CITY OF ALBUQUERQUE

Hydrology Section Planning Department
David S. Campbell, Director

Timothy M. Keller, Mayor

February 22, 2019

Savana Garcia
Wilson & Company Inc.
4401 Masthead St NE, Suite 150
Albuquerque, NM, 87109

RE: 4600 Edith Blvd NE – SWMD Admin. Office and Vehicle Maintenance Conceptual G&D Plan (Engineer's Stamp 4/29/2019)
Hydrology File: G15D202

Based upon the information provided in your submittal received 5/15/2019, the Conceptual Grading and Drainage Plan can't be approved for Site Plan, Building Permit or Work Order until the following comments are addressed and the plan agrees with the plat and site plan.

Prior approval of the Conceptual G&D for Site Plan

1. Please correct the Stormwater Quality Volume (SWQV) calculation at the end of the "Proposed Conditions" note on sheet GR-1. The required 80th percentile volume is 0.26" excess precipitation from the impervious area.
2. It appears that right of way dedication is needed along Rankin Rd. to contain the new C&G and Sidewalk. Please show the new Right of Way on the G&D Plan.
3. Add an inlet at the west end of the C&G in Rankin Rd. Identify the basin area draining to the new inlet and size the inlet(s) for total interception of the 100 year flows in Rankin Rd.
4. Please add a BMP, Pond C, for Basin 206 below the retaining wall.

Prior to approval of the final G&D Plan for Building Permit and Work Order

5. Remove the label "Not for Construction" from the G&D Plan. Include an overall sheet like the Conceptual G&D Plan and provide a detailed design at a larger scale on multiple 24' x 36" sheets including many more spot elevations and details of the ponds.
6. Please provide a cover page and table of contents for the calculations/report, and an engineer's stamp and signature. Please number the pages and organize each copy of the report in the same order. One of the submitted reports got scrambled and was difficult to reassemble. Please bind or staple the report.
7. Please add typical section of Rankin Road to the G&D Plan and include dimensions from the face of curb and sidewalk to the new right of way line. Also provide a typical section of the slope/retaining wall at the west end of the Rankin Rd frontage between the sidewalk and parking lot. The Retailing wall must not encroach into the public right of way.

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Albuquerque

NM 87103

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8. Basin # 206 should be served by a BMP, Pond C, to provide the required SWQV if possible. Please don't place the BMP on the uphill side of the retaining wall. The inlet could be replaced by a rundown into the pond and a pond outlet structure.
9. Please provide construction specifications and details on the G&D Plan for all of the hydraulic structures (build notes). Label the pipes, inlets, and manholes. The numbering system (nodes) in the calculations should be shown legibly on the G&D Plan both the overall plan and the more detailed sheets. The exhibit in the report is not legible.
10. The AHYMO peak flow rates seem about 20% higher than they should be, probably because the "Time to Peak" (t_p) values are set to -0.1 which is less than the minimum value of 0.1333 hr. When using the "Compute LT TP" command the t_p should be 0.0. The precipitation values seem appropriate though quarter hour should be 0.0 for type 2 distribution. Digital input files should be provided with the next submittal.
11. The numbering of Pond A and B on the G&D Plan does not agree with the labels in the AHYMO files, please fix the labels in AHYMO. Pond B, on the G&D Plan, appears to have an extended detention volume of 3' depth which can be counted as the BMP/ SWQV if the pond will drain in 48 hr or more at the average release rate calculated for the average pond depth (1.5'?). Please provide separate SWQV calculations for the area draining to each BMP.
12. How were the AHYMO pond routing input tables developed?
    a. Details of the pond outfall structures are required on the G&D Plans for construction.
    b. A narrative description of the pond outfall hydraulic calculations is also needed with the calculations.
    c. Provide pond volume calculations using the conic method showing the area of the contours used in the volume calculations.
13. The hydraulic HGL calculations for the on-site storm drains could not be checked because the pipe and inlet numbers are not shown on a map anywhere. Please add the pipe, inlet and MH labels to the overall G&D Plan and add the EGL to the output data table.
14. Please specify the Curb type/height on the G&D Plan and be sure that the 100 year flow depths do not overtop the curb particularly on the curbs carrying a lot of flow running north and south along the west edge. Especially consider specifying 8" STD C&G in the vicinity of curb opening inlets.

15. Typical sections should be shown at numerous locations around the perimeter of the site. Each section should show the property line, both the existing and proposed grades, slopes and walls with dimensions, both horizontal and vertical, as necessary to demonstrate compliance with DPM 22.5.B
16. A Phasing Plan should identify which portions of the site work are to be completed with each building.

Prior to Certificate of Occupancy

17. An engineer's Certification will be required for each building with site improvements complete according to the approved phasing plan.

If you have any questions, please contact me at 924-3986 or e-mail jhughes@cabq.gov.

Sincerely,

James D. Hughes, P.E.
Principal Engineer, Planning Dept.
Development and Review Services

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SWMD Maintenance & Administration Buildings Project

City of Albuquerque
Department of Municipal Development
Solid Waste Management Department

CONNECT TO EXISTING CATTLE GUARD INLET
RW H=5.6'
RW H=6.35'
PROPOSED CNG FUELING FACILITY
PROPOSED GUARD SHACK
EDITH BLVD.
ALAMEDA LATERAL
ALAMEDA LATERAL
CURB CUT
POND A
POND B
RANKIN RD.
COMANCHE RD.
16+00
20+00
25+00
31+00
31+84
SEE CROSS SECTIONS SHEETS CS-1 & CS-2
RW=5.0'
ADMIN BUILDING FF=5007.00
VEHICLE MAINTENANCE FF=5009.50
EXISTING FUEL ISLAND
BIN REPAIR/WELD FF=5012.00
PROPOSED BIN REPAIR
RECYCLE DROP OFF
OFFSITE 2
OFFSITE 1
COMANCHE LN
COMANCHE
SEE CROSS SECTIONS SHEETS CS-1 & CS-2

LEGEND

- XX — EXISTING CONTOURS
- XX — PROPOSED CONTOURS
- FF — FINISHED FLOOR
- X% — SLOPE ARROW
- PROPOSED RETAINING WALL
- EXISTING BASIN BOUNDARY
- PROPOSED BASIN BOUNDARY

GRADING & DRAINAGE PLAN

0 60' 120'
1"=60'-0"

Pond	Peak Flow (cfs)		Volume (ac-ft)		Elevation (ft)		
	In	Out	Prv'd	Req'd	Top	Bottom	WSEL
A	97	44.3	1.95	1.20	4997	4989	4995.4
B	48	44.2	0.56	0.39	4999	4994	4998.0

DRAINAGE ANALYSIS

INTRODUCTION

THE PROJECT SITE IS LOCATED IN NORTHEAST ALBUQUERQUE AT 4600 EDITH BLVD. THE SITE IS BOUNDED BY THE ALAMEDA DRAIN/EDITH BLVD. TO THE WEST, COMANCHE RD TO THE NORTH, RANKIN RD TO THE SOUTH, AND COMMERCIAL BUSINESSES TO THE EAST OF THE SITE. THE SITE IS NOT LOCATED WITHIN A DESIGNATED FEMA FLOOD PLAIN MAP, SEE FIRM MAPS 35001C0119G AND 35001C0332G. THE DRAINAGE REPORT HAS BEEN PREPARED IN ACCORDANCE WITH THE LATEST REVISION TO VOLUME 2 SECTION 22.2 OF THE CITY OF ALBUQUERQUE PROCESS MANUAL.

EXISTING CONDITIONS

THE SITE IS 23.8 AC AND MAJORITY OF THE SITE IS IMPERVIOUS. THE EXISTING SITE TOPOGRAPHY GENERALLY SLOPES FROM EAST TO WEST. THE EXISTING DRAINAGE INFRASTRUCTURE DIVERTS ALL THE SITES FLOWS THROUGH A SERIES OF WATER/OIL SEPARATORS AND INLETS INTO TWO PONDS LOCATED ON THE NORTH AND SOUTH OF THE SITE. THE LARGER DETENTION POND TO THE NORTH HAS AN OUTLET STRUCTURE THAT DISCHARGES THROUGH A 30 INCH CORRUGATED METAL PIPE (CMP) INTO A DRAINAGE SYSTEM IN COMANCHE RD. THE CONSTRUCTION PLANS FOR STORM WATER CONTROL IMPROVEMENTS FOR SOLID WASTE MANAGEMENT FACILITY COA PROJECT NUMBER 700691 PREPARED BY APPLIED ENGINEERING AND SURVEYING, INC. DATED 07/22/03 SHEET 2 OF 17 SHOWS AN OUTLET FROM THE POND WITH PEAK FLOW OF 44.3 CFS AND AN ALLOWABLE DISCHARGE OF 47.6 CFS FROM THE SITE. THE NORTHERN THREE QUARTERS OF THE SITE DRAINS INTO THIS POND. THE REMAINDER OF THE SITE DRAINS INTO THE SMALLER RETENTION POND TO THE SOUTHWEST CORNER OF THE SITE.

THE COMMERCIAL BUSINESSES TO THE EAST OF THE SITE ALSO DRAIN FROM THE EAST TO WEST. THE BUILDINGS ON THESE COMMERCIAL SITES ARE APPROXIMATELY 10-15 FT HIGHER THAN THE SITES EXISTING GRADE. THE OFFSITE FLOWS WILL FLOW DIRECTLY TO THE EAST AND THE NORTHERN HALF WILL EVENTUALLY DRAIN INTO THE NORTH POND AND THE SOUTH HALF FLOWS INTO THE SOUTH RETENTION POND. THE POND IS A SHALLOW POND WITH ROCK RIPRAP SPILLWAY DRAINING INTO RANKIN RD. THE AREA TO THE NORTH OF THE SITE IS COMANCHE RD WHICH HAS DRAINAGE INFRASTRUCTURE IN PLACE TO PREVENT FLOWS FROM BEING DISCHARGED TO THE PROJECT SITE. RANKIN RD TO THE SOUTH DRAINS EAST TO WEST AND THE FLOWS DO NOT ENTER THE PROPERTY. THE AREA TO THE WEST DRAINS EAST TO WEST AND THOSE FLOWS WILL ENTER THE ALAMEDA DRAIN.

PROPOSED CONDITIONS

THE PROPOSED SITE WILL MAINTAIN THE GENERAL FLOW DIRECTION OF EAST TO WEST AND SOUTH TO NORTH. ALL THE BASINS EXCEPT BASIN 206 WILL ULTIMATELY DRAIN INTO THE NEW POND LOCATED IN BASIN 220. BASINS 201-204 AND OFFSITE BASINS 1 AND 2 WILL CAPTURE THE DRAINAGE FROM THE MAINTENANCE AREA AND COMMERCIAL VEHICLE PARKING LOT AND BE ROUTED THROUGH A NEW POND IN BASIN 204. THIS POND WILL BE LINED AND WILL HAVE A WATER QUALITY OUTLET TO REMOVE THE TRASH AND OIL CAPTURED FROM THE SITE RUNOFF. THE NEW POND IN BASIN 220 WILL BE CONNECTED TO THE EXISTING POND DRAINAGE INFRASTRUCTURE THAT DISCHARGES TO THE STORM DRAIN SYSTEM IN COMANCHE RD. THIS POND WILL HAVE A WATER QUALITY RISER TO HELP REMOVE TRASH AND SEDIMENT FROM THE RUNOFF. THE POND DISCHARGE WILL BE 44.3 CFS WHICH WILL LESS THAN THE ALLOWABLE SITE DISCHARGE OF 47.6 CFS. THE EXISTING 60 INCH DRAINAGE SYSTEM IN COMANCHE RD IS ABOUT 19 FT DEEP. NO DATA RELATED TO HYDRAULIC GRADE LINE OF THIS SYSTEM WAS FOUND. THE POND OUTFALL WILL TIE TO THE EXISTING 30 INCH PIPE UPSTREAM OF THE EXISTING SYSTEM IN COMANCHE RD. THE EXISTING RETENTION POND IN BASIN 206 LOCATED ON THE SOUTHWEST CORNER WILL BE REMOVED. RUNOFF FROM THIS BASIN SHEET FLOWS TO AN INLET WHICH WILL ULTIMATELY DRAIN INTO THE EXISTING CATTLE GUARD INLET AT THE INTERSECTION OF EDITH BLVD AND RANKIN RD. THE COA STORMWATER QUALITY VOLUME FOR THE 80th PERCENTILE EVENT WAS CALCULATED USING 0.5 INCH OF RAINFALL DEPTH (0.6 INCH LESS 0.1 INCH FOR INITIAL ABSTRACTION). THIS VOLUME WAS CALCULATED TO BE 0.9 AC-FT FOR THE 21.48 AC OF THE SITE IMPERVIOUS AREAS. THIS RETENTION VOLUME WILL BE ACCOMMODATED IN POND A.

CALCULATIONS

THE 100-YR, 24-HR STORM EVENT USING AHYMO S-4 WERE USED TO CALCULATE PEAK FLOWS AND RUNOFF VOLUME FOR THE PROPOSED DEVELOPMENT WHICH ARE SUMMARIZED HERE. BENTLEY FLOWMASTER V8i WERE UTILIZED TO DETERMINE PROPOSED INLET CAPACITIES. BENTLEY CULVERTMASTER V3.3 WAS USED TO DESIGN PONDS OUTFALL PIPES. PEAK FLOWS FROM THE MODEL WERE ENTERED INTO THE STORMCAD V10.1 SOFTWARE TO ANALYZE AND DESIGN THE STORM SYSTEMS. BOTH PONDS INCLUDE ONE FOOT OF FREEBOARD AND SIDE SLOPES OF 3H: 1V.

Existing Conditions

Basin	Total Area (sq ft)	Total Area (Ac)	A %	A Ac	B %	B Ac	C %	C Ac	D %	D Ac	Peak Discharge (cfs), $Q_{100\ yr\text{-}24\ hr}$	Volume (ac-ft) $V_{100\ yr\text{-}24\ hr}$
A	62474.32	1.434	0	0	0	0	5	0.07	95	1.36	6.6	0.267
B	93252.44	2.141	0	0	0	0	5	0.11	95	2.03	9.0	0.401
C	48109.31	1.104	0	0	0	0	5	0.06	95	1.05	5.1	0.207
J	358117.7	8.221	0	0	0	0	5	0.41	95	7.81	38.3	1.556
K	345257	7.926	0	0	0	0	5	0.40	95	7.53	37.1	1.507
Offsite 1	55,490	1.274	0	0	0	0	10	0.13	90	1.15	5.9	0.235
Offsite 2	46,468	1.067	0	0	0	0	10	0.11	90	0.96	4.9	0.197

Proposed Conditions

Basin	Total Area (sq ft)	Total Area	A %	A Ac	B %	B Ac	C %	C Ac	D %	D Ac	Peak Discharge (cfs), $Q_{100\ yr\text{-}24\ hr}$	Volume (ac-ft) $V_{100\ yr\text{-}24\ hr}$
201	48,732	1.119	0	0.00	0	0.00	10	0.11	90	1.01	5.2	0.207
202	78,424	1.800	0	0.00	0	0.00	10	0.18	90	1.62	8.3	0.332
203	48,462	1.113	0	0.00	0	0.00	5	0.06	95	1.06	4.8	0.212
204	105,306	2.417	0	0.00	0	0.00	5	0.12	95	2.30	11.3	0.460
205	54,819	1.258	0	0.00	0	0.00	5	0.06	95	1.20	5.9	0.239
206	59,717	1.371	0	0.00	0	0.00	5	0.07	95	1.30	6.4	0.260
207	23,213	0.533	0	0.00	0	0.00	5	0.03	95	0.51	2.5	0.101
208	38,436	0.882	0	0.00	0	0.00	5	0.04	95	0.84	4.2	0.168
209	39,485	0.906	0	0.00	0	0.00	2	0.02	98	0.89	4.3	0.176
210	40,798	0.937	0	0.00	0	0.00	2	0.02	98	0.92	4.4	0.181
211	71,721	1.646	0	0.00	0	0.00	5	0.08	95	1.56	7.7	0.312
212	56,736	1.302	0	0.00	0	0.00	5	0.07	95	1.24	6.1	0.248
213	6,289	0.144	0	0.00	0	0.00	75	0.11	25	0.04	0.7	0.025
214	38,158	0.876	0	0.00	0	0.00	75	0.66	25	0.22	3.9	0.147
215	10,070	0.231	1	0.00	1	0.00	10	0.02	90	0.21	1.1	0.042
216	5,758	0.132	0	0.00	0	0.00	5	0.01	95	0.13	0.6	0.026
217	12,735	0.292	0	0.00	0	0.00	20	0.06	80	0.23	1.3	0.051
218	90,301	2.073	0	0.00	0	0.00	10	0.21	90	1.87	9.6	0.382
219	10,416	0.239	0	0.00	0	0.00	5	0.01	95	0.23	1.1	0.045
220	38,671	0.888	0	0.00	0	0.00	15	0.13	85	0.75	4.1	0.159
221	16,629	0.382	0	0.00	0	0.00	10	0.04	90	0.34	1.8	0.071
222	41,098	0.943	0	0.00	0	0.00	2	0.02	98	0.92	4.5	0.182
Offsite 1	55,490	1.274	0	0.00	0	0.00	10	0.13	90	1.15	5.9	0.235
Offsite 2	46,468	1.067	0	0.00	0	0.00	10	0.11	90	0.96	4.9	0.197

CONCEPTUAL GRADING & DRAINAGE PLAN

MARYAM D. GHAHI NEW MEXICO 17623 PROFESSIONAL ENGINEER
04/29/19

NOT FOR CONSTRUCTION

JR MILLER & ASSOCIATES
2700 SATURN STREET
BREA, CA 92821
714-524-1870

WILSON & COMPANY, INC.
4401 MASTHEAD ST NE
ALBUQUERQUE, NM 87109
505-348-4000

MAY 01, 2019

SHEET No. GR-1

COA PROJECT No. 7006.92 JRMA No. 4907

HYDROLOGY CALCULATIONS

AHYMO-EXISTING CONDITIONS

AHYMO PROGRAM SUMMARY TABLE (AHYMO-S4) - Ver. S4.01a, Rel: 01a RUN DATE (MON/DAY/YR) =04/29/2019

INPUT FILE = 32-01\2_Disciplines\Drainage_or_Sitework\Calculations\AHYMO\SWMD - EXIST.txt USER NO.= WilsonCoANMSiteA96476897

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	NOTATION
*S "EXISTING" CONDITION MODEL FOR SWMD Maintenance & Admin Project										PAGE = 1
START										TIME= 0.00
LOCATION		ALBUQUERQUE								
*S		RAINFALL DATA FROM NOAA ATLAS 14								
*S**********										
*S 100 YEAR 24HR STORM										
RAINFALL TYPE= 2 NOAA 14										RAIN24= 2.600
COMPUTE NM HYD	A	-	1	0.00220	6.60	0.267	2.27931	1.467	4.687	PER IMP= 95.00
COMPUTE NM HYD	B	-	2	0.00330	9.89	0.401	2.27932	1.467	4.685	PER IMP= 95.00
COMPUTE NM HYD	C	-	3	0.00170	5.10	0.207	2.27932	1.467	4.691	PER IMP= 95.00
COMPUTE NM HYD	J	-	4	0.01280	38.34	1.556	2.27932	1.467	4.680	PER IMP= 95.00
COMPUTE NM HYD	K	-	5	0.01240	37.14	1.507	2.27932	1.467	4.680	PER IMP= 95.00
COMPUTE NM HYD	OFF1	-	6	0.00199	5.89	0.235	2.21326	1.467	4.621	PER IMP= 90.00
COMPUTE NM HYD	OFF2	-	7	0.00167	4.94	0.197	2.21326	1.467	4.623	PER IMP= 90.00
FINISH										

```
*  SWMD Maintenance & Admin Project Proposed Basins
*  Drainage Basin Analysis
*S "EXISTING" CONDITION MODEL FOR SWMD Maintenance & Admin Project
*
START               TIME=0.0  PUNCH CODE=0 PRINT CODE=0
LOCATION            ALBUQUERQUE
*
* RAINFALL FROM NOAA COA DEVELOPMENT PROCESS MANUAL
*S      RAINFALL DATA FROM NOAA ATLAS 14
*S**************************************************************************
*S  100 YEAR 24HR STORM
RAINFALL                TYPE=2
                        QUARTER=1.06 IN
                        HOUR=   1.77 IN
                        SIX HR= 2.29 IN
                        DAY=    2.60 IN   DT=0.03333

*
*** Sub-BASIN A ****
*
COMPUTE LT TP           LCODE=1   UPLAND/LAG TIME METHOD
                        NK=2   ISLOPE=1
                        LENGTH=100 FT   SLOPE=0.050   K=0.7
                        LENGTH=105 FT   SLOPE=0.011   K=2.0
*
COMPUTE NM HYD          ID=1   HYD NO=A   DA=0.0022 SQ MI
                        PER A=00 PER B=00 PER C=5 PER D=95
                        TP=-0.1 hr   MASSRAIN=-1
*
PRINT HYD               ID=1   CODE=1
*
*
*
*** Sub-BASIN B ****
*
COMPUTE LT TP           LCODE=1   UPLAND/LAG TIME METHOD
                        NK=2   ISLOPE=1
                        LENGTH=100 FT   SLOPE=0.020   K=0.7
                        LENGTH=140 FT   SLOPE=0.020   K=2.0
*
COMPUTE NM HYD          ID=2   HYD NO=B   DA=0.0033 SQ MI
                        PER A=00 PER B=00 PER C=5 PER D=95
                        TP=-0.1 hr   MASSRAIN=-1
*
PRINT HYD               ID=2   CODE=1
*
*
*** Sub-BASIN C ****
*
COMPUTE LT TP           LCODE=1   UPLAND/LAG TIME METHOD
                        NK=2   ISLOPE=1
                        LENGTH=100 FT   SLOPE=0.020   K=0.7
                        LENGTH=100 FT   SLOPE=0.020   K=2.0
*
COMPUTE NM HYD          ID=3   HYD NO=C   DA=0.0017 SQ MI
                        PER A=00 PER B=00 PER C=5 PER D=95
                        TP=-0.1 hr   MASSRAIN=-1
*
PRINT HYD               ID=3   CODE=1
*
*
*** Sub-BASIN J ****
*
COMPUTE LT TP           LCODE=1   UPLAND/LAG TIME METHOD
                        NK=2   ISLOPE=1
                        LENGTH=100 FT   SLOPE=0.020   K=0.7
                        LENGTH=170 FT   SLOPE=0.020   K=2.0
*
COMPUTE NM HYD          ID=4   HYD NO=J   DA=0.0128 SQ MI
                        PER A=00 PER B=00 PER C=5 PER D=95
                        TP=-0.1 hr   MASSRAIN=-1
*
PRINT HYD               ID=4   CODE=1
*
*
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```
*** Sub-BASIN K ****
*
COMPUTE LT TP           LCODE=1   UPLAND/LAG TIME METHOD
                        NK=2   ISLOPE=1
                        LENGTH=100 FT   SLOPE=0.020   K=0.7
                        LENGTH=600 FT   SLOPE=0.020   K=2.0
*
COMPUTE NM HYD          ID=5   HYD NO=K   DA=0.0124 SQ MI
                        PER A=00 PER B=00 PER C=5 PER D=95
                        TP=-0.1 hr   MASSRAIN=-1
*
PRINT HYD               ID=5   CODE=1

*
*
*************************************************************************
*** Sub-BASIN OFF1 ****
*
COMPUTE LT TP           LCODE=1   UPLAND/LAG TIME METHOD
                        NK=2   ISLOPE=1
                        LENGTH=100 FT   SLOPE=0.010   K=0.7
                        LENGTH=200 FT   SLOPE=0.050   K=2.0
*
COMPUTE NM HYD          ID=6   HYD NO=OFF1   DA=0.00199 SQ MI
                        PER A=00 PER B=00 PER C=10 PER D=90
                        TP=-0.1 hr   MASSRAIN=-1
*
PRINT HYD               ID=6   CODE=1
*
*
*** Sub-BASIN OFF2 ****
*
COMPUTE LT TP           LCODE=1   UPLAND/LAG TIME METHOD
                        NK=2   ISLOPE=1
                        LENGTH=100 FT   SLOPE=0.010   K=0.7
                        LENGTH=200 FT   SLOPE=0.050   K=2.0
*
COMPUTE NM HYD          ID=7   HYD NO=OFF2   DA=0.00167 SQ MI
                        PER A=00 PER B=00 PER C=10 PER D=90
                        TP=-0.1 hr   MASSRAIN=-1
*
PRINT HYD               ID=7   CODE=1
*
*
*
FINISH
```

AHYMO-PROPOSED CONDITIONS

AHYMO PROGRAM SUMMARY TABLE (AHYMO-S4) - Ver. S4.01a, Rel: 01a RUN DATE (MON/DAY/YR) =04/25/2019

INPUT FILE = 14-100-132-01\2_Disciplines\Drainage_or_Sitework\Calculations\AHYMO\SWMD.txt USER NO.= WilsonCoANMSiteA96476897

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	NOTATION
*S "PROPOSED" CONDITION MODEL FOR SWMD Maintenance & Admin Project										
START										TIME= 0.00
LOCATION	ALBUQUERQUE									
*S	RAINFALL DATA FROM NOAA ATLAS 14									
*S**********										
*S 100 YEAR 24HR STORM										
RAINFALL TYPE= 2 NOAA 14										RAIN24= 2.600
COMPUTE NM HYD	OFF2	-	1	0.00167	4.94	0.197	2.21326	1.467	4.623	PER IMP= 90.00
COMPUTE NM HYD	201.00	-	97	0.00175	5.18	0.207	2.21326	1.467	4.623	PER IMP= 90.00
ADD HYD	201SUM	1&97	12	0.00342	10.12	0.404	2.21313	1.467	4.623	
COMPUTE NM HYD	203.00	-	2	0.00160	4.80	0.195	2.27932	1.467	4.692	PER IMP= 95.00
ADD HYD	203SUM	12& 2	10	0.00502	14.92	0.598	2.23418	1.467	4.645	
COMPUTE NM HYD	OFF1	-	1	0.00199	5.89	0.235	2.21326	1.467	4.621	PER IMP= 90.00
COMPUTE NM HYD	202.00	-	98	0.00281	8.31	0.332	2.21326	1.467	4.618	PER IMP= 90.00
ADD HYD	202SUM	1&98	3	0.00480	14.19	0.567	2.21316	1.467	4.620	
COMPUTE NM HYD	204.00	-	2	0.00378	11.33	0.460	2.27932	1.467	4.684	PER IMP= 95.00
ADD HYD	204SUM	3& 2	1	0.00858	25.52	1.026	2.24228	1.467	4.648	
COMPUTE NM HYD	221.00	-	2	0.00060	1.78	0.071	2.21326	1.467	4.647	PER IMP= 90.00
COMPUTE NM HYD	205.00	-	5	0.00197	5.91	0.239	2.27931	1.467	4.689	PER IMP= 95.00
ADD HYD	205SUM	2& 5	4	0.00257	7.70	0.310	2.26372	1.467	4.679	
ADD HYD	205SUMA	1& 4	6	0.01115	33.22	1.336	2.24722	1.467	4.655	
ADD HYD	205SUMB	10& 6	1	0.01617	48.14	1.935	2.24317	1.467	4.652	
ROUTE RESERVOIR	PONDA	1	30	0.01617	44.36	1.858	2.15480	1.533	4.286	AC-FT= 0.391
COMPUTE NM HYD	206.00	-	1	0.00223	6.69	0.271	2.27932	1.467	4.687	PER IMP= 95.00
ROUTE MCUNGE	206Rt	1	2	0.00223	6.69	0.271	2.27922	1.467	4.687	CCODE = 0.0
COMPUTE NM HYD	208.00	-	8	0.00138	4.15	0.168	2.27932	1.467	4.694	PER IMP= 95.00
COMPUTE NM HYD	209.00	-	9	0.00142	4.30	0.176	2.31895	1.467	4.734	PER IMP= 98.00
ADD HYD	209SUM	9& 8	11	0.00280	8.45	0.343	2.29924	1.467	4.714	
COMPUTE NM HYD	222.00	-	12	0.00147	4.45	0.182	2.31895	1.467	4.734	PER IMP= 98.00
ADD HYD	222SUM	11&12	13	0.00427	12.90	0.525	2.30597	1.467	4.721	
COMPUTE NM HYD	215.00	-	14	0.00036	1.08	0.042	2.21326	1.467	4.672	PER IMP= 90.00
ADD HYD	215SUM	14&13	15	0.00463	13.98	0.568	2.29873	1.467	4.717	
COMPUTE NM HYD	216.00	-	16	0.00021	0.64	0.026	2.27932	1.467	4.746	PER IMP= 95.00
ADD HYD	216SUM	16&15	17	0.00484	14.62	0.593	2.29786	1.467	4.718	
COMPUTE NM HYD	213.00	-	2	0.00023	0.66	0.025	2.01509	1.467	4.504	PER IMP= 75.00
COMPUTE NM HYD	214.00	-	99	0.00137	3.88	0.147	2.01509	1.467	4.425	PER IMP= 75.00
ADD HYD	214SUM	99& 2	3	0.00160	4.54	0.172	2.01488	1.467	4.436	
COMPUTE NM HYD	210.00	-	1	0.00146	4.42	0.181	2.31895	1.467	4.734	PER IMP= 98.00

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	NOTATION
ADD HYD	210SUM	1& 3	31	0.00306	8.97	0.352	2.15989	1.467	4.578	
ADD HYD	210SUMA	17&31	18	0.00790	23.58	0.946	2.24442	1.467	4.664	
COMPUTE NM HYD	207.00	-	1	0.00083	2.50	0.101	2.27932	1.467	4.703	PER IMP= 95.00
COMPUTE NM HYD	211.00	-	11	0.00257	7.71	0.312	2.27932	1.467	4.687	PER IMP= 95.00
ADD HYD	211SUM	1&11	10	0.00340	10.21	0.413	2.27918	1.467	4.691	
COMPUTE NM HYD	212.00	-	3	0.00204	6.12	0.248	2.27932	1.467	4.689	PER IMP= 95.00
ADD HYD	212SUM	10& 3	11	0.00544	16.33	0.661	2.27919	1.467	4.690	
COMPUTE NM HYD	218.00	-	1	0.00324	9.58	0.382	2.21326	1.467	4.618	PER IMP= 90.00
ADD HYD	218SUM	18& 1	10	0.01114	33.16	1.328	2.23533	1.467	4.651	
COMPUTE NM HYD	219.00	-	1	0.00037	1.12	0.045	2.27932	1.467	4.725	PER IMP= 95.00
ADD HYD	219SUM	10& 1	19	0.01151	34.28	1.373	2.23673	1.467	4.653	

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	NOTATION
ADD HYD	219SUMA	19&11	18	0.01695	50.60	2.034	2.25036	1.467	4.665	
COMPUTE NM HYD	220.00	-	20	0.00139	4.06	0.159	2.14720	1.467	4.559	PER IMP= 85.00
ADD HYD	220SUM	18&20	21	0.01834	54.66	2.193	2.24253	1.467	4.657	
ADD HYD	POND.IN	21&30	1	0.03451	97.32	4.052	2.20142	1.500	4.406	
ROUTE RESERVOIR	PONDA	1	96	0.03451	44.30	4.051	2.20123	1.667	2.006	AC-FT= 1.209
COMPUTE NM HYD	217.00	-	6	0.00046	1.33	0.051	2.08115	1.467	4.524	PER IMP= 80.00

FINISH

```
*  SWMD Maintenance & Admin Project Proposed Basins
*  Drainage Basin Analysis
*S "PROPOSED" CONDITION MODEL FOR SWMD Maintenance & Admin Project
*
START               TIME=0.0  PUNCH CODE=0 PRINT CODE=0
LOCATION            ALBUQUERQUE
*
* RAINFALL FROM NOAA COA DEVELOPMENT PROCESS MANUAL
*S      RAINFALL DATA FROM NOAA ATLAS 14
*S**************************************************************************
*S  100 YEAR 24HR STORM
RAINFALL                TYPE=2
                        QUARTER=1.06 IN
                        HOUR=   1.77 IN
                        SIX HR= 2.29 IN
                        DAY=    2.60 IN   DT=0.03333

*** Sub-BASIN OFF2 ****
*
COMPUTE LT TP           LCODE=1   UPLAND/LAG TIME METHOD
                        NK=2   ISLOPE=1
                        LENGTH=100 FT   SLOPE=0.010   K=0.7
                        LENGTH=200 FT   SLOPE=0.050   K=2.0
*
COMPUTE NM HYD          ID=1   HYD NO=OFF2   DA=0.00167 SQ MI
                        PER A=00 PER B=00 PER C=10 PER D=90
                        TP=-0.1 hr   MASSRAIN=-1
*
PRINT HYD               ID=1   CODE=1
*
*

*** Sub-BASIN 201 ****
*
COMPUTE LT TP           LCODE=1   UPLAND/LAG TIME METHOD
                        NK=2   ISLOPE=1
                        LENGTH=100 FT   SLOPE=0.050   K=0.7
                        LENGTH=185 FT   SLOPE=0.011   K=2.0
*
COMPUTE NM HYD          ID=97   HYD NO=201   DA=0.00175 SQ MI
                        PER A=00 PER B=00 PER C=10 PER D=90
                        TP=-0.1 hr   MASSRAIN=-1
*
PRINT HYD               ID=97   CODE=1
*
*
* Total Flow from Basin (OFF2 + 201)
ADD HYD                 ID=12  HYD NO=201SUM ID I=1   ID II=97
PRINT HYD               ID=12  CODE=1
*
*
*** Sub-BASIN 203 ****
*
COMPUTE LT TP           LCODE=1   UPLAND/LAG TIME METHOD
                        NK=2   ISLOPE=1
                        LENGTH=100 FT   SLOPE=0.020   K=0.7
                        LENGTH=190 FT   SLOPE=0.020   K=2.0
*
COMPUTE NM HYD          ID=2   HYD NO=203   DA=0.0016 SQ MI
                        PER A=00 PER B=00 PER C=5 PER D=95
                        TP=-0.1 hr   MASSRAIN=-1
*
PRINT HYD               ID=2   CODE=1
*
*
* Total Flow from Basin (OFF2+201+203)
ADD HYD                 ID=10  HYD NO=203SUM ID I=12   ID II=2
PRINT HYD               ID=10  CODE=1
*
*
**************************************************************************
*** Sub-BASIN OFF1 ****
*
COMPUTE LT TP           LCODE=1   UPLAND/LAG TIME METHOD
                        NK=2   ISLOPE=1
```

```
                        LENGTH=100 FT   SLOPE=0.010   K=0.7
                        LENGTH=200 FT   SLOPE=0.050   K=2.0
*
COMPUTE NM HYD          ID=1   HYD NO=OFF1   DA=0.00199 SQ MI
                        PER A=00 PER B=00 PER C=10 PER D=90
                        TP=-0.1 hr   MASSRAIN=-1
*
PRINT HYD               ID=1   CODE=1
*
*
*** Sub-BASIN 202 ****
*
COMPUTE LT TP           LCODE=1   UPLAND/LAG TIME METHOD
                        NK=2   ISLOPE=1
                        LENGTH=100 FT   SLOPE=0.048   K=0.7
                        LENGTH=240 FT   SLOPE=0.052   K=2.0
*
COMPUTE NM HYD          ID=98   HYD NO=202   DA=0.00281 SQ MI
                        PER A=00 PER B=00 PER C=10 PER D=90
                        TP=-0.1 hr   MASSRAIN=-1
*
PRINT HYD               ID=98   CODE=1
*
*
* Total Flow from Basin (OFF1+202)
ADD HYD                 ID=3  HYD NO=202SUM ID I=1   ID II=98
PRINT HYD               ID=3  CODE=1
*
*
*** Sub-BASIN 204 ****
*
COMPUTE LT TP           LCODE=1   UPLAND/LAG TIME METHOD
                        NK=2   ISLOPE=1
                        LENGTH=90 FT   SLOPE=0.050   K=0.7
*
COMPUTE NM HYD          ID=2   HYD NO=204   DA=0.00378 SQ MI
                        PER A=00 PER B=00 PER C=5 PER D=95
                        TP=-0.1 hr   MASSRAIN=-1
*
PRINT HYD               ID=2   CODE=1
*
*
* Total Flow from Basin (OFF1 +202 + 204)
ADD HYD                 ID=1  HYD NO=204SUM ID I=3   ID II=2
PRINT HYD               ID=1   CODE=1
*
*
*** Sub-BASIN 221 ****
*
COMPUTE LT TP           LCODE=1   UPLAND/LAG TIME METHOD
                        NK=2   ISLOPE=1
                        LENGTH=100 FT   SLOPE=0.045   K=0.7
                        LENGTH=200 FT   SLOPE=0.032   K=2.0
*
COMPUTE NM HYD          ID=2   HYD NO=221   DA=0.0006 SQ MI
                        PER A=00 PER B=00 PER C=10 PER D=90
                        TP=-0.1 hr   MASSRAIN=-1
*
PRINT HYD               ID=2   CODE=1
*
*

*** Sub-BASIN 205 ****
*
COMPUTE LT TP           LCODE=1   UPLAND/LAG TIME METHOD
                        NK=2   ISLOPE=1
                        LENGTH=100 FT   SLOPE=0.025   K=0.7
                        LENGTH=239 FT   SLOPE=0.014   K=2.0
*
COMPUTE NM HYD          ID=5   HYD NO=205   DA=0.00197 SQ MI
                        PER A=00 PER B=00 PER C=05 PER D=95
                        TP=-0.1 hr   MASSRAIN=-1
*
PRINT HYD               ID=5   CODE=1
*
```

```
*
* Total Flow from Basin (205 + 221)
ADD HYD                 ID=4  HYD NO=205SUM ID I=2   ID II=5
PRINT HYD               ID=4  CODE=1
*
*

* Total Flow from Basin (OFF1 TO 205)
ADD HYD                 ID=6  HYD NO=205SUMA ID I=1   ID II=4
PRINT HYD               ID=6   CODE=1
*
*
* Total Flow TO POND B
ADD HYD                 ID=1  HYD NO=205SUMB ID I=10   ID II=6
PRINT HYD               ID=1   CODE=1
*
*
****Route HYD 205sum to Sub-Basin  Through a Pipe

****Route Hyd  through POND B
*
ROUTE RESERVOIR         ID=30  HYD NO=PONDA  INFLOW ID=1  CODE=1
                        OUTFLOW (CFS)     STORAGE (AC FT)       ELEV
                        0                       0.0             4994
                        0.01                    0.0626          4995
                        0.02                    0.1469          4996
                        0.03                    0.2561          4997
                        43.9                    0.3932          4998
                        76.5                    0.5613          4999

*
*PRINT HYD              ID=30   CODE=1
*
**********------------------------------------------------------------
*** Sub-BASIN 206, Sheet Flow Out ****
*
COMPUTE LT TP           LCODE=1   UPLAND/LAG TIME METHOD
                        NK=2   ISLOPE=1
                        LENGTH=100 FT   SLOPE=0.020   K=0.7
                        LENGTH=187 FT   SLOPE=0.033   K=2.0
*
COMPUTE NM HYD          ID=1   HYD NO=206   DA=0.00223 SQ MI
                        PER A=00 PER B=00 PER C=05 PER D=95
                        TP=-0.1 hr   MASSRAIN=-1
*
PRINT HYD               ID=1   CODE=1
*

*
*****Route HYD  to Sub-Basin  Through a Pipe
COMPUTE RATING CURVE    CID=1   VS NO=1 CODE=-1   SLP=0.023
                        DIA=24 IN   N=0.013
*
ROUTE MCUNGE            ID=2  HYD NO=206Rt  INFLOW ID=1
                        DT=0 HR  LENGTH=200 FT
                        NS=0  SLOPE=0.010
*
PRINT HYD               ID=2   CODE=1
*
*
**********------------------------------------------------------------
**********------------------------------------------------------------
*
**** Sub-BASIN 208 ****
*
COMPUTE LT TP           LCODE=1   UPLAND/LAG TIME METHOD
                        NK=2   ISLOPE=1
                        LENGTH=100 FT   SLOPE=0.025   K=0.7
                        LENGTH=485 FT   SLOPE=0.018   K=2.0
*
COMPUTE NM HYD          ID=8   HYD NO=208   DA=0.00138 SQ MI
                        PER A=00 PER B=00 PER C=05 PER D=95
                        TP=-0.1 hr   MASSRAIN=-1
*
PRINT HYD               ID=8   CODE=1
```

```
*
*
*** Sub-BASIN 209 ****
*
COMPUTE LT TP           LCODE=1   UPLAND/LAG TIME METHOD
                        NK=2   ISLOPE=1
                        LENGTH=100 FT   SLOPE=0.018   K=0.7
                        LENGTH=410 FT   SLOPE=0.004   K=2.0
*
COMPUTE NM HYD          ID=9   HYD NO=209   DA=0.00142 SQ MI
                        PER A=00 PER B=00 PER C=02 PER D=98
                        TP=-0.1 hr   MASSRAIN=-1
*
PRINT HYD               ID=9   CODE=1
*
*
* Total Flow from Basin (208 + 209)
ADD HYD                 ID=11  HYD NO=209SUM ID I=9   ID II=8
PRINT HYD               ID=11   CODE=1
*
*** Sub-BASIN 222 ****
*
COMPUTE LT TP           LCODE=1   UPLAND/LAG TIME METHOD
                        NK=2   ISLOPE=1
                        LENGTH=89 FT   SLOPE=0.032   K=0.7
*
COMPUTE NM HYD          ID=12   HYD NO=222   DA=0.00147 SQ MI
                        PER A=00 PER B=00 PER C=2 PER D=98
                        TP=-0.1 hr   MASSRAIN=-1
*
PRINT HYD               ID=12   CODE=1
*
*
* Total Flow from Basin (208 + 209 + 222)
ADD HYD                 ID=13  HYD NO=222SUM ID I=11   ID II=12
PRINT HYD               ID=13   CODE=1
*
*** Sub-BASIN 215 ****
*
COMPUTE LT TP           LCODE=1   UPLAND/LAG TIME METHOD
                        NK=2   ISLOPE=1
                        LENGTH=100 FT   SLOPE=0.029   K=0.7
                        LENGTH=206 FT   SLOPE=0.003   K=2.0
*
COMPUTE NM HYD          ID=14   HYD NO=215   DA=0.00036 SQ MI
                        PER A=00 PER B=00 PER C=10 PER D=90
                        TP=-0.1 hr   MASSRAIN=-1
*
PRINT HYD               ID=14   CODE=1
*
*
* Total Flow from Basin (208 TO 215)
ADD HYD                 ID=15  HYD NO=215SUM ID I=14   ID II=13
PRINT HYD               ID=15   CODE=1
*

*** Sub-BASIN 216 ****
*
COMPUTE LT TP           LCODE=1   UPLAND/LAG TIME METHOD
                        NK=2   ISLOPE=1
                        LENGTH=100 FT   SLOPE=0.011   K=0.7
                        LENGTH=479 FT   SLOPE=0.023   K=2.0
*
COMPUTE NM HYD          ID=16   HYD NO=216   DA=0.00021 SQ MI
                        PER A=00 PER B=00 PER C=05 PER D=95
                        TP=-0.1 hr   MASSRAIN=-1
*
PRINT HYD               ID=16   CODE=1
*
*
* Total Flow from Basin (208 TO 216)
ADD HYD                 ID=17  HYD NO=216SUM ID I=16   ID II=15
PRINT HYD               ID=17   CODE=1
*
**************************************************************
```

```
*** Sub-BASIN 213 ****
*
COMPUTE LT TP           LCODE=1   UPLAND/LAG TIME METHOD
                        NK=2   ISLOPE=1
                        LENGTH=100 FT   SLOPE=0.025   K=0.7
                        LENGTH=50 FT   SLOPE=0.060   K=2.0
*
COMPUTE NM HYD          ID=2   HYD NO=213   DA=0.00023 SQ MI
                        PER A=00 PER B=00 PER C=25 PER D=75
                        TP=-0.1 hr   MASSRAIN=-1
*
PRINT HYD               ID=2   CODE=1
*
*
*** Sub-BASIN 214 ****
*
COMPUTE LT TP           LCODE=1   UPLAND/LAG TIME METHOD
                        NK=2   ISLOPE=1
                        LENGTH=100 FT   SLOPE=0.028   K=0.7
                        LENGTH=90 FT   SLOPE=0.061   K=2.0
*
COMPUTE NM HYD          ID=99   HYD NO=214   DA=0.00137 SQ MI
                        PER A=00 PER B=00 PER C=25 PER D=75
                        TP=-0.1 hr   MASSRAIN=-1
*
PRINT HYD               ID=99   CODE=1
*
* Total Flow from Basin (214 + 213)
ADD HYD                 ID=3  HYD NO=214SUM ID I=99   ID II=2
PRINT HYD               ID=3   CODE=1
*
*
**********************************************************************
*
****************************************************************
*** Sub-BASIN 210 ****
*
COMPUTE LT TP           LCODE=1   UPLAND/LAG TIME METHOD
                        NK=2   ISLOPE=1
                        LENGTH=300 FT   SLOPE=0.005   K=0.7
*
COMPUTE NM HYD          ID=1   HYD NO=210   DA=0.00146 SQ MI
                        PER A=00 PER B=00 PER C=02 PER D=98
                        TP=-0.1 hr   MASSRAIN=-1
*
PRINT HYD               ID=1   CODE=1
*
* Total Flow from Basin (213 + 214 + 210)
ADD HYD                 ID=31  HYD NO=210SUM ID I=1   ID II=3
PRINT HYD               ID=31   CODE=1
*
*

* Total Flow from Basin (208 TO 216 TO 210, 213 + 214)
ADD HYD                 ID=18  HYD NO=210SUMA ID I=17   ID II=31
PRINT HYD               ID=18   CODE=1
*
************************************************************

*** Sub-BASIN 207 ****
*
COMPUTE LT TP           LCODE=1   UPLAND/LAG TIME METHOD
                        NK=2   ISLOPE=1
                        LENGTH=100 FT   SLOPE=0.025   K=0.7
                        LENGTH=545 FT   SLOPE=0.015   K=2.0
*
COMPUTE NM HYD          ID=1   HYD NO=207   DA=0.00083 SQ MI
                        PER A=00 PER B=00 PER C=05 PER D=95
                        TP=-0.1 hr   MASSRAIN=-1
*
PRINT HYD               ID=1   CODE=1
*
*
*** Sub-BASIN 211 ****
*
```

```
COMPUTE LT TP           LCODE=1   UPLAND/LAG TIME METHOD
                        NK=2   ISLOPE=1
                        LENGTH=100 FT   SLOPE=0.055   K=0.7
                        LENGTH=114 FT   SLOPE=0.037   K=2.0
*
COMPUTE NM HYD          ID=11   HYD NO=211   DA=0.00257 SQ MI
                        PER A=00 PER B=00 PER C=5 PER D=95
                        TP=-0.1 hr   MASSRAIN=-1
*
PRINT HYD               ID=11   CODE=1
*
*
* Total Flow from Basin (211 + 207)
ADD HYD                 ID=10  HYD NO=211SUM ID I=1   ID II=11
PRINT HYD               ID=10   CODE=1
*
*** Sub-BASIN 212 ****
*
COMPUTE LT TP           LCODE=1   UPLAND/LAG TIME METHOD
                        NK=2   ISLOPE=1
                        LENGTH=100 FT   SLOPE=0.005   K=0.7
                        LENGTH=50 FT   SLOPE=0.260   K=2.0
*
COMPUTE NM HYD          ID=3   HYD NO=212   DA=0.00204 SQ MI
                        PER A=00 PER B=00 PER C=5 PER D=95
                        TP=-0.1 hr   MASSRAIN=-1
*
PRINT HYD               ID=3   CODE=1
*
*
* Total Flow from Basin (207+211+212)
ADD HYD                 ID=11  HYD NO=212SUM ID I=10   ID II=3
PRINT HYD               ID=11   CODE=1
*

*** Sub-BASIN 218 ****
*
COMPUTE LT TP           LCODE=1   UPLAND/LAG TIME METHOD
                        NK=2   ISLOPE=1
                        LENGTH=100 FT   SLOPE=0.040   K=0.7
                        LENGTH=50 FT   SLOPE=0.040   K=2.0
*
COMPUTE NM HYD          ID=1   HYD NO=218   DA=0.00324 SQ MI
                        PER A=00 PER B=00 PER C=10 PER D=90
                        TP=-0.1 hr   MASSRAIN=-1
*
PRINT HYD               ID=1   CODE=1
*
*
* Total Flow from Basins
ADD HYD                 ID=10  HYD NO=218SUM ID I=18   ID II=1
PRINT HYD               ID=10   CODE=1
*

*** Sub-BASIN 219 ****
*
COMPUTE LT TP           LCODE=1   UPLAND/LAG TIME METHOD
                        NK=2   ISLOPE=1
                        LENGTH=100 FT   SLOPE=0.025   K=0.7
                        LENGTH=143 FT   SLOPE=0.019   K=2.0
*
COMPUTE NM HYD          ID=1   HYD NO=219   DA=0.00037 SQ MI
                        PER A=00 PER B=00 PER C=05 PER D=95
                        TP=-0.1 hr   MASSRAIN=-1
*
PRINT HYD               ID=1   CODE=1
*
*
* Total Flow from Basins
ADD HYD                 ID=19  HYD NO=219SUM ID I=10   ID II=1
PRINT HYD               ID=19   CODE=1
*
*
*
* Add Flows from West Basins
```

```
ADD HYD                 ID=18  HYD NO=219SUMA ID I=19   ID II=11
PRINT HYD               ID=18   CODE=1
*
*
*** Sub-BASIN 220 ****
*
COMPUTE LT TP           LCODE=1   UPLAND/LAG TIME METHOD
                        NK=2   ISLOPE=1
                        LENGTH=100 FT   SLOPE=0.016   K=0.7
                        LENGTH=127 FT   SLOPE=0.032   K=2.0
*
COMPUTE NM HYD          ID=20   HYD NO=220   DA=0.00139 SQ MI
                        PER A=00 PER B=00 PER C=15 PER D=85
                        TP=-0.1 hr   MASSRAIN=-1
*
PRINT HYD               ID=20   CODE=1
*
*
* Total Flows from All Basins
ADD HYD                 ID=21  HYD NO=220SUM ID I=18   ID II=20
PRINT HYD               ID=21   CODE=1
*
*

* Add Outflow From Pond B
ADD HYD                 ID=1  HYD NO=POND.IN ID I=21   ID II=30
PRINT HYD               ID=1   CODE=1
*

****Route Hyd  through POND A- 27 inch orifice
*
ROUTE RESERVOIR         ID=96  HYD NO=PONDA  INFLOW ID=1  CODE=1
                        OUTFLOW (CFS)     STORAGE (AC FT)       ELEV
                        0.0                     0.00            4989
                        3.7                     0.1097          4990
                        12.8                    0.2491          4991
                        24.2                    0.4241          4992
                        32.1                    0.6403          4993
                        37.8                    0.8999          4994
                        42.7                    1.0112          4995
                        47.1                    1.5550          4996
                        51.2                    1.9531          4997
*
*PRINT HYD              ID=96   CODE=1
*
*
*** Sub-BASIN 217, Sheet flow Out ****
*
COMPUTE LT TP           LCODE=1   UPLAND/LAG TIME METHOD
                        NK=2   ISLOPE=1
                        LENGTH=100 FT   SLOPE=0.005   K=0.7
                        LENGTH=230 FT   SLOPE=0.004   K=2.0
*
COMPUTE NM HYD          ID=6   HYD NO=217   DA=0.00046 SQ MI
                        PER A=00 PER B=00 PER C=20 PER D=80
                        TP=-0.1 hr   MASSRAIN=-1
*
PRINT HYD               ID=6   CODE=1
*
*
*
FINISH
```

HYDRAULIC CALCULATIONS

FLOWMASTER CALCULATIONS

Worksheet for Basin 201-Dbl D_Sag

Project Description

Solve For	Spread

Input Data

Discharge		10.12	ft³/s
Gutter Width		2.50	ft
Gutter Cross Slope		0.06	ft/ft
Road Cross Slope		0.03	ft/ft
Grate Width		2.08	ft
Grate Length		6.66	ft
Local Depression		1.00	in
Local Depression Width		2.37	ft
Grate Type	P-50 mm (P-1-7/8")		
Clogging		50.00	%

Results

Spread	18.18	ft
Depth	0.62	ft
Gutter Depression	0.08	ft
Total Depression	0.16	ft
Open Grate Area	6.23	ft²
Active Grate Weir Length	8.74	ft

Worksheet for Basin 202-Dbl D_Sag

Project Description

Solve For	Spread

Input Data

Discharge		14.20	ft³/s
Gutter Width		2.50	ft
Gutter Cross Slope		0.06	ft/ft
Road Cross Slope		0.03	ft/ft
Grate Width		2.08	ft
Grate Length		6.66	ft
Local Depression		1.00	in
Local Depression Width		2.37	ft
Grate Type	P-50 mm (P-1-7/8")		
Clogging		50.00	%

Results

Spread	22.66	ft
Depth	0.75	ft
Gutter Depression	0.08	ft
Total Depression	0.16	ft
Open Grate Area	6.23	ft²
Active Grate Weir Length	8.74	ft

Worksheet for Basin 203-Sgl C_Sag

Project Description

Solve For	Spread

Input Data

Discharge		5.20	ft³/s
Gutter Width		2.50	ft
Gutter Cross Slope		0.06	ft/ft
Road Cross Slope		0.04	ft/ft
Local Depression		2.25	in
Local Depression Width		3.95	ft
Grate Width		2.08	ft
Grate Length		3.33	ft
Grate Type	P-50 mm (P-1-7/8")		
Clogging		50.00	%
Curb Opening Length		3.95	ft
Opening Height		0.50	ft
Curb Throat Type	Horizontal		
Throat Incline Angle		90.00	degrees

Options

Calculation Option	Use Both

Results

Spread	7.08	ft
Depth	0.31	ft
Gutter Depression	0.06	ft
Total Depression	0.25	ft
Open Grate Area	3.12	ft²
Active Grate Weir Length	5.41	ft

Worksheet for Basin 204-1 Sgl C

Project Description

Solve For	Efficiency

Input Data

Discharge		16.50	ft³/s
Slope		0.04000	ft/ft
Gutter Width		2.50	ft
Gutter Cross Slope		0.06	ft/ft
Road Cross Slope		0.01	ft/ft
Roughness Coefficient		0.013	
Local Depression		2.25	in
Local Depression Width		3.95	ft
Grate Width		2.08	ft
Grate Length		3.33	ft
Grate Type	P-50 mm (P-1-7/8")		
Clogging		50.00	%
Curb Opening Length		3.95	ft

Options

Calculation Option	Use Both
Grate Flow Option	Exclude None

Results

Efficiency		34.55	%
Intercepted Flow		5.70	ft³/s
Bypass Flow		10.80	ft³/s
Spread		26.83	ft
Depth		0.32	ft
Flow Area		2.68	ft²
Gutter Depression		0.13	ft
Total Depression		0.32	ft
Velocity		6.15	ft/s
Splash Over Velocity		7.39	ft/s
Frontal Flow Factor		1.00	
Side Flow Factor		0.01	
Grate Flow Ratio		0.30	
Equivalent Cross Slope		0.03444	ft/ft
Active Grate Length		1.67	ft
Length Factor		0.03	
Total Interception Length		75.77	ft

Messages

Messages	Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).
Notes	
Each Side	

Worksheet for Basin 204.2-Dbl C_Sag

Project Description

Solve For	Spread

Input Data

Discharge		10.80	ft³/s
Gutter Width		2.50	ft
Gutter Cross Slope		0.06	ft/ft
Road Cross Slope		0.05	ft/ft
Local Depression		2.25	in
Local Depression Width		7.40	ft
Grate Width		2.08	ft
Grate Length		6.66	ft
Grate Type	P-50 mm (P-1-7/8")		
Clogging		50.00	%
Curb Opening Length		7.40	ft
Opening Height		0.50	ft
Curb Throat Type	Horizontal		
Throat Incline Angle		90.00	degrees

Options

Calculation Option	Use Both

Results

Spread	6.48	ft
Depth	0.37	ft
Gutter Depression	0.03	ft
Total Depression	0.21	ft
Open Grate Area	6.23	ft²
Active Grate Weir Length	8.74	ft

Worksheet for Basin 206-Sgl C_Sag

Project Description

Solve For	Spread

Input Data

Discharge		6.40	ft³/s
Gutter Width		2.50	ft
Gutter Cross Slope		0.06	ft/ft
Road Cross Slope		0.05	ft/ft
Local Depression		2.25	in
Local Depression Width		3.95	ft
Grate Width		2.08	ft
Grate Length		3.33	ft
Grate Type	P-50 mm (P-1-7/8")		
Clogging		50.00	%
Curb Opening Length		3.95	ft
Opening Height		0.50	ft
Curb Throat Type	Horizontal		
Throat Incline Angle		90.00	degrees

Options

Calculation Option	Use Both

Results

Spread	6.94	ft
Depth	0.36	ft
Gutter Depression	0.04	ft
Total Depression	0.23	ft
Open Grate Area	3.12	ft²
Active Grate Weir Length	5.41	ft

Worksheet for Basin 207-1-Dbl C

Project Description

Solve For	Efficiency

Input Data

Discharge	5.52	ft³/s
Slope	0.00300	ft/ft
Gutter Width	2.50	ft
Gutter Cross Slope	0.06	ft/ft
Road Cross Slope	0.01	ft/ft
Roughness Coefficient	0.013	
Local Depression	2.25	in
Local Depression Width	7.40	ft
Grate Width	2.08	ft
Grate Length	6.66	ft
Grate Type	P-50 mm (P-1-7/8")	
Clogging	50.00	%
Curb Opening Length	7.40	ft

Options

Calculation Option	Use Both
Grate Flow Option	Exclude None

Results

Efficiency	65.13	%
Intercepted Flow	3.60	ft³/s
Bypass Flow	1.92	ft³/s
Spread	23.26	ft
Depth	0.36	ft
Flow Area	2.87	ft²
Gutter Depression	0.13	ft
Total Depression	0.32	ft
Velocity	1.92	ft/s
Splash Over Velocity	10.50	ft/s
Frontal Flow Factor	1.00	
Side Flow Factor	0.25	
Grate Flow Ratio	0.31	
Equivalent Cross Slope	0.02536	ft/ft
Active Grate Length	3.33	ft
Length Factor	0.15	
Total Interception Length	26.43	ft

Messages

Messages	Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).

Worksheet for Basin 207-2-Sgl C

Project Description

Solve For	Efficiency

Input Data

Discharge		4.42	ft³/s
Slope		0.00300	ft/ft
Gutter Width		2.50	ft
Gutter Cross Slope		0.06	ft/ft
Road Cross Slope		0.01	ft/ft
Roughness Coefficient		0.013	
Local Depression		2.25	in
Local Depression Width		3.95	ft
Grate Width		2.08	ft
Grate Length		3.33	ft
Grate Type	P-50 mm (P-1-7/8")		
Clogging		50.00	%
Curb Opening Length		3.95	ft

Options

Calculation Option	Use Both
Grate Flow Option	Exclude None

Results

Efficiency	55.45	%
Intercepted Flow	2.45	ft³/s
Bypass Flow	1.97	ft³/s
Spread	21.19	ft
Depth	0.34	ft
Flow Area	2.41	ft²
Gutter Depression	0.13	ft
Total Depression	0.32	ft
Velocity	1.84	ft/s
Splash Over Velocity	7.39	ft/s
Frontal Flow Factor	1.00	
Side Flow Factor	0.07	
Grate Flow Ratio	0.34	
Equivalent Cross Slope	0.04176	ft/ft
Active Grate Length	1.67	ft
Length Factor	0.13	
Total Interception Length	17.85	ft

Messages

Notes

Bypass to Basin 2017

Worksheet for Basin 208-Sgl C

Project Description

Solve For	Efficiency

Input Data

Discharge		4.20	ft³/s
Slope		0.02800	ft/ft
Gutter Width		2.50	ft
Gutter Cross Slope		0.06	ft/ft
Road Cross Slope		0.01	ft/ft
Roughness Coefficient		0.013	
Local Depression		2.25	in
Local Depression Width		3.95	ft
Grate Width		2.08	ft
Grate Length		3.33	ft
Grate Type	P-50 mm (P-1-7/8")		
Clogging		50.00	%
Curb Opening Length		3.95	ft

Options

Calculation Option	Use Both
Grate Flow Option	Exclude None

Results

Efficiency	68.52	%
Intercepted Flow	2.88	ft³/s
Bypass Flow	1.32	ft³/s
Spread	12.29	ft
Depth	0.25	ft
Flow Area	0.92	ft²
Gutter Depression	0.13	ft
Total Depression	0.32	ft
Velocity	4.57	ft/s
Splash Over Velocity	7.39	ft/s
Frontal Flow Factor	1.00	
Side Flow Factor	0.01	
Grate Flow Ratio	0.58	
Equivalent Cross Slope	0.06264	ft/ft
Active Grate Length	1.67	ft
Length Factor	0.09	
Total Interception Length	26.77	ft

Messages

Notes

Each Side

Worksheet for Basin 209-Sgl C_Sag

Project Description

Solve For	Spread

Input Data

Discharge		5.77	ft³/s
Gutter Width		2.50	ft
Gutter Cross Slope		0.06	ft/ft
Road Cross Slope		0.05	ft/ft
Local Depression		2.25	in
Local Depression Width		3.95	ft
Grate Width		2.08	ft
Grate Length		3.33	ft
Grate Type	P-50 mm (P-1-7/8")		
Clogging		50.00	%
Curb Opening Length		3.95	ft
Opening Height		0.50	ft
Curb Throat Type	Horizontal		
Throat Incline Angle		90.00	degrees

Options

Calculation Option	Use Both

Results

Spread	6.43	ft
Depth	0.33	ft
Gutter Depression	0.04	ft
Total Depression	0.23	ft
Open Grate Area	3.12	ft²
Active Grate Weir Length	5.41	ft

Worksheet for Basin 210-Sgl C

Project Description

Solve For	Efficiency

Input Data

Discharge		1.48	ft³/s
Slope		0.02100	ft/ft
Gutter Width		2.50	ft
Gutter Cross Slope		0.06	ft/ft
Road Cross Slope		0.01	ft/ft
Roughness Coefficient		0.013	
Local Depression		2.25	in
Local Depression Width		3.95	ft
Grate Width		2.08	ft
Grate Length		3.33	ft
Grate Type	P-50 mm (P-1-7/8")		
Clogging		50.00	%
Curb Opening Length		3.95	ft

Options

Calculation Option	Use Both
Grate Flow Option	Exclude None

Results

Efficiency	93.83	%
Intercepted Flow	1.39	ft³/s
Bypass Flow	0.09	ft³/s
Spread	6.87	ft
Depth	0.20	ft
Flow Area	0.40	ft²
Gutter Depression	0.13	ft
Total Depression	0.32	ft
Velocity	3.70	ft/s
Splash Over Velocity	7.39	ft/s
Frontal Flow Factor	1.00	
Side Flow Factor	0.02	
Grate Flow Ratio	0.83	
Equivalent Cross Slope	0.08270	ft/ft
Active Grate Length	1.67	ft
Length Factor	0.17	
Total Interception Length	13.41	ft

Messages

Notes

Each Side

Worksheet for Basin 211-Dbl C_Sag

Project Description

Solve For	Spread

Input Data

Discharge		7.70	ft³/s
Gutter Width		2.50	ft
Gutter Cross Slope		0.06	ft/ft
Road Cross Slope		0.02	ft/ft
Local Depression		2.25	in
Local Depression Width		7.40	ft
Grate Width		2.08	ft
Grate Length		6.66	ft
Grate Type	P-50 mm (P-1-7/8")		
Clogging		50.00	%
Curb Opening Length		7.40	ft
Opening Height		0.50	ft
Curb Throat Type	Horizontal		
Throat Incline Angle		90.00	degrees

Options

Calculation Option	Use Both

Results

Spread	5.65	ft
Depth	0.29	ft
Gutter Depression	0.10	ft
Total Depression	0.29	ft
Open Grate Area	6.23	ft²
Active Grate Weir Length	8.74	ft

Worksheet for Basin 212-Dbl C_Sag

Project Description

Solve For	Spread

Input Data

Discharge		6.10	ft³/s
Gutter Width		2.50	ft
Gutter Cross Slope		0.06	ft/ft
Road Cross Slope		0.02	ft/ft
Local Depression		2.25	in
Local Depression Width		7.40	ft
Grate Width		2.08	ft
Grate Length		6.66	ft
Grate Type	P-50 mm (P-1-7/8")		
Clogging		50.00	%
Curb Opening Length		7.40	ft
Opening Height		0.50	ft
Curb Throat Type	Horizontal		
Throat Incline Angle		90.00	degrees

Options

Calculation Option	Use Both

Results

Spread	5.12	ft
Depth	0.25	ft
Gutter Depression	0.10	ft
Total Depression	0.29	ft
Open Grate Area	6.23	ft²
Active Grate Weir Length	8.74	ft

Worksheet for Basin 214-Sgl D_Sag

Project Description

Solve For	Spread

Input Data

Discharge		4.54	ft³/s
Gutter Width		2.50	ft
Gutter Cross Slope		0.06	ft/ft
Road Cross Slope		0.04	ft/ft
Grate Width		2.08	ft
Grate Length		3.33	ft
Local Depression		1.00	in
Local Depression Width		2.37	ft
Grate Type	P-50 mm (P-1-7/8")		
Clogging		50.00	%

Results

Spread	11.32	ft
Depth	0.50	ft
Gutter Depression	0.05	ft
Total Depression	0.13	ft
Open Grate Area	3.12	ft²
Active Grate Weir Length	5.41	ft

Worksheet for Basins 215-Sgl C

Project Description

Solve For	Efficiency

Input Data

Discharge		1.24	ft³/s
Slope		0.01500	ft/ft
Gutter Width		2.50	ft
Gutter Cross Slope		0.06	ft/ft
Road Cross Slope		0.01	ft/ft
Roughness Coefficient		0.013	
Local Depression		2.25	in
Local Depression Width		3.95	ft
Grate Width		2.08	ft
Grate Length		3.33	ft
Grate Type	P-50 mm (P-1-7/8")		
Clogging		50.00	%
Curb Opening Length		3.95	ft

Options

Calculation Option	Use Both
Grate Flow Option	Exclude None

Results

Efficiency		95.33	%
Intercepted Flow		1.18	ft³/s
Bypass Flow		0.06	ft³/s
Spread		6.82	ft
Depth		0.20	ft
Flow Area		0.40	ft²
Gutter Depression		0.13	ft
Total Depression		0.32	ft
Velocity		3.13	ft/s
Splash Over Velocity		7.39	ft/s
Frontal Flow Factor		1.00	
Side Flow Factor		0.03	
Grate Flow Ratio		0.83	
Equivalent Cross Slope		0.08287	ft/ft
Active Grate Length		1.67	ft
Length Factor		0.20	
Total Interception Length		11.24	ft

Messages

Messages	Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).

Worksheet for Basin 218-Dbl C

Project Description

Solve For	Efficiency

Input Data

Discharge		14.05	ft³/s
Slope		0.03000	ft/ft
Gutter Width		2.50	ft
Gutter Cross Slope		0.06	ft/ft
Road Cross Slope		0.01	ft/ft
Roughness Coefficient		0.013	
Local Depression		2.25	in
Local Depression Width		7.40	ft
Grate Width		2.08	ft
Grate Length		6.66	ft
Grate Type	P-50 mm (P-1-7/8")		
Clogging		50.00	%
Curb Opening Length		7.40	ft

Options

Calculation Option	Use Both
Grate Flow Option	Exclude None

Results

Efficiency		44.56	%
Intercepted Flow		6.26	ft³/s
Bypass Flow		7.79	ft³/s
Spread		21.23	ft
Depth		0.34	ft
Flow Area		2.42	ft²
Gutter Depression		0.13	ft
Total Depression		0.32	ft
Velocity		5.81	ft/s
Splash Over Velocity		10.50	ft/s
Frontal Flow Factor		1.00	
Side Flow Factor		0.04	
Grate Flow Ratio		0.34	
Equivalent Cross Slope		0.02691	ft/ft
Active Grate Length		3.33	ft
Length Factor		0.05	
Total Interception Length		75.33	ft

Messages

Messages	Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).
Notes	
Each Side	

Worksheet for Basins 219-1-Dbl C

Project Description

Solve For	Efficiency

Input Data

Discharge	8.91	ft³/s
Slope	0.01500	ft/ft
Gutter Width	2.50	ft
Gutter Cross Slope	0.06	ft/ft
Road Cross Slope	0.01	ft/ft
Roughness Coefficient	0.013	
Local Depression	2.25	in
Local Depression Width	7.40	ft
Grate Width	2.08	ft
Grate Length	6.66	ft
Grate Type	P-50 mm (P-1-7/8")	
Clogging	50.00	%
Curb Opening Length	7.40	ft

Options

Calculation Option	Use Both
Grate Flow Option	Exclude None

Results

Efficiency	51.85	%
Intercepted Flow	4.62	ft³/s
Bypass Flow	4.29	ft³/s
Spread	20.27	ft
Depth	0.33	ft
Flow Area	2.22	ft²
Gutter Depression	0.13	ft
Total Depression	0.32	ft
Velocity	4.02	ft/s
Splash Over Velocity	10.50	ft/s
Frontal Flow Factor	1.00	
Side Flow Factor	0.08	
Grate Flow Ratio	0.36	
Equivalent Cross Slope	0.02775	ft/ft
Active Grate Length	3.33	ft
Length Factor	0.08	
Total Interception Length	49.62	ft

Messages

Messages	Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).

Worksheet for Basin 219-2-Sgl C

Project Description

Solve For	Efficiency

Input Data

Discharge		4.29	ft³/s
Slope		0.01500	ft/ft
Gutter Width		2.50	ft
Gutter Cross Slope		0.06	ft/ft
Road Cross Slope		0.01	ft/ft
Roughness Coefficient		0.013	
Local Depression		2.25	in
Local Depression Width		3.95	ft
Grate Width		2.08	ft
Grate Length		3.33	ft
Grate Type	P-50 mm (P-1-7/8")		
Clogging		50.00	%
Curb Opening Length		3.95	ft

Options

Calculation Option	Use Both
Grate Flow Option	Exclude None

Results

Efficiency	62.88	%
Intercepted Flow	2.70	ft³/s
Bypass Flow	1.59	ft³/s
Spread	14.55	ft
Depth	0.28	ft
Flow Area	1.22	ft²
Gutter Depression	0.13	ft
Total Depression	0.32	ft
Velocity	3.51	ft/s
Splash Over Velocity	7.39	ft/s
Frontal Flow Factor	1.00	
Side Flow Factor	0.02	
Grate Flow Ratio	0.50	
Equivalent Cross Slope	0.05576	ft/ft
Active Grate Length	1.67	ft
Length Factor	0.10	
Total Interception Length	24.01	ft

Messages

Notes

Each Side

Inlet Calculations

Basin ID	Flows (cfs)			Inlet Type	Notes
	Total	Intercepted	Bypass		
Offsite 1	4.94	0	4.94	-	Sheet flow to basin 201
Offsite 2	5.9	0	5.90	-	Sheet flow to basin 202
201	10.12	10.12	0.00	Double D	Sump inlet
202	14.20	14.20	0.00	Double D	Sump inlet
203	5.20	5.20	0.00	Single C	Sump inlet
204-1	16.50	5.70	10.80	Single C	Inlet at grade
204-2	10.80	10.80	0.00	Double C	Sump inlet
205	9.02	6.00	3.02	Single C	Inlets at grade, each side, 205 and 221
206	6.40	6.40	0.00	Single C	Sump inlet
207-1	5.52	3.60	1.92	Double C	bypass to second inlet
207-2	4.42	2.45	1.97	Single C	to Edith
208	4.20	2.88	1.32	Single C	bypass to basin 205
209	5.77	5.77	0.00	Single C	Sump inlet, 209 and third of 210 runoff
210	1.47	1.39	0.08	Single C	third of runoff , rest to basin 215
211	7.70	7.70	0.00	Double C	Sump inlet
212	6.10	6.10	0.00	Double C	Sump inlet
213	0.66	0.00	0.66	-	to Basin 214
214	4.54	4.54	0.00	Single C	Sump inlet
215	1.24	1.18	0.06	Single C	bypass of 210 and Basins 215, 216
216	0.60	0.00	0.60	-	to Basin 215 and Edith
217	1.33	0.00	1.33		to Edith
218	14.05	6.26	7.79	-	Basins 222 and218
219-1	8.91	4.62	4.29	Double C	bypass of 218 and Basin 219
219-2	4.29	2.70	1.59	Single C	bypass to Edith
220	4.10	4.10	0.00	-	Pond
221	1.78	0.00	1.78	-	to Basin 205
222	4.45	0.00	4.45	-	sheet flow to Basin 218

CULVERTMASTER CALCULATIONS

Culvert Calculator Report
Pond A Orifice

Comments: Maximum Allowable Discharge = 47.6 cfs

Solve For: Discharge

Culvert Summary					
Allowable HW Elevation	4,997.00	ft	Headwater Depth/Height	3.56	
Computed Headwater Elevation	4,997.00	ft	Discharge	51.18	cfs
Inlet Control HW Elev.	4,997.00	ft	Tailwater Elevation	4,986.92	ft
Outlet Control HW Elev.	4,995.11	ft	Control Type	Inlet Control	

Grades					
Upstream Invert	4,989.00	ft	Downstream Invert	4,984.42	ft
Length	50.00	ft	Constructed Slope	0.091600	ft/ft

Hydraulic Profile					
Profile	CompositePressureProfileS1S2		Depth, Downstream	1.40	ft
Slope Type	N/A		Normal Depth	1.19	ft
Flow Regime	N/A		Critical Depth	2.18	ft
Velocity Downstream	19.66	ft/s	Critical Slope	0.024086	ft/ft

Section					
Section Shape	Circular		Mannings Coefficient	0.013	
Section Material	Concrete		Span	2.25	ft
Section Size	27 inch		Rise	2.25	ft
Number Sections	1				

Outlet Control Properties					
Outlet Control HW Elev.	4,995.11	ft	Upstream Velocity Head	2.62	ft
Ke	0.50		Entrance Loss	1.31	ft

Inlet Control Properties					
Inlet Control HW Elev.	4,997.00	ft	Flow Control	N/A	
Inlet Type	Square edge w/headwall		Area Full	4.0	ft²
K	0.00980		HDS 5 Chart	1	
M	2.00000		HDS 5 Scale	1	
C	0.03980		Equation Form	1	
Y	0.67000				

Culvert Calculator Report
Pond A Outlet

Comments: Maximum Allowable Discharge = 47.6 cfs

Solve For: Discharge

Culvert Summary					
Allowable HW Elevation	4,997.00	ft	Headwater Depth/Height	3.20	
Computed Headwater Elevation	4,997.00	ft	Discharge	62.44	cfs
Inlet Control HW Elev.	4,997.00	ft	Tailwater Elevation	4,986.92	ft
Outlet Control HW Elev.	4,995.27	ft	Control Type	Inlet Control	

Grades					
Upstream Invert	4,989.00	ft	Downstream Invert	4,984.42	ft
Length	50.00	ft	Constructed Slope	0.091600	ft/ft

Hydraulic Profile					
Profile	CompositeS1S2		Depth, Downstream	1.51	ft
Slope Type	Steep		Normal Depth	1.25	ft
Flow Regime	N/A		Critical Depth	2.41	ft
Velocity Downstream	20.08	ft/s	Critical Slope	0.020246	ft/ft

Section					
Section Shape	Circular		Mannings Coefficient	0.013	
Section Material	Concrete		Span	2.50	ft
Section Size	30 inch		Rise	2.50	ft
Number Sections	1				

Outlet Control Properties					
Outlet Control HW Elev.	4,995.27	ft	Upstream Velocity Head	2.58	ft
Ke	0.50		Entrance Loss	1.29	ft

Inlet Control Properties					
Inlet Control HW Elev.	4,997.00	ft	Flow Control	N/A	
Inlet Type	Square edge w/headwall		Area Full	4.9	ft²
K	0.00980		HDS 5 Chart	1	
M	2.00000		HDS 5 Scale	1	
C	0.03980		Equation Form	1	
Y	0.67000				

Culvert Calculator Report
POND B Outlet

Solve For: Discharge

Culvert Summary					
Allowable HW Elevation	4,999.00	ft	Headwater Depth/Height	1.57	
Computed Headwater Elevation	4,999.00	ft	Discharge	76.51	cfs
Inlet Control HW Elev.	4,997.93	ft	Tailwater Elevation	4,997.51	ft
Outlet Control HW Elev.	4,999.00	ft	Control Type	Outlet Control	

Grades					
Upstream Invert	4,993.50	ft	Downstream Invert	4,993.29	ft
Length	53.70	ft	Constructed Slope	0.003911	ft/ft

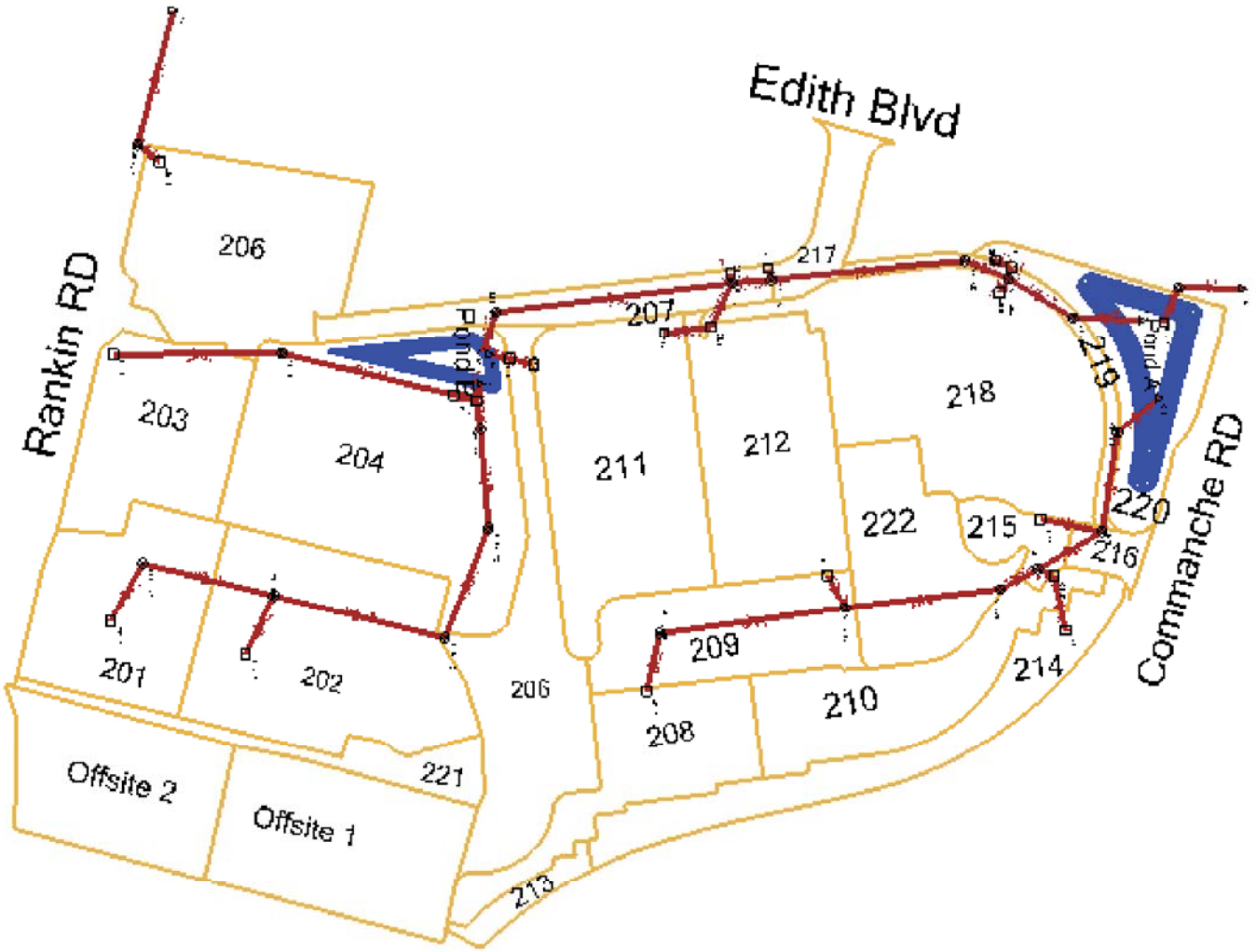
Hydraulic Profile					
Profile	PressureProfile		Depth, Downstream	4.22	ft
Slope Type	N/A		Normal Depth	N/A	ft
Flow Regime	N/A		Critical Depth	2.74	ft
Velocity Downstream	7.95	ft/s	Critical Slope	0.006341	ft/ft

Section					
Section Shape	Circular		Mannings Coefficient	0.013	
Section Material	Concrete		Span	3.50	ft
Section Size	42 inch		Rise	3.50	ft
Number Sections	1				

Outlet Control Properties					
Outlet Control HW Elev.	4,999.00	ft	Upstream Velocity Head	0.98	ft
Ke	0.20		Entrance Loss	0.20	ft

Inlet Control Properties					
Inlet Control HW Elev.	4,997.93	ft	Flow Control	Submerged	
Inlet Type	Beveled ring, 33.7° bevels		Area Full	9.6	ft²
K	0.00180		HDS 5 Chart	3	
M	2.50000		HDS 5 Scale	B	
C	0.02430		Equation Form	1	
Y	0.83000				

STORMCAD CALCULATIONS



StormCAD Plan View

StormCAD Results
Conduit Table

Label	Start Node	Stop Node	Diameter (in)	Length (Unified) (ft)	Slope (Calculated) (ft/ft)	Flow (cfs)	Capacity (Full Flow) (cfs)	Invert (Start) (ft)	Invert (Stop) (ft)	Elevation Ground (Start) (ft)	Elevation Ground (Stop) (ft)	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)	Velocity (ft/s)	Headloss (ft)	Cover (Start) (ft)	Cover (Stop) (ft)
CO-2	CB-20	CB-10	12	21.7	0.018	2.7	4.84	4996.96	4996.56	4999.93	5000.56	4998.60	4998.48	3.44	0.12	1.97	3.00
CO-4	CB-21	MH-2	30	48.6	0.094	44.3	125.91	4989.00	4984.42	4997.00	4998.85	4991.21	4989.24	23.41	2.15	5.50	11.93
CO-6	MH-2	O-6	30	80.9	0.05	44.3	91.88	4984.42	4980.36	4998.85	4998.90	4987.86	4986.92	9.02	0.94	11.93	16.04
Pipe - (01)	CB-18	MH - (02)	24	35.4	0.141	6.4	85.05	4985.00	4980.00	4992.21	4984.72	4985.90	4981.41	15.93	4.72	5.21	2.72
Pipe - (02)	MH - (02)	O-5	24	175.8	0.04	6.4	45.13	4980.00	4973.00	4984.72	4977.69	4980.90	4975.00	10.17	6.17	2.72	2.69
Pipe - (03)	CB-16	MH - (05)	24	83.3	0.005	10.1	16.07	5004.50	5004.08	5007.78	5008.78	5006.96	5006.79	3.22	0.17	1.28	2.70
Pipe - (04)	MH - (05)	MH - (65)	24	170.3	0.007	10.1	18.91	5004.08	5002.89	5008.78	5008.77	5006.61	5006.27	3.22	0.34	2.70	3.88
Pipe - (05)	MH - (65)	MH- (06)	30	222.8	0.005	24.3	28.95	5002.89	5001.78	5008.77	5008.77	5005.78	5005.00	4.95	0.78	3.38	4.49
Pipe - (06)	MH- (06)	MH - (63)	30	149.4	0.01	24.3	40.96	5001.78	5000.29	5008.77	5007.39	5003.46	5003.00	8.70	0.82	4.49	4.60
Pipe - (07)	CB-1	MH - (11)	24	212.9	0.006	5.2	17.47	4997.02	4995.75	5002.10	5001.89	4999.38	4999.27	1.66	0.11	3.08	4.14
Pipe - (08)(1)	MH - (11)	CB-19	24	233.1	0.006	5.2	17.53	4995.75	4994.35	5001.89	5001.49	4999.23	4999.11	1.66	0.12	4.14	5.14
Pipe - (08)(2)	CB-19	CB-2	24	20	0.006	10.9	17.52	4994.35	4994.23	5001.49	5001.42	4998.89	4998.84	3.47	0.05	5.14	5.19
Pipe - (15)	MH - (30)	MH - (20)	42	300.7	0.004	44.3	63.81	4993.29	4992.08	4999.92	4999.15	4997.32	4996.74	4.60	0.58	3.13	3.57
Pipe - (17)	MH - (20)	MH - (91)	42	49.7	0.004	61.7	63.82	4992.08	4991.88	4999.15	4999.04	4996.08	4995.89	6.41	0.19	3.57	3.66
Pipe - (18)	MH - (91)	MH - (22)	48	245.4	0.004	64.2	90.77	4991.88	4990.90	4999.04	5000.25	4995.77	4995.29	7.83	0.48	3.16	5.35
Pipe - (19)	MH - (22)	MH - (49)	48	59.8	0.004	64.2	91.00	4990.90	4990.66	5000.25	5000.71	4994.97	4994.85	5.10	0.12	5.35	6.05
Pipe - (20)	CB-4	O-2	24	24.8	0.02	6.0	32.13	4995.50	4995.00	5000.77	4999.00	4997.89	4997.87	1.91	0.02	3.27	2.00
Pipe - (21)	CB-3	CB-4	24	30.6	0.02	3.0	31.67	4996.10	4995.50	5000.93	5000.77	4997.96	4997.96	6.34	0.00	2.83	3.27
Pipe - (23)	H-1	MH - (30)	42	53.7	0.004	44.3	62.89	4993.50	4993.29	4999.00	4999.92	4997.78	4997.67	4.60	0.10	2.00	3.13
Pipe - (26)	MH - (58)	MH - (33)	18	197.4	0.01	8.7	10.49	5002.01	5000.04	5007.81	5006.88	5003.38	5002.09	6.63	1.32	4.30	5.34
Pipe - (27)	CB-6	MH - (20)	24	61.4	0.02	13.8	32.03	4994.03	4992.80	4999.24	4999.15	4996.99	4996.76	4.39	0.23	3.21	4.35
Pipe - (28)	CB-7	MH - (20)	18	12.1	0.05	3.6	23.48	4993.33	4992.73	4999.03	4999.15	4996.91	4996.90	2.04	0.01	4.20	4.93
Pipe - (29)	MH - (33)	MH - (36)	24	54.1	0.01	8.7	22.61	5000.04	4999.50	5006.88	5006.34	5002.15	5002.07	2.75	0.08	4.84	4.84
Pipe - (30)	MH - (36)	MH- (42)	24	93.7	0.02	14.6	31.96	4999.50	4997.63	5006.34	5005.23	5000.88	5000.24	9.94	0.92	4.84	5.60
Pipe - (31)	MH- (42)	MH - (38)	24	128	0.02	15.8	31.74	4997.63	4995.11	5005.23	5003.28	4999.06	4997.59	10.08	1.75	5.60	6.17
Pipe - (32)	MH - (38)	O-4	24	68.4	0.02	15.8	32.03	4995.11	4993.74	5003.28	4997.00	4996.54	4994.77	10.15	0.97	6.17	1.26
Pipe - (33)	CB-12	CB-13	18	70.9	0.02	4.5	14.82	5001.35	4999.94	5006.67	5005.43	5002.58	5002.48	7.37	0.13	3.82	3.99
Pipe - (34)	CB-13	MH - (36)	18	21.8	0.02	5.9	14.92	4999.94	4999.50	5005.43	5006.34	5002.11	5002.04	3.36	0.07	3.99	5.34
Pipe - (36)	CB-11	MH- (42)	18	60.7	0.03	1.2	18.19	5001.19	4999.37	5005.46	5005.23	5001.60	5000.44	5.80	1.29	2.77	4.36
Pipe - (38)	MH - (44)	O-3	54	87.7	0.009	77.7	185.49	4990.28	4989.50	5001.25	4999.00	4993.33	4993.46	11.15	0.16	6.47	5.00
Pipe - (42)	MH - (49)	MH - (44)	48	95.9	0.004	77.7	90.43	4990.66	4990.28	5000.71	5001.25	4994.26	4994.05	8.09	0.27	6.05	6.97
Pipe - (43)	CB-9	MH - (49)	18	20.8	0.02	6.3	14.94	4996.55	4996.13	5000.55	5000.71	4997.52	4996.87	8.08	0.25	2.50	3.08
Pipe - (44)	CB-10	MH - (49)	18	14.1	0.02	7.3	14.82	4996.56	4996.28	5000.56	5000.71	4997.61	4997.12	8.37	0.16	2.50	2.93
Pipe - (47)	MH - (86)	CB-2	30	35.1	0.02	24.3	57.91	4994.93	4994.23	5002.14	5001.42	4998.85	4998.73	4.95	0.12	4.71	4.69
Pipe - (48)	MH - (63)	MH - (86)	30	126.8	0.042	24.3	84.31	5000.29	4994.93	5007.39	5002.14	5001.97	4999.09	14.85	3.25	4.60	4.71
Pipe - (49)	CB-2	O-1	36	22.6	0.01	46.0	67.21	4994.23	4994.00	5001.42	4999.00	4997.98	4997.87	6.51	0.11	4.19	2.00
Pipe - (55)	CB-17	MH - (65)	24	82.1	0.005	14.2	15.98	5004.00	5003.59	5007.51	5008.77	5006.50	5006.18	4.52	0.32	1.51	3.18
Pipe - (75)	CB-8	MH - (91)	18	14.4	0.02	2.5	14.92	4992.17	4991.88	4998.91	4999.04	4996.26	4996.25	1.39	0.01	5.24	5.66
Pipe - (78)	CB-14	MH - (58)	18	46.9	0.01	5.8	10.52	5002.48	5002.01	5006.00	5007.81	5004.16	5004.02	3.27	0.14	2.02	4.30
Pipe - (80)	MH - (100)	MH - (58)	18	236.7	0.01	2.9	10.51	5004.38	5002.01	5007.72	5007.81	5005.02	5004.09	5.07	1.13	1.84	4.30
Pipe - (81)	CB-15	MH - (100)	18	74.5	0.03	2.9	18.19	5006.62	5004.38	5010.18	5007.72	5007.26	5005.40	7.52	2.03	2.07	1.84
Pipe - (82)	CB-5	CB-6	24	60.4	0.02	7.7	32.01	4995.24	4994.03	4999.24	4999.24	4997.45	4997.38	2.45	0.07	2.00	3.21

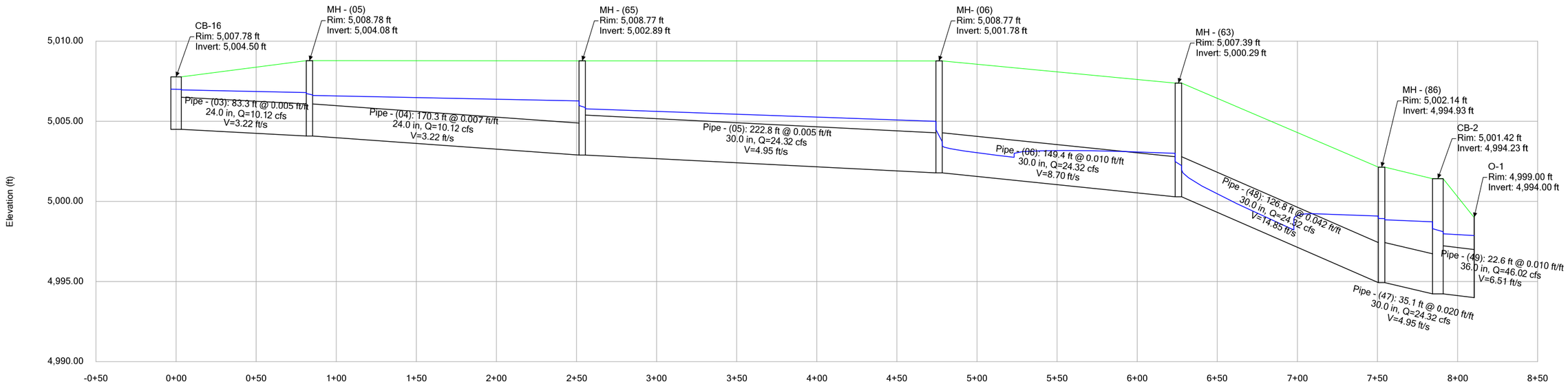
StormCAD Results
Manhole Table

Label	Diameter (in)	Elevation (Rim) (ft)	Elevation (Invert in 1) (ft)	Elevation (Invert in 2) (ft)	Elevation (Invert Out) (ft)	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)	Headloss (ft)
MH - (02)	48	4,984.72	4,980.00	(N/A)	4,980.00	4,981.13	4,980.96	0.24
MH - (05)	48	5,008.78	5,004.08	(N/A)	5,004.08	5,006.73	5,006.64	0.12
MH - (11)	48	5,001.89	4,995.75	(N/A)	4,995.75	4,999.25	4,999.24	0.01
MH - (20)	60	4,999.15	4,992.08	4,992.80	4,992.08	4,996.30	4,996.20	0.22
MH - (22)	72	5,000.25	4,990.90	(N/A)	4,990.90	4,995.13	4,995.05	0.16
MH - (30)	72	4,999.92	4,993.29	(N/A)	4,993.29	4,997.54	4,997.39	0.22
MH - (33)	48	5,006.88	5,000.04	(N/A)	5,000.04	5,002.19	5,002.18	0.04
MH - (36)	96	5,006.34	4,999.50	4,999.50	4,999.50	5,001.52	5,001.10	0.65
MH - (38)	48	5,003.28	4,995.11	(N/A)	4,995.11	4,997.16	4,996.78	0.61
MH - (44)	72	5,001.25	4,990.28	(N/A)	4,990.28	4,993.70	4,993.50	0.37
MH - (49)	72	5,000.71	4,990.66	4,996.13	4,990.66	4,994.43	4,994.39	0.17
MH - (58)	72	5,007.81	5,002.01	5,002.01	5,002.01	5,003.71	5,003.50	0.33
MH - (63)	48	5,007.39	5,000.29	(N/A)	5,000.29	5,002.48	5,002.23	0.51
MH - (65)	48	5,008.77	5,002.89	5,003.59	5,002.89	5,005.99	5,005.86	0.21
MH - (86)	48	5,002.14	4,994.93	(N/A)	4,994.93	4,998.93	4,998.93	0.08
MH - (91)	60	4,999.04	4,991.88	4,991.88	4,991.88	4,995.86	4,995.85	0.09
MH - (100)	48	5,007.72	5,004.38	(N/A)	5,004.38	5,005.20	5,005.07	0.17
MH- (06)	48	5,008.77	5,001.78	(N/A)	5,001.78	5,004.48	5,003.72	1.02
MH- (42)	72	5,005.23	4,997.63	4,999.37	4,997.63	4,999.78	4,999.30	0.72
MH-2	48	4,998.85	4,984.42	(N/A)	4,984.42	4,988.74	4,988.12	0.87

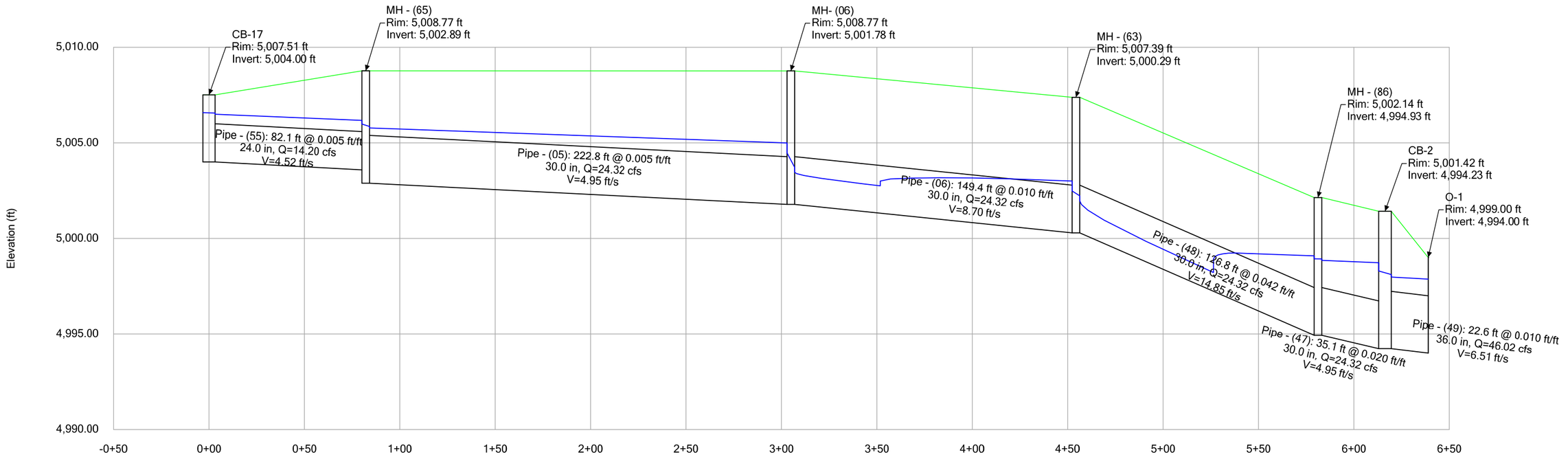
StormCAD Results
Inlet Table

ID	Label	Length (ft)	Flow (Total Out) (cfs)	Elevation (Rim) (ft)	Elevation (Invert Out) (ft)	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)
143	CB-1	6.5	5.2	5,002.10	4,997.02	4,999.40	4,999.39
144	CB-2	6.6	46.02	5,001.42	4,994.23	4,998.30	4,998.11
145	CB-3	3.25	3	5,000.93	4,996.10	4,997.97	4,997.96
146	CB-4	3.25	6	5,000.77	4,995.50	4,997.91	4,997.90
147	CB-5	6.5	7.7	4,999.24	4,995.24	4,997.49	4,997.47
148	CB-6	6.5	13.8	4,999.24	4,994.03	4,997.14	4,997.05
149	CB-7	3.25	3.6	4,999.03	4,993.33	4,996.94	4,996.93
150	CB-8	3.25	2.45	4,998.91	4,992.17	4,996.28	4,996.27
151	CB-9	3.25	6.26	5,000.55	4,996.55	4,997.89	4,997.66
152	CB-10	6.5	7.32	5,000.56	4,996.56	4,998.11	4,997.78
153	CB-11	6.5	1.18	5,005.46	5,001.19	5,001.69	5,001.63
154	CB-12	2.37	4.54	5,006.67	5,001.35	5,002.68	5,002.61
155	CB-13	3.25	5.93	5,005.43	4,999.94	5,002.41	5,002.11
156	CB-14	3.25	5.77	5,006.00	5,002.48	5,004.23	5,004.19
157	CB-15	3.25	2.88	5,010.18	5,006.62	5,007.39	5,007.31
158	CB-16	6.5	10.12	5,007.78	5,004.50	5,007.00	5,006.99
159	CB-17	6.4	14.2	5,007.51	5,004.00	5,006.58	5,006.56
160	CB-18	6.5	6.4	4,992.21	4,985.00	4,985.90	4,985.90
181	CB-19	3.25	10.9	5,001.49	4,994.35	4,998.95	4,998.93
184	CB-20	3.25	2.7	4,999.93	4,996.96	4,998.68	4,998.64
186	CB-21	3	44.3	4,997.00	4,989.00	4,992.13	4,991.57

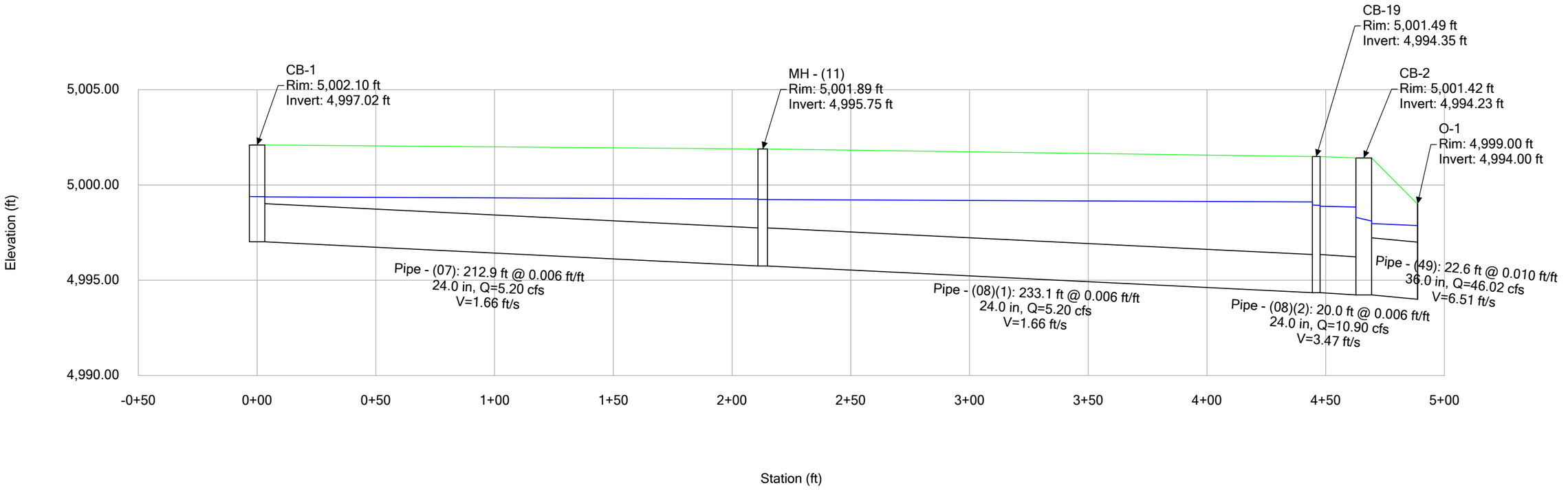
Profile Report
Engineering Profile - Profile - Basin 201 to Pond B (SWMD SD.stsw)



Profile Report
Engineering Profile - Profile - Basin 202 to Pond B (SWMD SD.stsw)

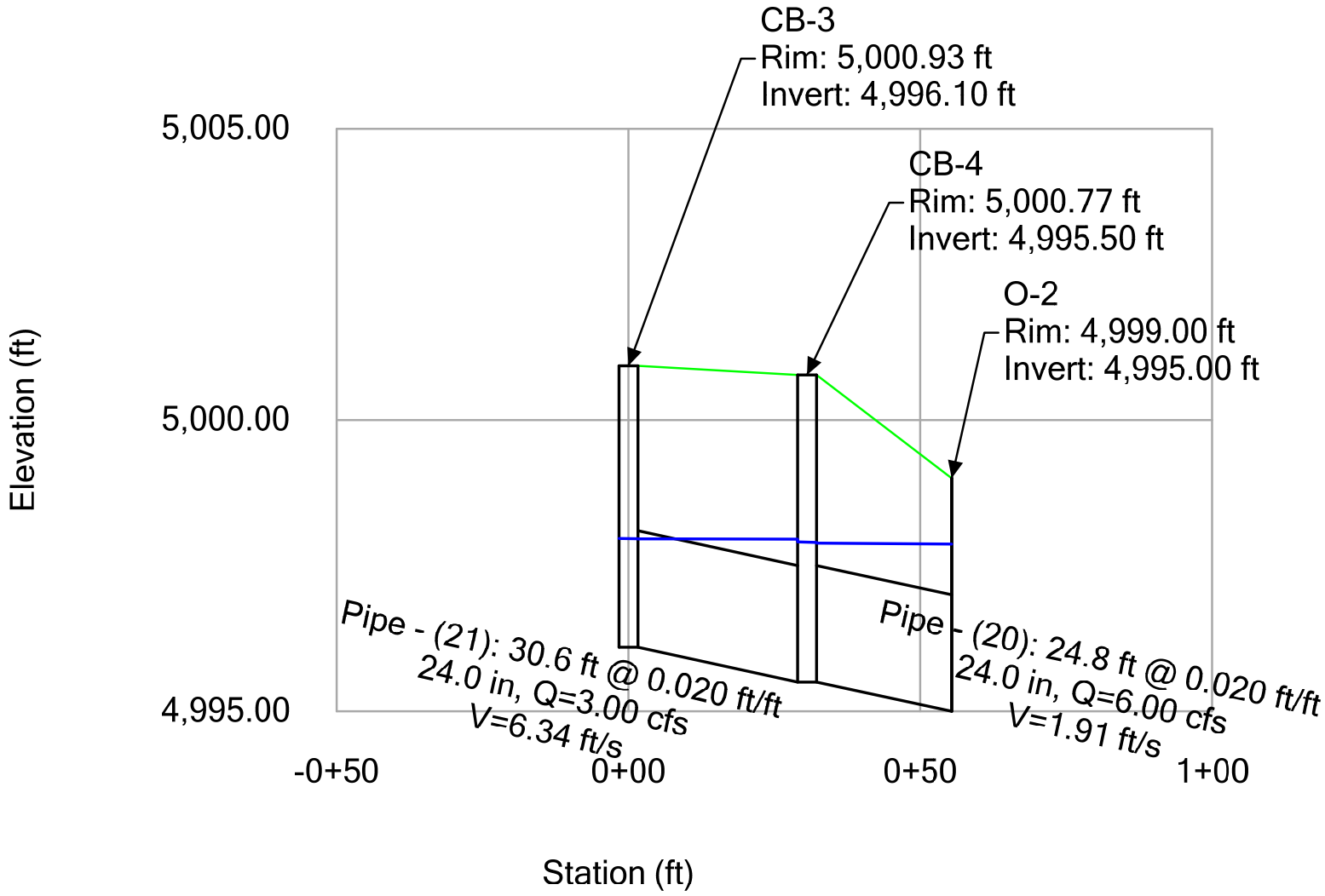


Profile Report
Engineering Profile - Profile - Basin 203 to Pond B (SWMD SD.stsw)

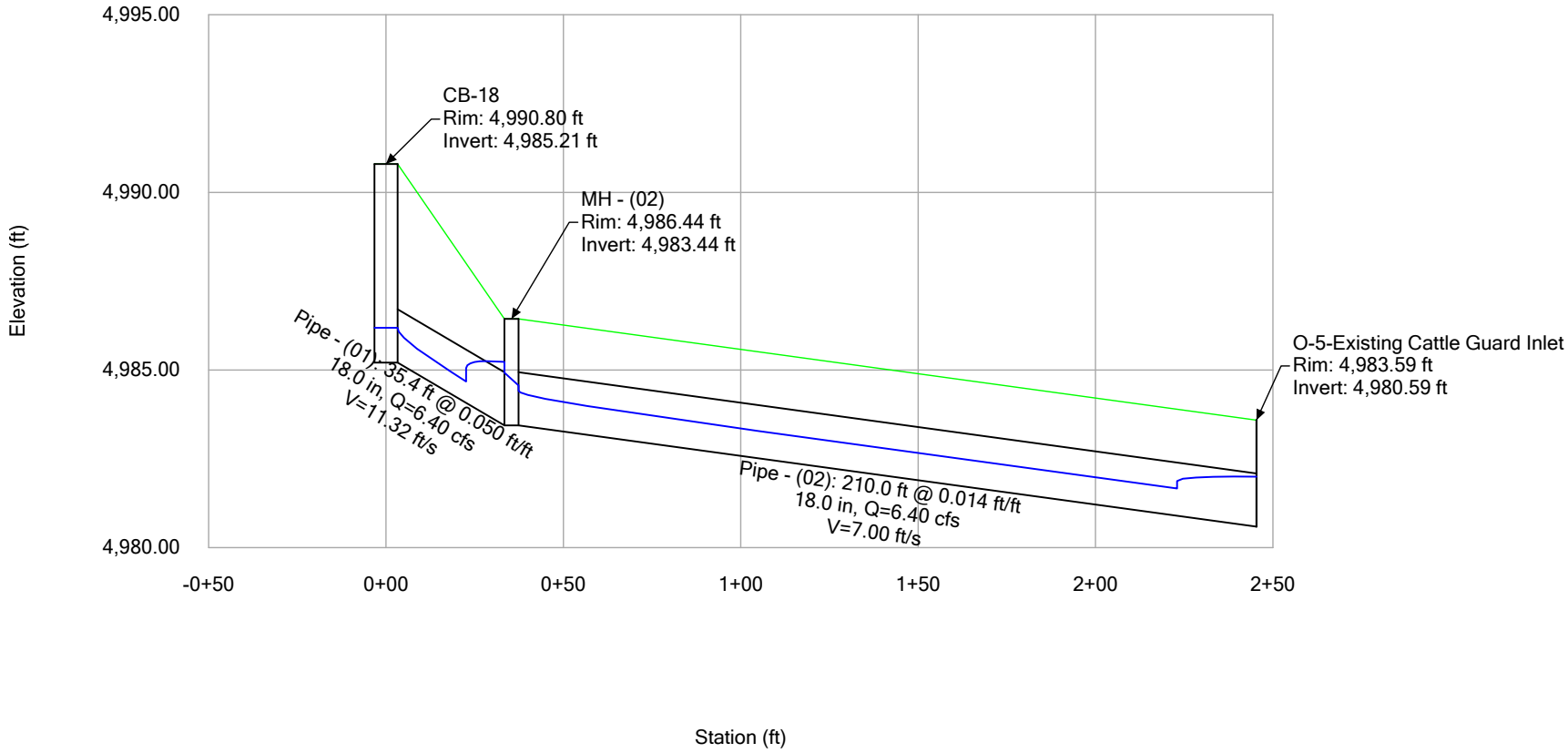


Profile Report

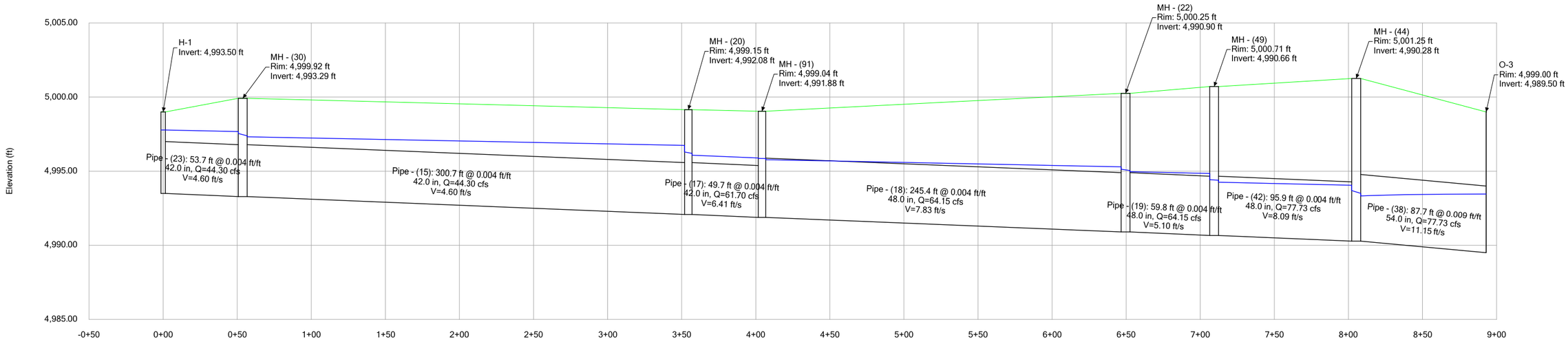
Engineering Profile - Profile - Basin 205 to Pond B (SWMD SD.stsw)



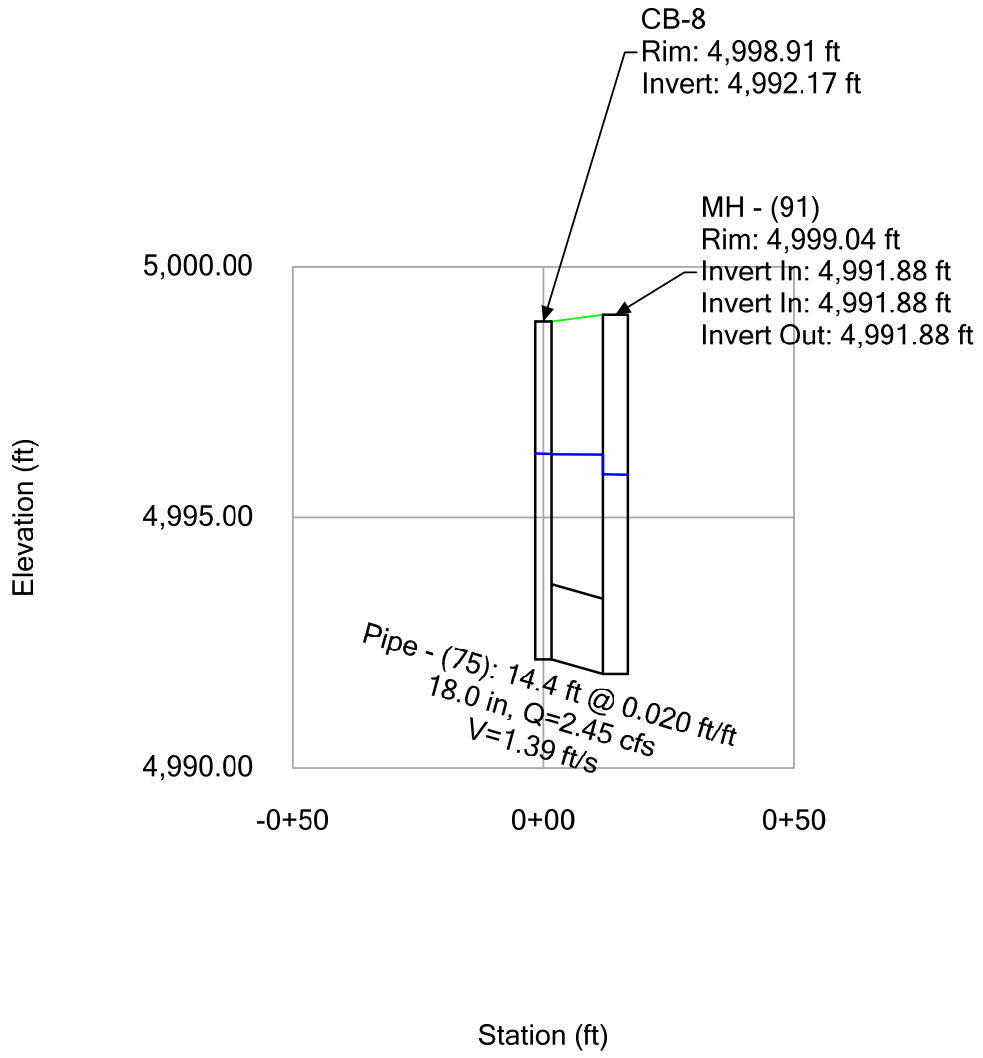
Profile Report
Engineering Profile - Profile - Basin 206 (SWMD SD.stsw)



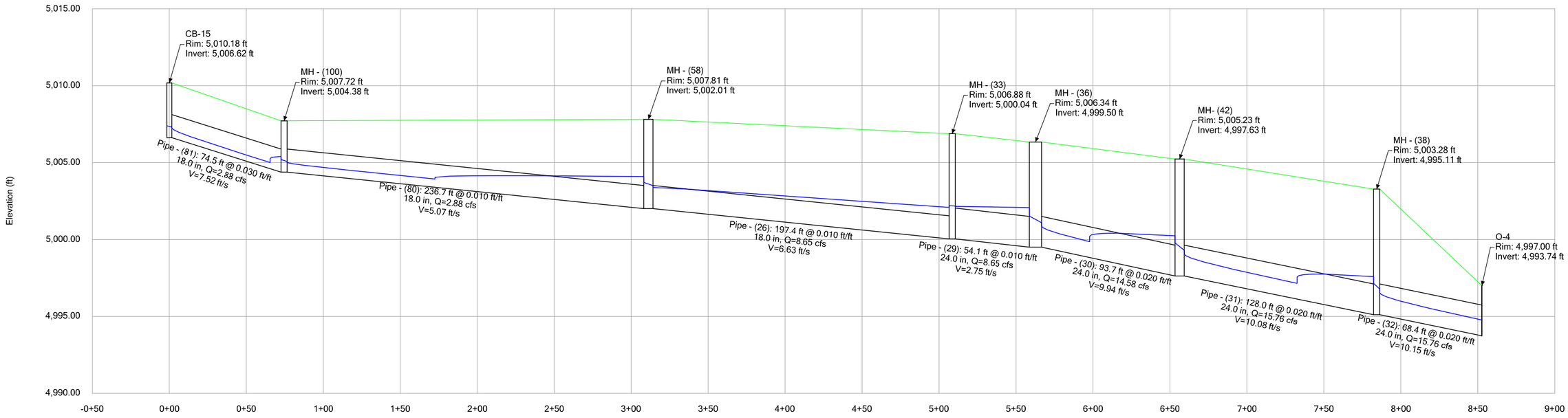
Profile Report
Engineering Profile - Profile - Pond B to Pond A (SWMD SD.stsw)



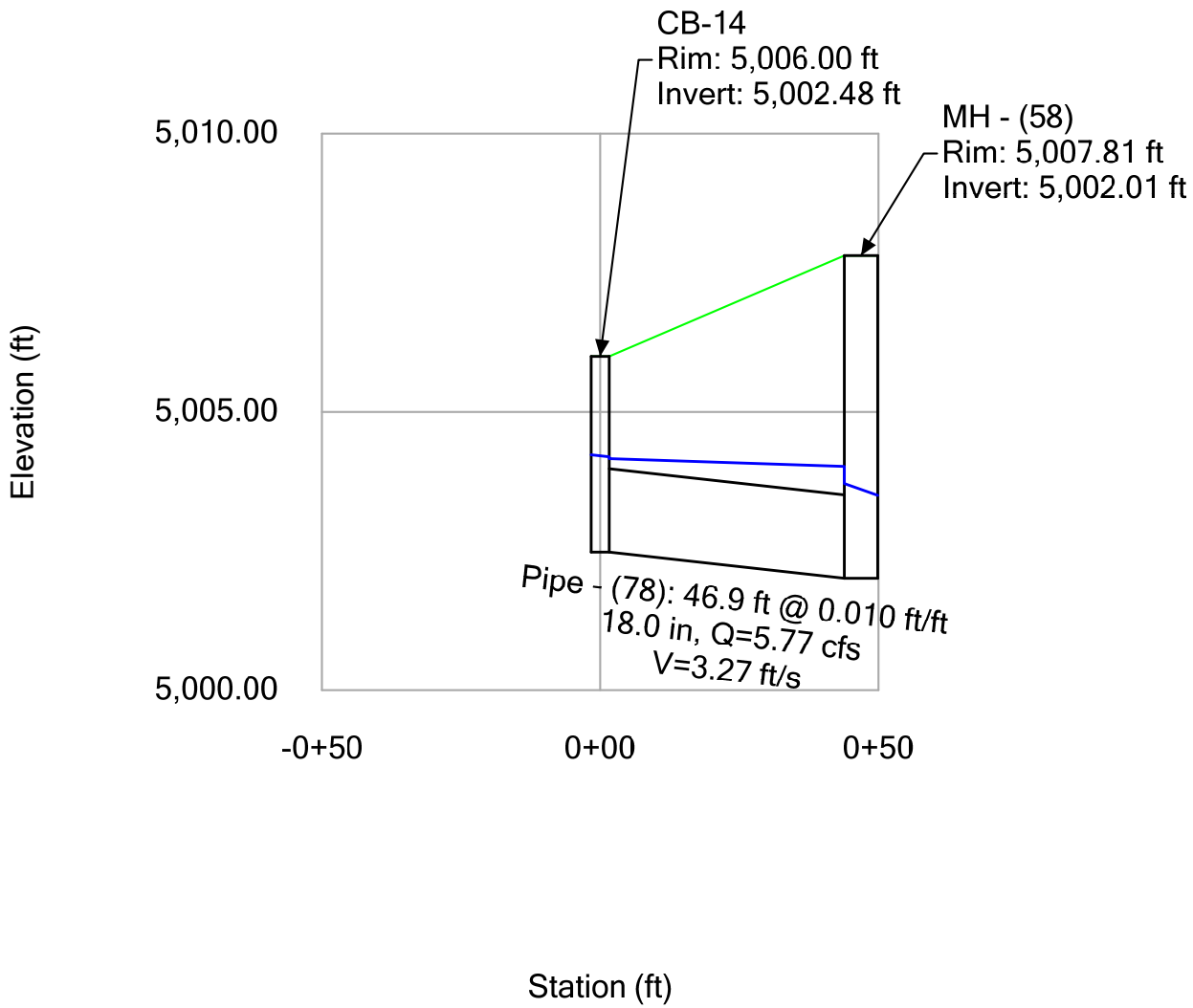
Profile Report
Engineering Profile - Profile - Basin 207 (SWMD SD.stsw)



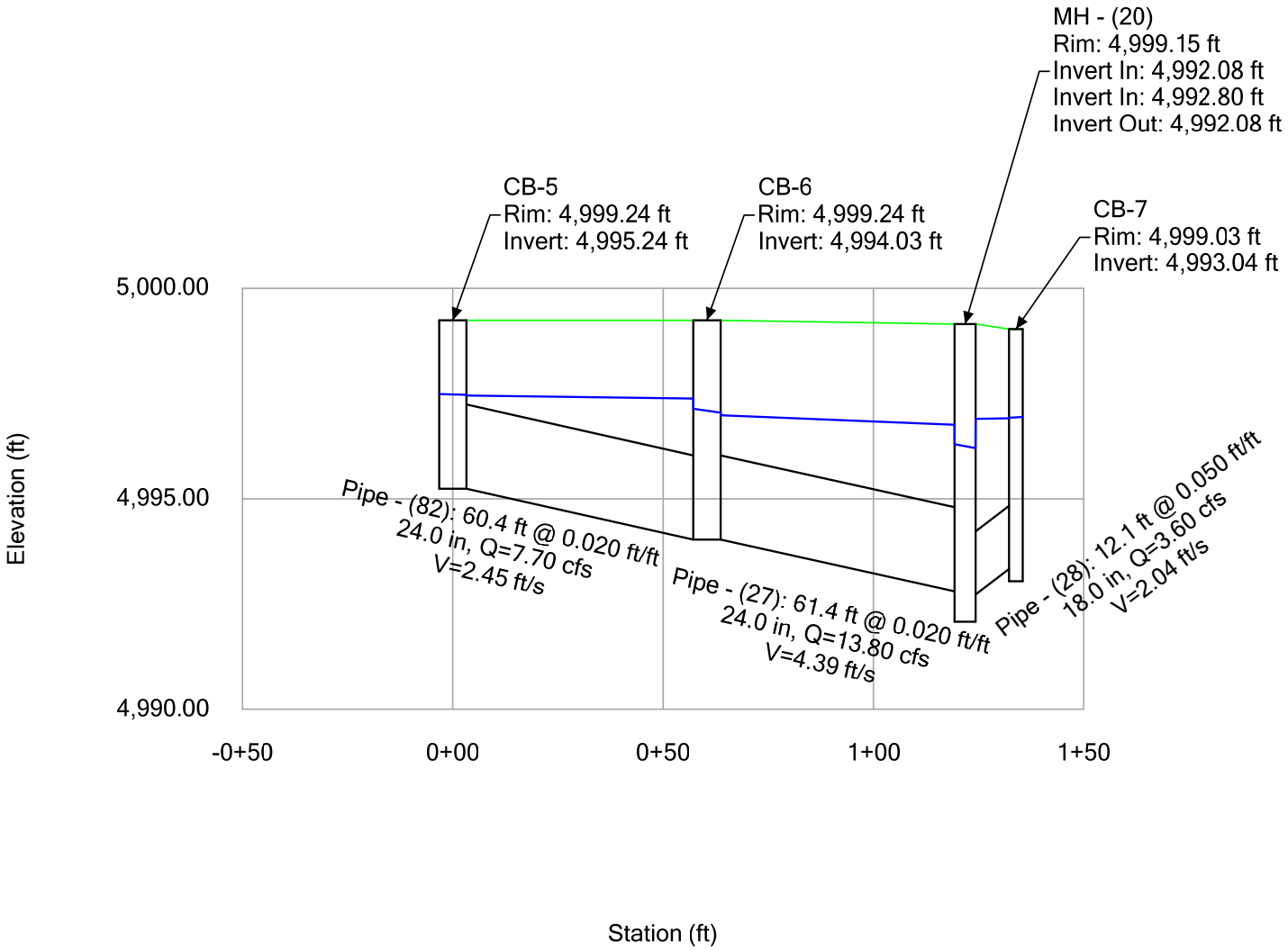
Profile Report
Engineering Profile - Profile - Basin 208 to Pond A (SWMD SD.stsw)



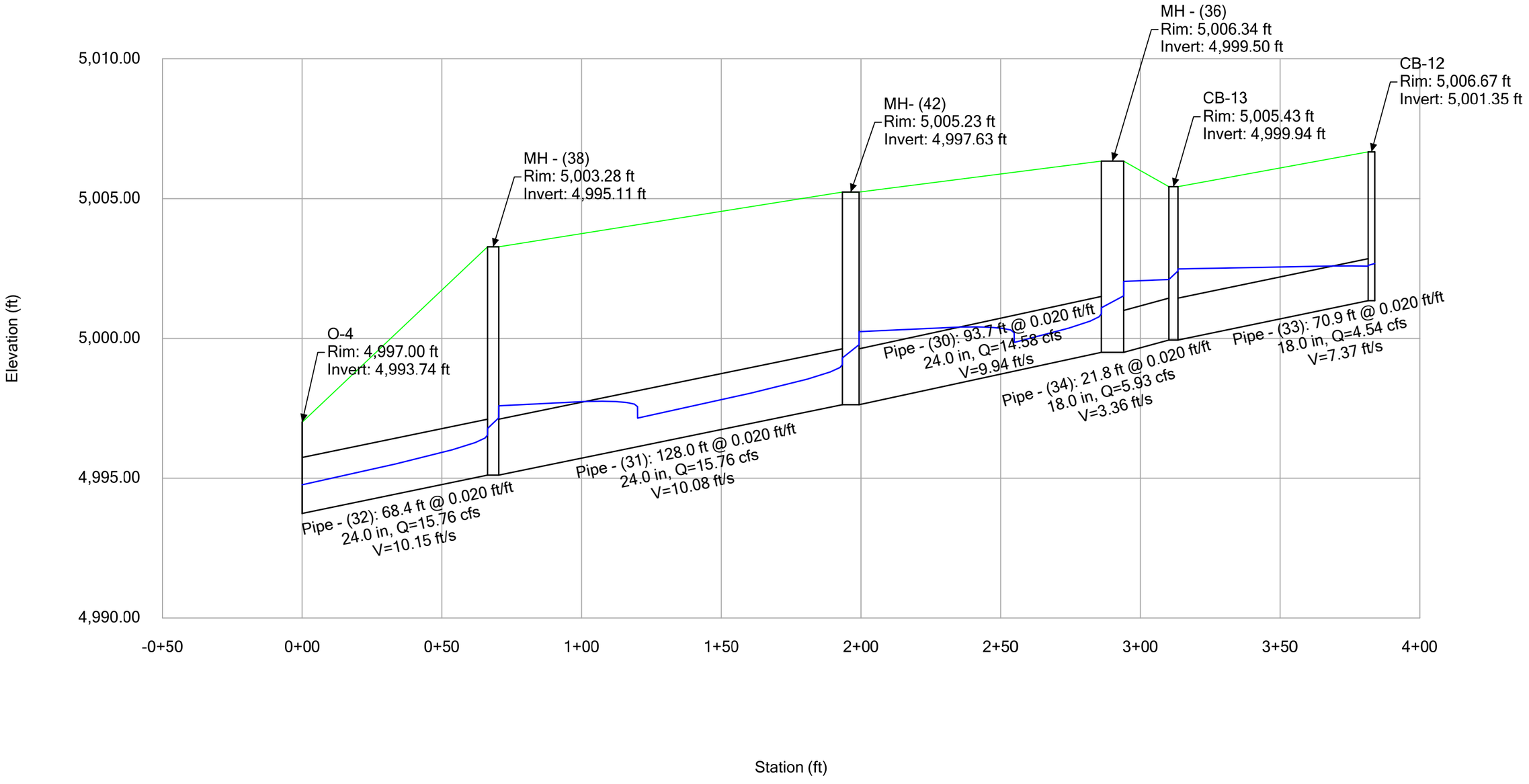
Profile Report
Engineering Profile - Basin 209 (SWMD SD.stsw)



Profile Report
Engineering Profile - Profile - Basins 211 to 212 (SWMD SD.stsw)

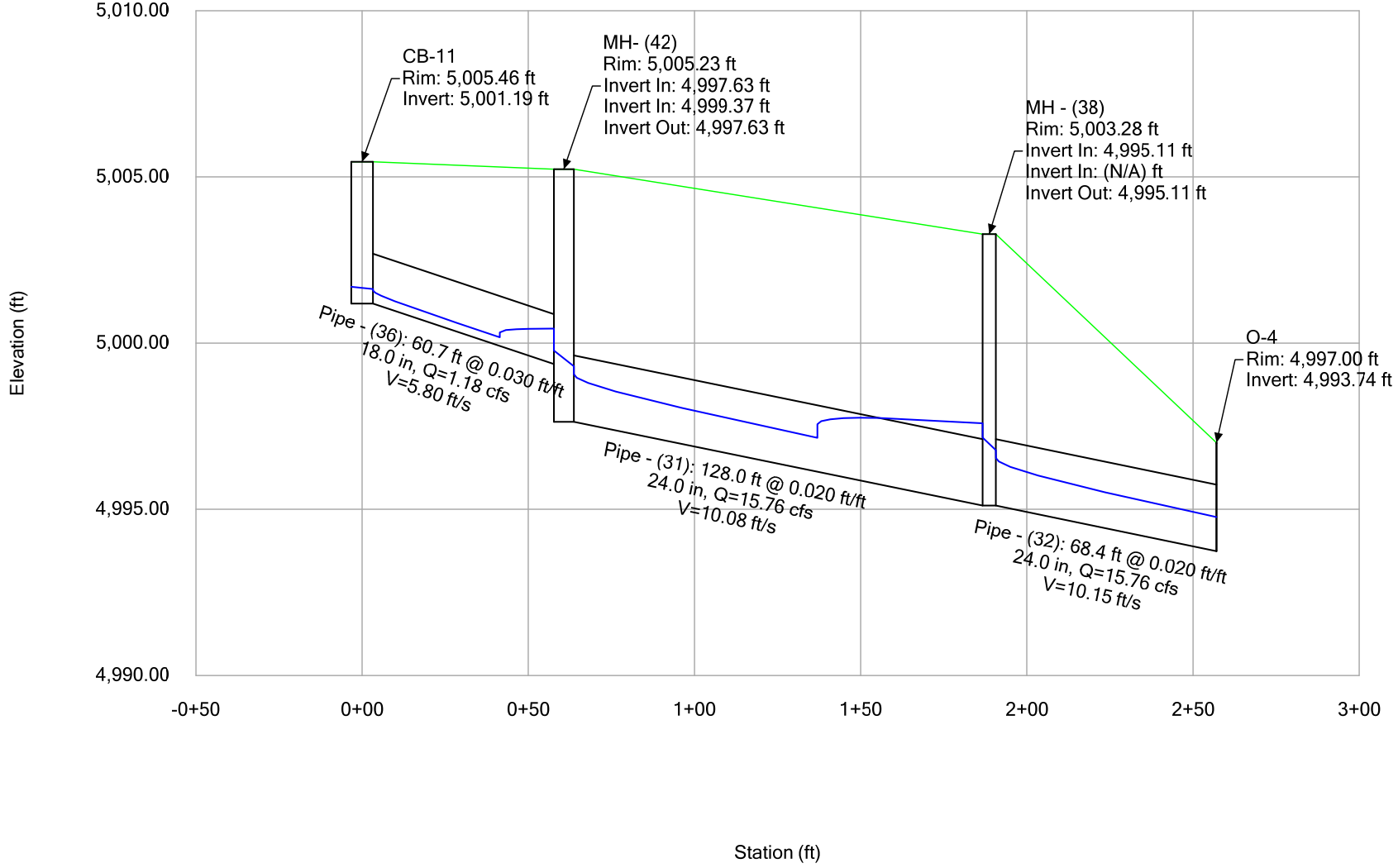


Profile Report
Engineering Profile - Profile - Basin 214 to Pond A (SWMD SD.stsw)

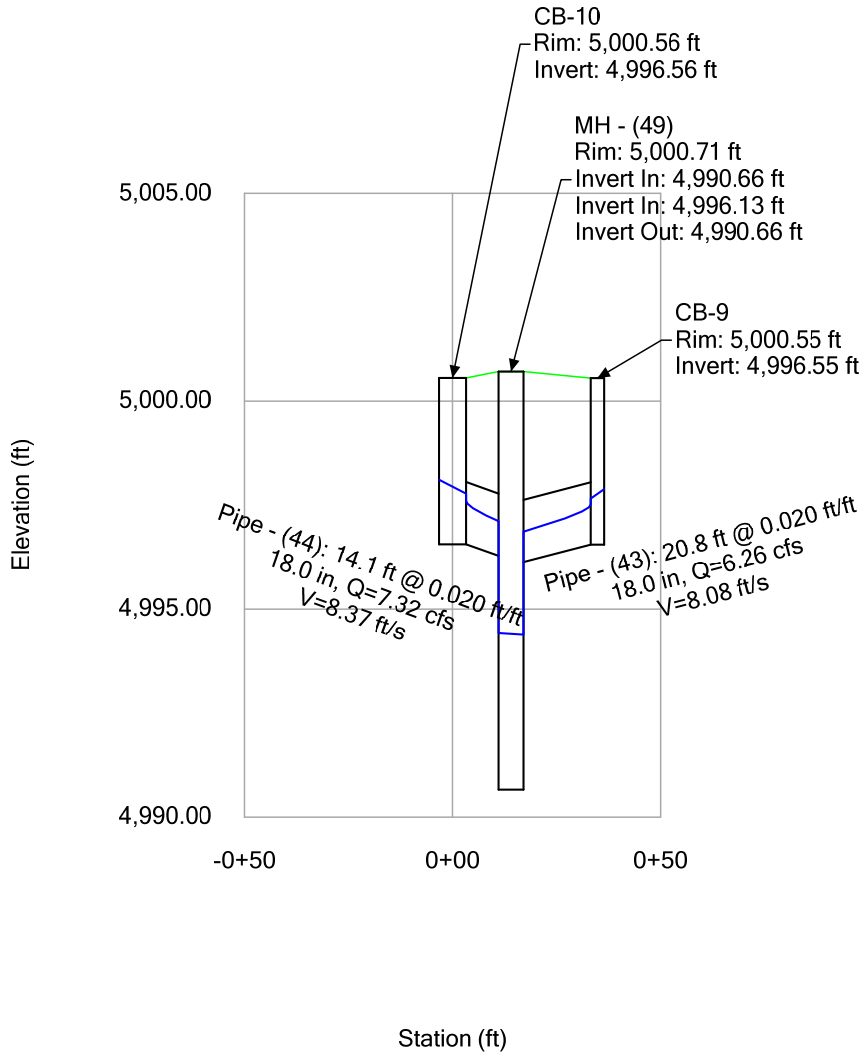


Profile Report

Engineering Profile - Profile - Basin 215 to Pond A (SWMD SD.stsw)



Profile Report
Engineering Profile - Profile - Basin 219 (SWMD SD.stsw)



Profile Report

Engineering Profile - Profile - Pond A Outfall (SWMD SD.stsw)