Redland
WHERE GREAT PLACES BEGIN
720.283.6783 Office
1500 West Canal Court
Littleton, Colorado 80120
REDLAND.COM

MEMORANDUM

To: **Matt Emmens, P.E.**

By: **Evan Rumney, P.E.**

Date: **April 10, 2020**

RE: Midtown Filing 12 Drainage Conformance Addendum

This memorandum addresses the drainage conformance for the development of Midtown Filing 12, which was previously included in the Approved Level III Drainage Report for Midtown Filing 6, dated July 17, 2017, prepared by Redland, and hereafter referred to as the Approved Report.

Midtown Filing 12, hereafter referred to as the Site, consists of 10.7 acres of single family attached residential development and 28.8 acres of park/landscape area and is located within Basins A17, A18, and Park of the Approved Report. The scope of work associated with Midtown Filing 12 includes the development of 148 single-family attached lots, the construction of 4 public R.O.W. streets, 14 private drives, sidewalks, parks and landscape tracts.

Basin A17 has been divided into 12 sub-basins (A17-1 through A17-7) for purposes of this report. Basin A18 and Park have been divided into six sub-basins (A18-1 through A18-6). Sub-basins will remain close to the assumed drainage patterns made in the Approved Report and will ultimately outfall to existing Detention Pond A which was constructed as part of Midtown Filing 6. The Approved Report containing the sizing of existing Detention Pond A and assumed drainage patterns for the park and Filing 12 can be found in Appendix E and F.

The overall drainage pattern for the site is to collect the runoff in the proposed storm sewer system and convey that flow in a 36" RCP to the east and connect to the existing 60" RCP storm in the existing 60' non-exclusive utility easement. Runoff will be conveyed through the existing 60" RCP in Zuni Street to the south and outfall into the existing filing 6 detention pond. Hydraulic calculations, capacity, and profiles for the existing 60" RCP in Zuni Street can be found in Appendix C.

Hydrologic and hydraulic calculations for the proposed sub-basins can be found in Appendix B and C. A description of the sub-basins are provided below:

Basin A17-1

Basin	Area (AC)	Runoff Coefficients		I (%)	Peak Flows (cfs)	
		C5	C100		Q5	Q100
A17-1	1.71	0.45	0.69	51.1%	2.4	6.9

Basin A17-1 encompasses twelve full lots and nine lots of which approximately half the lot lies within the basin. The basin is located on the southwest corner of the site. The runoff from this basin is anticipated to sheet flow from the lots and collect in the private drive at the front of the units or the rear yard swale at the rear of the lots. From this point the flow will be conveyed west to Tract A and be collected in a swale that will then convey the flow to the south along the western property line to design point A17-1. The flow will then be collected at a 18" FES on the southern boundary of the Site

and conveyed east in the proposed storm drain and ultimately to the existing Detention Pond A. The runoff from Basin A17-1 will be 2.4 cfs and 6.9 cfs in the 5-year and 100-year storm events respectively.

Basin A17-2

Basin	Area (AC)	Runoff Coefficients		I (%)	Peak Flows (cfs)	
		C5	C100		Q5	Q100
A17-2	1.28	0.43	0.68	48.4%	1.8	5.5

Basin A17-2 encompasses nine full lots and eight lots of which approximately half the lot lies within the basin. The basin is located on the northwest corner of the site. The runoff from this basin is anticipated to sheet flow from the lots and collect in the private drive at the front of the units or the rear yard swale at the rear of the lots. From this point the flow will be conveyed west to Tract A and be collected in a swale that will then convey the flow to the south along the western boundary line to design point A17-2. The flow will then be combined with flows from A17-1 and ultimately collected at an 18" FES on the southern boundary of the Site. The total routed flow at design point A17-1 from these two basins is 4.04 and 11.94 in the 5-year and 100-year storm events respectively. After the flow enters the 18" FES it will be conveyed east in the proposed storm drain and ultimately to the existing Detention Pond A.

Basin A17-3

Basin	Area (AC)	Runoff Coefficients		I (%)	Peak Flows (cfs)	
		C5	C100		Q5	Q100
A17-3	0.92	0.75	0.84	87.6%	2.7	5.7

Basin A17-3 contains ten lots of which approximately half the lot lies within the basin and the western half of Bryant Street. The basin is located on the west side of the site, adjacent to Basins A17-1 and A17-2. The runoff from this basin is anticipated to sheet flow from the lots and private drives and collect in Bryant Street. The flow will then be conveyed south down Bryant Street to Design Point A17-3 where it will be collected by a 10' Type 'R' Inlet and be conveyed through the proposed storm drain east to the existing 60" RCP in Zuni Street and ultimately to the existing Detention Pond A. The runoff from Basin A17-4 will be 2.7 cfs and 5.7 cfs in the 2-year and 100-year storm events respectively.

Basin A17-3A

Basin	Area (AC)	Runoff Coefficients		I (%)	Peak Flows (cfs)	
		C5	C100		Q5	Q100
A17-3A	0.39	0.86	0.89	100%	1.5	3.0

Basin A17-3A is 0.39 acres of Basin A17 described in the Approved Report. Storm water will sheet flow from the crown of Bryant Street east to the gutter where it will be collected and conveyed to the south down Bryant Street to Design Point A17-3A. Flows from A17-3 and A17-3A will combine at Design Point A17-3A and be collected by a 10' Type 'R' Inlet. Runoff will then be conveyed through the proposed storm drain east to the existing 60" RCP in Zuni Street and ultimately to the existing

Detention Pond A. The runoff generated from Basin A17-3A will be 1.5 cfs and 3.0 cfs in the 2-year and 100-year storm events respectively. Total runoff at Design Points A17-3 and A17-3A will be 4.2 cfs in the 5-year storm event and 8.7 cfs in the 100-year event. Inlet A17-3 has a 5.9 cfs capacity in the 5-year event without over topping the 6" curb and a 19.3 cfs capacity in the 100-year event where water will be allowed to pond up to the R.O.W.

Basin A17-4

Basin	Area (AC)	Runoff Coefficients		I (%)	Peak Flows (cfs)	
		C5	C100		Q5	Q100
A17-4	0.14	0.86	0.89	100%	0.6	1.2

Basin A17-4 is composed of the south half of W. 68th Avenue. Storm water will sheet flow from the center of the roadway to the south gutter where it will be conveyed to the east. The flow will be collected at design point A17-4 by a 5' Type 'R' Inlet and conveyed through the proposed storm drain south and east to the existing 60" RCP within Zuni Street then south to the existing Detention Pond A. The runoff from Basin A17-4 will be 0.6 cfs and 1.2 cfs in the 2-year and 100-year storm events respectively.

Basin A17-5A

Basin	Area (AC)	Runoff Coefficients		I (%)	Peak Flows (cfs)	
		C5	C100		Q5	Q100
A17-5A	0.45	0.70	0.81	82.4%	1.5	3.4

Basin A17-5A consists of approximately five and a half lots, the east side of Beach Street, the west side of Alcott Street, and Tract B. Storm water from the lots and Tract B will sheet flow to the gutter of Beach Street and Alcott Street. Flow will then head south in the gutters on Alcott Street and Beach Street eventually combining with flows from Basin A17-5 on the west side of Beach Street at Design Point A17-5A. Runoff during the 5-year and 100-year events will be 1.5 cfs and 3.4 cfs respectively.

Basin A17-5

Basin	Area (AC)	Runoff Coefficients		I (%)	Peak Flows (cfs)	
		C5	C100		Q5	Q100
A17-5	0.25	0.80	0.87	93.6%	1.0	2.0

Basin A17-5 consists of a southern portion of W. 68th Drive and an eastern portion of Beach Street. Storm water will sheet flow to the gutter of W. 68th Drive and Beach street then be conveyed west toward Design Point A17-5, where the flow will be combined with flows from Basin A17-4 and collected by Inlet A17-4. Routed flows from Basin A17-5 and A17-5A are 2.48 cfs and 5.33 cfs for the 5- year and 100-year storm events respectively.

Basin A17-6A

Basin	Area (AC)	Runoff Coefficients		I (%)	Peak Flows (cfs)	
		C5	C100		Q5	Q100
A17-6A	0.79	0.75	0.84	88.7%	2.9	6.1

Basin A17-6A consists of six residential lots, the rear half of eleven lots along W. 69th Place and Bryant Court, a portion of the eastern half of Bryant Street, and a western portion of W. 69th Place. Runoff from this basin sheet flows from the lots and into the curb and gutter of the streets. Flow will then generally head in the southern direction in the gutter of the streets to Design Point A17-6A where it will enter Basin A17-6. The peak flow in the 5-year event is 2.9 cfs and in the 100-year event is 6.1 cfs.

Basin A17-6

Basin	Area (AC)	Runoff Coefficients		I (%)	Peak Flows (cfs)	
		C5	C100		Q5	Q100
A17-6	0.47	0.71	0.82	82.4%	1.5	3.3

Basin A17-6 consists of four residential lots, the front half of three residential lots, the northwestern half of W. 68th Drive, and the southwestern half of W. 69th Drive. Runoff from this basin sheet flows from the lots into W.69th Drive and W. 68th Drive where the flow will generally head in the south eastern direction toward Design Point A17-6. Hear runoff will be combined with flows from Basin A17-7, A17-7A, and A17-7B and collected in a 10' Type 'R' Inlet then conveyed to the existing Detention Pond A through the proposed storm sewer system and the existing 60" RCP storm sewer in Zuni Street. The routed flows from Basin A17-6A and A17-6 at design Point A17-6 are 4.18 cfs and 9.00 cfs in the 5-year and 100-year storm events respectively.

Basin A17-7B

Basin	Area (AC)	Runoff Coefficients		I (%)	Peak Flows (cfs)	
		C5	C100		Q5	Q100
A17-7B	0.52	0.73	0.83	85.0%	1.7	3.7

Basin A17-7B consists of the rear half of nine residential lots, the front half of six residential lots, the northeastern half of W. 69th Place, and the western half of Beach Street. Runoff from this basin sheet flows from the lots into the gutters of W. 69th Place and Beach Street. Runoff is then generally conveyed in the south direction towards Design Point A17-7B where it combines with flows from Basin A17-7A, and Basin A17-7. The 5-year and 100-year runoff from Basin A17-7B is 1.7 cfs and 3.7 cfs respectively.

Basin A17-7A

Basin	Area (AC)	Runoff Coefficients		I (%)	Peak Flows (cfs)	
		C5	C100		Q5	Q100
A17-7A	0.93	0.50	0.72	57.0%	1.7	4.7

Basin A17-7A consists of six residential lots, the rear half of six residential lots, the southeastern half of W. 69th Place, Beacon Court, the northeastern half of W. 69th Drive, and Tract I. Runoff from this basin sheet flows from the lots into the gutters of W. 69th Place, Beacon Court, and W. 69th Drive. Runoff is then generally conveyed in the southeast direction towards Design Point A17-7A where it combines with flows from Basin A17-7B, and Basin A17-7. The 5-year and 100-year runoff from Basin A17-7B is 1.7 cfs and 4.7 cfs respectively.

Basin A17-7

Basin	Area (AC)	Runoff Coefficients		I (%)	Peak Flows (cfs)	
		C5	C100		Q5	Q100
A17-7	0.43	0.70	0.82	81.3%	1.4	3.0

Basin A17-7 consists of four residential lots, the rear half of 3 residential lots, the southeastern half of W. 69th Drive, the north eastern half of W. 68th Drive, and Tract L. Runoff from this basin sheet flows from the lots and tract into the gutters of W. 69th Drive and W. 68th Drive. Runoff is then generally conveyed in the southwest direction towards Design Point A17-7. The total routed flow from Basins A17-7A, A17-7B, and A17-7 amounts to 4.21 cfs in the 5-year storm event and 10.14 in the 100-year storm event. This flow is captured by a 10' Type 'R' Inlet at Design Point A17-7 and conveyed to the existing Detention Pond A through the proposed storm sewer system and the existing 60" RCP in Zuni Street.

Basin A18-6

Basin	Area (AC)	Runoff Coefficients		I (%)	Peak Flows (cfs)	
		C5	C100		Q5	Q100
A18-6	32.10	0.12	0.52	10.0%	5.5	47.2

Basin A18-6 consists of 32.10 acres of undeveloped park area. Runoff from this basin will generally follow historic drainage patterns and sheet flow to the south and ultimately to existing Detention Pond A. Based on the Mile High Flood District recommended imperviousness for parks, this Basin has been assumed to have an overall imperviousness of 10% to allow for future park improvements once all contamination mitigation efforts have been complete in the basin. The runoff during the 5-year storm event is 5.5 cfs and during the 100-year storm event is 47.2 cfs.

Basin A18-5

Basin	Area (AC)	Runoff Coefficients		I (%)	Peak Flows (cfs)	
		C5	C100		Q5	Q100
A18-5	0.54	0.54	0.73	61.0%	1.3	3.5

Basin A18-5 consists of seven residential lots, the rear half of 3 lots, the eastern half of W. 69th Place, the eastern half of W. 69th Drive, Tract P, and Tract M. Runoff from this basin will generally sheet flow into the gutters of W. 69th Place and W. 69th Drive or the conveyance swales in Tract P and Tract M. Runoff is then conveyed to the east and will flow through curb cuts at the southeastern corners of the intersections of Zuni Street and W. 69th Place and Zuni Street and W. 69th Drive. Flow will then run south along Zuni Street in the conveyance swales where it will be collected by Type 'C' Inlets at the north eastern corners of Zuni Street and W. 69th Place and Zuni Street and W. 69th Drive. Flow will be conveyed through the proposed storm sewers to the south and ultimately outfall into the existing Detention Pond A. The runoff during the 5-year storm event is 1.3 cfs and during the 100-year storm event is 3.5 cfs.

Basin A18-4

Basin	Area (AC)	Runoff Coefficients		I (%)	Peak Flows (cfs)	
		C5	C100		Q5	Q100
A18-4	0.91	0.57	0.75	65.8%	2.2	5.6

Basin A18-4 consists of approximately nine residential lots, the rear half of nine residential lots, a southwestern portion of Tract M, the northern half of W. 69th Place, and the eastern half of Zuni Court. Generally, storm water will sheet flow from the lots and into the gutters of W. 69th Place. Runoff will then flow down W. 69th Place and combine with flows from the eastern portion of the basin on the northeastern corner of Zuni Court. Flow will continue south down Zuni Court to Design Point A18-4 where it will combine with flows from Basin A18-3, A18-2, and A18-1. The runoff from Basin A18-4 is 2.2 cfs in the 5-year storm event and 5.6 cfs in the 100-year storm event.

Basin A18-3

Basin	Area (AC)	Runoff Coefficients		I (%)	Peak Flows (cfs)	
		C5	C100		Q5	Q100
A18-3	0.31	0.66	0.80	76.0%	0.9	2.2

Basin A18-3 consists of one residential lot, the rear half of six residential lots, a northern portion of Tract N, the southern half of W.69th Place, and the western half of Zuni Court. Generally, runoff will flow from the lots and Tract N into W. 69th Place and Zuni Court where it will head south to Design Point A18-3 and combine with flows from A18-4, A18-2, and A18-1. The runoff from Basin A18-3 is 0.9 cfs in the 5-year storm event and 2.2 cfs in the 100-year storm event.

Basin A18-2

Basin	Area (AC)	Runoff Coefficients		I (%)	Peak Flows (cfs)	
		C5	C100		Q5	Q100
A18-2	0.49	0.51	0.72	58.5%	1.1	2.8

Basin A18-2 consists of five residential lots, the front half of six residential lots, the majority of Tract N, the northern half of W.69th Drive, and the eastern half of Alcott Street. Generally, runoff will flow from the lots and Tract N into Alcott Street and W. 68th Drive where it will head east to Design Point A18-2 and combine with flows from A18-4, A18-3, and A18-1. The runoff from Basin A18-2 is 1.1 cfs in the 5-year storm event and 2.8 cfs in the 100-year storm event.

Basin A18-1

Basin	Area (AC)	Runoff Coefficients		I (%)	Peak Flows (cfs)	
		C5	C100		Q5	Q100
A18-1	0.29	0.71	0.82	81.8%	1.0	2.2

Basin A18-1 consists of the rear half of ten residential lots, the northern half of Tract N, the northern half of W.69th Drive, and the eastern half of Alcott Street. Generally, runoff will flow from the lots and Tract N into Alcott Street and W. 68th Drive where it will head east to Design Point A18-1 and combine with flows from A18-4, A18-2, and A18-1. The runoff from Basin A18-3 is 1.0 cfs in the 5-year storm event and 2.2 cfs in the 100-year storm event.

Drainage Criteria

Hydrologic and hydraulic analysis has been completed to meet the standards of the Adams County Storm Drainage Design and Stormwater Quality Control Criteria as well as the Urban Drainage Flood Control District (UDFCD) Manual.

For impervious percentages, each basin was analyzed and values were assigned based UDFCD Table 6-3. The composite imperviousness for each basin was then used to determine the Rational 'C' values for specific storm periods, including the 5-year and 100-year events.

Rainfall intensities for the one-hour storm are listed on Table 9.3 from the Adams County manual and are 1.42 inches and 2.71 inches respectively.

Design storm return periods are 5-year for the minor event and 100-year for the major event.

Peak flows and routing for each of the drainage basins and storm events were calculated using the rational method and are depicted on the attached SF-3 forms.

The hydraulic calculations for existing and proposed storm sewer facilities, including, inlet capacity, and storm sewer have been prepared based on requirements listed in the Adams County Manual and the UDFCD Manual. Please refer to the attached sheets for calculations.

The storm sewer system is designed to convey the major event without surcharging the pipe, while keeping the hydraulic and energy grade lines below finished grade. Emergency overflow routes have been designed to convey flows to the adjacent streets in the event an inlet and/or area drain becomes obstructed.

Detention and Water Quality Requirements

The detention and water quality requirements for Midtown Filing 12 are being provided by existing Detention Pond A that was built with Midtown Filing 6 and a part of the Approved Report.

Midtown Filing 12 was referred to as "Future PA-West" and composed of Basin A17, A18, and Park on the approved drainage map. The Site was anticipated to be 15 acres of developable area, 13.5 acres in Basin A17 and 1.5 acres in Basin A18, and 28.8 acres of Park. Below are the anticipated runoff coefficients utilized in the Approved Report:

Basin	5-Year C_d	100-Year C_d	Impervious
A17	0.63	0.74	80%
A18	0.68	0.79	85%
Park	0.21	0.53	10%

The total anticipated weighted runoff coefficients for the Site per the Approved Report are 0.36 and 0.60 in the 5-year and 100-year storm events. The weighted overall imperviousness is 34.1%.

Utilizing the latest Mile High Flood District runoff coefficient equations based on NRCS soil Group C/D the 5-year and 100-year updated runoff coefficients for the anticipated site are as follows:

Basin	5-Year C_d	100-Year C_d	Impervious
A17	0.69	0.81	80%
A18	0.73	0.83	85%
Park	0.12	0.53	10%

The total anticipated weighted runoff coefficients for the Site utilizing the latest Mile High Flood District runoff equations are 0.25 and 0.62 in the 5-year and 100-year storm events. The weighted overall imperviousness is 34.1%. Since the old runoff coefficient equations used for the Approved Report produce lower runoff results, they will be used as the proposed Site maximum allowable developed runoff to confirm the the proposed Site is within conformance with the Approved Report and the latest Mile High Flood District standards.

The water quality capture volume for existing Detention Pond A is 1.06 ac-ft and the 100-year detention volume provided is 5.22 ac-ft. The total 100-year peak release rate of 214.5 cfs, which will be routed through the pond outlet structure.

In the constructed condition, the Site will be 10.7 acres of single family attached residential development and 32.1 acres of park/landscape.

The total weighted runoff coefficients for the proposed Site are 0.25 and 0.59 for the 5-year and 100-year storm events respectively, with a total imperviousness of 25.7%. These calculations are below the anticipated values for the Site listed above and maintain that the constructed development will be in conformance with the Approved Report and the detention and water quality volumes within existing Detention Pond A.

Conclusion

The development of Midtown Filing 12 does not significantly change the overall drainage patterns of the Approved Report. Filing 12 was originally part of Basin A17, Basin A18, and Basin Park as discussed in the Approved Report with an assumed composite imperviousness of 34.1%. The drainage basins subdivided within Filing 12 have a composite imperviousness of 25.2%, lower that what was assumed in the Approved Report. The Site in the 5-year and 100-year storm event produce 32.6 cfs and 116.1 cfs respectively.

In summary, the Filing 12 Addendum complies with the Approved Report and Mile High Flood District regulations and standards. There are no anticipated negative impacts to existing Detention Pond A or downstream infrastructure. Also, there are no anticipated adverse impacts to adjacent properties or other portions of the Midtown at Clear Creek development are anticipated as a result of this development.

End of Memorandum

ENGINEER CERTIFICATION OF DRAINAGE REPORT

"I hereby certify that this report (plan) for the Drainage design of Midtown at Clear Creek Filing 12 was prepared by me or under my direct supervision in accordance with the provisions of Adams County Storm Drainage Design and Technical Criteria for the owners thereof. I understand that Adams County does not and will not assume liability for drainage facilities designed by others."

_____ _____

Evan B. Rumney, P.E. Date
Registered Professional Engineer
State of Colorado No. 54401

Redland
WHERE GREAT PLACES BEGIN

DEVELOPER CERTIFICATION OF DRAINAGE FACILITIES

"Brookfield Residential (Colorado) hereby certifies that the drainage facilities for Midtown at Clear Creek Filing 12 shall be constructed according to the design presented in this report. I understand that Adams County does not and will not assume liability for the drainage facilities designed and/ or certified by my engineer. I understand that Adams County reviews drainage plans pursuant to Colorado Revised Statues Title 30, Article 28; but cannot, on behalf of Midtown at Clear Creek Filing 12, guarantee that final drainage design review will absolve Brookfield Residential (Colorado) and/or their successors and/or assigns the future liability for improper design. I further understand that approval of the Final Plat and/or Final Development Plan does not imply approval of my engineer's drainage design."

_____ _____

Name of Developer (please print) Date

_____

Authorized Signature

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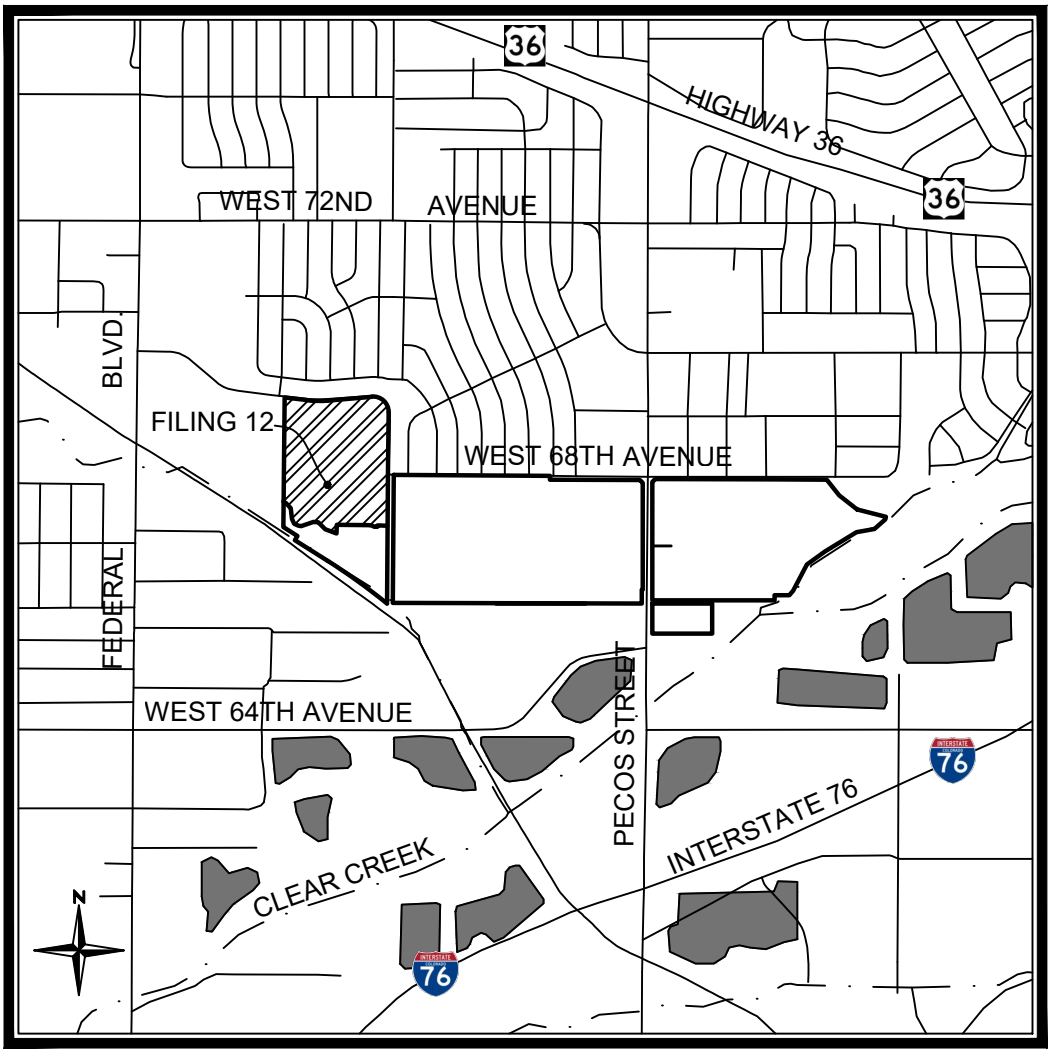
Appendix A - Vicinity Map, Soils Map, FIRM Map



VICINITY MAP

1" = 2000'

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VICINITY MAP

MIDTOWN FILING 12

AT CLEAR CREEK

ADAMS COUNTY COLORADO

DATE 03.20.2020

PROJ. NO. 10015.23

SHEET

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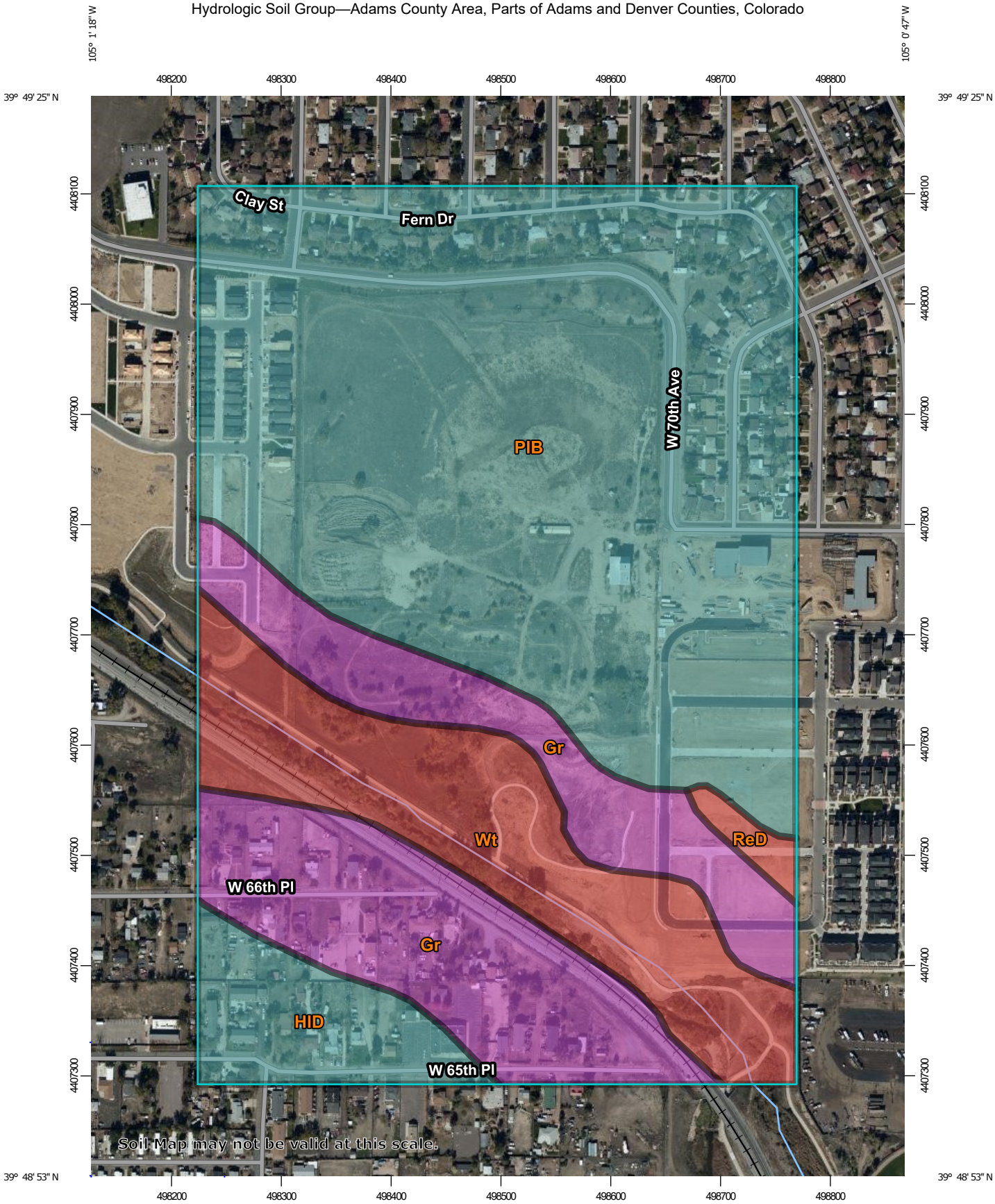
\\RS0\Projects\2010\10015 - Midtown\CADD\Exhibits\10015.23 Vicinity Map Filing 12.dwg, tab: VICINITY MAP, Apr 07, 2020 - 11:33am, erumney



Map Scale: 1:4,770 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 50 100 200 300

Feet
0 200 400 800 1200

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 13N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Lines

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Points

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

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

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

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

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

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

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

Soil Survey Area: Adams County Area, Parts of Adams and Denver Counties, Colorado
Survey Area Data: Version 16, Sep 12, 2019

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

Date(s) aerial images were photographed: Oct 20, 2018—Oct 26, 2018

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

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
Gr	Gravelly land-Shale outcrop complex	A	24.2	22.0%
HlD	Heldt clay, 3 to 9 percent slopes	C	6.4	5.8%
PlB	Platner loam, 0 to 3 percent slopes	C	62.0	56.2%
ReD	Renohill loam, 3 to 9 percent slopes	D	1.0	0.9%
Wt	Wet alluvial land	D	16.7	15.1%
Totals for Area of Interest			**110.3**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

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

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

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

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

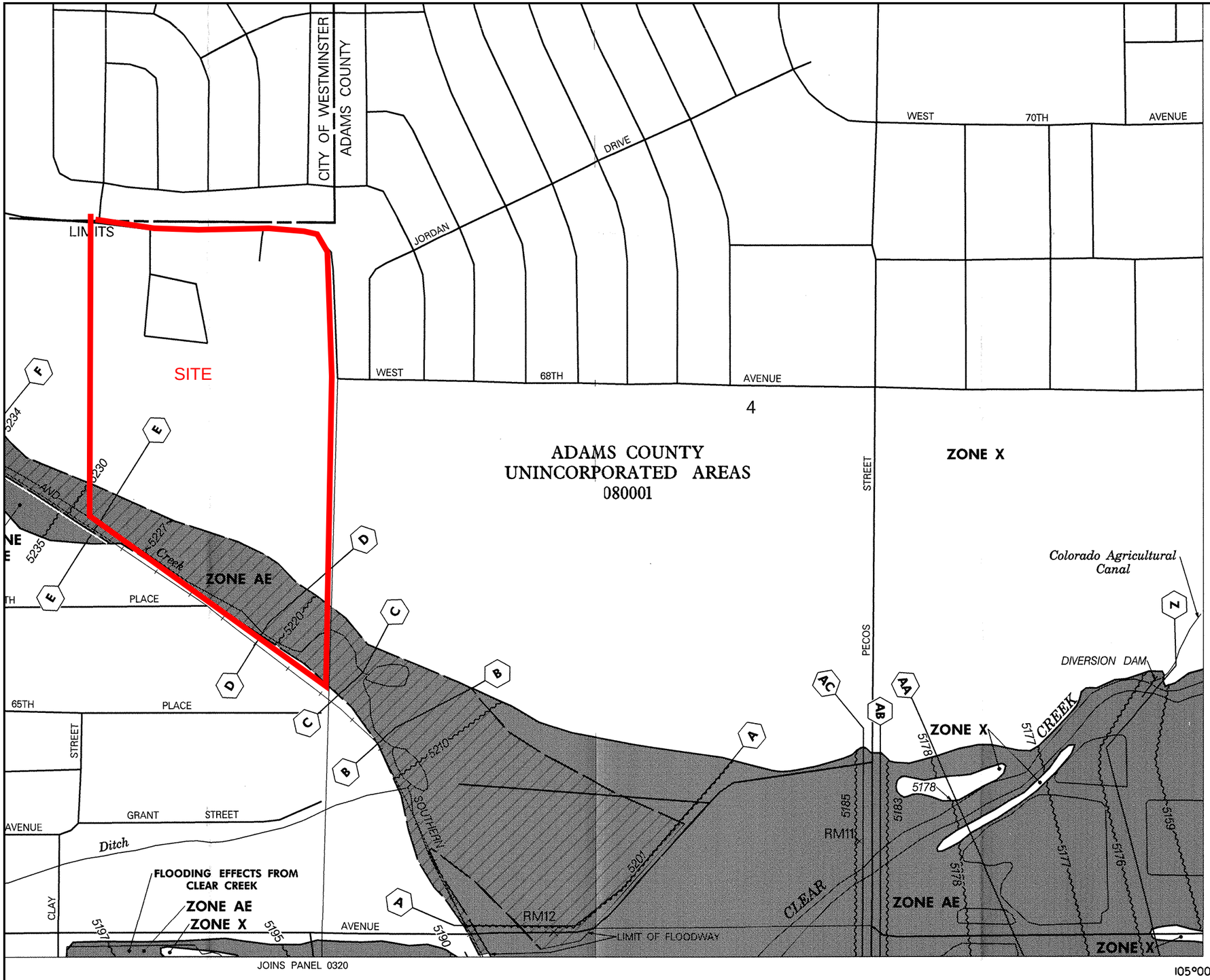
If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher



APPROXIMATE SCALE IN FEET

500 0 500

NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

ADAMS COUNTY, COLORADO AND INCORPORATED AREAS

PANEL 309 OF 875

(SEE MAP INDEX FOR PANELS NOT PRINTED)

CONTAINS: COMMUNITY	NUMBER	PANEL	SUFFIX
ADAMS COUNTY, UNINCORPORATED AREAS	080001	0309	G

MAP NUMBER
08001C0309 G

EFFECTIVE DATE:
AUGUST 16, 1995

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

720.283.6783 Office
1500 West Canal Court
Littleton, Colorado 80120
REDLAND.COM

Appendix B - Hydrologic Calculations

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SF-1
RUNOFF COEFFICIENTS - DEVELOPED

PROJECT NAME: Midtown Filing 12 DATE: 2/18/2020
PROJECT NUMBER: 10015.23
CALCULATED BY: EBR
CHECKED BY: MTP

LAND USE:	Paved Area	Lawn Area	Single Family Area
IMPERVIOUS %	100%	2%	70%

Calculations assume Type C/D soils per NRCS

OVERALL SITE STUDY AREA

DESIGN BASIN	DESIGN POINT	(AC)	(AC)	(AC)	TOTAL AREA (AC)	Cd(2)	Cd(5)	Cd(10)	Cd(100)	Impervious %
A17-1	A17-1	0.19	0.56	0.96	**1.71**	0.39	0.45	0.51	0.69	51.1%
A17-2	A17-2	0.12	0.46	0.70	**1.28**	0.37	0.43	0.49	0.68	48.4%
A17-3	A17-3	0.54		0.38	**0.92**	0.72	0.75	0.78	0.84	87.6%
A17-3A	A17-3A	0.39			**0.39**	0.83	0.86	0.87	0.89	100.0%
A17-4	A17-4	0.14			**0.14**	0.83	0.86	0.87	0.89	100.0%
A17-5	A17-5	0.19		0.05	**0.25**	0.77	0.80	0.82	0.87	93.6%
A17-5A	A17-5A	0.24	0.03	0.18	**0.45**	0.67	0.71	0.74	0.82	82.4%
A17-6	A17-6	0.25	0.02	0.20	**0.47**	0.67	0.71	0.74	0.82	82.4%
A17-6A	A17-6A	0.49		0.30	**0.79**	0.73	0.76	0.79	0.85	88.7%
A17-7	A17-7	0.22	0.02	0.19	**0.43**	0.66	0.70	0.73	0.82	81.3%
A17-7A	A17-7A	0.26	0.29	0.38	**0.93**	0.44	0.50	0.55	0.72	57.0%
A17-7B	A17-7B	0.26		0.26	**0.52**	0.69	0.73	0.76	0.83	85.0%
A17-8	A17-8	0.15	0.20	0.53	**0.87**	0.46	0.52	0.57	0.73	59.6%
A17 BASINS		**3.44**	**1.58**	**4.14**	**9.15**	0.55	0.60	0.65	0.77	**69.5%**
		37.5%	**17.3%**	**45.2%**	**100.0%**					
A18-1	A18-1	0.11		0.18	**0.29**	0.66	0.71	0.74	0.82	81.8%
A18-2	A18-2	0.11	0.13	0.24	**0.49**	0.45	0.51	0.56	0.72	58.5%
A18-3	A18-3	0.15	0.04	0.12	**0.31**	0.61	0.66	0.69	0.80	76.0%
A18-4	A18-4	0.29	0.18	0.43	**0.91**	0.52	0.57	0.62	0.75	65.8%
A18-5	A18-5	0.12	0.12	0.30	**0.54**	0.48	0.54	0.58	0.73	61.0%
A18-6	A18-6	2.61	29.49		**32.10**	0.06	0.12	0.21	0.52	10.0%
A16 BASINS		**3.40**	**29.97**	**1.28**	**34.64**	0.09	0.15	0.24	0.54	**14.1%**
		9.8%	**86.5%**	**3.7%**	**100.0%**					
OVERALL STUDY AREA		**6.83**	**31.55**	**5.41**	**43.80**	0.18	0.25	0.32	0.59	**25.7%**
		15.6%	**72.0%**	**12.4%**	**100.0%**					

Table 6-4. Runoff coefficient equations based on NRCS soil group and storm return period

NRCS Soil Group	Storm Return Period						
	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year	500-Year
A	$C_A = 0.84i^{1.302}$	$C_A = 0.86i^{1.276}$	$C_A = 0.87i^{1.232}$	$C_A = 0.88i^{1.124}$	$C_A = 0.85i+0.025$	$C_A = 0.78i+0.110$	$C_A = 0.65i+0.254$
B	$C_B = 0.84i^{1.169}$	$C_B = 0.86i^{1.088}$	$C_B = 0.81i+0.057$	$C_B = 0.63i+0.249$	$C_B = 0.56i+0.328$	$C_B = 0.47i+0.426$	$C_B = 0.37i+0.536$
C/D	$C_{C/D} = 0.83i^{1.122}$	$C_{C/D} = 0.82i+0.035$	$C_{C/D} = 0.74i+0.132$	$C_{C/D} = 0.56i+0.319$	$C_{C/D} = 0.49i+0.393$	$C_{C/D} = 0.41i+0.484$	$C_{C/D} = 0.32i+0.588$

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STANDARD FORM SF-2 - DEVELOPED
Time of Concentration

PROJECT NAME: Midtown Filing 12 — 9/13/2019 — DATE: 4/7/2020
PROJECT NUMBER: 10015.2
CALCULATED BY: EBR
CHECKED BY: MTP

SUB-BASIN DATA			INITIAL TIME (T_i)			TRAVEL TIME (T_t)						tc CHECK (URBANIZED BASINS)			FINAL tc		
DESIGN BASIN (1)	AREA Ac (2)	C_5 (3)	LENGTH Ft* (4)	SLOPE % (5)	T_i Min. (6)	LENGTH Ft. (7)	SLOPE % (8)	K (9)	Land Surface (10)	VEL fps (11)	T_t Min. (12)	COMP. tc (13)	TOTAL LENGTH (14)	$T_C=(26-17i)+\frac{L_t}{60(24i+9)S_0^{1/2}}$ (15)	Min.	C10	C100
A17-1	1.71	0.45	40	2.5%	5.5	560	1.4%	7.0	Short Pasture/Lawn	0.8	11.5	17.0	600	17.7	17.0	0.51	0.69
A17-2	1.28	0.43	40	2.5%	5.7	430	1.4%	7.0	Short Pasture/Lawn	0.8	8.8	14.5	470	18.0	14.5	0.49	0.68
A17-3	0.92	0.75	40	2.5%	3.0	835	1.0%	20.0	Paved Areas	2.0	7.0	9.9	875	11.7	9.9	0.78	0.84
A17-3A	0.39	0.86	21	2.0%	1.6	560	1.0%	20.0	Paved Areas	2.0	4.7	6.3	581	9.4	6.3	0.87	0.89
A17-4	0.14	0.86	10	2.0%	1.1	210	1.0%	20.0	Paved Areas	2.0	1.8	2.9	220	9.1	5.0	0.87	0.89
A17-5	0.25	0.80	20	2.0%	1.9	350	1.0%	20.0	Paved Areas	2.0	2.9	4.9	370	10.3	5.0	0.82	0.87
A17-5A	0.45	0.71	27	2.5%	2.7	215	1.0%	20.0	Paved Areas	2.0	1.8	4.5	242	12.1	5.0	0.74	0.82
A17-6	0.47	0.71	30	2.5%	2.9	425	1.0%	20.0	Paved Areas	2.0	3.5	6.4	455	12.3	6.4	0.74	0.82
A17-6A	0.79	0.76	27	2.5%	2.4	315	1.0%	20.0	Paved Areas	2.0	2.6	5.0	342	11.1	5.0	0.79	0.85
A17-7	0.43	0.70	30	2.5%	2.9	425	1.0%	20.0	Paved Areas	2.0	3.5	6.5	455	12.5	6.5	0.73	0.82
A17-7A	0.93	0.50	70	1.5%	8.0	400	1.0%	20.0	Paved Areas	2.0	3.3	11.3	470	16.6	11.3	0.55	0.72
A17-7B	0.52	0.73	32	2.5%	2.8	425	1.0%	20.0	Paved Areas	2.0	3.5	6.4	457	11.8	6.4	0.76	0.83
A17-8	0.87	0.52	36	2.5%	4.7	1,020	0.5%	7.0	Short Pasture/Lawn	0.5	34.3	39.0	1056	16.9	39.0	0.57	0.73
A18-1	0.29	0.71	27	2.5%	2.8	200	1.9%	20.0	Paved Areas	2.7	1.2	4.0	227	12.2	5.0	0.74	0.82
A18-2	0.49	0.51	55	2.5%	5.9	305	1.5%	20.0	Paved Areas	2.4	2.1	7.9	360	16.2	7.9	0.56	0.72
A18-3	0.31	0.66	28	2.5%	3.2	340	1.0%	20.0	Paved Areas	2.0	2.8	6.0	368	13.3	6.0	0.69	0.80
A18-4	0.91	0.57	28	2.5%	3.8	440	1.0%	20.0	Paved Areas	2.0	3.7	7.4	468	15.1	7.4	0.62	0.75
A18-5	0.54	0.54	27	2.5%	4.0	215	1.0%	20.0	Paved Areas	2.0	1.8	5.8	242	15.8	5.8	0.58	0.73
A18-6	32.10	0.12	500	1.3%	36.9	1,150	1.7%	7.0	Short Pasture/Lawn	0.9	21.0	57.9	1650	25.0	57.9	0.21	0.52

* L = 500' max for non-urban land uses and 300' max for urban land uses

$$T_i = \frac{0.395(1.1-C)L^{1/2}}{S^{1/3}} \qquad T_t = \frac{L}{60V} \qquad V = K\sqrt{S_0}$$

Table 6-2. NRCS Conveyance factors, K

Type of Land Surface	Conveyance Factor, K
Heavy meadow	2.5
Tillage/field	5
Short pasture and lawns	7
Nearly bare ground	10
Grassed waterway	15
Paved areas and shallow paved swales	20

REDLAND

STANDARD FORM SF-3 - DEVELOPED
STORM DRAINAGE DESIGN - RATIONAL METHOD 5 YEAR EVENT

PROJECT NAME: Midtown Filing 12 — 9/13/2019 — DATE: 4/7/2020
PROJECT NUMBER: 10015.23 — P_1 (1-Hour Rainfall) = 1.42
CALCULATED BY: EBR
CHECKED BY: MTP

		DIRECT RUNOFF							TOTAL RUNOFF				STREET		PIPE			TRAVEL TIME			REMARKS
STORM LINE	DESIGN POINT	DESIGN BASIN	AREA (AC)	RUNOFF COEFF C5	tc (min)	C*A(ac)	I (in/hr)	Q (cfs)	tc(min)	S(C*A) (ac)	I (in/hr)	Q - 5 YEAR (cfs)	SLOPE (%)	STREET FLOW(cfs)	DESIGN FLOW(cfs)	SLOPE (%)	PIPE SIZE (in)	LENGTH (ft)	VELOCITY (fps)	tt (min)	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
	A17-1	A17-1	1.71	0.45	17.00	0.78	3.03	2.4													
	A17-2	A17-2	1.28	0.43	14.52	0.55	3.27	1.8	17.0	1.33	3.03	**4.04**									
	A17-3	A17-3	0.92	0.75	9.92	0.69	3.85	**2.7**													
	A17-3A	A17-3A	0.39	0.86	6.30	0.33	4.51	**1.5**													
	A17-4	A17-4	0.14	0.86	5.00	0.12	4.82	**0.6**													
	A17-5	A17-5	0.25	0.80	5.00	0.20	4.82	1.0													
	A17-5A	A17-5A	0.45	0.71	5.00	0.32	4.82	1.5	5.0	0.51	4.82	**2.48**									
	A17-6	A17-6	0.47	0.71	6.42	0.33	4.49	1.5													
	A17-6A	A17-6A	0.79	0.76	5.00	0.60	4.82	2.9	6.4	0.93	4.49	**4.18**									
	A17-7	A17-7	0.43	0.70	6.49	0.30	4.47	1.4													
	A17-7A	A17-7A	0.93	0.50	11.34	0.47	3.65	1.7													
	A17-7B	A17-7B	0.52	0.73	6.35	0.38	4.50	1.7	11.3	1.15	3.65	**4.21**									
	A17-8	A17-8	0.87	0.52	39.02	0.46	1.90	**0.9**													
	A18-1	A18-1	0.29	0.71	5.00	0.20	4.82	**1.0**													
	A18-2	A18-2	0.49	0.51	7.94	0.25	4.18	**1.1**													
	A18-3	A18-3	0.31	0.66	5.99	0.20	4.58	**0.9**													
	A18-4	A18-4	0.91	0.57	7.42	0.52	4.28	**2.2**													
	A18-5	A18-5	0.54	0.54	5.76	0.29	4.63	**1.3**													
	A18-6	A18-6	32.10	0.12	57.94	3.75	1.47	**5.5**													

REDLAND

STANDARD FORM SF-3 - DEVELOPED
STORM DRAINAGE DESIGN - RATIONAL METHOD 100 YEAR EVENT

PROJECT NAME: Midtown Filing 12 — 9/13/2019 — DATE: 4/7/2020
PROJECT NUMBER: 10015.23 — P_1 (1-Hour Rainfall) = **2.71**
CALCULATED BY: EBR
CHECKED BY: MTP

		DIRECT RUNOFF							TOTAL RUNOFF				STREET		PIPE			TRAVEL TIME			REMARKS
STORM LINE	DESIGN POINT	DESIGN BASIN	AREA (AC)	RUNOFF COEFF C100	tc (min)	C*A(ac)	I (in/hr)	Q (cfs)	tc(min)	S(C*A) (ac)	I (in/hr)	Q - 100 YEAR (cfs)	SLOPE (%)	STREET FLOW(cfs)	DESIGN FLOW(cfs)	SLOPE (%)	PIPE SIZE (in)	LENGTH (ft)	VELOCITY (fps)	tt (min)	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
	A17-1	A17-1	1.71	0.69	17.00	1.19	5.79	6.9													
	A17-2	A17-2	1.28	0.68	14.52	0.88	6.25	5.5	14.5	2.06	6.25	**12.88**									
	A17-3	A17-3	0.92	0.84	9.92	0.78	7.35	**5.7**													
	A17-3A	A17-3A	0.39	0.89	6.30	0.35	8.61	**3.0**													
	A17-4	A17-4	0.14	0.89	5.00	0.13	9.19	**1.2**													
	A17-5	A17-5	0.25	0.87	5.00	0.21	9.19	2.0													
	A17-5A	A17-5A	0.45	0.82	5.00	0.37	9.19	3.4	5.0	0.58	9.19	**5.33**									
	A17-6	A17-6	0.47	0.82	6.42	0.38	8.56	3.3													
	A17-6A	A17-6A	0.79	0.85	5.00	0.67	9.19	6.1	5.0	1.05	9.19	**9.67**									
	A17-7	A17-7	0.43	0.82	6.49	0.36	8.53	3.0													
	A17-7A	A17-7A	0.93	0.72	11.34	0.67	6.97	4.7													
	A17-7B	A17-7B	0.52	0.83	6.35	0.43	8.59	3.7	6.4	1.46	8.59	**12.50**									
	A17-8	A17-8	0.87	0.73	39.02	0.64	3.62	**2.3**													
	A18-1	A18-1	0.29	0.82	5.00	0.24	9.19	**2.2**													
	A18-2	A18-2	0.49	0.72	7.94	0.36	7.99	**2.8**													
	A18-3	A18-3	0.31	0.80	5.99	0.25	8.74	**2.2**													
	A18-4	A18-4	0.91	0.75	7.42	0.69	8.17	**5.6**													
	A18-5	A18-5	0.54	0.73	5.76	0.40	8.84	**3.5**													
	A18-6	A18-6	32.10	0.52	57.94	16.85	2.80	**47.2**													

Appendix C - Hydraulic Calculations

Version 4.05 Released March 2017

INLET MANAGEMENT

Worksheet Protected

INLET NAME	Inlet A17-4	Inlet A17-6	A17-3 Street Capacity	Inlet A17-3	4" Curb Capacity	Inlet A18-1	Inlets A18-5
Site Type (Urban or Rural)	URBAN	URBAN	URBAN	URBAN	URBAN	URBAN	URBAN
Inlet Application (Street or Area)	STREET	STREET	STREET	STREET	STREET	STREET	AREA
Hydraulic Condition	In Sump	In Sump	On Grade	In Sump	On Grade	In Sump	Swale
Inlet Type	CDOT Type R Curb Opening	CDOT Type R Curb Opening		CDOT Type R Curb Opening		CDOT Type R Curb Opening	CDOT Type C (Depressed)

USER-DEFINED INPUT

User-Defined Design Flows

Minor Q_{known} (cfs)	3.1	8.4	4.2	4.2	2.9	5.2	1.3
Major Q_{known} (cfs)	6.5	22.2	8.7	8.7	6.1	12.8	3.5

Bypass (Carry-Over) Flow from Upstream

Receive Bypass Flow from:	No Bypass Flow Received	No Bypass Flow Received	No Bypass Flow Received	No Bypass Flow Received	No Bypass Flow Received	No Bypass Flow Received	No Bypass Flow Received
Minor Bypass Flow Received, Q_b (cfs)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Major Bypass Flow Received, Q_b (cfs)	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Watershed Characteristics

Subcatchment Area (acres)							
Percent Impervious							
NRCS Soil Type							

Watershed Profile

Overland Slope (ft/ft)							
Overland Length (ft)							
Channel Slope (ft/ft)							
Channel Length (ft)							

Minor Storm Rainfall Input

Design Storm Return Period, T_r (years)							
One-Hour Precipitation, P_1 (inches)							

Major Storm Rainfall Input

Design Storm Return Period, T_r (years)							
One-Hour Precipitation, P_1 (inches)							

CALCULATED OUTPUT

Minor Total Design Peak Flow, Q (cfs)	**3.1**	**8.4**	**4.2**	**4.2**	**2.9**	**5.2**	**1.3**
Major Total Design Peak Flow, Q (cfs)	**6.5**	**22.2**	**8.7**	**8.7**	**6.1**	**12.8**	**3.5**
Minor Flow Bypassed Downstream, Q_b (cfs)	N/A	N/A		N/A		N/A	0.0
Major Flow Bypassed Downstream, Q_b (cfs)	N/A	N/A		N/A		N/A	0.0

Minor Storm (Calculated) Analysis of Flow Time

C	N/A	N/A	N/A	N/A	N/A	N/A	N/A
C_5	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Overland Flow Velocity, Vi	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Channel Flow Velocity, Vt	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Overland Flow Time, Ti	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Channel Travel Time, Tt	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Calculated Time of Concentration, T_c	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Regional T_c	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Recommended T_c	N/A	N/A	N/A	N/A	N/A	N/A	N/A
T_c selected by User	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Design Rainfall Intensity, I	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Calculated Local Peak Flow, Q_p	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Major Storm (Calculated) Analysis of Flow Time

C	N/A	N/A	N/A	N/A	N/A	N/A	N/A
C_5	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Overland Flow Velocity, Vi	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Channel Flow Velocity, Vt	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Overland Flow Time, Ti	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Channel Travel Time, Tt	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Calculated Time of Concentration, T_c	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Regional T_c	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Recommended T_c	N/A	N/A	N/A	N/A	N/A	N/A	N/A
T_c selected by User	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Design Rainfall Intensity, I	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Calculated Local Peak Flow, Q_p	N/A	N/A	N/A	N/A	N/A	N/A	N/A

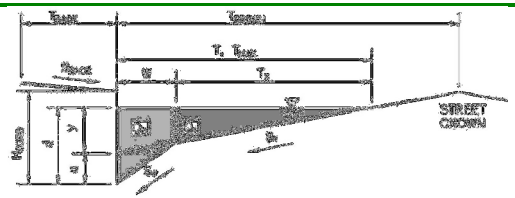
Version 4.05 Released March 2017

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: Midtown Filing 12

Inlet ID: Inlet A17-4



Gutter Geometry (Enter data in the blue cells)

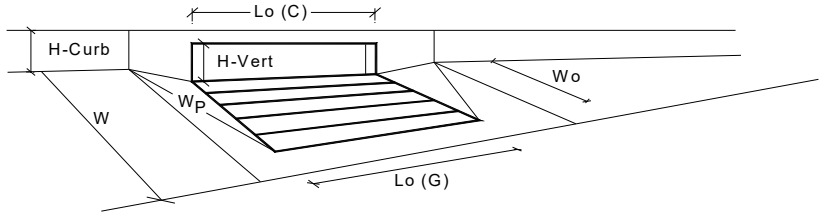
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	10.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.020	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	18.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.000	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.013	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	18.0	18.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	8.2	inches
Check boxes are not applicable in SUMP conditions		☐	☐	

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	**Q_{allow} =**	**SUMP**	**SUMP**	**cfs**

INLET IN A SUMP OR SAG LOCATION

Version 4.05 Released March 2017



Design Information (Input)		MINOR	MAJOR	
Type of Inlet	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from above)	a_{local} =	3.00	3.00	inches
Number of Unit Inlets (Grate or Curb Opening)	No =	1	1	
Water Depth at Flowline (outside of local depression)	Ponding Depth =	5.8	8.0	inches
Grate Information		MINOR	MAJOR	☑ Override Depths
Length of a Unit Grate	L_o (G) =	N/A	N/A	feet
Width of a Unit Grate	W_o =	N/A	N/A	feet
Area Opening Ratio for a Grate (typical values 0.15-0.90)	A_{ratio} =	N/A	N/A	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)	C_f (G) =	N/A	N/A	
Grate Weir Coefficient (typical value 2.15 - 3.60)	C_w (G) =	N/A	N/A	
Grate Orifice Coefficient (typical value 0.60 - 0.80)	C_o (G) =	N/A	N/A	
Curb Opening Information		MINOR	MAJOR	
Length of a Unit Curb Opening	L_o (C) =	5.00	5.00	feet
Height of Vertical Curb Opening in Inches	H_{vert} =	6.00	6.00	inches
Height of Curb Orifice Throat in Inches	H_{throat} =	6.00	6.00	inches
Angle of Throat (see USDCM Figure ST-5)	Theta =	63.40	63.40	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)	W_p =	2.00	2.00	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)	C_f (C) =	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)	C_w (C) =	3.60	3.60	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)	C_o (C) =	0.67	0.67	
Low Head Performance Reduction (Calculated)		MINOR	MAJOR	
Depth for Grate Midwidth	d_{Grate} =	N/A	N/A	ft
Depth for Curb Opening Weir Equation	d_{Curb} =	0.32	0.50	ft
Combination Inlet Performance Reduction Factor for Long Inlets	$RF_{Combination}$ =	0.75	1.00	
Curb Opening Performance Reduction Factor for Long Inlets	RF_{Curb} =	1.00	1.00	
Grated Inlet Performance Reduction Factor for Long Inlets	RF_{Grate} =	N/A	N/A	
		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	**Q_a =**	**5.0**	**9.3**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms(>Q PEAK)	$Q_{PEAK\ REQUIRED}$ =	3.1	6.5	cfs

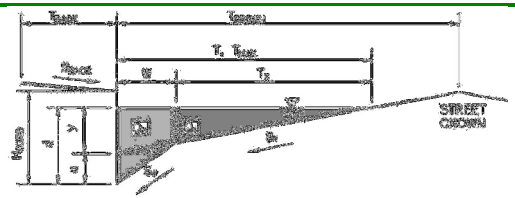
Version 4.05 Released March 2017

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: Midtown Filing 12

Inlet ID: Inlet A17-6



Gutter Geometry (Enter data in the blue cells)

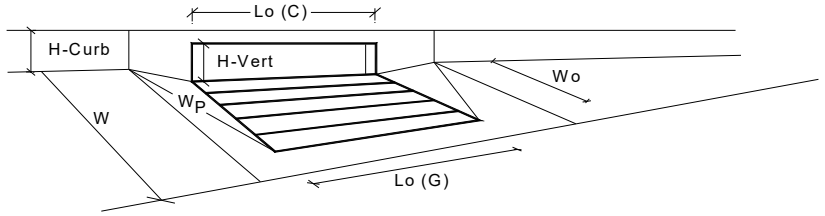
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	10.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.020	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	18.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.000	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.013	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	18.0	18.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	8.4	inches
Check boxes are not applicable in SUMP conditions		☐	☐	

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	**Q_{allow} =**	**SUMP**	**SUMP**	**cfs**

INLET IN A SUMP OR SAG LOCATION

Version 4.05 Released March 2017



Design Information (Input)		MINOR	MAJOR	
Type of Inlet	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from above)	a_{local} =	3.00	3.00	inches
Number of Unit Inlets (Grate or Curb Opening)	No =	3	3	
Water Depth at Flowline (outside of local depression)	Ponding Depth =	5.8	8.0	inches
Grate Information		MINOR	MAJOR	☑ Override Depths
Length of a Unit Grate	L_o (G) =	N/A	N/A	feet
Width of a Unit Grate	W_o =	N/A	N/A	feet
Area Opening Ratio for a Grate (typical values 0.15-0.90)	A_{ratio} =	N/A	N/A	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)	C_f (G) =	N/A	N/A	
Grate Weir Coefficient (typical value 2.15 - 3.60)	C_w (G) =	N/A	N/A	
Grate Orifice Coefficient (typical value 0.60 - 0.80)	C_o (G) =	N/A	N/A	
Curb Opening Information		MINOR	MAJOR	
Length of a Unit Curb Opening	L_o (C) =	5.00	5.00	feet
Height of Vertical Curb Opening in Inches	H_{vert} =	6.00	6.00	inches
Height of Curb Orifice Throat in Inches	H_{throat} =	6.00	6.00	inches
Angle of Throat (see USDCM Figure ST-5)	Theta =	63.40	63.40	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)	W_p =	2.00	2.00	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)	C_f (C) =	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)	C_w (C) =	3.60	3.60	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)	C_o (C) =	0.67	0.67	
Low Head Performance Reduction (Calculated)		MINOR	MAJOR	
Depth for Grate Midwidth	d_{Grate} =	N/A	N/A	ft
Depth for Curb Opening Weir Equation	d_{Curb} =	0.32	0.50	ft
Combination Inlet Performance Reduction Factor for Long Inlets	$RF_{Combination}$ =	0.55	0.75	
Curb Opening Performance Reduction Factor for Long Inlets	RF_{Curb} =	0.78	0.89	
Grated Inlet Performance Reduction Factor for Long Inlets	RF_{Grate} =	N/A	N/A	
		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	**Q_a =**	**12.5**	**27.9**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms(>Q PEAK)	$Q_{PEAK\ REQUIRED}$ =	8.4	22.2	cfs

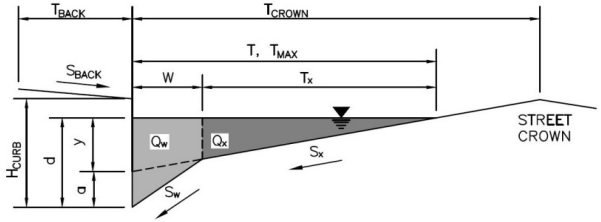
Version 4.05 Released March 2017

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: Midtown Filing 12

Inlet ID: A17-3 Street Capacity 6" Vertical Curb & Gutter



Gutter Geometry (Enter data in the blue cells)

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	10.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.020	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	18.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.010	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.013	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	18.0	18.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	8.0	inches
Allow Flow Depth at Street Crown (leave blank for no)		☐	☑	check = yes

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Spread Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	**Q_{allow} =**	**15.4**	**42.4**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

Major storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

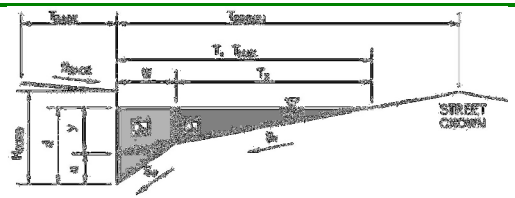
Version 4.05 Released March 2017

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: Midtown Filing 12

Inlet ID: Inlet A17-3



Gutter Geometry (Enter data in the blue cells)

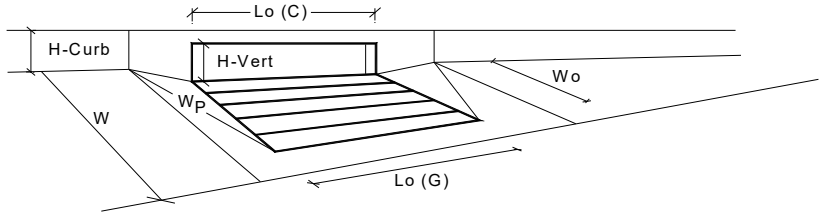
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	10.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.020	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	14.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.000	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.013	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	14.0	14.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	8.0	inches
Check boxes are not applicable in SUMP conditions		☐	☐	

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	Q_{allow} =	**SUMP**	**SUMP**	**cfs**

INLET IN A SUMP OR SAG LOCATION

Version 4.05 Released March 2017



Design Information (Input)		MINOR	MAJOR	
Type of Inlet	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from above)	a_{local} =	3.00	3.00	inches
Number of Unit Inlets (Grate or Curb Opening)	No =	2	2	
Water Depth at Flowline (outside of local depression)	Ponding Depth =	4.9	8.0	inches
Grate Information		MINOR	MAJOR	☑ Override Depths
Length of a Unit Grate	L_o (G) =	N/A	N/A	feet
Width of a Unit Grate	W_o =	N/A	N/A	feet
Area Opening Ratio for a Grate (typical values 0.15-0.90)	A_{ratio} =	N/A	N/A	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)	C_f (G) =	N/A	N/A	
Grate Weir Coefficient (typical value 2.15 - 3.60)	C_w (G) =	N/A	N/A	
Grate Orifice Coefficient (typical value 0.60 - 0.80)	C_o (G) =	N/A	N/A	
Curb Opening Information		MINOR	MAJOR	
Length of a Unit Curb Opening	L_o (C) =	5.00	5.00	feet
Height of Vertical Curb Opening in Inches	H_{vert} =	6.00	6.00	inches
Height of Curb Orifice Throat in Inches	H_{throat} =	6.00	6.00	inches
Angle of Throat (see USDCM Figure ST-5)	Theta =	63.40	63.40	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)	W_p =	2.00	2.00	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)	C_f (C) =	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)	C_w (C) =	3.60	3.60	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)	C_o (C) =	0.67	0.67	
Low Head Performance Reduction (Calculated)		MINOR	MAJOR	
Depth for Grate Midwidth	d_{Grate} =	N/A	N/A	ft
Depth for Curb Opening Weir Equation	d_{Curb} =	0.24	0.50	ft
Combination Inlet Performance Reduction Factor for Long Inlets	$RF_{Combination}$ =	0.46	0.75	
Curb Opening Performance Reduction Factor for Long Inlets	RF_{Curb} =	0.86	1.00	
Grated Inlet Performance Reduction Factor for Long Inlets	RF_{Grate} =	N/A	N/A	
		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	**Q_a =**	**5.9**	**19.3**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms(>Q PEAK)	$Q_{PEAK\ REQUIRED}$ =	4.2	8.7	cfs

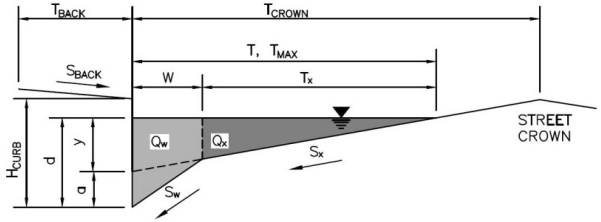
Version 4.05 Released March 2017

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: Midtown Filing 12

Inlet ID: 4" Curb Capacity



Gutter Geometry (Enter data in the blue cells)

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	2.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.025	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.020	
Height of Curb at Gutter Flow Line	H_{CURB} =	4.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	13.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.010	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.013	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	13.0	13.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	4.0	4.0	inches
Allow Flow Depth at Street Crown (leave blank for no)		☐	☑	check = yes

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	**Q_{allow} =**	**4.2**	**4.2**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

WARNING: MAJOR STORM max. allowable capacity is less than the design flow given on sheet 'Inlet Management'

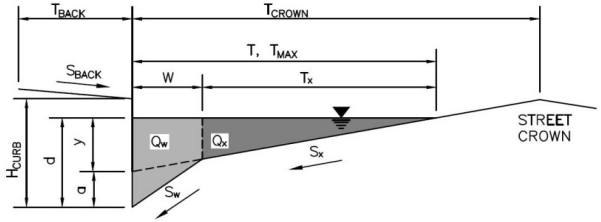
Version 4.05 Released March 2017

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: Midtown Filing 12

Inlet ID: Inlet A18-1



Gutter Geometry (Enter data in the blue cells)

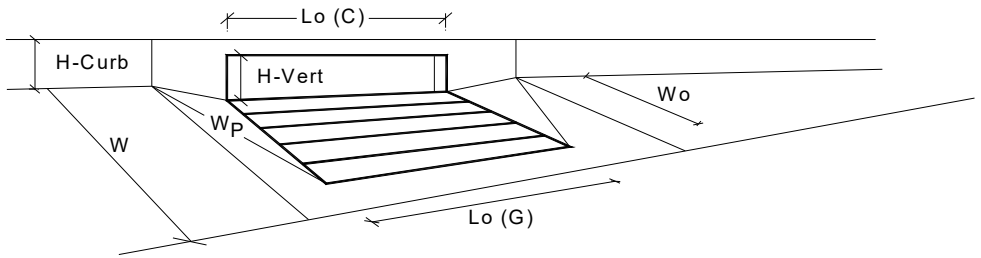
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	5.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.025	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.020	
Height of Curb at Gutter Flow Line	H_{CURB} =	4.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	13.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.000	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.013	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	13.0	13.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	4.0	6.0	inches
Check boxes are not applicable in SUMP conditions		☐	☐	

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	**Q_{allow} =**	**SUMP**	**SUMP**	**cfs**

INLET IN A SUMP OR SAG LOCATION

Version 4.05 Released March 2017



Design Information (Input)		MINOR	MAJOR	
Type of Inlet	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from above)	a_{local} =	5.00	5.00	inches
Number of Unit Inlets (Grate or Curb Opening)	No =	2	2	
Water Depth at Flowline (outside of local depression)	Ponding Depth =	4.0	7.0	inches
Grate Information		MINOR	MAJOR	☑ Override Depths
Length of a Unit Grate	L_o (G) =	N/A	N/A	feet
Width of a Unit Grate	W_o =	N/A	N/A	feet
Area Opening Ratio for a Grate (typical values 0.15-0.90)	A_{ratio} =	N/A	N/A	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)	C_f (G) =	N/A	N/A	
Grate Weir Coefficient (typical value 2.15 - 3.60)	C_w (G) =	N/A	N/A	
Grate Orifice Coefficient (typical value 0.60 - 0.80)	C_o (G) =	N/A	N/A	
Curb Opening Information		MINOR	MAJOR	
Length of a Unit Curb Opening	L_o (C) =	5.00	5.00	feet
Height of Vertical Curb Opening in Inches	H_{vert} =	6.00	6.00	inches
Height of Curb Orifice Throat in Inches	H_{throat} =	6.00	6.00	inches
Angle of Throat (see USDCM Figure ST-5)	Theta =	63.40	63.40	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)	W_p =	2.00	2.00	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)	C_f (C) =	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)	C_w (C) =	3.60	3.60	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)	C_o (C) =	0.67	0.67	

Grate Flow Analysis (Calculated)		MINOR	MAJOR	
Clogging Coefficient for Multiple Units	Coef =	N/A	N/A	
Clogging Factor for Multiple Units	Clog =	N/A	N/A	
Grate Capacity as a Weir (based on Modified HEC22 Method)		MINOR	MAJOR	
Interception without Clogging	Q_{wi} =	N/A	N/A	cfs
Interception with Clogging	Q_{wa} =	N/A	N/A	cfs
Grate Capacity as a Orifice (based on Modified HEC22 Method)		MINOR	MAJOR	
Interception without Clogging	Q_{oi} =	N/A	N/A	cfs
Interception with Clogging	Q_{oa} =	N/A	N/A	cfs
Grate Capacity as Mixed Flow		MINOR	MAJOR	

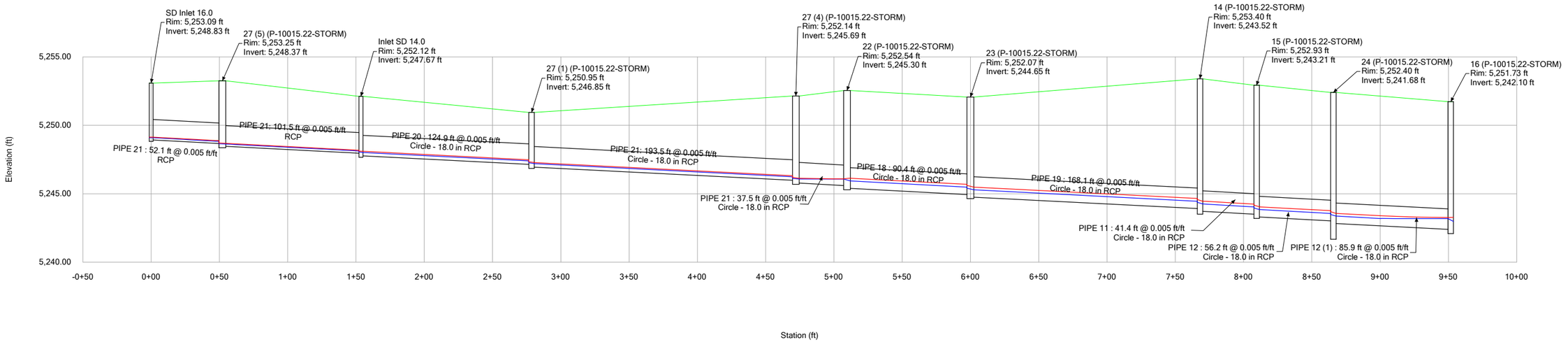
Interception without Clogging	Q_{mi} =	N/A	N/A	cfs
Interception with Clogging	Q_{ma} =	N/A	N/A	cfs
Resulting Grate Capacity (assumes clogged condition)	**Q_{Grate} =**	**N/A**	**N/A**	**cfs**
Curb Opening Flow Analysis (Calculated)		MINOR	MAJOR	
Clogging Coefficient for Multiple Units	Coef =	1.25	1.25	
Clogging Factor for Multiple Units	Clog =	0.06	0.06	
Curb Opening as a Weir (based on Modified HEC22 Method)		MINOR	MAJOR	
Interception without Clogging	Q_{wi} =	3.3	16.5	cfs
Interception with Clogging	Q_{wa} =	3.1	15.5	cfs
Curb Opening as an Orifice (based on Modified HEC22 Method)		MINOR	MAJOR	
Interception without Clogging	Q_{oi} =	19.5	23.7	cfs
Interception with Clogging	Q_{oa} =	18.3	22.2	cfs
Curb Opening Capacity as Mixed Flow		MINOR	MAJOR	
Interception without Clogging	Q_{mi} =	7.5	18.4	cfs
Interception with Clogging	Q_{ma} =	7.0	17.2	cfs
Resulting Curb Opening Capacity (assumes clogged condition)	**Q_{Curb} =**	**3.1**	**15.5**	**cfs**
Resultant Street Conditions		MINOR	MAJOR	
Total Inlet Length	L =	10.00	10.00	feet
Resultant Street Flow Spread (based on street geometry from above)	T =	10.4	22.9	ft.>T-Crown
Resultant Flow Depth at Street Crown	d_{CROWN} =	0.0	2.4	inches
Low Head Performance Reduction (Calculated)		MINOR	MAJOR	
Depth for Grate Midwidth	d_{Grate} =	N/A	N/A	ft
Depth for Curb Opening Weir Equation	d_{Curb} =	0.17	0.42	ft
Combination Inlet Performance Reduction Factor for Long Inlets	$RF_{Combination}$ =	0.38	0.66	
Curb Opening Performance Reduction Factor for Long Inlets	RF_{Curb} =	0.79	0.99	
Grated Inlet Performance Reduction Factor for Long Inlets	RF_{Grate} =	N/A	N/A	
		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	**Q_a =**	**3.1**	**15.5**	**cfs**
WARNING: Inlet Capacity less than Q Peak for Minor Storm	$Q_{PEAK\ REQUIRED}$ =	5.2	12.8	cfs

5-YEAR

FlexTable: Conduit Table

Label	Start Node	Stop Node	Invert (Start) (ft)	Invert (Stop) (ft)	Length (User Defined) (ft)	Slope (Calculated) (ft/ft)	Diameter (in)	Manning's n	Flow (cfs)	Velocity (ft/s)	Capacity (Full Flow) (cfs)	Elevation Ground (Start) (ft)	Elevation Ground (Stop) (ft)	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)	Energy Grade Line (In) (ft)	Energy Grade Line (Out) (ft)
PIPE 21	27 (5)	Inlet SD 14.0	5,248.47	5,247.97	101.5	0.005	18.0	0.013	0.19	1.77	7.37	5,253.25	5,252.12	5,248.63	5,248.13	5,248.68	5,248.18
PIPE 21	SD Inlet 16.0	27 (5)	5,248.93	5,248.67	52.1	0.005	18.0	0.013	0.19	1.78	7.42	5,253.09	5,253.25	5,249.09	5,248.83	5,249.14	5,248.88
PIPE 21	27 (1)	27 (4)	5,246.95	5,245.99	193.5	0.005	18.0	0.013	0.44	2.30	7.40	5,250.95	5,252.14	5,247.20	5,246.24	5,247.28	5,246.32
PIPE 20	Inlet SD 14.0	27 (1)	5,247.77	5,247.15	124.9	0.005	18.0	0.013	0.44	2.31	7.40	5,252.12	5,250.95	5,248.02	5,247.40	5,248.10	5,247.48
PIPE 21	27 (4)	22	5,245.79	5,245.60	37.5	0.005	18.0	0.013	0.44	2.32	7.48	5,252.14	5,252.54	5,246.08	5,246.08	5,246.13	5,246.09
PIPE 19	23	14	5,244.75	5,243.92	168.1	0.005	18.0	0.013	2.06	3.58	7.38	5,252.07	5,253.40	5,245.29	5,244.46	5,245.49	5,244.66
PIPE 18	22	23	5,245.40	5,244.95	90.4	0.005	18.0	0.013	2.06	3.59	7.41	5,252.54	5,252.07	5,245.94	5,245.49	5,246.14	5,245.69
PIPE 12	15	24	5,243.31	5,243.03	56.2	0.005	18.0	0.013	2.06	3.59	7.41	5,252.93	5,252.40	5,243.85	5,243.57	5,244.05	5,243.77
PIPE 12 (1)	24	16	5,242.83	5,242.40	85.9	0.005	18.0	0.013	2.06	3.60	7.43	5,252.40	5,251.73	5,243.37	5,243.19	5,243.57	5,243.26
PIPE 11	14	15	5,243.72	5,243.51	41.4	0.005	18.0	0.013	2.06	3.61	7.48	5,253.40	5,252.93	5,244.26	5,244.05	5,244.46	5,244.25
PIPE 21 (6)	SD Inlet 6.2	16	5,242.52	5,242.40	24.0	0.005	18.0	0.013	2.91	3.94	7.43	5,251.36	5,251.73	5,243.20	5,243.19	5,243.42	5,243.34
CO-8	16	SD Inlet 6.1	5,242.20	5,242.13		0.006	24.0	0.013	4.97	4.75	17.28	5,251.73	5,251.36	5,242.98	5,242.98	5,243.28	5,243.22
CO-7	SD Inlet 6.1	MH-2	5,241.93	5,239.10	454.6	0.006	24.0	0.013	5.87	5.09	17.85	5,251.36	5,252.16	5,242.79	5,240.90	5,243.11	5,240.96
CO-3	MH-1	MH-2	5,240.19	5,239.10	217.4	0.005	24.0	0.013	10.68	5.46	16.02	5,246.01	5,252.16	5,241.38	5,240.90	5,241.85	5,241.10
CO-2	CB-9	MH-1	5,241.30	5,240.39	68.9	0.013	18.0	0.013	2.95	5.64	12.07	5,242.39	5,246.01	5,241.95	5,241.71	5,242.20	5,241.76
CO-6	MH-4	MH-5	5,235.64	5,235.08	111.5	0.005		0.013	16.55	5.87	46.69	5,244.36	5,245.00	5,237.27	5,237.26	5,237.43	5,237.36
CO-5	MH-3	MH-4	5,236.52	5,235.84	136.5	0.005	36.0	0.013	16.55	6.08	47.08	5,245.15	5,244.36	5,237.82	5,237.37	5,238.31	5,237.69
CO-4	MH-2	MH-3	5,238.90	5,236.72	436.8	0.005	36.0	0.013	16.55	6.08	47.12	5,252.16	5,245.15	5,240.20	5,238.12	5,240.69	5,238.53
PIPE 17	SD Inlet 11.1	22	5,247.10	5,245.60	49.6	0.030	18.0	0.013	1.62	6.38	18.26	5,251.34	5,252.54	5,247.58	5,246.08	5,247.75	5,246.25
CO-14	CB-10	MH-5	5,236.91	5,235.07	242.0	0.008	60.0	0.013	23.49	7.47	227.09	5,247.13	5,245.00	5,238.25	5,237.26	5,238.73	5,237.39
CO-12	MH-6	O-1	5,224.65	5,223.80	159.0	0.005	66.0	0.013	40.04	7.61	245.52	5,238.50	5,234.00	5,229.31	5,229.30	5,229.37	5,229.34
CO-13	SD Inlet 3.0	MH-1	5,240.73	5,240.39	19.4	0.017	18.0	0.013	7.73	8.07	13.89	5,245.77	5,246.01	5,241.81	5,241.71	5,242.31	5,242.05
CO-10	MH-5	MH-7	5,234.98	5,234.31	89.1	0.008	60.0	0.013	40.04	8.68	225.83	5,245.00	5,243.38	5,236.75	5,236.19	5,237.39	5,236.74
CO-11	MH-7	MH-6	5,234.10	5,228.86	273.0	0.019	60.0	0.013	40.04	12.11	360.84	5,243.38	5,238.50	5,235.87	5,229.98	5,236.51	5,232.27

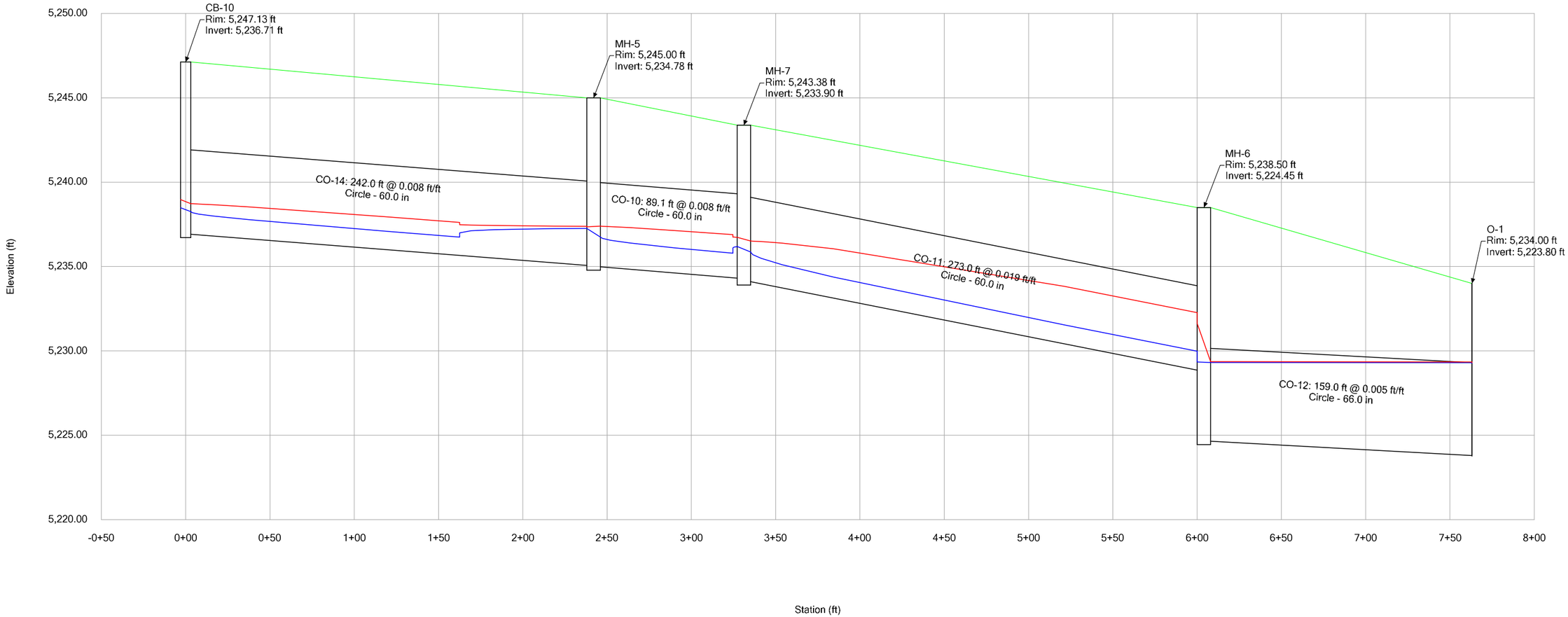
Profile Report
Engineering Profile - Profile - 1 (Midtown Filing 12 Storm Sewer_Park Pad Grading.stsw)
5-YEAR



Profile Report

Engineering Profile - Profile - 2 (Midtown Filing 12 Storm Sewer_Park Pad Grading.stsw)

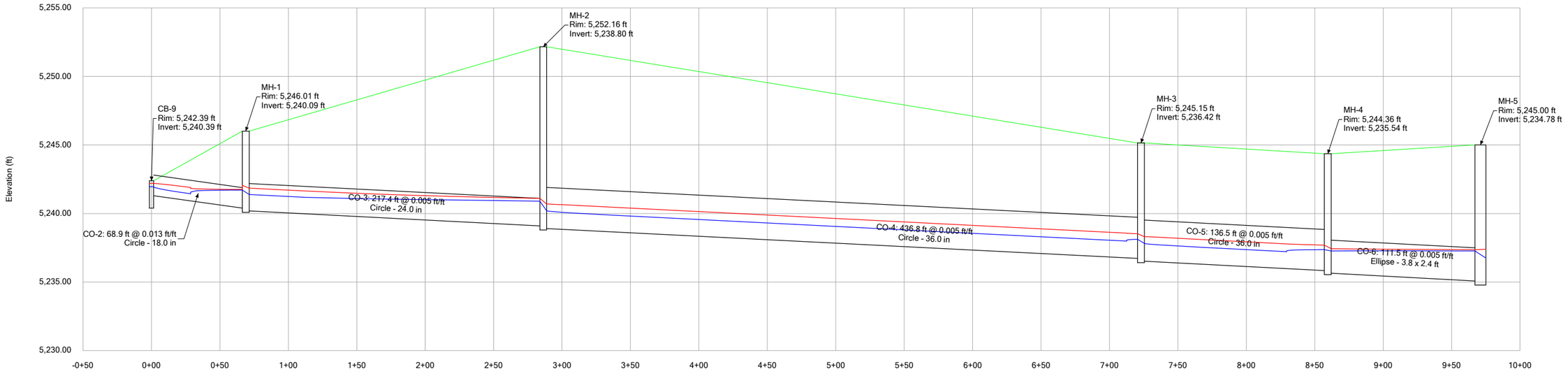
5-YEAR



Profile Report

Engineering Profile - Profile - 3 (Midtown Filing 12 Storm Sewer_Park Pad Grading.stsw)

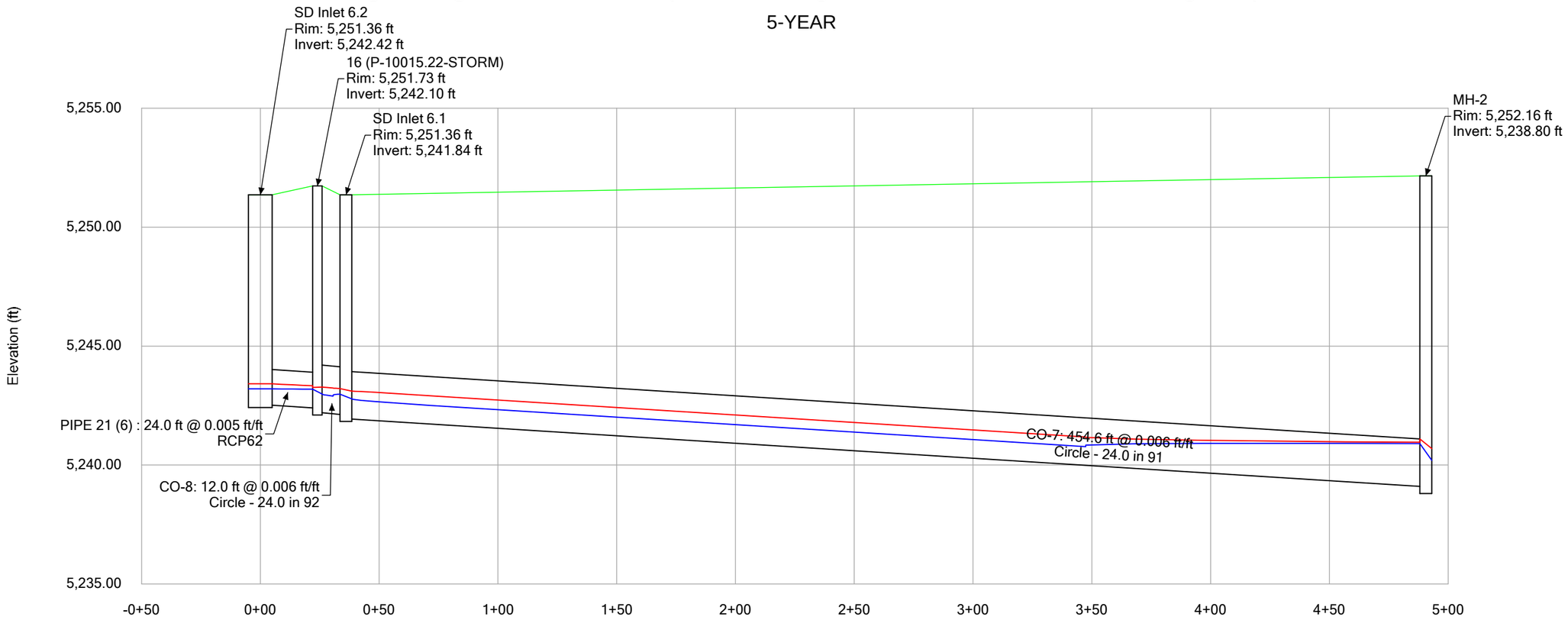
5-YEAR



Profile Report

Engineering Profile - Profile - 4 (Midtown Filing 12 Storm Sewer_Park Pad Grading.stsw)

5-YEAR



Profile Report

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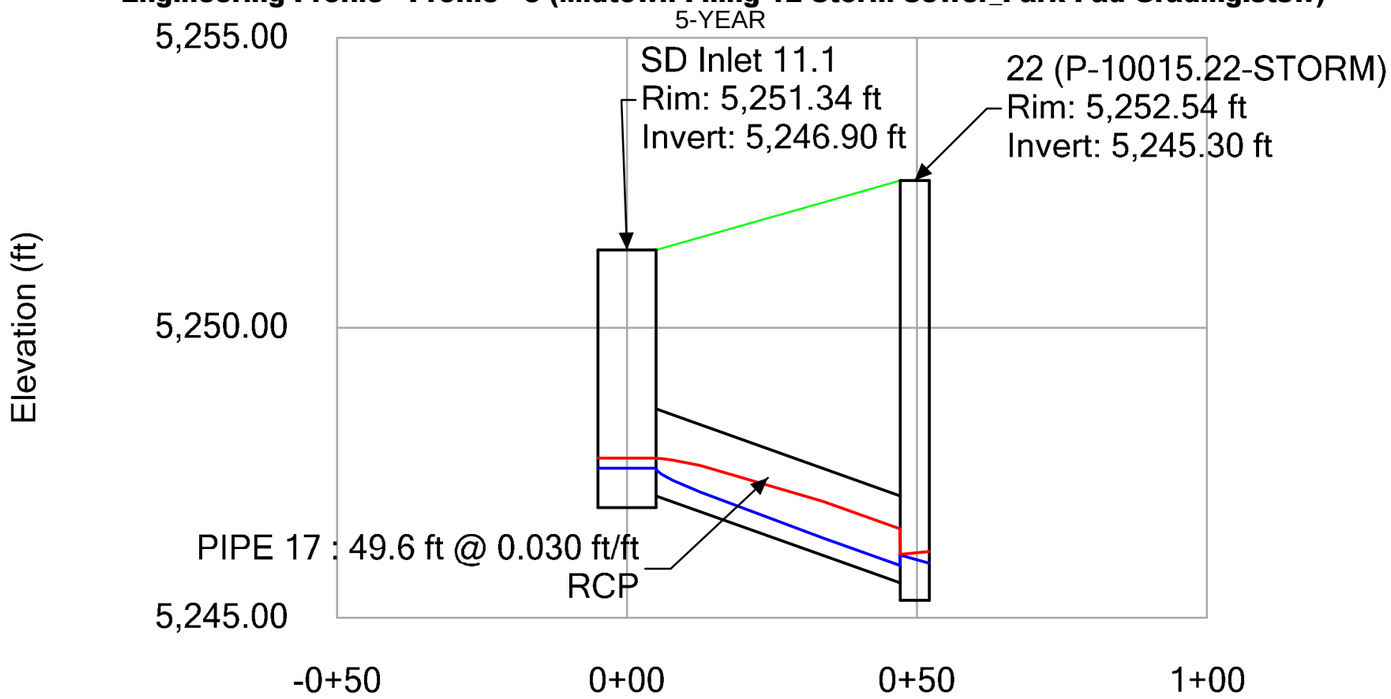
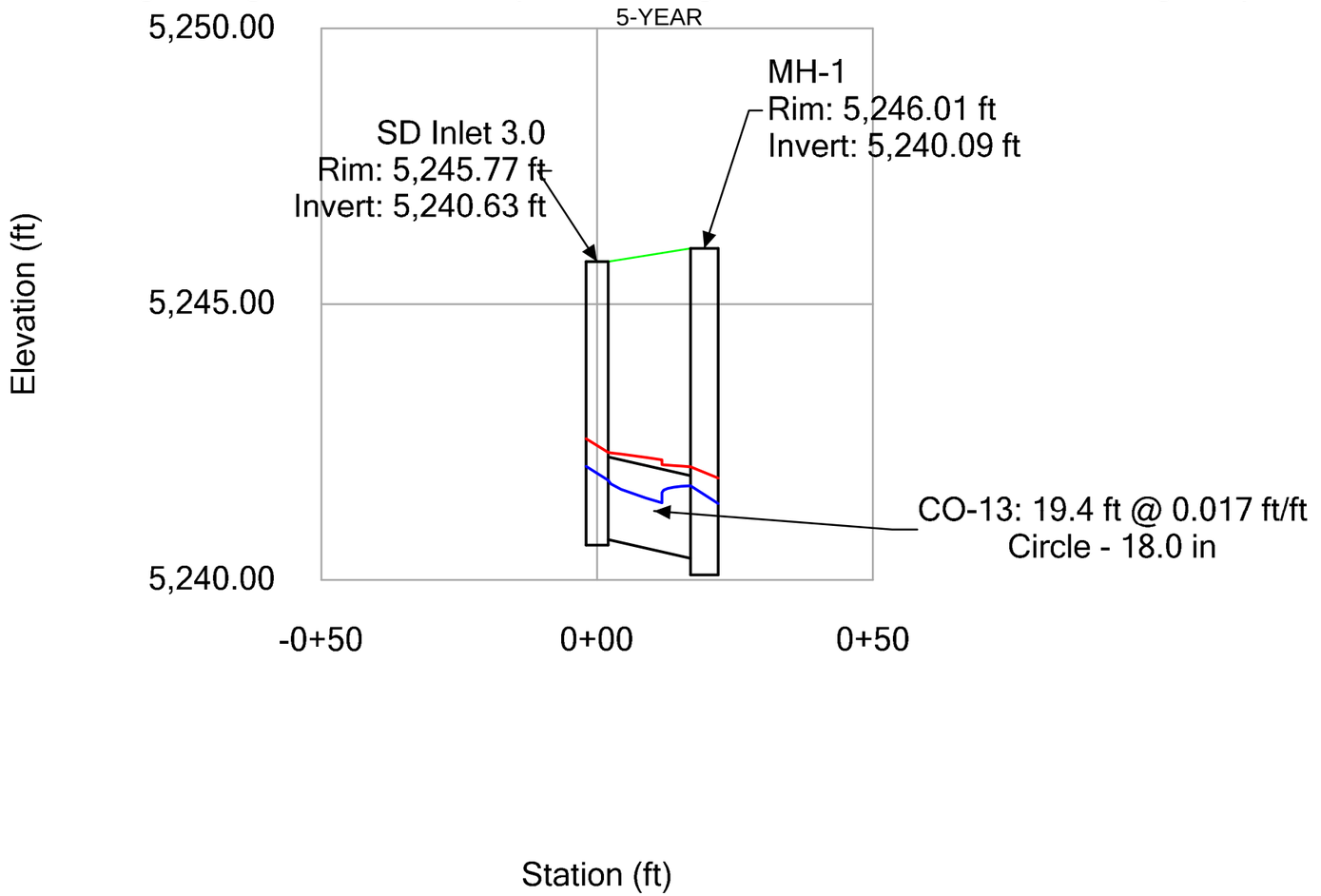


Profile Report

Engineering Profile - Profile - 6 (Midtown Filing 12 Storm Sewer_Park Pad Grading.stsw)

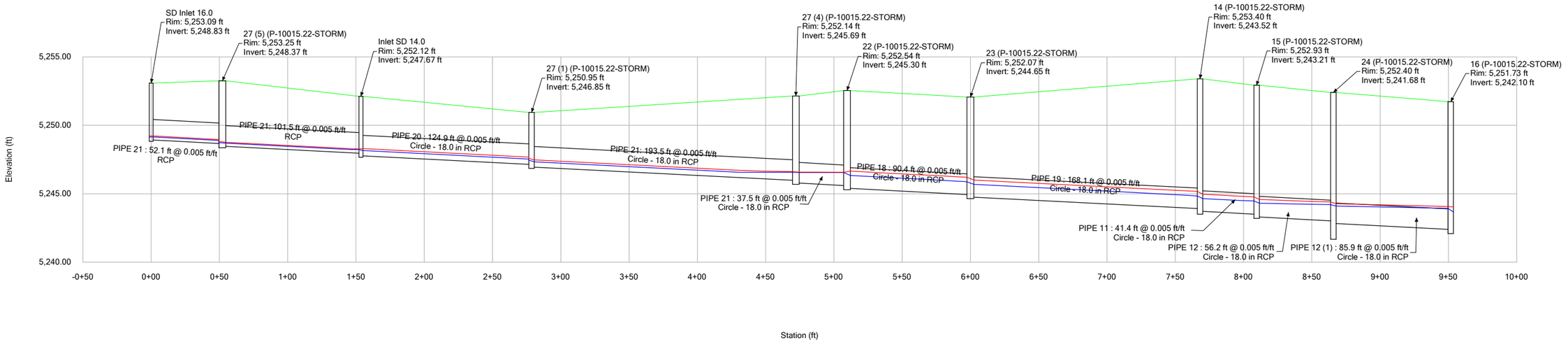


100-YEAR

FlexTable: Conduit Table

Label	Start Node	Stop Node	Invert (Start) (ft)	Invert (Stop) (ft)	Length (User Defined) (ft)	Slope (Calculated) (ft/ft)	Diameter (in)	Manning's n	Flow (cfs)	Velocity (ft/s)	Capacity (Full Flow) (cfs)	Elevation Ground (Start) (ft)	Elevation Ground (Stop) (ft)	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)	Energy Grade Line (In) (ft)	Energy Grade Line (Out) (ft)
PIPE 21	27 (5)	Inlet SD 14.0	5,248.47	5,247.97	101.5	0.005	18.0	0.013	0.36	2.15	7.37	5,253.25	5,252.12	5,248.69	5,248.23	5,248.77	5,248.28
PIPE 21	SD Inlet 16.0	27 (5)	5,248.93	5,248.67	52.1	0.005	18.0	0.013	0.36	2.16	7.42	5,253.09	5,253.25	5,249.15	5,248.89	5,249.23	5,248.97
PIPE 21	27 (1)	27 (4)	5,246.95	5,245.99	193.5	0.005	18.0	0.013	1.09	3.00	7.40	5,250.95	5,252.14	5,247.34	5,246.58	5,247.48	5,246.62
PIPE 20	Inlet SD 14.0	27 (1)	5,247.77	5,247.15	124.9	0.005	18.0	0.013	1.09	3.00	7.40	5,252.12	5,250.95	5,248.16	5,247.54	5,248.30	5,247.68
PIPE 21	27 (4)	22	5,245.79	5,245.60	37.5	0.005	18.0	0.013	1.09	3.02	7.48	5,252.14	5,252.54	5,246.56	5,246.56	5,246.58	5,246.57
PIPE 19	23	14	5,244.75	5,243.92	168.1	0.005	18.0	0.013	5.27	4.54	7.38	5,252.07	5,253.40	5,245.69	5,244.85	5,246.01	5,245.18
PIPE 18	22	23	5,245.40	5,244.95	90.4	0.005	18.0	0.013	5.27	4.55	7.41	5,252.54	5,252.07	5,246.33	5,245.88	5,246.66	5,246.21
PIPE 12	15	24	5,243.31	5,243.03	56.2	0.005	18.0	0.013	5.27	4.55	7.41	5,252.93	5,252.40	5,244.32	5,244.21	5,244.59	5,244.40
PIPE 12 (1)	24	16	5,242.83	5,242.40	85.9	0.005	18.0	0.013	5.27	4.56	7.43	5,252.40	5,251.73	5,244.10	5,243.93	5,244.27	5,244.07
PIPE 11	14	15	5,243.72	5,243.51	41.4	0.005	18.0	0.013	5.27	4.58	7.48	5,253.40	5,252.93	5,244.65	5,244.48	5,244.98	5,244.78
PIPE 21 (6)	SD Inlet 6.2	16	5,242.52	5,242.40	24.0	0.005	18.0	0.013	6.86	3.88	7.43	5,251.36	5,251.73	5,244.04	5,243.93	5,244.27	5,244.17
CO-8	16	SD Inlet 6.1	5,242.20	5,242.13		0.006	24.0	0.013	12.13	5.95	17.28	5,251.73	5,251.36	5,243.67	5,243.66	5,244.04	5,244.00
CO-7	SD Inlet 6.1	MH-2	5,241.93	5,239.10	454.6	0.006	24.0	0.013	14.29	6.31	17.85	5,251.36	5,252.16	5,243.29	5,241.35	5,243.90	5,241.67
CO-3	MH-1	MH-2	5,240.19	5,239.10	217.4	0.005	24.0	0.013	15.01	4.78	16.02	5,246.01	5,252.16	5,242.31	5,241.35	5,242.67	5,241.71
CO-2	CB-9	MH-1	5,241.30	5,240.39	68.9	0.013	18.0	0.013	5.63	6.71	12.07	5,242.39	5,246.01	5,242.75	5,242.56	5,242.91	5,242.72
CO-6	MH-4	MH-5	5,235.64	5,235.08	111.5	0.005		0.013	29.30	4.12	46.69	5,244.36	5,245.00	5,239.00	5,238.78	5,239.26	5,239.04
CO-5	MH-3	MH-4	5,236.52	5,235.84	136.5	0.005	36.0	0.013	29.30	7.02	47.08	5,245.15	5,244.36	5,239.41	5,239.16	5,239.68	5,239.42
CO-4	MH-2	MH-3	5,238.90	5,236.72	436.8	0.005	36.0	0.013	29.30	7.03	47.12	5,252.16	5,245.15	5,240.65	5,239.57	5,241.38	5,239.85
PIPE 17	SD Inlet 11.1	22	5,247.10	5,245.60	49.6	0.030	18.0	0.013	4.18	8.39	18.26	5,251.34	5,252.54	5,247.88	5,246.56	5,248.19	5,246.75
CO-14	CB-10	MH-5	5,236.91	5,235.07	242.0	0.008	60.0	0.013	71.49	10.24	227.09	5,247.13	5,245.00	5,239.30	5,238.78	5,240.22	5,239.10
CO-12	MH-6	O-1	5,224.65	5,223.80	159.0	0.005	66.0	0.013	100.79	9.83	245.52	5,238.50	5,234.00	5,229.38	5,229.30	5,229.71	5,229.58
CO-13	SD Inlet 3.0	MH-1	5,240.73	5,240.39	19.4	0.017	18.0	0.013	9.39	5.31	13.89	5,245.77	5,246.01	5,242.71	5,242.56	5,243.15	5,243.00
CO-10	MH-5	MH-7	5,234.98	5,234.31	89.1	0.008	60.0	0.013	100.79	11.18	225.83	5,245.00	5,243.38	5,237.84	5,237.54	5,239.01	5,238.42
CO-11	MH-7	MH-6	5,234.10	5,228.86	273.0	0.019	60.0	0.013	100.79	15.75	360.84	5,243.38	5,238.50	5,236.96	5,230.69	5,238.13	5,234.42

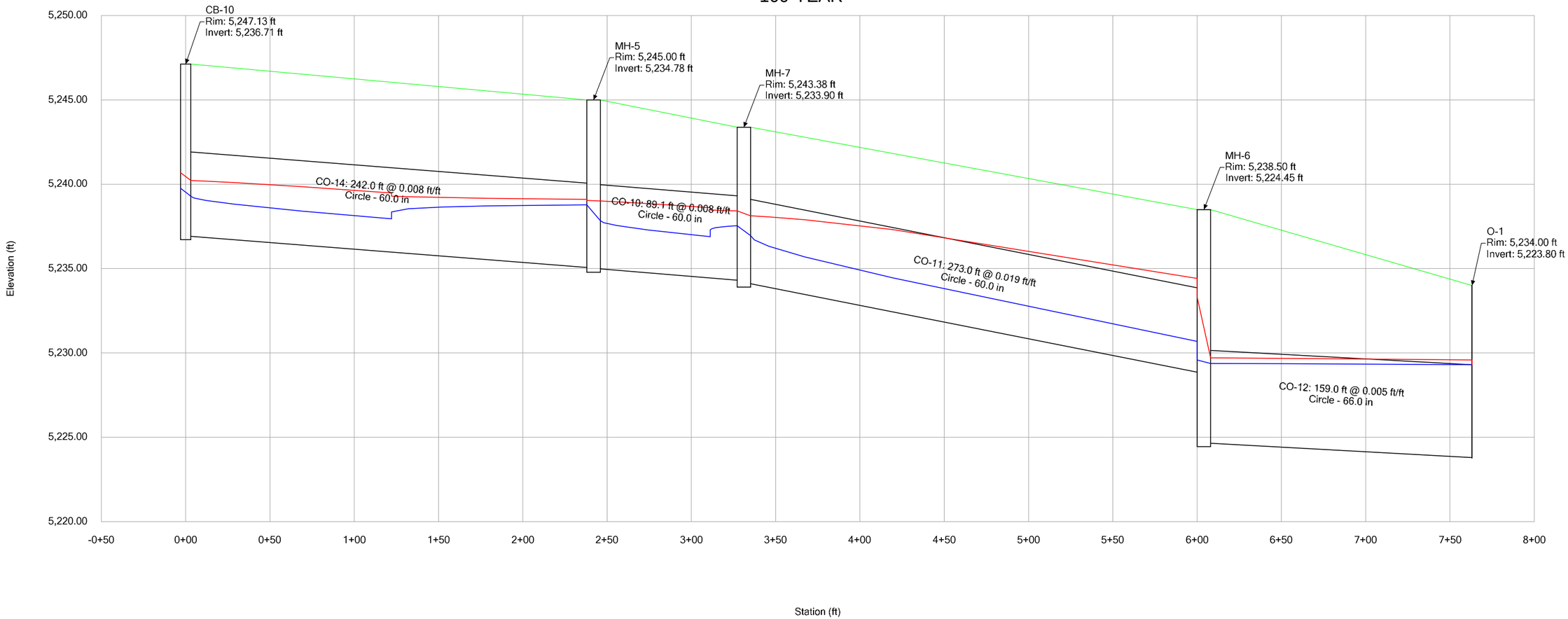
Profile Report
Engineering Profile - Profile - 1 (Midtown Filing 12 Storm Sewer_Park Pad Grading.stsw)
100-YEAR



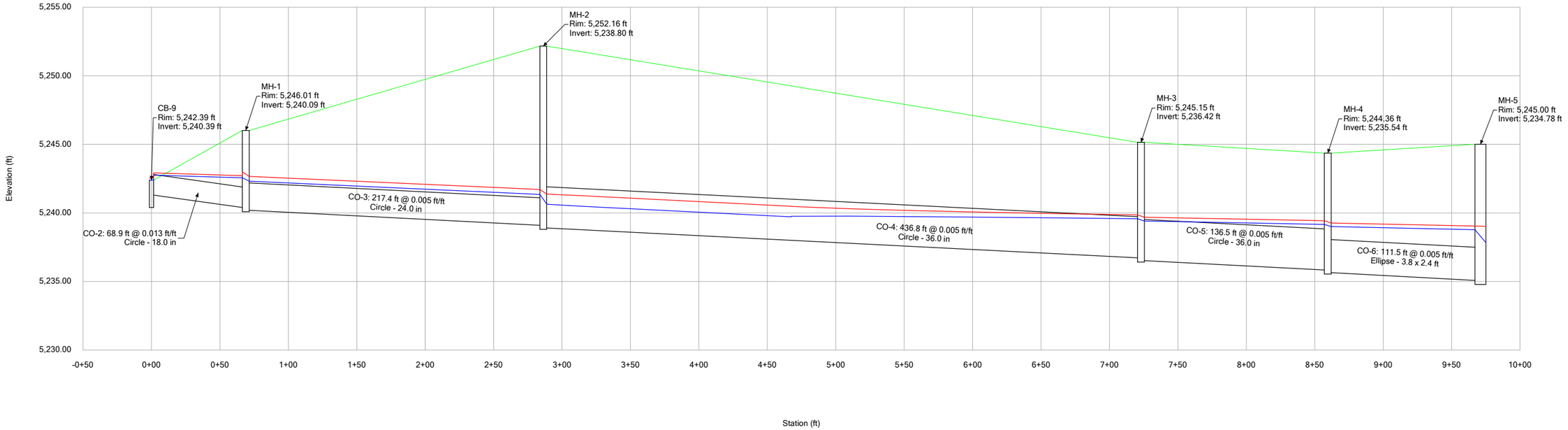
Profile Report

Engineering Profile - Profile - 2 (Midtown Filing 12 Storm Sewer_Park Pad Grading.stsw)

100-YEAR



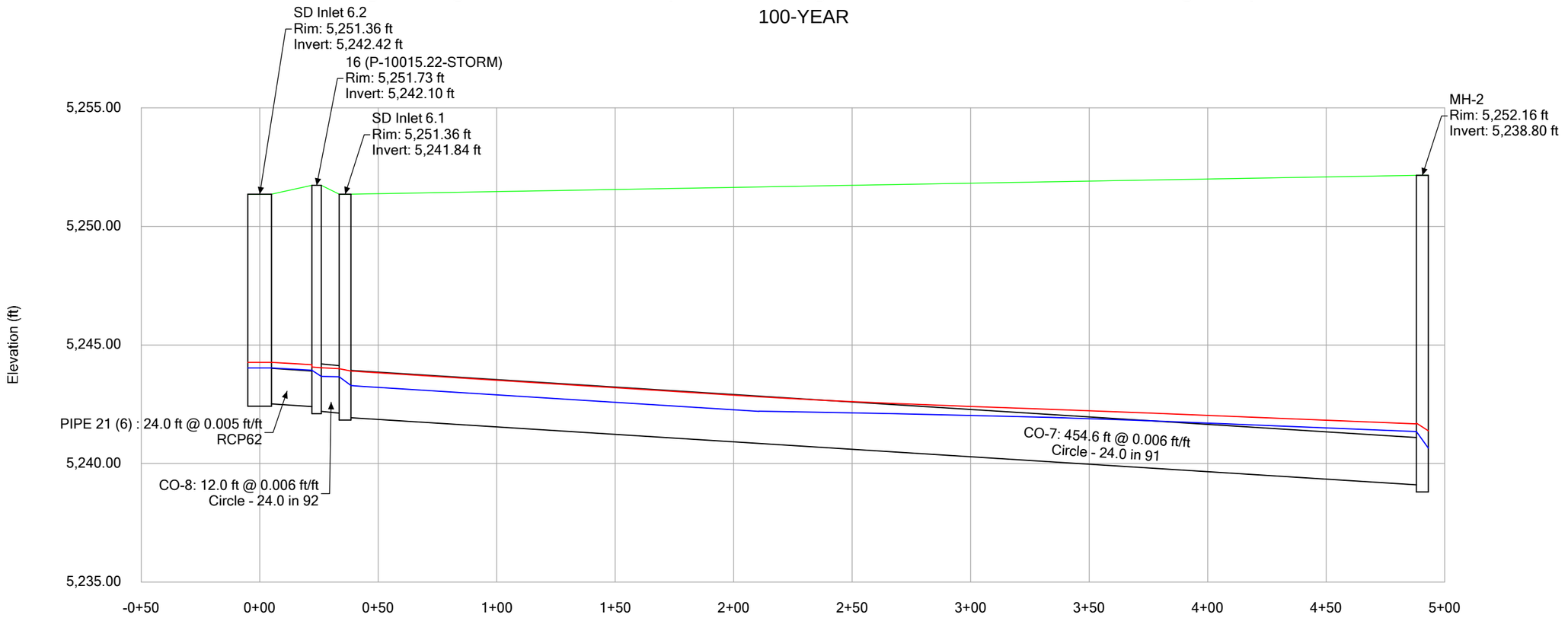
Profile Report
Engineering Profile - Profile - 3 (Midtown Filing 12 Storm Sewer_Park Pad Grading.stsw)
100-YEAR



Profile Report

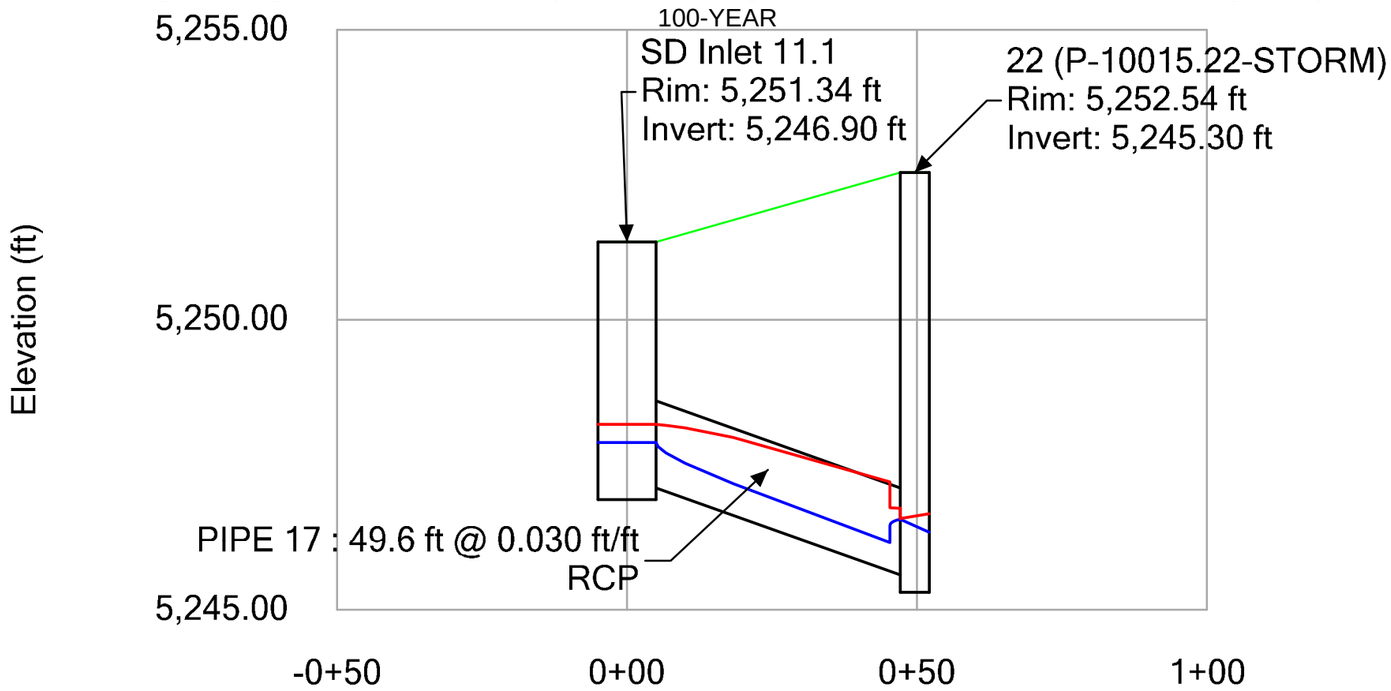
Engineering Profile - Profile - 4 (Midtown Filing 12 Storm Sewer_Park Pad Grading.stsw)

100-YEAR



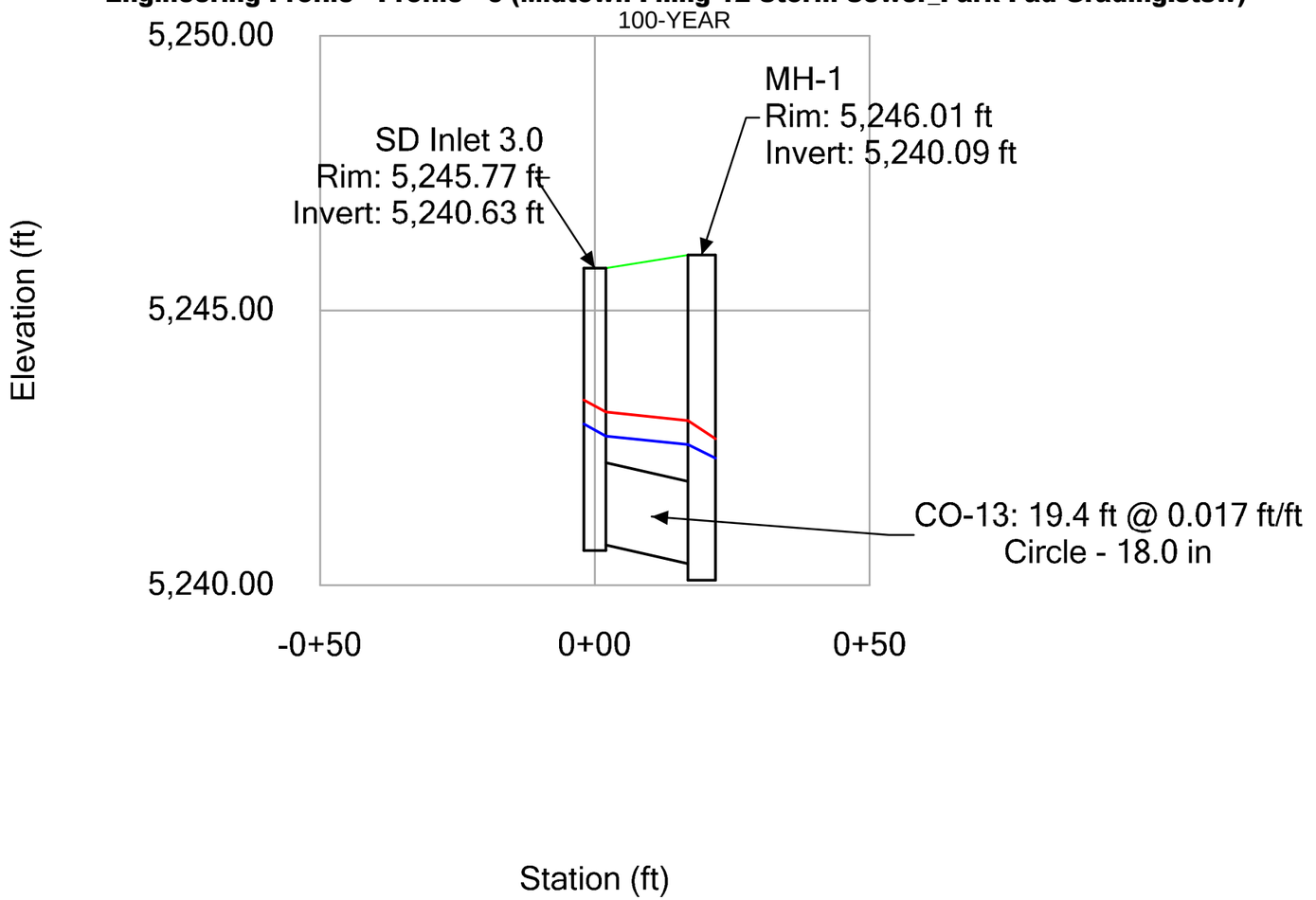
Profile Report

Engineering Profile - Profile - 5 (Midtown Filing 12 Storm Sewer_Park Pad Grading.stsw)

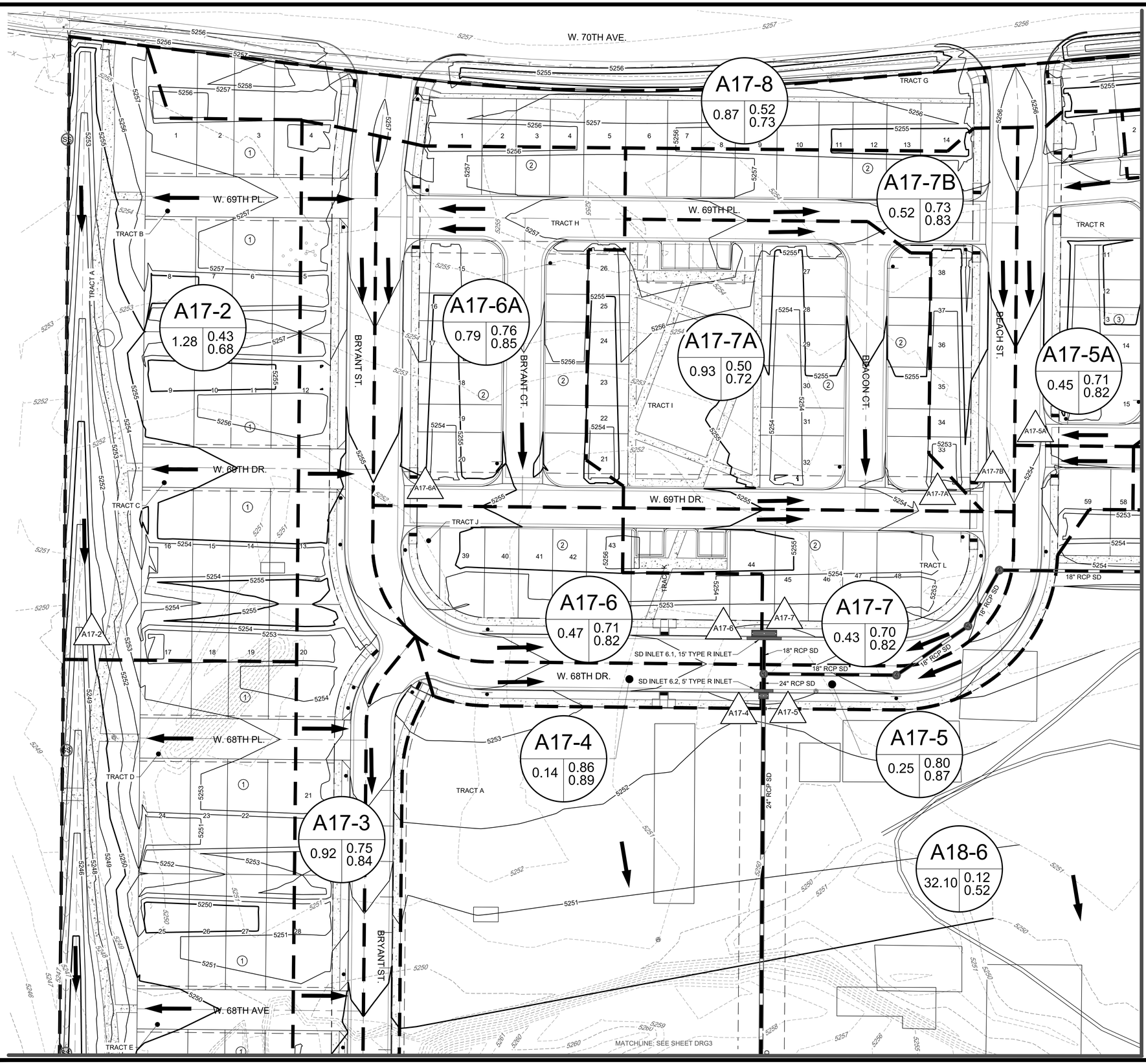


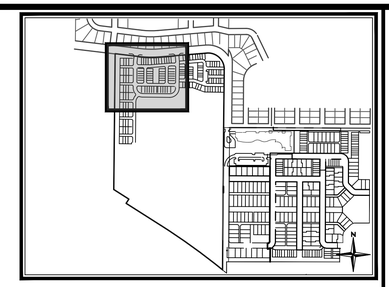
Profile Report

Engineering Profile - Profile - 6 (Midtown Filing 12 Storm Sewer_Park Pad Grading.stsw)



Appendix D – Proposed Drainage Maps





DRAINAGE LEGEND

- EXISTING MINOR CONTOUR (5281)
- EXISTING MAJOR CONTOUR (5280)
- PROPOSED MINOR CONTOUR (5281)
- PROPOSED MAJOR CONTOUR (5280)
- PROPOSED STORM SEWER LINE
- EXISTING STORM SEWER LINE
- PROPOSED MANHOLE
- PROPOSED BOX BASE MANHOLE
- PROPOSED INLET
- PROPOSED FLARED END SECTION
- HISTORIC MAJOR BASIN BOUNDARY
- PROPOSED MAJOR BASIN BOUNDARY
- PROPOSED MINOR BASIN BOUNDARY
- FILING 11 BOUNDARY

A1 — BASIN ID
0.000 — BASIN AREA (ACRES)
0.00 — 5 YEAR RUNOFF COEFFICIENT
0.00 — 100 YEAR RUNOFF COEFFICIENT
00 — DESIGN POINT
FLOW ARROW

BENCHMARK DESCRIPTION

ADAMS COUNTY GPS CONTROL STATION 0226
3-1/4" CDOT ALUMINUM CAP STAMPED "4.070000 GPS 34 ZBS PLS 11434". LOCATED AT NORTHWEST CORNER WEST 70TH & BROADWAY.

ELEVATION = 5169.25 (NAVD 88)

Redland
WHERE GREAT PLACES BEGIN
720.283.6783 Office
1500 West Canal Court
Littleton, Colorado 80120
REDLAND.COM

DRAWN	EBR
CHECKED	EBR
APPROVED	MTP
PROJECT NO.	10015.23
HORZ. SCALE	1" = 30'
VERT. SCALE	N/A

NOTES
1ST SUBMITTAL TO ADAMS COUNTY

NO.	DATE
1	04.10.2020

MIDTOWN FILING NO 12

DRAINAGE MAP

SHEET
DRG 1

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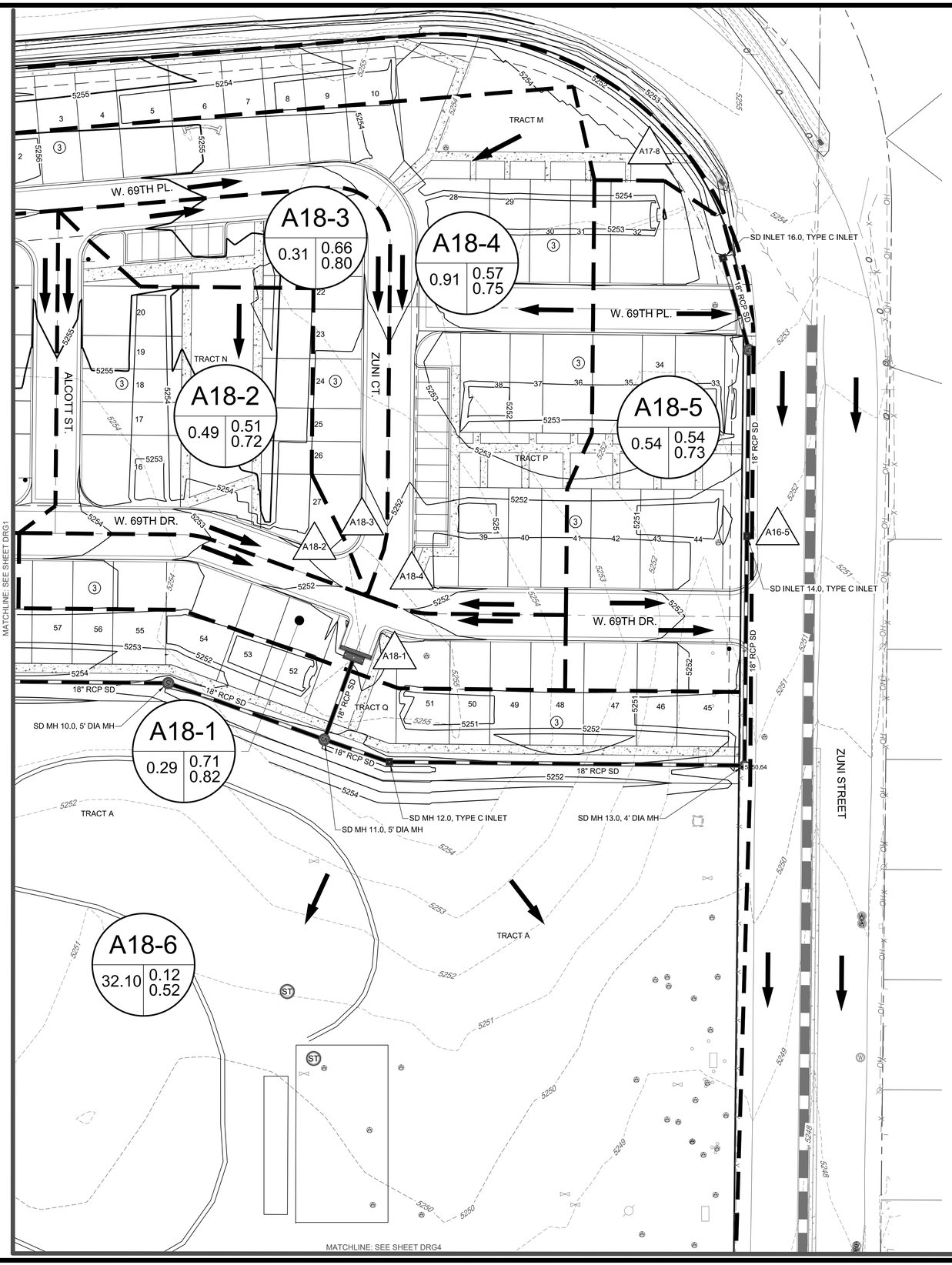

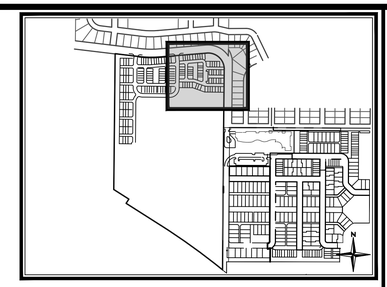

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VERT. SCALE N/A

NO.	DATE	NOTES
1	04.10.2020	1ST SUBMITTAL TO ADAMS COUNTY

MIDTOWN FILING NO 12

DRAINAGE MAP

SHEET
DRG 2

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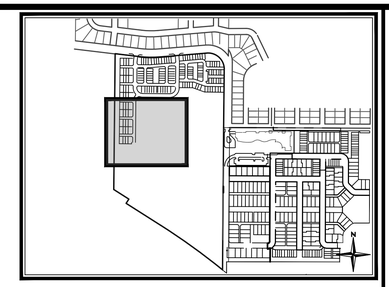

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CHECKED ~~EBR~~
APPROVED ~~EBR~~
PROJECT NO. ~~10015.23~~
HORZ. SCALE 1" = 30'
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NO.	DATE	NOTES
1	04.10.2020	1ST SUBMITTAL TO ADAMS COUNTY

MIDTOWN FILING NO 12

DRAINAGE MAP

SHEET
DRG 3

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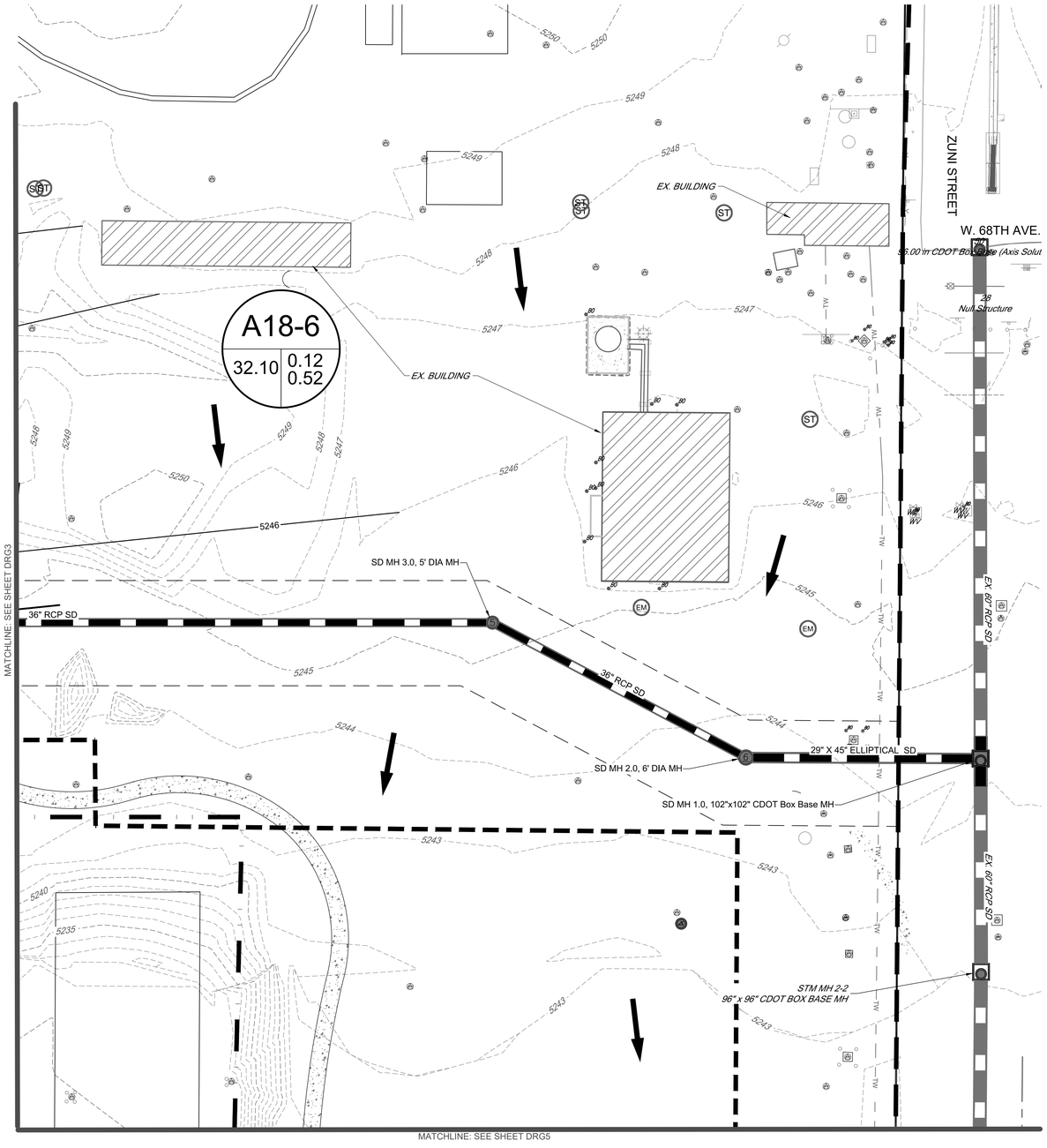

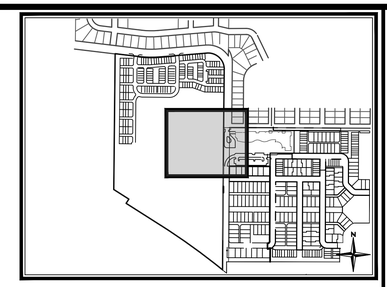

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MIDTOWN FILING NO 12

DRAINAGE MAP

SHEET
DRG 4

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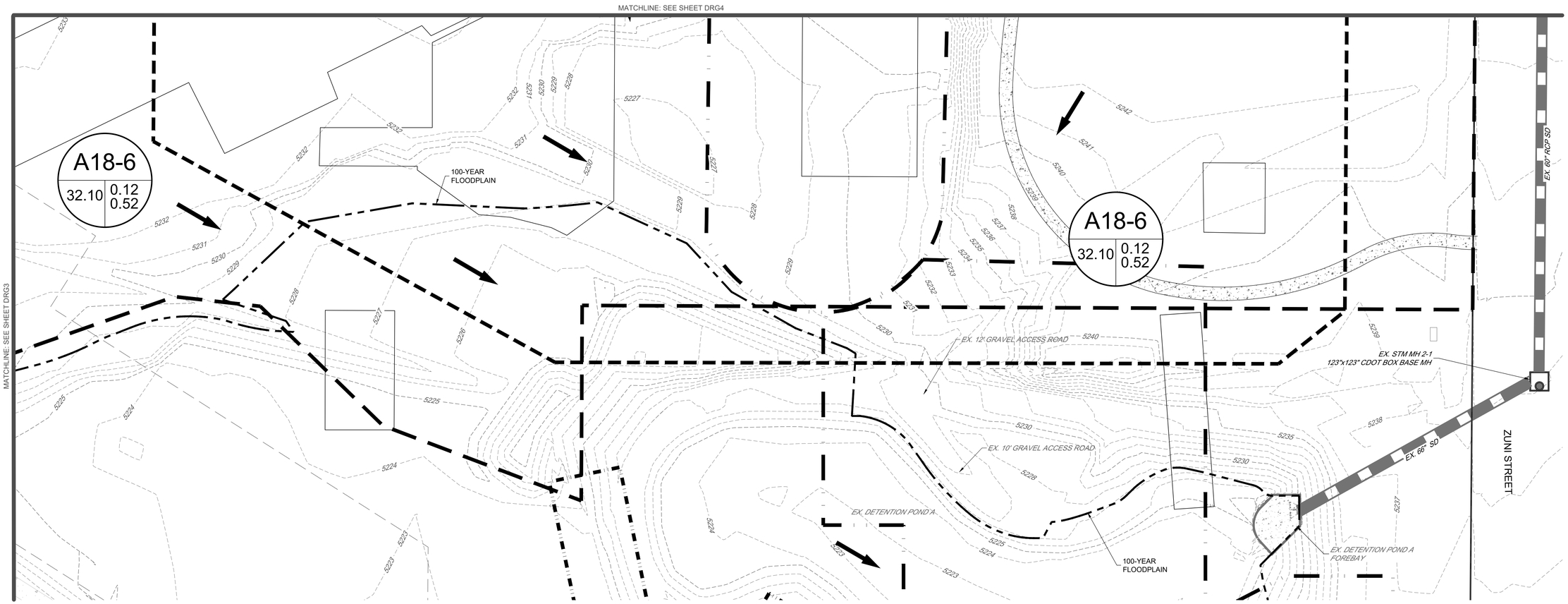

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MIDTOWN FILING NO 12

DRAINAGE MAP

SHEET
DRG 5

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Appendix E - Midtown Filing 6 Report Excerpts

REDLAND

SF-1
RUNOFF COEFFICIENTS

PROJECT NAME: Midtown Filing 6
PROJECT NUMBER: 10015.14
CALCULATED BY: SRP
CHECKED BY: MTP

DATE: 8/12/2016

	Runoff Coeffecients (Type C Soil)							
		OFFSITE	NEIGHBORHOOD	APARTMENT	OPEN SPACE	PARK	PAVED	SINGLE-FAMILY RESIDENTIAL
LAND USE:	SCHOOL	AREA	COMMERCIAL	AREA	AREA	AREA	AREA	AREA
2-YEAR COEFF.	0.34	0.31	0.66	0.60	0.06	0.11	0.89	0.49
5-YEAR COEFF.	0.40	0.37	0.68	0.63	0.16	0.21	0.90	0.53
10-YEAR COEFF.	0.46	0.44	0.71	0.66	0.26	0.30	0.92	0.57
100-YEAR COEFF.	0.60	0.59	0.79	0.74	0.51	0.53	0.96	0.68
IMPERVIOUSNESS	50%	45%	85%	80%	2%	10%	100%	70%

Runoff Coeffecients and Imperviousness values are courtesy of Urban Drainage Criteria Manual Vol.1 . Values are from tables RO-3 and RO-5.

*Off-site area coefficients are based on street pavement and adjacent roadside ditch

DESIGN BASIN	DESIGN POINT	School (AC)	Offsite Area (AC)	Neighborhood Commercial (AC)	APARTMENT AREA (AC)	OPEN SPACE AREA (AC)	PARK AREA (AC)	PAVED AREA (AC)	SINGLE-FAMILY RES. AREA (AC)	TOTAL AREA (AC)	Cc(2)	Cc(5)	Cc(10)	Cc(100)	% IMP
A1	A1	4.93								**4.93**	0.34	0.40	0.46	0.60	50%
A2	A2					0.35		0.83	1.99	**3.17**	0.55	0.59	0.63	0.73	70%
A3	A3					0.22		0.67	1.33	**2.22**	0.57	0.61	0.64	0.75	72%
A4	A4					0.13		0.42	1.10	**1.65**	0.56	0.60	0.63	0.74	72%
A5	A5					0.10		0.27	0.49	**0.86**	0.57	0.60	0.64	0.75	72%
A6	A6					0.36		0.11	0.37	**0.84**	0.36	0.42	0.48	0.64	45%
A7	A7					0.02		0.11	0.26	**0.39**	0.58	0.62	0.65	0.75	75%
A8	A8					0.02		0.25	0.55	**0.82**	0.60	0.63	0.67	0.76	77%
A9	A9					0.02		0.13	0.20	**0.35**	0.61	0.65	0.68	0.77	77%
A9.1	A9.1					0.08		0.37		**0.45**	0.74	0.77	0.80	0.88	83%
A10	A10					0.13		0.68	1.17	**1.98**	0.60	0.63	0.67	0.77	76%
A11	A11					0.32			0.44	**0.76**	0.31	0.37	0.44	0.61	41%
A12	A12					0.05		0.41	0.61	**1.07**	0.62	0.65	0.69	0.78	78%
A13	A13					0.10		0.36	0.07	**0.53**	0.68	0.71	0.75	0.84	78%
A14	A14					0.05		0.17	0.33	**0.55**	0.57	0.61	0.65	0.75	73%
A15	A15					0.08		0.16	0.43	**0.67**	0.53	0.57	0.62	0.73	69%
A16	A16					0.82		0.22	0.45	**1.49**	0.31	0.38	0.45	0.63	37%
A17	A17				13.50					**13.50**	0.60	0.63	0.66	0.74	80%
A18	A18			1.50						**1.50**	0.66	0.68	0.71	0.79	85%
Total Onsite Basin A										**37.73**	0.54	0.58	0.62	0.72	71%
OS1	OS1		44.35							**44.35**	0.31	0.37	0.44	0.59	45%
Park	P1						28.80			**28.80**	0.11	0.21	0.30	0.53	10%
Ultimate Pond A										**110.88**	0.21	0.25	0.29	0.38	44.6%

STANDARD FORM SF-2
Time of Concentration

PROJECT NAME: Midtown Filing 6
PROJECT NUMBER: 10015.1
CALCULATED BY: SRP
CHECKED BY: MTP
DATE: 8/12/2016

SUB-BASIN DATA			INITIAL TIME (T_i)			TRAVEL TIME (T_t)						tc CHECK (URBANIZED BASINS)			FINAL tc		
DESIGN BASIN (1)	AREA Ac (2)	C_5 (3)	LENGTH Ft (4)	SLOPE % (5)	T_i Min. (6)	LENGTH Ft. (7)	SLOPE % (8)	C_v (9)	Land Surface (10)	VEL fps (11)	T_t Min. (12)	COMP. tc (13)	TOTAL LENGTH (14)	tc=(L/180)+10 Min. (15)	Min.	C10	C100
A1	4.93	0.34	50	2.0%	7.8	400	1.0%	20.0	Paved Areas	2.0	3.3	11.2	450	12.5	11.2	0.40	0.46
A2	3.17	0.55	100	2.5%	7.5	645	1.0%	20.0	Paved Areas	2.0	5.4	12.8	745	14.1	12.8	0.59	0.63
A3	2.22	0.57	75	2.5%	6.2	525	1.1%	20.0	Paved Areas	2.1	4.2	10.4	600	13.3	10.4	0.61	0.64
A4	1.65	0.56	105	3.6%	6.6	190	0.8%	20.0	Paved Areas	1.8	1.8	8.4	295	11.6	8.4	0.60	0.63
A5	0.86	0.56	75	2.5%	6.3	370	1.0%	20.0	Paved Areas	2.0	3.1	9.4	445	12.5	9.4	0.60	0.64
A6	0.84	0.56	200	2.0%	11.1	20	1.0%	20.0	Paved Areas	2.0	0.2	11.3	220	11.2	11.3	0.42	0.48
A7	0.39	0.56	65	2.5%	5.9	120	1.0%	20.0	Paved Areas	2.0	1.0	6.9	185	11.0	6.9	0.62	0.65
A8	0.82	0.56	75	2.5%	6.3	440	1.1%	20.0	Paved Areas	2.1	3.5	9.8	515	12.9	9.8	0.63	0.67
A9	0.35	0.56	65	2.5%	5.9	440	1.1%	20.0	Paved Areas	2.1	3.5	9.4	505	12.8	9.4	0.65	0.68
A9.1	0.45	0.56	14	2.0%	2.9	580	1.4%	20.0	Paved Areas	2.4	4.1	7.0	594	13.3	7.0	0.77	0.80
A10	1.98	0.56	100	2.5%	7.3	680	1.0%	20.0	Paved Areas	2.0	5.7	13.0	780	14.3	13.0	0.63	0.67
A11	0.76	0.56	105	2.5%	7.5	120	2.0%	7.0	Short Pasture/Lawn	1.0	2.0	9.5	225	11.3	9.5	0.37	0.44
A12	1.07	0.56	100	2.5%	7.3	275	0.9%	20.0	Paved Areas	1.9	2.4	9.7	375	12.1	9.7	0.65	0.69
A13	0.53	0.56	70	2.5%	6.1	215	0.9%	20.0	Paved Areas	1.9	1.9	8.0	285	11.6	8.0	0.71	0.75
A14	0.55	0.56	80	2.5%	6.5	150	0.8%	20.0	Paved Areas	1.8	1.4	7.9	230	11.3	7.9	0.61	0.65
A15	0.67	0.56	90	2.5%	6.9	135	0.8%	20.0	Paved Areas	1.8	1.3	8.2	225	11.3	8.2	0.57	0.62
A16	1.49	0.31	85	2.5%	9.8	0	0.8%	20.0	Paved Areas	1.8	0.0	9.8	85	10.5	9.8	0.38	0.45
A17	13.50	0.60	75	2.5%	5.8	1,570	0.8%	20.0	Paved Areas	1.8	14.6	20.5	1645	19.1	19.1	0.63	0.66
A18	1.50	0.66	50	2.0%	4.5	350	0.8%	20.0	Paved Areas	1.8	3.3	7.8	400	12.2	12.2	0.68	0.71
OS1	44.35	0.31	80	2.0%	10.3	1,330	1.0%	20.0	Paved Areas	2.0	11.1	21.4	1410	17.8	17.8	0.37	0.44
Park	28.80	0.16	500	1.3%	35.3	1,150	1.7%	7.0	Short Pasture/Lawn	0.9	21.0	56.3	1650	19.2	56.3	0.26	0.51

REDLAND

STANDARD FORM SF-3
STORM DRAINAGE DESIGN - RATIONAL METHOD 100 YEAR EVENT

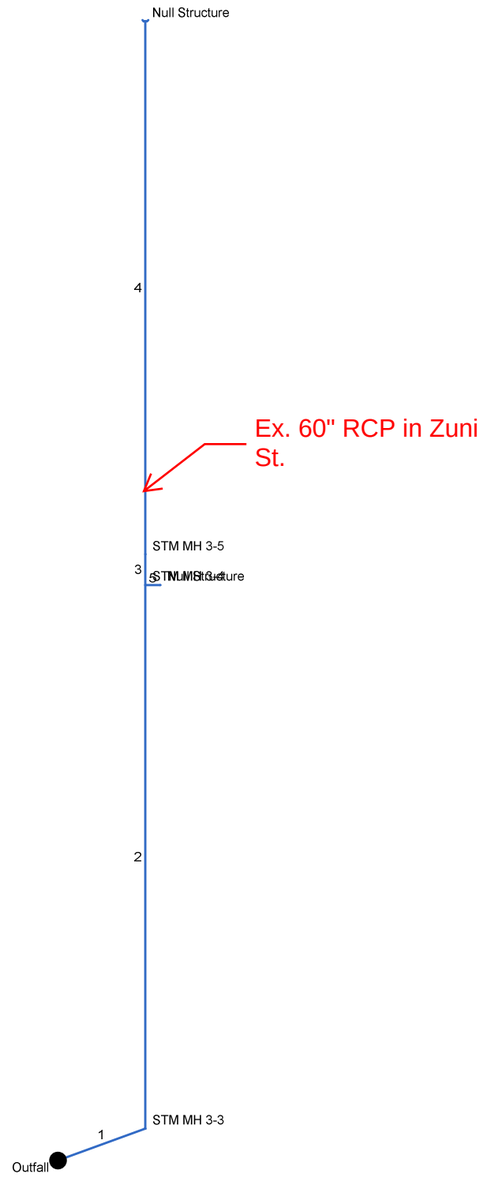
PROJECT NAME: Midtown Filing 6
PROJECT NUMBER: 10015.14
CALCULATED BY: SRP
CHECKED BY: MTP

DATE: 8/12/2016

P_1 (1-Hour Rainfall) = 2.71 From Adams County County Ch. 9

		DIRECT RUNOFF							TOTAL RUNOFF				STREET		PIPE			TRAVEL TIME			REMARKS
BASIN NAME	DESIGN POINT	DESIGN BASIN	AREA (AC)	RUNOFF COEFF C100	tc (min)	C*A(ac)	I (in/hr)	Q (cfs)	tc(min)	∑(C*A) (ac)	I (in/hr)	Q (cfs)	SLOPE (%)	STREET FLOW(cfs)	DESIGN FLOW(cfs)	SLOPE (%)	PIPE SIZE (in)	LENGTH (ft)	VELOCITY (fps)	tt (min)	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
A1	A1	A1	4.93	0.46	11.15	2.27	7.02	15.91													
A2	A2	A2	3.17	0.63	12.84	1.99	6.60	13.14	12.84	4.26	6.60	28.11			15.91	0.5%	30	625	5.80	1.80	Route A1 to A1.1
A3	A3	A3	2.22	0.64	10.39	1.43	7.22	10.34	12.84	5.69	6.60	37.57									
A4	A4	A4	1.65	0.63	8.41	1.05	7.82	8.19							37.57	0.5%	42	300	7.40	0.68	Route to A4.1
A5	A5	A5	0.86	0.64	9.40	0.55	7.51	4.16	13.52	7.29	6.46	47.05									
															47.05	0.5%	42	18	7.60	0.04	Route to A4.2
A12	A12	A12	1.07	0.69	9.71	0.74	7.42	5.47													
A13	A13	A13	0.53	0.75	7.99	0.40	7.97	3.16	9.71	1.14	7.42	8.42									
A14	A14	A14	0.55	0.75	7.92	0.41	7.99	3.30							8.42	2%	18	245	7.60	0.54	Route to A13.1
A15	A15	A15	0.67	0.73	8.18	0.49	7.90	3.85	10.25	2.03	7.26	14.78									
	A4.2								13.56	9.32	6.45	60.11			14.78	0.5%	30	370	5.70	1.08	Route to A4.2
A6	A6	A6	0.84	0.64	11.28	0.54	6.98	3.78							60.11	0.5%	48	210	8.20	0.43	Route to A4.3
A7	A7	A7	0.39	0.75	6.88	0.29	8.38	2.45	13.98	10.16	6.36	64.56									
A8	A8	A8	0.82	0.76	9.81	0.62	7.39	4.61							64.56	0.5%	48	245	8.65	0.47	Route to A7.1
A9	A9	A9	0.35	0.77	9.38	0.27	7.52	2.04	14.46	11.05	6.26	69.19									
A10	A10	A10	1.98	0.77	12.96	1.51	6.58	9.96							69.19	0.5%	48	185	8.50	0.36	Route to A10.1
A11	A11	A11	0.76	0.61	9.50	0.46	7.48	3.46													
A9.1	A9.1	A9.1	0.45	0.88	7.03	0.40	8.32	3.30	14.82	13.43	6.19	83.07									
A16	A16	A16	1.49	0.63	9.81	0.94	7.39	6.91													
A17	A17	A17	13.50	0.74	19.14	9.99	5.45	54.49													
A18	A18	A18	1.50	0.79	12.22	1.19	6.75	8.00													
Park	P1	Park	28.80	0.53	56.31	15.26	2.86	43.62													
OS1	OS1	OS1	44.35	0.59	17.83	26.17	5.65	147.96													

Hydraflow Storm Sewers Extension for AutoCAD® Civil 3D® 2013 Plan



Project File: 10015.7 Midtown Filing 6 Zuni Hydraflow.stm	Number of lines: 5	Date: 8/11/2016

Storm Sewer Tabulation

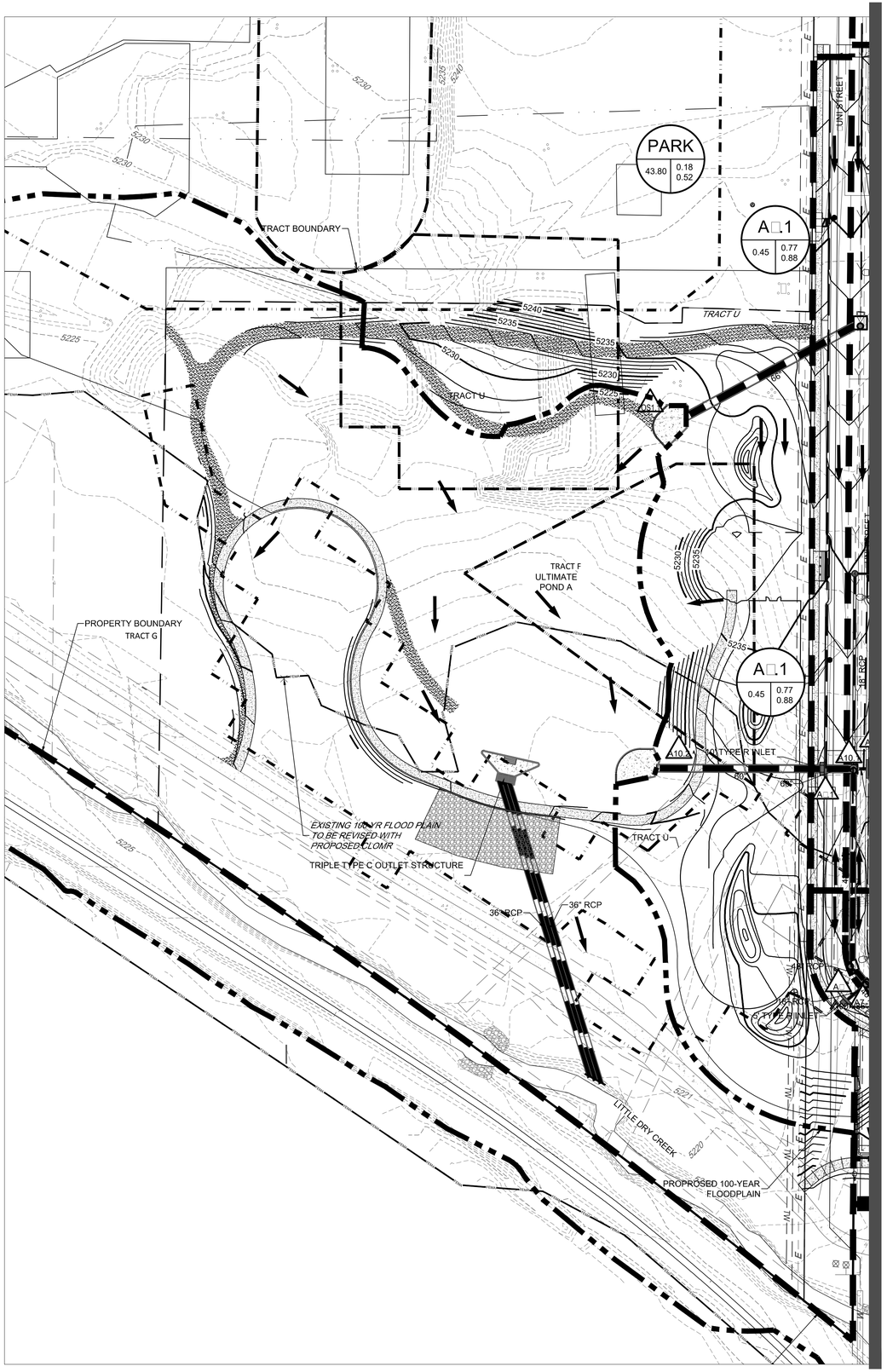
Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
1	End	105.790	0.00	44.35	0.00	0.00	26.17	0.0	24.5	4.8	126.2	334.6	11.08	66	0.99	5223.82	5224.87	5226.16	5227.99	5238.20	5239.73	PIPE 60
2	1	618.800	0.00	44.35	0.00	0.00	26.17	0.0	22.6	5.1	132.2	363.9	9.77	66	1.00	5225.07	5231.26	5227.99	5234.46	5239.73	5247.82	PIPE 59
3	2	35.025	0.00	33.70	0.00	0.00	19.88	0.0	22.5	5.1	100.8	363.8	10.74	66	1.00	5232.84	5233.19	5234.82	5235.96	5247.82	5247.76	PIPE 65
4	3	606.669	33.70	33.70	0.59	19.88	19.88	20.6	20.6	5.3	105.8	293.8	11.30	60	1.27	5235.48	5243.20	5237.55	5246.13	5247.76	5253.50	PIPE 67
5	2	16.879	10.65	10.65	0.59	6.28	6.28	20.6	20.6	5.3	33.42	91.51	12.63	30	4.98	5235.84	5236.68	5236.89	5238.65	5247.82	5247.00	PIPE 58

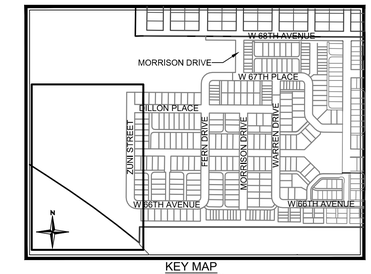
Project File: 10015.7 Midtown Filing 6 Zuni Hydraflow.stm

Number of lines: 5

Run Date: 8/9/2016

NOTES:Intensity = 91.94 / (Inlet time + 10.70) ^ 0.83 ; Return period =Yrs. 100 ; c = cir e = ellip b = box





KEY MAP
SCALE: 1" = 500'

DRAINAGE LEGEND

- EXISTING MINOR CONTOUR (5281)
- EXISTING MAJOR CONTOUR (5280)
- PROPOSED MINOR CONTOUR (5281)
- PROPOSED MAJOR CONTOUR (5280)
- PROPOSED STORM SEWER LINE
- PROPOSED MANHOLE
- PROPOSED BOX BASE MANHOLE
- PROPOSED INLET
- PROPOSED FLARED END SECTION
- PROPOSED MAJOR BASIN BOUNDARY
- HISTORIC MAJOR BASIN BOUNDARY
- PROPOSED MINOR BASIN BOUNDARY
- A1 / 0.000 / 0.00 / 0.00 — BASIN ID; 5 YEAR RUNOFF; 100 YEAR RUNOFF; BASIN AREA □ACRES□
- 00 — DESIGN POINT
- FLOW ARROW

NOTES:

1. ULTIMATE POND A TO BE CONSTRUCTED AS A PART OF MIDTOWN FILING 6. TEMPORARY POND A OF MIDTOWN FILING 4 TO BE REMOVED AFTER ULTIMATE POND A IS CONSTRUCTED.

N

0 25 50 100

SCALE: 1" = 50'

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1500 West Canal Court
Littleton, Colorado 80120
REDLAND.COM

DRAWN SRP
CHECKED MTP
APPROVED
PROJECT NO. 10015.7
HOR. SCALE 1"=50'
VERT. SCALE

NO.	DATE	NOTES
1	08.12.2016	1ST SUBMITTAL

MIDTOWN AT CLEAR CREEK
FILING 6 CONSTRUCTION DOCUMENTS

PROPOSED DRAINAGE MAP

SHEET
DNG 3

I:\2010\10015 - Midtown\CAD\Sheet Sets\Drainage\10015.7 Proposed Filing 6 Drainage Map.DWG tab: DNG 3 Jul 12, 2017 - 8:27am erummey

UNI STREET

SEE SHEET DNG2

A18 | 0.68 | 0.79 | 1.50

PARK | 0.21 | 0.53 | 28.80

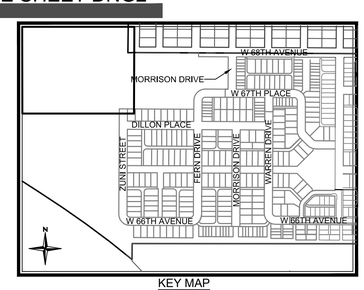
A17 | 0.63 | 0.74 | 13.50

70TH AVENUE

FUTURE PA-WEST

FUTURE STORM SEWER TO DETENTION POND A

SEE SHEET DNG3



KEY MAP
SCALE: 1" = 500'

N

0 25 50 100

SCALE: 1" = 50'

DRAINAGE LEGEND

- 5281 — EXISTING MINOR CONTOUR
- 5280 — EXISTING MAJOR CONTOUR
- 5281 — PROPOSED MINOR CONTOUR
- 5280 — PROPOSED MAJOR CONTOUR
- PROPOSED STORM SEWER LINE
- PROPOSED MANHOLE
- PROPOSED BOX BASE MANHOLE
- PROPOSED INLET
- PROPOSED FLARED END SECTION
- PROPOSED MAJOR BASIN BOUNDARY
- HISTORIC MAJOR BASIN BOUNDARY
- PROPOSED MINOR BASIN BOUNDARY
- A1 | 0.000 | 0.00 / 0.00 — BASIN ID; 5 YEAR RUNOFF; 100 YEAR RUNOFF; BASIN AREA □ACRES□
- 00 — DESIGN POINT
- FLOW ARROW

NOTES:

1. ULTIMATE POND A TO BE CONSTRUCTED AS A PART OF MIDTOWN FILING 6. TEMPORARY POND A OF MIDTOWN FILING 4 TO BE REMOVED AFTER ULTIMATE POND A IS CONSTRUCTED.

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Littleton, Colorado 80120
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DRAWN SRP
CHECKED MTP
APPROVED
PROJECT NO. 10015.7
HOR. SCALE 1"=50'
VERT. SCALE

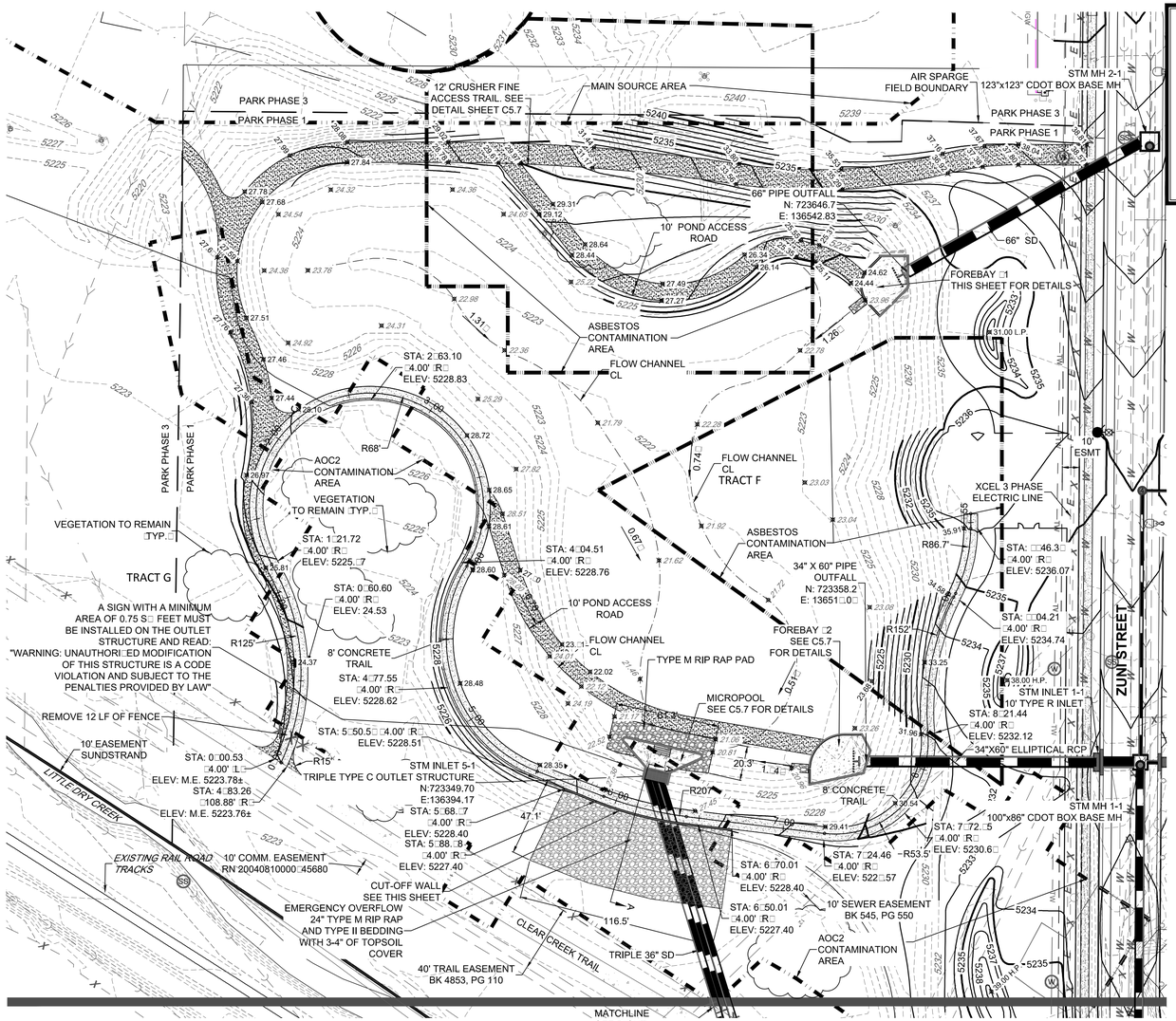
DATE	NO	NOTES
08.12.2016	1	1ST SUBMITTAL
11.11.2016	2	2ND SUBMITTAL
04.17.2017	3	3RD SUBMITTAL

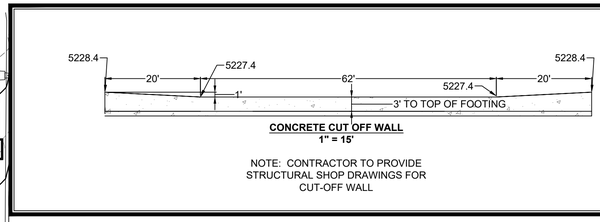
MIDTOWN AT CLEAR CREEK
FILING 6 CONSTRUCTION DOCUMENTS

PROPOSED DRAINAGE MAP

SHEET
DNG 4

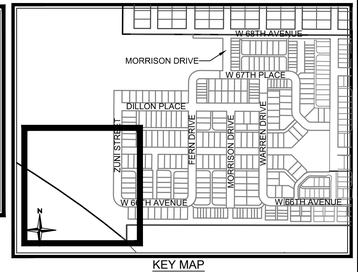
I:\2010\10015 - Midtown\CADD\Sheet Sets\Drainage\10015.7 Proposed Filing 4 Permanent Pond Drainage Map.dwg tab: DNG 4 Apr 13, 2017 - 1:41pm spangburn



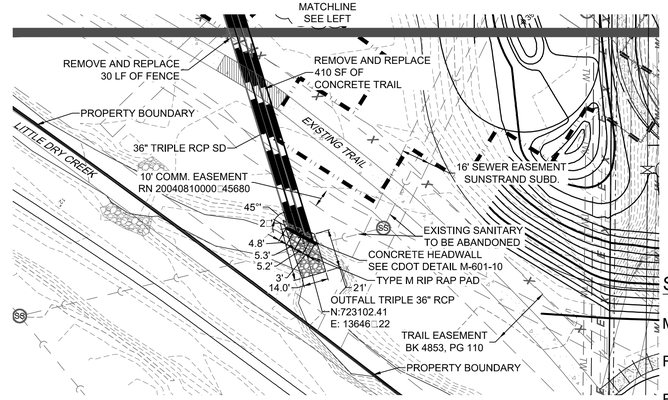


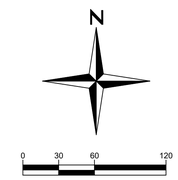
CONCRETE CUT OFF WALL
1" = 15'

NOTE: CONTRACTOR TO PROVIDE STRUCTURAL SHOP DRAWINGS FOR CUT-OFF WALL



KEY MAP
SCALE: 1" = 500'





SCALE: 1" = 60'

SUMMARY OF POND VOLUMES

MICROPOOL: 0.027 AC-FT

FOREBAY 1: 0.021 AC-FT

FOREBAY 2: 0.014 AC-FT

WQCV: 1.06 AC-FT

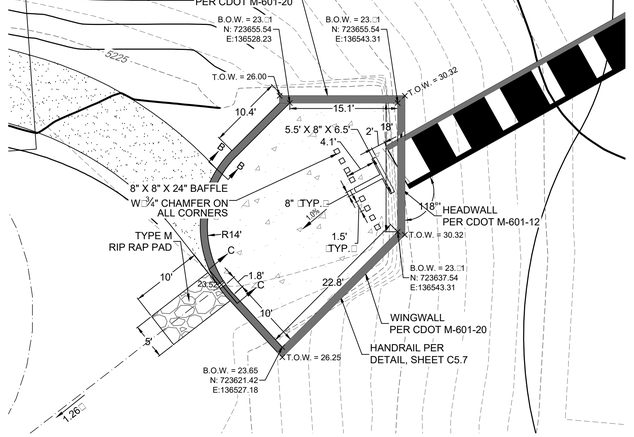
100 YEAR DETENTION: 5.22 AC-FT

100 YEAR DETENTION WQ50 WQCV: 5.75 AC-FT

COMPACTION NOTE

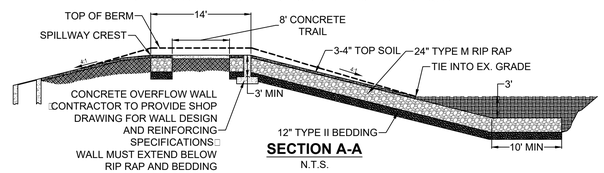
EXCAVATION AND BACKFILL FOR STORM SEWER STRUCTURES SHALL BE IN ACCORDANCE WITH CDOT SPECIFICATION SECTION 206.

NOTE:
1. **REFER TO THE SOIL MANAGEMENT PLAN (SMP) DATED FEBRUARY 2014 PREPARED BY ARCADIS REGARDING SOIL AND MATERIAL HANDLING REQUIREMENTS. THE SMP ALSO DETAILS DISPOSAL REQUIREMENTS. THIS SMP MUST BE USED FOR ALL WORK INCLUDING ANY KNOWN AND/OR UNKNOWN CONTAMINATED AREAS.**

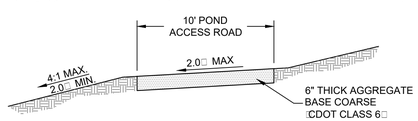


FOREBAY #1
1"=10'

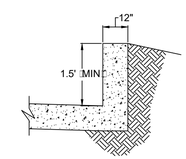
NOTE: CONTRACTOR TO SUPPLY STRUCTURAL SHOP DRAWINGS FOR FOREBAY AND WINGWALLS



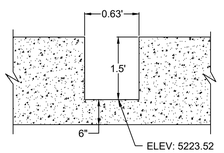
SECTION A-A
N.T.S.



ACCESS ROAD
N.T.S.

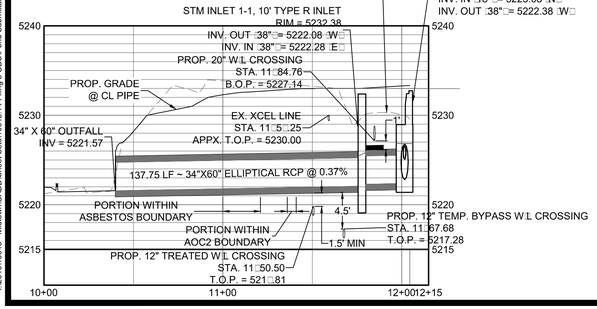


SECTION B-B
N.T.S.

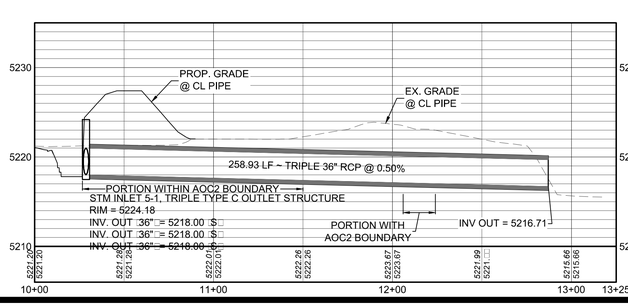


SECTION C-C
N.T.S.

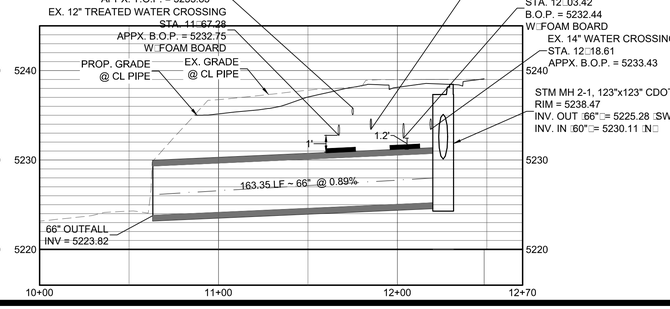
OUTFALL TO STM MH 1-1 PROFILE
V: 1" = 40.00
H: 1" = 8.00



POND OUTFALL PROFILE
V: 1" = 40.00
H: 1" = 8.00



OUTFALL TO STM MH 3-1 PROFILE
V: 1" = 40.00
H: 1" = 8.00



BENCHMARK DESCRIPTION

ADAMS COUNTY GPS CONTROL STATION 0226
3-1/4" CDOT ALUMINUM CAP STAMPED "4.070000 GPS 34 BS PLS 11434". LOCATED AT NORTHWEST CORNER WEST 70TH BROADWAY.

ELEVATION = 516 25 NAVD 88

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1500 West Canal Court
Littleton, Colorado 80120

COLORADO LICENSED PROFESSIONAL ENGINEER
MICHAEL A. PIETSCHMANN
No. 32832

DRAWN	EBR/AO
CHECKED	MTP
APPROVED	MTP
PROJECT NO.	10015.14
HOR. SCALE	1" = 40'
VERT. SCALE	

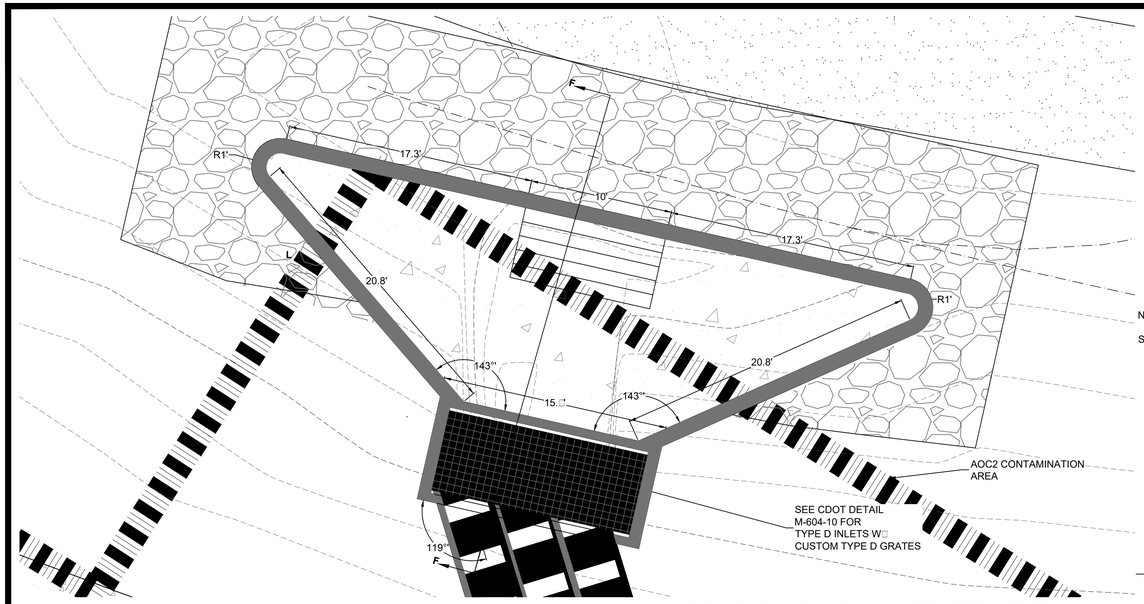
NO.	DATE	NOTES
1	04.12.2017	1ST SUBMITTAL
2	07.18.2017	2ND SUBMITTAL - RESPONSE TO COMMENTS

MIDTOWN AT CLEAR CREEK
FILING 4 PERMANENT POND STORM INFRASTRUCTURE

DETENTION POND PLAN

SHEET
C5.6

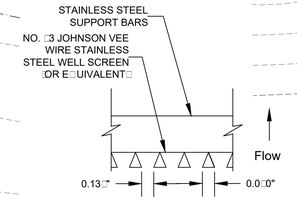
I:\2010\10015 - Midtown\CADD\Sheet Sets\10015.14 Filing 6 CDS\Pond Submittal\10015.14 Pond Details.dwg tab: C5.6 DETENTION POND PLAN Jul 17, 2017 - 6:40am erumney



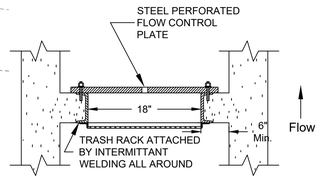
POND - OUTLET STRUCTURE/MICROPOOL PLAN VIEW

1"=4'

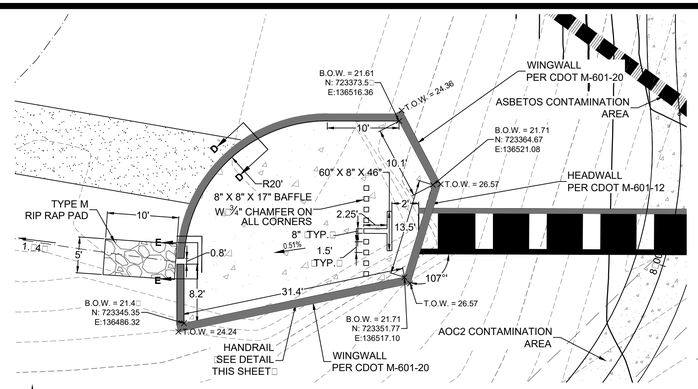
NOTE: CONTRACTOR TO SUPPLY STRUCTURAL SHOP DRAWINGS FOR OUTLET STRUCTURE/MICROPOOL



SECTION I-I



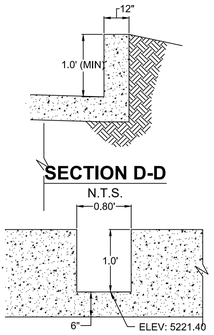
SECTION H-H - PLAN VIEW



FOREBAY 2

1"=20'

NOTE: CONTRACTOR TO SUPPLY STRUCTURAL SHOP DRAWINGS FOR FOREBAY AND WINGWALLS

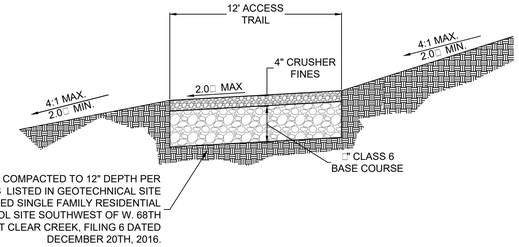


SECTION D-D

N.T.S.

SECTION E-E

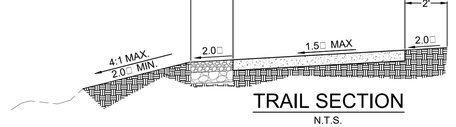
N.T.S.



MOISTURE CONDITIONED AND COMPACTED TO 12" DEPTH PER COMPACTION STANDARDS LISTED IN GEOTECHNICAL SITE DEVELOPMENT STUDY FOR PROPOSED SINGLE FAMILY RESIDENTIAL DEVELOPMENT AND FUTURE SCHOOL SITE SOUTHWEST OF W. 68TH AVE. AND MORRISON DR. MIDTOWN AT CLEAR CREEK, FILING 6 DATED DECEMBER 20TH, 2016.

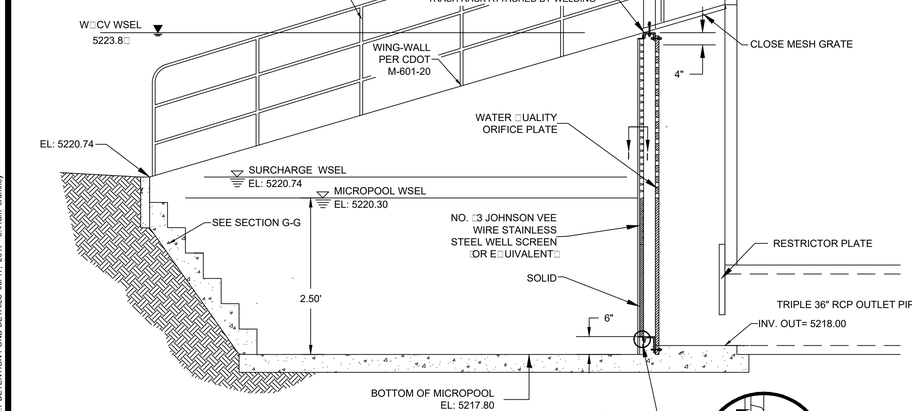
ACCESS TRAIL SECTION

N.T.S.



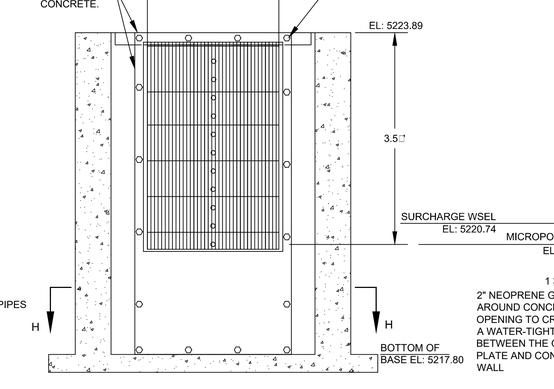
TRAIL SECTION

N.T.S.

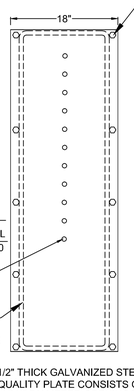


OUTLET STRUCTURE SECTION F-F

NOTE: CONTRACTOR TO SUPPLY STRUCTURAL SHOP DRAWINGS FOR OUTLET STRUCTURE/MICROPOOL

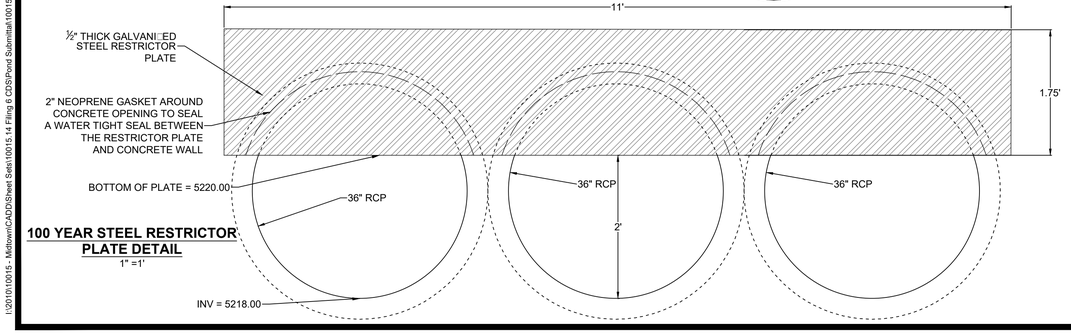


TRASH RACK DETAIL



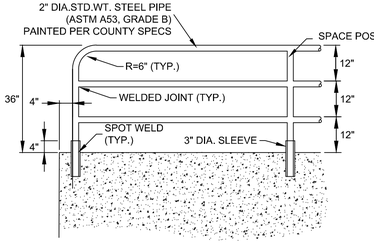
1/2" THICK GALVANIZED STEEL WATER QUALITY PLATE CONSISTS OF ELEVEN (11) 1 3/4" DIAMETER OPENINGS SPACED 0.33' ON CENTER STARTING AT THE TOP OF THE SURCHARGE WSEL.

WATER □UALITY ORIFICE PLATE DETAIL

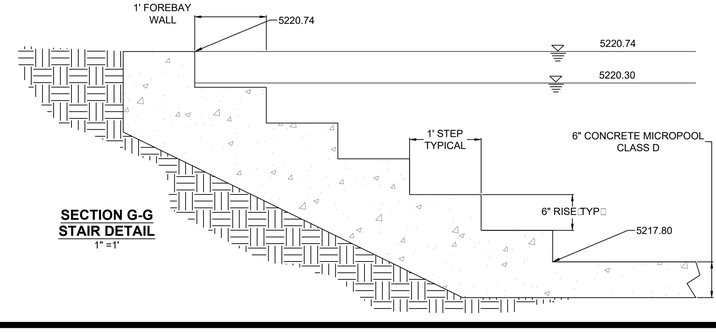


100 YEAR STEEL RESTRICTOR PLATE DETAIL

1" =1'



HANDRAIL DETAIL



SECTION G-G STAIR DETAIL

1" =1'

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Littleton, Colorado 80120

COLORADO LICENSED PROFESSIONAL ENGINEER MICHAEL T. PIETSCHMANN 38832

DRAWN	EBR/BAO
CHECKED	MTP
APPROVED	MTP
PROJECT NO.	10015.14
HOR. SCALE	1" = 40'
VERT. SCALE	

NO.	DATE	NOTES
1	04.12.2017	1ST SUBMITTAL
2	07.19.2017	2ND SUBMITTAL - RESPONSE TO COMMENTS

MIDTOWN AT CLEAR CREEK
FILING 4 PERMANENT POND STORM INFRASTRUCTURE

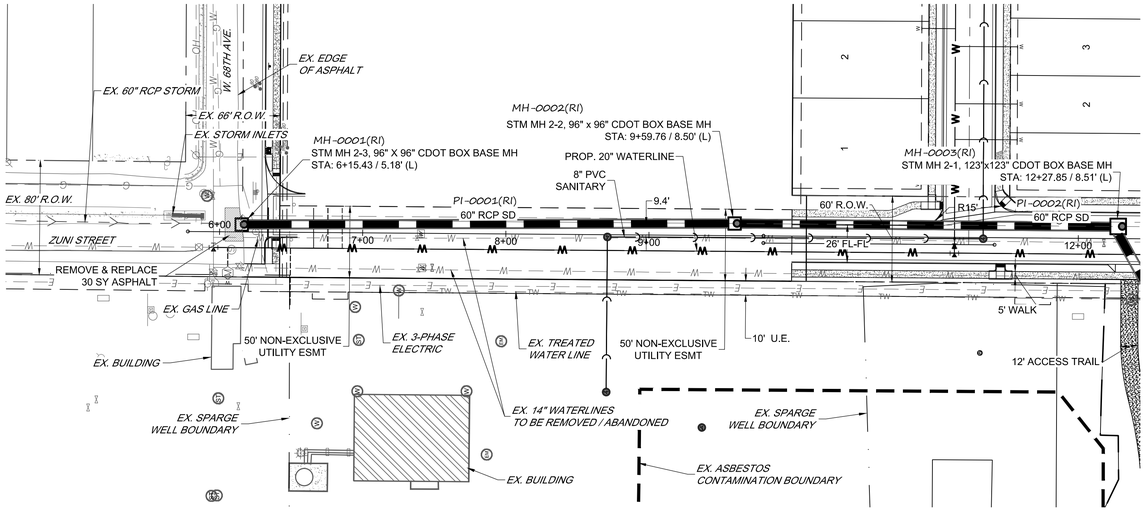
DETENTION POND DETAILS

SHEET

C5.7

I:\2010\10015 - Midtown\CAD\Sheet Sets\10015.14 Filing 6 CDS\Pond Submittal\10015.14 Pond Details.dwg tab: C5.7 DETENTION POND DETAILS Jul 17, 2017 - 6:41am erummey

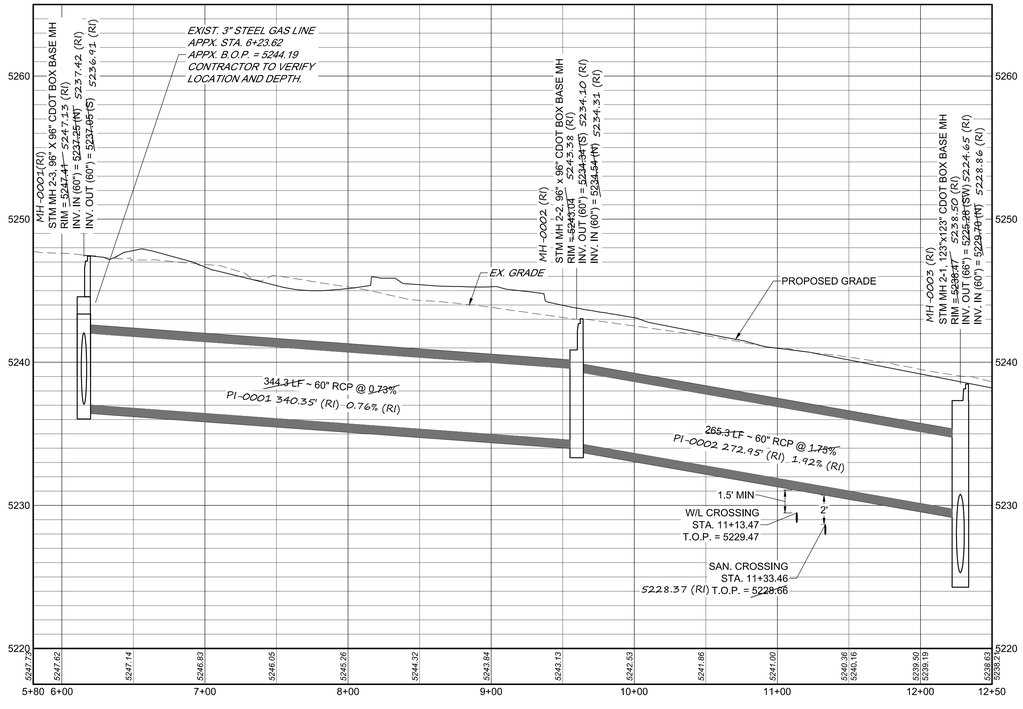
Appendix F – Record Drawing Detention Pond A Sheets

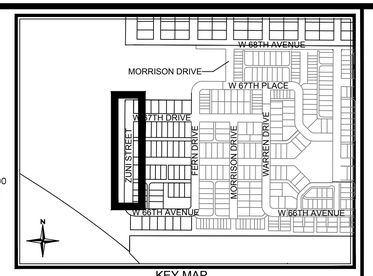


ZUNI STREET PLAN

ZUNI STREET PROFILE

H: 1" = 50'
V: 1" = 5'





KEY MAP
SCALE: 1" = 500'

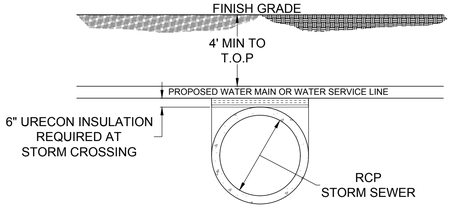
RECORD DRAWINGS

THESE RECORD DRAWINGS HAVE BEEN PREPARED BASED ON INFORMATION PROVIDED BY AZTEC CONSULTANTS, INC, DATED SEPTEMBER 24, 2018. REDLAND IS UNDER NO OBLIGATION OR DUTY TO VERIFY THE ACCURACY AND/OR COMPLETENESS OF THIS INFORMATION AND HAS NOT DONE SO. REDLAND SHALL NOT BE RESPONSIBLE FOR ANY ERRORS OR OMISSIONS THAT MAY BE INCORPORATED AS A RESULT OF ERRONEOUS INFORMATION PROVIDED BY OTHERS.

ONLY ITEMS MARKED WITH "RI" REFLECTS RECORD INFORMATION PROVIDED BY THE SURVEYOR. RECORD INFORMATION IS SHOWN ONLY FOR THE ITEMS INDICATED ON THESE PLANS. UNLESS EXPLICITLY MARKED WITH "RI" , CONSTRUCTED CONDITIONS SHOULD NOT BE ASSUMED.

NOTES

1. REFER TO SHEET C5.6 FOR INTERSECTION VERTICAL DESIGN / WARPING
2. REFER TO SHEET C1.4 FOR TYPICAL STREET SECTIONS.
3. ALL STATIONING IS CENTERLINE STATIONING UNLESS OTHERWISE NOTED . CENTERLINE AND R.O.W. DIMENSIONS ARE FOR REFERENCE ONLY. REFER TO THE FINAL SUBDIVISION PLAT FOR HORIZONTAL CONTROL.
4. ALL ELEVATIONS IN PLAN VIEW ARE FLOWLINE ELEVATIONS UNLESS OTHERWISE NOTED.
5. CROSS PANS ARE 8 FEET IN WIDTH UNLESS OTHERWISE NOTED.
6. STORM INLET STATIONING/OFFSET REFERENCE IS AT THE INTERSECTION OF FLOWLINE AND THE CENTER OF THE STRUCTURE.
7. STORM INLETS LOCATED ALONG CURBS SHALL BE CONSTRUCTED WITH TOP OF BOX AT SAME GRADE AS EXTENDED CURB UNLESS OTHERWISE NOTED.
8. FOR ALL PUBLIC ROADWAY AND UTILITY IMPROVEMENTS, THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING THE LATEST EDITION OF THE ADAMS COUNTY DEVELOPMENT STANDARDS AND REGULATIONS PRIOR TO CONSTRUCTION, AND KEEPING THE CONSTRUCTION PLANS AND THE STANDARDS AND REGULATIONS ON THE JOB SITE AT ALL TIMES.
9. ALL STORM SEWER PIPE SHALL BE CLASS III RCP UNLESS OTHERWISE NOTED.
10. ALL FLOWLINE ALONG CURB RAMPS SHALL HAVE A MINIMUM CROSS SLOPE OF 0.5% TO FACILITATE DRAINAGE AND AVOID STANDING WATER AND ICE.
11. REFER TO SHEET C9.0 FOR STANDARD CURB CUT AND APPROACH DETAIL.
12. PIPE JOINTS SHALL BE WATERTIGHT AND FLEXIBLE GASKET JOINTS, BOTH BETWEEN PIPE SECTIONS AND AT MANHOLES. PIPE JOINTS SHALL CONSIST OF RESILIENT CONNECTIONS COMPLYING WITH THE REQUIREMENTS OF ASTM C-443 OR ASTM C-923, AS APPROPRIATE.
13. REFER TO THE "PRELIMINARY GEOTECHNICAL STUDY, MIDTOWN AT CLEAR CREEK, PHASE 2 AND 3 PREPARED BY CESARE, INC. DATED JULY 2, 2012 FOR PAVEMENT SECTION DESIGN.
14. CONTRACTOR TO COORDINATE ALL REMOVAL AND/OR RELOCATION OF EXISTING DRY UTILITIES WITH THE APPROPRIATE PUBLIC SERVICE PROVIDERS.
15. CONTRACTOR TO REMOVE AND DISPOSE OF ALL MATERIALS DEMOLISHED INCLUDING BUT NOT LIMITED TO ASPHALT, CONCRETE, PIPES, POLES AND ANY OTHER MATERIALS DUE TO THE INSTALLATION OF PROPOSED IMPROVEMENTS.
16. ALL ALLEY CURB CUTS AND SIDEWALK ADJACENT TO ALLEY CURB CUTS SHALL BE THE SAME THICKNESS AS THE PROPOSED ALLEY SECTION AS REQUIRED BY THE FINAL PAVEMENT DESIGN REPORT PREPARED FOR FILING 2 AND IN ACCORDANCE WITH ADAMS COUNTY STANDARD CURB CUT DETAIL ON C9.0. THE FINAL PAVEMENT DESIGN REPORT MUST BE REVIEWED AND APPROVED BY ADAMS COUNTY PRIOR TO COMMENCING PAVING OPERATIONS.
17. SEE SHEET C9.0 FOR EXISTING / PROPOSED ASPHALT JOINT DETAIL.
18. REFER TO LANDSCAPE PLAN FOR PLACEMENT OF SCORE JOINTS IN CONCRETE TRAIL.
19. ALL EXISTING STORM SEWER RIM ELEVATIONS / MANHOLES MUST BE ADJUSTED AS SHOWN.
20. SEE SHEET C4.4 FOR DEMOLITION OF EXISTING STORM SEWER, WATER LINES, OVERHEAD UTILITIES, SANITARY, AND TREATED WATER LINES.
21. REFER TO THE SOIL MANAGEMENT PLAN (SMP) DATED FEBURUARY 2014 PREPARED BY ARCADIS REGARDING SOIL AND MATERIAL HANDLING REQUIREMENTS. THE SMP ALSO DETAILS DISPOSAL REQUIREMENTS. THIS SMP MUST BE USED FOR ALL OF FILING 6 INCLUDING ANY KNOWN AND/OR UNKNOWN CONTAMINATION AREAS.
22. CONTRACTOR MUST VIDEO STORM SEWER PER ADAMS COUNTY TO RECEIVE PRELIMINARY ACCEPTANCE.
23. CONTRACTOR TO PROVIDE TRAFFIC CONTROL PLAN.



FOAM BOARD CROSSING DETAIL
1" = 5'
(DETAIL REQUIRED BY CRESTVIEW WATER AND SANITATION DISTRICT)

BENCHMARK DESCRIPTION

ADAMS COUNTY GPS CONTROL STATION 0226
3-1/4" CDOT ALUMINUM CAP STAMPED "4.070000 GPS 34 ZBS PLS 11434". LOCATED AT NORTHWEST CORNER WEST 70TH & BROADWAY.

ELEVATION = 5169.25 (NAVD 88)

YEARS
Redland
WHERE GREAT PLACES BEGIN
7292 S. Country Court, Littleton, Colorado 80120
720.283.4783 Office
REDLAND.COM

COLORADO LICENSED PROFESSIONAL ENGINEER
NICHOLAS T. PRETSCHNER
39832

DRAWN	EBR/RAO
CHECKED	MTP
APPROVED	MTP
PROJECT NO.	10015.14
HORZ. SCALE	1" = 50'
VERT. SCALE	1" = 5'

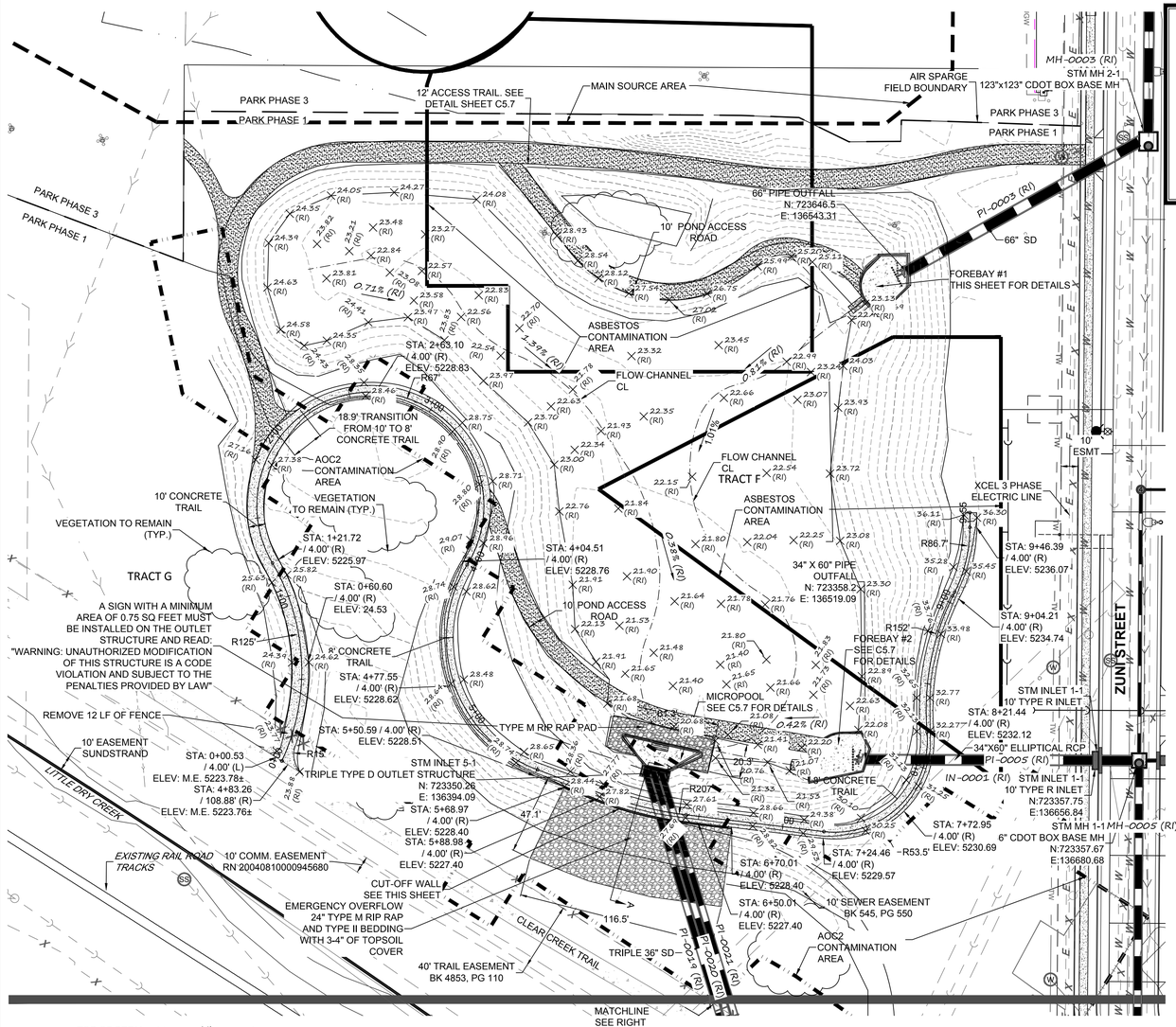
DATE	NO.	NOTES
09/01/2017	1	APPROVAL SET

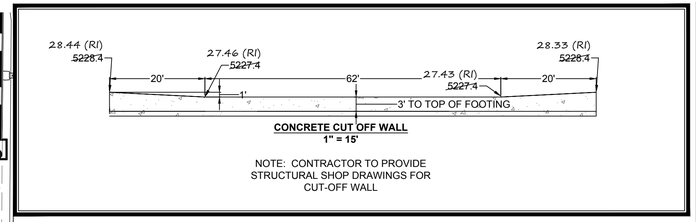
MIDTOWN AT CLEAR CREEK
FILING 6 CONSTRUCTION DOCUMENTS

ZUNI STREET P&P

SHEET
C5.0-A

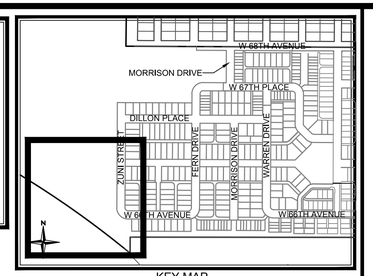
I:\2010\10015 - Midtown\CADD\Sheet Sets\10015.14 Filing 6 CDS\10015.14 Zuni Street P&P.dwg tab: C5.0 ZUNI STREET P&P (2) Oct 01, 2018 - 2:46pm erummey



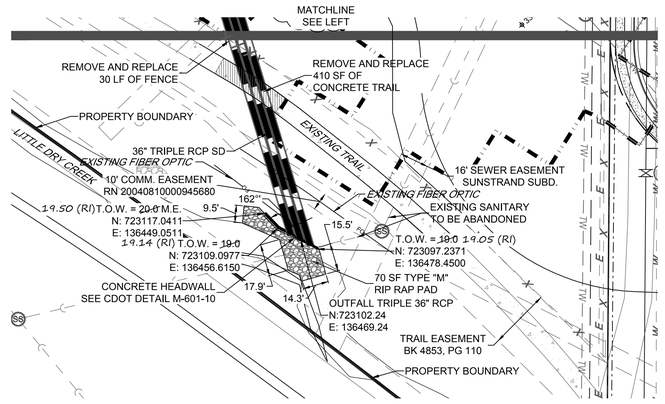


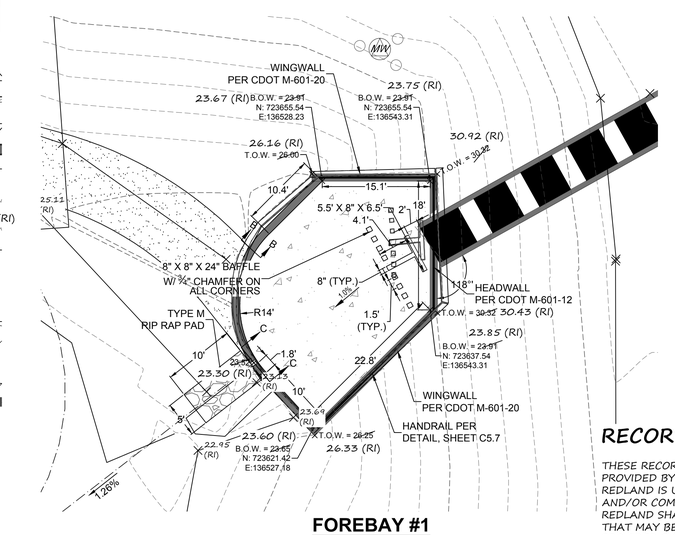
CONCRETE CUT OFF WALL
1" = 15'

NOTE: CONTRACTOR TO PROVIDE STRUCTURAL SHOP DRAWINGS FOR CUT-OFF WALL



KEY MAP
SCALE: 1" = 500'





SUMMARY OF POND VOLUMES

MICROPOOL: 0.027 AC-FT *0.024 AC-FT (RI)*

FOREBAY 1: 0.021 AC-FT *0.024 AC-FT (RI)*

FOREBAY 2: 0.014 AC-FT *0.016 AC-FT (RI)*

WQCV: 1.06 AC-FT *1.8 AC-FT (RI)*

REQUIRED 100 YEAR DETENTION: 5.22 AC-FT *6.2 AC-FT (RI)*

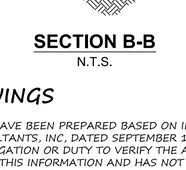
100 YEAR DETENTION W/ 50% WCQV: 5.75 AC-FT

NOTE:

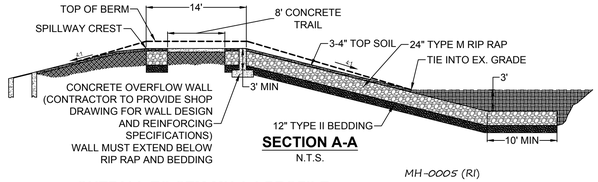
1. **REFER TO THE SOIL MANAGEMENT PLAN (SMP) DATED FEBRUARY 2014 PREPARED BY ARCADIS REGARDING SOIL AND MATERIAL HANDLING REQUIREMENTS. THE SMP ALSO DETAILS DISPOSAL REQUIREMENTS. THIS SMP MUST BE USED FOR ALL WORK INCLUDING ANY KNOWN AND/OR UNKNOWN CONTAMINATED AREAS.**
2. **CRESTVIEW WATER AND SANITATION DISTRICT IS NOT RESPONSIBLE FOR ANY DAMAGE TO THE ACCESS TRAIL OR ADJACENT AREAS.**

COMPACTION NOTE

EXCAVATION AND BACKFILL FOR STORM SEWER STRUCTURES SHALL BE IN ACCORDANCE WITH CDOT SPECIFICATION SECTION 206.



SECTION B-B
N.T.S.



SECTION A-A
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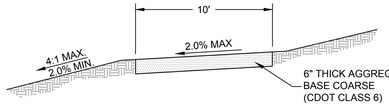
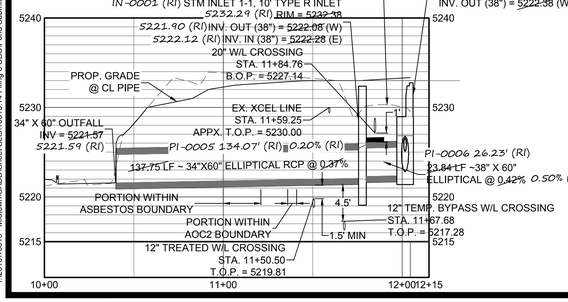
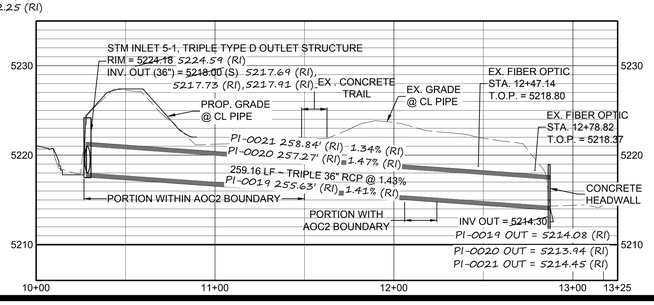


POND ACCESS ROAD
N.T.S.

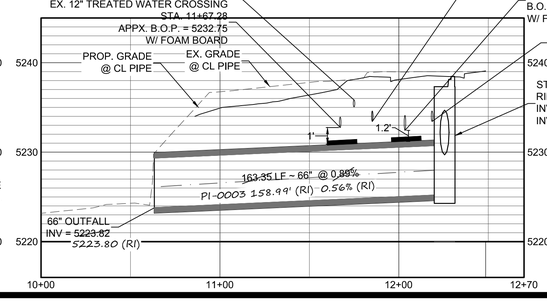
OUTFALL TO STM MH 1-1 PROFILE
V: 1" = 40.00
H: 1" = 8.00



POND OUTFALL PROFILE
V: 1" = 40.00
H: 1" = 8.00



OUTFALL TO STM MH 3-1 PROFILE
V: 1" = 40.00
H: 1" = 8.00



RECORD DRAWINGS

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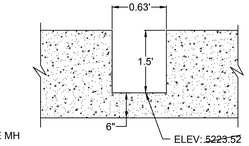
NOTE: CONTRACTOR TO SUPPLY STRUCTURAL SHOP DRAWINGS FOR FOREBAY AND WINGWALLS

FOREBAY #1
1"=10'



SECTION C-C
N.T.S.

BENCHMARK DESCRIPTION

ADAMS COUNTY GPS CONTROL STATION 0226
3-1/4" CDOT ALUMINUM CAP STAMPED "4.070000 GPS 34 ZBS PLS 11434". LOCATED AT NORTHWEST CORNER WEST 70TH & BROADWAY.

ELEVATION = 5169.25 (NAVD 88)

YEARS REDLAND WHERE GREAT PLACES BEGIN
720.283.6783 Office
5800 Lombardy Court, Littleton, Colorado 80120
REDLAND.COM

COLORADO LICENSED PROFESSIONAL ENGINEER MICHAEL T. PIETSCHMANN 38832

DRAWN	EBR/RAO
CHECKED	MTP
APPROVED	MTP
PROJECT NO.	10015.14
HORZ. SCALE	1" = 40'
VERT. SCALE	

NO.	DATE	NOTES
1	04.12.2017	1ST SUBMITTAL
2	07/18/2017	2ND SUBMITTAL - RESPONSE TO COMMENTS
3	11/02/2017	STREET SECTIONS AND OUTLET STRUCTURE REVISION
4	12/05/2017	REVISED 36" RCP OUTLET FOR FIBER OPTIC

MIDTOWN AT CLEAR CREEK
FILING 4 PERMANENT POND STORM INFRASTRUCTURE

DETENTION POND PLAN

SHEET
C5.6

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RECORD DRAWINGS

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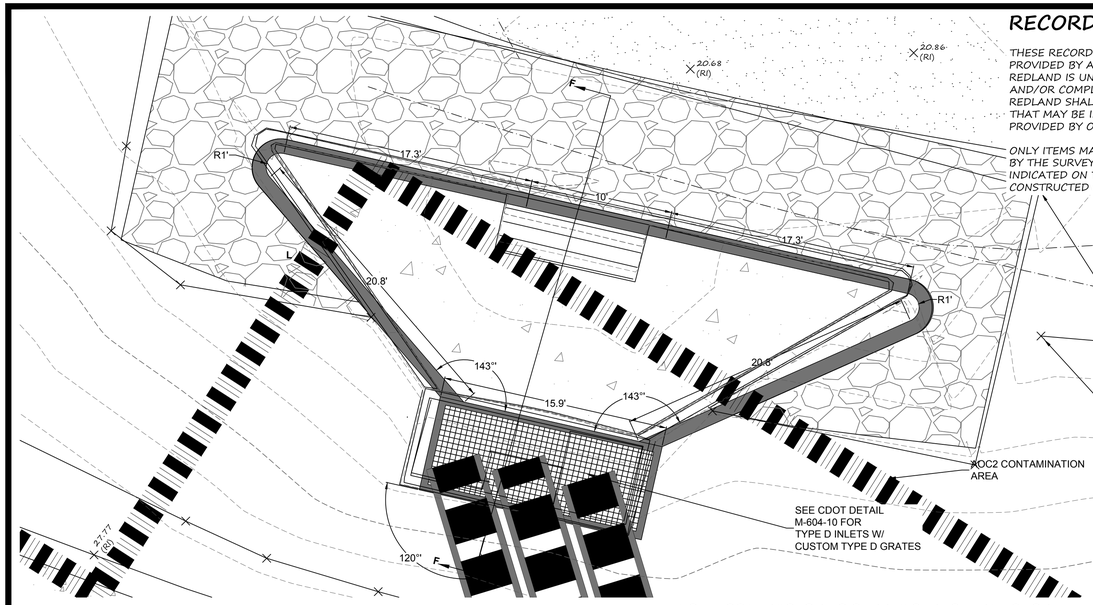
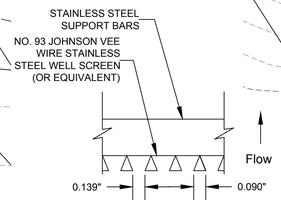
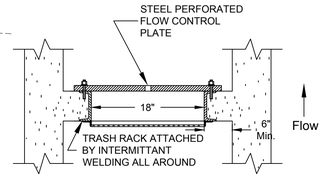


POND - OUTLET STRUCTURE/MICROPOOL PLAN VIEW
1"=4'

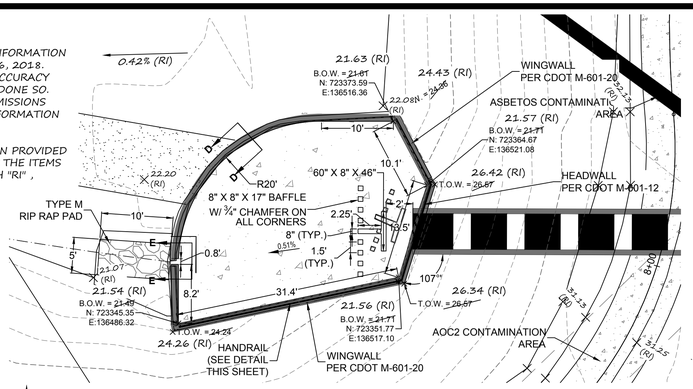
NOTE: CONTRACTOR TO SUPPLY STRUCTURAL SHOP DRAWINGS FOR OUTLET STRUCTURE/MICROPOOL



SECTION I-I

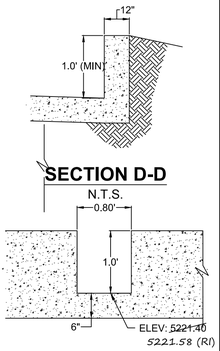


SECTION H-H - PLAN VIEW



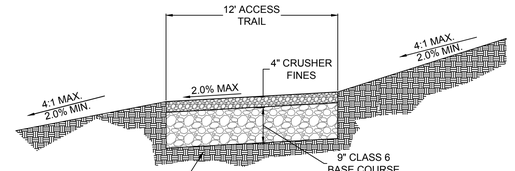
FOREBAY 2
1"=20'

NOTE: CONTRACTOR TO SUPPLY STRUCTURAL SHOP DRAWINGS FOR FOREBAY AND WINGWALLS



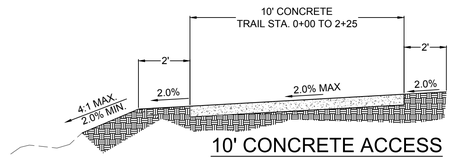
SECTION D-D
N.T.S.

SECTION E-E
N.T.S.

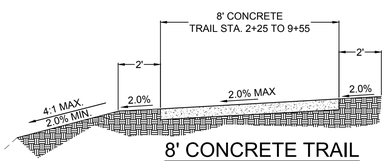


MOISTURE CONDITIONED AND COMPACTED TO 12" DEPTH PER COMPACTION STANDARDS LISTED IN GEOTECHNICAL SITE DEVELOPMENT STUDY FOR PROPOSED SINGLE FAMILY RESIDENTIAL DEVELOPMENT AND FUTURE SCHOOL SITE SOUTHWEST OF W. 68TH AVE. AND MORRISON DR. MIDTOWN AT CLEAR CREEK, FILING 6 DATED DECEMBER 20TH, 2016.

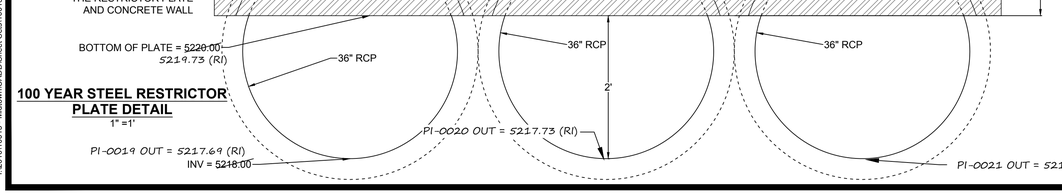
12' ACCESS TRAIL SECTION
N.T.S.



10' CONCRETE ACCESS TRAIL SECTION
N.T.S.

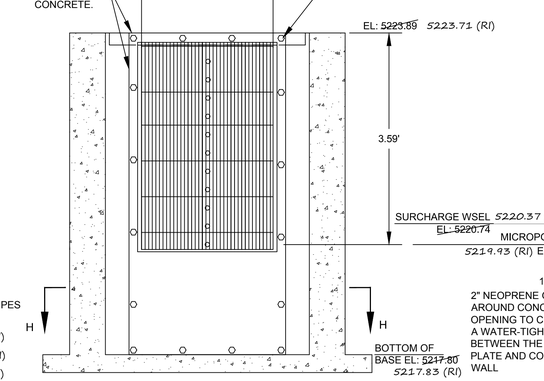


8' CONCRETE TRAIL SECTION
N.T.S.



OUTLET STRUCTURE SECTION F-F

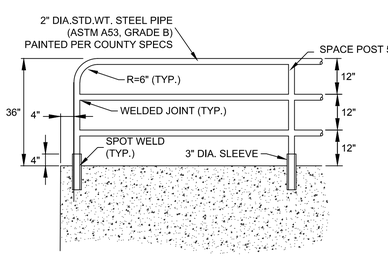
NOTE: CONTRACTOR TO SUPPLY STRUCTURAL SHOP DRAWINGS FOR OUTLET STRUCTURE/MICROPOOL



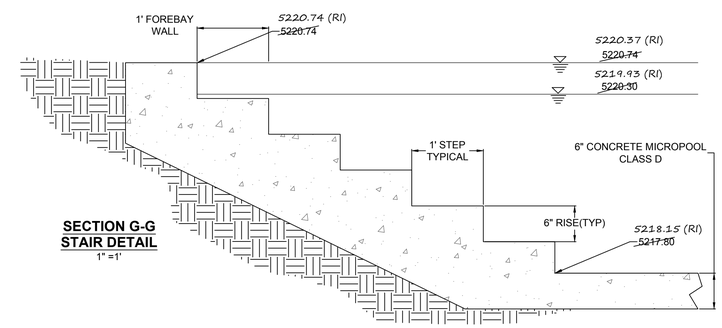
TRASH RACK DETAIL

WATER QUALITY ORIFICE PLATE DETAIL

100 YEAR STEEL RESTRICTOR PLATE DETAIL
1" =1'



HANDRAIL DETAIL



SECTION G-G STAIR DETAIL
1" =1'

YEARS REDLAND WHERE GREAT PLACES BEGIN
720.283.6783 Office
5594 Elati Street, Littleton, Colorado 80120
REDLAND.COM

COLORADO LICENSED PROFESSIONAL ENGINEER NICHOLAS T. PRETSCHNER 39832

DRAWN	EBRRAO
CHECKED	MTP
APPROVED	MTP
PROJECT NO.	10015.14
HORZ. SCALE	1" = 40'
VERT. SCALE	

NO.	DATE	NOTES
1	04.12.2017	1ST SUBMITTAL
2	07/09/2017	2ND SUBMITTAL INCLUDES SECTION A-A & B-B, REVISED EQ STORM, NOTE REVISION

MIDTOWN AT CLEAR CREEK
FILING 4 PERMANENT POND STORM INFRASTRUCTURE

DETENTION POND DETAILS

SHEET
C5.7

I:\2015\10015 - Midtown\CAD\Sheet Sets\10015.14 Filing 6 CDS\Pond Submittal\10015.14 Pond Details.dwg tab: C5.7 DETENTION POND DETAILS Oct 01, 2018 - 12:54pm erumsey