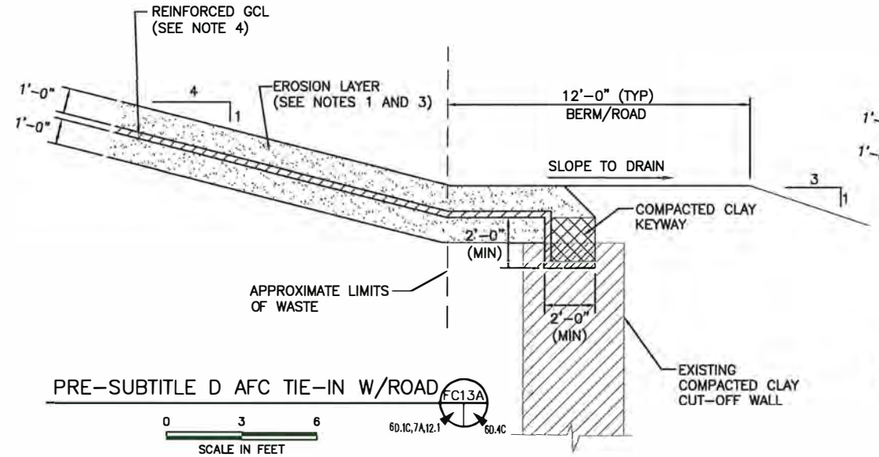
SCALE IN FEET



SUBTITLE D AFC TIE-IN W/OUT ROAD FC12A

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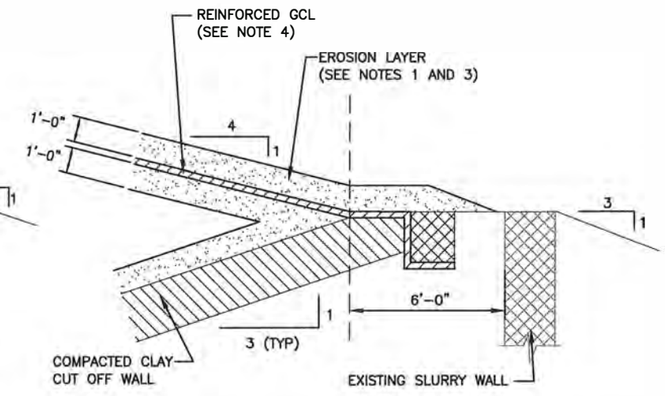
SCALE IN FEET



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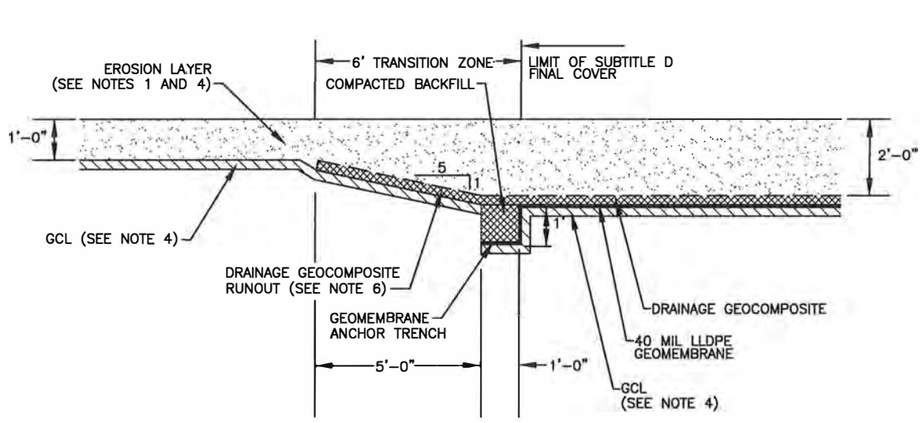
SCALE IN FEET



PRE-SUBTITLE D AFC TIE-IN FC14A

0 3 6 60.1C,7A,12.1 60.4C

SCALE IN FEET



PRE-SUBTITLE D/SUBTITLE D ALTERNATIVE FINAL COVER TIE-IN FC4A

0 2 4 60.1C,7A,12.1 60.4C

SCALE IN FEET

NOTES:

1. TOP 6" OF EROSION LAYER WILL BE CAPABLE OF SUSTAINING VEGETATION CONSISTENT WITH THE COVER SPECIFICATION. (REFER TO ATTACHMENT 6A, APPENDIX 6A-D)
2. FINAL COVER COMPONENTS WILL BE CONSTRUCTED ACCORDING TO FCSQCP INCLUDED IN ATTACHMENT 12.
3. EROSION LAYER MAY CONSIST OF BOTH ONSITE AND OFF-SITE SOILS. BORROW SOURCE TO BE SELECTED BY OWNER PRIOR TO CONSTRUCTION.
4. GCL WILL ACT AS AN INFILTRATION LAYER AND WILL HAVE A HYDRAULIC CONDUCTIVITY OF $3X10^{-9}$ cm/sec OR LESS.
5. FLOW IN DRAINAGE GEOCOMPOSITE WILL BE INTERCEPTED BY A 3 IN DIAMETER COLLECTION PIPE AS SPECIFIED IN ATTACHMENT 12-FCSQCP.
6. THICKNESSES OF GEOSYNTHETIC MATERIALS ARE NOT SHOWN TO SCALE.

STATE OF TEXAS
KYLE D. COULD
106018
PROFESSIONAL ENGINEER
9.24.24

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0:\0120\439\FLIP MOD 2024\ATT 6\6D\CLEAN\6D.4C FC TIE-IN DETAILS.dwg, rarrington, 1:2

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DATE: 08/2010
FILE: 0120-439-11
CAD: 6D.4C TIE-IN DETAILS.DWG

DRAWN BY: JDW
DESIGN BY: MDM
REVIEWED BY: JPY

Weaver Consultants Group
TBPE REGISTRATION NO. F-3727

PREPARED FOR
McCARTY ROAD LANDFILL TX, LP

REVISIONS

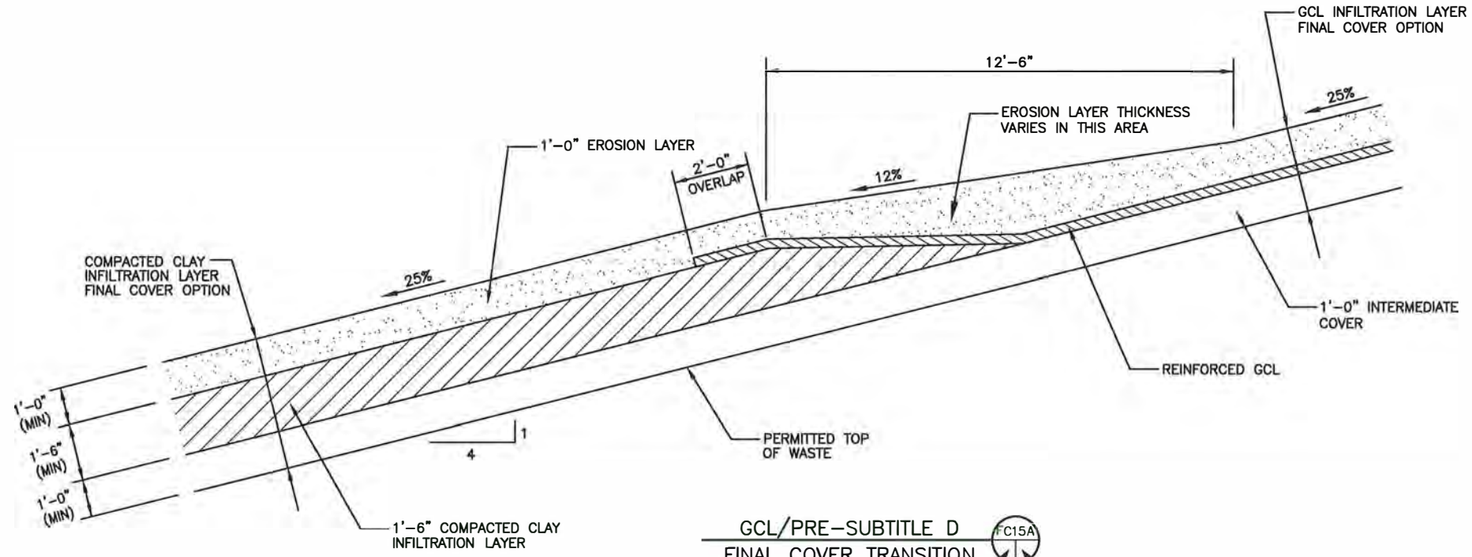
NO.	DATE	DESCRIPTION
1	01/2012	PERMIT MODIFICATION
2	09/2024	PERMIT MODIFICATION

ALTERNATIVE FINAL COVER TIE-IN DETAILS

McCARTY ROAD LANDFILL
HARRIS COUNTY, TEXAS

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ATTACHMENT 6D.4C

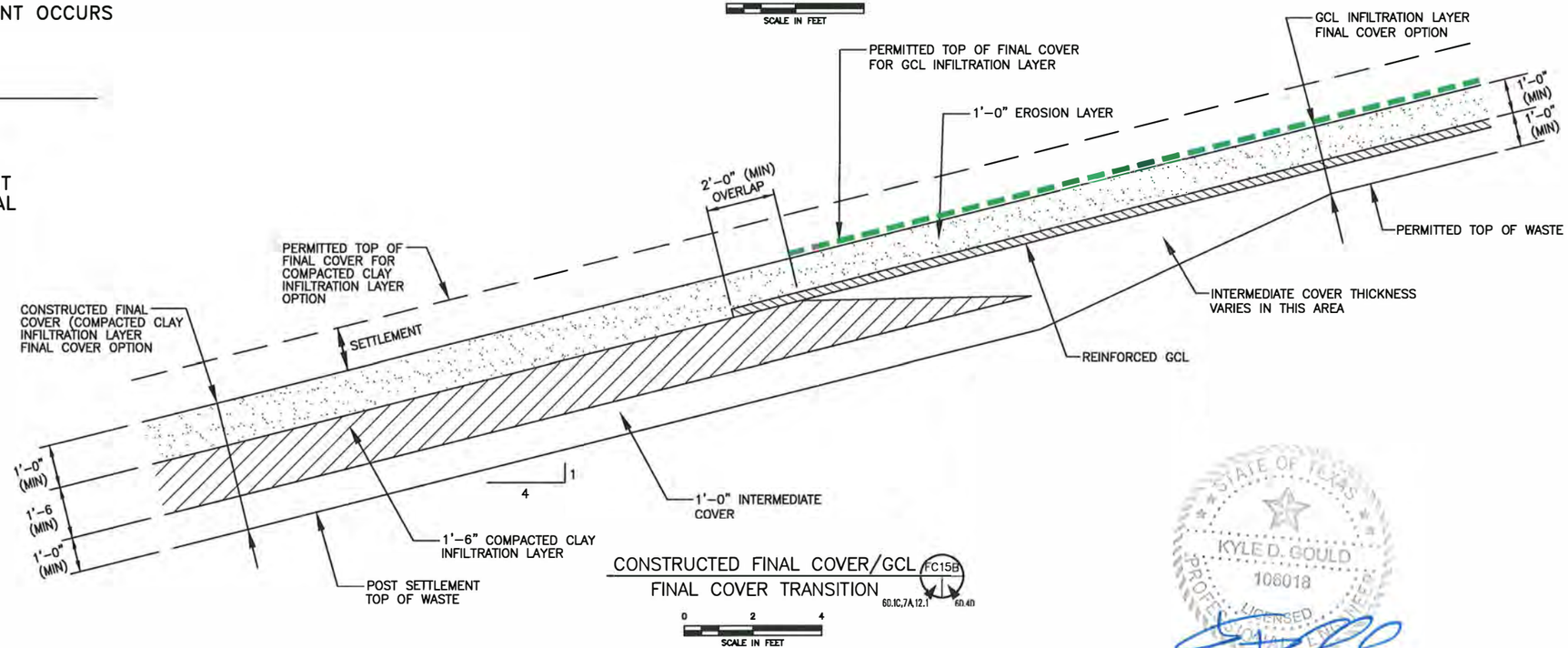


GCL/PRE-SUBTITLE D
FINAL COVER TRANSITION
FC15A
60.1C,7A,12.1
60.4D

0 2 4
SCALE IN FEET

TIE-IN OPTION IF NO SETTLEMENT OCCURS

TIE-IN OPTION WITH SETTLEMENT OF EXISTING CONSTRUCTED FINAL COVER



CONSTRUCTED FINAL COVER/GCL
FINAL COVER TRANSITION
FC15B
60.1C,7A,12.1
60.4D

0 2 4
SCALE IN FEET

STATE OF TEXAS
KYLE D. GOULD
106018
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PROFESSIONAL ENGINEER
9.24.24

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DATE: 08/2010
FILE: 0120-439-11
CAD: 6D.4D FINAL COVER DETAILS.DWG

DRAWN BY: JDW
DESIGN BY: MDM
REVIEWED BY: JPY

Weaver Consultants Group
TBPE REGISTRATION NO. F-3727

PREPARED FOR
McCARTY ROAD LANDFILL TX, LP

REVISIONS		
NO.	DATE	DESCRIPTION
1	02/2012	PERMIT MODIFICATION
2	09/2024	PERMIT MODIFICATION

GCL/PRE-SUBTITLE D FINAL COVER TRANSITION DETAILS

McCARTY ROAD LANDFILL
HARRIS COUNTY, TEXAS

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ATTACHMENT 6D.4D

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McCARTY ROAD LANDFILL
CITY OF HOUSTON, HARRIS COUNTY, TEXAS
TCEQ PERMIT NO. MSW-261B

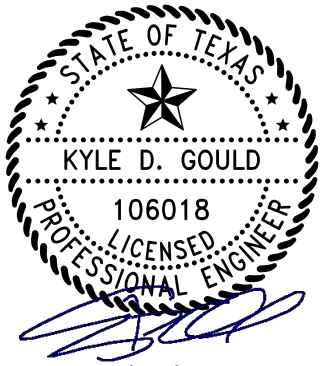
PART III – SITE DEVELOPMENT PLAN
ATTACHMENT 7
LANDFILL COMPLETION PLAN

Prepared for

McCarty Road Landfill TX, LP

Approved Site Development Plan
August 2008
Revised October 2008
Revised December 2010
Revised January 2012

Revised December 2024



12/12/2024

Prepared by

Weaver Consultants Group, LLC
TBPE Registration No. F-3727
6420 Southwest Boulevard, Suite 206
Fort Worth, Texas 76109
817-735-9770

WCG Project No. 0120-439-11-259

STATE OF TEXAS
KYLE D. GOULD
106018
LICENSED
PROFESSIONAL ENGINEER
12/12/2024

ALTERNATIVE FINAL COVER SIDESLOPE (FC6A)
ALTERNATIVE FINAL COVER TOPSLOPE (FC5A)
HCFCD DITCH (P116-00-00)
FORMER SOIL BORROW AREA
LEY ROAD
PRE SUBTITLE D TIE-IN (FC14A)
PRE-SUBTITLE D TIE-IN W/ROAD (FC13A)
NWP
NP
NEP
EP
GCL/PRE-SUBTITLE D FINAL COVER TRANSITION (FC15)
ALTERNATIVE FINAL COVER TOPSLOPE/SIDESLOPE TRANSITION (FC7A)
PRE-SUBTITLE D TIE-IN W/ROAD (FC13)
PRE-SUBTITLE D AREA
GREENS BAYOU (P100-00-00)
ALTERNATIVE FINAL COVER-SIDESLOPE (FC2A)
ALTERNATIVE FINAL COVER TOPSLOPE/SIDESLOPE TRANSITION (FC3A)
SUBTITLE D TIE-IN (FC12A)
SUBTITLE D AREA
UNION PACIFIC RAILROAD SPUR
SIDESLOPE SWALE (PRE-SUBTITLE D AREA) (FC8A)
SEP
SIDESLOPE SWALE (SUBTITLE D AREA) (FC9A)
HCFCD DITCH (P114-00-00)
SWP
CITY OF HOUSTON ROAD EASEMENT
SP-1
SP-2
COMPOSITE FINAL COVER-TOPSLOPE (FC1A)
EXISTING FLARE FACILITY
EXISTING MAINTENANCE AND PAINT FACILITY
EXISTING SCALEHOUSE
EXISTING OFFICE BUILDING
EXISTING SITE ACCESS ROAD (OATES ROAD)
PRE-SUBTITLE D FINAL COVER TIE-IN (FC4A)
SUBTITLE D TIE-IN W/ROAD (FC11A)
U.S. HIGHWAY 90 (McCARTY ROAD)
H&P EASEMENT
UNION PACIFIC RAILROAD

POND LABELS	
NP	NORTH POND
NWP	NORTHWEST POND
NEP	NORTHEAST POND
EP	EAST POND
SEP	SOUTHEAST POND
SWP	SOUTHWEST POND
SP-1	SOUTH POND 1
SP-2	SOUTH POND 2

0 300 600
SCALE IN FEET

LEGEND

- PERMIT BOUNDARY
- LIMITS OF WASTE
- DEED RESTRICTION BOUNDARY (SEE NOTE 10)
- 200 FINAL CONTOURS
- 745000 N STATE PLANE COORDINATE SYSTEM
- 29°49'45" GEODETIC COORDINATE SYSTEM
- EXISTING CONTOUR
- MW-11UB GROUNDWATER MONITORING WELL
- GMP-M LANDFILL GAS MONITORING PROBE
- EASEMENT BOUNDARY
- 100-YR FLOODPLAIN (REFER TO ATTACHMENT 6C)
- GABIONS
- PROPOSED DRAINAGE SWALE
- PROPOSED DRAINAGE LETDOWN
- CONSTRUCTED FINAL COVER

NOTES:

1. TOPOGRAPHIC MAPPING PREPARED BY FIRMATEK FROM AERIAL PHOTOGRAPHY FLOWN 11-17-2023. THE GRID SYSTEM IS TIED TO THE TEXAS STATE PLANE COORDINATE SYSTEM SOUTH CENTRAL ZONE NAD 1927.
2. PERMIT BOUNDARY AND EASEMENTS WERE REPRODUCED FROM COSTELLO, INC. STANDARD LAND SURVEY DRAWING, DATED MARCH 2004.
3. REFER TO ATTACHMENT 7B FOR POST DEVELOPMENT DRAINAGE INFORMATION.
4. FINAL COVER DETAILS ARE PROVIDED IN ATTACHMENT 6D-FINAL COVER DETAILS.
5. MAXIMUM FINAL COVER ELEVATION: 314.5 FT-MSL MAXIMUM WASTE ELEVATION: 313.5 FT-MSL.
6. REFER TO ATTACHMENT 2 FOR TYPICAL CROSS SECTION INFORMATION.
7. DRAINAGE DESIGN INFORMATION INCLUDED IN ATTACHMENT 6A.
8. THE TOP DECK WILL BE MARKED AND LIGHTED. CONSISTENT WITH FAA REQUIREMENTS. REFER TO PARTS I/II, APPENDIX I/IIA FOR MORE INFORMATION.
9. REFER TO ATTACHMENT 14 FOR DETAILS OF THE LANDFILL GAS MANAGEMENT PLAN.
10. REFER TO ATTACHMENT 6, APPENDIX 6A-F FOR DEED RESTRICTION INFORMATION.

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G:\0120\439\FLIP MOD 2024\ATT 7\CLEAN\7-A COMPLETION PLAN.dwg, vguzman, 1:2

- [ ] DRAFT
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DATE: 03/2004
FILE: 0120-439-11
CAD: 5.04-PRO-DR.DWG
DRAWN BY: JDW
DESIGN BY: SAN/ALD
REVIEWED BY: JPY

Weaver Consultants Group
TBPE REGISTRATION NO. F-3727

PREPARED FOR
McCARTY ROAD LANDFILL TX, LP

REVISIONS

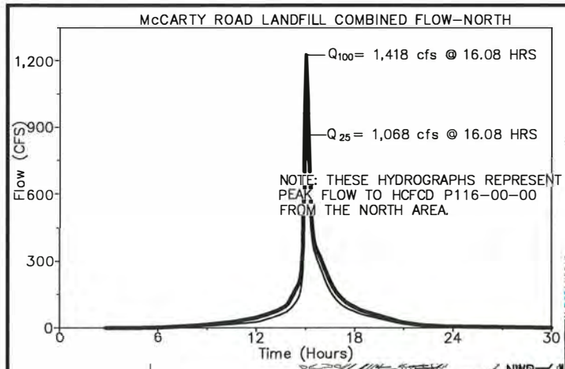
NO.	DATE	DESCRIPTION
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2	12/2010	PERMIT MODIFICATION
3	01/2012	PERMIT MODIFICATION
4	12/2024	PERMIT MODIFICATION

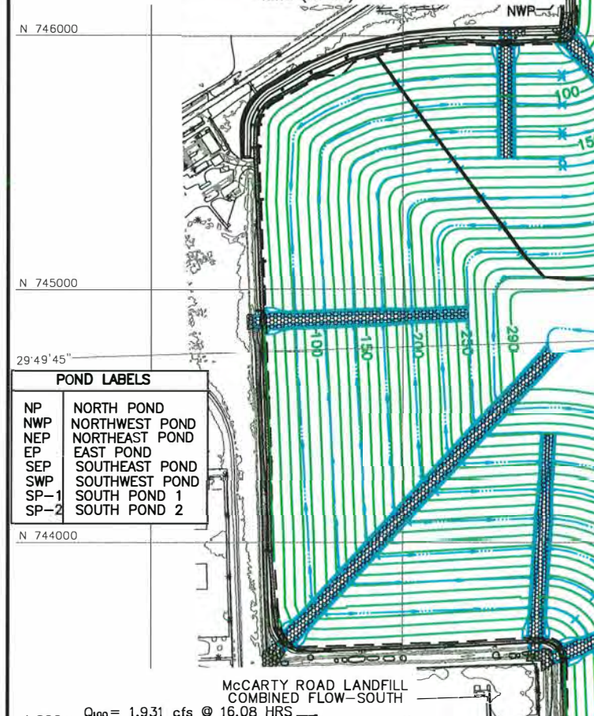
MAJOR PERMIT AMENDMENT LANDFILL COMPLETION PLAN

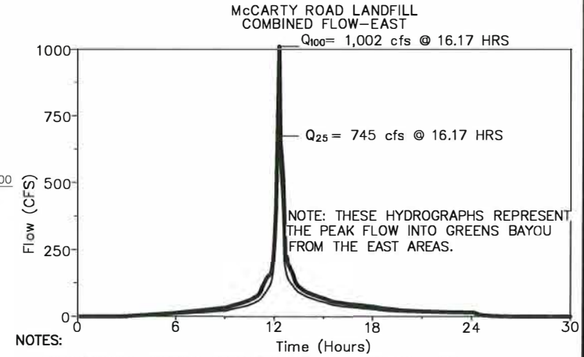
McCARTY ROAD LANDFILL
HARRIS COUNTY, TEXAS

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ATTACHMENT 7A







POND LABELS	
NP	NORTH POND
NWP	NORTHWEST POND
NEP	NORTHEAST POND
EP	EAST POND
SEP	SOUTHEAST POND
SWP	SOUTHWEST POND
SP–1	SOUTH POND 1
SP–2	SOUTH POND 2

DRAINAGE AREAS WITHIN PERMIT BOUNDARY	
BASIN	AREA
NORTH	124.69 ACRES
EAST	106.71 ACRES
SOUTH	195.10 ACRES
BORROW AREA	5.49 ACRES
FORMER LANDFILL	26.26 ACRES

LEGEND
- PERMIT BOUNDARY
- LIMITS OF WASTE
- DEED RESTRICTION BOUNDARY (SEE NOTE 5)
- 150 FINAL CONTOUR
- 745000 N STATE PLANE COORDINATE SYSTEM
- 29°49'45" GEODETIC COORDINATE SYSTEM
- 20 EXISTING CONTOUR
- DRAINAGE AREA
- EASEMENT BOUNDARY
- 100–YR FLOODPLAIN (REFER TO ATTACHMENT 6C)
- PROPOSED DRAINAGE SWALE
- PROPOSED DRAINAGE LETDOWN
- GABIONS
- Q_{25}=40cfs / Q_{100}=155cfs PEAK FLOW RATE

N
0 300 600
SCALE IN FEET

NOTES:
1. TOPOGRAPHIC MAPPING PREPARED BY FIRMATEK FROM AERIAL PHOTOGRAPHY FLOWN 11–17–2023. THE GRID SYSTEM IS TIED TO THE TEXAS STATE PLANE COORDINATE SYSTEM SOUTH CENTRAL ZONE NAD 1927.
2. PERMIT BOUNDARY AND EASEMENTS WERE REPRODUCED FROM COSTELLO, INC. STANDARD LAND SURVEY DRAWING, MARCH 2004.
3. THE HYDROGRAPHS SHOWN WERE DEVELOPED TO REPRESENT COMBINED PEAK FLOWS. THESE HYDROGRAPHS WERE DEVELOPED BY COMBINING THE HYDROGRAPHS AT THE STORMWATER OUTFALLS. THE COMBINED HYDROGRAPHS WERE DEVELOPED FOR COMPARISON PURPOSES ONLY AND THEY ARE NOT INTENDED TO REPRESENT AN ACTUAL PEAK FLOW RATE. SEE ATTACHMENT 6A FOR MORE INFORMATION.
4. THE TOTAL DISCHARGE HYDROGRAPH AND Q_{100} ENTERING THE FORMER SOIL BORROW AREA WERE REPRODUCED FROM THE HCFCD APPROVED DRAINAGE DESIGN REPORT BY WBC DATED AUGUST 2003 (REFER TO ATTACHMENT 6B).
5. REFER TO ATTACHMENT 6, APPENDIX 6A–F FOR DEED RESTRICTION INFORMATION.
6. THE PEAK FLOW RATES ENTERING THE SITE REPRESENT THE PEAK FLOWS IN THE HCFCD DITCHES P116–00–00 AND P114 00–00 AS THEY ENTER THE PERMIT BOUNDARY.

STATE OF TEXAS
KYLE D. GOULD
106018
PROFESSIONAL ENGINEER
LICENSED
9-24-24

- [ ] DRAFT
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DATE: 03/2004
FILE: 0120–439–11
CAD: 7–B–POST–DEV.DWG
DRAWN BY: JDW
DESIGN BY: SAN/ALD
REVIEWED BY: JPY

Weaver Consultants Group
TBPE REGISTRATION NO. F–3727

PREPARED FOR
McCARTY ROAD LANDFILL TX, LP

REVISIONS		
NO.	DATE	DESCRIPTION
1	01/2012	PERMIT MODIFICATION
2	09/2024	PERMIT MODIFICATION

MAJOR PERMIT AMENDMENT
POST DEVELOPMENT DRAINAGE PLAN

McCARTY ROAD LANDFILL
HARRIS COUNTY, TEXAS

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ATTACHMENT 7B

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O:\0120\439\FILP MOD 2024\ATT 7\CLEAN\7-B POST DEV.dwg, farrington, 1:2

McCARTY ROAD LANDFILL
CITY OF HOUSTON, HARRIS COUNTY, TEXAS
TCEQ PERMIT NO. MSW-261B

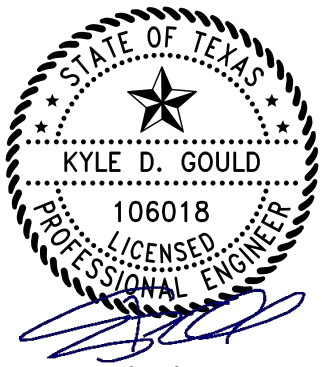
PART III – SITE DEVELOPMENT PLAN
ATTACHMENT 12
FINAL CLOSURE PLAN

Prepared for

McCarty Road Landfill TX, LP

Approved Site Development Plan
August 2008
Revised October 2009
Revised September 2011
Revised February 2013
Revised August 2020

Revised December 2024

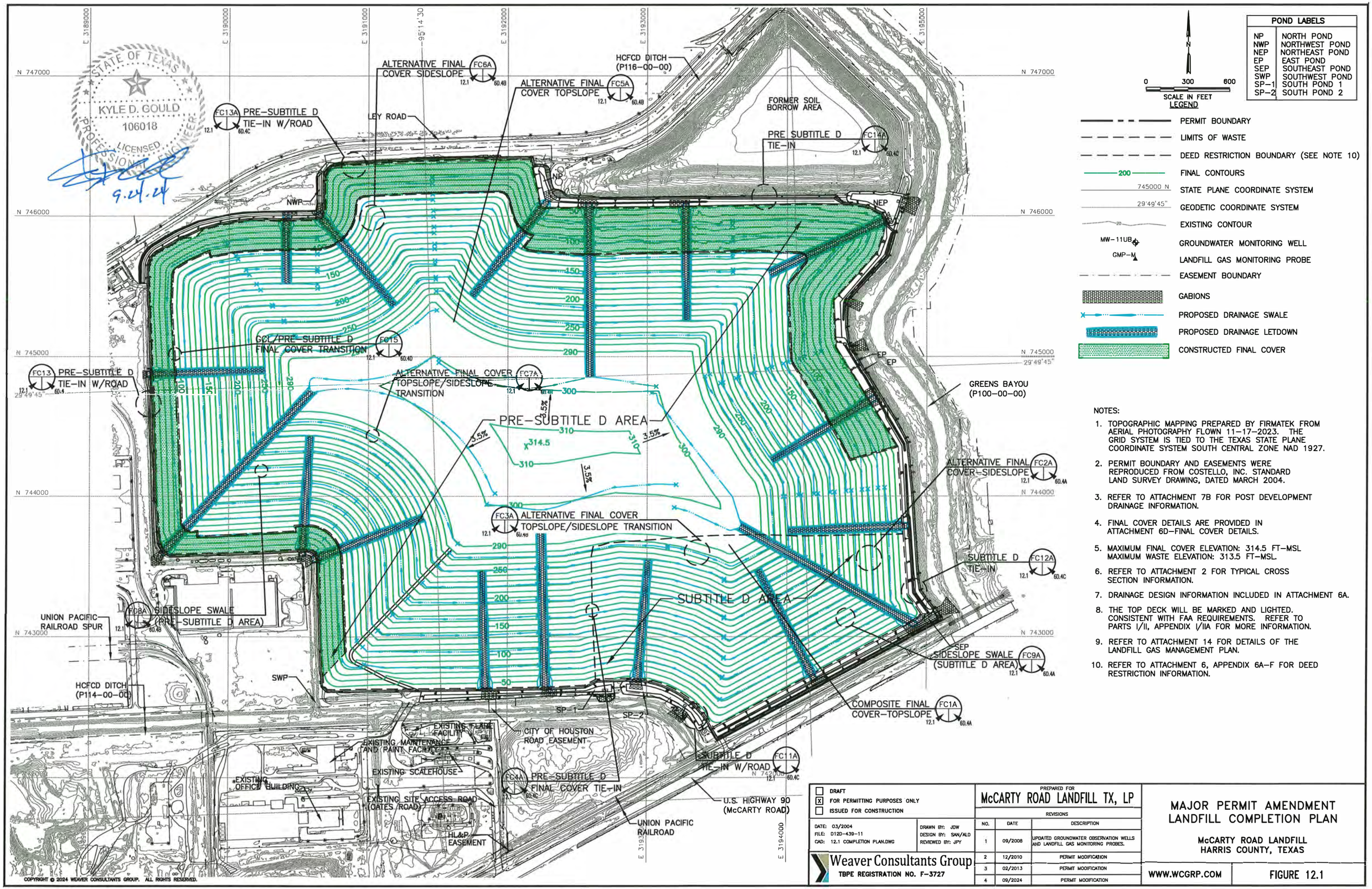


12/12/2024

Prepared by

Weaver Consultants Group, LLC
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6420 Southwest Boulevard, Suite 206
Fort Worth, Texas 76109
817-735-9770

WCG Project No. 0120-439-11-259



POND LABELS	
NP	NORTH POND
NWP	NORTHWEST POND
NEP	NORTHEAST POND
EP	EAST POND
SEP	SOUTHEAST POND
SWP	SOUTHWEST POND
SP-1	SOUTH POND 1
SP-2	SOUTH POND 2

NOTES:

1. TOPOGRAPHIC MAPPING PREPARED BY FIRMATEK FROM AERIAL PHOTOGRAPHY FLOWN 11-17-2023. THE GRID SYSTEM IS TIED TO THE TEXAS STATE PLANE COORDINATE SYSTEM SOUTH CENTRAL ZONE NAD 1927.
2. PERMIT BOUNDARY AND EASEMENTS WERE REPRODUCED FROM COSTELLO, INC. STANDARD LAND SURVEY DRAWING, DATED MARCH 2004.
3. REFER TO ATTACHMENT 7B FOR POST DEVELOPMENT DRAINAGE INFORMATION.
4. FINAL COVER DETAILS ARE PROVIDED IN ATTACHMENT 6D-FINAL COVER DETAILS.
5. MAXIMUM FINAL COVER ELEVATION: 314.5 FT-MSL MAXIMUM WASTE ELEVATION: 313.5 FT-MSL.
6. REFER TO ATTACHMENT 2 FOR TYPICAL CROSS SECTION INFORMATION.
7. DRAINAGE DESIGN INFORMATION INCLUDED IN ATTACHMENT 6A.
8. THE TOP DECK WILL BE MARKED AND LIGHTED. CONSISTENT WITH FAA REQUIREMENTS. REFER TO PARTS I/II, APPENDIX I/IIA FOR MORE INFORMATION.
9. REFER TO ATTACHMENT 14 FOR DETAILS OF THE LANDFILL GAS MANAGEMENT PLAN.
10. REFER TO ATTACHMENT 6, APPENDIX 6A-F FOR DEED RESTRICTION INFORMATION.

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DATE: 03/2004
FILE: D12D-439-11
CAD: 12.1 COMPLETION PLAN.DWG
DRAWN BY: JDW
DESIGN BY: SAN/ALD
REVIEWED BY: JPY

Weaver Consultants Group
TBPE REGISTRATION NO. F-3727

PREPARED FOR
McCARTY ROAD LANDFILL TX, LP

REVISIONS

NO.	DATE	DESCRIPTION
1	09/2008	UPDATED GROUNDWATER OBSERVATION WELLS AND LANDFILL GAS MONITORING PROBES.
2	12/2010	PERMIT MODIFICATION
3	02/2013	PERMIT MODIFICATION
4	09/2024	PERMIT MODIFICATION

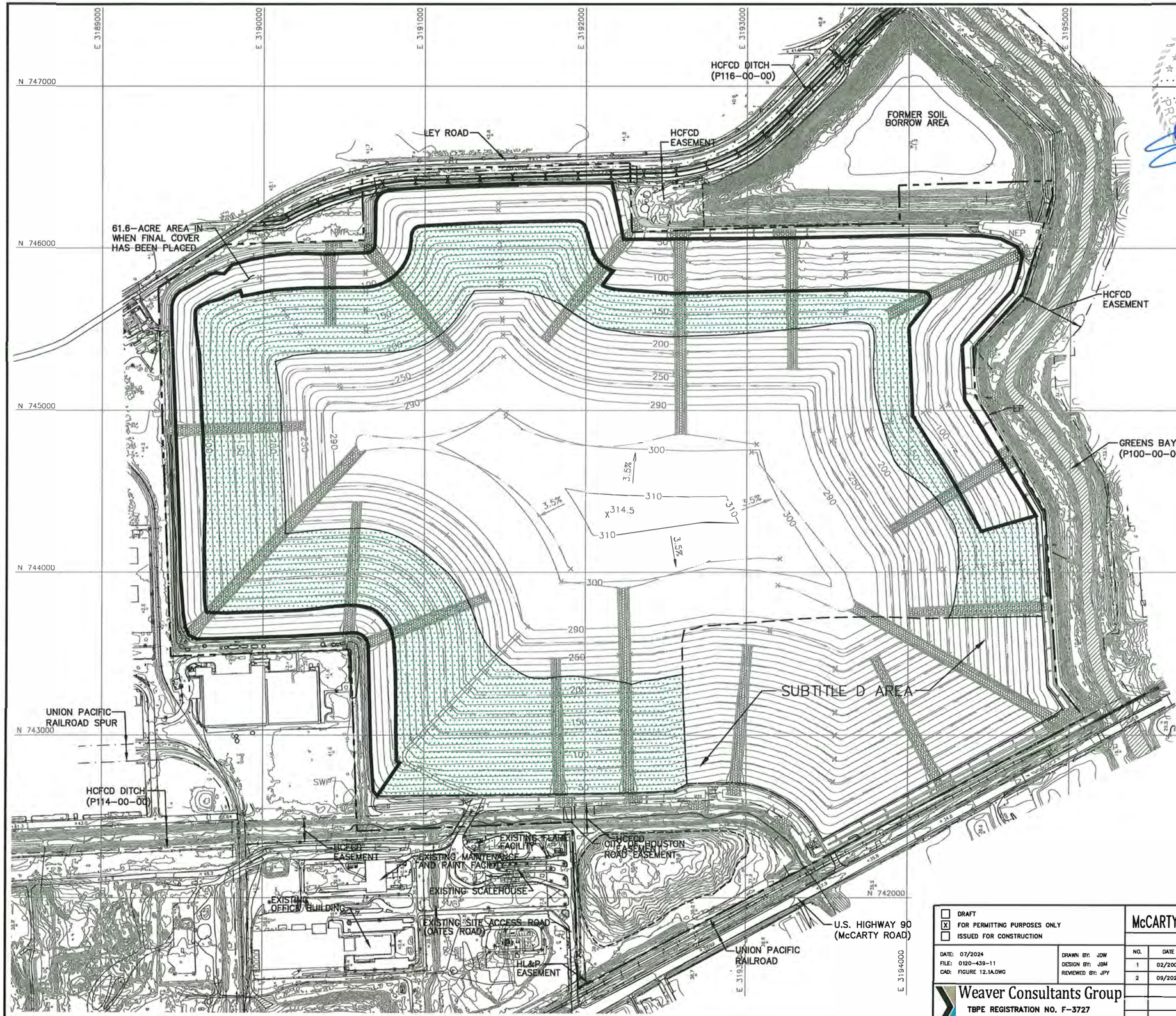
MAJOR PERMIT AMENDMENT LANDFILL COMPLETION PLAN

McCARTY ROAD LANDFILL
HARRIS COUNTY, TEXAS

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FIGURE 12.1

D:\0120\439\FIP MOD 2024\ATT 12\CLEAN\12.1 COMPLETION PLAN.dwg, sford, 1:2



POND LABELS	
NP	NORTH POND
NWP	NORTHWEST POND
NEP	NORTHEAST POND
EP	EAST POND
SEP	SOUTHEAST POND
SWP	SOUTHWEST POND
SP-1	SOUTH POND 1
SP-2	SOUTH POND 2

N

0 300 600

SCALE IN FEET

LEGEND

- PERMIT BOUNDARY
- LIMITS OF WASTE
- DEED RESTRICTION BOUNDARY
- 200 FINAL CONTOUR
- 745000 N STATE PLANE COORDINATE SYSTEM
- 29°49'45" GEODETIC COORDINATE SYSTEM
- 20 EXISTING CONTOUR
- PROPOSED DRAINAGE SWALE
- PROPOSED DRAINAGE LETDOWN
- EASEMENT BOUNDARY
- GABIONS
- SECTOR BOUNDARY
- EXPEDITED FINAL COVER AREA (SEE NOTE 5)

STATE OF TEXAS
KYLE D. GOULD
106018
LICENSED
PROFESSIONAL ENGINEER
4-24-24

NOTES:

1. TOPOGRAPHIC MAPPING PREPARED BY FIRMATEK FROM AERIAL PHOTOGRAPHY FLOWN 11-17-2023. THE GRID SYSTEM IS TIED TO THE TEXAS STATE PLANE COORDINATE SYSTEM SOUTH CENTRAL ZONE NAD 1927.
2. TYPICAL SIDESLOPES ARE 4H:1V, TYPICAL TOPSLOPE IS 3.5%.
3. DETENTION POND INFORMATION IS PROVIDED IN ATTACHMENT 6A.
4. PERMIT BOUNDARY AND EASEMENTS WERE REPRODUCED FROM COSTELLO, INC. STANDARD LAND SURVEY DRAWING, DATED MARCH 2004.
5. ONCE ANY 20-ACRE SIDESLOPE AREA LOCATED IN THE EXPEDITED FINAL COVER AREA SHOWN REACHES THE PERMITTED FINAL ELEVATION, THE LANDFILL WILL COMMENCE PLACEMENT OF FINAL COVER OVER THE 20-ACRE AREA WITHIN 12 MONTHS OF BRINGING THE 20-ACRE AREA TO THE FINAL PERMITTED WASTE FILL GRADE. THIS REQUIREMENT IS CONSISTENT WITH THE DECEMBER 4, 2007 MEDIATED SETTLEMENT AGREEMENT BETWEEN McCARTY ROAD LANDFILL TX, LP AND HARRIS COUNTY.
6. REFER TO ATTACHMENT 6, APPENDIX 6A-F FOR DEED RESTRICTION INFORMATION.
7. GAS MONITORING PROBES GMP-Q, GMP-R, AND GMP-S ARE BEING DECOMMISSIONED AND RELOCATED AS DOCUMENTED IN A PERMIT MODIFICATION SUBMITTED BY WEAVER BOOS CONSULTANTS (WBC) IN APRIL 2004. GMP-T5 AND GMP-U ARE BEING DECOMMISSIONED IN A PERMIT MODIFICATION SUBMITTED BY WBC IN APREIL 2004. GMP-T1 WILL BECOME A PERMANENT GAS MONITORING PROBE FOR THIS AREA. REFER TO ATTACHMENT 14 FOR ADDITIONAL INFORMATION.

- [ ] DRAFT
- [x] FOR PERMITTING PURPOSES ONLY
- [ ] ISSUED FOR CONSTRUCTION

DATE: 07/2024
FILE: 0120-439-11
CAD: FIGURE 12.1A.DWG
DRAWN BY: JDW
DESIGN BY: JBM
REVIEWED BY: JPY

Weaver Consultants Group
TBPE REGISTRATION NO. F-3727

PREPARED FOR
McCARTY ROAD LANDFILL TX, LP

REVISIONS

NO.	DATE	DESCRIPTION
1	02/2008	HARRIS COUNTY SETTLEMENT INFORMATION
2	09/2024	PERMIT MODIFICATION

MAJOR PERMIT AMENDMENT EXPEDITED FINAL COVER AREA

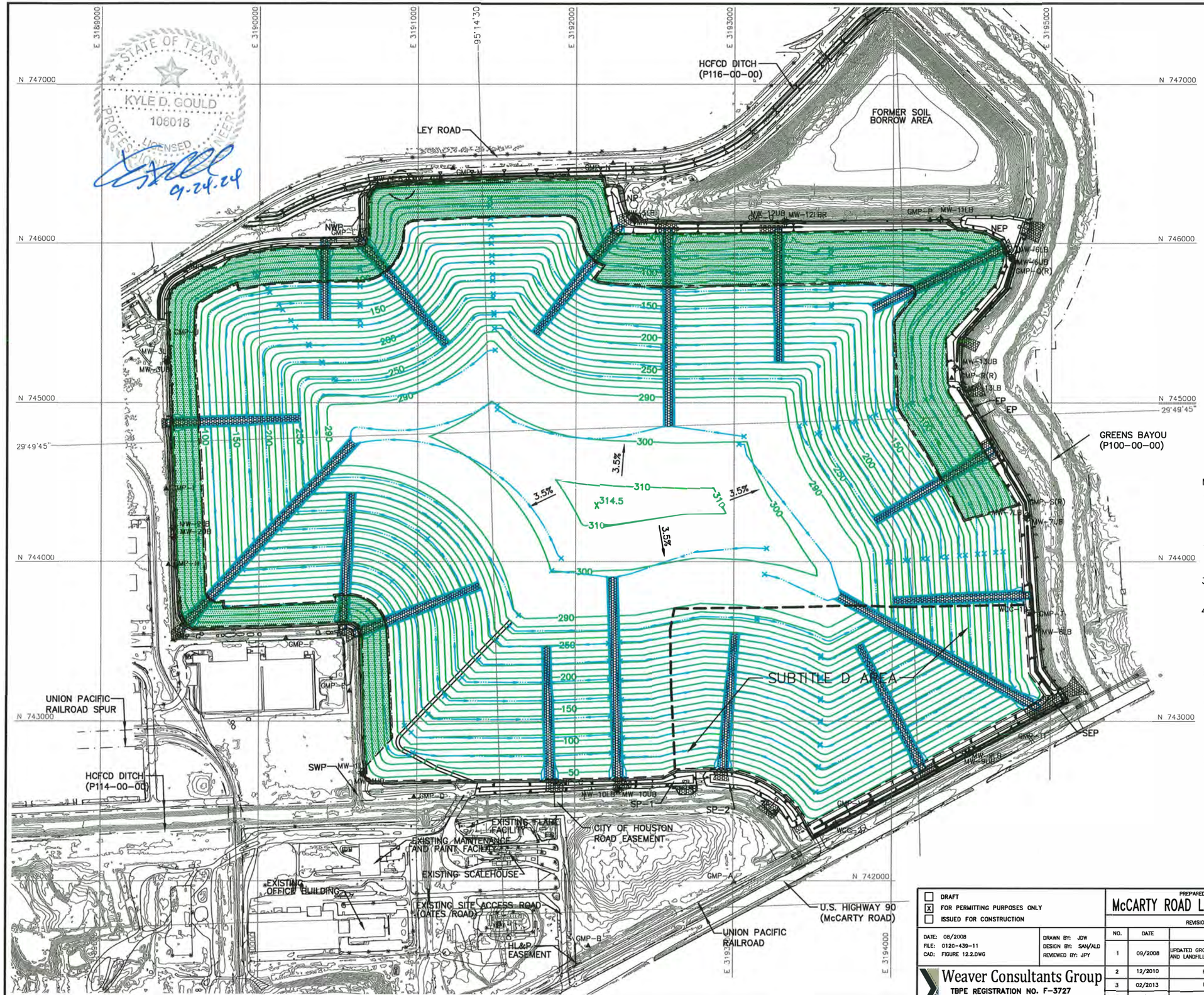
McCARTY ROAD LANDFILL
HARRIS COUNTY, TEXAS

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FIGURE 12.1A

O:\0120\439\FLP MOD 2024\ATT 12\CLEAN\FIGURE 12.1A.dwg, Farrington, 1:2

STATE OF TEXAS
KYLE D. GOULD
106018
LICENSED
PROFESSIONAL ENGINEER
9.24.24



POND LABELS	
NP	NORTH POND
NWP	NORTHWEST POND
NEP	NORTHEAST POND
EP	EAST POND
SEP	SOUTHEAST POND
SWP	SOUTHWEST POND
SP-1	SOUTH POND 1
SP-2	SOUTH POND 2

N

0 300 600

SCALE IN FEET

LEGEND

- PERMIT BOUNDARY
- LIMITS OF WASTE
- DEED RESTRICTION BOUNDARY (SEE NOTE 10)
- 200 — FINAL CONTOURS
- 745000 N — STATE PLANE COORDINATE SYSTEM
- 29°49'45" — GEODETIC COORDINATE SYSTEM
- 20 — EXISTING CONTOUR
- MW-11UB — GROUNDWATER MONITORING WELL
- GMP-M — LANDFILL GAS MONITORING PROBE
- EASEMENT BOUNDARY
- GABIONS
- PROPOSED DRAINAGE SWALE
- PROPOSED DRAINAGE LETDOWN
- CONSTRUCTED FINAL COVER
- LIMITS OF SUBTITLE D FINAL COVER

NOTES:

1. TOPOGRAPHIC MAPPING PREPARED BY FIRMATEK FROM AERIAL PHOTOGRAPHY FLOWN 11-17-2023. THE GRID SYSTEM IS TIED TO THE TEXAS STATE PLANE COORDINATE SYSTEM SOUTH CENTRAL ZONE NAD 1927.
2. PERMIT BOUNDARY AND EASEMENTS WERE REPRODUCED FROM COSTELLO, INC. STANDARD LAND SURVEY DRAWING, DATED MARCH 2004.
3. REFER TO ATTACHMENT 14—LANDFILL GAS MANAGEMENT PLAN FOR LFG SYSTEM DESIGN.
4. THE LARGEST AREA REQUIRING FINAL COVER IS ASSUMED TO BE THE ENTIRE FINAL COVER AREA WHICH INCLUDES APPROXIMATELY 53.1 ACRES OF COMPOSITE SUBTITLE D FINAL COVER AND 335 ACRES OF SOIL ONLY OR GCL ALTERNATIVE PRE-SUBTITLE D FINAL COVER. REFER TO ATTACHMENT 8 FOR DETAILED BREAKDOWN OF DIFFERENT FINAL COVER TYPES.
5. REFER TO ATTACHMENT 6, APPENDIX 6A-F FOR DEED RESTRICTION INFORMATION.
6. PROPOSED PROBES DESIGNATED WITH "(R)" ARE REPLACEMENT PROBES. PROPOSED PROBES GMP-W THROUGH GMP-LL WERE ADDED ALONG THE WESTERN PERIMETER OF THE LANDFILL AS PART OF THE AAWWE SETTLEMENT AGREEMENT.
7. GROUNDWATER OBSERVATION WELLS OW-1, OW-2, OW-3, OW-4 AND OW-5 WERE ADDED ALONG THE NORTHERN AND EASTERN PERIMETER OF THE LANDFILL AS PART OF THE HARRIS COUNTY SETTLEMENT AGREEMENT. OBSERVATION WELLS OW6 THROUGH OW13 WERE ADDED ALONG THE WESTERN PERIMETER OF THE LANDFILL AS PART OF THE AAWWE SETTLEMENT AGREEMENT.

- [ ] DRAFT
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DATE: 08/2008
FILE: 0120-439-11
CAD: FIGURE 12.2.DWG

DRAWN BY: JDW
DESIGN BY: SAN/ALD
REVIEWED BY: JPY

Weaver Consultants Group
TBPE REGISTRATION NO. F-3727

PREPARED FOR
McCARTY ROAD LANDFILL TX, LP

REVISIONS

NO.	DATE	DESCRIPTION
1	09/2008	UPDATED GROUNDWATER OBSERVATION WELLS AND LANDFILL GAS MONITORING PROBES.
2	12/2010	PERMIT MODIFICATION
3	02/2013	PERMIT MODIFICATION
4	09/2024	PERMIT MODIFICATION

LARGEST AREA TO REQUIRE FINAL COVER

McCARTY ROAD LANDFILL
HARRIS COUNTY, TEXAS

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FIGURE 12.2

O:\0120\439\FIP MOD 2024\ATT 12\CLEAN\12.2 CLOSURE PLAN.dwg, rarrington, 1:2

2 FINAL COVER SYSTEM

2.1 Introduction

The final cover system for the McCarty Road Landfill was developed to incorporate the requirements of §330.253(b). The rules state that within 180 days of the last receipt of waste, the owner shall complete the installation of a final cover system designed and constructed to minimize infiltration and erosion. This system will include installation of a multi-layer cover system and a storm water runoff control system. The storm water runoff controls are addressed in Attachment 6 – Groundwater and Surface Water Protection Plan. The final cover system design is discussed below and is also detailed in Attachment 6D.

2.2 Cover System Design

The final cover system will consist of both soil only (pre-Subtitle D areas) and composite (Subtitle D areas) cover system, as well as a GCL alternative final cover for both pre-Subtitle D and Subtitle D areas. The final cover system will provide a low maintenance cover, protect against erosion, reduce rainfall percolation through the cover system and subsequently minimize leachate generation within the landfill. As depicted on Attachment 7A – Landfill Completion Plan, a maximum slope of 3.5 percent is provided for the top slopes and 4H:1V sideslopes are provided to minimize erosion and facilitate drainage of the landfill. A composite final cover system will be constructed over the Subtitle D waste disposal area, and a soil only final cover system will be constructed over the pre-Subtitle D area (or a GCL alternative final cover may be constructed in either area). Components of the multi-layer final cover system include (from top to bottom):

Subtitle D Area

* An erosion layer consisting of a 24-inch-thick layer of earthen material (top 6 inches capable of sustaining plant growth). The vegetation layer will consist of native or introduced grasses capable of providing 90 percent coverage over the cover system.
* A drainage geocomposite will be used as drainage layer.
* A 40-mil, smooth (topslope) and textured (sideslope), linear low-density polyethylene (LLDPE) or other equivalent material may be used.
* An 18-inch-thick compacted clay infiltration layer with a coefficient of permeability of less than or equal to $1x10^{-5}$ cm/s or a GCL with a coefficient of permeability of less than or equal to $3x10^{-9}$ cm/s. Unreinforced GCL will be used on the top slopes and reinforced GCL will be used on the sideslopes.

McCARTY ROAD LANDFILL
CITY OF HOUSTON, HARRIS COUNTY, TEXAS
TCEQ PERMIT NO. MSW-261B

MAJOR PERMIT AMENDMENT APPLICATION

PART III – SITE DEVELOPMENT PLAN
ATTACHMENT 12A
FINAL COVER SYSTEM QUALITY CONTROL PLAN

Prepared for

McCarty Road Landfill TX, LP

Approved Site Development Plan August 2008

Revised March 2011

Revised September 2024



Prepared by

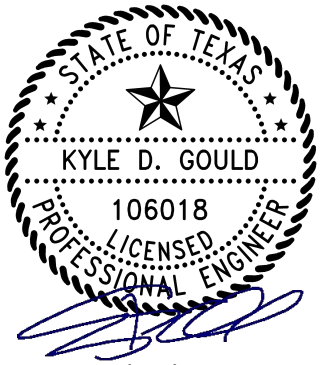
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817-735-9770

WCG Project No. 0120-439-11-259

APPENDIX 12A-A

FINAL COVER DRAINAGE LAYER DESIGN

Includes pages 12A-A.1 through 12A-A.7



12/12/2024

Required: Determine the material characteristics and allowable length of the geocomposite drainage layer before a drainage pipe is required to intercept flow in the drainage layer, and provide a pipe design for drainage collection.

References:

1. Koerner, R.M., *Designing With Geosynthetics*, third edition, 1994.
2. Poly-Flex, Inc., "Poly-Flex Ultra Flow Drainage Net and Geocomposites".
3. Maidment, David R., *Handbook of Hydrology*. McGraw-Hill, Inc. 1993.
4. *HELP Model results in Appendix 15A of the Site Development* Plan (Attachment 15).

Solution:

1. Determine Specific Discharge at the Bottom of Erosion Layer

1.1. Topslopes:

Hydraulic conductivity for top 6" of Erosion Layer (K_1)= 6.40E-05 cm/s
Hydraulic conductivity for lower 18" of Erosion Layer(K_2)= 4.20E-05 cm/s

Equivalent Hydraulic conductivity:

$$K_E = \frac{K_1 \times h_1 + K_2 \times h_2}{h_1 + h_2}$$

where:

h_1= 0.5 ft, top 6 inches of erosion layer
h_2= 1.5 ft, lower 18 inches of erosion layer

Equivalent hydraulic conductivity of Erosion Layer K_E = 4.7E-05 cm/sec

Thickness of Erosion Layer $T=h_1+h_2$ = 24 inches

Water Content (Θ) in Erosion Layer (From Help Model, Ref.4)
(Note these water contents are initiated by HELP)

Initial Θ:
in top 6 inches 0.2901
in lower 18 inches 0.3632
Final Θ:
in top 6 inches 0.2919
in lower 18 inches 0.3452

Calculate both initial and final equivalent water storage (defined as the water content of 24 inch thick erosion layer)

Initial: 0.3449
Final: 0.3319

Calculate Specific Discharge (Ref. 3)

$q=K_E*\Theta$

q: Specific discharge cm^3/cm^2-s
K_E: Equivalent hydraulic conductivity (cm/s)
Θ: Water content

$q= K_E * \Theta$

q= 1.64E-05 cm/s = 1.64E-07 m/s

1.2 Sideslopes:

Hydraulic conductivity for top 6" of Erosion Layer (K_1)= 6.40E-05 cm/s
Hydraulic conductivity for lower 18" of Erosion Layer(K_2)= 4.20E-05 cm/s

Equivalent Hydraulic conductivity:

$$K_E = \frac{K_1 \times h_1 + K_2 \times h_2}{h_1 + h_2}$$

where:

h_1= 0.5 ft, top 6 inches of erosion layer
h_2= 1.5 ft, lower 18 inches of erosion layer

Equivalent hydraulic conductivity of Erosion Layer K_E = 4.7E-05 cm/sec

Thickness of Erosion Layer $T=h_1+h_2$ = 24 inches

Water Content (Θ) in Erosion Layer (From Help Model, Ref.4)
(Note these water contents are initiated by HELP)

Initial Θ:
in top 6 inches 0.2850
in lower 18 inches 0.3619
Final Θ:
in top 6 inches 0.2898
in lower 18 inches 0.3424

Calculate both initial and final equivalent water storage (defined as the water content of 24 inch thick erosion layer)

Initial: 0.3427
Final: 0.3293

Calculate Specific Discharge (Ref. 3)

$q=K_E*\Theta$

q: Specific discharge cm^3/cm^2-s
K_E: Equivalent hydraulic conductivity (cm/s)
Θ: Water content

$q= K_E * \Theta$

q= 1.63E-05 cm/s = 1.6E-07 m/s

2. Capacity of the Drainage Geocomposite

2.1. Final Cover Geocomposite Drainage Layer Thickness:

Assume the final cover geocomposite drainage layer will undergo linear compression due to the weight of soil (erosion layer).

Unloaded Geocomposite Drainage Layer Thickness = 0.20 in
Compressibility at 20,000 psf = 50 %

Unit Weight of Soil = 116 pcf
Thickness of Erosion layer= 2 ft

Table 1 - Final Cover Geocomposite Drainage Layer Thickness

Fill Condition	Slope %	d_s[2] (ft)	P[3] (psf)	t[4] (in)	t[4] (m)
Closed (top-slope)	3.5	2.0012	232	0.199	0.005
Closed (side-slope)	25	2.0642	239	0.199	0.005

[2] d_s is the vertical thickness of soil above the final cover geocomposite drainage layer.

[3] P is the pressure on the final cover geocomposite drainage layer due to the weight of the waste and soil.

[4] t is the thickness of the final cover geocomposite drainage layer after being subjected to linear compression.

2.2. Factors of Safety for Strength and Environmental Conditions:

Table 2 - Factors of Safety

	Fill Condition	
Factor of Safety	Closed (top-slope)	Closed (side-slope)
Geotextile Intrusion	2.0	2.0
Creep Deformation[2]	1.0	1.0
Chemical Clogging	2.0	2.0
Biological Clogging	2.0	2.0
FS Factor[1]	8.00	8.00

[1] The FS Factor is the product of all of the factors of safety for each fill condition.

[2] The FS Factor for creep is 1.0 because the final cover geocomposite drainage layer thickness has been adjusted for the overburden pressure.

2.3. Manufacturer's Transmissivity Data:

Manufacturer's transmissivity values represent the lowest transmissivity values obtained during product data research. (Refer to transmissivity of single and double side drainage geocomposites in Appendix 12A-C).

2.4. Compute the Design Transmissivity (T) of the Final Cover Geocomposite Drainage Layer:

Table 3 - Required Transmissivity

Fill Condition	P[2] (psf)	t[3] (in)	T[4] (m^2/s)	FS Factor[5]	T_{DES}[6] (m^2/s)	k[7] (cm/s)
Closed (top-slope)	232	0.199	1.55E-03	8.00	1.9E-04	3.84
Closed (side-slope)	239	0.199	2.65E-04	8.00	3.3E-05	0.66

[2] P is the pressure on the final cover geocomposite drainage layer due to the weight of the soil from Table 1.

[3] t is the calculated final cover geocomposite drainage layer thickness from Table 1.

[4] T is the published transmissivity values for a representative final cover geocomposite drainage layer (refer to Appendix 12A-C for product data for Poly-Flex 6oz/sy polypropylene geotextile with 200 mil drainage net; top-slope is single-sided and side slope is double-sided. Equivalent material can be used).

[5] FS Factor is the product of the factors of safety from Table 2.

[6] T_{DES} is the design transmissivity value calculated using the following equation:

$$T_{DES} = T / (FS\ Factor)$$

[7] k is hydraulic conductivity and calculated using the following equation:

$$k = T_{DES}/t$$

3. <u>Maximum Allowable Drainage Layer Length ($L_{s\text{-}max}$)</u>

$$\text{Length } (L_{s\text{-}max}) = \frac{\text{Transmissivity of Drainage Geocomposite } (m^2/s)}{\text{Specific Discharge } (m/s)}$$

$$L_{s\text{-}max} = \frac{T_{DES}}{q}$$

Top Slope:

$L_{s\text{-}max}$ = 3880 ft > maximum top slope length ($L_{s\text{-}max}$) is 200 ft

A collection pipe intercepting flow in top drainage layer will be placed in the locations as shown on Sheet 12A.A-7.

Side Slope:

$L_{s\text{-}max}$ = 668 ft > maximum collection pipe ($L_{s\text{-}max}$) spacing provided 260 ft

A collection pipe intercepting flow in drainage layer will be placed every other swale as shown on Sheet 12A-A-7. Maximum pipe is spacing is 260 ft.

4. Collection Pipe Design

4.1. Maximum flow to collection pipe:

Maximum pipe length ($L_{p\text{-}max}$) - See Sheet 12A-A.7.

Topslope:	1300 ft
Sideslope:	700 ft

Maximum ($L_{s\text{-}max}$) slope lengths from Step 3 above

Topslope:	200 ft
Sideslope:	260 ft

Flow per unit length of collection pipe (q_p):

$q_p = L_{s\text{-}max} \times q$ (q is calculated in Step 1 above.)

Topslope:
$q_p = L_{s\text{-}max} \times q =$ 0.0001075 cfs/ft

Sideslope:
$q_p = L_{s\text{-}ax} \times q =$ 0.000139 cfs/ft

Maximum pipe flow (Q_{max}):

$Q_{max} = L_{p\text{-}max} \times q_p$

Topslope:
$Q_{max} = L_{p\text{-}max} \times q_p =$ 0.139756 cfs

Sideslope:
$Q_{max} = L_{p\text{-}max} \times q_p =$ 0.097191 cfs

4.2. Collection Pipe Size:

Use Manning Equation to determine the pipe size.

Pipe Capacity (Qpc):

$$Q = \frac{1.49 A R^{2/3} S^{1/2}}{n}$$ (from Chapter 10 of Reference 3)

where:
- A: Flow area (sf), cross section of pipe
- R: hydraulic radius (ft) - Cross Section/perimeter
- S: Pipe slope (unitless)
- n: manning roughness coefficient

d=	3.00	inches, collection pipe diameter
A=	0.05	sf
P=	0.79	ft
R=	0.06	ft
S=	0.05	minimum slope
n=	0.010	selected for plastic HDPE or equivalent pipe
Q_{pc}=	0.258	cfs

4.3. Fullness ratio of pipe (f):

$$f = Q_{max}/Q_{pc}$$

Topslope:
$f = Q_{max}/Q_{pc} =$ 0.54

Sideslope:
$f = Q_{max}/Q_{pc} =$ 0.38

As shown in Step 4.3, flow rates in pipe do not exceed the pipe capacity, selected pipe size is acceptable.

5. Conclusion

The drainage layer will be terminated as specified above with a 3"-diameter perforated or slotted pipe that will be located between the drainage geocomposite and FML. The flowline slope of these pipes which collect infiltrating water from the drainage layer will be a minimum of 0.5 percent, and the pipe will be daylighted through a T-connection to the drainage letdowns or the perimeter channels.

STATE OF TEXAS
KYLE D. GOULD
106018
LICENSED
PROFESSIONAL ENGINEER
9.24.24

E 3189000 E 3190000 E 3191000 95°14'30" E 3192000 E 3193000 E 3195000

N 747000 N 746000 N 745000 29°49'45" N 744000 N 743000 N 742000

HCFCD DITCH (P116-00-00)

LEY ROAD

FORMER SOIL BORROW AREA

GREENS BAYOU (P100-00-00)

UNION PACIFIC RAILROAD SPUR

HCFCD DITCH (P114-00-00)

EXISTING FLARE FACILITY

EXISTING MAINTENANCE AND PAINT FACILITY

EXISTING SCALEHOUSE

EXISTING OFFICE BUILDING

EXISTING SITE ACCESS ROAD (GATES ROAD)

CITY OF HOUSTON ROAD EASEMENT

H.L.&P. EASEMENT

U.S. HIGHWAY 90 (McCARTY ROAD)

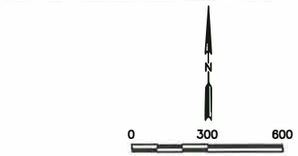
UNION PACIFIC RAILROAD

NP NWP NEP EP SEP SP-1 SP-2

GMP-A GMP-B GMP-D GMP-E GMP-F GMP-M GMP-P GMP-Q(R) GMP-R GMP-S GMP-T1 GMP-T5 GMP-U

MW-3UB MW-5UB MW-6LB MW-7LB MW-7UB MW-8LB MW-10LB MW-10UB MW-11LB MW-11UB MW-12LBR MW-12UB MW-13LB MW-13UB MW-14LB MW-14UB WCC-1R

3.5% 314.5



LEGEND

- PERMIT BOUNDARY
- LIMITS OF WASTE
- DEED RESTRICTION BOUNDARY (SEE NOTE 10)
- 200 FINAL CONTOURS
- 745000 N STATE PLANE COORDINATE SYSTEM
- 29°49'45" GEODETIC COORDINATE SYSTEM
- 20 EXISTING CONTOUR
- MW-11UB GROUNDWATER MONITORING WELL
- GMP-M LANDFILL GAS MONITORING PROBE
- EASEMENT BOUNDARY
- GABIONS
- PROPOSED DRAINAGE SWALE
- PROPOSED DRAINAGE LETDOWN
- CONSTRUCTED FINAL COVER
- LIMITS OF SUBTITLE D FINAL COVER
- DRAINAGE PIPES

POND LABELS	
NP	NORTH POND
NWP	NORTHWEST POND
NEP	NORTHEAST POND
EP	EAST POND
SEP	SOUTHEAST POND
SWP	SOUTHWEST POND
SP-1	SOUTH POND 1
SP-2	SOUTH POND 2

NOTES:

1. TOPOGRAPHIC MAPPING PREPARED BY FIRMATEK FROM AERIAL PHOTOGRAPHY FLOWN 11-17-2023. THE GRID SYSTEM IS TIED TO THE TEXAS STATE PLANE COORDINATE SYSTEM SOUTH CENTRAL ZONE NAD 1927.
2. PERMIT BOUNDARY AND EASEMENTS WERE REPRODUCED FROM COSTELLO, INC. STANDARD LAND SURVEY DRAWING, DATED MARCH 2004.
3. REFER TO ATTACHMENT 6, APPENDIX 6A-F FOR DEED RESTRICTION INFORMATION.
4. GAS MONITORING PROBES GMP-Q, GMP-R, AND GMP-S ARE BEING DECOMMISSIONED AND RELOCATED AS DOCUMENTED IN A PERMIT MODIFICATION SUBMITTED BY WEAVER BOOS CONSULTANTS (WBC) IN APRIL 2004. GMP-T5 AND GMP-U ARE BEING DECOMMISSIONED IN A PERMIT MODIFICATION SUBMITTED BY WBC IN APRIL 2004. GMP-T1 WILL BECOME A PERMANENT GAS MONITORING PROBE FOR THIS AREA. REFER TO ATTACHMENT 14 FOR ADDITIONAL INFORMATION.

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- [ ] ISSUED FOR CONSTRUCTION

DATE: 08/2008
FILE: 0120-439-11
CAD: 12A-A-7 PIPE LAYOUT.DWG
DRAWN BY: JDW
DESIGN BY: SAN/ALD
REVIEWED BY: JPY

Weaver Consultants Group
TBPE REGISTRATION NO. F-3727

PREPARED FOR
McCARTY ROAD LANDFILL TX, LP

REVISIONS

NO.	DATE	DESCRIPTION
1	08/2004	RESPONSE TO TCEQ 1st TECHNICAL COMMENTS
2	09/2024	PERMIT MODIFICATION

MAJOR PERMIT AMNDMENT
DRAINAGE PIPE LAYOUT

McCARTY ROAD LANDFILL
HARRIS COUNTY, TEXAS

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