Final Drainage Report

Compark Village South Filing No. 2
Parker, Colorado

Code: CLCPKC3

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Submitted: September 20, 2016

ENGINEERS CERTIFICATION

This Final Drainage Report for Compark Village South Filing No. 2 was prepared by me or under my direct supervision in accordance with the provisions of the *Town of Parker Storm Drainage and Environmental Criteria Manual.* I understand that the Town of Parker and its designated town authority do not and will not assume liability for drainage facilities designed by others.

Rick J. Moore, P.E.

Registered Professional Engineer

State of Colorado No. 30877

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I. Introduction

A. Location

Compark Village South Filing 2 is located within the south half of section 6, township 6 south, range 66 west of the 6th principal meridian, Town of Parker, Douglas County, Colorado. The site is bound by existing residential neighborhoods to the South, future Belford Ave to the North, and future developed parcels to the East and West.

The Compark Village South Filing 2 developed area is approximately 32.9 acres. Upon final build out, the site will contain 120 residential duplex lots and 72 residential single family home lots.

B. Description of Property

The topography for the site generally slopes from South to North. The highest elevation on the site is located at the southwest quadrant of the site and the lowest elevation is located directly north of Belford Avenue.

Existing vegetation on the site is comprised of native grasses, shrubs and weedy species indigenous to the area.

C. Existing Soils

Existing soils for the site were researched on the NRCS web soil survey, see Appendix A. Three principal soil groups exist onsite:

- Newlin Gravelly Sandy Loam (NeE 8 to 30% slopes) This rolling to steep sloping soil is located on uplands and terrace side slopes. Runoff is medium and erosion hazard is slight to moderate. This soil is classified as a Type B Hydrologic Soil Group.
- Fondis Clay Loam (FoD 3 to 9% slopes) This sloping soil is located on uplands. Runoff is high and the erosion hazard is moderate. The soil is classified as a Type C Hydrologic Soil Group.
- Fondis Clay Loam (FoB 1 to 3% slopes) This gently sloping soil is located on tablelands and uplands. Runoff is medium and erosion hazard is slight to moderate. The soil is classified as a Type C Hydrologic Soil Group.

II. Drainage Basins and Sub-Basins

A. Existing Basin Description

The proposed site is tributary to Green Acres Tributary which runs through the property adjacent to the North of the site. The Green Acres Tributary confluences w/ Happy Canyon Creek upstream of Jordan Road and ultimately joins Cherry Creek, further downstream of Jordan Road. There is an existing 10' x 12' box culvert located to the north of the site that conveys flows from an existing depressed area to the north of the site through and under E-470.

The site is located within Zone X as shown on the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRM) numbers 08035C0062F and 08035C0066F, dated September 30, 2005 for Happy Canyon Creek. The FIRM maps can be found in Appendix A. A portion of the Green Acres Tributary is located in the Zone A 100-year Floodplain, also shown on the FIRM maps in Appendix A.

B. Proposed Basin Development

The proposed site will be divided into several drainage sub-basins. These sub-basins have been determined based on land use, area, roadway slopes, storm sewer locations and inlet capacities. The developed site will generally follow the existing drainage patterns and runoff will be conveyed via storm sewer, overland flow, and channel flow through a proposed channel to a proposed regional detention and water quality pond located directly north of the site. This regional detention pond will release restricted flows into an existing box culvert under E-470 and into the Green Acres Tributary in compliance with the Master Drainage Report for Compark Village South and Town of Parker requirements. The Preliminary Drainage Exhibit located in Appendix D shows the location and size of each proposed drainage sub-basin.

C. Sub Basin Descriptions

BEL-1

Drainage basin BEL-1 is composed of landscaped area, sidewalk, and the north half of a portion of Belford Avenue. Storm water will flow east toward Design Point B1 where it will be collected by Inlet 2-1. This is an on grade 10' Type R inlet with the capacity to handle the runoff from a 5 year storm event. From there, storm water will be conveyed to the West Water Quality Pond just southeast of Belford Avenue via storm sewer. This pond discharges directly to Green Acres Tributary. In the 100 year storm event, excess runoff will bypass Inlet 2-1 and flow into sub basin BEL-3 where it will be intercepted by Inlet 2-2.

BEL-2

Drainage basin BEL-2 is composed of landscaped area, sidewalk, and the south half of a portion of Belford Avenue. Storm water will flow east toward Design Point B2 where it will be collected by Inlet 1-1. This is an on grade 10' Type R inlet with the capacity to handle the runoff from a 5 year storm event. From there, storm water will be conveyed to the West Water Quality Pond just southeast of Belford Avenue via storm sewer. This pond discharges directly to Green Acres Tributary. In the 100 year storm event, excess runoff will bypass Inlet 1-1 and flow into sub basin BEL-4 where it will be intercepted by Inlet 1-2.

BEL-3

Drainage basin BEL-3 is composed of landscaped area, sidewalk, and the north half of a portion of Belford Avenue. Storm water will flow toward a low point in the middle of the basin at Design Point B3 where it will be collected by Inlet 2-2. This is a 15' Type R inlet in sump with the capacity to handle the runoff from a 100 year storm event for basin BEL-3 as well as the bypass runoff from basin BEL-1. From there, storm water will be conveyed to the East Water Quality Pond just east of Belford Avenue via storm sewer. This pond discharges directly to Green Acres Tributary.

BEL-4

Drainage basin BEL-4 is composed of landscaped area, sidewalk, and the south half of a portion of Belford Avenue. Storm water will flow toward a low point in the middle of the basin at Design Point B4 where it will be collected by Inlet 1-2. This is a 10' Type R inlet in sump with the capacity to handle the runoff from a 100 year storm event for basin BEL-4 as well as the bypass runoff from basin BEL-2. From there, storm water will be conveyed to the East Water Quality Pond just east of Belford Avenue via storm sewer. This pond discharges directly to Green Acres Tributary.

BEL-5

Drainage basin BEL-5 is composed of landscaped area, sidewalk, and the north half of a portion of Belford Avenue. It also includes half of the bridge over Happy Canyon Creek. Storm water will generally flow southeast toward Design Point B5 at South Chambers Road. A storm sewer network has not yet been designed to accommodate this basin. This will be completed in Phase 2.

BEL-6

Drainage basin BEL-6 is composed of landscaped area, sidewalk, and the south half of a portion of Belford Avenue. It also includes half of the bridge over Happy Canyon Creek. Storm water will generally flow southeast toward Design Point B6 at South

Chambers Road. A storm sewer network has not yet been designed to accommodate this basin. This will be completed in Phase 2.

CVS-1

Drainage basin CVS-1 is composed of landscaped area, sidewalk, and the north half of a portion of Belford Avenue. Storm water will flow northeast toward Design Point 1 where it will be intercepted by Inlet 1-3. This is an on grade 15' Type R inlet with the capacity to handle the runoff from a 5 year storm event. From there, storm water will be conveyed directly to Green Acres Tributary via storm sewer. In the 100 year storm event, excess runoff will bypass Inlet 1-3 and flow into sub basin CVS-3.

CVS-2

Drainage basin CVS-2 is composed of landscaped area, sidewalk, and the south half of a portion of Belford Avenue. Storm water will flow northeast toward Design Point 2 where it will be intercepted by Inlet 2-3. This is an on grade 15' Type R inlet with the capacity to handle the runoff from a 5 year storm event. From there, storm water will be conveyed directly to Green Acres Tributary via storm sewer. In the 100 year storm event, excess runoff will bypass Inlet 2-3 and flow into sub basin CVS-4 where it will be intercepted by Inlet 2-4.

CVS-3

Drainage basin CVS-3 is composed of landscaped area, sidewalk, and the north half of a portion of Belford Avenue. Storm water will flow northeast toward Design Point 3 where it will be collected by Inlet 1-4. This is an on grade 10' Type R inlet with the capacity to handle the runoff from a 5 year storm event. From there, storm water will be conveyed directly to Green Acres Tributary via storm sewer. In the 100 year storm event, excess runoff will bypass Inlet 2-3 and flow into sub basin CVS-7 where it will be intercepted by Inlet 1-6.

CVS-4

Drainage basin CVS-4 is composed of landscaped area, sidewalk, and the south half of a portion of Belford Avenue. Storm water will flow northeast toward Design Point 4 where it will be collected by Inlet 2-4. This is an on grade 15' Type R inlet with the capacity to handle the runoff from a 5 year storm event. From there, storm water will be conveyed directly to Green Acres Tributary via storm sewer. In the 100 year storm event, excess runoff will bypass Inlet 2-4 and flow into sub basin CVS-8 where it will be intercepted by Inlet 2-6.

CVS-4A

Drainage basin CVS-4 is composed of landscaped area, sidewalk, residential homes, and residential local streets. Storm water will flow northeast toward Design Point 4A

where it will be collected by Inlet 3-4. This is a 10' Type R inlet in sump with the capacity to handle the runoff from a 100 year storm event for basin CVS-4A as well as the bypass runoff from basin CVS-5. From there, it will be conveyed directly to Green Acres Tributary via storm sewer.

CVS-5

Drainage basin CVS-5 is composed of landscaped area, sidewalk, residential homes and residential local streets. Storm water will flow northeast toward Design Point 5 where it will be collected by Inlet 5-4. This is an on grade 15' Type R inlet with the capacity to handle the runoff from a 2 year storm event. From there, it will be conveyed directly to Green Acres Tributary via storm sewer. In the 100 year storm event, excess runoff will bypass Inlet 5-4 and flow into sub basin CVS-4A where it will be intercepted by Inlet 3-4.

CVS-6

Drainage basin CVS-6 is composed of landscaped area, a berm, sidewalk, and residential local streets. Storm water will flow north toward Design Point 6 where it will be collected by Inlet 6-4. This is an on grade 10' Type R inlet with the capacity to handle the runoff from a 100 year storm event. From there, it will be conveyed directly to Green Acres Tributary via storm sewer.

CVS-7

Drainage basin CVS-7 is composed of landscaped area, sidewalk, and the north half of a portion of Belford Avenue. Storm water will flow east toward Design Point 7 where it will be collected by Inlet 1-6. This is an on grade 10' Type R inlet with the capacity to handle the runoff from a 5 year storm event. From there, storm water will be conveyed directly to Green Acres Tributary via storm sewer. In the 100 year storm event, excess runoff will bypass Inlet 5-4 and flow into sub basin CVS-11 where it will be intercepted by Inlet 1-5.

CVS-8

Drainage basin CVS-8 is composed of landscaped area, sidewalk, and the south half of a portion of Belford Avenue. Storm water will flow east toward Design Point 8 where it will be intercepted by Inlet 2-6. This is an on grade 15' Type R inlet with the capacity to handle the runoff from a 5 year storm event. From there, storm water will be conveyed directly to Green Acres Tributary via storm sewer. In the 100 year storm event, excess runoff will bypass Inlet 2-6 and flow into sub basin CVS-12 where it will be intercepted by Inlet 2-5.

CVS-9

Drainage basin CVS-9 is composed of landscaped area, sidewalk, residential homes and residential local streets. Storm water will flow northeast toward Design Point 9 where it will be collected by Inlet 4-5A. This is an on grade 15' Type R inlet with the capacity to handle the runoff from a 2 year storm event. From there, it will be conveyed directly to Green Acres Tributary via storm sewer. In the 100 year storm event, excess runoff will bypass Inlet 4-5A and flow into sub basin CVS-12 where it will be intercepted by Inlet 2-5.

CVS-9A

Drainage basin CVS-9A is composed of landscaped area, sidewalk, residential homes and residential local streets. Storm water will generally flow northwest toward Design Point 9A where it will be collected by Inlet 4-4. This is a 5' Type R inlet in sump with the capacity to handle the runoff from a 100 year storm event. From there, it will be conveyed directly to Green Acres Tributary via storm sewer.

CVS-10

Drainage basin CVS-10 is composed of landscaped area, sidewalk, residential homes and residential local streets. Storm water will flow northeast toward Design Point 10 where it will be collected by Inlet 5-5A. This is an on grade 15' Type R inlet with the capacity to handle the runoff from a 2 year storm event. From there, storm water will be conveyed directly to Green Acres Tributary via storm sewer. In the 100 year storm event, excess runoff will bypass Inlet 5-5A and flow into sub basin CVS-13 where it will be intercepted by Inlet 4-5.

CVS-11

Drainage basin CVS-11 is composed of landscaped area, sidewalk, and the north half of a portion of Belford Avenue. Storm water will flow toward a low point in the middle of the basin at Design Point 11 where it will be collected by Inlet 1-5. This is a 10' Type R inlet in sump with the capacity to handle the runoff from a 100 year storm event for basin CVS-11 as well as the bypass runoff from basin CVS-7. From there, storm water will be conveyed to the regional detention pond at E-470 via storm sewer. This pond discharges directly to Green Acres Tributary.

CVS-12

Drainage basin CVS-12 is composed of landscaped area, sidewalk, residential homes, residential local streets, and the south half of a portion of Belford Avenue. Storm water will flow toward a low point in the middle of the north side of the basin at Design Point 12 where it will be collected by Inlet 2-5. This is a 15' Type R inlet in sump with the capacity to handle the runoff from a 100 year storm event for basin CVS-12 as well as the bypass runoff from basins CVS-8 and CVS-9. From there,

storm water will be conveyed to the regional detention pond at E-470 via storm sewer. This pond discharges directly to Green Acres Tributary.

CVS-12A

Drainage basin CVS-12A is composed of landscaped area, sidewalk, residential homes and residential local streets. Storm water will generally flow south toward Design Point 12A where it will be collected by Inlet 3-5. This is a 10' Type R inlet in sump with the capacity to handle the runoff from a 100 year storm event. From there, storm water will be conveyed to the regional detention pond at E-470 via storm sewer. This pond discharges directly to Green Acres Tributary.

CVS-13

Drainage basin CVS-13 is composed of landscaped area, sidewalk, residential homes and residential local streets. Storm water will flow northeast toward Design Point 13 where it will be collected by Inlet 4-5. This is a 15' Type R inlet in sump with the capacity to handle the runoff from a 100 year storm event. From there, storm water will be conveyed to the regional detention pond at E-470 via storm sewer. This pond discharges directly to Green Acres Tributary.

CVS-14

Drainage basin CVS-14 is composed of landscaped area, berms, sidewalk, residential homes and residential local streets. Storm water will flow toward a low point in the middle of the north side of the basin at Design Point 14 where it will be collected by Inlet 6-5. This is a 15' Type R inlet in sump with the capacity to handle the runoff from a 2 year storm event. From there, storm water will be conveyed to the regional detention pond at E-470 via storm sewer. This pond discharges directly to Green Acres Tributary. In the 100 year storm event, excess runoff will pond at Inlet 6-5 and eventually flow into sub basins CVS-13 and CVS-15 where it will be intercepted by Inlets 4-5 and 5-5.

CVS-14A

Drainage basin CVS-14A is composed of landscaped area and berms. Runoff will flow toward a swale along the north side of the basin. The swale will send the storm water east toward Design Point 14A where it will be collected by Inlet 7-5. This is a CDOT Type C inlet with the capacity to handle the runoff from a 100 year storm event. From there, storm water will be conveyed to the regional detention pond at E-470 via storm sewer. This pond discharges directly to Green Acres Tributary.

CVS-15

Drainage basin CVS-15 is to be developed in a later phase and will be composed of landscaped area, sidewalk, residential homes and residential local streets. Storm

water will flow northwest toward Design Point 15 where it will be collected by Inlet 5-5. This is a 10' Type R inlet in sump with the capacity to handle the runoff from a 100 year storm event. From there, storm water will be conveyed to the regional detention pond at E-470 via storm sewer. This pond discharges directly to Green Acres Tributary.

CVS-16

Drainage basin CVS-16 is composed of landscaped area, sidewalk, residential homes and residential local streets. Storm water will flow northeast toward Design Point 16. A storm sewer network has not yet been designed to accommodate this basin. This will be completed in a later phase of the project. In the interim condition, runoff will be collected by a temporary swale directly east of the basin. This swale is sized with the capacity to handle the runoff from the 100 year storm event. It is designed to convey water directly to the regional detention pond at E-470.

CVS-17

Drainage basin CVS-17 is to be developed in a later phase and will be composed of landscaped area, sidewalk, residential homes and residential local streets. Storm water will flow northeast toward Design Point 17. A storm sewer network has not yet been designed to accommodate this basin. This will be completed as part of a later phase.

CVS-18

Drainage basin CVS-18 is to be developed in a later phase and will be composed of landscaped area, sidewalk, and residential local streets. Storm water will flow northeast toward Design Point 18. A storm sewer network has not yet been designed to accommodate this basin. This will be completed as part of a later phase.

CVS-19

Drainage basin CVS-19 is to be developed in a later phase and will be composed of landscaped area, sidewalk, residential homes, residential local streets, and the south half of a portion of Belford Avenue. Storm water will flow northeast toward Design Point 19. A storm sewer network has not yet been designed to accommodate this basin. This will be completed as part of a later phase.

CVS-20

Drainage basin CVS-20 is to be developed in a later phase and will be composed of landscaped area, sidewalk, residential homes, and residential local streets. Storm water will flow southwest and then northwest toward Design Point 20. A storm sewer network has not yet been designed to accommodate this basin. This will be completed as part of a later phase.

CVS-21

Drainage basin CVS-21 is to be developed in a later phase and will be composed of landscaped area, sidewalk, residential homes, and residential local streets. Storm water will flow north east toward Design Point 21. A storm sewer network has not yet been designed to accommodate this basin. This will be completed as part of a later phase.

III. Drainage Design Criteria

A. Hydrology Criteria

The Town of Parker *Storm Drainage and Environmental Criteria Manual* and the Urban Drainage and Flood Control District (UDFCD) *Urban Storm Drainage Criteria Manual* were used for the storm drainage system design.

The following criteria was utilized in developing the proposed drainage system:

- The proposed drainage system is designed to match, as best as possible, the historic drainage patterns occurring at the site.
- The proposed drainage system attempts to limit the diversion of storm runoff from one basin to another (basin transfer).
- Runoff generated from drainage sub-basins is conveyed via the proposed storm sewer system, overland flow or via the Green Acres Tributary into the proposed regional detention and water quality pond.

Design Rainfall: UDFCD rainfall data is used to determine peak runoff values. The 2-year and 100-year frequency storms are used as the minor and major design storms respectively.

Runoff Calculation: Peak storm runoff is determined using the rational formula,

$Q = CIA$ (CFS)

C = Runoff coefficient based on surface impermeability

I = Rainfall intensity in inches per hour

A = Drainage basin area in acres

UDFCD Imperviousness Values (Table 6-3) and Runoff Coefficients (Table 6-5) were used to develop basin runoff coefficients. These tables can be found in Appendix B. The runoff coefficients are weighted for each applicable sub-basin to more accurately reflect the runoff characteristics of the site.

Time of Concentration is determined using the criteria in Sections 3.4.1 and 3.4.2 of the UDFCD Criteria Manual. These calculations are included in Appendix B.

Rainfall intensities are determined using the Town of Parker's *Storm Drainage and Environmental Criteria Manual* Point Rainfall data and Intensity-Duration curves.

The recurrence intervals used for this study were based on a residential land use. The minor drainage system is designed for a 2-year recurrence interval and the major drainage system is designed for a 100-year recurrence interval.

B. Hydraulic Criteria

The following criteria were utilized in determining allowable street flow.

Minor Storm (2-yr)

- Local Street – No curb overtopping and flow may spread to crown of street.

Minor Storm (5-yr)

- Collector Street – No curb overtopping. Flow Spread must leave at least a 10 foot width free of water. (5-feet on each side of crown for roads without median. 10-feet on each side of median for roads with a median.)

Major Storm (100-yr)

- Local and Collector Streets – The depth of water at the gutter flowline shall not exceed 12 inches. A minimum of 18-inches must be provided from the water surface elevation to the lowest floor elevation or window well opening elevation for structures that are adjacent to the roadway (this includes residential dwellings, public, commercial and industrial buildings).

For the major and minor storm events, allowable capacity was determined using Street and Inlet Hydraulics version 3.14 by UDFCD.

IV. Drainage Facility Design

A. General Concept

Stormwater runoff from the proposed subdivision will generally follow existing drainage patterns from southwest to northeast on the site. Overland flow and a proposed storm sewer system will route the runoff to the Green Acres Tributary or directly to the proposed regional detention and water quality pond located on the Green Acres Tributary at E-470. This pond will release restricted flows directly into the Green Acres Tributary through the existing 10' x 12' box culvert under E-470.

B. Specific Details

As mentioned previously in this report, the site will be divided into several drainage sub-basins. The onsite runoff will be routed through the site via the proposed roadways and gutters where it will be intercepted by a number of on-grade inlets and inlets located in roadway sumps. This runoff will be routed, via storm sewer, to either the Green Acres Tributary which leads to the proposed regional detention pond or directly to the proposed regional detention pond. Existing water quality structures from the Compark Village South, Filing 1 project will ensure that any water directly entering the Green Acres Tributary is treated.

In addition to the onsite sub-basins, the runoff from some offsite areas will be routed through the proposed site. These offsite areas are two basins (H170 & H180) directly south of the site that include part of the Grand View Estates development. In each basin, flows are intercepted via proposed flared end sections and carried through the site via proposed storm sewer into either the Green Acres Tributary or directly into the proposed regional detention pond at E-470.

The proposed regional detention pond for this development was designed based on a study of major basins that all discharge to the Green Acres Tributary. As has been stated, smaller sub basins were created for this report to more accurately design the storm sewer network that serves the KB Homes residential development. To verify coordination between these two sets of data, a table has been provided below.

Basin ID	Impervious % used in GAT Hydrology Study	Composite Impervious % of Corresponding Sub Basins
H161	50%	41%
H171	50%	44%
H181	50%	38%

The corresponding composite impervious percentages from the sub basin analysis are all below the percentages used to design the regional detention pond. Therefore, the pond has been sufficiently designed to exceed the storage requirements for the KB Homes residential site.

More details for the proposed detention and water quality pond are included in the Conceptual Drainage Report for Compark South prepared by Manhard Consulting, Ltd.[5] and approved by the Town of Parker.

V. Environmental Protection Criteria

A. Erosion and Sediment Control Measures

During construction, silt fence, inlet protection, and vehicle tracking pads will be used to prevent sediment from entering the storm sewer system or sediment leaving the site. Temporary sediment basins will also be used during construction to trap sediment from stormwater before it leaves the site. All erosion and sediment control measures will be maintained, inspected, and repaired by the Contractor throughout the construction project in compliance with Town of Parker requirements. The proposed Construction Best Management Practices (CBMPs) for this development will follow the requirements for the Town of Parker and UDFCD.

B. Water Quality

Water quality control for this development will be constructed as part of the Compark Village South Filing 1 project. This will consist of CDS manhole structures from Contech Engineered Solutions LLC at the end of each storm line that discharges to Green Acres Tributary.

VI. Conclusion

A. Compliance with Standards

The drainage system for Compark Village South Filing No. 2 was designed to meet the Town of Parker's *Storm Drainage and Environmental Criteria Manual* and the Urban Drainage and Flood Control District's *Urban Storm Drainage Criteria Manual*. The existing Flood Insurance Rate Map (FIRM) in Appendix A shows no portion of the developed site area to be within a flood hazard area. Therefore, no map revisions through FEMA are required as part of this development.

B. Drainage Concept

The drainage system was designed to allow storm water to be safely conveyed through and away from the site without negatively impacting downstream properties. The drainage concepts proposed for this site are in accordance with the Conceptual Drainage Report for Compark South prepared by Manhard Consluting, Ltd. and approved by the Town of Parker.

All storm sewer facilities are intended to be included within the Town of Parker's public improvements maintenance program. The Compark South Drainage Channel Tract will be owned and maintained by the Belford South Metropolitan District. The Town of Parker will retain oversight maintenance rights as needed during emergency conditions.

C. Erosion and Sediment Control Concept

The Construction Best Management Practices (CBMPs) proposed for this site follow the requirements of the Town of Parker and the recommendations by UDFCD. Attention to proper installation and maintenance are essential for the sediment and erosion control practices to function properly.

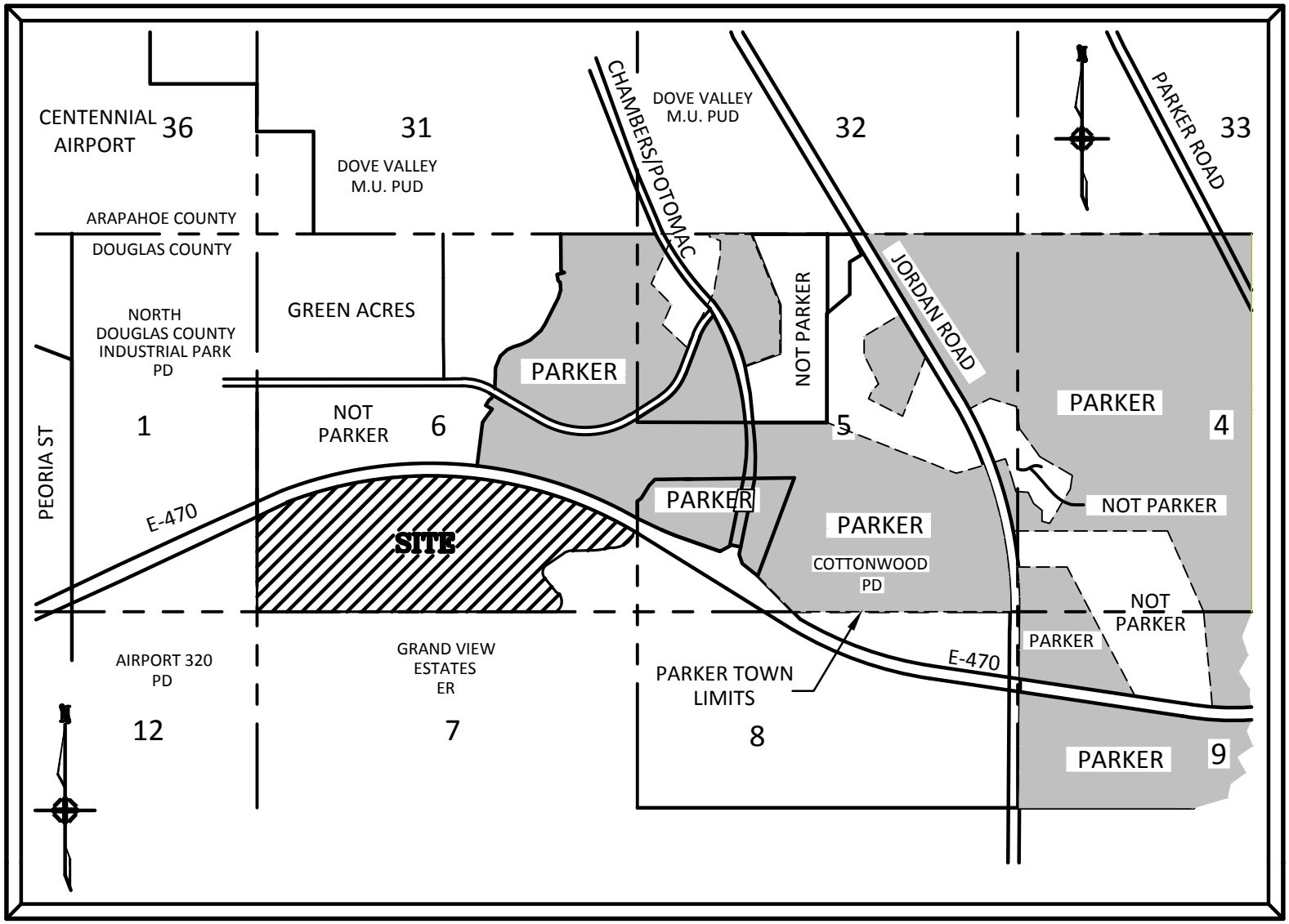
VII. References

1. Town of Parker's *Storm Drainage and Environmental Criteria Manual*, February 2014.
2. Urban Drainage and Flood Control District's *Urban Storm Drainage Criteria Manual* Vol. 1–2, dated April, 2008.
3. Urban Drainage and Flood Control District's *Urban Storm Drainage Criteria Manual* Vol. 3, dated November, 2010.
4. StormCAD, V8i (SELECT series 2), Bentley Systems, Inc., c. 2011 Bentley Systems, Inc.
5. Conceptual Drainage Report for Compark South, prepared by Manhard Consulting, Ltd., dated November 20, 2015.
6. Happy Canyon Creek Major Drainageway Plan, prepared by Muller Engineering Company, Inc., dated March 2014

APPENDIX A

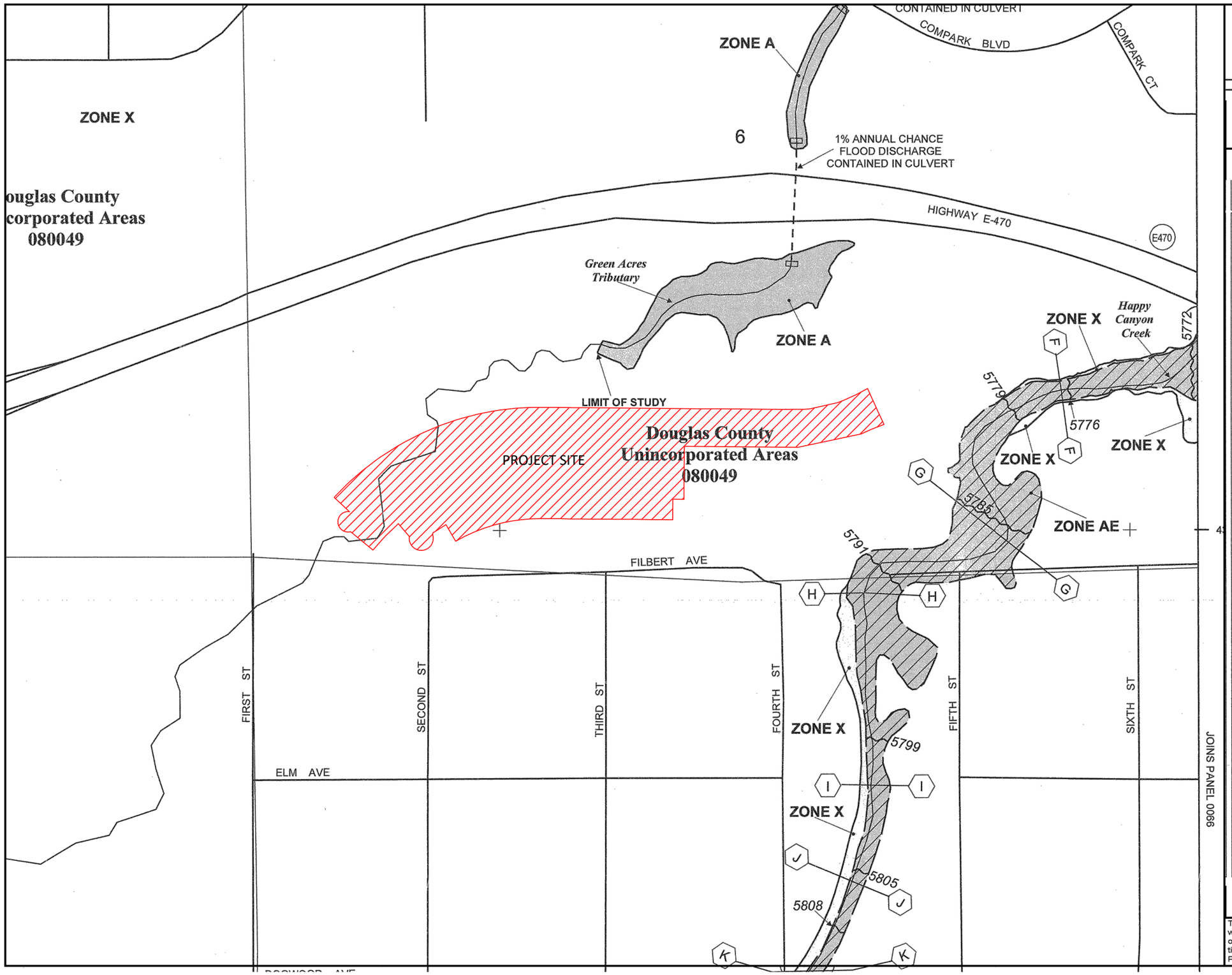
Maps

- Vicinity Map
- FEMA Flood Information Rate Map
- Soils Map



VICINITY MAP

N.T.S.



MAP SCALE 1" = 500'

500 1000 FEET

PANEL 0062F

FIRM

FLOOD INSURANCE RATE MAP

DOUGLAS COUNTY, COLORADO AND INCORPORATED AREAS

PANEL 62 OF 495

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS

COMMUNITY	NUMBER	PANEL	SUFFIX
DOUGLAS COUNTY	080049	0062	F
LONE TREE, CITY OF	080319	0062	F

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
08035C0062F

EFFECTIVE DATE:
SEPTEMBER 30, 2005

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

orth American Vertical must be compared to e **vertical datum**. An detic Vertical Datum of County flooding source. evations that were not M. The offsets for each ouglas County Vertical onversion between the merican Vertical Datum ://www.ngs.noaa.gov or ess:

information for **bench** Services Branch of the visit its website at itional control points please visit wer.htm.

by the Douglas County tment. Additional input arker. These data are

hannel configurations previous FIRM for this Data tables in the Flood raulic data) may reflect on this map. Also, the ay differ from what is

st data available at the or de-annexations may users should contact imit locations.

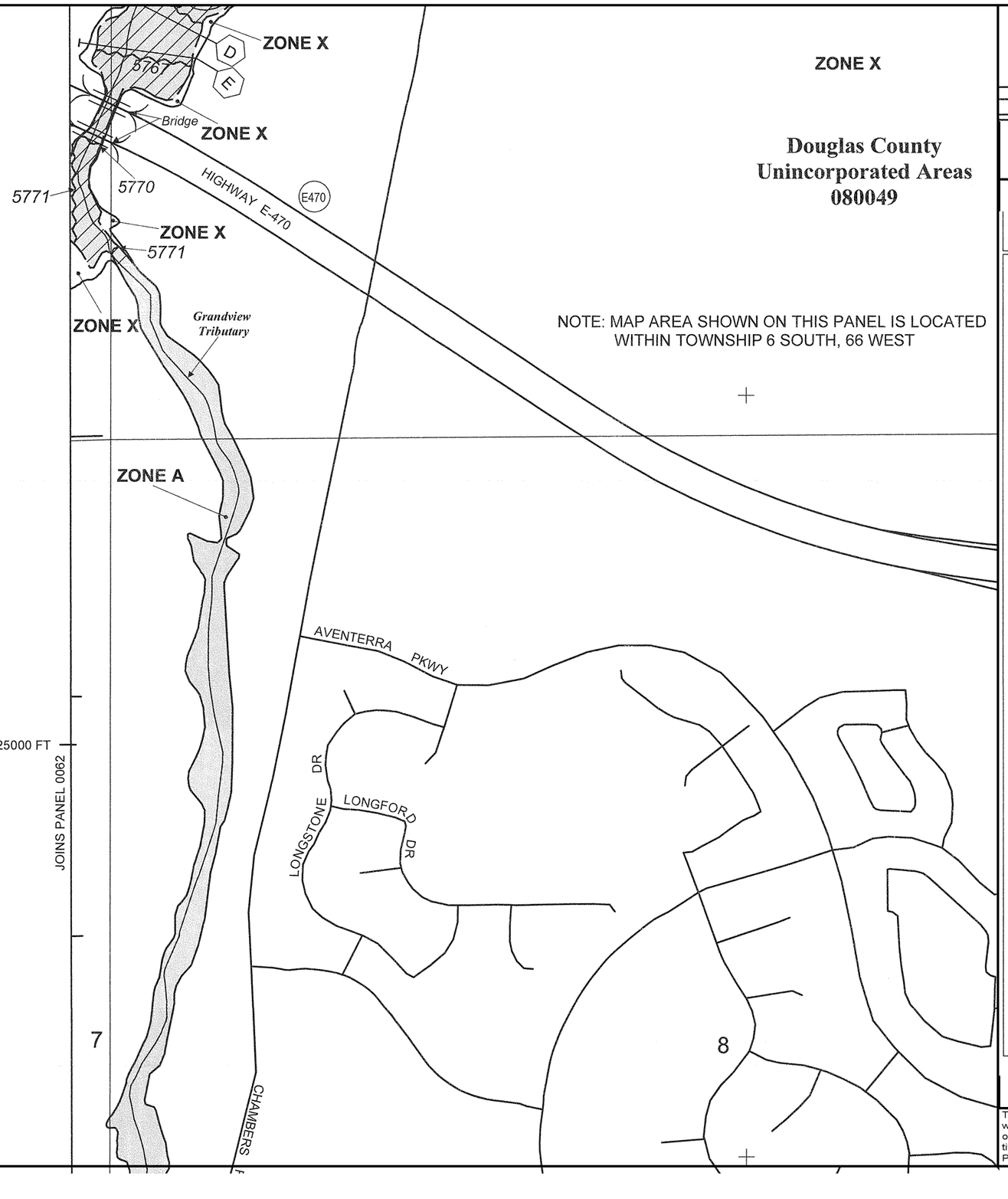
n overview map of the repository addresses; ood Insurance Program panels on which each

616 for information on products may include ce Study report, and/or ay also be reached by ema.gov.

oncerning the National **EMA MAP** (1-877-336-

et Table

Vertical Datum



ZONE X

Douglas County Unincorporated Areas 080049

NOTE: MAP AREA SHOWN ON THIS PANEL IS LOCATED WITHIN TOWNSHIP 6 SOUTH, 66 WEST

MAP SCALE 1" = 500'

500 1000 FEET

PANEL 0066F

FIRM

FLOOD INSURANCE RATE MAP

DOUGLAS COUNTY, COLORADO AND INCORPORATED AREAS

PANEL 66 OF 495

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS

COMMUNITY	NUMBER	PANEL	SUFFIX
DOUGLAS COUNTY	080049	0066	F
PARKER, TOWN OF	080310	0066	F

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

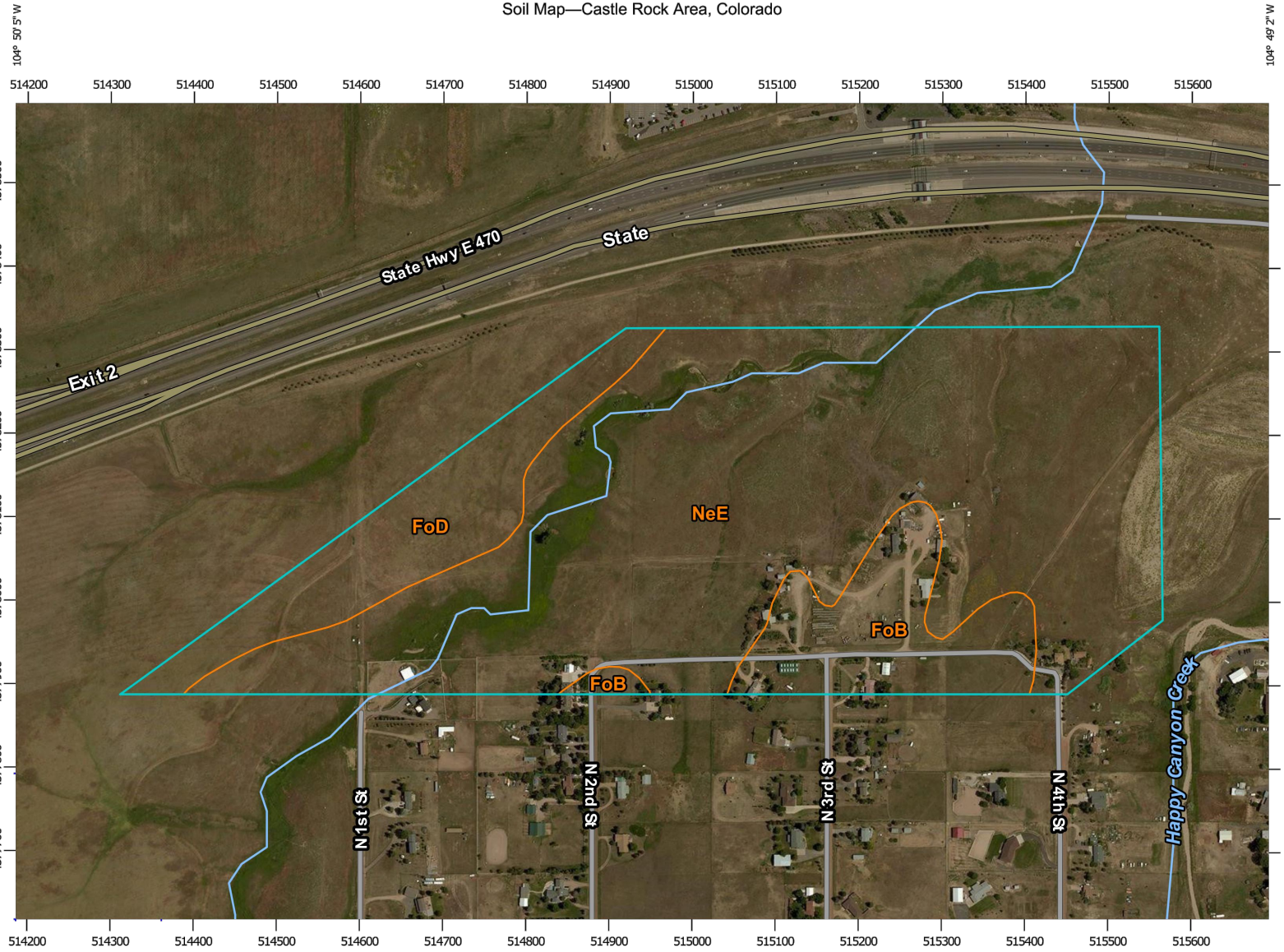
MAP NUMBER 08035C0066F

EFFECTIVE DATE: SEPTEMBER 30, 2005

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

Soil Map—Castle Rock Area, Colorado



Map Scale: 1:6,890 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 100 200 400 600

Feet: 0 300 600 1200 1800

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

Natural Resources Conservation Service

Web Soil Survey
National Cooperative Soil Survey

1/14/2016
Page 1 of 3

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COMPARK VILLAGE SOUTH FILING NO. 1
TOWN OF PARKER, CO
SOIL MAP EXHIBIT

RJM
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1/14/16
1:6, 890
SHEET
1
CLCPKC3

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Dwg Name: P:\Clcpkc3\ComSouth05--Residential Preliminary Plat\Documents\Engineering\StormWater Reports\Preliminary Report\Soil Map Exhibit.dwg Updated By: rkatz
11:25

MAP LEGEND

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

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

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

Water Features
- Streams and Canals

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

Background
- Aerial Photography

MAP INFORMATION

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

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: http://websoilsurvey.nrcs.usda.gov
Coordinate System: Web Mercator (EPSG:3857)

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

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

Soil Survey Area: Castle Rock Area, Colorado
Survey Area Data: Version 8, Sep 23, 2014

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

Date(s) aerial images were photographed: Jun 10, 2014—Aug 21, 2014

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

Manhard CONSULTING LTD

COMPARK VILLAGE SOUTH FILING NO. 1
TOWN OF PARKER, CO
SOIL MAP EXHIBIT

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CLCPKC3

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11:25 Dwg Name: P:\Clcpkc3\ComSouth05-Residential Preliminary Plat\Documents\Engineering\StormWater Reports\Preliminary Report\Soil Map Exhibit.dwg Updated By: rkatz

Map Unit Legend

Castle Rock Area, Colorado (CO622)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
FoB	Fondis clay loam, 1 to 3 percent slopes	12.3	12.1%
FoD	Fondis clay loam, 3 to 9 percent slopes	13.2	12.9%
NeE	Newlin gravelly sandy loam, 8 to 30 percent slopes	76.6	75.0%
Totals for Area of Interest		**102.1**	**100.0%**

CLCPKC3 SHEET 3 | 1:6,890 | 1/14/16 | RAK | R.M
COMPARK VILLAGE SOUTH FILING NO. 1
TOWN OF PARKER, CO
SOIL MAP EXHIBIT
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APPENDIX B

Hydrologic Analysis

- UDFCD Table 6-3
- UDFCD Table 6-4
- UDFCD Table 6-5
- UDFCD Figures 6-1, 6-2 & 6-3
- Impervious Percentage Calculations
- Time of Concentration Calculations
- 2-Year Storm Runoff Calculations
- 5-Year Storm Runoff Calculations
- 100-Year Storm Runoff Calculations

Table 6-3. Recommended percentage imperviousness values

Land Use or Surface Characteristics	Percentage Imperviousness (%)
Business:	
Downtown Areas	95
Suburban Areas	75
Residential:	
Single-family	
2.5 acres or larger	12
0.75 – 2.5 acres	20
0.25 – 0.75 acres	30
0.25 acres or less	45
Apartments	75
Industrial:	
Light areas	80
Heavy areas	90
Parks, cemeteries	10
Playgrounds	25
Schools	55
Railroad yard areas	50
Undeveloped Areas:	
Historic flow analysis	2
Greenbelts, agricultural	2
Off-site flow analysis (when land use not defined)	45
Streets:	
Paved	100
Gravel (packed)	40
Drive and walks	90
Roofs	90
Lawns, sandy soil	2
Lawns, clayey soil	2

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
A	$C_A = 0.89i$	$C_A = 0.93i$	$C_A = 0.94i$	$C_A = 0.944i$	$C_A = 0.95i$	$C_A = 0.81i + 0.154$
B	$C_B = 0.89i$	$C_B = 0.93i$	$C_B = 0.81i + 0.125$	$C_B = 0.70i + 0.23$	$C_B = 0.59i + 0.364$	$C_B = 0.49i + 0.454$
C/D	$C_{C/D} = 0.89i$	$C_{C/D} = 0.87i + 0.052$	$C_{C/D} = 0.74i + 0.2$	$C_{C/D} = 0.64i + 0.31$	$C_{C/D} = 0.54i + 0.418$	$C_{C/D} = 0.45i + 0.508$

Where:

i = % imperviousness (expressed as a decimal)

C_A = Runoff coefficient for Natural Resources Conservation Service (NRCS) HSG A soils

C_B = Runoff coefficient for NRCS HSG B soils

$C_{C/D}$ = Runoff coefficient for NRCS HSG C and D soils.

The values for various catchment imperviousness and storm return periods are presented graphically in Figures 6-1 through 6-3, and are tabulated in Table 6-5. These coefficients were developed for the Denver region to work in conjunction with the time of concentration recommendations in Section 2.4. Use of these coefficients and this procedure outside of the semi-arid climate found in the Denver region may not be valid. The UD-Rational Excel workbook performs all the needed calculations to find the runoff coefficient given the soil type and imperviousness and the reader may want to take advantage of this macro-enabled Excel workbook that is available for download from the UDFCD's website www.udfcd.org.

See Examples 7.1 and 7.2 that illustrate the Rational Method.

Table 6-5. Runoff coefficients, *c*

Total or Effective % Imperviousness	NRCS Hydrologic Soil Group A					
	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr
2%	0.02	0.02	0.02	0.02	0.02	0.17
5%	0.04	0.05	0.05	0.05	0.05	0.19
10%	0.09	0.09	0.09	0.09	0.1	0.23
15%	0.13	0.14	0.14	0.14	0.14	0.28
20%	0.18	0.19	0.19	0.19	0.19	0.32
25%	0.22	0.23	0.24	0.24	0.24	0.36
30%	0.27	0.28	0.28	0.28	0.29	0.4
35%	0.31	0.33	0.33	0.33	0.33	0.44
40%	0.36	0.37	0.38	0.38	0.38	0.48
45%	0.4	0.42	0.42	0.42	0.43	0.52
50%	0.45	0.47	0.47	0.47	0.48	0.56
55%	0.49	0.51	0.52	0.52	0.52	0.6
60%	0.53	0.56	0.56	0.57	0.57	0.64
65%	0.58	0.6	0.61	0.61	0.62	0.68
70%	0.62	0.65	0.66	0.66	0.67	0.72
75%	0.67	0.7	0.71	0.71	0.71	0.76
80%	0.71	0.74	0.75	0.76	0.76	0.8
85%	0.76	0.79	0.8	0.8	0.81	0.84
90%	0.8	0.84	0.85	0.85	0.86	0.88
95%	0.85	0.88	0.89	0.9	0.9	0.92
100%	0.89	0.93	0.94	0.94	0.95	0.96
Total or Effective % Imperviousness	**NRCS Hydrologic Soil Group B**					
2%	0.02	0.02	0.14	0.24	0.38	0.46
5%	0.04	0.05	0.17	0.27	0.39	0.48
10%	0.09	0.09	0.21	0.3	0.42	0.5
15%	0.13	0.14	0.25	0.34	0.45	0.53
20%	0.18	0.19	0.29	0.37	0.48	0.55
25%	0.22	0.23	0.33	0.41	0.51	0.58
30%	0.27	0.28	0.37	0.44	0.54	0.6
35%	0.31	0.33	0.41	0.48	0.57	0.63
40%	0.36	0.37	0.45	0.51	0.6	0.65
45%	0.4	0.42	0.49	0.55	0.63	0.67
50%	0.45	0.47	0.53	0.58	0.66	0.7
55%	0.49	0.51	0.57	0.62	0.69	0.72
60%	0.53	0.56	0.61	0.65	0.72	0.75
65%	0.58	0.6	0.65	0.69	0.75	0.77
70%	0.62	0.65	0.69	0.72	0.78	0.8
75%	0.67	0.7	0.73	0.76	0.81	0.82
80%	0.71	0.74	0.77	0.79	0.84	0.85
85%	0.76	0.79	0.81	0.83	0.87	0.87
90%	0.8	0.84	0.85	0.86	0.89	0.9
95%	0.85	0.88	0.89	0.9	0.92	0.92
100%	0.89	0.93	0.94	0.94	0.95	0.94

Table 6-5. Runoff coefficients, *c* (continued)

Total or Effective % Imperviousness	NRCS Hydrologic Soil Groups C and D					
	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr
2%	0.02	0.07	0.22	0.32	0.43	0.52
5%	0.04	0.1	0.24	0.34	0.45	0.53
10%	0.09	0.14	0.27	0.37	0.47	0.55
15%	0.13	0.18	0.31	0.41	0.5	0.58
20%	0.18	0.23	0.35	0.44	0.53	0.6
25%	0.22	0.27	0.39	0.47	0.55	0.62
30%	0.27	0.31	0.42	0.5	0.58	0.64
35%	0.31	0.36	0.46	0.53	0.61	0.67
40%	0.36	0.4	0.5	0.57	0.63	0.69
45%	0.4	0.44	0.53	0.6	0.66	0.71
50%	0.45	0.49	0.57	0.63	0.69	0.73
55%	0.49	0.53	0.61	0.66	0.72	0.76
60%	0.53	0.57	0.64	0.69	0.74	0.78
65%	0.58	0.62	0.68	0.73	0.77	0.8
70%	0.62	0.66	0.72	0.76	0.8	0.82
75%	0.67	0.7	0.76	0.79	0.82	0.85
80%	0.71	0.75	0.79	0.82	0.85	0.87
85%	0.76	0.79	0.83	0.85	0.88	0.89
90%	0.8	0.83	0.87	0.89	0.9	0.91
95%	0.85	0.88	0.9	0.92	0.93	0.94
100%	0.89	0.92	0.94	0.95	0.96	0.96

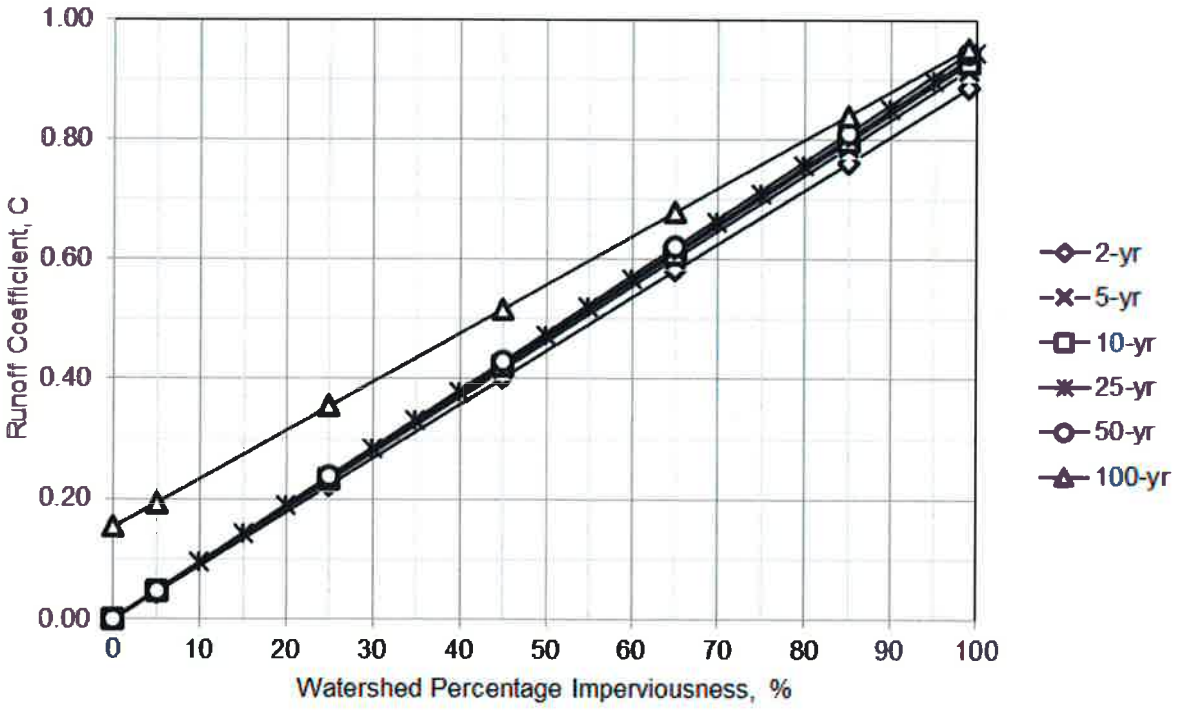


Figure 6-1. Runoff coefficient vs. watershed imperviousness NRCS HSG A

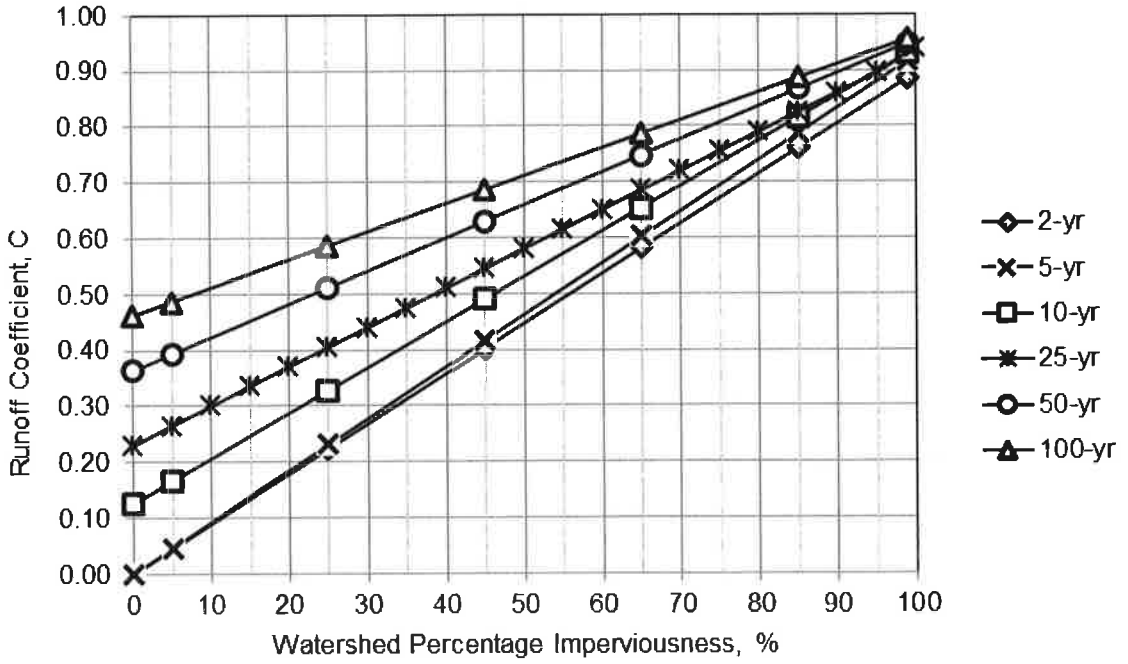


Figure 6-2. Runoff coefficient vs. watershed imperviousness NRCS HSG B

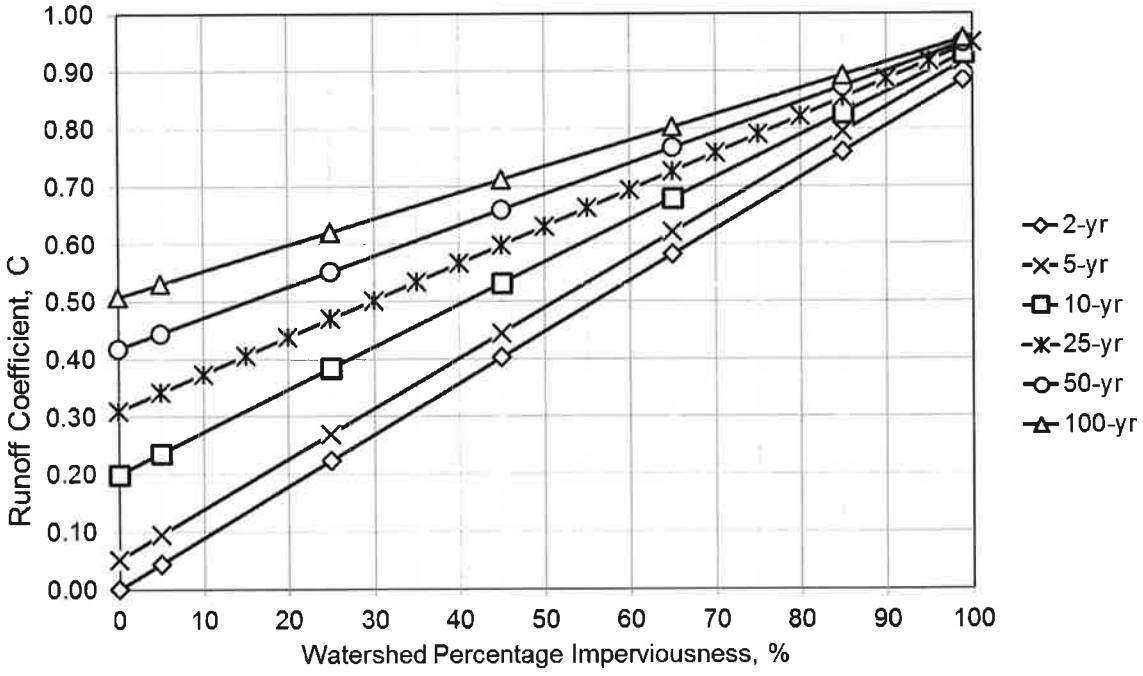


Figure 6-3. Runoff coefficient vs. watershed imperviousness NRCS HSG C and D

Compark South

TOWN OF PARKER, COLORADO
PROPOSED IMPERVIOUSNESS CALCULATIONS
6/9/2016

CVS-1

Land Use	Imperviousness (UDFCD Table 6-3)	Total Area (Acres)	Impervious Area (Acres)
Pavement/Hardscape	100%	1.18	1.18
Landscape	2%	2.67	0.05
	Total Area:	3.85	

Percentage Imperviousness: **32.0%**
C_2 (Table 6-4, Type C Soil): **0.28**
C_5 (Table 6-4, Type C Soil): **0.33**
C_{100} (Table 6-4, Type C Soil): **0.65**

CVS-2

Land Use	Imperviousness (UDFCD Table 6-3)	Total Area (Acres)	Impervious Area (Acres)
Pavement/Hardscape	100%	1.09	1.09
Landscape	2%	0.33	0.01
	Total Area:	1.42	

Percentage Imperviousness: **77.0%**
C_2 (Table 6-4, Type C Soil): **0.69**
C_5 (Table 6-4, Type C Soil): **0.72**
C_{100} (Table 6-4, Type C Soil): **0.85**

CVS-3

Land Use	Imperviousness (UDFCD Table 6-3)	Total Area (Acres)	Impervious Area (Acres)
Pavement/Hardscape	100%	0.57	0.57
Landscape	2%	0.37	0.01
	Total Area:	0.94	

Percentage Imperviousness: **62.0%**
C_2 (Table 6-4, Type B Soil): **0.55**
C_5 (Table 6-4, Type B Soil): **0.58**
C_{100} (Table 6-4, Type B Soil): **0.76**

*Note: Impervous percentages were determined using Figures 3-3, 3-4, 3-5 from Volume 3 of the Urban Storm Drainage Critera Manual.

CVS-4

Land Use	Imperviousness (UDFCD Table 6-3)	Total Area (Acres)	Impervious Area (Acres)
Pavement/Hardscape	100%	0.56	0.56
Landscape	2%	0.61	0.01
	Total Area:	1.17	

Percentage Imperviousness: **49.0%**
C_2 (Table 6-4, Type B Soil): **0.44**
C_5 (Table 6-4, Type B Soil): **0.46**
C_{100} (Table 6-4, Type B Soil): **0.69**

CVS-4A

Percentage Imperviousness*: **50.0%**
C_2 (Table 6-4, Type B Soil): **0.45**
C_5 (Table 6-4, Type B Soil): **0.47**
C_{100} (Table 6-4, Type B Soil): **0.70**

CVS-5

Percentage Imperviousness*: **45.0%**
C_2 (Table 6-4, Type B Soil): **0.40**
C_5 (Table 6-4, Type B Soil): **0.42**
C_{100} (Table 6-4, Type B Soil): **0.67**

CVS-6

Land Use	Imperviousness (UDFCD Table 6-3)	Total Area (Acres)	Impervious Area (Acres)
Pavement/Hardscape	100%	0.28	0.28
Landscape	2%	0.37	0.01
	Total Area:	0.65	

Percentage Imperviousness: **45.0%**
C_2 (Table 6-4, Type B Soil): **0.40**
C_5 (Table 6-4, Type B Soil): **0.42**
C_{100} (Table 6-4, Type B Soil): **0.67**

*Note: Impervous percentages were determined using Figures 3-3, 3-4, 3-5 from Volume 3 of the Urban Storm Drainage Critera Manual.

CVS-6A

Land Use	Imperviousness (UDFCD Table 6-3)	Total Area (Acres)	Impervious Area (Acres)
Pavement/Hardscape	100%	0.00	0.00
Landscape	2%	0.78	0.02
	Total Area:	0.78	

Percentage Imperviousness: **2.0%**
C_2 (Table 6-4, Type B Soil): **0.02**
C_5 (Table 6-4, Type B Soil): **0.02**
C_{100} (Table 6-4, Type B Soil): **0.46**

CVS-7

Land Use	Imperviousness (UDFCD Table 6-3)	Total Area (Acres)	Impervious Area (Acres)
Pavement/Hardscape	100%	0.86	0.86
Landscape	2%	0.25	0.01
	Total Area:	1.11	

Percentage Imperviousness: **78.0%**
C_2 (Table 6-4, Type B Soil): **0.69**
C_5 (Table 6-4, Type B Soil): **0.73**
C_{100} (Table 6-4, Type B Soil): **0.84**

CVS-8

Land Use	Imperviousness (UDFCD Table 6-3)	Total Area (Acres)	Impervious Area (Acres)
Pavement/Hardscape	100%	0.86	0.86
Landscape	2%	0.73	0.01
	Total Area:	1.59	

Percentage Imperviousness: **55.0%**
C_2 (Table 6-4, Type B Soil): **0.49**
C_5 (Table 6-4, Type B Soil): **0.51**
C_{100} (Table 6-4, Type B Soil): **0.72**

CVS-9

Percentage Imperviousness*: **55.0%**
C_2 (Table 6-4, Type B Soil): **0.49**
C_5 (Table 6-4, Type B Soil): **0.51**
C_{100} (Table 6-4, Type B Soil): **0.72**

*Note: Impervous percentages were determined using Figures 3-3, 3-4, 3-5 from Volume 3 of the Urban Storm Drainage Critera Manual.

CVS-9A

Percentage Imperviousness*:	**55.0%**
C_2 (Table 6-4, Type B Soil):	**0.49**
C_5 (Table 6-4, Type B Soil):	**0.51**
C_{100} (Table 6-4, Type B Soil):	**0.72**

CVS-10

Percentage Imperviousness*:	**51.0%**
C_2 (Table 6-4, Type B Soil):	**0.45**
C_5 (Table 6-4, Type B Soil):	**0.47**
C_{100} (Table 6-4, Type B Soil):	**0.70**

CVS-11

Land Use	Imperviousness (UDFCD Table 6-3)	Total Area (Acres)	Impervious Area (Acres)
Pavement/Hardscape	100%	1.57	1.57
Landscape	2%	0.46	0.01
	Total Area:	2.03	

Percentage Imperviousness:	**78.0%**
C_2 (Table 6-4, Type B Soil):	**0.69**
C_5 (Table 6-4, Type B Soil):	**0.73**
C_{100} (Table 6-4, Type B Soil):	**0.84**

CVS-12

Percentage Imperviousness*:	**55.0%**
C_2 (Table 6-4, Type B Soil):	**0.49**
C_5 (Table 6-4, Type B Soil):	**0.51**
C_{100} (Table 6-4, Type B Soil):	**0.72**

CVS-12A

Percentage Imperviousness*:	**55.0%**
C_2 (Table 6-4, Type B Soil):	**0.49**
C_5 (Table 6-4, Type B Soil):	**0.51**
C_{100} (Table 6-4, Type B Soil):	**0.72**

*Note: Impervous percentages were determined using Figures 3-3, 3-4, 3-5 from Volume 3 of the Urban Storm Drainage Critera Manual.

CVS-13

Percentage Imperviousness*:	**55.0%**
C_2 (Table 6-4, Type B Soil):	**0.49**
C_5 (Table 6-4, Type B Soil):	**0.51**
C_{100} (Table 6-4, Type B Soil):	**0.72**

CVS-14

Percentage Imperviousness:	**43.0%**
C_2 (Table 6-4, Type B Soil):	**0.38**
C_5 (Table 6-4, Type B Soil):	**0.40**
C_{100} (Table 6-4, Type B Soil):	**0.66**

CVS-14A

Land Use	Imperviousness (UDFCD Table 6-3)	Total Area (Acres)	Impervious Area (Acres)
Pavement/Hardscape	100%	0.00	0.00
Landscape	2%	4.12	0.08
	Total Area:	4.12	

Percentage Imperviousness:	**2.0%**
C_2 (Table 6-4, Type B Soil):	**0.02**
C_5 (Table 6-4, Type B Soil):	**0.02**
C_{100} (Table 6-4, Type B Soil):	**0.46**

CVS-15

Percentage Imperviousness*:	**55.0%**
C_2 (Table 6-4, Type B Soil):	**0.49**
C_5 (Table 6-4, Type B Soil):	**0.51**
C_{100} (Table 6-4, Type B Soil):	**0.72**

CVS-16

Percentage Imperviousness*:	**50.0%**
C_2 (Table 6-4, Type B Soil):	**0.45**
C_5 (Table 6-4, Type B Soil):	**0.47**
C_{100} (Table 6-4, Type B Soil):	**0.70**

*Note: Impervous percentages were determined using Figures 3-3, 3-4, 3-5 from Volume 3 of the Urban Storm Drainage Critera Manual.

CVS-17

Percentage Imperviousness*:	**51.0%**
C_2 (Table 6-4, Type B Soil):	**0.45**
C_5 (Table 6-4, Type B Soil):	**0.47**
C_{100} (Table 6-4, Type B Soil):	**0.70**

CVS-18

Percentage Imperviousness*:	**50.0%**
C_2 (Table 6-4, Type B Soil):	**0.45**
C_5 (Table 6-4, Type B Soil):	**0.47**
C_{100} (Table 6-4, Type B Soil):	**0.70**

CVS-19

Percentage Imperviousness*:	**73.0%**
C_2 (Table 6-4, Type B Soil):	**0.65**
C_5 (Table 6-4, Type B Soil):	**0.68**
C_{100} (Table 6-4, Type B Soil):	**0.81**

CVS-20

Percentage Imperviousness*:	**50.0%**
C_2 (Table 6-4, Type B Soil):	**0.45**
C_5 (Table 6-4, Type B Soil):	**0.47**
C_{100} (Table 6-4, Type B Soil):	**0.70**

CVS-21

Percentage Imperviousness*:	**50.0%**
C_2 (Table 6-4, Type B Soil):	**0.45**
C_5 (Table 6-4, Type B Soil):	**0.47**
C_{100} (Table 6-4, Type B Soil):	**0.70**

*Note: Impervous percentages were determined using Figures 3-3, 3-4, 3-5 from Volume 3 of the Urban Storm Drainage Critera Manual.

BEL-1

Land Use	Imperviousness (UDFCD Table 6-3)	Total Area (Acres)	Impervious Area (Acres)
Pavement/Hardscape	100%	1.23	1.23
Landscape	2%	2.50	0.05
	Total Area:	3.73	

Percentage Imperviousness: **34.0%**

C_2 (Table 6-4, Type B Soil): **0.30**

C_5 (Table 6-4, Type B Soil): **0.32**

C_{100} (Table 6-4, Type B Soil): **0.62**

BEL-2

Land Use	Imperviousness (UDFCD Table 6-3)	Total Area (Acres)	Impervious Area (Acres)
Pavement/Hardscape	100%	0.68	0.68
Landscape	2%	0.70	0.01
	Total Area:	1.38	

Percentage Imperviousness: **77.0%**

C_2 (Table 6-4, Type B Soil): **0.69**

C_5 (Table 6-4, Type B Soil): **0.72**

C_{100} (Table 6-4, Type B Soil): **0.83**

BEL-3

Land Use	Imperviousness (UDFCD Table 6-3)	Total Area (Acres)	Impervious Area (Acres)
Pavement/Hardscape	100%	1.34	1.34
Landscape	2%	5.42	0.11
	Total Area:	6.76	

Percentage Imperviousness: **21.0%**

C_2 (Table 6-4, Type B Soil): **0.19**

C_5 (Table 6-4, Type B Soil): **0.20**

C_{100} (Table 6-4, Type B Soil): **0.56**

*Note: Impervous percentages were determined using Figures 3-3, 3-4, 3-5 from Volume 3 of the Urban Storm Drainage Critera Manual.

BEL-4

Land Use	Imperviousness (UDFCD Table 6-3)	Total Area (Acres)	Impervious Area (Acres)
Pavement/Hardscape	100%	1.36	1.36
Landscape	2%	0.39	0.01
	Total Area:	1.75	

Percentage Imperviousness: **78.0%**
C_2 (Table 6-4, Type B Soil): **0.69**
C_5 (Table 6-4, Type B Soil): **0.73**
C_{100} (Table 6-4, Type B Soil): **0.84**

BEL-5

Land Use	Imperviousness (UDFCD Table 6-3)	Total Area (Acres)	Impervious Area (Acres)
Pavement/Hardscape	100%	3.43	3.43
Landscape	2%	1.12	0.02
	Total Area:	4.55	

Percentage Imperviousness: **76.0%**
C_2 (Table 6-4, Type B Soil): **0.68**
C_5 (Table 6-4, Type B Soil): **0.71**
C_{100} (Table 6-4, Type B Soil): **0.83**

BEL-6

Land Use	Imperviousness (UDFCD Table 6-3)	Total Area (Acres)	Impervious Area (Acres)
Pavement/Hardscape	100%	2.77	2.77
Landscape	2%	1.18	0.02
	Total Area:	3.95	

Percentage Imperviousness: **71.0%**
C_2 (Table 6-4, Type B Soil): **0.63**
C_5 (Table 6-4, Type B Soil): **0.66**
C_{100} (Table 6-4, Type B Soil): **0.80**

*Note: Impervous percentages were determined using Figures 3-3, 3-4, 3-5 from Volume 3 of the Urban Storm Drainage Critera Manual.

PROPOSED DRAINAGE BASINS
STANDARD FORM SF-2
TIME OF CONCENTRATION

PROJECT: **Compark Village South, Filing 1**

JOB NO: CLCPKC3

CALCULATED BY: RAK DATE: June 30, 2016

REVISED BY: DATE:

NOTES:

$T_i = [0.395 \times (1.1 - C_5) \times L^{0.5}] / (S^{0.33})$

$T_t = L / (60 \times V)$ (Velocity from UDFCD Fig. RO-1)

T_C Check = 10 + L/180 (Urbanized Basins Only)

SUB-BASIN DATA			INITIAL/OVERLAND TIME (Ti)			TRAVEL TIME (Tt) - (GRASS SWALE)				TRAVEL TIME (Tt) - (PAVEMENT/CURB & GUTTER)				Tc CHECK (urbanized basins)		FINAL Tc (min)	REMARKS
AREA DESIGNATION	RUNOFF COEFFICIENT, C100	AREA, A (acres)	FLOW LENGTH, (ft)	SLOPE (%)	INITIAL TIME, Ti (MIN)	FLOW LENGTH, (ft)	SLOPE (%)	VELOCITY (fps)	TRAVEL TIME Tt, (min)	FLOW LENGTH, (ft)	SLOPE (%)	VELOCITY (fps)	TRAVEL TIME Tt, (min)	TOTAL LENGTH (ft)	MAXIMUM Tc = (L/180 + 10)		
CVS-1 (Inlet 1-3)	0.65	3.85	0	0.0%	0.0	0	0.0%	0.0	0.0	1172	2.0%	2.8	6.9	1172	16.5	6.9	
CVS-2 (Inlet 2-3)	0.85	1.42	0	0.0%	0.0	0	0.0%	0.0	0.0	1125	2.0%	2.8	6.6	1125	16.3	6.6	
CVS-3 (Inlet 1-4)	0.76	0.94	0	0.0%	0.0	0	0.0%	0.0	0.0	1055	2.0%	2.8	6.2	1055	15.9	6.2	
CVS-4 (Inlet 2-4)	0.69	1.17	0	0.0%	0.0	0	0.0%	0.0	0.0	600	1.5%	2.4	4.1	600	13.3	4.1	
CVS-4A (Inlet 3-4)	0.70	1.76	100	1.5%	6.3	49	1.5%	0.9	1.0	405	1.5%	2.4	2.8	554	13.1	10.0	
CVS-5 (Inlet 5-4)	0.67	2.63	100	4.0%	4.9	130	5.5%	1.6	1.3	380	1.3%	2.3	2.8	610	13.4	9.0	
CVS-6 (Inlet 6-4)	0.67	0.58	-	-	-	-	-	-	-	-	-	-	-	-	-	5.0	Minimum
CVS-6A (Inlet 7-4)	0.46	0.78	-	-	-	-	-	-	-	-	-	-	-	-	-	5.0	Minimum
CVS-7 (Inlet 1-6)	0.84	1.11	0	0.0%	0.0	0	0.0%	0.0	0.0	904	0.6%	1.5	10.2	904	15.0	10.2	
CVS-8 (Inlet 2-6)	0.72	1.59	0	0.0%	0.0	0	0.0%	0.0	0.0	897	0.6%	1.5	10.1	897	15.0	10.1	
CVS-9 (Inlet 4-5A)	0.72	2.50	60	1.5%	4.6	115	1.5%	0.9	2.2	624	1.1%	2.1	5.0	799	14.4	11.8	
CVS-9A (Inlet 3-4)	0.72	0.37	-	-	-	-	-	-	-	-	-	-	-	-	-	5.0	Minimum
CVS-10 (Inlet 5-5A)	0.70	3.47	100	4.0%	4.5	113	4.0%	1.4	1.3	682	1.0%	2.0	5.7	895	15.0	11.6	
CVS-11 (Inlet 1-5)	0.84	2.03	0	0.0%	0.0	0	0.0%	0.0	0.0	1046	0.5%	1.4	12.3	1046	15.8	12.3	
CVS-12 (Inlet 2-5)	0.72	4.48	100	1.5%	5.9	48	1.5%	0.9	0.9	599	1.0%	2.0	5.0	747	14.2	11.9	
CVS-12A (Inlet 3-5)	0.72	2.63	100	1.7%	5.7	51	1.7%	0.9	0.9	467	1.8%	2.7	2.9	618	13.4	9.5	
CVS-13 (Inlet 4-5)	0.72	4.89	30	4.7%	2.2	0	0.0%	0.0	0.0	739	1.0%	2.0	6.2	769	14.3	8.4	
CVS-14 (Inlet 6-5)	0.66	6.55	100	1.5%	6.9	20	1.5%	0.9	0.4	1229	1.0%	2.0	10.2	1349	17.5	17.5	
CVS-14A (Inlet 7-5)	0.46	4.12	100	5.0%	6.8	1258	2.0%	1.0	21.2	0	0.0%	0.0	0.0	1358	17.5	17.5	
CVS-15 (Inlet 5-5)	0.72	3.00	100	5.7%	3.8	127	5.7%	1.7	1.3	723	1.4%	2.4	5.1	950	15.3	10.2	
CVS-16	0.70	2.07	100	1.6%	6.2	44	1.6%	0.9	0.8	772	1.0%	2.0	6.4	916	15.1	13.5	
CVS-17	0.70	4.10	100	5.3%	4.1	129	5.3%	1.6	1.3	564	1.0%	2.0	4.7	793	14.4	10.2	
CVS-18	0.70	3.06	100	15.5%	2.9	115	3.0%	1.2	1.6	990	1.0%	2.0	8.3	1205	16.7	12.8	
CVS-19	0.81	1.61	100	3.5%	3.4	200	3.5%	1.3	2.5	0	0.0%	0.0	0.0	300	11.7	6.0	
CVS-20	0.70	1.80	100	2.0%	5.8	17	2.0%	1.0	0.3	570	1.0%	2.0	4.8	687	13.8	10.8	
CVS-21	0.70	3.88	100	0.0%	22.3	164	3.3%	1.3	2.1	833	1.1%	2.1	6.6	1097	16.1	16.1	
BEL-1 (Inlet 2-1)	0.62	3.73	100	1.5%	7.6	466	1.5%	0.9	9.1	462	0.8%	1.8	4.4	508	12.8	12.8	
BEL-2 (Inlet 1-1)	0.83	1.38	0	0.0%	0.0	0	0.0%	0.0	0.0	1123	1.5%	2.4	7.6	1123	16.2	7.6	
BEL-3 (Inlet 2-2)	0.56	6.76	100	1.5%	8.6	232	1.5%	0.9	4.5	462	0.8%	1.8	4.3	794	14.4	14.4	
BEL-4 (Inlet 1-2)	0.84	1.75	0	0.0%	0.0	0	0.0%	0.0	0.0	825	0.8%	1.7	7.9	825	14.6	7.9	
BEL-5	0.83	4.55	100	3.1%	3.4	0	0.0%	0.0	0.0	1602	3.1%	3.5	7.6	1702	19.5	11.0	
BEL-6	0.80	3.95	100	9.8%	2.5	0	0.0%	0.0	0.0	1009	3.0%	3.5	4.9	1109	16.2	7.4	

PROPOSED DRAINAGE BASINS
STANDARD FORM SF-3
STORM DRAINAGE SYSTEM DESIGN
(RATIONAL METHOD PROCEDURE)

PROJECT: **COMPARK VILLAGE SOUTH, FILINGS 1 & 2** CLCPKC3

CALCULATED BY: RAK DATE: June 30, 2016 Manning's n-value =0.013 2-YEAR
REVISED BY: DATE:

		DIRECT RUNOFF							INLET	STORM SEWER				REMARKS
Basin ID	Design Point	Area (ac)	Tc (min.)	Runoff Coefficient, C	Intensity, I (in/hr)	C*A (Acres)	Direct Runoff, Q (cfs)	Total Runoff, Q (cfs)	Intercepted (cfs)	Bypass (cfs)	Design Flow (cfs)	Slope (%)	Pipe Size (inches)	
CVS-1 (Inlet 1-3)	1	3.85	6.9	0.28	4.3	1.10	**4.7**	**4.7**	4.7	0.0	8.9	3.8%	24	
CVS-2 (Inlet 2-3)	2	1.42	6.6	0.69	4.3	0.97	**4.2**	**4.2**	4.2	0.0	4.2	10.0%	24	
CVS-3 (Inlet 1-4)	3	0.94	6.2	0.55	4.4	0.52	**2.3**	**2.3**	2.3	0.0	2.3	1.7%	18	
CVS-4 (Inlet 2-4)	4	1.17	4.1	0.44	5.0	0.51	**2.5**	**2.5**	2.5	0.0	2.5	0.9%	18	
CVS-4A (Inlet 3-4)	4A	1.76	10.0	0.45	3.8	0.78	**2.9**	**2.9**	2.9	0.0	2.9	1.0%	18	
CVS-5 (Inlet 5-4)	5	2.63	9.0	0.40	3.9	1.05	**4.1**	**4.1**	4.1	0.0	4.1	1.0%	18	
CVS-6 (Inlet 6-4)	6	0.58	5.0	0.40	4.7	0.23	**1.1**	**1.1**	1.1	0.0	9.7	1.7%	36	
CVS-6A (Inlet 7-4)	6A	0.78	5.0	0.02	4.7	0.01	**0.1**	**0.1**	0.1	0.0	8.6	0.4%	36	
CVS-7 (Inlet 1-6)	7	1.11	10.2	0.69	3.7	0.77	**2.9**	**2.9**	2.9	0.0	5.8	3.0%	24	
CVS-8 (Inlet 2-6)	8	1.59	10.1	0.49	3.7	0.78	**2.9**	**2.9**	2.9	0.0	2.9	1.4%	24	
CVS-9 (Inlet 4-5A)	9	2.50	11.8	0.49	3.5	1.22	**4.3**	**4.3**	4.3	0.0	4.3	1.0%	18	
CVS-9A (Inlet 4-4)	9A	0.37	5.0	0.49	4.7	0.18	**0.9**	**0.9**	0.9	0.0	0.9	1.0%	18	
CVS-10 (Inlet 5-5A)	10	3.47	11.6	0.45	3.5	1.58	**5.6**	**5.6**	5.6	0.0	5.6	1.0%	18	
CVS-11 (Inlet 1-5)	11	2.03	12.3	0.69	3.4	1.41	**4.9**	**4.9**	4.9	0.0	4.9	0.8%	36	
CVS-12 (Inlet 2-5)	12	4.48	11.9	0.49	3.5	2.19	**7.7**	**7.7**	7.7	0.0	7.7	0.7%	36	
CVS-12A (Inlet 3-5)	12A	2.63	9.5	0.49	3.8	1.29	**4.9**	**4.9**	4.9	0.0	41.5	1.9%	36	
CVS-13 (Inlet 4-5)	13	4.89	8.4	0.49	4.0	2.39	**9.6**	**9.6**	9.6	0.0	9.6	1.9%	18	
CVS-14 (Inlet 6-5)	14	6.55	17.5	0.38	2.9	2.51	**7.3**	**7.3**	7.3	0.0	11.6	3.2%	30	
CVS-14A (Inlet 7-5)	14A	4.01	17.5	0.02	2.9	0.07	**0.2**	**0.2**	0.2	0.0	4.3	4.7%	24	
CVS-15 (Inlet 5-5)	15	3.00	10.2	0.49	3.7	1.47	**5.5**	**5.5**	5.5	0.0	5.5	1.9%	18	
CVS-16	16	2.07	13.5	0.45	3.3	0.92	**3.1**	**3.1**	3.1	0.0	-	-	-	
CVS-17	17	4.10	10.2	0.45	3.7	1.86	**7.0**	**7.0**	7.0	0.0	-	-	-	
CVS-18	18	3.06	12.8	0.45	3.4	1.36	**4.6**	**4.6**	4.6	0.0	-	-	-	
CVS-19	19	1.61	6.0	0.65	4.5	1.05	**4.7**	**4.7**	4.7	0.0	-	-	-	
CVS-20	20	1.80	10.8	0.45	3.6	0.80	**2.9**	**2.9**	2.9	0.0	-	-	-	
CVS-21	21	3.88	16.1	0.45	3.1	1.73	**5.3**	**5.3**	5.3	0.0	-	-	-	
BEL-1 (Inlet 2-1)	B1	3.73	12.8	0.30	3.4	1.13	**3.8**	**3.8**	3.8	0.0	5.9	3.3%	36	
BEL-2 (Inlet 1-1)	B2	1.38	7.6	0.69	4.2	0.95	**3.9**	**3.9**	3.9	0.0	8.4	0.9%	36	
BEL-3 (Inlet 2-2)	B3	6.76	14.4	0.19	3.2	1.26	**4.1**	**4.1**	4.1	0.0	6.6	3.2%	36	
BEL-4 (Inlet 1-2)	B4	1.75	7.9	0.69	4.1	1.21	**5.0**	**5.0**	5.0	0.0	11.6	2.9%	36	
BEL-5	B5	4.55	11.0	0.68	3.6	3.08	**11.1**	**11.1**	-	-	-	-	-	
BEL-6	B6	3.95	7.4	0.63	4.2	2.50	**10.5**	**10.5**	-	-	-	-	-	

PROPOSED DRAINAGE BASINS
STANDARD FORM SF-3
STORM DRAINAGE SYSTEM DESIGN
(RATIONAL METHOD PROCEDURE)

PROJECT: **COMPARK VILLAGE SOUTH, FILINGS 1 & 2** CLCPKC3

CALCULATED BY: RAK DATE: June 30, 2016 Manning's n-value =0.013 5-YEAR
REVISED BY: DATE:

		DIRECT RUNOFF							INLET		STORM SEWER			REMARKS
Basin ID	Design Point	Area (ac)	Tc (min.)	Runoff Coefficient, C	Intensity, I (in/hr)	C*A (Acres)	Direct Runoff, Q (cfs)	Total Runoff, Q (cfs)	Intercepted (cfs)	Bypass (cfs)	Design Flow (cfs)	Slope (%)	Pipe Size (inches)	
CVS-1 (Inlet 1-3)	1	3.85	6.9	0.33	4.3	1.27	**5.5**	**5.5**	5.5	0.0	10.0	3.8%	24	
CVS-2 (Inlet 2-3)	2	1.42	6.6	0.72	4.3	1.03	**4.5**	**4.5**	4.5	0.0	4.5	10.0%	24	
CVS-3 (Inlet 1-4)	3	0.94	6.2	0.58	4.4	0.54	**2.4**	**2.4**	2.4	0.0	2.4	1.7%	18	
CVS-4 (Inlet 2-4)	4	1.17	4.1	0.46	5.0	0.53	**2.6**	**2.6**	2.6	0.0	2.6	0.9%	18	
CVS-4A (Inlet 3-4)	4A	1.76	10.0	0.47	3.8	0.82	**3.1**	**3.1**	3.1	0.0	3.1	1.0%	18	
CVS-5 (Inlet 5-4)	5	2.63	9.0	0.42	3.9	1.10	**4.3**	**4.3**	4.3	0.0	4.3	1.0%	18	
CVS-6 (Inlet 6-4)	6	0.58	5.0	0.42	4.7	0.24	**1.1**	**1.1**	1.1	0.0	9.7	1.7%	36	
CVS-6A (Inlet 7-4)	6A	0.78	5.0	0.02	4.7	0.01	**0.1**	**0.1**	0.1	0.0	8.6	0.4%	36	
CVS-7 (Inlet 1-6)	7	1.11	10.2	0.73	3.7	0.81	**3.0**	**3.0**	3.0	0.0	6.0	3.0%	24	
CVS-8 (Inlet 2-6)	8	1.59	10.1	0.51	3.7	0.81	**3.0**	**3.0**	3.0	0.0	3.0	1.4%	24	
CVS-9 (Inlet 4-5A)	9	2.50	11.8	0.51	3.5	1.28	**4.5**	**4.5**	4.5	0.0	4.5	1.0%	18	
CVS-9A (Inlet 4-4)	9A	0.37	5.0	0.51	4.7	0.19	**0.9**	**0.9**	0.9	0.0	0.9	1.0%	18	
CVS-10 (Inlet 5-5A)	10	3.47	11.6	0.47	3.5	1.65	**5.8**	**5.8**	5.8	0.0	5.8	1.0%	18	
CVS-11 (Inlet 1-5)	11	2.03	12.3	0.73	3.4	1.47	**5.1**	**5.1**	5.1	0.0	5.1	0.8%	36	
CVS-12 (Inlet 2-5)	12	4.48	11.9	0.51	3.5	2.29	**8.0**	**8.0**	8.0	0.0	8.0	0.7%	36	
CVS-12A (Inlet 3-5)	12A	2.63	9.5	0.51	3.8	1.35	**5.2**	**5.2**	5.2	0.0	43.2	1.9%	36	
CVS-13 (Inlet 4-5)	13	4.89	8.4	0.51	4.0	2.50	**10.0**	**10.0**	10.0	0.0	10.0	1.9%	18	
CVS-14 (Inlet 6-5)	14	6.55	17.5	0.40	2.9	2.62	**7.7**	**7.7**	7.7	0.0	12.0	3.2%	30	
CVS-14A (Inlet 7-5)	14A	4.01	17.5	0.02	2.9	0.07	**0.2**	**0.2**	0.2	0.0	4.3	4.7%	24	
CVS-15 (Inlet 5-5)	15	3.00	10.2	0.51	3.7	1.53	**5.7**	**5.7**	5.7	0.0	5.7	1.9%	18	
CVS-16	16	2.07	13.5	0.47	3.3	0.96	**3.2**	**3.2**	-	-	-	-	-	
CVS-17	17	4.10	10.2	0.47	3.7	1.94	**7.3**	**7.3**	-	-	-	-	-	
CVS-18	18	3.06	12.8	0.47	3.4	1.42	**4.8**	**4.8**	-	-	-	-	-	
CVS-19	19	1.61	6.0	0.68	4.5	1.09	**4.9**	**4.9**	-	-	-	-	-	
CVS-20	20	1.80	10.8	0.47	3.6	0.84	**3.1**	**3.1**	-	-	-	-	-	
CVS-21	21	3.88	16.1	0.47	3.1	1.80	**5.5**	**5.5**	-	-	-	-	-	
BEL-1 (Inlet 2-1)	B1	3.73	12.8	0.32	3.4	1.18	**4.0**	**4.0**	4.0	0.0	6.1	3.3%	36	
BEL-2 (Inlet 1-1)	B2	1.38	7.6	0.72	4.2	0.99	**4.1**	**4.1**	4.1	0.0	8.8	0.9%	36	
BEL-3 (Inlet 2-2)	B3	6.76	14.4	0.20	3.2	1.32	**4.2**	**4.2**	4.2	0.0	6.9	3.2%	36	
BEL-4 (Inlet 1-2)	B4	1.75	7.9	0.73	4.1	1.27	**5.2**	**5.2**	5.2	0.0	12.1	2.9%	36	
BEL-5	B5	4.55	11.0	0.71	3.6	3.22	**11.6**	**11.6**	-	-	-	-	-	
BEL-6	B6	3.95	7.4	0.66	4.2	2.61	**10.9**	**10.9**	-	-	-	-	-	

PROPOSED DRAINAGE BASINS
STANDARD FORM SF-3
STORM DRAINAGE SYSTEM DESIGN
(RATIONAL METHOD PROCEDURE)

PROJECT: **COMPARK VILLAGE SOUTH, FILINGS 1 & 2** CLCPKC3

CALCULATED BY: RAK DATE: June 30, 2016 Manning's n-value =0.013 100-YEAR
REVISED BY: DATE:

		DIRECT RUNOFF							INLET		STORM SEWER			REMARKS
Basin ID	Design Point	Area (ac)	Tc (min.)	Runoff Coefficient, C	Intensity, I (in/hr)	C*A (Acres)	Direct Runoff, Q (cfs)	Total Runoff with Bypass, Q (cfs)	Intercepted (cfs)	Bypass (cfs)	Design Flow (cfs)	Slope (%)	Pipe Size (inches)	
CVS-1 (Inlet 1-3)	1	3.85	6.9	0.65	8.0	2.51	**20.2**	**20.2**	13.5	6.7	22.5	3.8%	24	Bypass flow goes to CVS-3.
CVS-2 (Inlet 2-3)	2	1.42	6.6	0.85	8.1	1.21	**9.9**	**9.9**	9.0	1.0	9.0	10.0%	24	Bypass flow goes to CVS-4.
CVS-3 (Inlet 1-4)	3	0.94	6.2	0.76	8.3	0.71	**5.9**	**12.6**	7.7	4.9	7.7	1.7%	18	Takes bypass flow from CVS-1. Bypass goes to CVS-7.
CVS-4 (Inlet 2-4)	4	1.17	4.1	0.69	9.3	0.81	**7.5**	**8.5**	8.0	0.5	8.0	0.9%	18	Takes bypass flow from CVS-2. Bypass goes to CVS-8.
CVS-4A (Inlet 3-4)	4A	1.76	10.0	0.70	7.0	1.23	**8.6**	**11.0**	11.0	0.0	11.0	1.0%	18	Takes bypass flow from CVS-5.
CVS-5 (Inlet 5-4)	5	2.63	9.0	0.67	7.3	1.77	**13.0**	**13.0**	10.6	2.4	10.6	1.0%	18	Bypass flow goes to CVS-4A.
CVS-6 (Inlet 6-4)	6	0.58	5.0	0.67	8.8	0.39	**3.5**	**3.5**	3.5	0.0	54.5	1.7%	36	
CVS-6A (Inlet 7-4)	6A	0.78	5.0	0.46	8.8	0.36	**3.2**	**3.2**	3.2	0.0	51.0	0.4%	36	
CVS-7 (Inlet 1-6)	7	1.11	10.2	0.84	7.0	0.93	**6.5**	**11.4**	7.3	4.1	15.4	3.0%	24	Takes bypass flow from CVS-3. Bypass goes to CVS-11.
CVS-8 (Inlet 2-6)	8	1.59	10.1	0.72	7.0	1.15	**8.1**	**8.6**	8.1	0.5	8.1	1.4%	24	Takes bypass flow from CVS-4. Bypass goes to CVS-12.
CVS-9 (Inlet 4-5A)	9	2.50	11.8	0.72	6.6	1.81	**11.9**	**11.9**	10.1	1.8	10.1	1.0%	18	Bypass flow goes to CVS-12.
CVS-9A (Inlet 4-4)	9A	0.37	5.0	0.72	8.8	0.27	**2.4**	**2.4**	2.4	0.0	2.4	1.0%	18	
CVS-10 (Inlet 5-5A)	10	3.47	11.6	0.70	6.6	2.44	**16.2**	**16.2**	12.0	4.2	12.0	1.0%	18	Bypass flow goes to CVS-13.
CVS-11 (Inlet 1-5)	11	2.03	12.3	0.84	6.5	1.70	**11.0**	**15.1**	15.1	0.0	15.1	0.8%	36	Takes bypass flow from CVS-7.
CVS-12 (Inlet 2-5)	12	4.48	11.9	0.72	6.6	3.24	**21.3**	**23.6**	23.6	0.0	23.6	0.7%	36	Takes bypass flow from CVS-8 and CVS-9.
CVS-12A (Inlet 3-5)	12A	2.63	9.5	0.72	7.2	1.90	**13.6**	**13.6**	13.6	0.0	140.4	1.9%	36	Takes bypass flow from CVS-13 and CVS-15.
CVS-13 (Inlet 4-5)	13	4.89	8.4	0.72	7.5	3.54	**26.6**	**37.2**	37.2	0.0	37.2	1.9%	18	Takes bypass flow from CVS-10 and CVS 14.
CVS-14 (Inlet 6-5)	14	6.55	17.5	0.66	5.5	4.35	**23.8**	**23.8**	11.1	12.7	45.9	3.2%	30	Bypass flow goes to CVS-13 and CVS-15
CVS-14A (Inlet 7-5)	14A	4.01	17.5	0.46	5.5	1.86	**10.2**	**10.2**	10.2	0.0	34.8	4.7%	24	
CVS-15 (Inlet 5-5)	15	3.00	10.2	0.72	7.0	2.17	**15.2**	**21.6**	21.6	0.0	21.6	1.9%	18	Takes bypass from CVS-14.
CVS-16	16	2.07	13.5	0.70	6.2	1.45	**9.0**	**-**	-	-	-	-	-	
CVS-17	17	4.10	10.2	0.70	7.0	2.89	**20.2**	**-**	-	-	-	-	-	
CVS-18	18	3.06	12.8	0.70	6.4	2.14	**13.6**	**-**	-	-	-	-	-	
CVS-19	19	1.61	6.0	0.81	8.4	1.31	**11.0**	**-**	-	-	-	-	-	
CVS-20	20	1.80	10.8	0.70	6.8	1.26	**8.6**	**-**	-	-	-	-	-	
CVS-21	21	3.88	16.1	0.70	5.7	2.71	**15.5**	**-**	-	-	-	-	-	
BEL-1 (Inlet 2-1)	B1	3.73	12.8	0.62	6.3	2.31	**14.7**	**14.7**	8.3	6.4	63.6	3.3%	36	Bypass flow goes to BEL-3.
BEL-2 (Inlet 1-1)	B2	1.38	7.6	0.83	7.8	1.15	**8.9**	**8.9**	6.5	2.4	69.5	0.9%	36	Bypass flow goes to BEL-4.
BEL-3 (Inlet 2-2)	B3	6.76	14.4	0.56	6.0	3.76	**22.6**	**29.0**	29.0	0.0	95.6	3.2%	36	Takes bypass from BEL-1.
BEL-4 (Inlet 1-2)	B4	1.75	7.9	0.84	7.7	1.46	**11.2**	**13.6**	13.6	0.0	110.8	2.9%	36	Takes bypass from BEL-2.
BEL-5	B5	4.55	11.0	0.83	6.8	3.76	**25.5**	**-**	-	-	-	-	-	
BEL-6	B6	3.95	7.4	0.80	7.9	3.17	**24.9**	**-**	-	-	-	-	-	

APPENDIX C

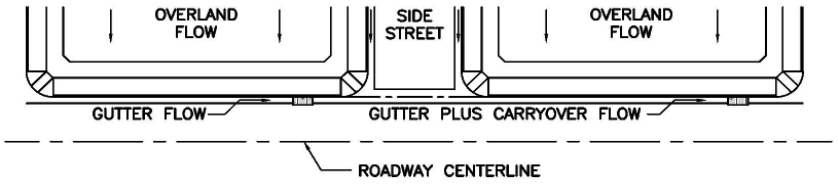
Hydraulic Analysis

- Inlet Capacity Calculations
- StormCAD Storm Sewer Design
    - 2-Year Storm Table and Profiles
    - 5-Year Storm Table and Profiles
    - 100-Year Storm Table and Profiles
- Swale Calculations
- Water Quality Structure Cut Sheets & Calculations

Worksheet Protected

DESIGN PEAK FLOW FOR ONE-HALF OF STREET OR GRASS-LINED CHANNEL BY THE RATIONAL METHOD

Project: COMPARK SOUTH
Inlet ID: INLET 3-4



Show Details

Design Flow: ONLY if already determined through other methods:
(local peak flow for 1/2 of street OR grass-lined channel):

	Minor Storm	Major Storm	
*Q_{Known} =	2.9	8.6	cfs

*** If you enter values in Row 14, skip the rest of this sheet and proceed to sheet Q-Allow or Area Inlet.**

<--- FILL IN THIS SECTION OR... FILL IN THE SECTIONS BELOW. <---

Geographic Information: (Enter data in the blue cells):

Subcatchment Area =		Acres
Percent Imperviousness =		%
NRCS Soil Type =		A, B, C, or D

Site Type:
- Site is Urban
- Site is Non-Urban

Flows Developed For:
- Street Inlets
- Area Inlets in a Median

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

Rainfall Information: Intensity I (inch/hr) = $C_1 * P_1 / (C_2 + T_c) ^ C_3$

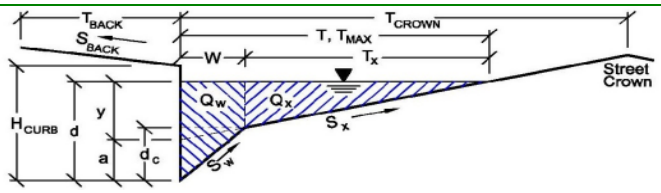
	Minor Storm	Major Storm	
Design Storm Return Period, T_r =			years
Return Period One-Hour Precipitation, P_1 =			inches
C_1 =			
C_2 =			
C_3 =			
User-Defined Storm Runoff Coefficient (leave this blank to accept a calculated value), C =			
User-Defined 5-yr. Runoff Coefficient (leave this blank to accept a calculated value), C_5 =			
Bypass (Carry-Over) Flow from upstream Subcatchments, Q_b =	**0.0**	**2.4**	**cfs**
Total Design Peak Flow, Q =	**2.9**	**11.0**	**cfs**

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

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

Project: COMPARK SOUTH

Inlet ID: INLET 3-4



Gutter Geometry (Enter data in the blue cells)

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	0.0	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} =	17.0	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} =	0.012	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	17.0	17.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	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} =**	**SUMP**	**SUMP**	**cfs**

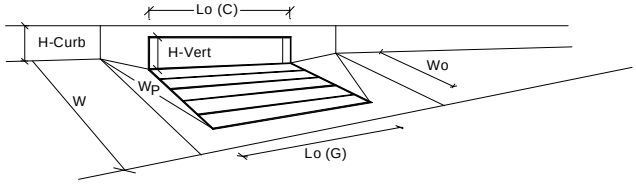
Minor storm max. allowable capacity GOOD - greater than flow given on sheet 'Q-Peak'

Major storm max. allowable capacity GOOD - greater than flow given on sheet 'Q-Peak'

INLET IN A SUMP OR SAG LOCATION

Project = COMPARK SOUTH

Inlet ID = INLET 3-4

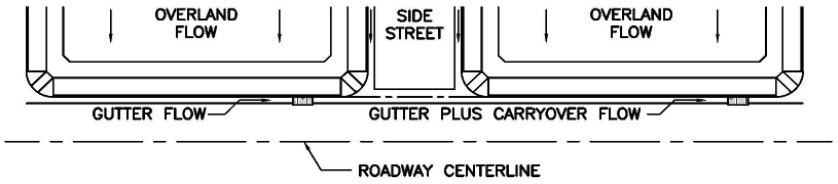


Design Information (Input)		MINOR	MAJOR	
Type of Inlet	Inlet Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from 'Q-Allow')	a_{local} =	3.00	3.00	inches
Number of Unit Inlets (Grate or Curb Opening)	No =	2	2	
Water Depth at Flowline (outside of local depression)	Ponding Depth =	5.6	12.0	inches
				☑ Override Depths
Grate Information		MINOR	MAJOR	
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	
		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	**Q_a =**	**8.7**	**25.5**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms (>Q PEAK)	$Q_{PEAK\ REQUIRED}$ =	2.9	11.0	cfs

Worksheet Protected

DESIGN PEAK FLOW FOR ONE-HALF OF STREET OR GRASS-LINED CHANNEL BY THE RATIONAL METHOD

Project: COMPARK SOUTH
Inlet ID: INLET 4-4



Show Details

Design Flow: ONLY if already determined through other methods:
(local peak flow for 1/2 of street OR grass-lined channel):

	Minor Storm	Major Storm	
*Q_{Known} =	0.9	2.4	cfs

*** If you enter values in Row 14, skip the rest of this sheet and proceed to sheet Q-Allow or Area Inlet.**

<--- FILL IN THIS SECTION OR... FILL IN THE SECTIONS BELOW. <---

Geographic Information: (Enter data in the blue cells):

Subcatchment Area =		Acres
Percent Imperviousness =		%
NRCS Soil Type =		A, B, C, or D

Site Type:
- Site is Urban
- Site is Non-Urban

Flows Developed For:
- Street Inlets
- Area Inlets in a Median

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

Rainfall Information: Intensity I (inch/hr) = $C_1 * P_1 / (C_2 + T_c) ^ C_3$

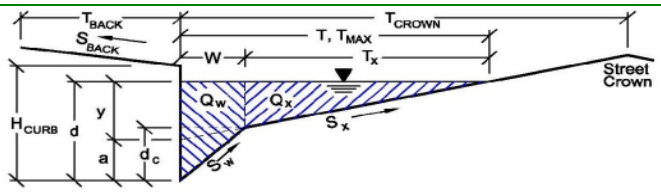
	Minor Storm	Major Storm	
Design Storm Return Period, T_t =			years
Return Period One-Hour Precipitation, P_1 =			inches
C_1 =			
C_2 =			
C_3 =			
User-Defined Storm Runoff Coefficient (leave this blank to accept a calculated value), C =			
User-Defined 5-yr. Runoff Coefficient (leave this blank to accept a calculated value), C_5 =			
Bypass (Carry-Over) Flow from upstream Subcatchments, Q_b =	0.0	0.0	cfs
Total Design Peak Flow, Q =	0.9	2.4	cfs

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

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

Project: COMPARK SOUTH

Inlet ID: INLET 4-4



Gutter Geometry (Enter data in the blue cells)

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	0.0	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} =	17.0	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} =	0.012	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	17.0	17.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	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} =**	**SUMP**	**SUMP**	**cfs**

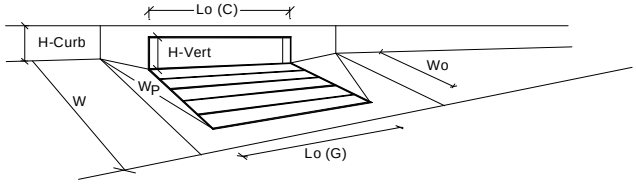
Minor storm max. allowable capacity GOOD - greater than flow given on sheet 'Q-Peak'

Major storm max. allowable capacity GOOD - greater than flow given on sheet 'Q-Peak'

INLET IN A SUMP OR SAG LOCATION

Project = COMPARK SOUTH

Inlet ID = INLET 4-4

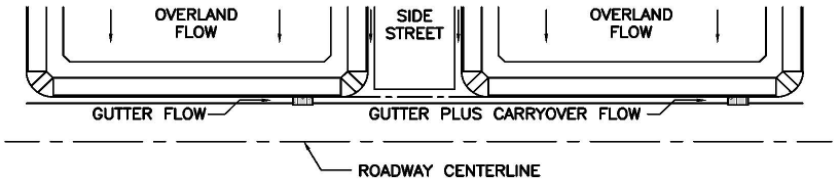


Design Information (Input)		MINOR	MAJOR	
Type of Inlet	Inlet Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from 'Q-Allow')	a_{local} =	3.00	3.00	inches
Number of Unit Inlets (Grate or Curb Opening)	No =	1	1	
Water Depth at Flowline (outside of local depression)	Ponding Depth =	3.4	5.6	inches
				☐ Override Depths
Grate Information		MINOR	MAJOR	
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	
		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	**Q_a =**	**1.1**	**4.6**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms (>Q PEAK)	$Q_{PEAK\ REQUIRED}$ =	0.9	2.4	cfs

Worksheet Protected

DESIGN PEAK FLOW FOR ONE-HALF OF STREET OR GRASS-LINED CHANNEL BY THE RATIONAL METHOD

Project: COMPARK SOUTH
Inlet ID: INLET 5-4



Show Details

Design Flow: ONLY if already determined through other methods:
(local peak flow for 1/2 of street OR grass-lined channel):

	Minor Storm	Major Storm	
*Q_{Known} =	4.1	13.0	cfs

*** If you enter values in Row 14, skip the rest of this sheet and proceed to sheet Q-Allow or Area Inlet.**

<--- FILL IN THIS SECTION OR... FILL IN THE SECTIONS BELOW. <---

Geographic Information: (Enter data in the blue cells):

Subcatchment Area =		Acres
Percent Imperviousness =		%
NRCS Soil Type =		A, B, C, or D

Site Type:
- Site is Urban
- Site is Non-Urban

Flows Developed For:
- Street Inlets
- Area Inlets in a Median

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

Rainfall Information: Intensity I (inch/hr) = $C_1 * P_1 / (C_2 + T_c) ^ C_3$

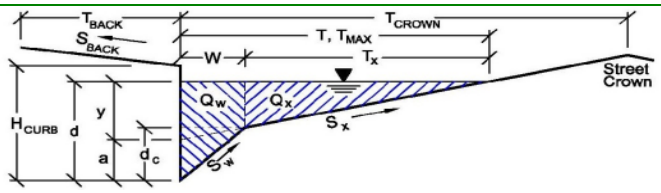
	Minor Storm	Major Storm	
Design Storm Return Period, T_t =			years
Return Period One-Hour Precipitation, P_1 =			inches
C_1 =			
C_2 =			
C_3 =			
User-Defined Storm Runoff Coefficient (leave this blank to accept a calculated value), C =			
User-Defined 5-yr. Runoff Coefficient (leave this blank to accept a calculated value), C_5 =			
Bypass (Carry-Over) Flow from upstream Subcatchments, Q_b =	0.0	0.0	cfs
Total Design Peak Flow, Q =	4.1	13.0	cfs

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

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

Project: COMPARK SOUTH

Inlet ID: INLET 5-4



Gutter Geometry (Enter data in the blue cells)			
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	0.0	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} =	17.0	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 =	0.015	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} =	17.0	17.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	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} =**	**16.4**	**137.5**	**cfs**

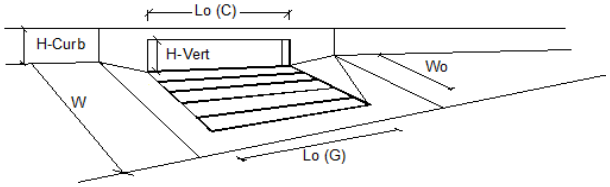
Minor storm max. allowable capacity GOOD - greater than flow given on sheet 'Q-Peak'

Major storm max. allowable capacity GOOD - greater than flow given on sheet 'Q-Peak'

INLET ON A CONTINUOUS GRADE

Project: COMPARK SOUTH

Inlet ID: INLET 5-4



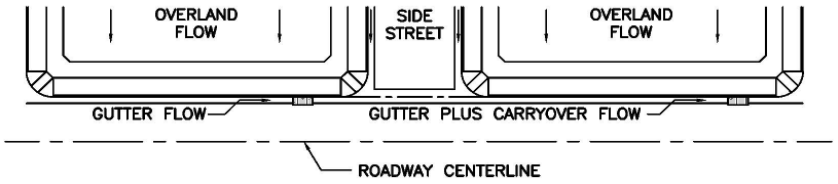
Design Information (Input)		MINOR	MAJOR	
Type of Inlet	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from 'Q-Allow')	a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	3	3	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	5.00	5.00	ft
Width of a Unit Grate (cannot be greater than W from Q-Allow)	W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C_f-C =	0.10	0.10	

Street Hydraulics: OK - Q < maximum allowable from sheet 'Q-Allow'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**4.10**	**10.59**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.0**	**2.4**	**cfs**
Capture Percentage = Q_a/Q_o =	**C% =**	**100**	**81**	**%**

Worksheet Protected

DESIGN PEAK FLOW FOR ONE-HALF OF STREET OR GRASS-LINED CHANNEL BY THE RATIONAL METHOD

Project: COMPARK SOUTH
Inlet ID: INLET 6-4



Show Details

Design Flow: ONLY if already determined through other methods:
(local peak flow for 1/2 of street OR grass-lined channel):

	Minor Storm	Major Storm	
*Q_{Known} =	1.1	3.5	cfs

*** If you enter values in Row 14, skip the rest of this sheet and proceed to sheet Q-Allow or Area Inlet.**

<--- FILL IN THIS SECTION OR... FILL IN THE SECTIONS BELOW. <---

Geographic Information: (Enter data in the blue cells):

Subcatchment Area =		Acres
Percent Imperviousness =		%
NRCS Soil Type =		A, B, C, or D

Site Type:
- Site is Urban
- Site is Non-Urban

Flows Developed For:
- Street Inlets
- Area Inlets in a Median

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

Rainfall Information: Intensity I (inch/hr) = $C_1 * P_1 / (C_2 + T_c) ^ C_3$

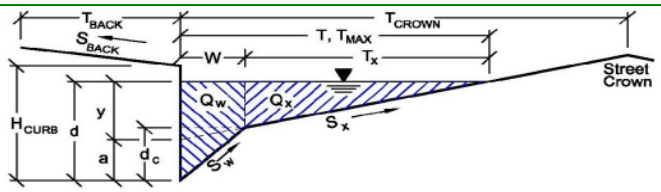
	Minor Storm	Major Storm	
Design Storm Return Period, T_t =			years
Return Period One-Hour Precipitation, P_1 =			inches
C_1 =			
C_2 =			
C_3 =			
User-Defined Storm Runoff Coefficient (leave this blank to accept a calculated value), C =			
User-Defined 5-yr. Runoff Coefficient (leave this blank to accept a calculated value), C_5 =			
Bypass (Carry-Over) Flow from upstream Subcatchments, Q_b =	**0.0**	**0.0**	**cfs**
Total Design Peak Flow, Q =	**1.1**	**3.5**	**cfs**

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

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

Project: COMPARK SOUTH

Inlet ID: INLET 6-4



Gutter Geometry (Enter data in the blue cells)

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	0.0	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} =	17.0	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 =	0.006	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} =	17.0	17.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	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} =**	**10.4**	**86.9**	**cfs**

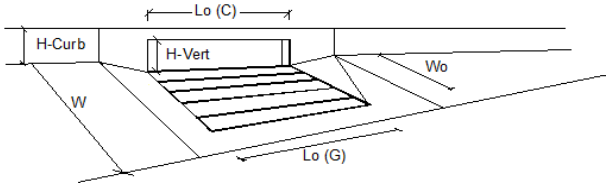
Minor storm max. allowable capacity GOOD - greater than flow given on sheet 'Q-Peak'

Major storm max. allowable capacity GOOD - greater than flow given on sheet 'Q-Peak'

INLET ON A CONTINUOUS GRADE

Project: COMPARK SOUTH

Inlet ID: INLET 6-4



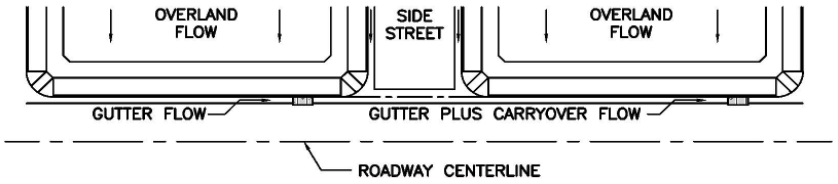
Design Information (Input)		MINOR	MAJOR	
Type of Inlet	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from 'Q-Allow')	a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	2	2	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	5.00	5.00	ft
Width of a Unit Grate (cannot be greater than W from Q-Allow)	W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C_f-C =	0.10	0.10	

Street Hydraulics: OK - Q < maximum allowable from sheet 'Q-Allow'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**1.10**	**3.47**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.0**	**0.0**	**cfs**
Capture Percentage = Q_a/Q_o =	**C% =**	**100**	**99**	**%**

Worksheet Protected

DESIGN PEAK FLOW FOR ONE-HALF OF STREET OR GRASS-LINED CHANNEL BY THE RATIONAL METHOD

Project: COMPARK SOUTH
Inlet ID: INLET 3-5



Show Details

Design Flow: ONLY if already determined through other methods:
(local peak flow for 1/2 of street OR grass-lined channel):

	Minor Storm	Major Storm	
*Q_{Known} =	4.9	13.6	cfs

*** If you enter values in Row 14, skip the rest of this sheet and proceed to sheet Q-Allow or Area Inlet.**

<--- FILL IN THIS SECTION OR... FILL IN THE SECTIONS BELOW. <---

Geographic Information: (Enter data in the blue cells):

Subcatchment Area =		Acres
Percent Imperviousness =		%
NRCS Soil Type =		A, B, C, or D

Site Type:
- Site is Urban
- Site is Non-Urban

Flows Developed For:
- Street Inlets
- Area Inlets in a Median

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

Rainfall Information: Intensity I (inch/hr) = $C_1 * P_1 / (C_2 + T_c) ^ C_3$

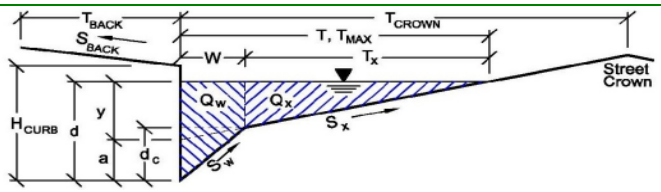
	Minor Storm	Major Storm	
Design Storm Return Period, T_r =			years
Return Period One-Hour Precipitation, P_1 =			inches
C_1 =			
C_2 =			
C_3 =			
User-Defined Storm Runoff Coefficient (leave this blank to accept a calculated value), C =			
User-Defined 5-yr. Runoff Coefficient (leave this blank to accept a calculated value), C_5 =			
Bypass (Carry-Over) Flow from upstream Subcatchments, Q_b =	0.0	0.0	cfs
Total Design Peak Flow, Q =	4.9	13.6	cfs

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

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

Project: COMPARK SOUTH

Inlet ID: INLET 3-5



Gutter Geometry (Enter data in the blue cells)

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	0.0	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} =	17.0	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} =	17.0	17.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	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} =**	**SUMP**	**SUMP**	**cfs**

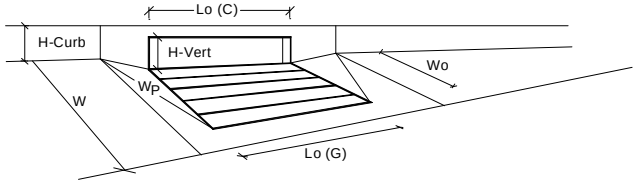
Minor storm max. allowable capacity GOOD - greater than flow given on sheet 'Q-Peak'

Major storm max. allowable capacity GOOD - greater than flow given on sheet 'Q-Peak'

INLET IN A SUMP OR SAG LOCATION

Project = COMPARK SOUTH

Inlet ID = INLET 3-5

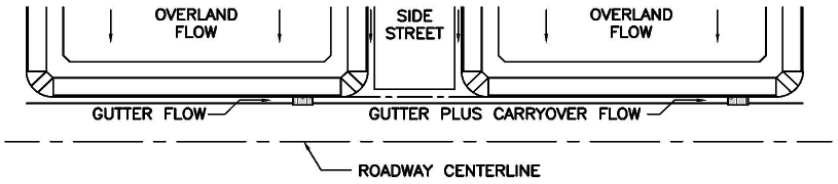


Design Information (Input)		MINOR	MAJOR	
Type of Inlet	Inlet Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from 'Q-Allow')	a_{local} =	3.00	3.00	inches
Number of Unit Inlets (Grate or Curb Opening)	No =	2	2	
Water Depth at Flowline (outside of local depression)	Ponding Depth =	5.6	12.0	inches
				☑ Override Depths
Grate Information		MINOR	MAJOR	
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	
		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	**Q_a =**	**8.7**	**25.5**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms (>Q PEAK)	$Q_{PEAK\ REQUIRED}$ =	4.9	13.6	cfs

Worksheet Protected

DESIGN PEAK FLOW FOR ONE-HALF OF STREET OR GRASS-LINED CHANNEL BY THE RATIONAL METHOD

Project: COMPARK SOUTH
Inlet ID: INLET 4-5



Show Details

Design Flow: ONLY if already determined through other methods:
(local peak flow for 1/2 of street OR grass-lined channel):

	Minor Storm	Major Storm	
*Q_{Known} =	9.6	26.6	cfs

*** If you enter values in Row 14, skip the rest of this sheet and proceed to sheet Q-Allow or Area Inlet.**

<--- FILL IN THIS SECTION OR... FILL IN THE SECTIONS BELOW. <---

Geographic Information: (Enter data in the blue cells):

Subcatchment Area =		Acres
Percent Imperviousness =		%
NRCS Soil Type =		A, B, C, or D

Site Type:
- Site is Urban
- Site is Non-Urban

Flows Developed For:
- Street Inlets
- Area Inlets in a Median

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

Rainfall Information: Intensity I (inch/hr) = $C_1 * P_1 / (C_2 + T_c) ^ C_3$

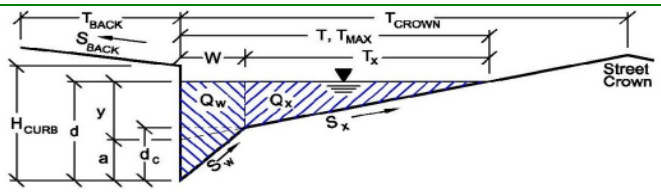
	Minor Storm	Major Storm	
Design Storm Return Period, T_r =			years
Return Period One-Hour Precipitation, P_1 =			inches
C_1 =			
C_2 =			
C_3 =			
User-Defined Storm Runoff Coefficient (leave this blank to accept a calculated value), C =			
User-Defined 5-yr. Runoff Coefficient (leave this blank to accept a calculated value), C_5 =			
Bypass (Carry-Over) Flow from upstream Subcatchments, Q_b =	0.0	10.6	cfs
Total Design Peak Flow, Q =	9.6	37.2	cfs

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

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

Project: COMPARK SOUTH

Inlet ID: INLET 4-5



Gutter Geometry (Enter data in the blue cells)

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	0.0	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} =	17.0	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} =	17.0	17.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	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} =**	**SUMP**	**SUMP**	**cfs**

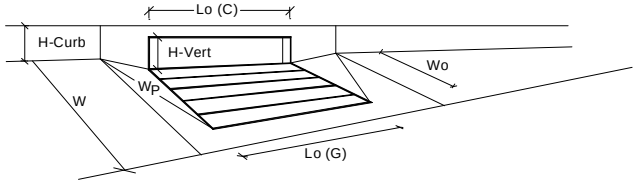
Minor storm max. allowable capacity GOOD - greater than flow given on sheet 'Q-Peak'

Major storm max. allowable capacity GOOD - greater than flow given on sheet 'Q-Peak'

INLET IN A SUMP OR SAG LOCATION

Project = COMPARK SOUTH

Inlet ID = INLET 4-5

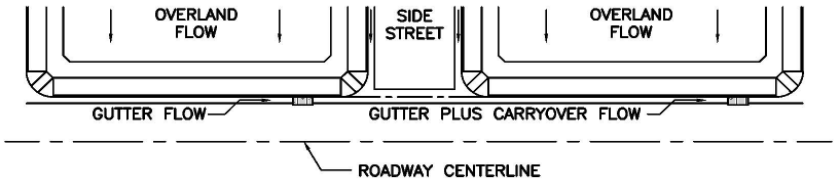


Design Information (Input)		MINOR	MAJOR	
Type of Inlet	Inlet Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from 'Q-Allow')	a_{local} =	3.00	3.00	inches
Number of Unit Inlets (Grate or Curb Opening)	No =	3	3	
Water Depth at Flowline (outside of local depression)	Ponding Depth =	5.6	12.0	inches
				☑ Override Depths
Grate Information		MINOR	MAJOR	
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	
		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	**Q_a =**	**11.2**	**39.1**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms (>Q PEAK)	$Q_{PEAK\ REQUIRED}$ =	9.6	37.2	cfs

Worksheet Protected

DESIGN PEAK FLOW FOR ONE-HALF OF STREET OR GRASS-LINED CHANNEL BY THE RATIONAL METHOD

Project: COMPARK SOUTH
Inlet ID: INLET 5-5



Show Details

Design Flow: ONLY if already determined through other methods:
(local peak flow for 1/2 of street OR grass-lined channel):

	Minor Storm	Major Storm	
*Q_{Known} =	5.5	15.2	cfs

*** If you enter values in Row 14, skip the rest of this sheet and proceed to sheet Q-Allow or Area Inlet.**

<--- FILL IN THIS SECTION OR... FILL IN THE SECTIONS BELOW. <---

Geographic Information: (Enter data in the blue cells):

Subcatchment Area =		Acres
Percent Imperviousness =		%
NRCS Soil Type =		A, B, C, or D

Site Type:
- Site is Urban
- Site is Non-Urban

Flows Developed For:
- Street Inlets
- Area Inlets in a Median

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

Rainfall Information: Intensity I (inch/hr) = $C_1 * P_1 / (C_2 + T_c) ^ C_3$

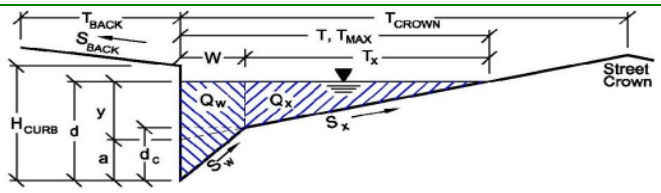
	Minor Storm	Major Storm	
Design Storm Return Period, T_r =			years
Return Period One-Hour Precipitation, P_1 =			inches
C_1 =			
C_2 =			
C_3 =			
User-Defined Storm Runoff Coefficient (leave this blank to accept a calculated value), C =			
User-Defined 5-yr. Runoff Coefficient (leave this blank to accept a calculated value), C_5 =			
Bypass (Carry-Over) Flow from upstream Subcatchments, Q_b =	**0.0**	**6.4**	**cfs**
Total Design Peak Flow, Q =	**5.5**	**21.6**	**cfs**

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

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

Project: COMPARK SOUTH

Inlet ID: INLET 5-5



Gutter Geometry (Enter data in the blue cells)

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	0.0	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} =	17.0	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} =	17.0	17.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	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} =**	**SUMP**	**SUMP**	**cfs**

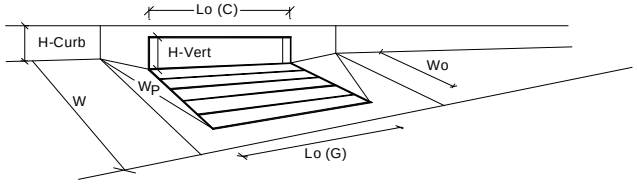
Minor storm max. allowable capacity GOOD - greater than flow given on sheet 'Q-Peak'

Major storm max. allowable capacity GOOD - greater than flow given on sheet 'Q-Peak'

INLET IN A SUMP OR SAG LOCATION

Project = COMPARK SOUTH

Inlet ID = INLET 5-5

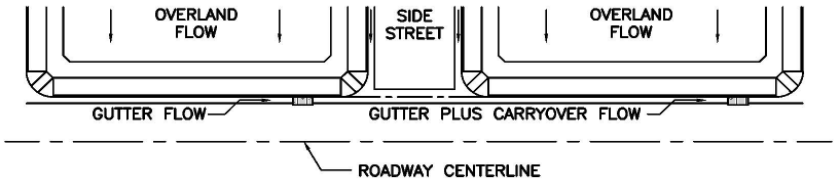


Design Information (Input)		MINOR	MAJOR	
Type of Inlet	Inlet Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from 'Q-Allow')	a_{local} =	3.00	3.00	inches
Number of Unit Inlets (Grate or Curb Opening)	No =	2	2	
Water Depth at Flowline (outside of local depression)	Ponding Depth =	5.6	12.0	inches
				☑ Override Depths
Grate Information		MINOR	MAJOR	
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	
		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	**Q_a =**	**8.7**	**25.5**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms (>Q PEAK)	$Q_{PEAK\ REQUIRED}$ =	5.5	21.6	cfs

Worksheet Protected

DESIGN PEAK FLOW FOR ONE-HALF OF STREET OR GRASS-LINED CHANNEL BY THE RATIONAL METHOD

Project: COMPARK SOUTH
Inlet ID: INLET 4-5A



Show Details

Design Flow: ONLY if already determined through other methods:
(local peak flow for 1/2 of street OR grass-lined channel):

	Minor Storm	Major Storm	
*Q_{Known} =	4.3	11.9	cfs

*** If you enter values in Row 14, skip the rest of this sheet and proceed to sheet Q-Allow or Area Inlet.**

<--- FILL IN THIS SECTION OR... FILL IN THE SECTIONS BELOW. <---

Geographic Information: (Enter data in the blue cells):

Subcatchment Area =		Acres
Percent Imperviousness =		%
NRCS Soil Type =		A, B, C, or D

Site Type:
- Site is Urban
- Site is Non-Urban

Flows Developed For:
- Street Inlets
- Area Inlets in a Median

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

Rainfall Information: Intensity I (inch/hr) = $C_1 * P_1 / (C_2 + T_c) ^ C_3$

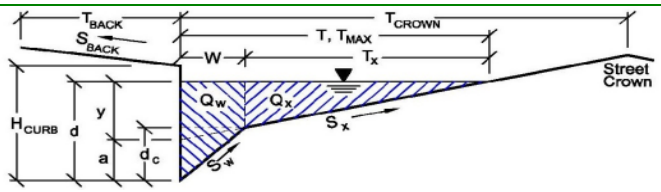
	Minor Storm	Major Storm	
Design Storm Return Period, T_r =			years
Return Period One-Hour Precipitation, P_1 =			inches
C_1 =			
C_2 =			
C_3 =			
User-Defined Storm Runoff Coefficient (leave this blank to accept a calculated value), C =			
User-Defined 5-yr. Runoff Coefficient (leave this blank to accept a calculated value), C_5 =			
Bypass (Carry-Over) Flow from upstream Subcatchments, Q_b =	0.0	0.0	cfs
Total Design Peak Flow, Q =	4.3	11.9	cfs

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

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

Project: COMPARK SOUTH

Inlet ID: INLET 4-5A



Gutter Geometry (Enter data in the blue cells)

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	0.0	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} =	17.0	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 =	0.015	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} =	17.0	17.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	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} =**	**16.4**	**137.5**	**cfs**

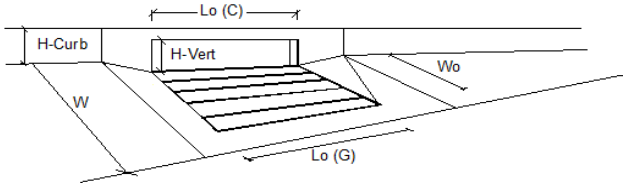
Minor storm max. allowable capacity GOOD - greater than flow given on sheet 'Q-Peak'

Major storm max. allowable capacity GOOD - greater than flow given on sheet 'Q-Peak'

INLET ON A CONTINUOUS GRADE

Project: COMPARK SOUTH

Inlet ID: INLET 4-5A



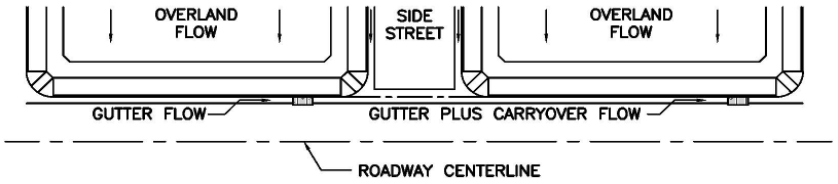
Design Information (Input)		MINOR	MAJOR	
Type of Inlet	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from 'Q-Allow')	a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	3	3	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	5.00	5.00	ft
Width of a Unit Grate (cannot be greater than W from Q-Allow)	W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C_f-C =	0.10	0.10	

Street Hydraulics: OK - Q < maximum allowable from sheet 'Q-Allow'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**4.30**	**10.05**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.0**	**1.8**	**cfs**
Capture Percentage = Q_a/Q_o =	**C% =**	**100**	**84**	**%**

Worksheet Protected

DESIGN PEAK FLOW FOR ONE-HALF OF STREET OR GRASS-LINED CHANNEL BY THE RATIONAL METHOD

Project: COMPARK SOUTH
Inlet ID: INLET 5-5A



Show Details

Design Flow: ONLY if already determined through other methods:
(local peak flow for 1/2 of street OR grass-lined channel):

	Minor Storm	Major Storm	
*Q_{Known} =	5.6	16.2	cfs

*** If you enter values in Row 14, skip the rest of this sheet and proceed to sheet Q-Allow or Area Inlet.**

<--- FILL IN THIS SECTION OR... FILL IN THE SECTIONS BELOW. <---

Geographic Information: (Enter data in the blue cells):

Subcatchment Area =		Acres
Percent Imperviousness =		%
NRCS Soil Type =		A, B, C, or D

Site Type:
- Site is Urban
- Site is Non-Urban

Flows Developed For:
- Street Inlets
- Area Inlets in a Median

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

Rainfall Information: Intensity I (inch/hr) = $C_1 * P_1 / (C_2 + T_c) ^ C_3$

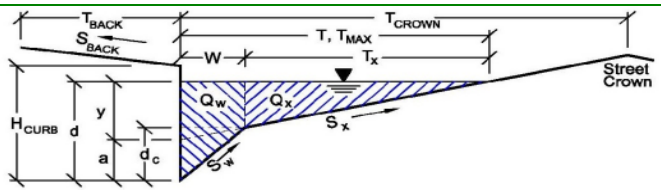
	Minor Storm	Major Storm	
Design Storm Return Period, T_r =			years
Return Period One-Hour Precipitation, P_1 =			inches
C_1 =			
C_2 =			
C_3 =			
User-Defined Storm Runoff Coefficient (leave this blank to accept a calculated value), C =			
User-Defined 5-yr. Runoff Coefficient (leave this blank to accept a calculated value), C_5 =			
Bypass (Carry-Over) Flow from upstream Subcatchments, Q_b =	0.0	0.0	cfs
Total Design Peak Flow, Q =	5.6	16.2	cfs

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

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

Project: COMPARK SOUTH

Inlet ID: INLET 5-5A



Gutter Geometry (Enter data in the blue cells)

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	0.0	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} =	17.0	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 =	0.015	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} =	17.0	17.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	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} =**	**16.4**	**137.5**	**cfs**

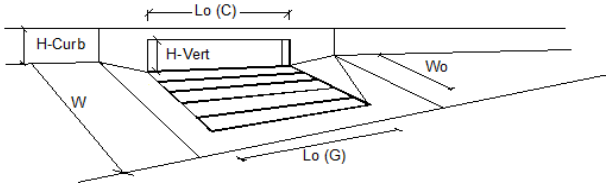
Minor storm max. allowable capacity GOOD - greater than flow given on sheet 'Q-Peak'

Major storm max. allowable capacity GOOD - greater than flow given on sheet 'Q-Peak'

INLET ON A CONTINUOUS GRADE

Project: COMPARK SOUTH

Inlet ID: INLET 5-5A



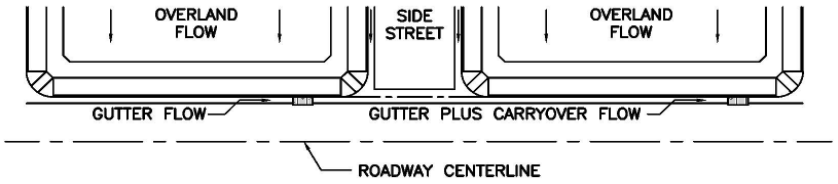
Design Information (Input)		MINOR	MAJOR	
Type of Inlet	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from 'Q-Allow')	a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	3	3	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	5.00	5.00	ft
Width of a Unit Grate (cannot be greater than W from Q-Allow)	W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C_f-C =	0.10	0.10	

Street Hydraulics: OK - Q < maximum allowable from sheet 'Q-Allow'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**5.60**	**11.98**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.0**	**4.2**	**cfs**
Capture Percentage = Q_a/Q_o =	**C% =**	**100**	**74**	**%**

Worksheet Protected

DESIGN PEAK FLOW FOR ONE-HALF OF STREET OR GRASS-LINED CHANNEL BY THE RATIONAL METHOD

Project: COMPARK SOUTH
Inlet ID: INLET 6-5



Show Details

Design Flow: ONLY if already determined through other methods:
(local peak flow for 1/2 of street OR grass-lined channel):

	Minor Storm	Major Storm	
*Q_{Known} =	7.6	23.5	cfs

*** If you enter values in Row 14, skip the rest of this sheet and proceed to sheet Q-Allow or Area Inlet.**

<--- FILL IN THIS SECTION OR... FILL IN THE SECTIONS BELOW. <---

Geographic Information: (Enter data in the blue cells):

Subcatchment Area =		Acres
Percent Imperviousness =		%
NRCS Soil Type =		A, B, C, or D

Site Type:
- Site is Urban
- Site is Non-Urban

Flows Developed For:
- Street Inlets
- Area Inlets in a Median

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

Rainfall Information: Intensity I (inch/hr) = $C_1 * P_1 / (C_2 + T_c)^{C_3}$

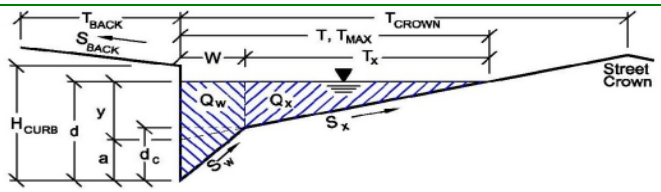
	Minor Storm	Major Storm	
Design Storm Return Period, T_t =			years
Return Period One-Hour Precipitation, P_1 =			inches
C_1 =			
C_2 =			
C_3 =			
User-Defined Storm Runoff Coefficient (leave this blank to accept a calculated value), C =			
User-Defined 5-yr. Runoff Coefficient (leave this blank to accept a calculated value), C_5 =			
Bypass (Carry-Over) Flow from upstream Subcatchments, Q_b =	0.0	0.0	cfs
Total Design Peak Flow, Q =	7.6	23.5	cfs

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

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

Project: COMPARK SOUTH

Inlet ID: INLET 6-5



Gutter Geometry (Enter data in the blue cells)

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	0.0	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} =	17.0	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} =	17.0	17.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	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} =**	**SUMP**	**SUMP**	**cfs**

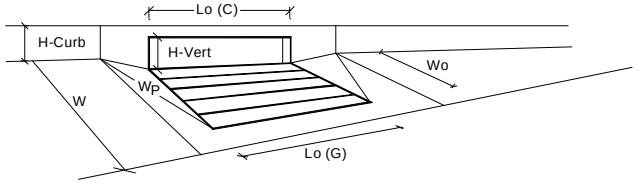
Minor storm max. allowable capacity GOOD - greater than flow given on sheet 'Q-Peak'

Major storm max. allowable capacity GOOD - greater than flow given on sheet 'Q-Peak'

INLET IN A SUMP OR SAG LOCATION

Project = COMPARK SOUTH

Inlet ID = INLET 6-5

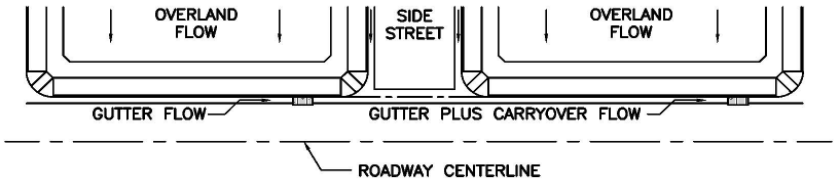


Design Information (Input)		MINOR	MAJOR	
Type of Inlet	Inlet Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from 'Q-Allow')	a_{local} =	3.00	3.00	inches
Number of Unit Inlets (Grate or Curb Opening)	No =	3	3	
Water Depth at Flowline (outside of local depression)	Ponding Depth =	5.6	5.6	inches
				☐ Override Depths
Grate Information		MINOR	MAJOR	
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	
		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	**Q_a =**	**11.1**	**11.1**	**cfs**
WARNING: Inlet Capacity less than Q Peak for MAJOR Storm	$Q_{PEAK\ REQUIRED}$ =	7.6	23.5	cfs

Worksheet Protected

DESIGN PEAK FLOW FOR ONE-HALF OF STREET OR GRASS-LINED CHANNEL BY THE RATIONAL METHOD

Project: COMPARK SOUTH
Inlet ID: INLET 7-5



Show Details

Design Flow: ONLY if already determined through other methods:
(local peak flow for 1/2 of street OR grass-lined channel):

	Minor Storm	Major Storm	
*Q_{Known} =	0.2	9.8	cfs

<--- FILL IN THIS SECTION OR...

*** If you enter values in Row 14, skip the rest of this sheet and proceed to sheet Q-Allow or Area Inlet.**

Geographic Information: (Enter data in the blue cells):

FILL IN THE SECTIONS BELOW. <---

Subcatchment Area =		Acres
Percent Imperviousness =		%
NRCS Soil Type =		A, B, C, or D

Site Type:
- Site is Urban
- Site is Non-Urban

Flows Developed For:
- Street Inlets
- Area Inlets in a Median

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

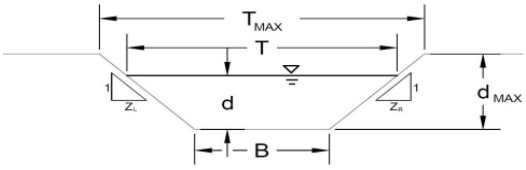
Rainfall Information: Intensity I (inch/hr) = $C_1 * P_1 / (C_2 + T_c) ^ C_3$

	Minor Storm	Major Storm	
Design Storm Return Period, T_r =			years
Return Period One-Hour Precipitation, P_1 =			inches
C_1 =			
C_2 =			
C_3 =			
User-Defined Storm Runoff Coefficient (leave this blank to accept a calculated value), C =			
User-Defined 5-yr. Runoff Coefficient (leave this blank to accept a calculated value), C_5 =			
Bypass (Carry-Over) Flow from upstream Subcatchments, Q_b =	0.0	0.0	cfs
Total Design Peak Flow, Q =	0.2	9.8	cfs

AREA INLET IN A TRAPEZOIDAL GRASS-LINED CHANNEL

COMPARK SOUTH

INLET 7-5



Grass Type	Limiting Manning's n
A	0.06
B	0.04
C	0.033
D	0.03
E	0.024

Analysis of Trapezoidal Grass-Lined Channel Using SCS Method

	NRCS Vegetal Retardance (A, B, C, D, or E)	A, B, C, D or E =	C	
	Manning's n (Leave cell D16 blank to manually enter an n value)	n =	see details below	
	Channel Invert Slope	S_O =	0.0100	ft/ft
	Bottom Width	B =	2.00	ft
Warning 01	Left Side Slope	Z1 =	0.20	ft/ft
Warning 01	Right Side Slope	Z2 =	0.20	ft/ft

Check one of the following soil types:

Soil Type:	Max. Velocity (V_{MAX})	Max Froude No. (F_{MAX})
Sandy	5.0 fps	0.50
Non-Sandy	7.0 fps	0.80

Choose One:
- ○ Sandy
- ◉ Non-Sandy

		Minor Storm	Major Storm	
Max. Allowable Top Width of Channel for Minor & Major Storm	T_{MAX} =	12.00	12.00	feet
Max. Allowable Water Depth in Channel for Minor & Major Storm	d_{MAX} =	1.00	2.10	feet

Allowable Channel Capacity Based On Channel Geometry

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion	Q_{allow} =	1.02	10.51	cfs
MAJOR STORM Allowable Capacity is based on Depth Criterion	d_{allow} =	1.00	2.10	ft

Water Depth in Channel Based On Design Peak Flow

Design Peak Flow	Q_o =	0.20	9.80	cfs
Water Depth	d =	0.54	2.04	feet

Minor storm max. allowable capacity GOOD - greater than flow given on sheet 'Q-Peak'

Major storm max. allowable capacity GOOD - greater than flow given on sheet 'Q-Peak'

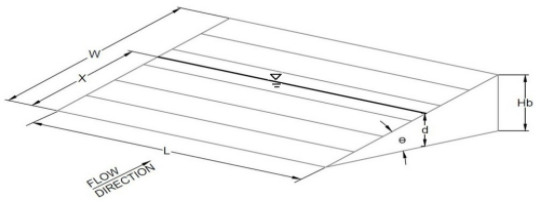
AREA INLET IN A TRAPEZOIDAL GRASS-LINED CHANNEL

COMPARK SOUTH

INLET 7-5

Inlet Design Information (Input)

Type of Inlet — Inlet Type = CDOT Type C



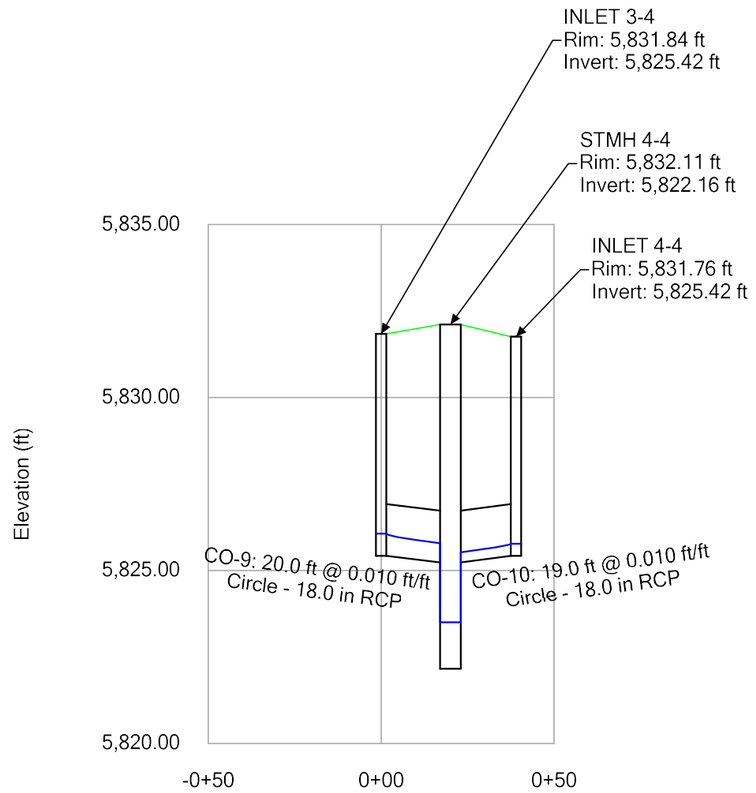
Angle of Inclined Grade (must be <= 30 degrees)	θ =	0.00	degrees
Width of Grade	W =	3.00	feet
Length of Grade	L =	3.00	feet
Open Area Ratio	A_{RATIO} =	0.70	
Height of Inclined Grade	H_B =	0.00	feet
Clogging Factor	C_f =	0.50	
Grate Discharge Coefficient	C_d =	0.96	
Orifice Coefficient	C_o =	0.64	
Weir Coefficient	C_w =	2.05	

		MINOR	MAJOR	
Water Depth at Inlet (for depressed inlets, 1 foot is added for depression)	d =	0.54	2.04	
Total Inlet Interception Capacity (assumes clogged condition)	**Q_a =**	**7.23**	**23.09**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms (> Q PEAK)	**Bypassed Flow, Q_b =**	**0.00**	**0.00**	**cfs**
	Capture Percentage = Q_a/Q_o = C%	**100**	**100**	**%**

Warning 01: Sideslope steepness exceeds USDCM Volume I recommendation.
Warning 02: Depth (d) exceeds USDCM Volume I recommendation.

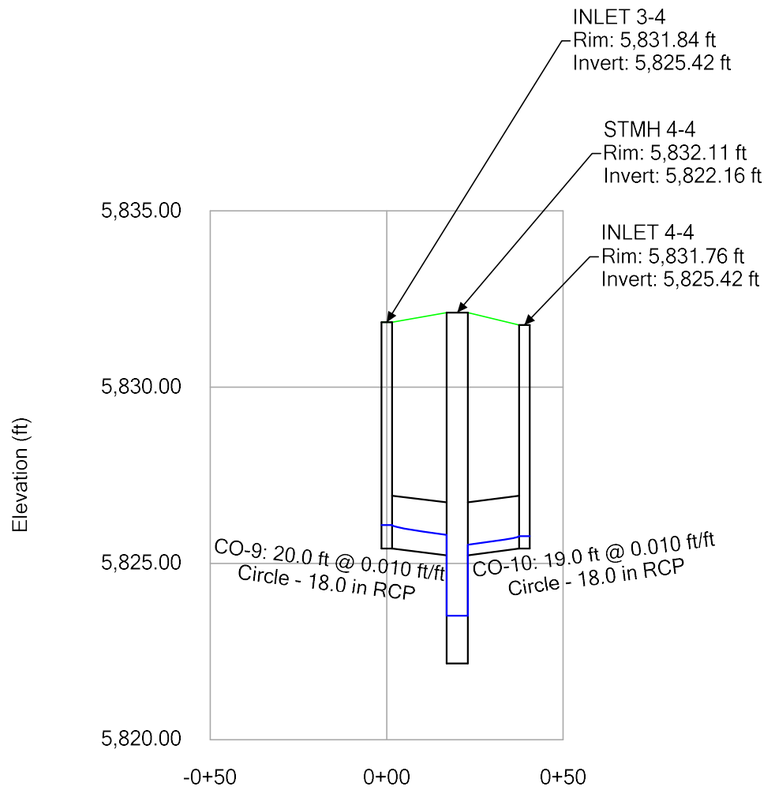
Profile Report

Engineering Profile - Profile - Storm Line 4A (Compark Village South StormCAD [2 year].stsw)



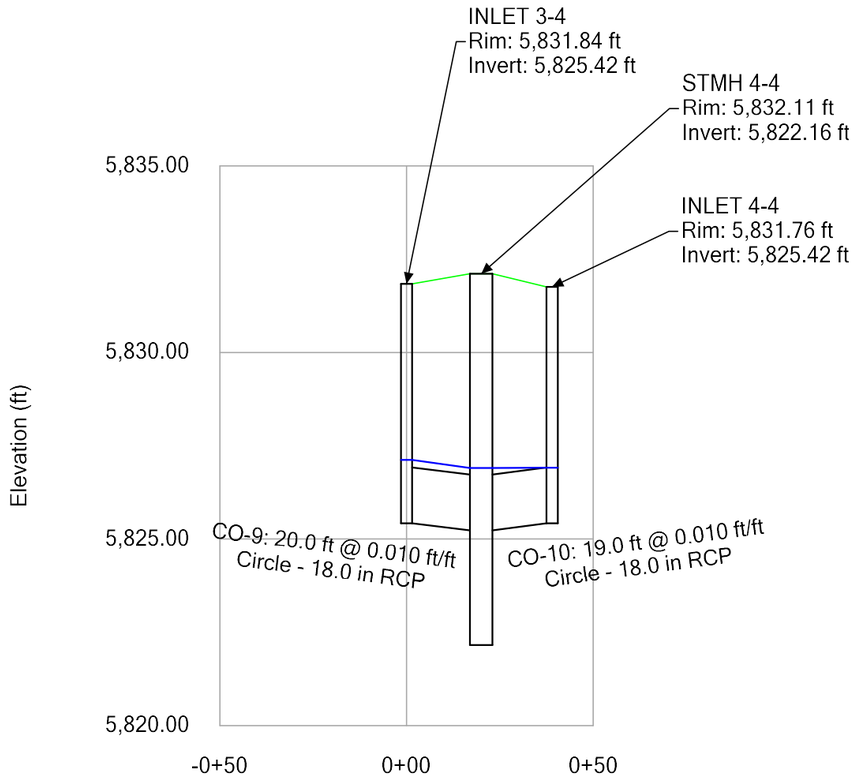
Profile Report

Engineering Profile - Profile - Storm Line 4A (Compark Village South StormCAD [5 year].stsw)



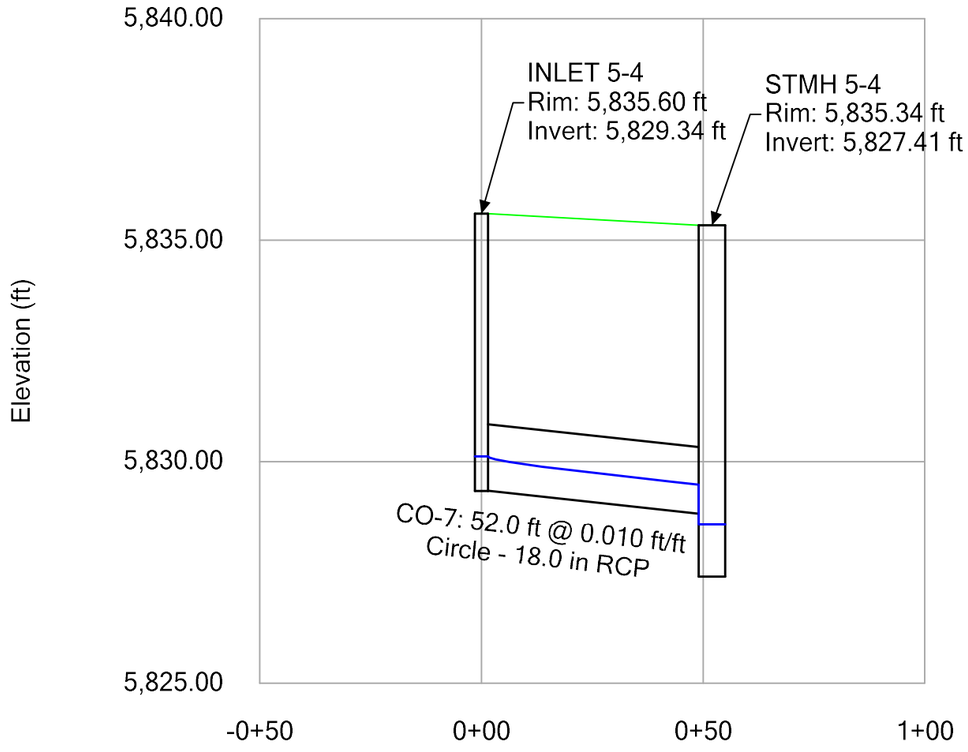
Profile Report

Engineering Profile - Profile - Storm Line 4A (Compark Village South StormCAD [100 year].stsw)



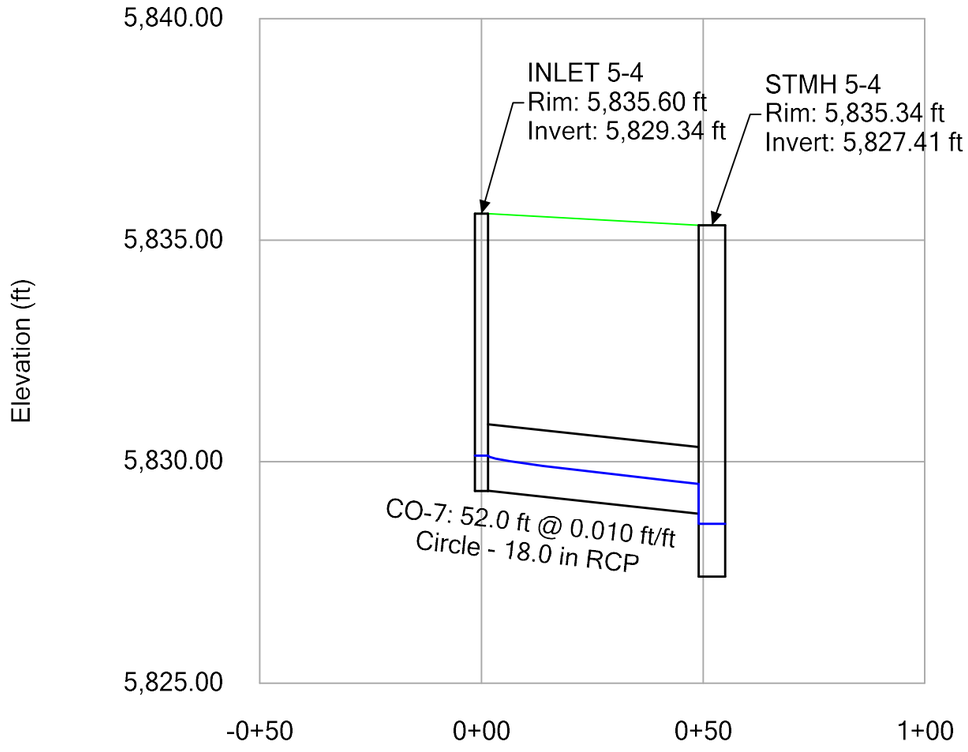
Profile Report

Engineering Profile - Profile - Storm Line 4B (Compark Village South StormCAD [2 year].stsw)



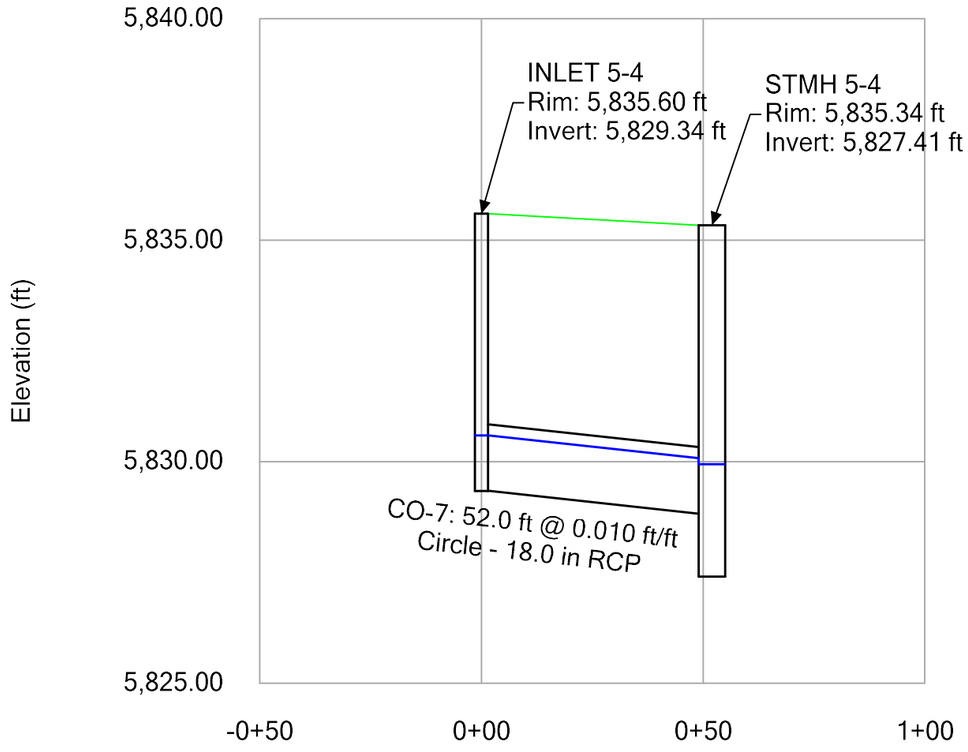
Profile Report

Engineering Profile - Profile - Storm Line 4B (Compark Village South StormCAD [5 year].stsw)



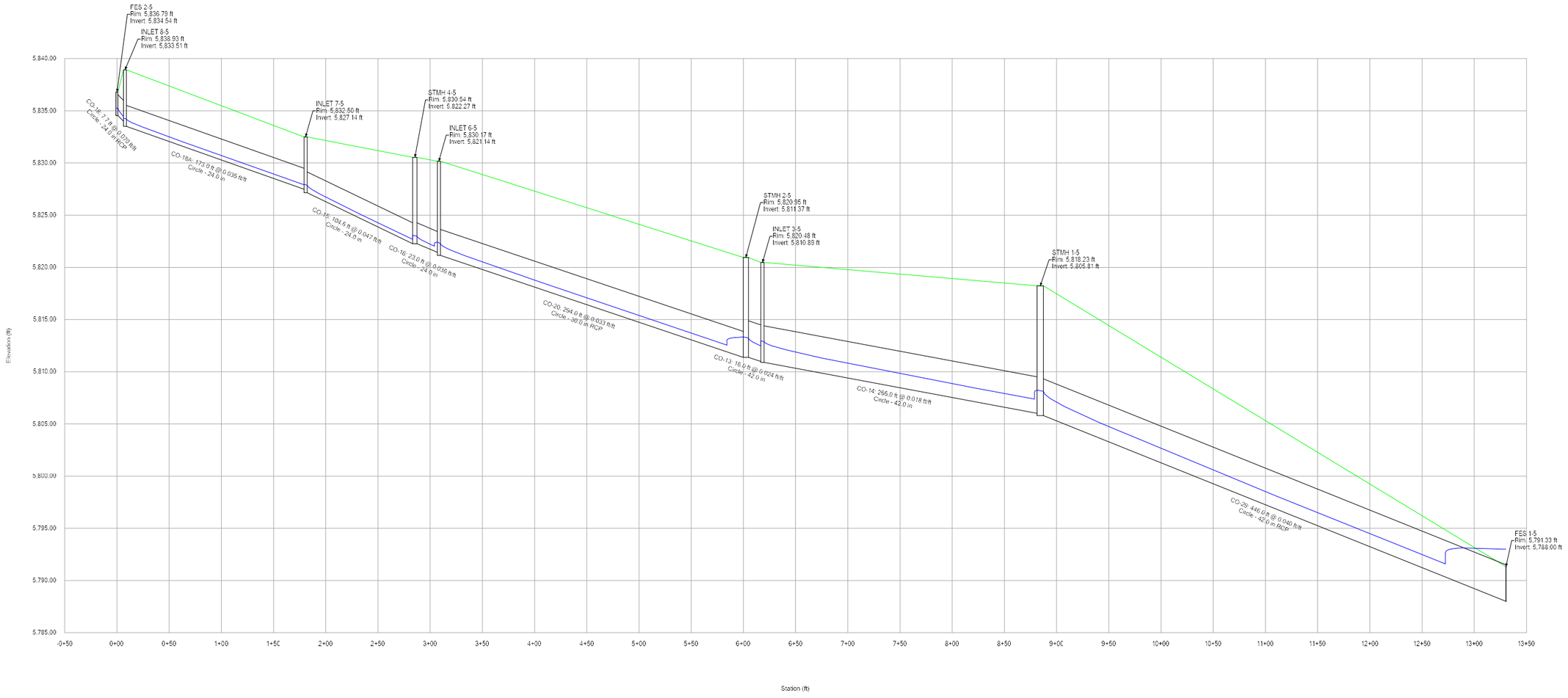
Profile Report

Engineering Profile - Profile - Storm Line 4B (Compark Village South StormCAD [100 year].stsw)



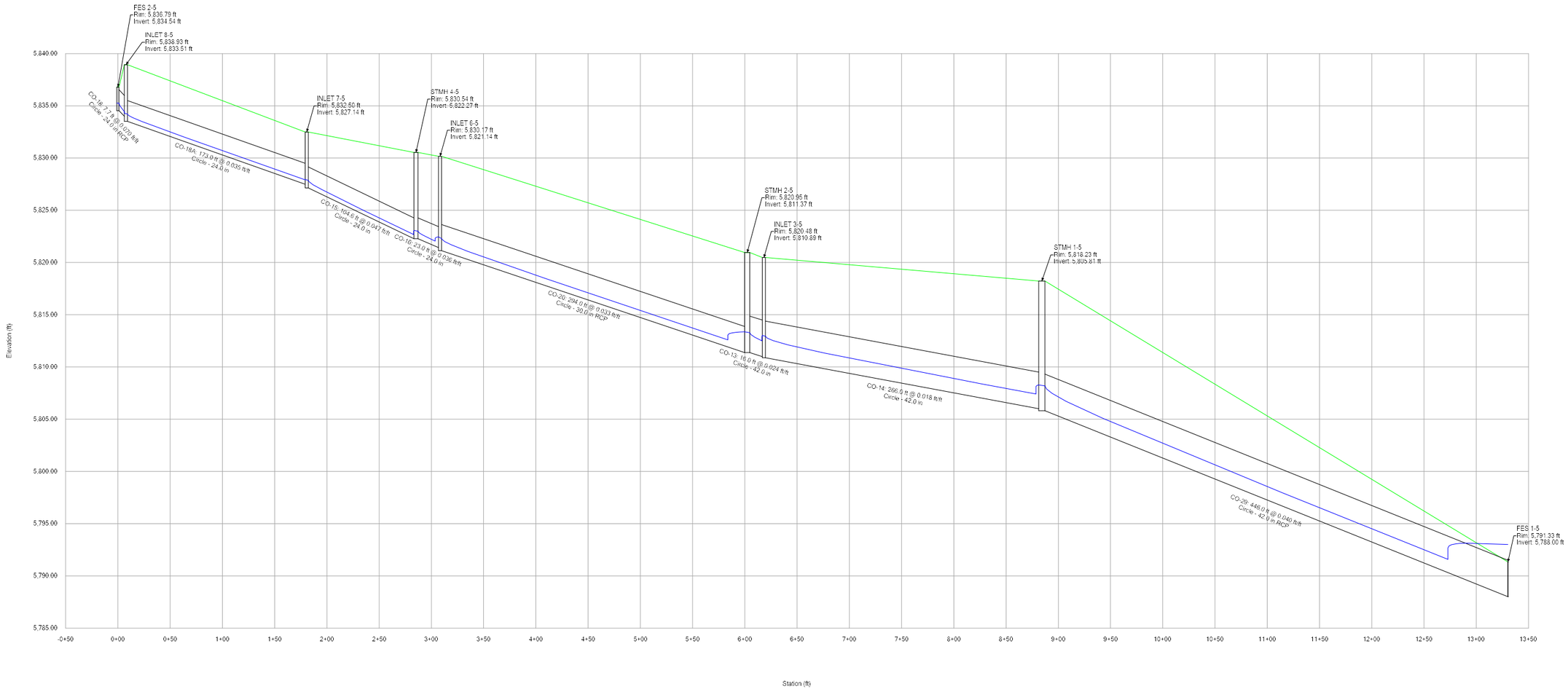
Profile Report

Engineering Profile - Profile - Storm Line 5 (Compark Village South StormCAD [2 year].stsw)



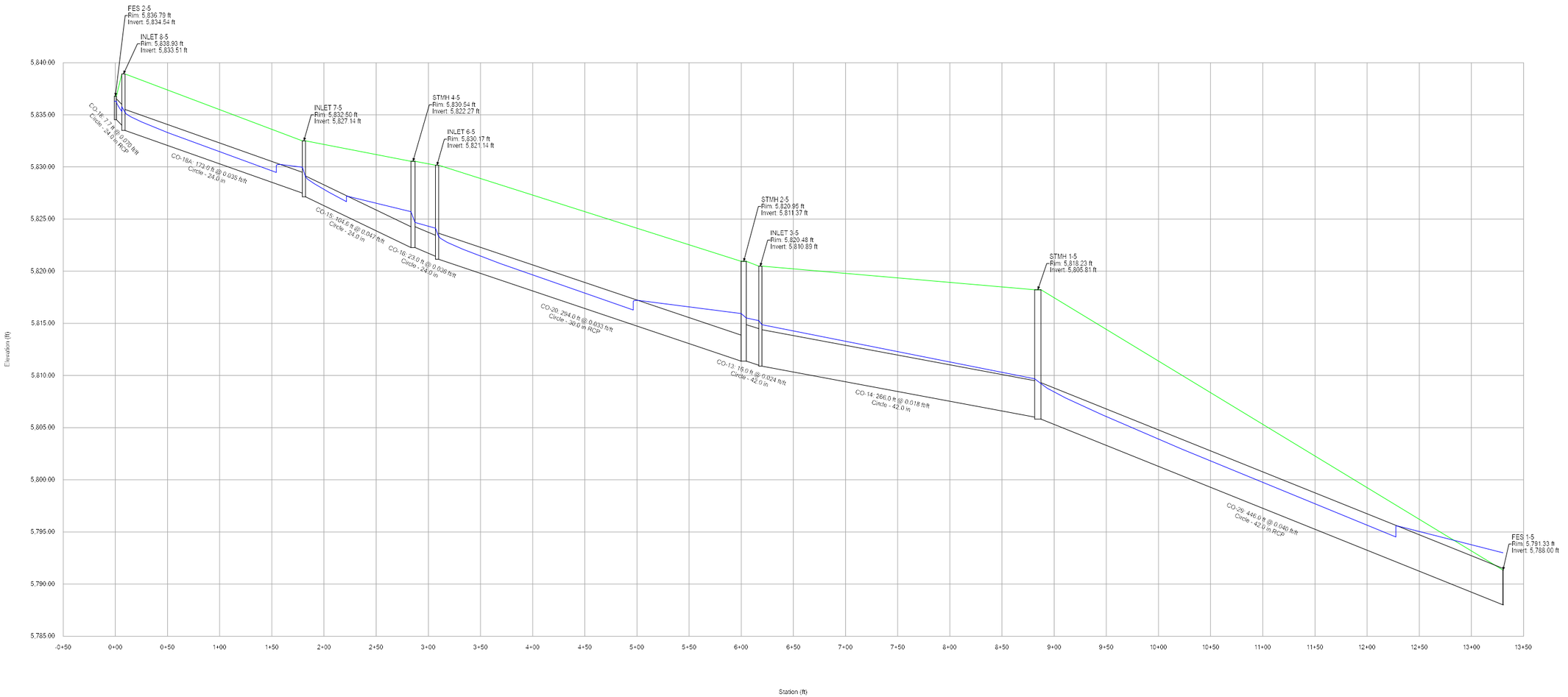
Profile Report

Engineering Profile - Profile - Storm Line 5 (Compark Village South StormCAD [5 year].stsw)



Profile Report

Engineering Profile - Profile - Storm Line 5 (Compark Village South StormCAD [100 year].stsw)



Profile Report

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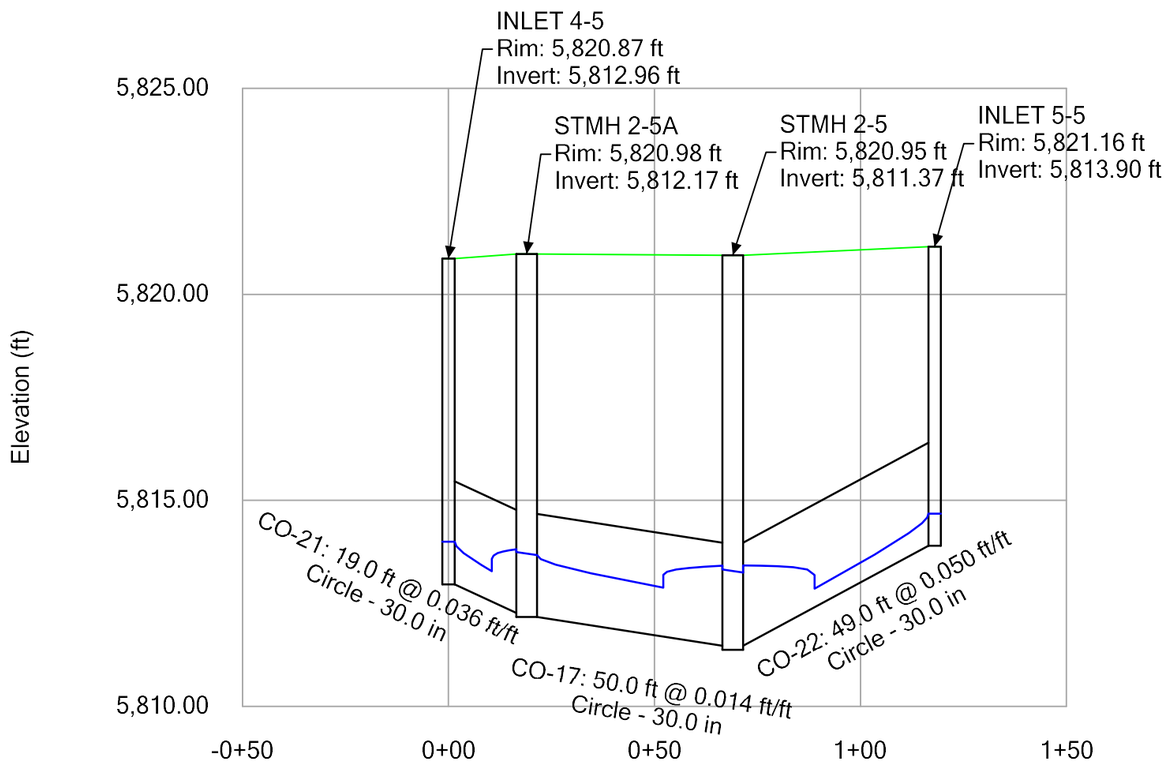
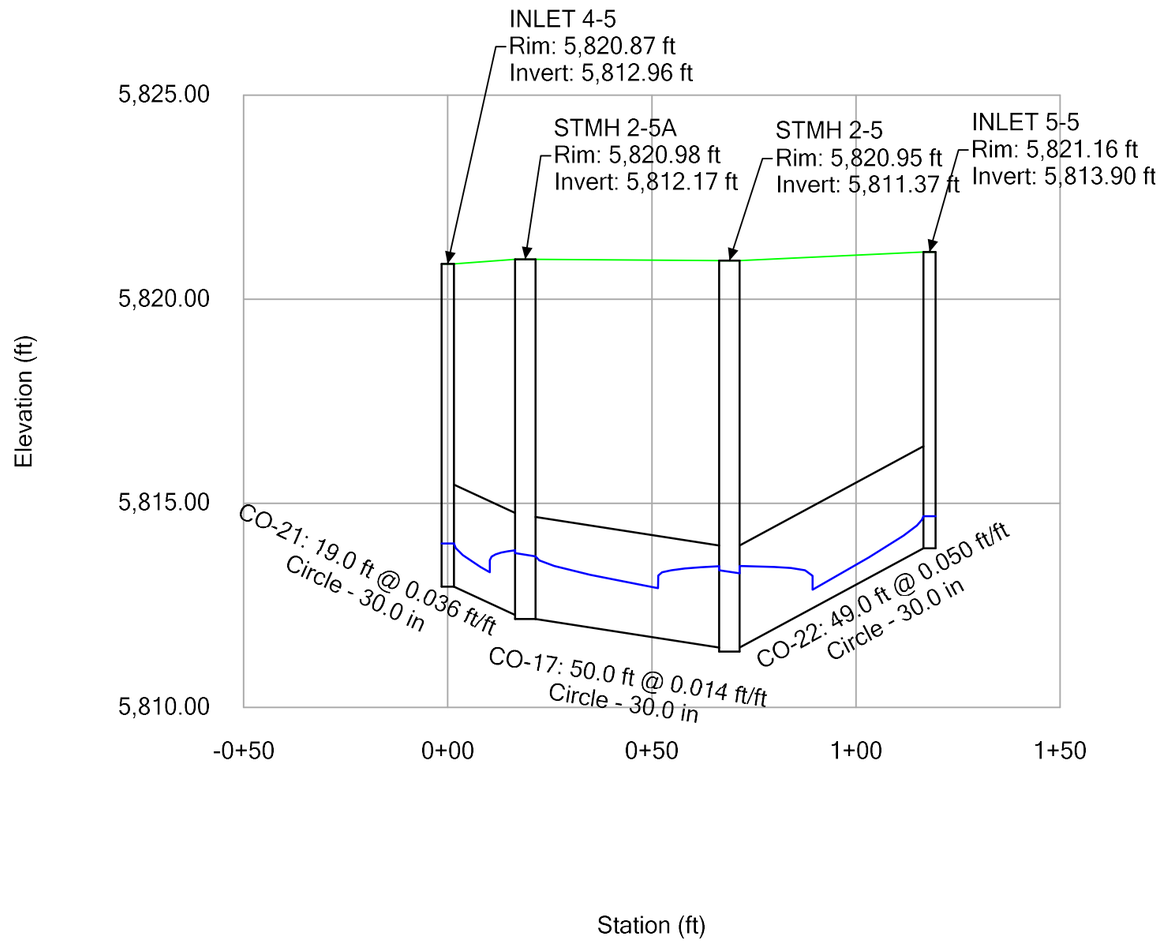


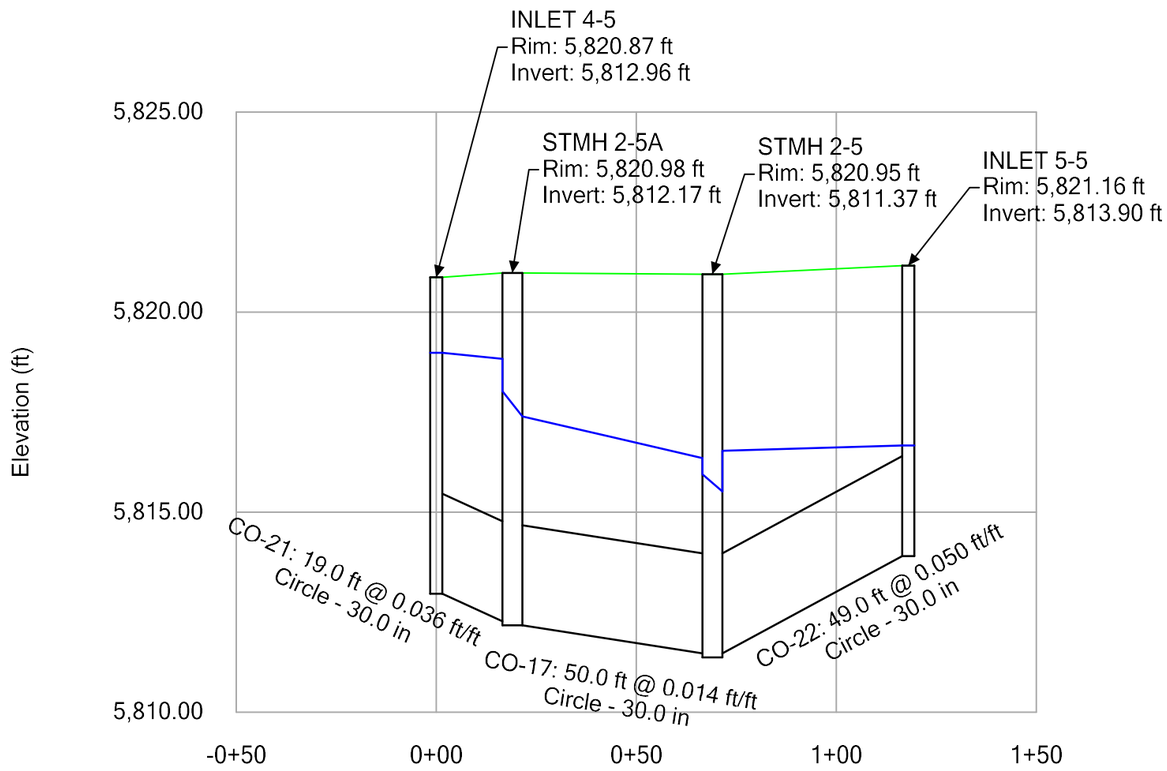
Profile Report

Engineering Profile - Profile - Storm Line 5B (Compark Village South StormCAD [5 year].stsw)

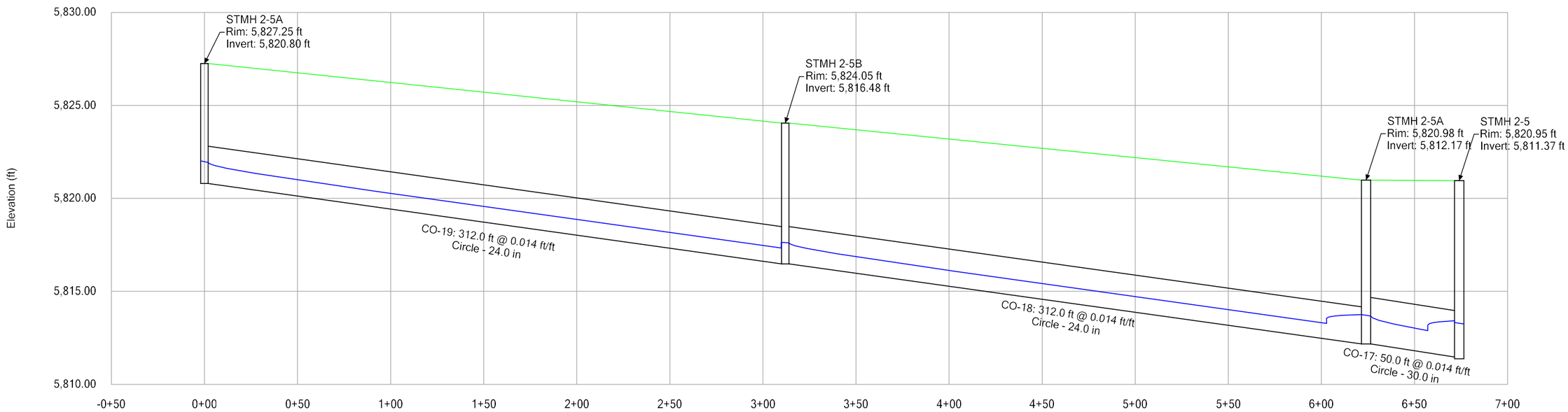


Profile Report

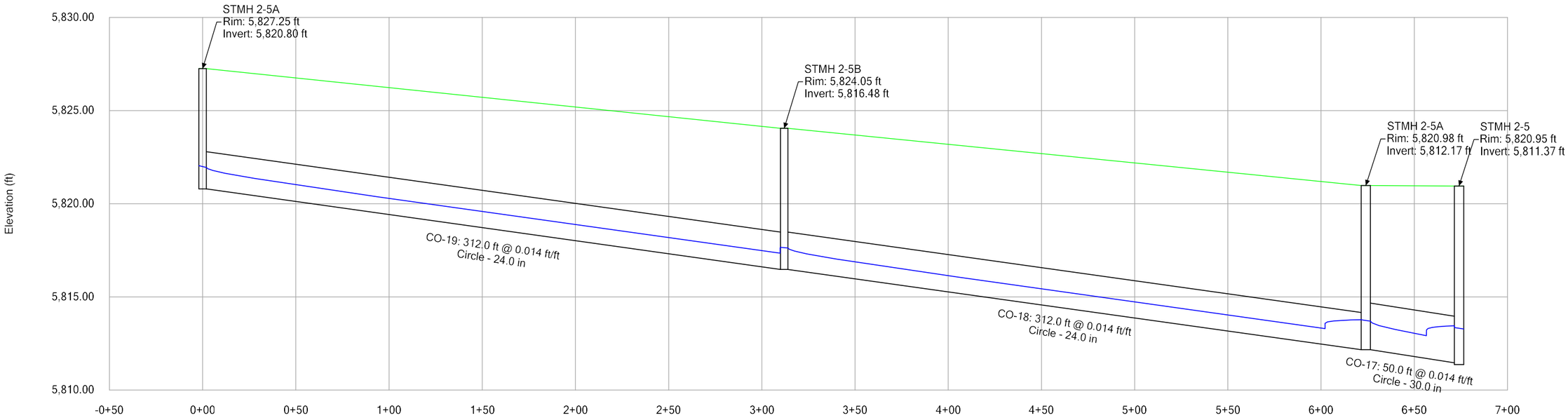
Engineering Profile - Profile - Storm Line 5B (Compark Village South StormCAD [100 year].stsw)



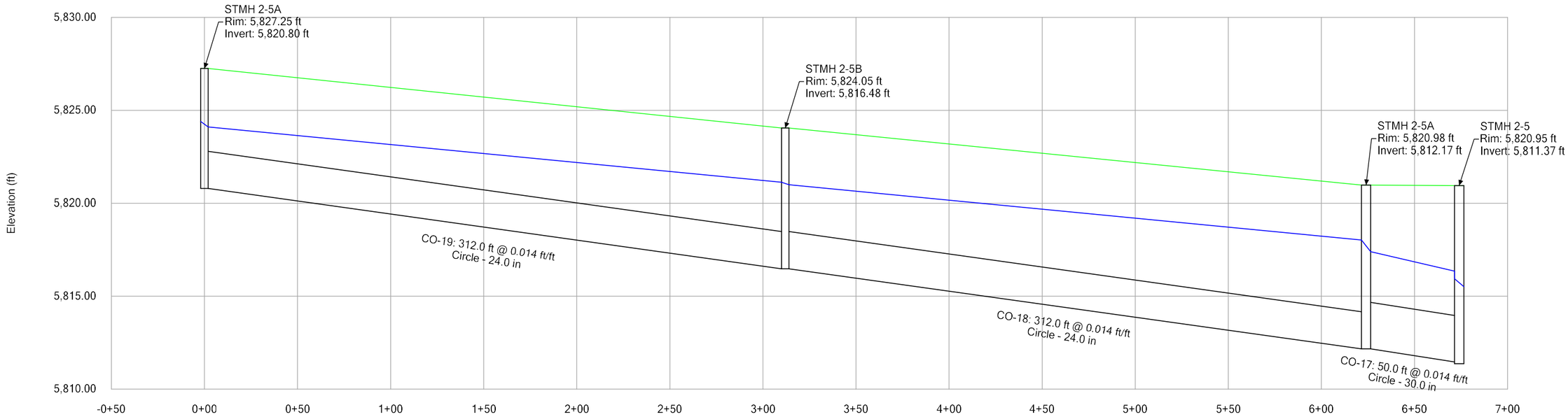
Profile Report
Engineering Profile - Profile - Storm Line 5C (Compark Village South StormCAD [2 year].stsw)



Profile Report
Engineering Profile - Profile - Storm Line 5C (Compark Village South StormCAD [5 year].stsw)

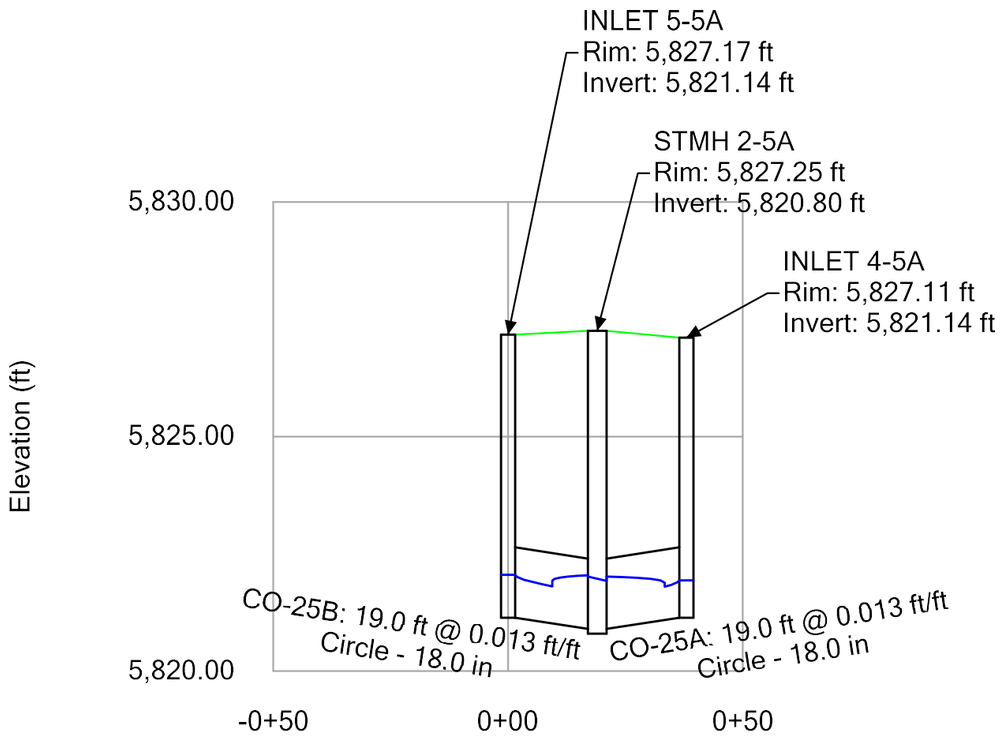


Profile Report
Engineering Profile - Profile - Storm Line 5C (Compark Village South StormCAD [100 year].stsw)



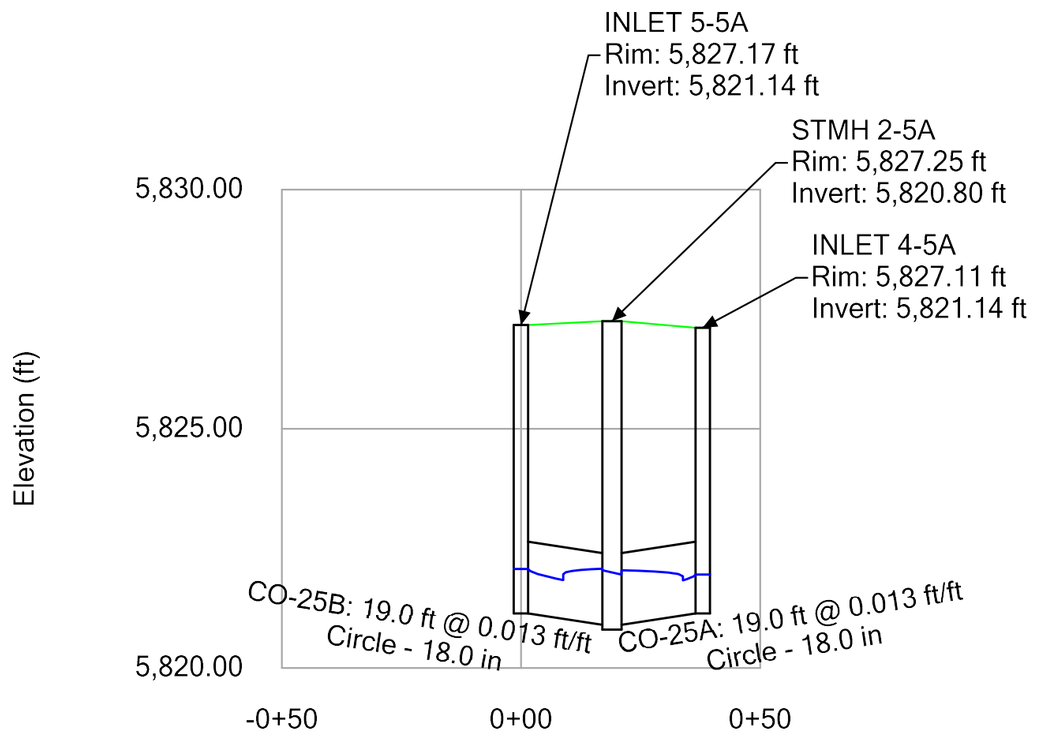
Profile Report

Engineering Profile - Profile - Stomr Line 5D (Compark Village South StormCAD [2 year].stsw)



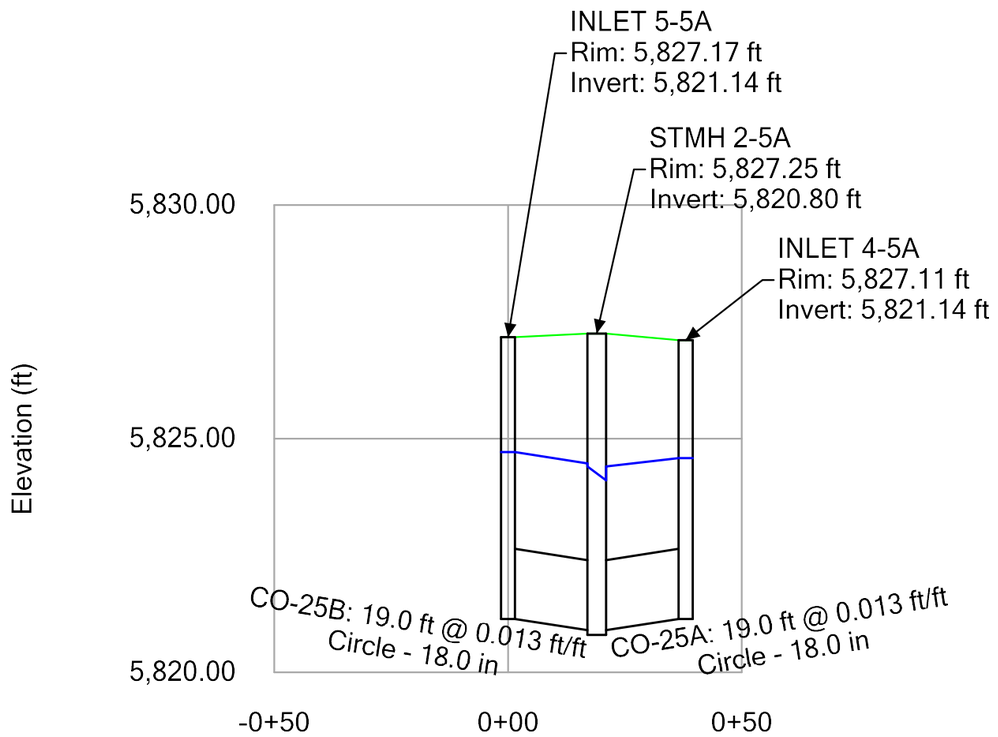
Profile Report

Engineering Profile - Profile - Stomr Line 5D (Compark Village South StormCAD [5 year].stsw)

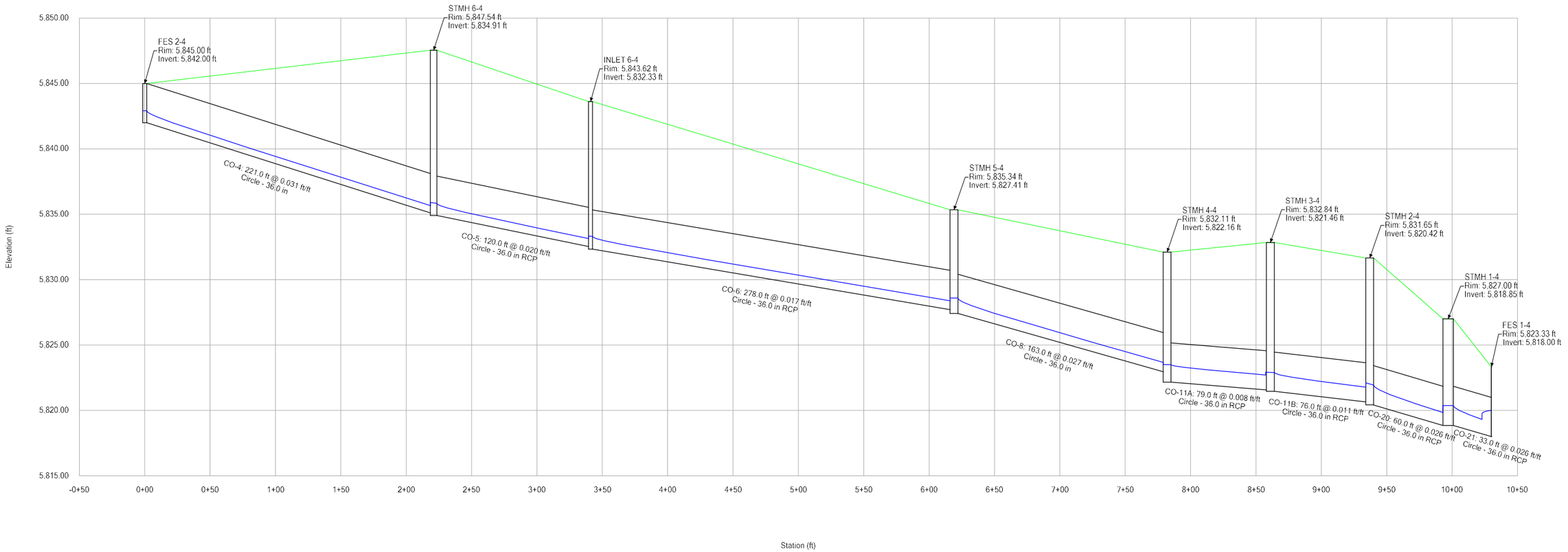


Profile Report

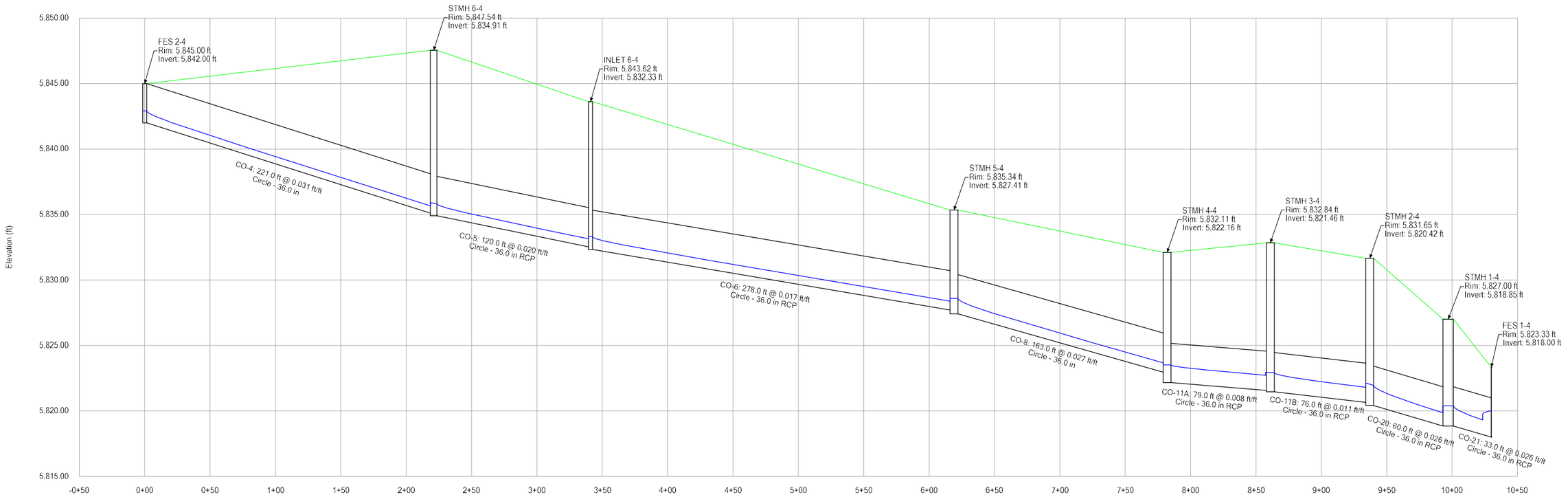
Engineering Profile - Profile - Stomr Line 5D (Compark Village South StormCAD [100 year].stsw)



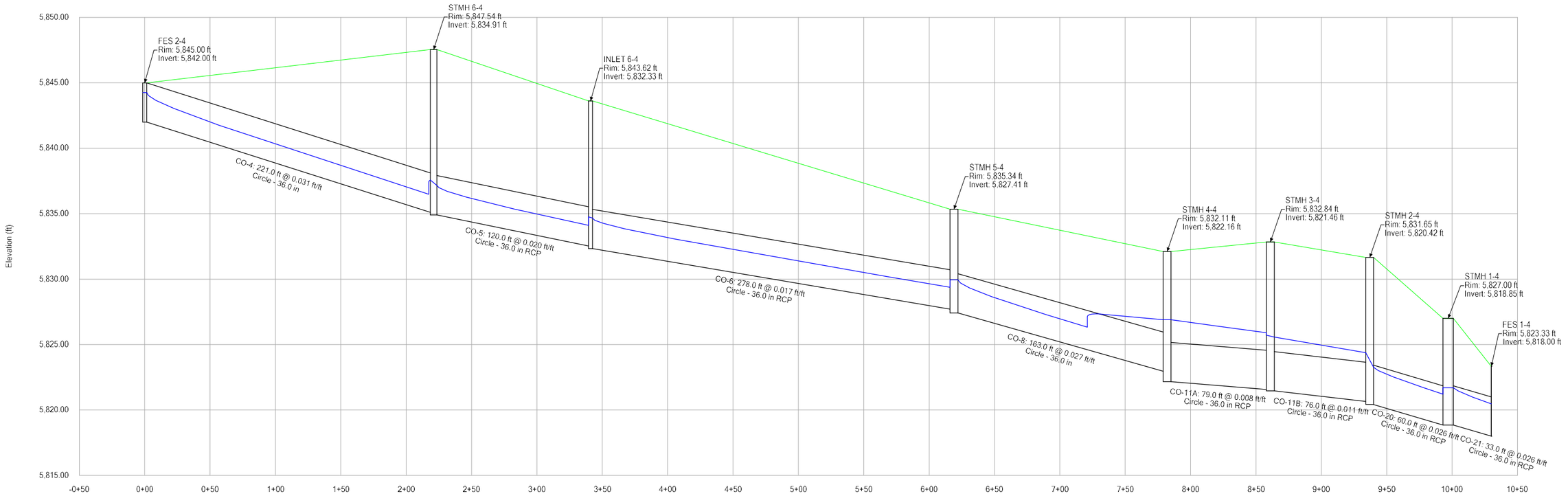
Profile Report
Engineering Profile - Profile - Storm Line 4 (Compark Village South StormCAD [2 year].stsw)

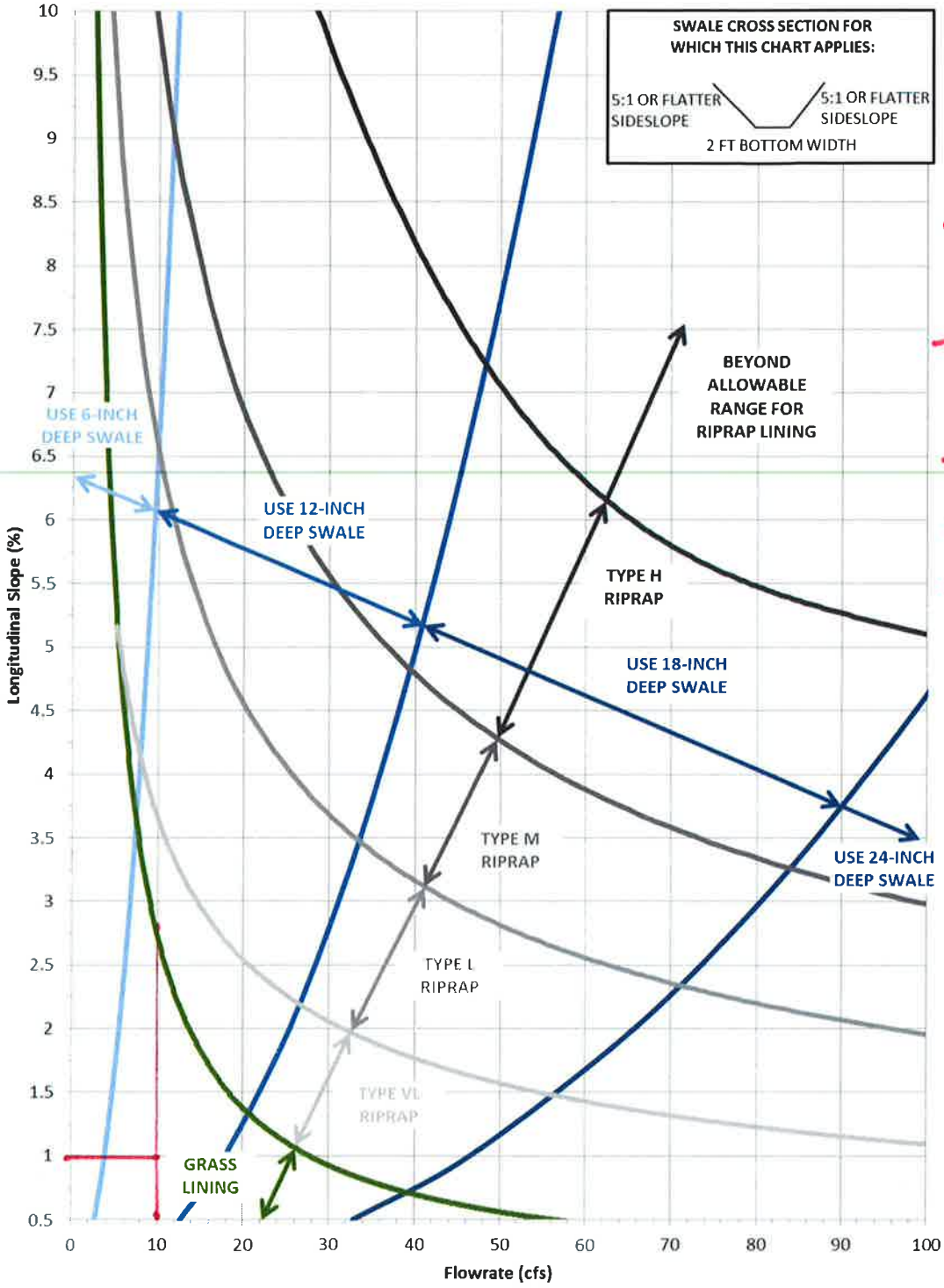


Profile Report
Engineering Profile - Profile - Storm Line 4 (Compark Village South StormCAD [5 year].stsw)



Profile Report
Engineering Profile - Profile - Storm Line 4 (Compark Village South StormCAD [100 year].stsw)

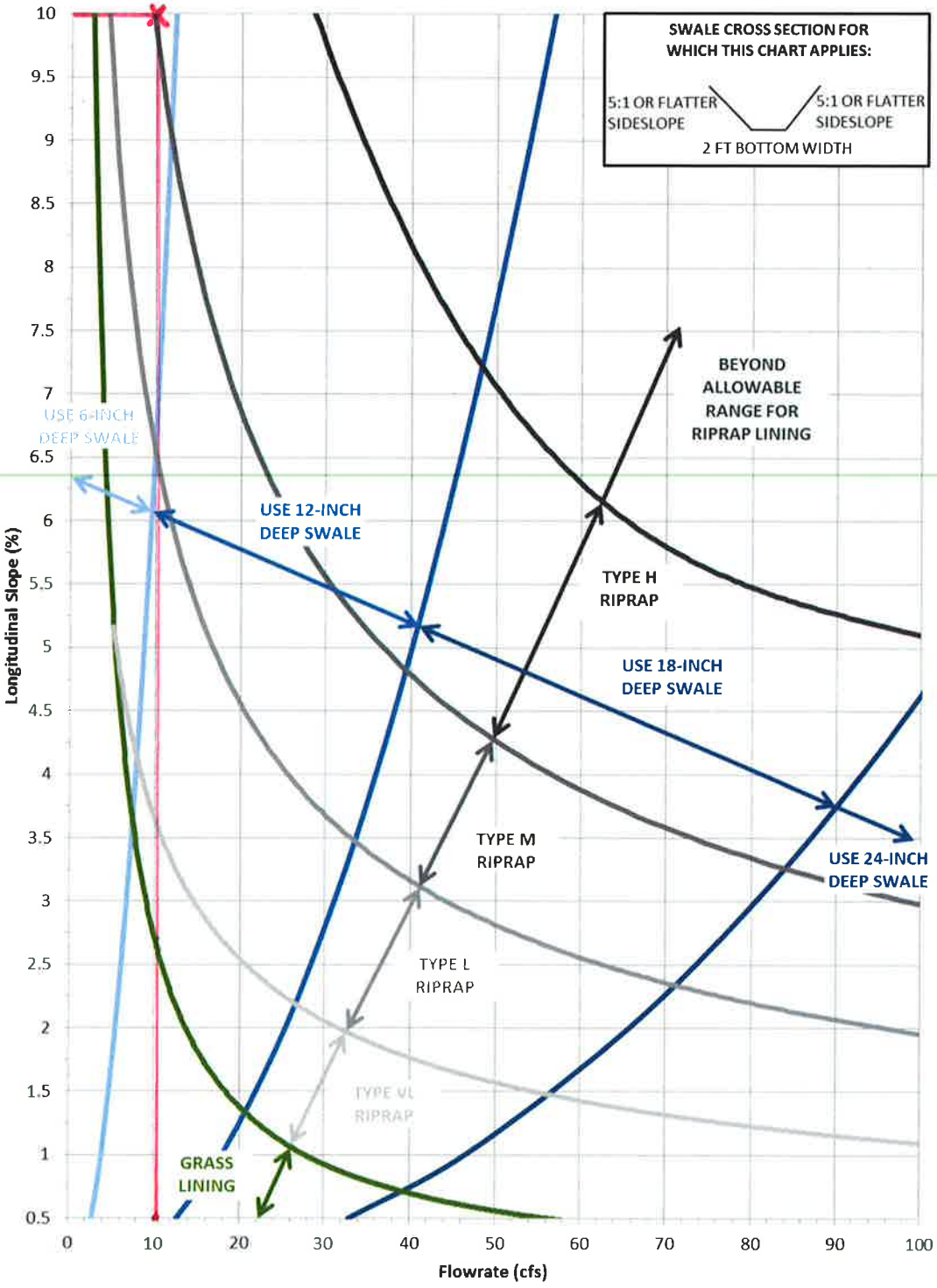




Upper
Q = 9.8 cfs
S = 1%
- 1' Deep to Match Lower
- Grass lined
- 2' Bottom
- 5:1 Sides

Figure 8-22. Swale stability chart; 2- to 4-foot bottom width and side slopes between 5:1 and 10:1 (Note: Riprap classifications refer to gradation for riprap used in soil riprap or void-filled riprap. See Figure 8-34 for gradations.) (Source: Muller Engineering Company)

TEMPORARY SWALE
(EAST OF RESIDENTIAL SITE)



Lower
Q = 9.8 cfs
s = 10%
1' Deep
Type M Riprap
2' Bottom
5:1 Sides

Figure 8-22. Swale stability chart; 2- to 4-foot bottom width and side slopes between 5:1 and 10:1 (Note: Riprap classifications refer to gradation for riprap used in soil riprap or void-filled riprap. See Figure 8-34 for gradations.) (Source: Muller Engineering Company)

Temporary Swale East of Residential Site - Upper

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.035	
Channel Slope	0.01000	ft/ft
Left Side Slope	0.20	ft/ft (H:V)
Right Side Slope	0.20	ft/ft (H:V)
Bottom Width	4.00	ft
Discharge	9.80	ft³/s

Results

Normal Depth	0.79	ft
Flow Area	3.29	ft²
Wetted Perimeter	5.62	ft
Hydraulic Radius	0.59	ft
Top Width	4.32	ft
Critical Depth	0.57	ft
Critical Slope	0.02837	ft/ft
Velocity	2.98	ft/s
Velocity Head	0.14	ft
Specific Energy	0.93	ft
Froude Number	0.60	
Flow Type	Subcritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.79	ft
Critical Depth	0.57	ft
Channel Slope	0.01000	ft/ft

Temp Swale East of Street E - Top

GVF Output Data

Critical Slope	0.02837	ft/ft

Temporary Swale East of Residential Site - Lower

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.050	
Channel Slope	0.10000	ft/ft
Left Side Slope	0.20	ft/ft (H:V)
Right Side Slope	0.20	ft/ft (H:V)
Bottom Width	4.00	ft
Discharge	9.80	ft³/s

Results

Normal Depth	0.48	ft
Flow Area	1.95	ft²
Wetted Perimeter	4.97	ft
Hydraulic Radius	0.39	ft
Top Width	4.19	ft
Critical Depth	0.57	ft
Critical Slope	0.05791	ft/ft
Velocity	5.03	ft/s
Velocity Head	0.39	ft
Specific Energy	0.87	ft
Froude Number	1.30	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

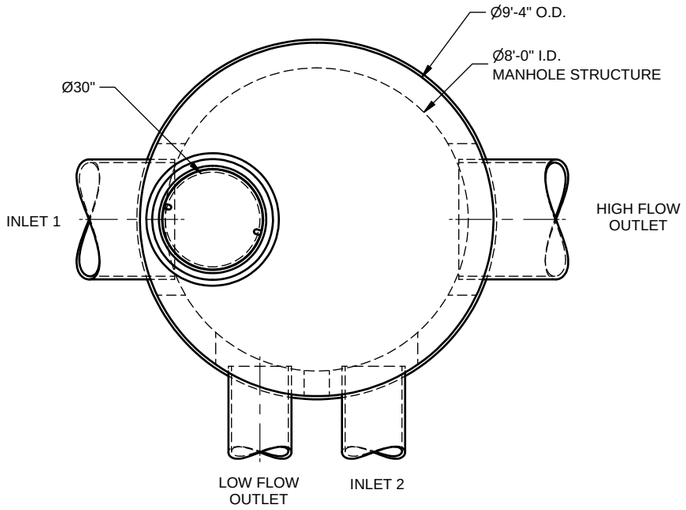
Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.48	ft
Critical Depth	0.57	ft
Channel Slope	0.10000	ft/ft

Temp Swale East of Street E - Bottom

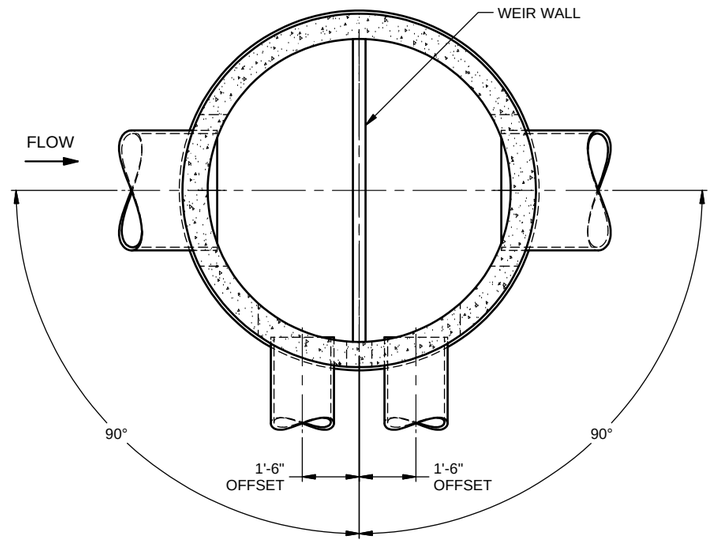
GVF Output Data

Critical Slope	0.05791	ft/ft

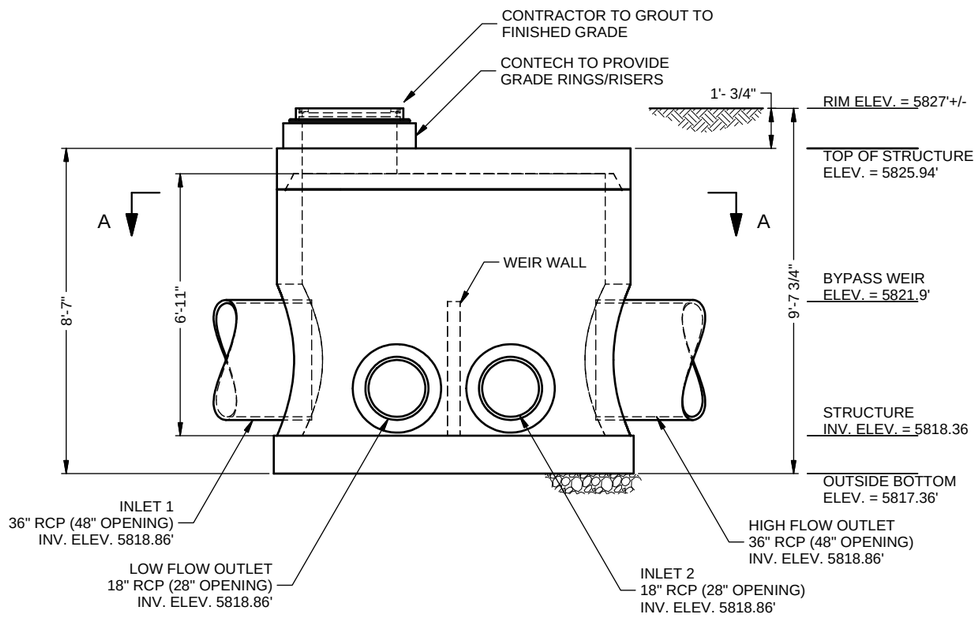
FOR REFERENCE ONLY. TO BE CONSTRUCTED AS PART OF FILING 1.



PLAN VIEW



SECTION A-A



ELEVATION VIEW

MATERIAL LIST - PROVIDED BY CONTECH

COUNT	DESCRIPTION	INSTALLED BY
1	JOINT SEALANT (BY PRECASTER)	CONTRACTOR
1 PLACE	GRADE RINGS/RISERS	CONTRACTOR
1	Ø30" x 4" EJ #41600484, OR EQUIVALENT	CONTRACTOR

GENERAL NOTES
1. CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
2. FOR FABRICATION DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHT, PLEASE CONTACT YOUR CONTECH REPRESENTATIVE. www.ContechES.com.
3. BYPASS STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING. CONTRACTOR TO CONFIRM STRUCTURE MEETS REQUIREMENTS OF PROJECT.
4. STRUCTURE SHALL MEET AASHTO HS-20 ASSUMING EARTH COVER OF 0' - 5', AND GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION. CASTINGS SHALL MEET AASHTO M306 LOAD RATING AND BE CAST WITH THE CONTECH LOGO.
5. BYPASS STRUCTURE SHALL BE PRECAST CONCRETE CONFORMING TO ASTM C-478 AND AASHTO LOAD FACTOR DESIGN METHOD.

INSTALLATION NOTES
A. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE MANHOLE STRUCTURE (LIFTING CLUTCHES PROVIDED).
C. CONTRACTOR TO INSTALL JOINT SEALANT BETWEEN ALL STRUCTURE SECTIONS AND ASSEMBLE STRUCTURE.
D. CONTRACTOR TO PROVIDE, INSTALL, AND GROUT INLET AND OUTLET PIPE(S).
E. CONTRACTOR TO INSTALL GRADE RINGS/RISERS OR BLOCK REQUIRED BETWEEN THE TOP OF THE STRUCTURE AND THE BASE OF THE MANHOLE FRAMES.

STRUCTURE WEIGHT
APPROXIMATE HEAVIEST PICK = 27000 LBS.
OF 2 PIECES

MAX FOOTPRINT = 9.5'

CONTECH
CONTRACT
DRAWING

LPICO
LAYOUT 1C

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If discrepancies between the supplied information upon which the drawing is based and actual field conditions are encountered as site work progresses, these discrepancies must be immediately reported to Contech for re-evaluation of the design. Contech accepts no liability for designs based on missing, incomplete or inaccurate information supplied by others.

NO.	DATE	REVISION DESCRIPTION	BY

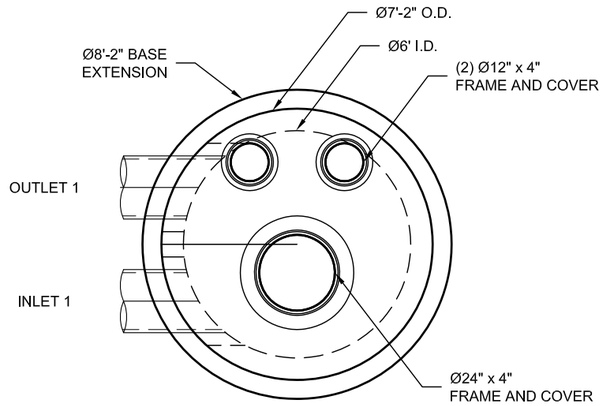
DIVERSION BYPASS BPMH96 - 542946-40 COMPARK SOUTH PARKER, CO

CONTECH® ENGINEERED SOLUTIONS LLC
www.ContechES.com
9025 Centre Pointe Drive, Suite 400, West Chester, OH
800-338-1122 513-645-7000 513-645-7846 FAX

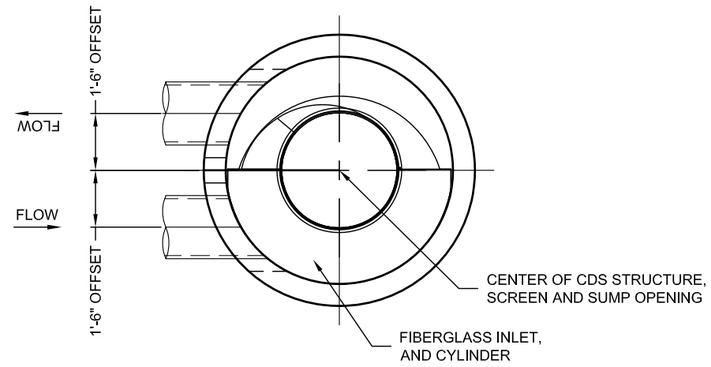
DATE: 7/15/16	SCALE: NONE
DESIGNED: JHR	DRAWN: MLC
CHECKED:	APPROVED:
PROJECT NUMBER: 542946	
SHEET: 1 OF 1	

C:\Inventor Temp\542946-40 INV\542946-40-BPMH.dwg

FOR REFERENCE ONLY. TO BE CONSTRUCTED AS PART OF FILING 1.

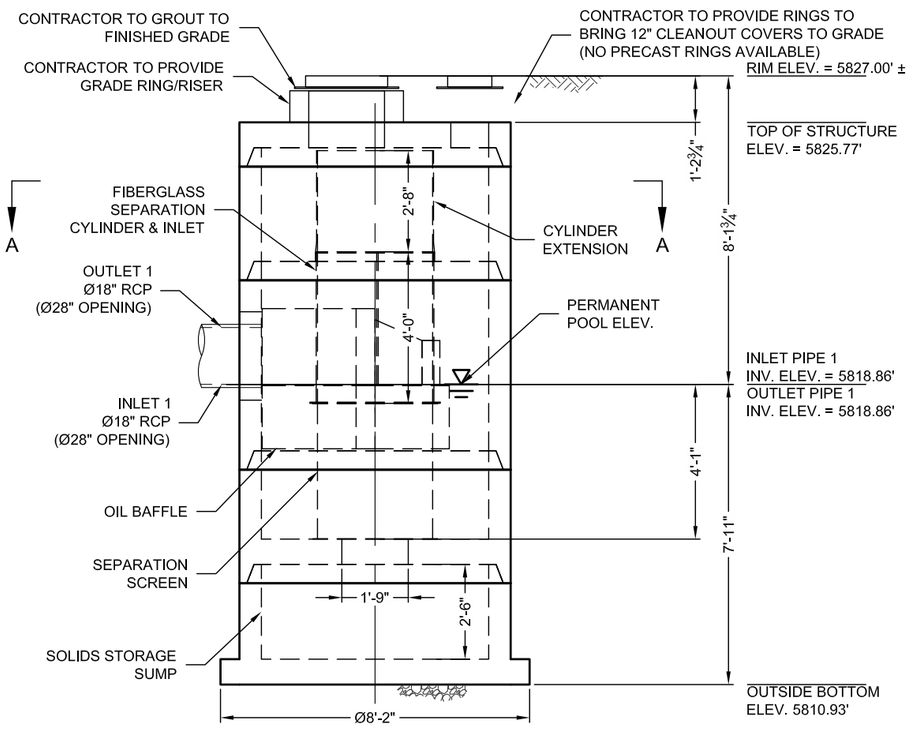


PLAN VIEW



SECTION A-A

• INTERNAL COMPONENTS TO BE INSTALLED BY CONTECH ON SITE



ELEVATION VIEW

MATERIAL LIST (PROVIDED BY CONTECH)

COUNT	DESCRIPTION	INSTALLED BY
1	FIBERGLASS INLET AND CYLINDER	CONTECH
1	2400 micron, 3' O.D. x 3.58' SEP. SCREEN	CONTECH
1	CYLINDER EXTENSION	CONTRACTOR
1	SEALANT FOR JOINTS (BY PRECASTER)	CONTRACTOR
1	Ø24" x 4" FRAME & COVER, EJ#41600389, OR EQUIV.	CONTRACTOR
2	Ø12" x 4" FRAME & COVER, EJ#41610201, OR EQUIV.	CONTRACTOR

SITE DESIGN DATA

WATER QUALITY FLOW RATE	0 CF
PEAK FLOW RATE	88 CF
RETURN PERIOD OF PEAK FLOW	100 YRS

GENERAL NOTES
1. CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
2. FOR FABRICATION DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHT, PLEASE CONTACT YOUR CONTECH ENGINEERED SOLUTIONS LLC REPRESENTATIVE. www.ContechES.com
3. CDS WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING. CONTRACTOR TO CONFIRM STRUCTURE MEETS REQUIREMENTS OF PROJECT.
4. STRUCTURE SHALL MEET AASHTO HS-20 LOAD RATING, ASSUMING EARTH COVER OF 0' - 2', AND GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION. CASTINGS SHALL MEET AASHTO M306 AND BE CAST WITH THE CONTECH LOGO.
5. IF REQUIRED, PVC HYDRAULIC SHEAR PLATE IS PLACED ON SHELF AT BOTTOM OF SCREEN CYLINDER. REMOVE AND REPLACE AS NECESSARY DURING MAINTENANCE CLEANING.
6. CDS STRUCTURE SHALL BE PRECAST CONCRETE CONFORMING TO ASTM C-478 AND AASHTO LOAD FACTOR DESIGN METHOD.

INSTALLATION NOTES
A. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE CDS MANHOLE STRUCTURE.
C. CONTRACTOR TO INSTALL JOINT SEALANT BETWEEN ALL STRUCTURE SECTIONS AND ASSEMBLE STRUCTURE.
D. CONTRACTOR TO PROVIDE, INSTALL, AND GROUT INLET AND OUTLET PIPE(S). MATCH PIPE INVERTS WITH ELEVATIONS SHOWN. ALL PIPE CENTERLINES TO MATCH PIPE OPENING CENTERLINES.
E. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO ASSURE UNIT IS WATER TIGHT, HOLDING WATER TO FLOWLINE INVERT MINIMUM. IT IS SUGGESTED THAT ALL JOINTS BELOW PIPE INVERTS ARE GROUTED.

STRUCTURE WEIGHT
APPROXIMATE HEAVIEST PICK = 10000 LBS.
STRUCTURE IS DELIVERED IN 5 PIECES

MAX FOOTPRINT = Ø8'-2"

CONTECH
CONTRACT
DRAWING

LPICO
LAYOUT 1A
3035-6-FGIS
1026 / FI72886

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MARK	DATE	REVISION DESCRIPTION	BY

CDS3035-6-C - 542946-20
COMPARK SOUTH
PARKER, CO
for SYSTEM: STMH 1-4A

CONTECH ENGINEERED SOLUTIONS LLC
www.ContechES.com
11815 NE Glenn Widing Drive, Portland, OR 97220
503-240-3393 800-561-1271 FAX
800-548-4667

THE PRODUCT MAY BE PROTECTED BY ONE OR MORE OF THE FOLLOWING U.S. PATENTS: 4,788,340; 4,841,120; 5,411,340; 6,68,132; RELATED FOREIGN PATENTS AND OTHER PATENTS PENDING.

DATE:	SCALE:
07/18/16	1/4" = 1'-0"
DESIGNED: JHR	DRAWN: MLC
CHECKED: XXX	APPROVED: ----
PROJECT No.: 542946	SEQUENCE No.: 20
SHEET: 1 OF 1	

\\AD.CONTECH-CPI.COM\ROOT\MERLIN\PROJECT\ACTIVE\542900\542946\542946-20-CDS\DRAWINGS\PRE-542946-20-CDS3035-6 CONFAB.DWG 8/16/2016 2:59 PM

OFFLINE CONCENTRIC CDS HYDRAULIC CALCULATIONS

Compark South

Parker, CO

542946

STMH 1-4

DESIGN PARAMETERS

CDS Model No. =	CDS3035-6	
Design Treatment Flow =	3.8	cfs
Peak Design Flow =	88	cfs
Peak Design Return Interval =	100	year
Rim Elev. @ CDS (diversion) =	5827.00	ft
Required FB @ CDS Unit =	1.00	ft
Rim Elev. @ 1st U/S Structure =	5825.81	ft
Reqd. FB @ 1st U/S Structure =	1.00	ft

HYDRAULIC RESULTS SUMMARY

Estimated FB at CDS Unit =	1.31	ft	(OK)
Est. FB at 1st U/S structure =	0.52	ft	(Flood Potential)

DETAILED CALCULATIONS

TREATMENT FLOW

Estimated HGL at Outfall

$EL_{D/S\ Inv.}$ = 5817.99 ft (based on CDS Invert unless provided)

$HGL_{D/S}$ = 5,818.37 ft (unless provided, $D/S_{INV} + d_{n\text{-}WQ}$)

Exit Loss from DownStream Pipe, h_1

$$h_1 = k * [V^2 / (2*g)]$$

where,

k = 0.40

V = Q / A_F

= 7.31 fps

h_1 = 0.33 ft

$EGL_1 = EL_0 + h_1$

= 5818.70 ft

Head Loss Through Downstream Pipe, h_2

Friction Losses, h_2

$$h_2 = S_{EGL} * L$$

where,

$L_{D/S}$ = 33 ft

$$S_{EGL} = [(Q * n) / (1.49 * A_F * R^{2/3})]^2$$

where,

D/S Pipe Characteristics

Dia. = 36 in

S_{PIPE} = 0.0261 ft/ft

n = 0.013

Flow Characteristics

d_F = 0.38 ft

A_F = 0.52 sf

P_W = 2.18 ft

R = 0.24 ft

S_{EGL} = 0.0275 ft / ft

h_2 = 0.91 ft

$EGL_2' = EGL_1 + h_2$

= 5819.61 ft

Check Entrance Condition for Critical Depth Control

$EL_{CDS\ Inv.}$ = 5818.85 ft

d_c = 0.62 ft

$EGL_C = EL_{CDS\ Inv.} + d_c + V_{dc}^2 / (2*g)$

= 5819.67 ft

Identify Controling EGL

Flow enters pipe at critical depth, EGLc controls.

EGL_2 = 5819.67 ft

Re-entry Loss into DownStream Pipe, h_3

$h_3 = k * [V^2 / (2*g)]$

where,

k = 0.40

V = Q / A

= 3.59 fps (flow area based on critical depth)

h_3 = 0.08 ft

$EGL_3' = EGL_2 + h_3$

= 5819.75 ft

Check for CDS outlet control

$EL_{CDS\ Inv.}$ = 5818.85 ft

CDS I/O Diam. = 18.00 in

$L_{CDS\ out}$ = 5.00 ft

$L_{CDS\ in}$ = 5.00 ft

$d_{c\ (CDS\ out)}$ = 0.74 ft

$EGL_C = EL_{CDS\ Inv.} + d_{c\ (CDS\ Out)} + V_{dc}^2 / (2*g)$

= 5819.89 ft

Identify Controling EGL

The greater value controls

EGL_3 = 5819.89 ft

Determine CDS Weir Height

$HL_{CDS\ Op}$ = 2.00 ft

$V_{CDS\ out}$ = 2.91 ft (partial pipe)

$HL_{CDS\ out}$ = 0.012 ft

$V_{CDS\ in}$ = 2.15 ft (full pipe)

$HL_{CDS\ in}$ = 0.008 ft

$HL_{CDS\ I/O}$ = 2.02 ft

$EL_W' = EGL_3 + HL_{CDS\ Op} + HL_{CDS\ I/O}$

= 5821.91 ft

$H_W' = EL_W' - EL_{CDS\ Inv.}$

= 3.06 ft, or 36.7 in

Adjust for constructability

Use H_W = 36.5 in, or 3.04 ft

$EL_W = EL_{CDS\ Inv.} + H_W$

= 5821.89 ft

PEAK CONVEYANCE FLOW

Estimated HGL at Outfall

$HGL_{D/S}$ = 5,820.00 ft (water level at D/S outlet per engineer, 100-yr)

Exit Loss from D/S Pipe, h_1

$h_1 = k * [V^2 / (2*g)]$

where,

k = 0.40

V = Q / A_F

= 17.10 fps

h_1 = 1.82 ft

$EGL_1 = EL_0 + h_1$

= 5821.82 ft

Head Loss Through D/S Pipe, h_2

Friction Losses, h_2

$h_2 = S_{EGL} * L_{D/S}$

where,

$L_{D/S}$ = 33 ft

$S_{EGL} = [(Q * n) / (1.49 * A_F * R^{2/3})]^2$

where,

D/S Pipe Characteristics

Dia. = 36 in

S_{PIPE} = 0.0261 ft/ft

n = 0.013

Flow Characteristics

d_n = 2.05 ft

A_F = 5.15 sf

P_W = 5.84 ft

R = 0.88 ft

S_{EGL} = 0.0263 ft / ft

h_2 = 0.87 ft

$EGL_2' = EGL_1 + h_2$

= 5822.68 ft

Check Entrance Condition for Critical Depth Control

$EL_{CDS\ Inv.}$ = 5818.85 ft

d_c = 2.99 ft

$EGL_C = EL_{CDS\ Inv.} + d_c + V_{dc}^2 / (2*g)$

= 5824.25 ft

Identify Controling EGL

Cannot enter at less than minimum energy, EGLc controls.

EGL_2 = 5824.25 ft

Re-entry Loss into D/S Pipe, h_3

$h_3 = k * [V^2 / (2*g)]$

where,

$k =$ 0.40

$V = Q / A_F$

$=$ 12.45 fps (area based on critical depth)

$h_3 =$ 0.96 ft

$EGL_3 = EGL_2 + h_3$

$=$ 5825.21 ft

$HGL_3 = EGL_3 - [(V_P/4)^2 / (2*g)]$

$=$ 5825.06 ft (velocity assumed 25% of pipe velocity)

Head over Diversion Weir, h_4

$EL_{Weir} =$ 5821.89 ft (established above)

$L_{Weir} =$ 8.00 ft

(weir is submerged)

Headloss for Free Discharge Condition

$h_{4a} = [Q / (C * L)]^{2/3}$

where,

$C =$ 3.43

$h_{4a} =$ 2.18 ft

$EGL_{4a} = EL_{Weir} + h_{4a}$

$=$ 5824.07 ft

Headloss for Submerged Condition

$d_{Sub} =$ 3.17 ft (depth of submergence)

$h_{4b} =$ 0.48 ft (separate submerged weir calc.)

$EGL_{4b} = EGL_3 + h_{4b}$

$=$ 5825.69 ft

Identify EGL U/S of Weir

The discharge condition is Submerged , therefore

$EGL_4 =$ 5825.69 ft

Expansion Loss from U/S Pipe, h_5

$h_5 = k * [V^2 / (2*g)]$

where,

$k =$ 0.40

$V = Q / A_F$

$=$ 12.45 fps

$h_5 =$ 0.96 ft

$EGL_5 = EGL_4 + h_5$

$=$ 5826.65 ft

Head Loss Through U/S Pipe, h_6

Friction Losses, h_6

$h_6 = S_{EGL} * L$

where,

$L_{U/S}$ = 60 ft

$S_{EGL} = [(Q * n) / (1.49 * A_F * R^{2/3})]^2$

where,

U/S Pipe Characteristics

Dia. = 36 in

S_{PIPE} = 0.0261 ft/ft

n = 0.013

Flow Characteristics

d_n = 3.00 ft

A_F = 7.07 sf

P_W = 9.42 ft

R = 0.75 ft

S_{EGL} = 0.0173 ft / ft

h_6 = 1.04 ft

$EGL_6' = EGL_5 + h_6$

= 5827.69 ft

Check Entrance Condition for Critical Depth Control

$EL_{U/S\ Inv.}$ = 5820.42 ft (based on inv & slope unless provided)

d_c = 2.99 ft

$EGL_C = EL_{CDS\ Inv.} + d_c + V_{dc}^2 / (2*g)$

= 5825.82 ft

Identify Controling EGL

Friction based EGL controls.

EGL_6 = 5827.69 ft

$HGL_6 = EGL_6 - [V^2 / (2*g)]$

= 5825.29 ft

Headloss Across Diversion Structure During Peak Flow

$HL_{DW} = EGL_5 - EGL_2$

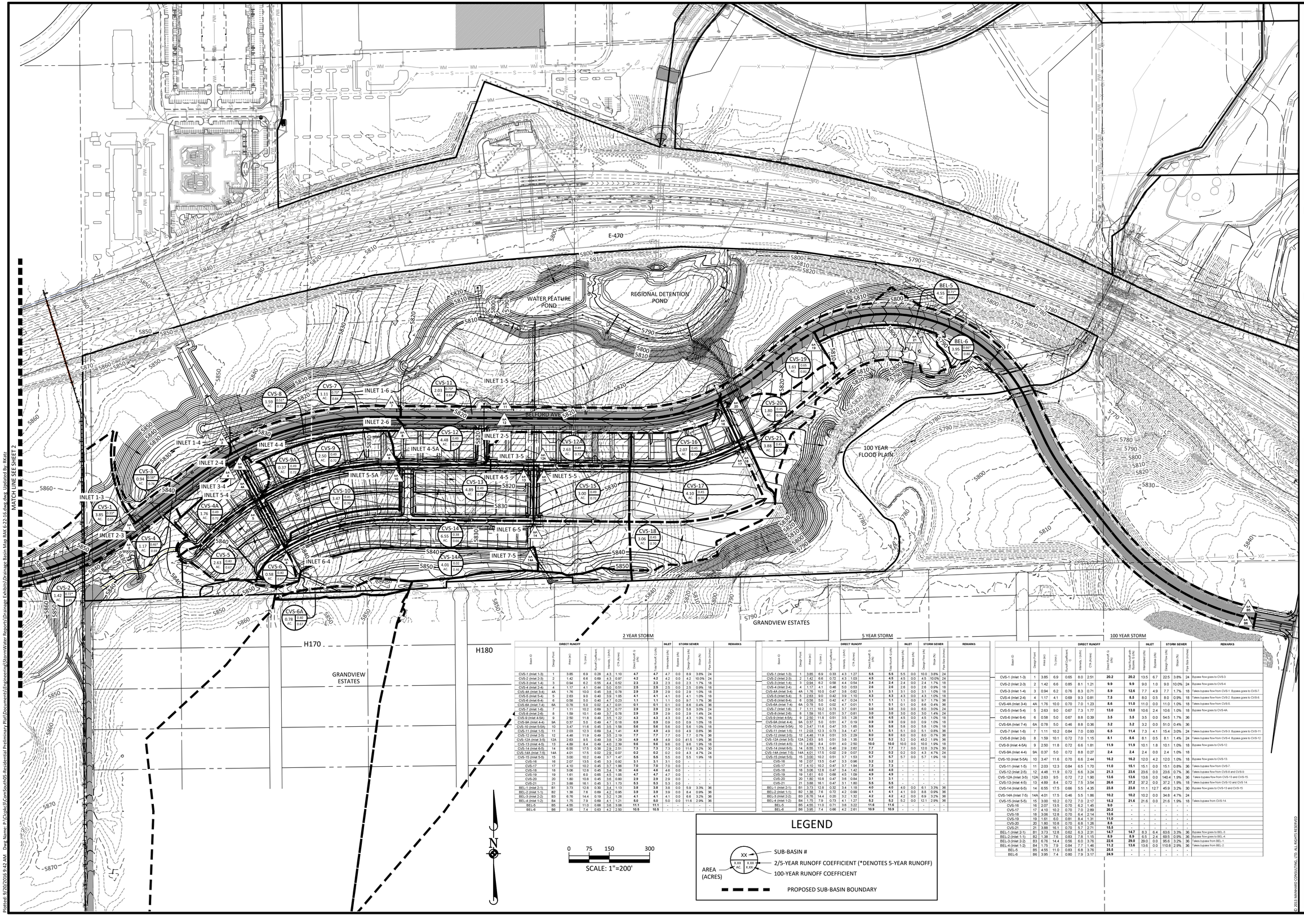
HL_{DW} = 2.40 ft

Freeboard at CDS Unit = 1.31 ft

FB at first U/S structure = 0.52 ft

APPENDIX D

Drainage Basin Map



2 YEAR STORM

	DIRECT RUNOFF							INLET	STORM SEWER			REMARKS
Basin ID	Design Point	Area (ac)	Tc (min.)	Runoff Coefficient	Intensity (in/hr)	CFs (Acres)	Direct Runoff Q (cfs)	Intercepted Q (cfs)	Bypass (cfs)	Design Flow (cfs)	Slope (%)	Pipe Size (inches)	
CVS-1 (Inlet 1-3)	1	3.85	6.9	0.26	4.3	1.10	**4.7**	4.7	0.0	8.9	3.8%	24	
CVS-2 (Inlet 2-3)	2	1.42	6.6	0.69	4.3	0.97	**4.2**	4.2	0.0	4.2	10.0%	24	
CVS-3 (Inlet 1-4)	3	0.94	6.2	0.55	4.4	0.52	**2.3**	2.3	0.0	2.3	1.7%	18	
CVS-4 (Inlet 2-4)	4	1.17	4.1	0.44	5.0	0.51	**2.5**	2.5	0.0	2.5	0.9%	18	
CVS-4A (Inlet 3-4)	4A	1.76	10.0	0.45	3.8	0.78	**2.9**	2.9	0.0	2.9	1.0%	18	
CVS-5 (Inlet 5-4)	5	2.63	9.0	0.40	3.9	1.05	**4.1**	4.1	0.0	4.1	1.0%	18	
CVS-6 (Inlet 6-4)	6	0.58	5.0	0.40	4.7	0.23	**1.1**	1.1	0.0	9.7	1.7%	36	
CVS-6A (Inlet 7-4)	6A	0.78	5.0	0.02	4.7	0.01	**0.1**	0.1	0.0	8.6	0.4%	36	
CVS-7 (Inlet 1-6)	7	1.11	10.2	0.69	3.7	0.77	**2.9**	2.9	0.0	5.8	3.0%	24	
CVS-8 (Inlet 2-6)	8	1.59	10.1	0.46	3.7	0.78	**2.9**	2.9	0.0	2.9	1.4%	24	
CVS-9 (Inlet 4-5A)	9	2.50	11.8	0.49	3.5	1.22	**4.3**	4.3	0.0	4.3	1.0%	18	
CVS-9A (Inlet 4-4)	9A	0.37	5.0	0.49	4.7	0.18	**0.9**	0.9	0.0	0.9	1.0%	18	
CVS-10 (Inlet 5-5A)	10	3.47	11.6	0.45	3.5	1.56	**5.6**	5.6	0.0	5.6	1.0%	18	
CVS-11 (Inlet 1-5)	11	2.03	12.3	0.69	3.4	1.41	**4.9**	4.9	0.0	4.9	0.8%	36	
CVS-12 (Inlet 2-5)	12	4.48	11.9	0.49	3.5	2.19	**7.7**	7.7	0.0	7.7	0.3%	36	
CVS-12A (Inlet 3-5)	12A	2.63	9.5	0.49	3.8	1.29	**4.9**	4.9	0.0	41.5	1.9%	36	
CVS-13 (Inlet 4-5)	13	4.89	8.4	0.40	4.0	1.96	**9.6**	9.6	0.0	9.6	1.0%	18	
CVS-14 (Inlet 6-5)	14	6.55	17.5	0.38	2.9	2.51	**7.3**	7.3	0.0	11.6	3.2%	30	
CVS-14A (Inlet 7-5)	14A	4.01	17.5	0.02	2.9	0.07	**0.2**	0.2	0.0	0.8	4.7%	24	
CVS-15 (Inlet 5-5)	15	3.00	10.2	0.49	3.7	1.47	**5.5**	5.5	0.0	5.5	1.9%	18	
CVS-16	16	2.07	13.5	0.45	3.3	0.92	**3.1**	3.1	0.0	-	-	-	
CVS-17	17	4.10	10.2	0.45	3.7	1.86	**7.0**	7.0	0.0	-	-	-	
CVS-18	18	3.06	12.8	0.45	3.4	1.36	**4.6**	4.6	0.0	-	-	-	
CVS-19	19	1.61	6.0	0.65	4.5	1.05	**4.7**	4.7	0.0	-	-	-	
CVS-20	20	1.80	10.8	0.45	3.6	0.80	**2.9**	2.9	0.0	-	-	-	
CVS-21	21	3.88	16.1	0.45	3.1	1.73	**5.3**	5.3	0.0	-	-	-	
BEL-1 (Inlet 2-1)	B1	3.73	12.8	0.30	3.4	1.13	**3.8**	3.8	0.0	5.9	3.3%	36	
BEL-2 (Inlet 1-1)	B2	1.38	7.6	0.69	4.2	0.95	**3.9**	3.9	0.0	8.4	0.9%	36	
BEL-3 (Inlet 2-2)	B3	6.76	14.4	0.19	3.2	1.26	**4.1**	4.1	0.0	6.6	3.2%	36	
BEL-4 (Inlet 1-2)	B4	1.75	7.9	0.69	4.1	1.71	**5.0**	5.0	0.0	11.6	2.9%	36	
BEL-5	B5	4.55	11.0	0.65	3.6	3.08	**11.1**	11.1	-	-	-	-	
BEL-6	B6	3.95	7.4	0.63	4.2	2.50	**10.5**	10.5	-	-	-	-	

5 YEAR STORM

	DIRECT RUNOFF							INLET	STORM SEWER			REMARKS
Basin ID	Design Point	Area (ac)	Tc (min.)	Runoff Coefficient	Intensity (in/hr)	CFs (Acres)	Direct Runoff Q (cfs)	Intercepted (cfs)	Bypass (cfs)	Design Flow (cfs)	Slope (%)	Pipe Size (inches)	
CVS-1 (Inlet 1-3)	1	3.85	6.9	0.33	4.3	1.27	**5.5**	5.5	0.0	10.0	3.8%	24	
CVS-2 (Inlet 2-3)	2	1.42	6.6	0.72	4.3	1.03	**4.5**	4.5	0.0	4.5	10.0%	24	
CVS-3 (Inlet 1-4)	3	0.94	6.2	0.58	4.4	0.54	**2.4**	2.4	0.0	2.4	1.7%	18	
CVS-4 (Inlet 2-4)	4	1.17	4.1	0.46	5.0	0.53	**2.6**	2.6	0.0	2.6	0.9%	18	
CVS-4A (Inlet 3-4)	4A	1.76	10.0	0.47	3.8	0.82	**3.1**	3.1	0.0	3.1	1.0%	18	
CVS-5 (Inlet 5-4)	5	2.63	9.0	0.42	3.9	1.10	**4.3**	4.3	0.0	4.3	1.0%	18	
CVS-6 (Inlet 6-4)	6	0.58	5.0	0.42	4.7	0.24	**1.1**	1.1	0.0	9.7	1.7%	36	
CVS-6A (Inlet 7-4)	6A	0.78	5.0	0.02	4.7	0.01	**0.1**	0.1	0.0	8.6	0.4%	36	
CVS-7 (Inlet 1-6)	7	1.11	10.2	0.73	3.7	0.81	**3.0**	3.0	0.0	6.0	3.0%	24	
CVS-8 (Inlet 2-6)	8	1.59	10.1	0.51	3.7	0.81	**3.0**	3.0	0.0	3.0	1.4%	24	
CVS-9 (Inlet 4-5A)	9	2.50	11.8	0.51	3.5	1.28	**4.5**	4.5	0.0	4.5	1.0%	18	
CVS-9A (Inlet 4-4)	9A	0.37	5.0	0.51	4.7	0.19	**0.9**	0.9	0.0	0.9	1.0%	18	
CVS-10 (Inlet 5-5A)	10	3.47	11.6	0.47	3.5	1.65	**5.8**	5.8	0.0	5.8	1.0%	18	
CVS-11 (Inlet 1-5)	11	2.03	12.3	0.73	3.4	1.47	**5.1**	5.1	0.0	5.1	0.8%	36	
CVS-12 (Inlet 2-5)	12	4.48	11.9	0.51	3.5	2.29	**8.0**	8.0	0.0	8.0	0.7%	36	
CVS-12A (Inlet 3-5)	12A	2.63	9.5	0.51	3.8	1.35	**5.2**	5.2	0.0	43.2	1.9%	36	
CVS-13 (Inlet 4-5)	13	4.89	8.4	0.51	4.0	2.50	**10.0**	10.0	0.0	10.0	1.9%	18	
CVS-14 (Inlet 6-5)	14	6.55	17.5	0.40	2.9	2.62	**7.7**	7.7	0.0	12.0	3.2%	30	
CVS-14A (Inlet 7-5)	14A	4.01	17.5	0.02	2.9	0.07	**0.2**	0.2	0.0	0.8	4.7%	24	
CVS-15 (Inlet 5-5)	15	3.00	10.2	0.51	3.7	1.53	**5.7**	5.7	0.0	5.7	1.9%	18	
CVS-16	16	2.07	13.5	0.47	3.3	0.96	**3.2**	3.2	-	-	-	-	
CVS-17	17	4.10	10.2	0.47	3.7	1.94	**7.3**	7.3	-	-	-	-	
CVS-18	18	3.06	12.8	0.47	3.4	1.42	**4.8**	4.8	-	-	-	-	
CVS-19	19	1.61	6.0	0.68	4.5	1.09	**4.9**	4.9	-	-	-	-	
CVS-20	20	1.80	10.8	0.47	3.6	0.84	**3.1**	3.1	-	-	-	-	
CVS-21	21	3.88	16.1	0.47	3.1	1.80	**5.5**	5.5	-	-	-	-	
BEL-1 (Inlet 2-1)	B1	3.73	12.8	0.32	3.4	1.18	**4.0**	4.0	0.0	6.1	3.3%	36	
BEL-2 (Inlet 1-1)	B2	1.38	7.6	0.72	4.2	0.99	**4.1**	4.1	0.0	8.8	0.9%	36	
BEL-3 (Inlet 2-2)	B3	6.76	14.4	0.20	3.2	1.32	**4.2**	4.2	0.0	6.9	3.2%	36	
BEL-4 (Inlet 1-2)	B4	1.75	7.9	0.73	4.1	1.27	**5.2**	5.2	0.0	12.1	2.9%	36	
BEL-5	B5	4.55	11.0	0.71	3.6	3.22	**11.6**	11.6	-	-	-	-	
BEL-6	B6	3.95	7.4	0.66	4.2	2.61	**10.9**	10.9	-	-	-	-	

100 YEAR STORM

	DIRECT RUNOFF							INLET	STORM SEWER			REMARKS
Basin ID	Design Point	Area (ac)	Tc (min.)	Runoff Coefficient	Intensity (in/hr)	CFs (Acres)	Direct Runoff Q (cfs)	Intercepted (cfs)	Bypass (cfs)	Design Flow (cfs)	Slope (%)	Pipe Size (inches)	
CVS-1 (Inlet 1-3)	1	3.85	6.9	0.65	8.0	2.51	**20.2**	**20.2**	13.5	6.7	22.5	3.8%	24	Bypass flow goes to CVS-3.
CVS-2 (Inlet 2-3)	2	1.42	6.6	0.85	8.1	1.21	**9.9**	**9.9**	9.0	1.0	9.0	10.0%	24	Bypass flow goes to CVS-4
CVS-3 (Inlet 1-4)	3	0.94	6.2	0.76	8.3	0.71	**5.9**	**12.6**	7.7	4.9	7.7	1.7%	18	Takes bypass flow from CVS-1. Bypass goes to CVS-7
CVS-4 (Inlet 2-4)	4	1.17	4.1	0.89	9.0	0.81	**7.5**	**8.5**	8.0	0.5	8.0	0.9%	18	Takes bypass flow from CVS-2. Bypass goes to CVS-6
CVS-4A (Inlet 3-4)	4A	1.76	10.0	0.70	7.0	1.23	**8.6**	**11.0**	11.0	0.0	11.0	1.0%	18	Takes bypass flow from CVS-5
CVS-5 (Inlet 5-4)	5	2.63	9.0	0.67	7.3	1.77	**13.0**	**13.0**	10.6	2.4	10.6	1.0%	18	Bypass flow goes to CVS-4A.
CVS-6 (Inlet 6-4)	6	0.58	5.0	0.67	8.8	0.39	**3.5**	**3.5**	3.5	0.0	54.5	1.7%	36	
CVS-6A (Inlet 7-4)	6A	0.78	5.0	0.46	8.8	0.36	**3.2**	**3.2**	3.2	0.0	51.0	0.4%	36	
CVS-7 (Inlet 1-6)	7	1.11	10.2	0.84	7.0	0.93	**6.5**	**11.4**	7.3	4.1	15.4	3.0%	24	Takes bypass flow from CVS-3. Bypass goes to CVS-11
CVS-8 (Inlet 2-6)	8	1.59	10.1	0.72	7.0	1.15	**8.1**	**8.8**	8.1	0.5	8.1	1.4%	24	Takes bypass flow from CVS-4. Bypass goes to CVS-12
CVS-9 (Inlet 4-5A)	9	2.50	11.8	0.72	6.6	1.81	**11.9**	**11.9**	10.1	1.8	10.1	1.0%	18	Bypass flow goes to CVS-12.
CVS-9A (Inlet 4-4)	9A	0.37	5.0	0.72	8.8	0.27	**2.4**	**2.4**	2.4	0.0	2.4	0.0	18	
CVS-10 (Inlet 5-5A)	10	3.47	11.6	0.70	6.6	2.44	**16.2**	**16.2**	12.0	4.2	12.0	1.0%	18	Bypass flow goes to CVS-13.
CVS-11 (Inlet 1-5)	11	2.03	12.3	0.84	6.5	1.70	**11.0**	**15.1**	15.1	0.0	15.1	0.8%	36	Takes bypass flow from CVS-7
CVS-12 (Inlet 2-5)	12	4.48	11.9	0.72	6.6	3.24	**21.3**	**23.6**	23.6	0.0	23.6	0.7%	36	Takes bypass flow from CVS-8 and CVS-9
CVS-12A (Inlet 3-5)	12A	2.63	9.5	0.72	7.2	1.90	**13.6**	**13.6**	13.6	0.0	140.4	1.9%	36	Takes bypass flow from CVS-10 and CVS-15.
CVS-13 (Inlet 4-5)	13	4.89	8.4	0.72	7.5	3.54	**26.6**	**37.2**	37.2	0.0	37.2	1.9%	18	Takes bypass flow from CVS-10 and CVS-14.
CVS-14 (Inlet 6-5)	14	6.55	17.5	0.66	5.5	4.35	**23.8**	**23.8**	11.1	12.7	45.9	3.2%	30	Bypass flow goes to CVS-13 and CVS-15
CVS-14A (Inlet 7-5)	14A	4.01	17.5	0.46	5.5	1.86	**10.2**	**10.2**	10.2	0.0	34.8	4.7%	24	
CVS-15 (Inlet 5-5)	15	3.00	10.2	0.72	7.2	2.17	**15.2**	**21.6**	21.6	0.0	21.6	1.9%	18	Takes bypass flow from CVS-14.
CVS-16	16	2.07	13.5	0.70	6.2	1.45	**9.0**	-	-	-	-	-		
CVS-17	17	4.10	10.2	0.70	7.0	2.89	**20.2**	-	-	-	-	-		
CVS-18	18	3.06	12.8	0.70	6.4	2.14	**13.6**	-	-	-	-	-		
CVS-19	19	1.61	6.0	0.81	8.4	1.31	**11.0**	-	-	-	-	-		
CVS-20	20	1.80	10.8	0.70	6.8	1.26	**8.6**	-	-	-	-	-		
CVS-21	21	3.88	16.1	0.70	5.7	2.71	**15.5**	-	-	-	-	-		
BEL-1 (Inlet 2-1)	B1	3.73	12.8	0.62	6.3	2.31	**14.7**	8.3	6.4	63.6	3.3%	36	Bypass flow goes to BEL-3	
BEL-2 (Inlet 1-1)	B2	1.38	7.6	0.83	7.8	1.15	**8.9**	6.5	2.4	69.5	0.9%	36	Bypass flow goes to BEL-4	
BEL-3 (Inlet 2-2)	B3	6.76	14.4	0.56	6.0	3.76	**22.6**	**29.0**	29.0	0.0	95.6	3.2%	36	Takes bypass from BEL-1.
BEL-4 (Inlet 1-2)	B4	1.75	7.9	0.84	7.7	1.46	**11.2**	**13.6**	13.6	0.0	110.8	2.9%	36	Takes bypass from BEL-2.
BEL-5	B5	4.55	11.0	0.83	6.8	3.76	**25.5**	-	-	-	-	-		
BEL-6	B6	3.95	7.4	0.80	7.9	3.17	**24.9**	-	-	-	-	-		

LEGEND

- XX — SUB-BASIN #
- X.XX AC / X.XX X.XX — AREA (ACRES); 2/5-YEAR RUNOFF COEFFICIENT (*DENOTES 5-YEAR RUNOFF); 100-YEAR RUNOFF COEFFICIENT
- PROPOSED SUB-BASIN BOUNDARY

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COMPARK SOUTH
TOWN OF PARKER, CO
PROPOSED DRAINAGE AREA MAP

PROJ. MGR.: RLB
PROJ. ASSOC.: ASD
DRAWN BY: RAK
DATE: 6-30-16

SHEET 1 OF 3
CLCPKC3

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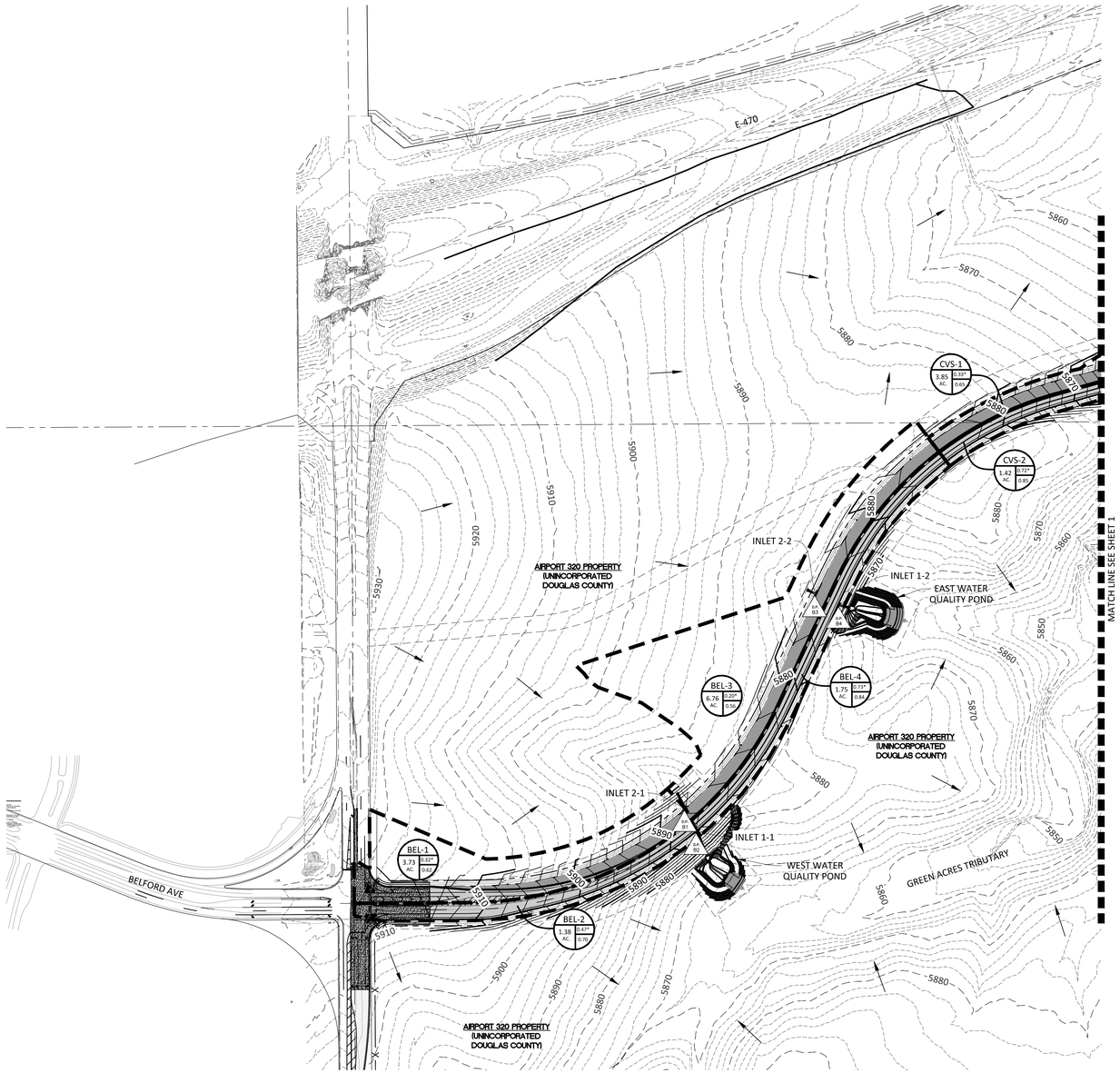
Plotted: 9/30/2016 9:42 AM Dwg Name: P:\Clcpkc3\Com\South\05-Residential\Preliminary Plat\Documents\Engineering\sStormWater Reports\Drainage Exhibits\Drainage Basin Map RAK 6-22-16.dwg, Updated By: RKatz



LEGEND

- XX — SUB-BASIN #
- AREA (ACRES) — X.XX AC
- 2/5-YEAR RUNOFF COEFFICIENT (*DENOTES 5-YEAR RUNOFF) — X.XX
- 100-YEAR RUNOFF COEFFICIENT — X.XX
- PROPOSED SUB-BASIN BOUNDARY

0 75 150 300

SCALE: 1"=200'

2 YEAR STORM

DIRECT RUNOFF								INLET		STORM SEWER				REMARKS
Basin ID	Design Point	Area (ac)	Tc (min.)	Runoff Coefficient, C	Intensity, I (in/hr)	CfA (Acres)	Direct Runoff, Q (cfs)	Total Runoff, Q (cfs)	Intercepted (cfs)	Bypass (cfs)	Design Flow (cfs)	Slope (%)	Pipe Size (inches)	
CVS-1 (Inlet 1-3)	1	3.85	6.9	0.28	4.3	1.10	**4.7**	**4.7**	0.0	8.9	3.8%	24		
CVS-2 (Inlet 2-3)	2	1.42	6.6	0.69	4.3	0.97	**4.2**	**4.2**	0.0	4.2	10.0%	24		
CVS-3 (Inlet 1-4)	3	0.94	6.2	0.55	4.4	0.52	**2.3**	**2.3**	0.0	2.3	1.7%	18		
CVS-4 (Inlet 2-4)	4	1.17	4.1	0.44	5.0	0.51	**2.5**	**2.5**	0.0	2.5	0.9%	18		
CVS-4A (Inlet 3-4)	4A	1.76	10.0	0.45	3.8	0.78	**2.9**	**2.9**	2.9	0.0	2.9	1.0%	18	
CVS-5 (Inlet 5-4)	5	2.63	9.0	0.40	3.9	1.05	**4.1**	**4.1**	4.1	0.0	4.1	1.0%	18	
CVS-6 (Inlet 6-4)	6	0.58	5.0	0.40	4.7	0.23	**1.1**	**1.1**	1.1	0.0	9.7	1.7%	36	
CVS-6A (Inlet 7-6)	6A	0.78	5.0	0.02	4.7	0.01	**0.1**	**0.1**	0.1	0.0	8.6	0.4%	36	
CVS-7 (Inlet 1-6)	7	1.11	10.2	0.69	3.7	0.77	**2.9**	**2.9**	2.9	0.0	5.8	3.0%	24	
CVS-8 (Inlet 2-6)	8	1.59	10.1	0.69	3.7	0.78	**2.9**	**2.9**	2.9	0.0	2.9	1.4%	24	
CVS-9 (Inlet 4-5A)	9	2.50	11.8	0.49	3.5	1.22	**4.3**	**4.3**	4.3	0.0	4.3	1.0%	18	
CVS-9A (Inlet 4-4)	9A	0.37	5.0	0.49	4.7	0.18	**0.9**	**0.9**	0.9	0.0	0.9	1.0%	18	
CVS-10 (Inlet 5-5A)	10	3.47	11.6	0.45	3.5	1.58	**5.6**	**5.6**	5.6	0.0	5.6	1.0%	18	
CVS-11 (Inlet 1-5)	11	2.03	12.3	0.69	3.4	1.41	**4.9**	**4.9**	4.9	0.0	4.9	0.8%	36	
CVS-12 (Inlet 2-5)	12	4.48	11.9	0.49	3.5	2.19	**7.7**	**7.7**	7.7	0.0	7.7	0.7%	36	
CVS-12A (Inlet 3-5)	12A	2.63	9.5	0.49	3.8	1.29	**4.9**	**4.9**	4.9	0.0	41.5	1.9%	36	
CVS-13 (Inlet 4-5)	13	4.89	8.4	0.49	4.0	2.39	**9.6**	**9.6**	9.6	0.0	9.6	1.9%	18	
CVS-14 (Inlet 6-5)	14	6.55	17.5	0.38	2.9	2.51	**7.3**	**7.3**	7.3	0.0	11.6	3.2%	30	
CVS-14A (Inlet 7-5)	14A	4.01	17.5	0.02	2.9	0.07	**0.2**	**0.2**	0.2	0.0	4.3	4.7%	24	
CVS-15 (Inlet 5-5)	15	3.00	10.2	0.49	3.7	1.47	**5.5**	**5.5**	5.5	0.0	5.5	1.9%	18	
CVS-16	16	2.07	13.5	0.45	3.3	0.92	**3.1**	**3.1**	3.1	0.0	-	-	-	
CVS-17	17	4.10	10.2	0.45	3.7	1.86	**7.0**	**7.0**	7.0	0.0	-	-	-	
CVS-18	18	3.06	12.8	0.45	3.4	1.36	**4.6**	**4.6**	4.6	0.0	-	-	-	
CVS-19	19	1.61	6.0	0.65	4.5	1.05	**4.7**	**4.7**	4.7	0.0	-	-	-	
CVS-20	20	1.80	10.8	0.45	3.6	0.80	**2.9**	**2.9**	2.9	0.0	-	-	-	
CVS-21	21	3.88	16.1	0.45	3.1	1.73	**5.3**	**5.3**	5.3	0.0	-	-	-	
BEL-1 (Inlet 2-1)	B1	3.73	12.8	0.30	3.4	1.13	**3.8**	**3.8**	3.8	0.0	5.9	3.3%	36	
BEL-2 (Inlet 1-1)	B2	1.38	7.6	0.69	4.2	0.95	**3.9**	**3.9**	3.9	0.0	8.4	0.9%	36	
BEL-3 (Inlet 2-2)	B3	6.76	14.4	0.19	3.2	1.26	**4.1**	**4.1**	4.1	0.0	6.6	3.2%	36	
BEL-4 (Inlet 1-2)	B4	1.75	7.9	0.69	4.1	1.21	**5.0**	**5.0**	5.0	0.0	11.6	2.9%	36	
BEL-5	B5	4.55	11.0	0.66	3.6	3.08	**11.1**	**11.1**	-	-	-	-	-	
BEL-6	B6	3.95	7.4	0.63	4.2	2.50	**10.5**	**10.5**	-	-	-	-	-	

5 YEAR STORM

DIRECT RUNOFF								INLET		STORM SEWER				REMARKS
Basin ID	Design Point	Area (ac)	Tc (min.)	Runoff Coefficient, C	Intensity, I (in/hr)	CfA (Acres)	Direct Runoff, Q (cfs)	Total Runoff, Q (cfs)	Intercepted (cfs)	Bypass (cfs)	Design Flow (cfs)	Slope (%)	Pipe Size (inches)	
CVS-1 (Inlet 1-3)	1	3.85	6.9	0.33	4.3	1.27	**5.5**	**5.5**	5.5	0.0	10.0	3.8%	24	
CVS-2 (Inlet 2-3)	2	1.42	6.6	0.72	4.3	1.03	**4.5**	**4.5**	4.5	0.0	4.5	10.0%	24	
CVS-3 (Inlet 1-4)	3	0.94	6.2	0.59	4.4	0.54	**2.4**	**2.4**	2.4	0.0	2.4	1.7%	18	
CVS-4 (Inlet 2-4)	4	1.17	4.1	0.46	5.0	0.53	**2.6**	**2.6**	2.6	0.0	2.6	0.9%	18	
CVS-4A (Inlet 3-4)	4A	1.76	10.0	0.47	3.8	0.82	**3.1**	**3.1**	3.1	0.0	3.1	1.0%	18	
CVS-5 (Inlet 5-4)	5	2.63	9.0	0.42	3.9	1.10	**4.3**	**4.3**	4.3	0.0	4.3	1.0%	18	
CVS-6 (Inlet 6-4)	6	0.58	5.0	0.42	4.7	0.24	**1.1**	**1.1**	1.1	0.0	9.7	1.7%	36	
CVS-6A (Inlet 7-6)	6A	0.78	5.0	0.02	4.7	0.01	**0.1**	**0.1**	0.1	0.0	8.6	0.4%	36	
CVS-7 (Inlet 1-6)	7	1.11	10.2	0.73	3.7	0.81	**3.0**	**3.0**	3.0	0.0	6.0	3.0%	24	
CVS-8 (Inlet 2-6)	8	1.59	10.1	0.51	3.7	0.81	**3.0**	**3.0**	3.0	0.0	3.0	1.4%	24	
CVS-9 (Inlet 4-5A)	9	2.50	11.8	0.51	3.5	1.28	**4.5**	**4.5**	4.5	0.0	4.5	1.0%	18	
CVS-9A (Inlet 4-4)	9A	0.37	5.0	0.51	4.7	0.19	**0.9**	**0.9**	0.9	0.0	0.9	1.0%	18	
CVS-10 (Inlet 5-5A)	10	3.47	11.6	0.47	3.5	1.65	**5.8**	**5.8**	5.8	0.0	5.8	1.0%	18	
CVS-11 (Inlet 1-5)	11	2.03	12.3	0.73	3.4	1.47	**5.1**	**5.1**	5.1	0.0	5.1	0.8%	36	
CVS-12 (Inlet 2-5)	12	4.48	11.9	0.51	3.5	2.29	**8.0**	**8.0**	8.0	0.0	8.0	0.7%	36	
CVS-12A (Inlet 3-5)	12A	2.63	9.5	0.51	3.8	1.35	**5.2**	**5.2**	5.2	0.0	43.2	1.9%	36	
CVS-13 (Inlet 4-5)	13	4.89	8.4	0.51	4.0	2.50	**10.0**	**10.0**	10.0	0.0	10.0	1.9%	18	
CVS-14 (Inlet 6-5)	14	6.55	17.5	0.40	2.9	2.62	**7.7**	**7.7**	7.7	0.0	12.0	3.2%	30	
CVS-14A (Inlet 7-5)	14A	4.01	17.5	0.02	2.9	0.07	**0.2**	**0.2**	0.2	0.0	4.3	4.7%	24	
CVS-15 (Inlet 5-5)	15	3.00	10.2	0.51	3.7	1.53	**5.7**	**5.7**	5.7	0.0	5.7	1.9%	18	
CVS-16	16	2.07	13.5	0.47	3.3	0.96	**3.2**	**3.2**	-	-	-	-	-	
CVS-17	17	4.10	10.2	0.47	3.7	1.94	**7.3**	**7.3**	-	-	-	-	-	
CVS-18	18	3.06	12.8	0.47	3.4	1.42	**4.8**	**4.8**	-	-	-	-	-	
CVS-19	19	1.61	6.0	0.68	4.5	1.09	**4.9**	**4.9**	-	-	-	-	-	
CVS-20	20	1.80	10.8	0.47	3.6	0.84	**3.1**	**3.1**	-	-	-	-	-	
CVS-21	21	3.88	16.1	0.47	3.1	1.80	**5.5**	**5.5**	-	-	-	-	-	
BEL-1 (Inlet 2-1)	B1	3.73	12.8	0.32	3.4	1.18	**4.0**	**4.0**	4.0	0.0	6.1	3.3%	36	
BEL-2 (Inlet 1-1)	B2	1.38	7.6	0.72	4.2	0.99	**4.1**	**4.1**	4.1	0.0	8.8	0.9%	36	
BEL-3 (Inlet 2-2)	B3	6.76	14.4	0.20	3.2	1.32	**4.2**	**4.2**	4.2	0.0	6.9	3.2%	36	
BEL-4 (Inlet 1-2)	B4	1.75	7.9	0.73	4.1	1.27	**5.2**	**5.2**	5.2	0.0	12.1	2.9%	36	
BEL-5	B5	4.55	11.0	0.71	3.6	3.22	**11.6**	**11.6**	-	-	-	-	-	
BEL-6	B6	3.95	7.4	0.66	4.2	2.61	**10.9**	**10.9**	-	-	-	-	-	

100 YEAR STORM

DIRECT RUNOFF									INLET		STORM SEWER				REMARKS
Basin ID	Design Point	Area (ac)	Tc (min.)	Runoff Coefficient, C	Intensity, I (in/hr)	CfA (Acres)	Direct Runoff, Q (cfs)	Total Runoff, Q (cfs)	Intercepted (cfs)	Bypass (cfs)	Design Flow (cfs)	Slope (%)	Pipe Size (inches)	
CVS-1 (Inlet 1-3)	1	3.85	6.9	0.65	8.0	2.51	**20.2**	**20.2**	13.5	6.7	22.5	3.8%	24	Bypass flow goes to CVS-3
CVS-2 (Inlet 2-3)	2	1.42	6.6	0.85	8.1	1.21	**9.9**	**9.9**	9.0	1.0	9.0	10.0%	24	Bypass flow goes to CVS-4
CVS-3 (Inlet 1-4)	3	0.94	6.2	0.76	8.3	0.71	**5.9**	**12.6**	7.7	4.9	7.7	1.7%	18	Takes bypass flow from CVS-1. Bypass goes to CVS-7
CVS-4 (Inlet 2-4)	4	1.17	4.1	0.69	9.3	0.81	**7.5**	**8.5**	8.0	0.5	8.0	0.9%	18	Takes bypass flow from CVS-2. Bypass goes to CVS-8
CVS-4A (Inlet 3-4)	4A	1.76	10.0	0.70	7.0	1.23	**8.6**	**11.0**	11.0	0.0	11.0	1.0%	18	Takes bypass flow from CVS-5
CVS-5 (Inlet 5-4)	5	2.63	9.0	0.67	7.3	1.77	**13.0**	**13.0**	10.6	2.4	10.6	1.0%	18	Bypass flow goes to CVS-4A
CVS-6 (Inlet 6-4)	6	0.58	5.0	0.67	8.8	0.39	**3.5**	**3.5**	3.5	0.0	54.5	1.7%	36	
CVS-6A (Inlet 7-4)	6A	0.78	5.0	0.46	8.8	0.36	**3.2**	**3.2**	3.2	0.0	51.0	0.4%	36	
CVS-7 (Inlet 1-6)	7	1.11	10.2	0.84	7.0	0.93	**6.5**	**11.4**	7.3	4.1	15.4	3.0%	24	Takes bypass flow from CVS-3. Bypass goes to CVS-11
CVS-8 (Inlet 2-6)	8	1.59	10.1	0.72	7.0	1.15	**8.1**	**8.6**	8.1	0.5	8.1	1.4%	24	Takes bypass flow from CVS-4. Bypass goes to CVS-12
CVS-9 (Inlet 4-5A)	9	2.50	11.8	0.72	6.6	1.81	**11.9**	**11.9**	10.1	1.8	10.1	1.0%	18	Bypass flow goes to CVS-12
CVS-9A (Inlet 4-4)	9A	0.37	5.0	0.72	8.8	0.27	**2.4**	**2.4**	2.4	0.0	2.4	1.0%	18	
CVS-10 (Inlet 5-5A)	10	3.47	11.6	0.70	6.6	2.44	**16.2**	**16.2**	12.0	4.2	12.0	1.0%	18	Bypass flow goes to CVS-13
CVS-11 (Inlet 1-5)	11	2.03	12.3	0.84	6.5	1.70	**11.0**	**15.1**	15.1	0.0	15.1	0.8%	36	Takes bypass flow from CVS-7
CVS-12 (Inlet 2-5)	12	4.48	11.9	0.72	6.6	3.24	**21.3**	**23.6**	23.6	0.0	23.6	0.7%	36	Takes bypass flow from CVS-8 and CVS-9
CVS-12A (Inlet 3-5)	12A	2.63	9.5	0.72	7.2	1.90	**13.6**	**13.6**	13.6	0.0	140.4	1.9%	36	Takes bypass flow from CVS-13 and CVS-15
CVS-13 (Inlet 4-5)	13	4.89	8.4	0.72	7.5	3.54	**26.6**	**37.2**	37.2	0.0	37.2	1.9%	18	Takes bypass flow from CVS-10 and CVS-14
CVS-14 (Inlet 6-5)	14	6.55	17.5	0.66	5.5	4.35	**23.8**	**23.8**	11.1	12.7	45.9	3.2%	30	Bypass flow goes to CVS-13 and CVS-15
CVS-14A (Inlet 7-5)	14A	4.01	17.5	0.46	5.5	1.86	**10.2**	**10.2**	10.2	0.0	34.8	4.7%	24	
CVS-15 (Inlet 5-5)	15	3.00	10.2	0.72	7.0	2.17	**15.2**	**21.6**	21.6	0.0	21.6	1.9%	18	Takes bypass from CVS-14.
CVS-16	16	2.07	13.5	0.70	6.2	1.45	**9.0**	-	-	-	-	-	-	
CVS-17	17	4.10	10.2	0.70	7.0	2.89	**20.2**	-	-	-	-	-	-	
CVS-18	18	3.06	12.8	0.70	6.4	2.14	**13.6**	-	-	-	-	-	-	
CVS-19	19	1.61	6.0	0.81	8.4	1.31	**11.0**	-	-	-	-	-	-	
CVS-20	20	1.80	10.8	0.70	6.8	1.26	**8.6**	-	-	-	-	-	-	
CVS-21	21	3.88	16.1	0.70	5.7	2.71	**15.5**	-	-	-	-	-	-	
BEL-1 (Inlet 2-1)	B1	3.73	12.8	0.62	6.3	2.31	**14.7**	**14.7**	8.3	6.4	63.6	3.3%	36	Bypass flow goes to BEL-3
BEL-2 (Inlet 1-1)	B2	1.38	7.6	0.83	7.8	1.15	**8.9**	**8.9**	6.5	2.4	69.5	0.9%	36	Bypass flow goes to BEL-4
BEL-3 (Inlet 2-2)	B3	6.76	14.4	0.56	6.0	3.75	**22.5**	**29.0**	29.0	0.0	95.6	3.2%	36	Takes bypass from BEL-1
BEL-4 (Inlet 1-2)	B4	1.75	7.9	0.84	7.7	1.46	**11.2**	**13.6**	13.6	0.0	110.8	2.9%	36	Takes bypass from BEL-2
BEL-5	B5	4.55	11.0	0.83	6.8	3.76	**25.5**	-	-	-	-	-	-	
BEL-6	B6	3.95	7.4	0.80	7.9	3.17	**24.9**	-	-	-	-	-	-	

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Civil Engineers • Surveyors • Water Resource Engineers • Water & Wastewater Engineers
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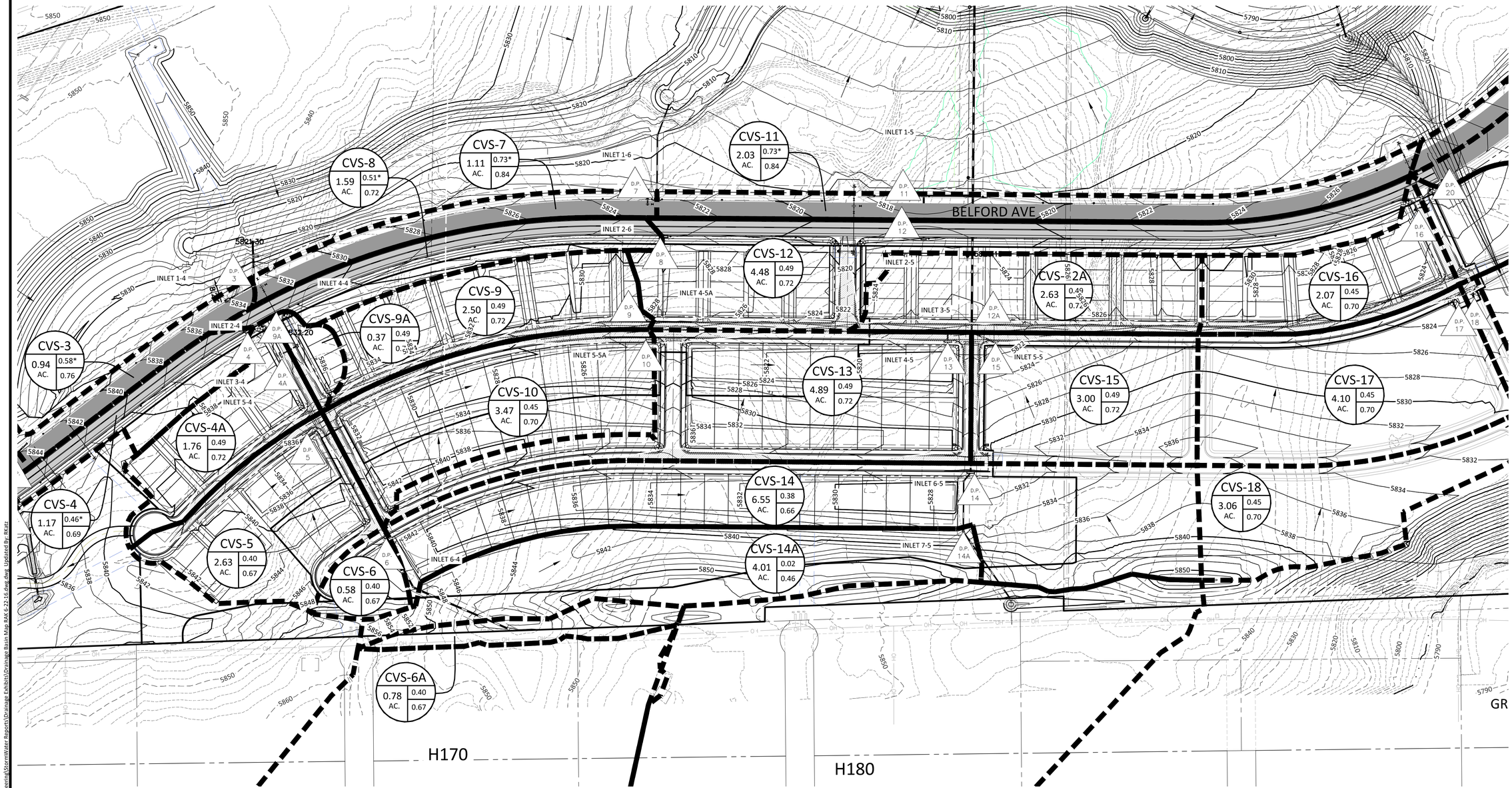
REVISIONS	DATE	DRAWN BY

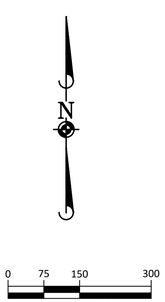
COMPARK SOUTH
TOWN OF PARKER, CO
PROPOSED DRAINAGE AREA MAP

PROJ. MGR.: RLB
PROJ. ASSOC.: ASD
DRAWN BY: RAK
DATE: 6-30-16

SHEET 2 OF 3
CLCPKC3

Plotted: 9/20/2016 8:28 AM Dwg Name: P:\Clcpkc3\Com\South\05-Residential Preliminary Plat\Documents\Engineering\StormWater Reports\Drainage Exhibits\Drainage Basin Map RAK 6-22-16.dwg Updated By: RKatz





2 YEAR STORM

DIRECT RUNOFF								INLET		STORM SEWER				REMARKS
Basin ID	Design Point	Area (ac)	Tc (min.)	Runoff Coefficient, C	Intensity, I (in/hr)	CfA (Acres)	Direct Runoff, Q (cfs)	Total Runoff, Q (cfs)	Intercepted (cfs)	Bypass (cfs)	Design Flow (cfs)	Slope (%)	Pipe Size (inches)	
CVS-1 (Inlet 1-3)	1	3.85	6.9	0.28	4.3	1.10	**4.7**	**4.7**	0.0	8.9	3.8%	24		
CVS-2 (Inlet 2-3)	2	1.42	6.6	0.69	4.3	0.97	**4.2**	**4.2**	4.2	0.0	10.0%	24		
CVS-3 (Inlet 1-4)	3	0.94	6.2	0.55	4.4	0.52	**2.3**	**2.3**	0.0	2.3	1.7%	18		
CVS-4 (Inlet 2-4)	4	1.17	4.1	0.44	5.0	0.51	**2.5**	**2.5**	0.0	2.5	0.9%	18		
CVS-4A (Inlet 3-4)	4A	1.76	10.0	0.45	3.5	0.78	**2.9**	**2.9**	0.0	2.9	1.0%	18		
CVS-5 (Inlet 5-4)	5	2.63	9.0	0.40	3.9	1.05	**4.1**	**4.1**	4.1	0.0	1.0%	18		
CVS-6 (Inlet 6-4)	6	0.58	5.0	0.40	4.7	0.23	**1.1**	**1.1**	0.0	9.7	1.7%	36		
CVS-6A (Inlet 7-4)	6A	0.78	5.0	0.02	4.7	0.01	**0.1**	**0.1**	0.0	8.6	0.4%	36		
CVS-7 (Inlet 1-6)	7	1.11	10.2	0.69	3.7	0.77	**2.9**	**2.9**	2.9	0.0	5.8	3.0%	24	
CVS-8 (Inlet 2-6)	8	1.59	10.1	0.49	3.7	0.78	**2.9**	**2.9**	2.9	0.0	2.9	1.4%	24	
CVS-9 (Inlet 4-5A)	9	2.50	11.8	0.49	3.5	1.22	**4.3**	**4.3**	4.3	0.0	4.3	1.0%	18	
CVS-9A (Inlet 4-4)	9A	0.37	5.0	0.49	4.7	0.18	**0.9**	**0.9**	0.0	0.9	1.0%	18		
CVS-10 (Inlet 5-5A)	10	3.47	11.6	0.45	3.5	1.58	**5.6**	**5.6**	5.6	0.0	5.6	1.0%	18	
CVS-11 (Inlet 1-5)	11	2.03	12.3	0.69	3.4	1.41	**4.9**	**4.9**	4.9	0.0	4.9	0.8%	36	
CVS-12 (Inlet 2-5)	12	4.48	11.9	0.49	3.5	2.19	**7.7**	**7.7**	7.7	0.0	7.7	0.7%	36	
CVS-12A (Inlet 3-5)	12A	2.63	9.5	0.49	3.8	1.29	**4.9**	**4.9**	4.9	0.0	41.5	1.9%	36	
CVS-13 (Inlet 4-5)	13	4.89	8.4	0.49	4.0	2.39	**9.6**	**9.6**	9.6	0.0	9.6	1.9%	18	
CVS-14 (Inlet 6-5)	14	6.55	17.5	0.38	2.9	2.51	**7.3**	**7.3**	7.3	0.0	11.6	3.2%	30	
CVS-14A (Inlet 7-5)	14A	4.01	17.5	0.02	2.9	0.07	**0.2**	**0.2**	0.2	0.0	4.3	4.7%	24	
CVS-15 (Inlet 5-5)	15	3.00	10.2	0.49	3.7	1.47	**5.5**	**5.5**	5.5	0.0	5.5	1.9%	18	
CVS-16	16	2.07	13.5	0.45	3.3	0.92	**3.1**	**3.1**	0.0	-	-	-	-	
CVS-17	17	4.10	10.2	0.45	3.7	1.86	**7.0**	**7.0**	0.0	-	-	-	-	
CVS-18	18	3.06	12.8	0.45	3.4	1.36	**4.6**	**4.6**	0.0	-	-	-	-	
CVS-19	19	1.61	6.0	0.65	4.5	1.05	**4.7**	**4.7**	4.7	0.0	-	-	-	
CVS-20	20	1.80	10.8	0.45	3.6	0.80	**2.9**	**2.9**	2.9	0.0	-	-	-	
CVS-21	21	3.88	16.1	0.45	3.1	1.73	**5.3**	**5.3**	0.0	-	-	-	-	
BEL-1 (Inlet 2-1)	B1	3.73	12.8	0.30	3.4	1.13	**3.8**	**3.8**	3.8	0.0	5.9	3.3%	36	
BEL-2 (Inlet 1-1)	B2	1.38	7.6	0.69	4.2	0.95	**3.9**	**3.9**	3.9	0.0	8.4	0.9%	36	
BEL-3 (Inlet 2-2)	B3	6.76	14.4	0.19	3.2	1.26	**4.1**	**4.1**	4.1	0.0	6.6	3.2%	36	
BEL-4 (Inlet 1-2)	B4	1.75	7.9	0.69	4.1	1.21	**5.0**	**5.0**	5.0	0.0	11.6	2.9%	36	
BEL-5	B5	4.55	11.0	0.68	3.6	3.08	**11.1**	**11.1**	-	-	-	-	-	
BEL-6	B6	3.95	7.4	0.63	4.2	2.50	**10.5**	**10.5**	-	-	-	-	-	

5 YEAR STORM

DIRECT RUNOFF								INLET		STORM SEWER				REMARKS
Basin ID	Design Point	Area (ac)	Tc (min.)	Runoff Coefficient, C	Intensity, I (in/hr)	CfA (Acres)	Direct Runoff, Q (cfs)	Total Runoff, Q (cfs)	Intercepted (cfs)	Bypass (cfs)	Design Flow (cfs)	Slope (%)	Pipe Size (inches)	
CVS-1 (Inlet 1-3)	1	3.85	6.9	0.33	4.3	1.27	**5.5**	**5.5**	5.5	0.0	10.0	3.8%	24	
CVS-2 (Inlet 2-3)	2	1.42	6.6	0.72	4.3	1.03	**4.5**	**4.5**	4.5	0.0	4.5	10.0%	24	
CVS-3 (Inlet 1-4)	3	0.94	6.2	0.58	4.4	0.54	**2.4**	**2.4**	2.4	0.0	2.4	1.7%	18	
CVS-4 (Inlet 2-4)	4	1.17	4.1	0.46	5.0	0.53	**2.6**	**2.6**	2.6	0.0	2.6	0.9%	18	
CVS-4A (Inlet 3-4)	4A	1.76	10.0	0.47	3.8	0.82	**3.1**	**3.1**	3.1	0.0	3.1	1.0%	18	
CVS-5 (Inlet 5-4)	5	2.63	9.0	0.42	3.9	1.10	**4.3**	**4.3**	4.3	0.0	4.3	1.0%	18	
CVS-6 (Inlet 6-4)	6	0.58	5.0	0.42	4.7	0.24	**1.1**	**1.1**	1.1	0.0	9.7	1.7%	36	
CVS-6A (Inlet 7-4)	6A	0.78	5.0	0.02	4.7	0.01	**0.1**	**0.1**	0.1	0.0	8.6	0.4%	36	
CVS-7 (Inlet 1-6)	7	1.11	10.2	0.73	3.7	0.81	**3.0**	**3.0**	3.0	0.0	6.0	3.0%	24	
CVS-8 (Inlet 2-6)	8	1.59	10.1	0.51	3.7	0.81	**3.0**	**3.0**	3.0	0.0	3.0	1.4%	24	
CVS-9 (Inlet 4-5A)	9	2.50	11.8	0.51	3.5	1.28	**4.5**	**4.5**	4.5	0.0	4.5	1.0%	18	
CVS-9A (Inlet 4-4)	9A	0.37	5.0	0.51	4.7	0.19	**0.9**	**0.9**	0.0	0.9	1.0%	18		
CVS-10 (Inlet 5-5A)	10	3.47	11.6	0.47	3.5	1.65	**5.8**	**5.8**	5.8	0.0	5.8	1.0%	18	
CVS-11 (Inlet 1-5)	11	2.03	12.3	0.73	3.4	1.47	**5.1**	**5.1**	5.1	0.0	5.1	0.8%	36	
CVS-12 (Inlet 2-5)	12	4.48	11.9	0.51	3.5	2.29	**8.0**	**8.0**	8.0	0.0	8.0	0.7%	36	
CVS-12A (Inlet 3-5)	12A	2.63	9.5	0.51	3.8	1.35	**5.2**	**5.2**	5.2	0.0	43.2	1.9%	36	
CVS-13 (Inlet 4-5)	13	4.89	8.4	0.51	4.0	2.50	**10.0**	**10.0**	10.0	0.0	10.0	1.9%	18	
CVS-14 (Inlet 6-5)	14	6.55	17.5	0.40	2.9	2.62	**7.7**	**7.7**	7.7	0.0	12.0	3.2%	30	
CVS-14A (Inlet 7-5)	14A	4.01	17.5	0.02	2.9	0.07	**0.2**	**0.2**	0.2	0.0	4.3	4.7%	24	
CVS-15 (Inlet 5-5)	15	3.00	10.2	0.51	3.7	1.53	**5.7**	**5.7**	5.7	0.0	5.7	1.9%	18	
CVS-16	16	2.07	13.5	0.47	3.3	0.96	**3.2**	**3.2**	-	-	-	-	-	
CVS-17	17	4.10	10.2	0.47	3.7	1.94	**7.3**	**7.3**	-	-	-	-	-	
CVS-18	18	3.06	12.8	0.47	3.4	1.42	**4.8**	**4.8**	-	-	-	-	-	
CVS-19	19	1.61	6.0	0.68	4.5	1.09	**4.9**	**4.9**	-	-	-	-	-	
CVS-20	20	1.80	10.8	0.47	3.6	0.84	**3.1**	**3.1**	-	-	-	-	-	
CVS-21	21	3.88	16.1	0.47	3.1	1.80	**5.5**	**5.5**	-	-	-	-	-	
BEL-1 (Inlet 2-1)	B1	3.73	12.8	0.32	3.4	1.18	**4.0**	**4.0**	4.0	0.0	6.1	3.3%	36	
BEL-2 (Inlet 1-1)	B2	1.38	7.6	0.72	4.2	0.99	**4.1**	**4.1**	4.1	0.0	8.8	0.9%	36	
BEL-3 (Inlet 2-2)	B3	6.76	14.4	0.20	3.2	1.32	**4.2**	**4.2**	4.2	0.0	6.9	3.2%	36	
BEL-4 (Inlet 1-2)	B4	1.75	7.9	0.73	4.1	1.27	**5.2**	**5.2**	5.2	0.0	12.1	2.9%	36	
BEL-5	B5	4.55	11.0	0.71	3.6	3.22	**11.6**	**11.6**	-	-	-	-	-	
BEL-6	B6	3.95	7.4	0.66	4.2	2.61	**10.9**	**10.9**	-	-	-	-	-	

100 YEAR STORM

DIRECT RUNOFF								INLET		STORM SEWER				REMARKS
Basin ID	Design Point	Area (ac)	Tc (min.)	Runoff Coefficient, C	Intensity, I (in/hr)	CfA (Acres)	Direct Runoff, Q (cfs)	Total Runoff with Bypass Q (cfs)	Intercepted (cfs)	Bypass (cfs)	Design Flow (cfs)	Slope (%)	Pipe Size (inches)	
CVS-1 (Inlet 1-3)	1	3.85	6.9	0.65	8.0	2.51	**20.2**	**20.2**	13.5	6.7	22.5	3.8%	24	bypass flow goes to CVS-3.
CVS-2 (Inlet 2-3)	2	1.42	6.6	0.85	8.1	1.21	**9.9**	**9.9**	9.0	1.0	9.0	10.0%	24	bypass flow goes to CVS-4.
CVS-3 (Inlet 1-4)	3	0.94	6.2	0.76	8.3	0.71	**5.9**	**12.6**	7.7	4.9	7.7	1.7%	18	Takes bypass flow from CVS-1. Bypass goes to CVS-7
CVS-4 (Inlet 2-4)	4	1.17	4.1	0.69	9.3	0.81	**7.5**	**8.5**	8.0	0.5	8.0	0.9%	18	Takes bypass flow from CVS-2. Bypass goes to CVS-8
CVS-4A (Inlet 3-4)	4A	1.76	10.0	0.70	7.0	1.23	**8.6**	**11.0**	11.0	0.0	11.0	1.0%	18	Takes bypass flow from CVS-5
CVS-5 (Inlet 5-4)	5	2.63	9.0	0.67	7.3	1.77	**13.0**	**13.0**	10.6	2.4	10.6	1.0%	18	bypass flow goes to CVS-4A.
CVS-6 (Inlet 6-4)	6	0.58	5.0	0.67	8.8	0.39	**3.5**	**3.5**	3.5	0.0	54.5	1.7%	36	
CVS-6A (Inlet 7-4)	6A	0.78	5.0	0.46	8.8	0.36	**3.2**	**3.2**	3.2	0.0	51.0	0.4%	36	
CVS-7 (Inlet 1-6)	7	1.11	10.2	0.84	7.0	0.93	**6.5**	**11.4**	7.3	4.1	15.4	3.0%	24	Takes bypass flow from CVS-3. Bypass goes to CVS-11.
CVS-8 (Inlet 2-6)	8	1.59	10.1	0.72	7.0	1.15	**8.1**	**8.6**	8.1	0.5	8.1	1.4%	24	Takes bypass flow from CVS-4. Bypass goes to CVS-12.
CVS-9 (Inlet 4-5A)	9	2.50	11.8	0.72	6.6	1.81	**11.9**	**11.9**	10.1	1.8	10.1	1.0%	18	bypass flow goes to CVS-12.
CVS-9A (Inlet 4-4)	9A	0.37	5.0	0.72	8.8	0.27	**2.4**	**2.4**	2.4	0.0	2.4	1.0%	18	
CVS-10 (Inlet 5-5A)	10	3.47	11.6	0.70	6.6	2.44	**16.2**	**16.2**	12.0	4.2	12.0	1.0%	18	bypass flow goes to CVS-13.
CVS-11 (Inlet 1-5)	11	2.03	12.3	0.84	6.5	1.70	**11.0**	**15.1**	15.1	0.0	15.1	0.8%	36	Takes bypass flow from CVS-7
CVS-12 (Inlet 2-5)	12	4.48	11.9	0.72	6.6	3.24	**21.3**	**23.6**	23.6	0.0	23.6	0.7%	36	Takes bypass flow from CVS-8 and CVS-9
CVS-12A (Inlet 3-5)	12A	2.63	9.5	0.72	7.2	1.90	**13.6**	**13.6**	13.6	0.0	140.4	1.9%	36	Takes bypass flow from CVS-13 and CVS-15
CVS-13 (Inlet 4-5)	13	4.89	8.4	0.72	7.5	3.54	**26.6**	**37.2**	37.2	0.0	37.2	1.9%	18	Takes bypass flow from CVS-10 and CVS-14.
CVS-14 (Inlet 6-5)	14	6.55	17.5	0.66	5.5	4.35	**23.8**	**23.8**	11.1	12.7	45.9	3.2%	30	bypass flows to CVS-13 and CVS-15
CVS-14A (Inlet 7-5)	14A	4.01	17.5	0.46	5.5	1.86	**10.2**	**10.2**	10.2	0.0	34.8	4.7%	24	
CVS-15 (Inlet 5-5)	15	3.00	10.2	0.72	7.0	2.17	**15.2**	**21.6**	21.6	0.0	21.6	1.9%	18	bypass flows from CVS-14.
CVS-16	16	2.07	13.5	0.70	6.2	1.45	**9.0**	-	-	-	-	-		
CVS-17	17	4.10	10.2	0.70	7.0	2.89	**20.2**	-	-	-	-	-		
CVS-18	18	3.06	12.8	0.70	6.4	2.14	**13.6**	-	-	-	-	-		
CVS-19	19	1.61	6.0	0.81	8.4	1.31	**11.0**	-	-	-	-	-		
CVS-20	20	1.80	10.8	0.70	6.8	1.26	**8.6**	-	-	-	-	-		
CVS-21	21	3.88	16.1	0.70	5.7	2.71	**15.5**	-	-	-	-	-		
BEL-1 (Inlet 2-1)	B1	3.73	12.8	0.62	6.3	2.31	**14.7**	**14.7**	8.3	6.4	63.6	3.3%	36	Bypass flow goes to BEL-3.
BEL-2 (Inlet 1-1)	B2	1.38	7.6	0.83	7.8	1.15	**8.9**	**8.9**	6.5	2.4	69.5	0.9%	36	Bypass flow goes to BEL-4.
BEL-3 (Inlet 2-2)	B3	6.76	14.4	0.56	6.0	3.76	**22.6**	**29.0**	29.0	0.0	95.6	3.2%	36	Takes bypass from BEL-1
BEL-4 (Inlet 1-2)	B4	1.75	7.9	0.84	7.7	1.46	**11.2**	**13.6**	13.6	0.0	110.8	2.9%	36	Takes bypass from BEL-2
BEL-5	B5	4.55	11.0	0.63	6.8	3.78	**25.5**	-	-	-	-	-		
BEL-6	B6	3.95	7.4	0.80	7.9	3.17	**24.9**	-	-	-	-	-		

LEGEND

- SUB-BASIN #
- 2/5-YEAR RUNOFF COEFFICIENT (*DENOTES 5-YEAR RUNOFF)
- 100-YEAR RUNOFF COEFFICIENT
- AREA (ACRES)
- PROPOSED SUB-BASIN BOUNDARY

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REVISIONS
DATE

COMPARK SOUTH
TOWN OF PARKER, CO
PROPOSED DRAINAGE AREA MAP - FILING NO. 2

PROJ. MGR.: RLB
PROJ. ASSOC.: ASD
DRAWN BY: RAK
DATE: 6-30-16

SHEET 3 OF 3
CLCPKC3

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