



# Tualatin Industrial Park

## PRELIMINARY STORMWATER REPORT

Tualatin, Oregon

October 28, 2019

The information contained in this report was prepared by  
and under direct supervision of the undersigned:

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AAI Project Number: A19173.10

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# Tualatin Industrial Park

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## I. Project Summary

This report has been prepared to outline the existing and proposed on-site stormwater conditions for the Tualatin Industrial Park project. This report is based on topographic survey, GIS information and field observations.

The project site is located in Tualatin, Oregon. The total pre-developed site is approximately 717,020 square feet (16.46 acres). The site currently consists of an open field and slopes from south to north.

See Appendix A – Existing Conditions.

The primary purpose of this project is to develop the site for two new shell warehouse buildings, parking and drive aisles. The site improvements will consist of 593,735 square feet (13.63 acres) of total impervious area. In addition to the site improvements, stormwater management will be provided, including conveyance, water quality treatment, and flow control with detention.

See Appendix B – Site Plan and Appendix C – Storm Plan and Details.

## II. Stormwater Design

The proposed stormwater facilities are designed to capture all runoff from the proposed site improvements. No runoff from adjacent properties is anticipated to be captured by the proposed facilities. In addition, all site impervious runoff will be completely managed on site and will not drain onto adjacent properties. The stormwater management for this project is designed according to the requirements outlined in the CWS Design and Construction Standards R&O 19-5.

The site is hydraulically divided into three basins. Each basin will collect a portion of the site's total stormwater runoff, conveyed first to one of several pretreatment manholes, then to one of several Contech Stormfilter manholes for treatment, then to separate flow control/detention systems before tying into the City's storm system in the public ROW.

Water quality treatment will be accomplished by using several Contech Stormfilter manholes, sized using a water quality event of 0.36" of rainfall over 4 hours. Flow control will be achieved using orificed flow control manholes in conjunction with detention chambers. The orifice systems are designed to restrict post-developed flows to pre-developed rates during the 2-, 10-, and 25- year events. Flows in excess of these events will bypass the flow control systems.

See Appendix D – HydroCAD Report and Storm Calculations

# Tualatin Industrial Park

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## III. Conveyance Calculations

All proposed storm mains and services are sized to convey up to the 25-yr storm event.

See Appendix E – Conveyance Calculations (*to be provided with permit submittal*).

## IV. Downstream Analysis

No negative impacts are anticipated downstream as post-developed flows are being limited to pre-developed flows. (*Certificate of Downstream Investigation to be provided with permit submittal, if needed*)

## V. Operations and Maintenance

See Appendix F – Operations and Maintenance Report (*to be provided with permit submittal*).

## VI. Engineering Conclusion

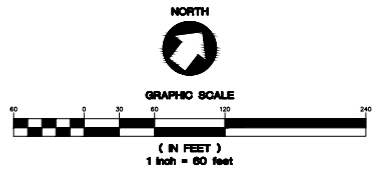
Based on the requirements of the CWS Design and Construction Standards R&O 19-5, the proposed site facilities are adequately designed to manage the proposed development conditions and should be approved as designed.

## Appendix A

Existing Conditions



**SHEET NOTES**  
 1. SURVEY COMPLETED BY AKS ENGINEERING AND FORESTRY, LLC.



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## Appendix B

Site Plan



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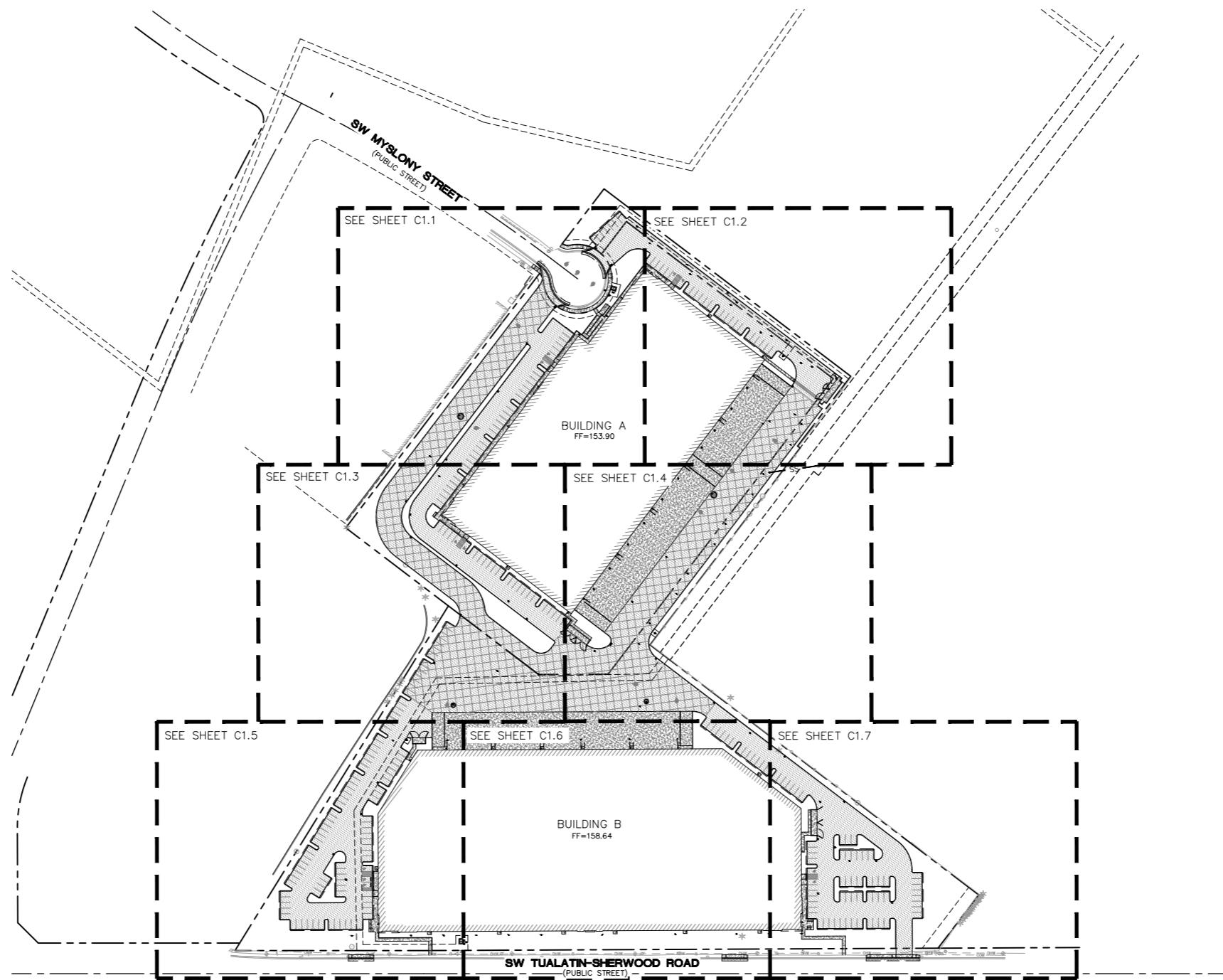
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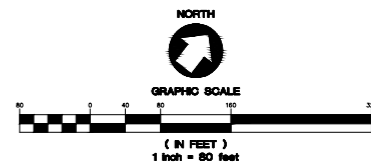


**SHEET NOTES**

1. SEE SHEET C0.2 FOR GENERAL SHEET NOTES.
2. SEE ARCHITECTURAL PLANS FOR ADDITIONAL SITE INFORMATION.
3. THE CONTRACTOR SHALL HAVE A FULL SET OF THE CURRENT APPROVED CONSTRUCTION DOCUMENTS INCLUDING ADDENDA ON THE PROJECT SITE AT ALL TIMES.
4. THE CONTRACTOR SHALL KEEP THE ENGINEER AND JURISDICTION INFORMED OF CONSTRUCTION PROGRESS TO FACILITATE SITE OBSERVATIONS AT REQUIRED INTERVALS. 24-HOUR NOTICE IS REQUIRED.

**LEGEND**

PROPERTY LINE	
CONCRETE SURFACING	
PRIVATE ASPHALT SURFACING	
COMMERCIAL ASPHALT SURFACE	







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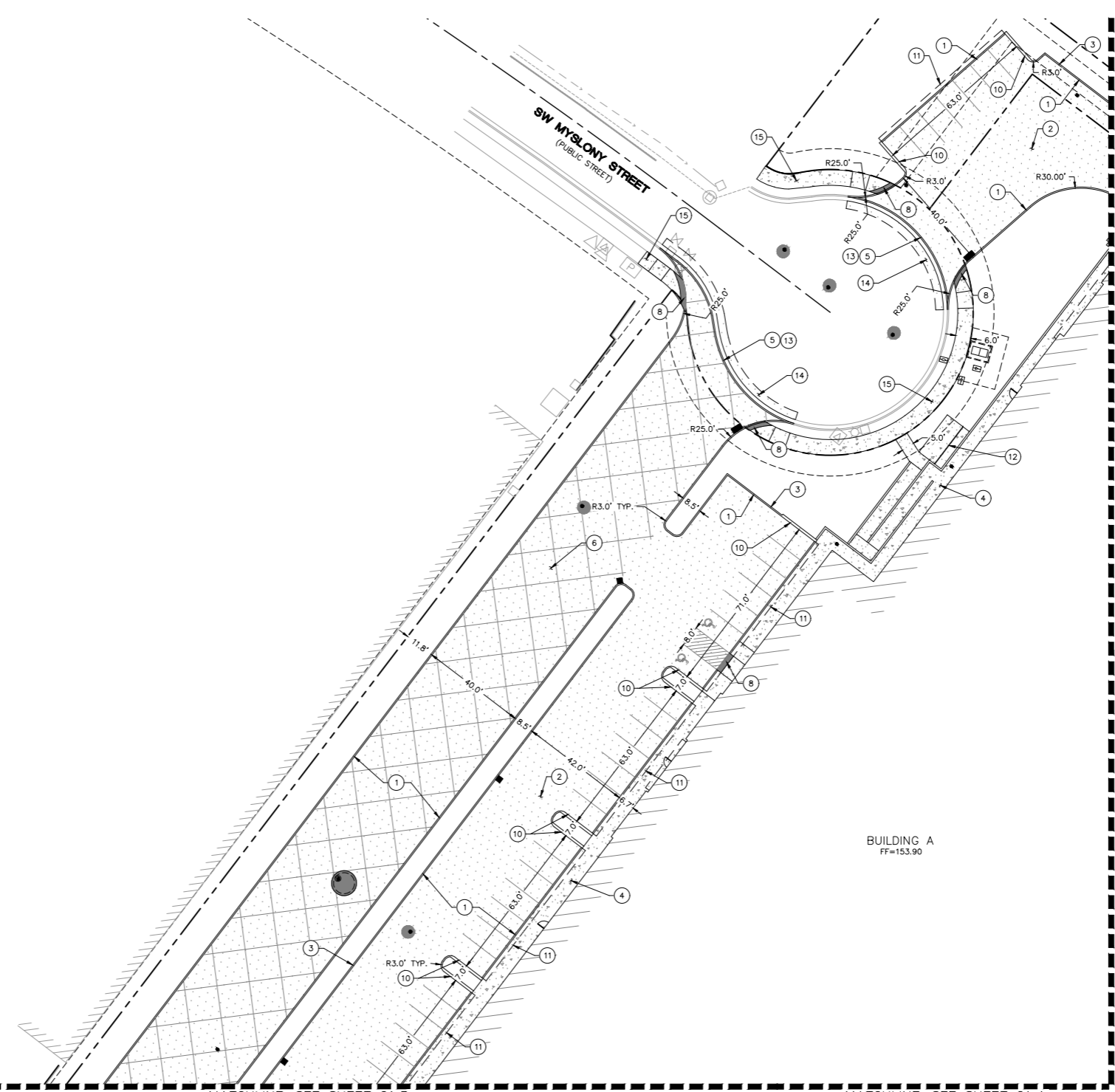
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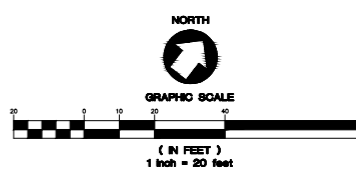
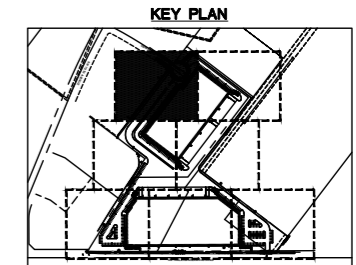


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**(X) CONSTRUCTION NOTES**

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3. INSTALL WALL, DESIGN BUILD BY CONTRACTOR
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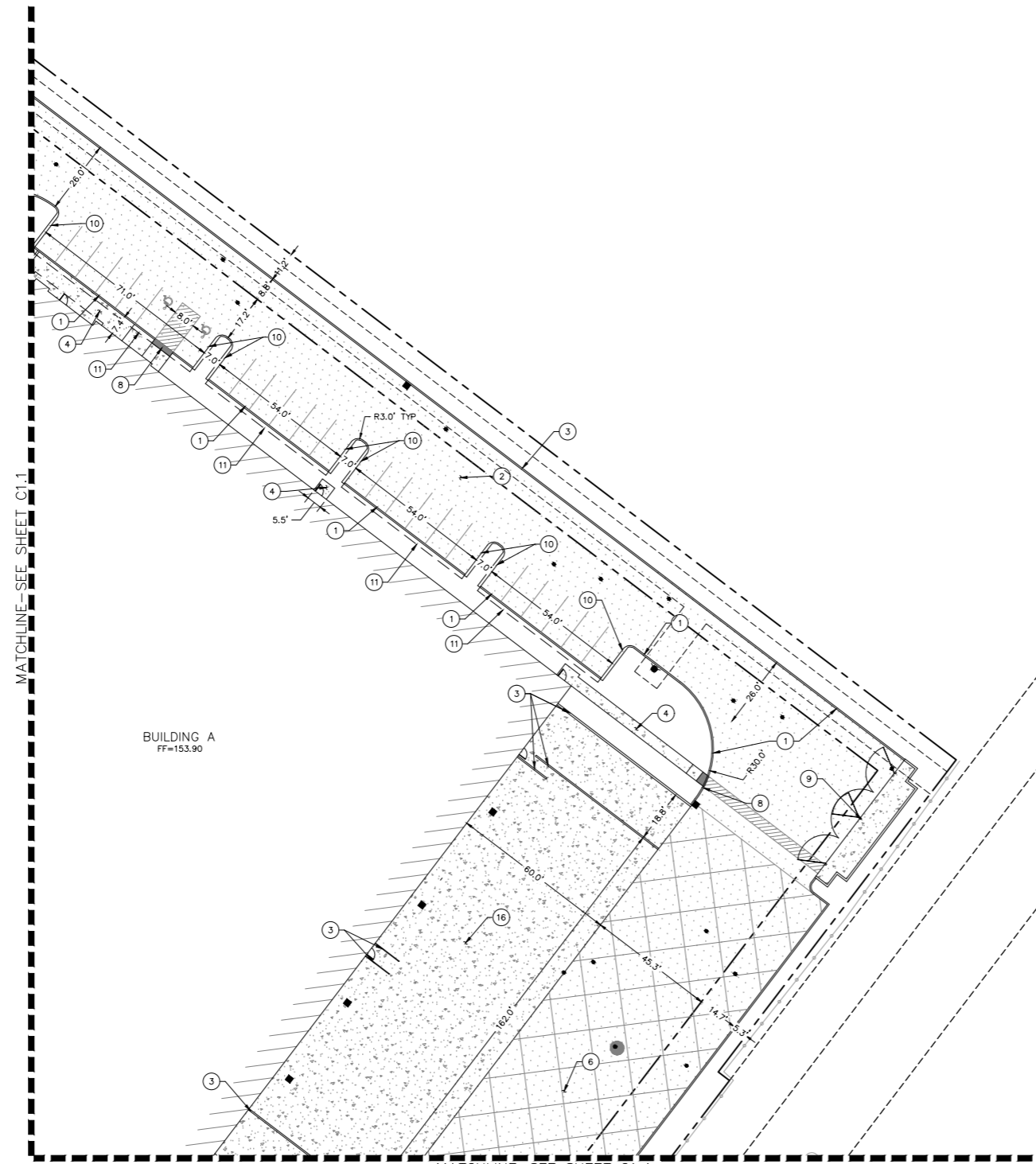
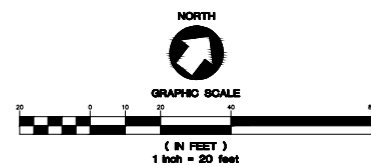
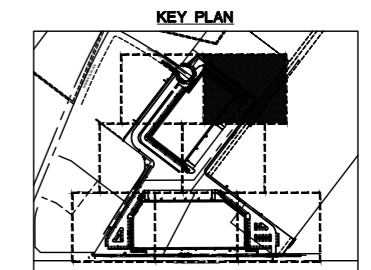
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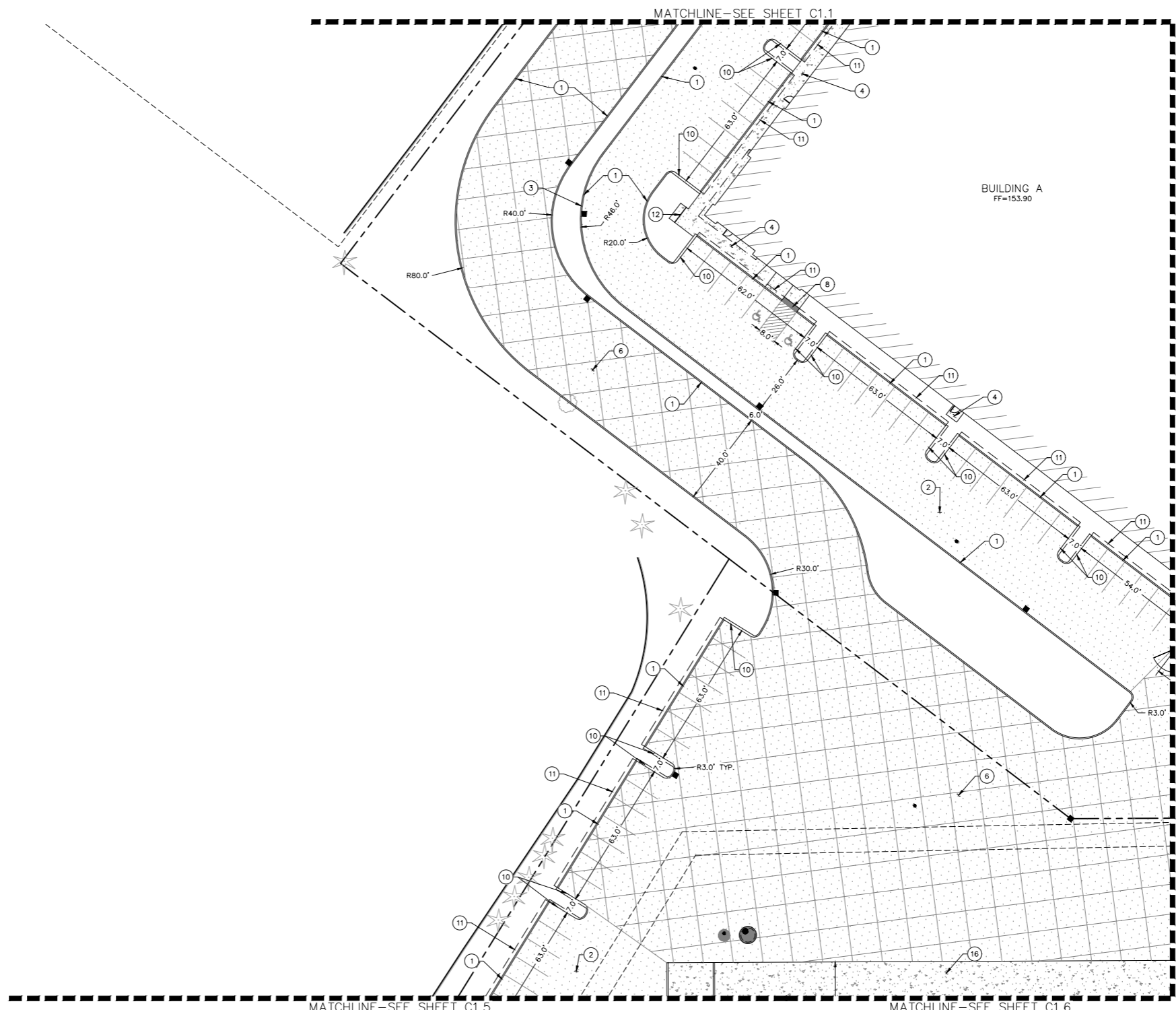
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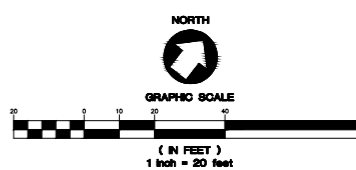
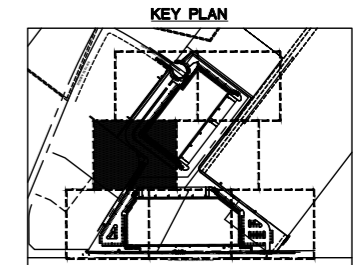


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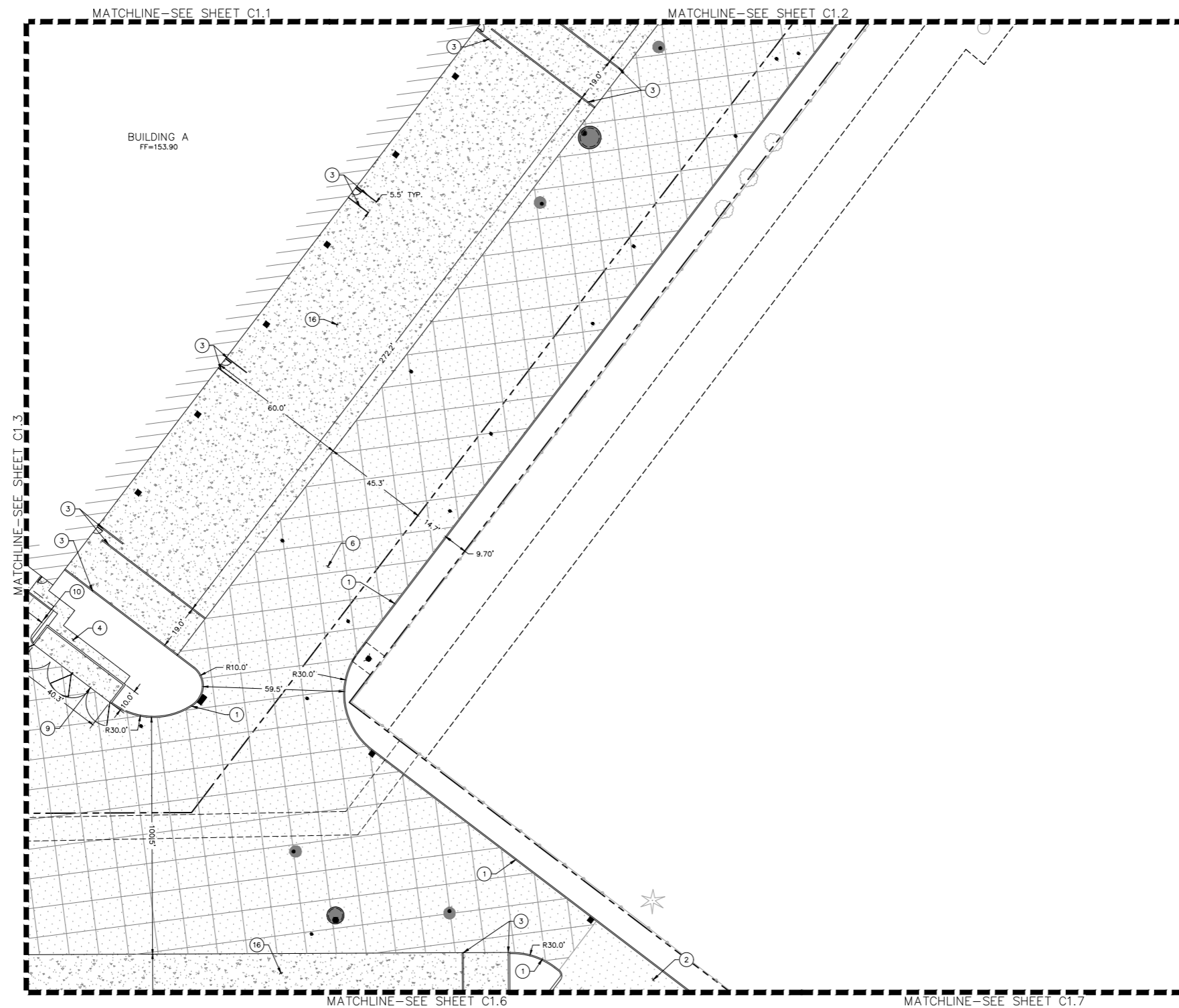
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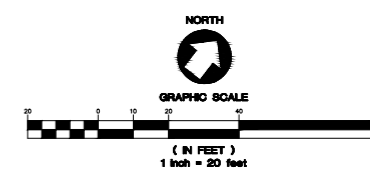
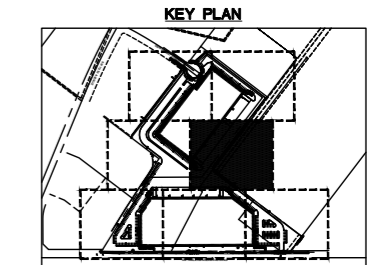


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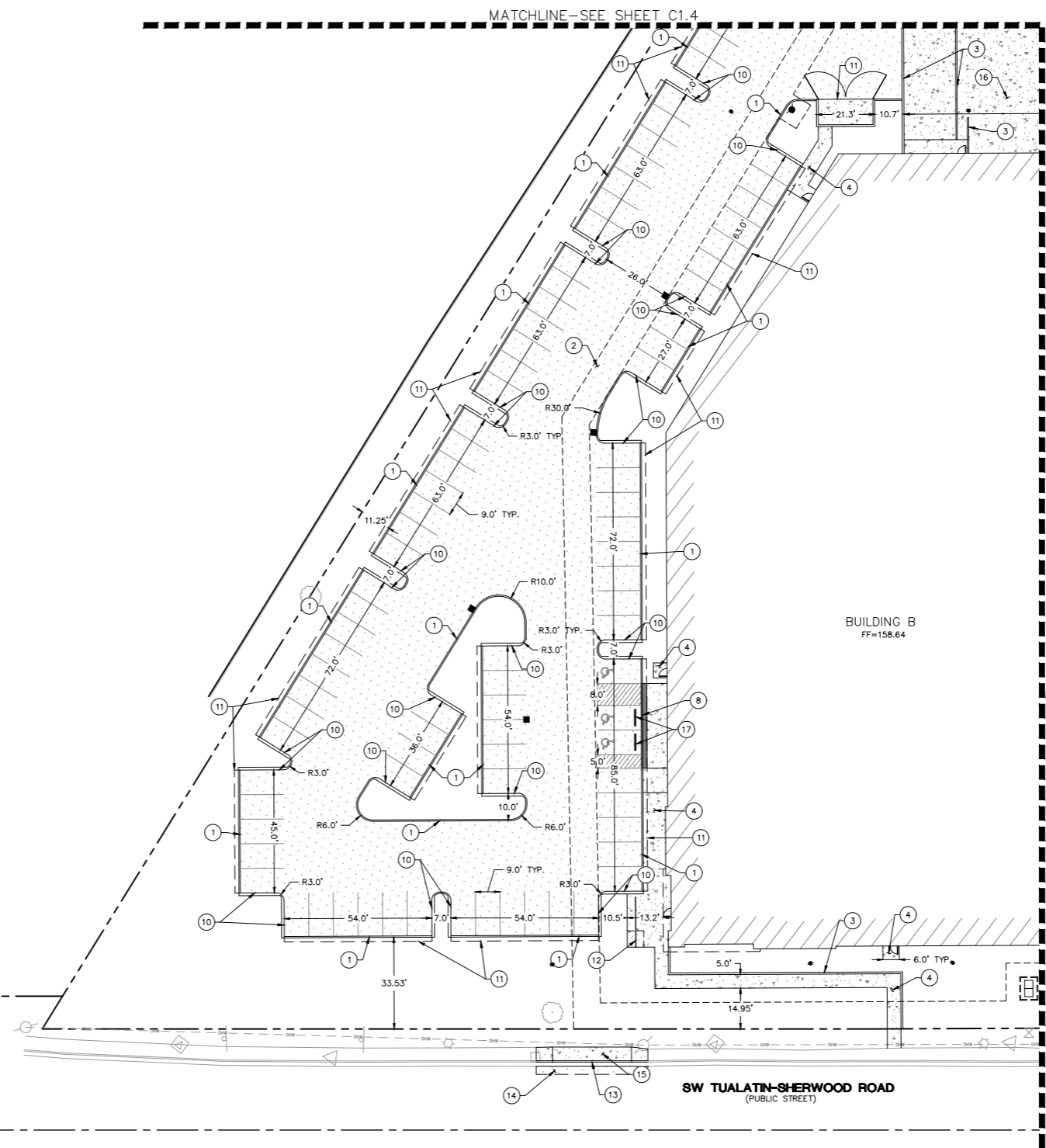
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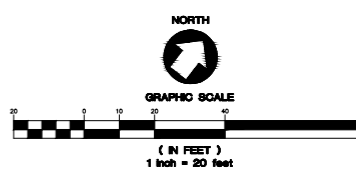
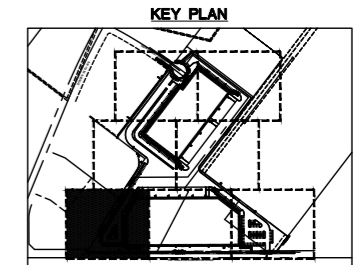


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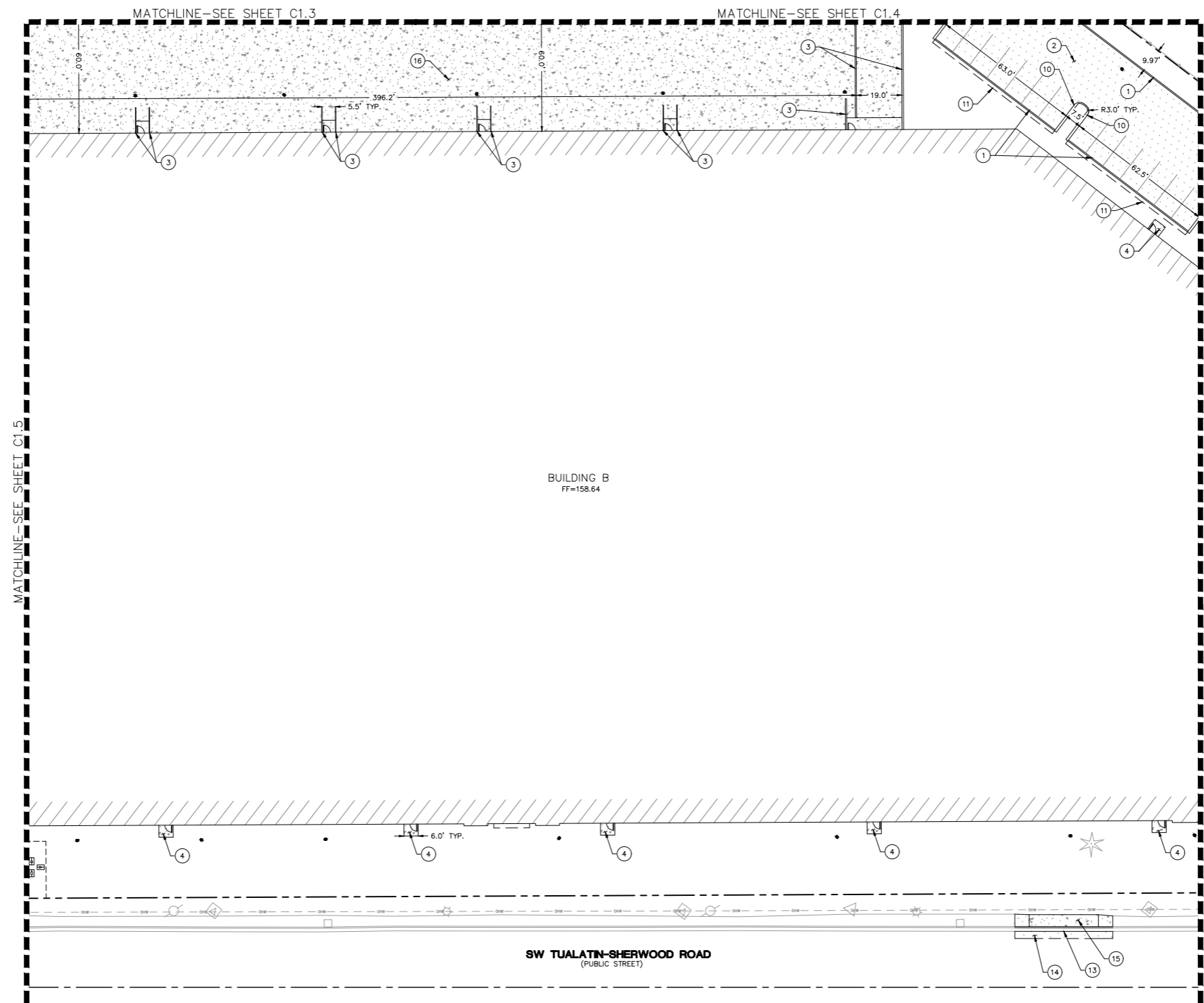
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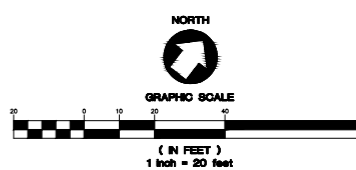
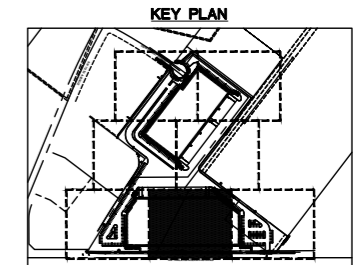


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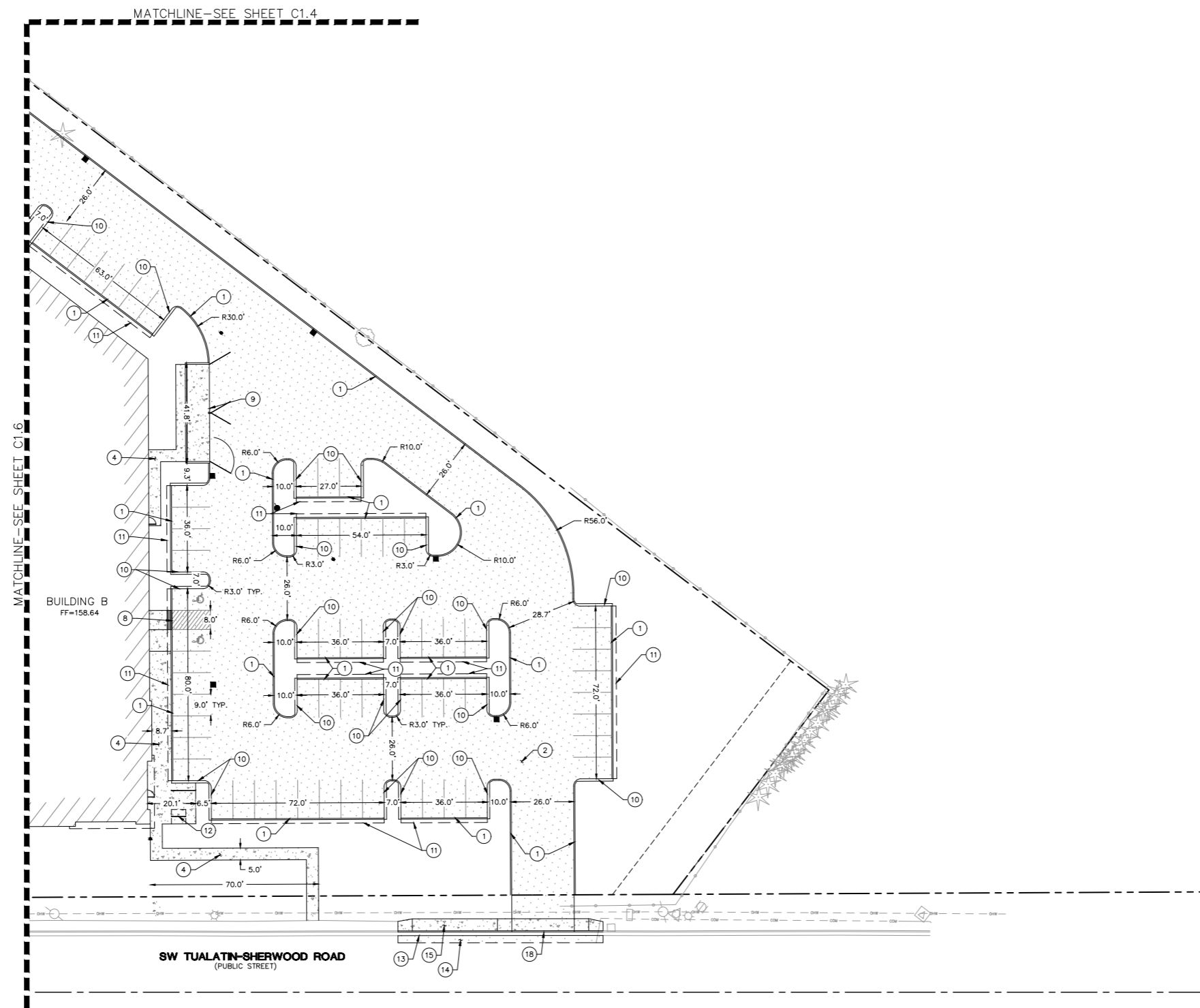
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**C1.7**

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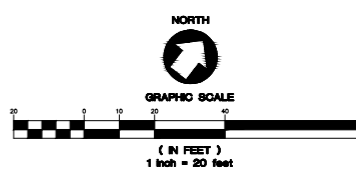
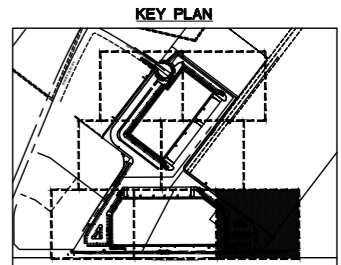


**SHEET NOTES**

- SEE SHEET C1.0 FOR GENERAL SITE PLAN NOTES AND LEGEND.
- SEE ARCHITECTURAL PLANS FOR ADDITIONAL SITE INFORMATION

**(X) CONSTRUCTION NOTES**

- INSTALL PRIVATE 6" WIDE CONCRETE CURB
- INSTALL ASPHALT SURFACE
- INSTALL WALL, DESIGN BUILD BY CONTRACTOR
- INSTALL PRIVATE SIDEWALK
- INSTALL 40' WIDE COMMERCIAL DRIVEWAY
- INSTALL HEAVY ASPHALT SURFACE
- INSTALL 6' WIDE PUBLIC SIDEWALK
- INSTALL ADA RAMP
- INSTALL TRASH ENCLOSURE, SEE ARCHITECTURAL PLANS FOR ADDITIONAL INFORMATION
- INSTALL PRIVATE 9" WIDE CONCRETE CURB
- 3' WIDE VEHICLE OVERHANG
- INSTALL BICYCLE RACK, SEE ARCHITECTURAL PLANS FOR ADDITIONAL INFORMATION
- INSTALL PUBLIC CURB AND GUTTER
- INSTALL PUBLIC ASPHALT
- INSTALL PUBLIC SIDEWALK
- INSTALL PRIVATE CONCRETE SURFACE
- INSTALL WHEELSTOPS
- INSTALL 26' WIDE DRIVEWAY



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## Appendix C

Storm Plan and Details

*(Details to be provided with permit submittal)*





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 Newport Beach, CA 92660



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**TUALATIN INDUSTRIAL**  
 TUALATIN, OR

SHEET TITLE

STORM PLAN

DATE: 10/28/19

DRAWN: NJD

CHECKED: DSE

REVISIONS:

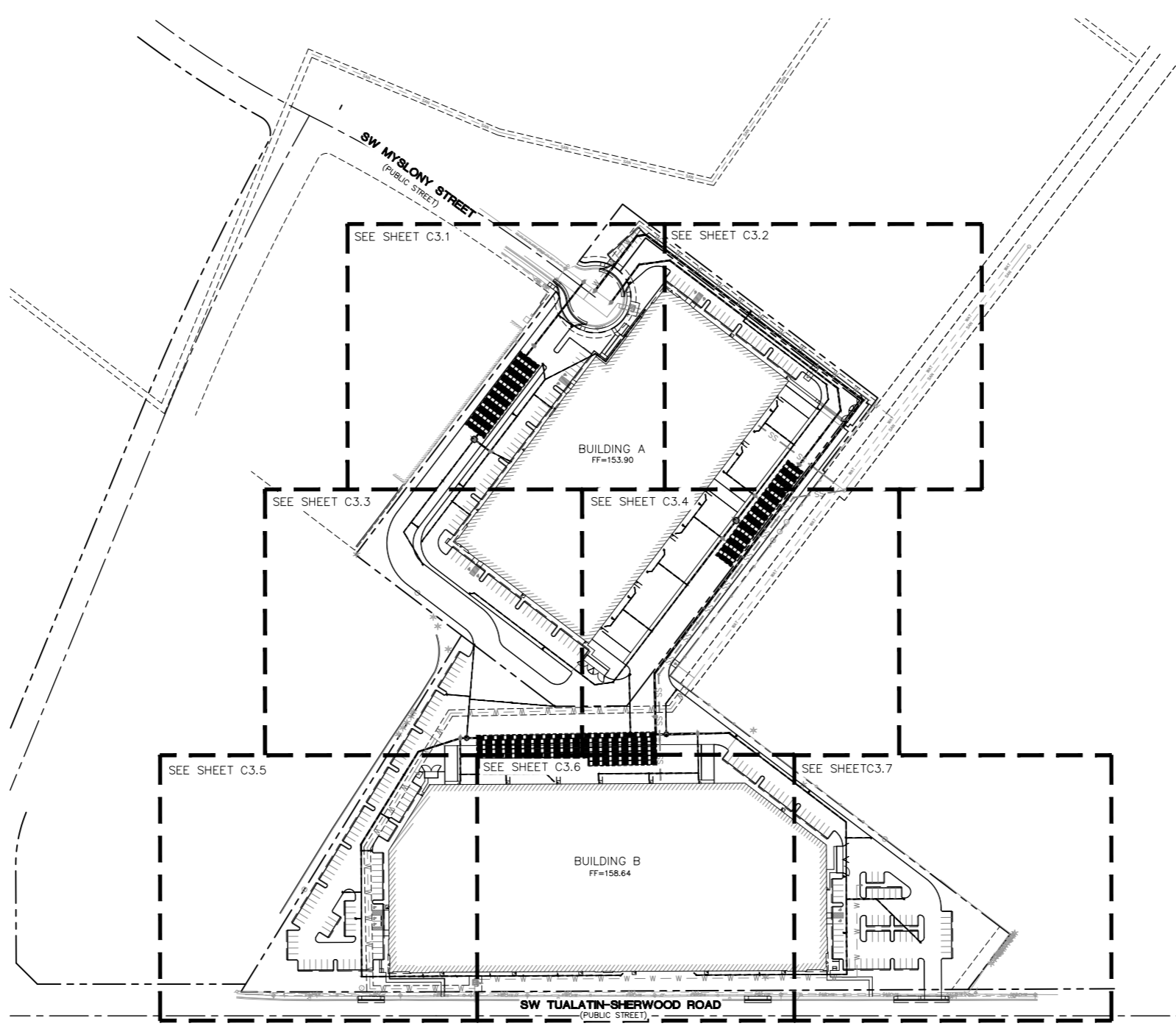
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SHEET NUMBER

**C3.0**

JOB NUMBER: A19173.10

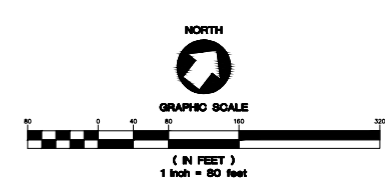


**SHEET NOTES**

- SEE C0.2 FOR GENERAL SHEET NOTES.
- ALL STORM PIPING SHALL BE PVC 3034 OR APPROVED EQUAL AT 1.0% MIN SLOPE, UNLESS NOTED OTHERWISE.
- THIS PLAN IS GENERALLY DIAGRAMMATIC. IT DOES NOT SHOW EVERY JOINT, BEND, FITTING, OR ACCESSORY REQUIRED FOR CONSTRUCTION.
- CLEAN OUTS SHALL BE INSTALLED IN CONFORMANCE WITH UPC CHAPTER SEVEN, SECTION 707 AND SECTION 719. NOT ALL REQUIRED CLEAN OUTS ARE SHOWN.
- UTILITIES WITHIN FIVE FEET OF A BUILDING SHALL BE CONSTRUCTED OF MATERIALS APPROVED FOR INTERIOR USE AS DESCRIBED IN THE CURRENT EDITION OF THE UPC.
- CHANGES IN DIRECTION OF DRAINAGE PIPING SHALL BE MADE BY THE APPROPRIATE USE OF APPROVED FITTINGS AND SHALL BE OF THE ANGLES PRESENTED BY ONE-SIXTEENTH BEND, ONE-EIGHTH BEND, ONE-SIXTH BEND OR OTHER APPROVED FITTINGS OF EQUIVALENT SWEEP.
- INLETS AND OUTLETS TO ON-SITE MANHOLES SHALL HAVE FLEXIBLE CONNECTION NO CLOSER THAN 12" AND NO FARTHER THAN 36" FROM THE MANHOLE.

**LEGEND**

SANITARY SEWER LINE	SS	SS
WATER LINE	W	W
FIRE LINE	FP	FP
FDC LINE	FDC	FDC
STORM LINE		



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**TUALATIN INDUSTRIAL**  
 TUALATIN, OR

SHEET TITLE  
**STORM PLAN - ENLARGEMENT**

DATE: 10/28/19  
 DRAWN: NJD  
 CHECKED: DSE  
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SHEET NUMBER  
**C3.1**

JOB NUMBER: A19173.10

**SHEET NOTES**

- SEE SHEET C3.0 FOR GENERAL STORM NOTES AND LEGEND.

**LABEL LEGEND**

- PIPE LABELS**
- UTILITY LENGTH
  - UTILITY SIZE
  - UTILITY TYPE
- XXLF - XX" XX
- S=X.XX%
- ↳ SLOPE (WHERE APPLICABLE)

**STRUCTURE LABELS**

- UTILITY TYPE (SD=STORM DRAINAGE)
  - STRUCTURE TYPE CALLOUT (SEE BELOW)
  - ID NUMBER (WHERE APPLICABLE)
- XX-XX-XX  
 RIM=XX.XX  
 IE IN=XX.XX  
 IE OUT=XX.XX
- ↳ STRUCTURE INFO (WHERE APPLICABLE)

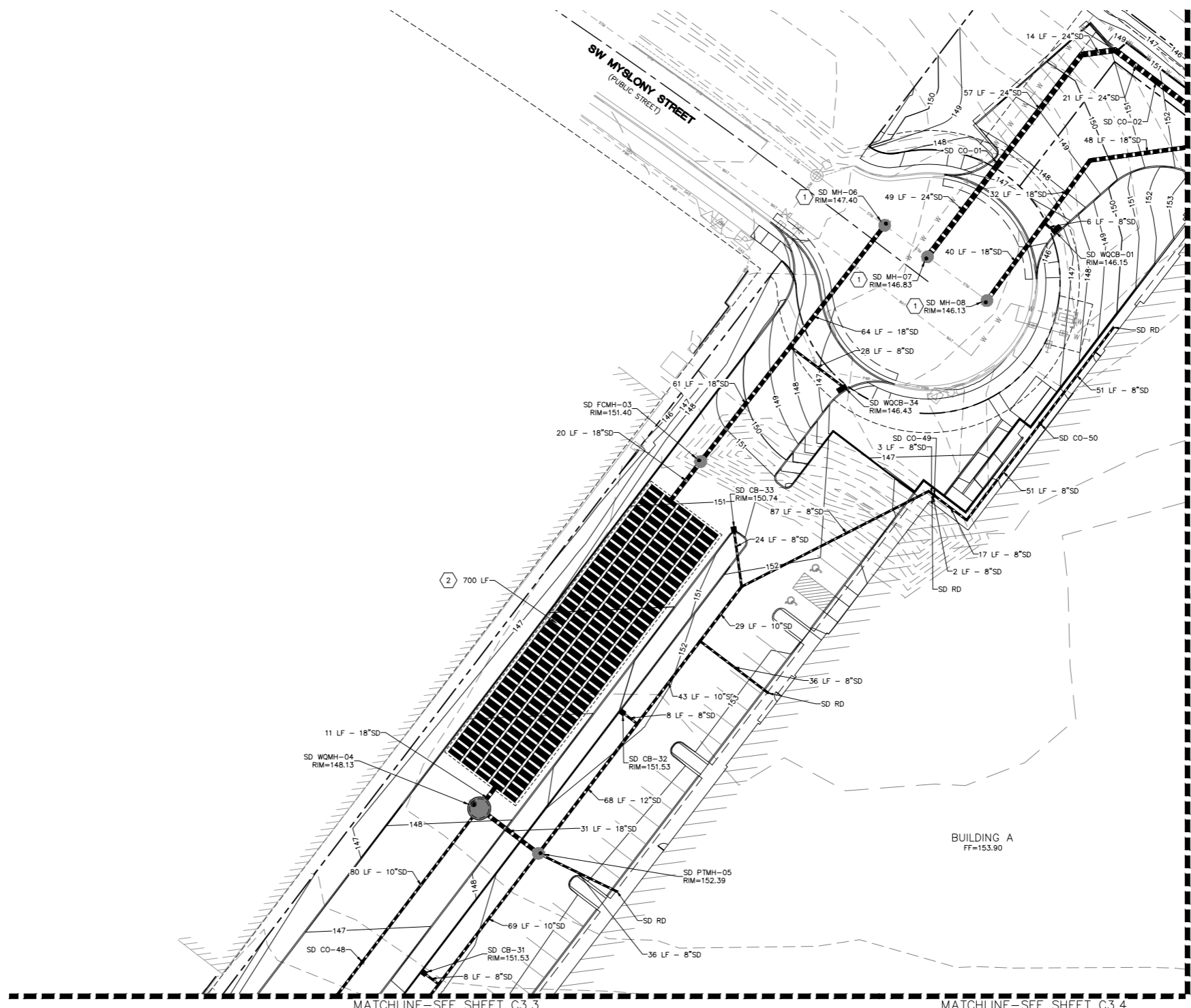
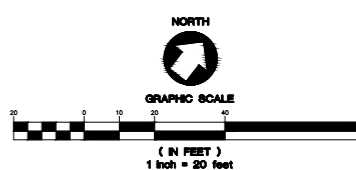
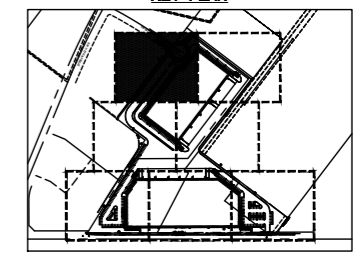
**STRUCTURE TYPES**

CALLOUT	DESCRIPTION
CB	CATCH BASIN
CO	CLEANOUT
FCMH	FLOW CONTROL MANHOLE
PTMH	PRETREATMENT MANHOLE
RD	ROOF DRAIN. SEE PLUMBING PLANS FOR CONTINUATION
WQCB	WATER QUALITY CATCHBASIN
WQMH	WATER QUALITY MANHOLE

**STORM NOTES**

- CONNECT TO EXISTING STORM MAIN
- INSTALL MC-3500 STORMTECH DETENTION CHAMBERS

**KEY PLAN**



MATCHLINE-SEE SHEET C3.2

MATCHLINE-SEE SHEET C3.3

MATCHLINE-SEE SHEET C3.4

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**SHEET NOTES**

- SEE SHEET C3.0 FOR GENERAL STORM NOTES AND LEGEND.

**LABEL LEGEND**

- PIPE LABELS**
- UTILITY LENGTH
  - UTILITY SIZE
  - UTILITY TYPE
- XXLF - XX" XX
- S=X.XXX%
- SLOPE (WHERE APPLICABLE)

**STRUCTURE LABELS**

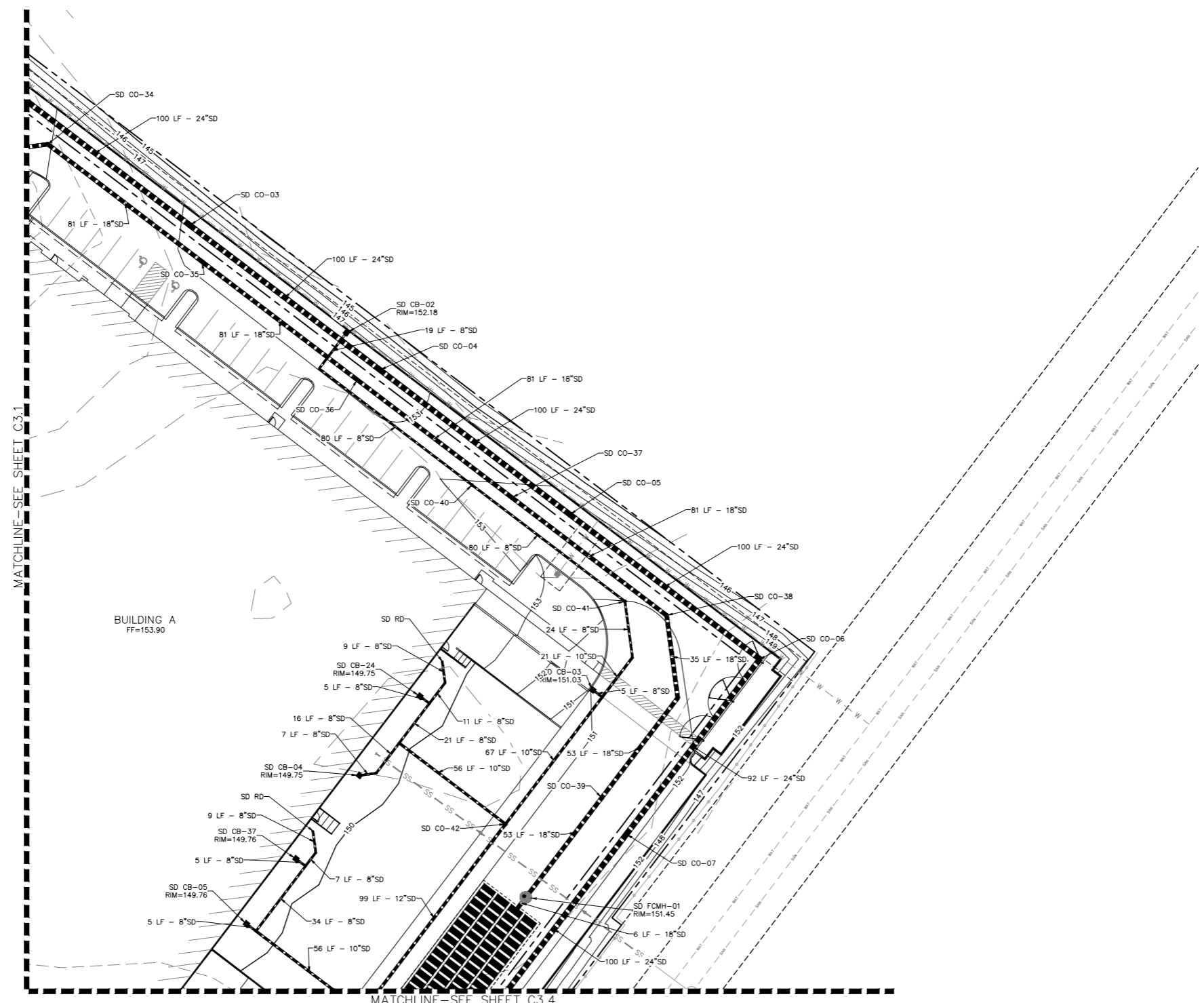
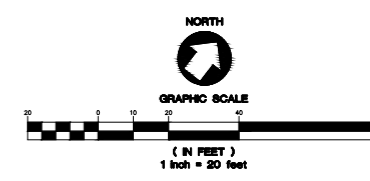
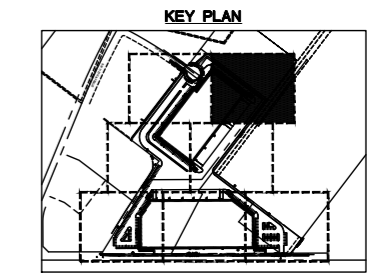
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  - STRUCTURE TYPE CALLOUT (SEE BELOW)
  - ID NUMBER (WHERE APPLICABLE)
- XX XX-XX  
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 IE IN=XX.XX  
 IE OUT=XX.XX
- STRUCTURE INFO (WHERE APPLICABLE)

**STRUCTURE TYPES**

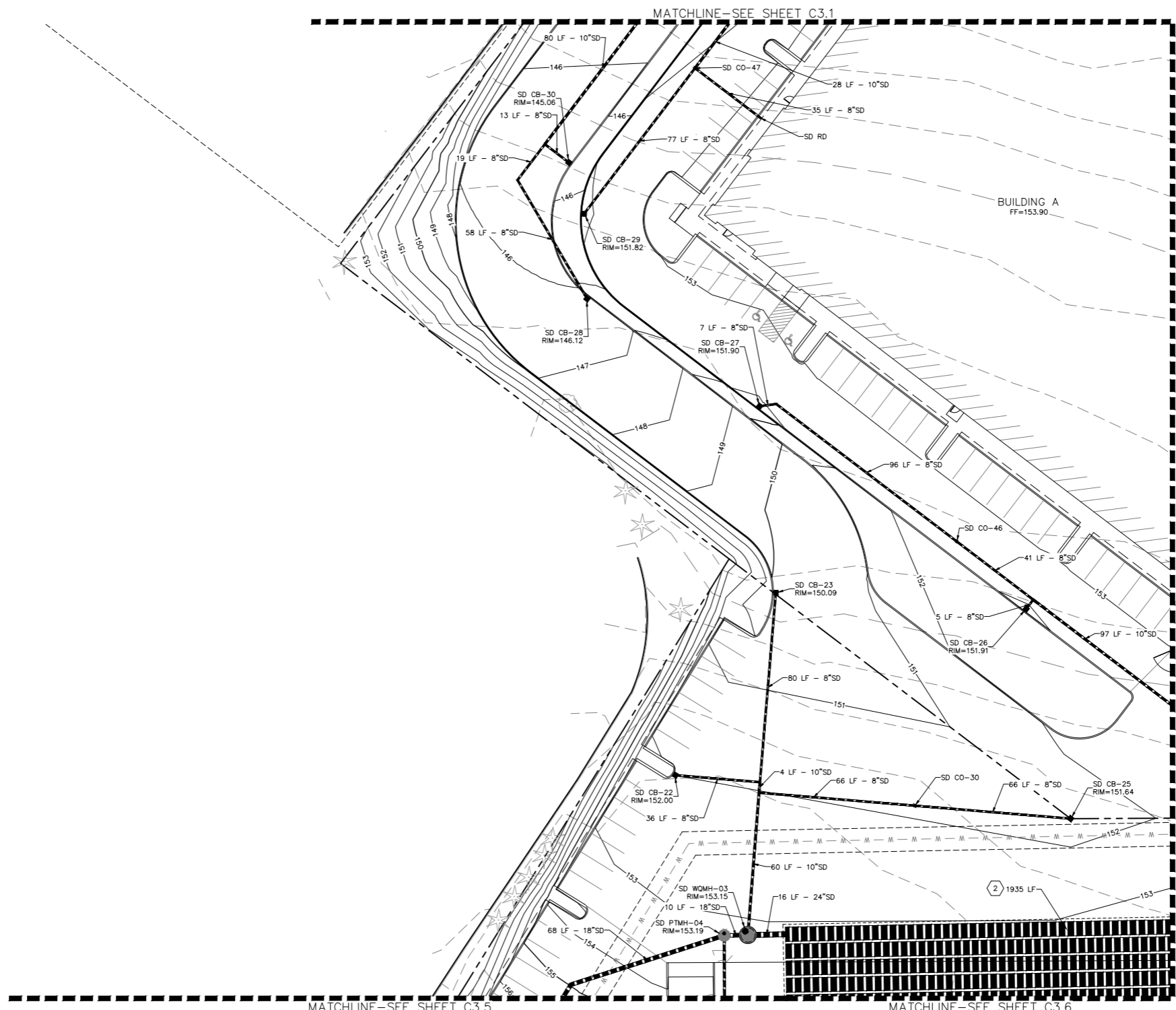
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CO	CLEANOUT
FCMH	FLOW CONTROL MANHOLE
PTMH	PRETREATMENT MANHOLE
RD	ROOF DRAIN. SEE PLUMBING PLANS FOR CONTINUATION
WQCB	WATER QUALITY CATCHBASIN
WQMH	WATER QUALITY MANHOLE

**STORM NOTES**

- CONNECT TO EXISTING STORM MAIN
- INSTALL MC-3500 STORMTECH DETENTION CHAMBERS



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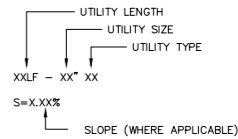


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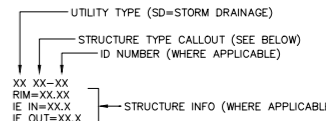
- SEE SHEET C3.0 FOR GENERAL STORM NOTES AND LEGEND.

**LABEL LEGEND**

**PIPE LABELS**



**STRUCTURE LABELS**

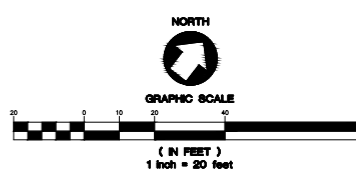
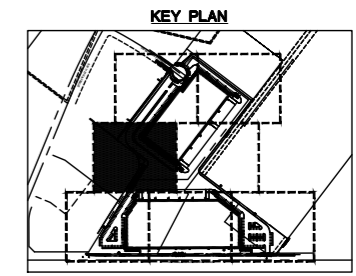


**STRUCTURE TYPES**

CALLOUT	DESCRIPTION
CB	CATCH BASIN
CO	CLEANOUT
FCMH	FLOW CONTROL MANHOLE
PTMH	PRETREATMENT MANHOLE
RD	ROOF DRAIN, SEE PLUMBING PLANS FOR CONTINUATION
WQCB	WATER QUALITY CATCHBASIN
WQMH	WATER QUALITY MANHOLE

**STORM NOTES**

- CONNECT TO EXISTING STORM MAIN
- INSTALL MC-3500 STORMTECH DETENTION CHAMBERS



SHEET TITLE  
**STORM PLAN - ENLARGEMENT**

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 DRAWN: NJD  
 CHECKED: DSE  
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SHEET NUMBER  
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JOB NUMBER: A19173.10

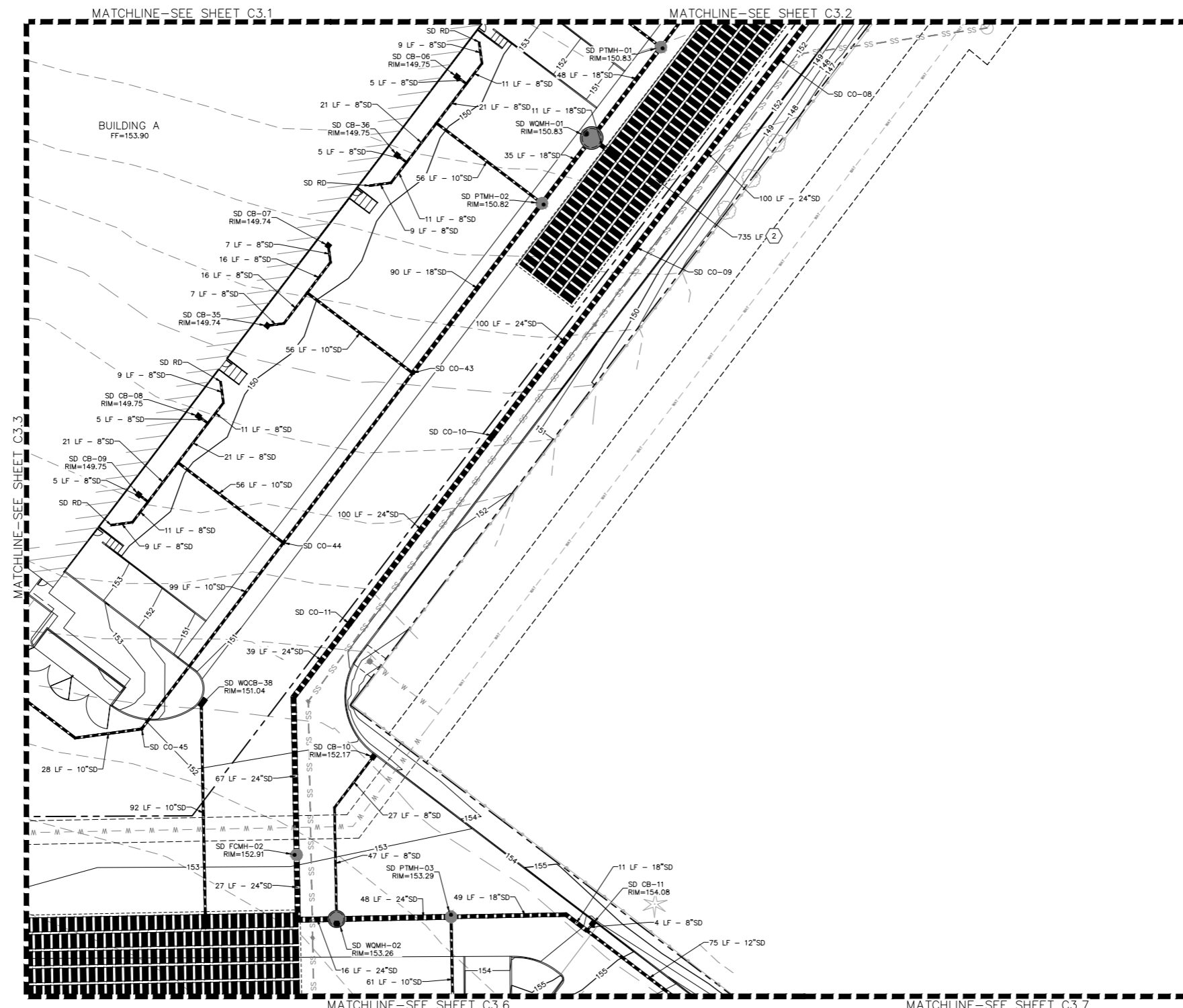


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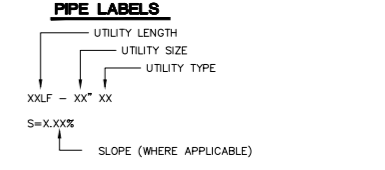
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 TUALATIN, OR



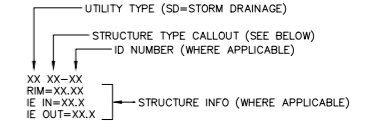
**SHEET NOTES**

- SEE SHEET C3.0 FOR GENERAL STORM NOTES AND LEGEND.

**LABEL LEGEND**



**STRUCTURE LABELS**

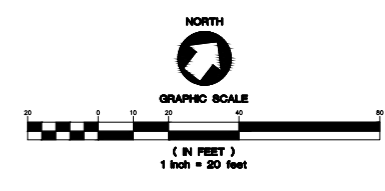
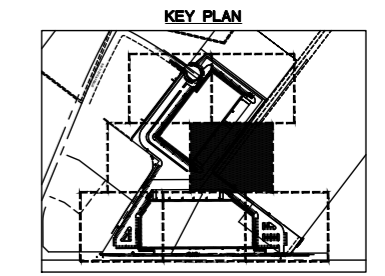


**STRUCTURE TYPES**

CALLOUT	DESCRIPTION
CB	CATCH BASIN
CO	CLEANOUT
FCMH	FLOW CONTROL MANHOLE
PTMH	PRETREATMENT MANHOLE
RD	ROOF DRAIN. SEE PLUMBING PLANS FOR CONTINUATION
WQCB	WATER QUALITY CATCHBASIN
WQMH	WATER QUALITY MANHOLE

**STORM NOTES**

- CONNECT TO EXISTING STORM MAIN
- INSTALL MC-3500 STORMTECH DETENTION CHAMBERS



SHEET TITLE  
**STORM PLAN - ENLARGEMENT**

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SHEET NUMBER  
**C3.4**

JOB NUMBER: A19173.10

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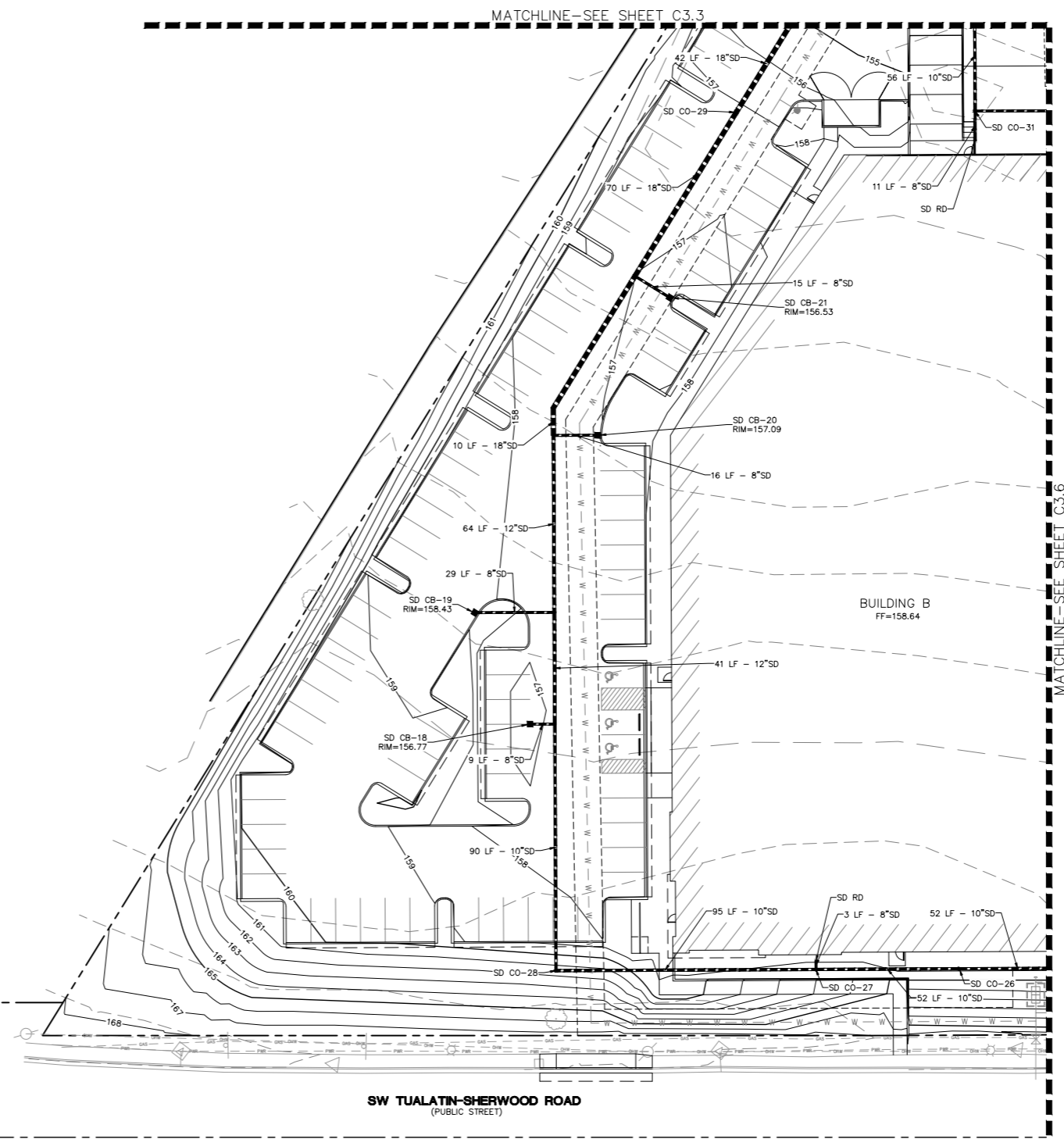
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 TUALATIN, OR

SHEET TITLE  
**STORM PLAN - ENLARGEMENT**  
 DATE: 10/28/19  
 DRAWN: NJD  
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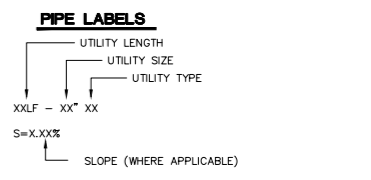
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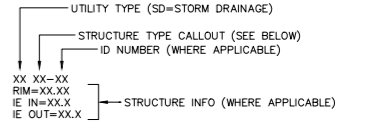
**SHEET NOTES**

- SEE SHEET C3.0 FOR GENERAL STORM NOTES AND LEGEND.

**LABEL LEGEND**



**STRUCTURE LABELS**

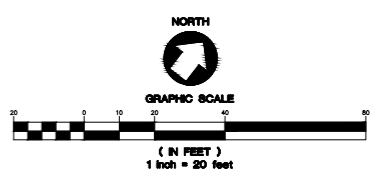
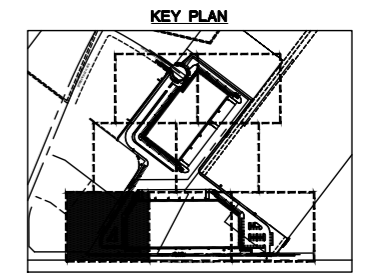


**STRUCTURE TYPES**

CALLOUT	DESCRIPTION
CB	CATCH BASIN
CO	CLEANOUT
FCMH	FLOW CONTROL MANHOLE
PTMH	PRETREATMENT MANHOLE
RD	ROOF DRAIN. SEE PLUMBING PLANS FOR CONTINUATION
WQCB	WATER QUALITY CATCHBASIN
WQMH	WATER QUALITY MANHOLE

**STORM NOTES**

- CONNECT TO EXISTING STORM MAIN
- INSTALL MC-3500 STORMTECH DETENTION CHAMBERS



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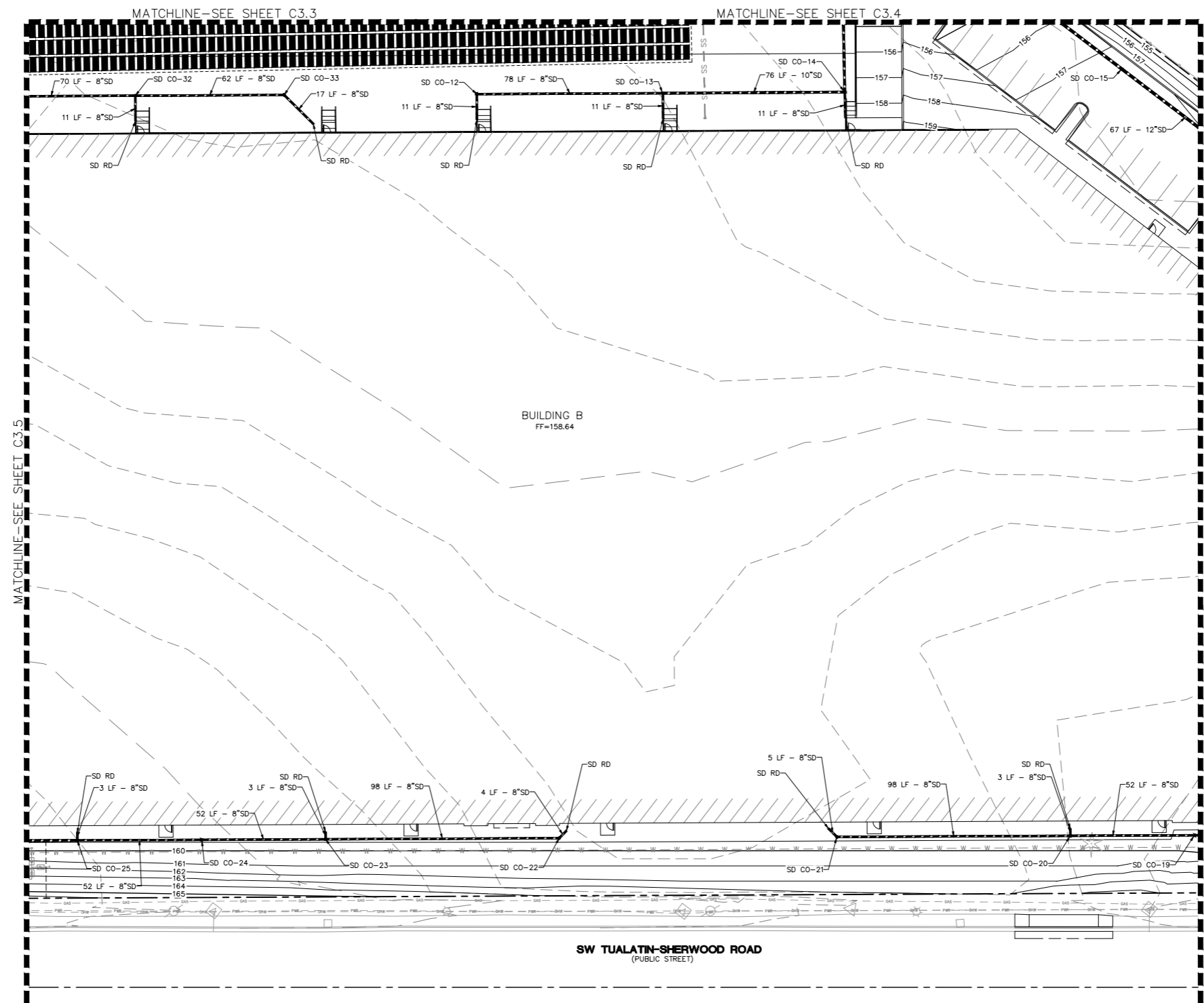
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 TUALATIN, OR

SHEET TITLE  
**STORM PLAN - ENLARGEMENT**  
 DATE: 10/28/19  
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 REVISIONS:

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 SHEET NUMBER

**C3.6**

JOB NUMBER: A19173.10



**SHEET NOTES**  
 1. SEE SHEET C3.0 FOR GENERAL STORM NOTES AND LEGEND.

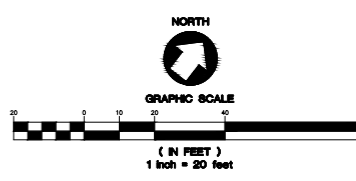
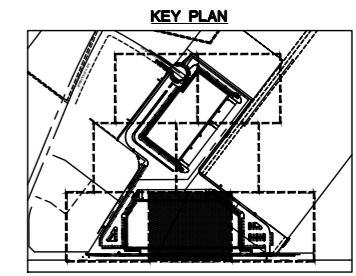
**LABEL LEGEND**  
**PIPE LABELS**  
 UTILITY LENGTH  
 UTILITY SIZE  
 UTILITY TYPE  
 XXLF - XX" XX  
 S=X.XXX%  
 SLOPE (WHERE APPLICABLE)

**STRUCTURE LABELS**  
 UTILITY TYPE (SD=STORM DRAINAGE)  
 STRUCTURE TYPE CALLOUT (SEE BELOW)  
 ID NUMBER (WHERE APPLICABLE)  
 XX XX-XX  
 RIM=XX.XX  
 IE IN=XX.XX  
 IE OUT=XX.X

**STRUCTURE TYPES**  

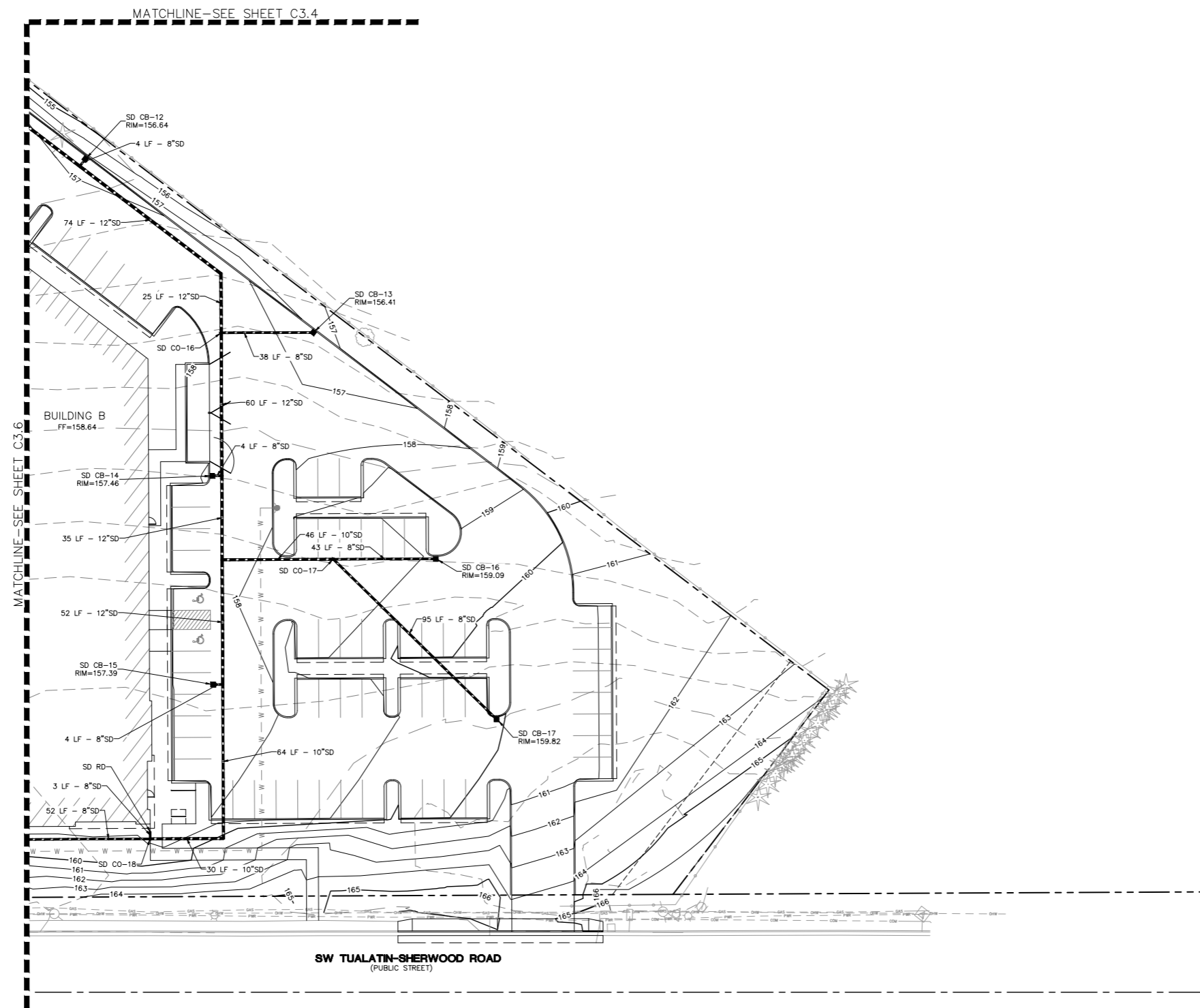
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CO	CLEANOUT
FCMH	FLOW CONTROL MANHOLE
PTMH	PRETREATMENT MANHOLE
RD	ROOF DRAIN, SEE PLUMBING PLANS FOR CONTINUATION
WQMB	WATER QUALITY CATCHBASIN
WQMH	WATER QUALITY MANHOLE

**STORM NOTES**  
 1. CONNECT TO EXISTING STORM MAIN  
 2. INSTALL MC-3500 STORMTECH DETENTION CHAMBERS



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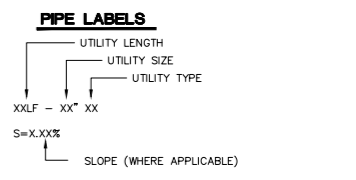
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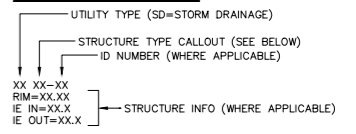
**SHEET NOTES**

- SEE SHEET C3.0 FOR GENERAL STORM NOTES AND LEGEND.

**LABEL LEGEND**



**STRUCTURE LABELS**

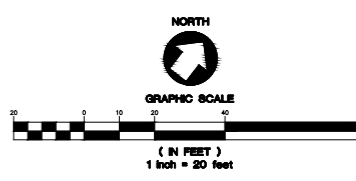
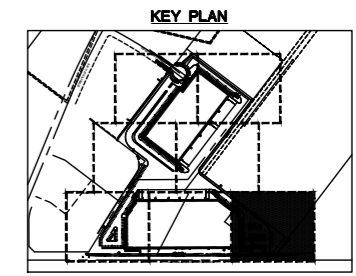


**STRUCTURE TYPES**

CALLOUT	DESCRIPTION
CB	CATCH BASIN
CO	CLEANOUT
FCMH	FLOW CONTROL MANHOLE
PTMH	PRETREATMENT MANHOLE
RD	ROOF DRAIN, SEE PLUMBING PLANS FOR CONTINUATION
WQCB	WATER QUALITY CATCHBASIN
WQMH	WATER QUALITY MANHOLE

**STORM NOTES**

- CONNECT TO EXISTING STORM MAIN
- INSTALL MC-3500 STORMTECH DETENTION CHAMBERS



SHEET TITLE

**STORM PLAN - ENLARGEMENT**

DATE: 10/28/19

DRAWN: NJD

CHECKED: DSE

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SHEET NUMBER

**C3.7**

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## Appendix D

HydroCAD Report and Storm Calculations



Northeast Ex Cond



Building A - East



(new Pond)



Existing Conditions



Building A - West



(new Pond)



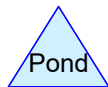
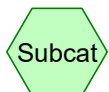
Existing Conditions



Building B



(new Pond)



**Routing Diagram for A19173.10 - Pascuzzi**

Prepared by {enter your company name here}, Printed 10/28/2019  
HydroCAD® 10.00-24 s/n 01638 © 2018 HydroCAD Software Solutions LLC

**A19173.10 - Pascuzzi**

Type IA 24-hr 2yr Rainfall=2.50"

Prepared by {enter your company name here}

Printed 10/28/2019

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Page 2

Time span=0.00-48.00 hrs, dt=0.06 hrs, 801 points  
 Runoff by SBUH method, Split Pervious/Imperv.  
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

<b>Subcatchment1S: Existing Conditions</b>	Runoff Area=132,930 sf 0.00% Impervious Runoff Depth=0.61" Tc=5.0 min CN=74/0 Runoff=0.26 cfs 0.155 af
<b>Subcatchment23S: Building A - West</b>	Runoff Area=132,930 sf 89.48% Impervious Runoff Depth=2.12" Tc=5.0 min CN=79/98 Runoff=1.62 cfs 0.539 af
<b>Subcatchment24S: Building B</b>	Runoff Area=393,369 sf 84.73% Impervious Runoff Depth=2.05" Tc=5.0 min CN=79/98 Runoff=4.62 cfs 1.544 af
<b>Subcatchment29S: Existing Conditions</b>	Runoff Area=393,369 sf 0.00% Impervious Runoff Depth=0.61" Tc=5.0 min CN=74/0 Runoff=0.77 cfs 0.458 af
<b>Subcatchment31S: Northeast Ex Cond</b>	Runoff Area=139,212 sf 0.00% Impervious Runoff Depth=0.61" Tc=5.0 min CN=74/0 Runoff=0.27 cfs 0.162 af
<b>Subcatchment32S: Building A - East</b>	Runoff Area=139,212 sf 95.15% Impervious Runoff Depth=2.20" Tc=5.0 min CN=79/98 Runoff=1.78 cfs 0.586 af
<b>Pond 26P: (new Pond)</b>	Peak Elev=2.30' Storage=0.192 af Inflow=1.62 cfs 0.539 af Outflow=0.26 cfs 0.539 af
<b>Pond 27P: (new Pond)</b>	Peak Elev=2.39' Storage=0.551 af Inflow=4.62 cfs 1.544 af Outflow=0.76 cfs 1.542 af
<b>Pond 33P: (new Pond)</b>	Peak Elev=2.48' Storage=0.220 af Inflow=1.78 cfs 0.586 af Outflow=0.27 cfs 0.585 af

**Total Runoff Area = 30.556 ac Runoff Volume = 3.444 af Average Runoff Depth = 1.35"**  
**56.07% Pervious = 17.133 ac 43.93% Impervious = 13.423 ac**

**Summary for Subcatchment 1S: Existing Conditions**

[49] Hint: Tc<2dt may require smaller dt

Runoff = 0.26 cfs @ 8.02 hrs, Volume= 0.155 af, Depth= 0.61"

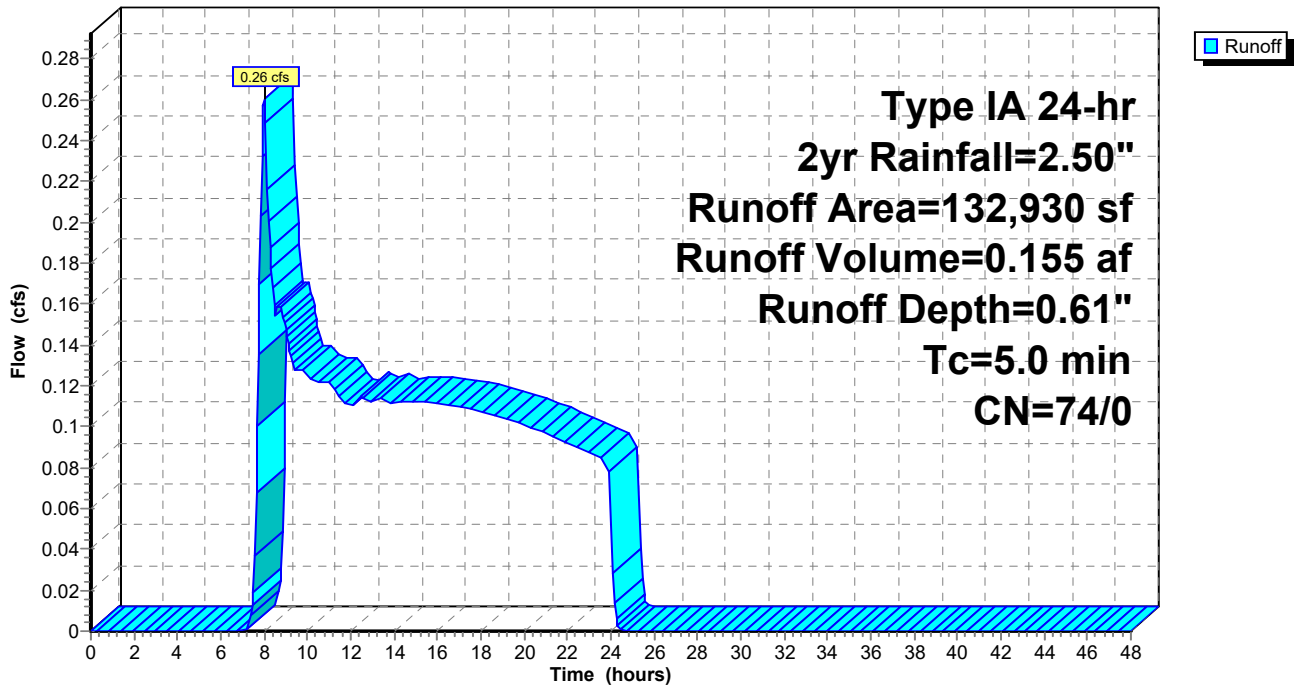
Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.06 hrs  
 Type IA 24-hr 2yr Rainfall=2.50"

Area (sf)	CN	Description
132,930	74	>75% Grass cover, Good, HSG C
132,930	74	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

**Subcatchment 1S: Existing Conditions**

Hydrograph



**Summary for Subcatchment 23S: Building A - West**

[49] Hint: Tc<2dt may require smaller dt

Runoff = 1.62 cfs @ 7.91 hrs, Volume= 0.539 af, Depth= 2.12"

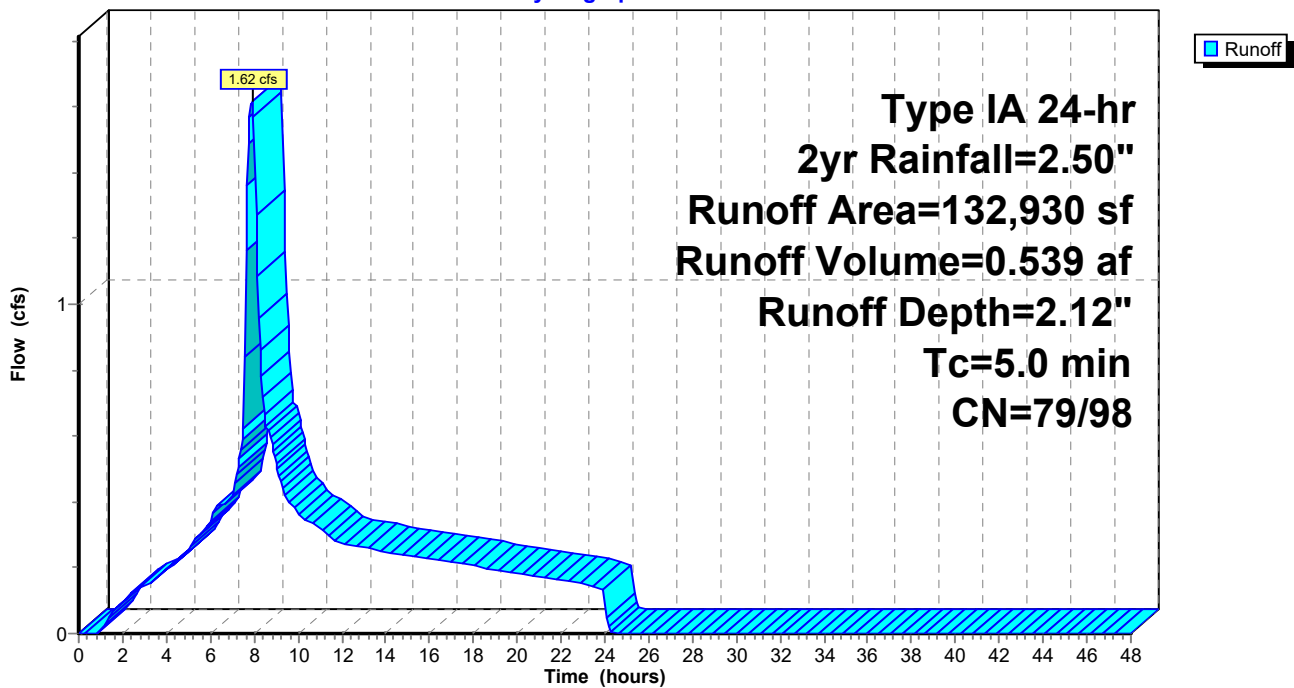
Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.06 hrs  
 Type IA 24-hr 2yr Rainfall=2.50"

Area (sf)	CN	Description
118,941	98	Paved parking, HSG C
13,989	79	50-75% Grass cover, Fair, HSG C
132,930	96	Weighted Average
13,989	79	10.52% Pervious Area
118,941	98	89.48% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

**Subcatchment 23S: Building A - West**

Hydrograph



**Summary for Subcatchment 24S: Building B**

[49] Hint: Tc<2dt may require smaller dt

Runoff = 4.62 cfs @ 7.91 hrs, Volume= 1.544 af, Depth= 2.05"

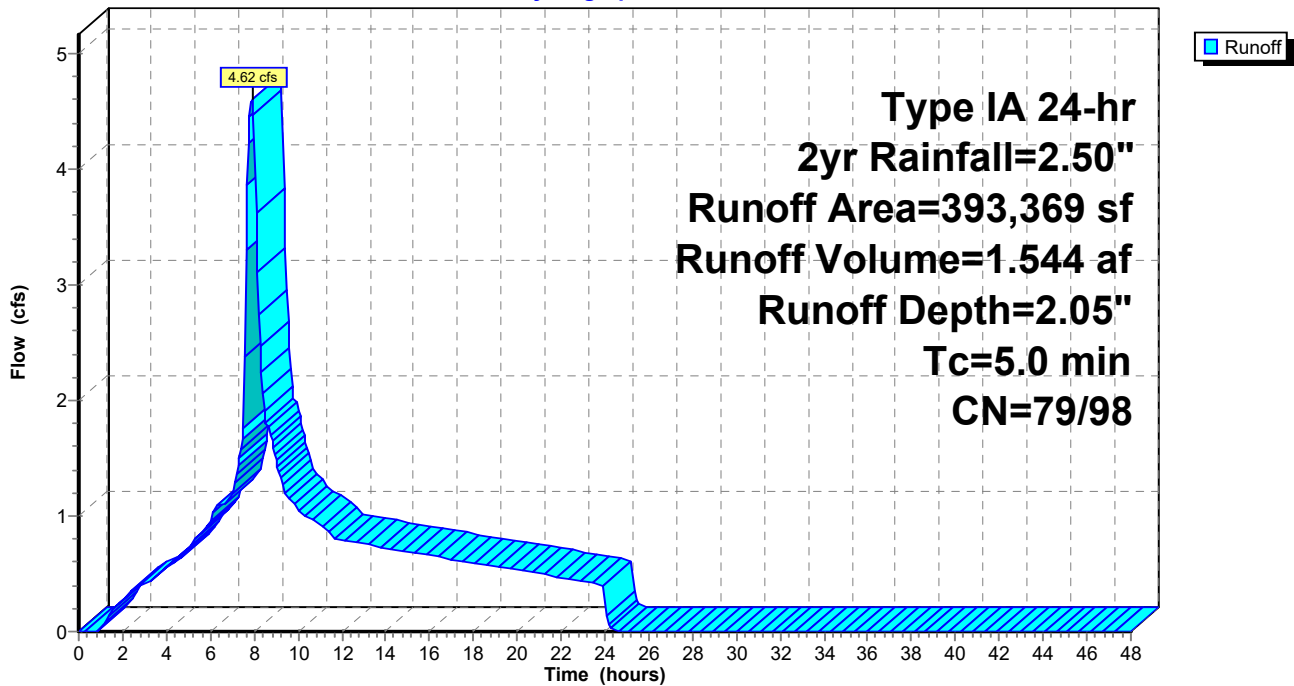
Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.06 hrs  
Type IA 24-hr 2yr Rainfall=2.50"

Area (sf)	CN	Description
333,300	98	Paved parking, HSG C
60,069	79	50-75% Grass cover, Fair, HSG C
393,369	95	Weighted Average
60,069	79	15.27% Pervious Area
333,300	98	84.73% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

**Subcatchment 24S: Building B**

Hydrograph



**Summary for Subcatchment 29S: Existing Conditions**

[49] Hint: Tc<2dt may require smaller dt

Runoff = 0.77 cfs @ 8.02 hrs, Volume= 0.458 af, Depth= 0.61"

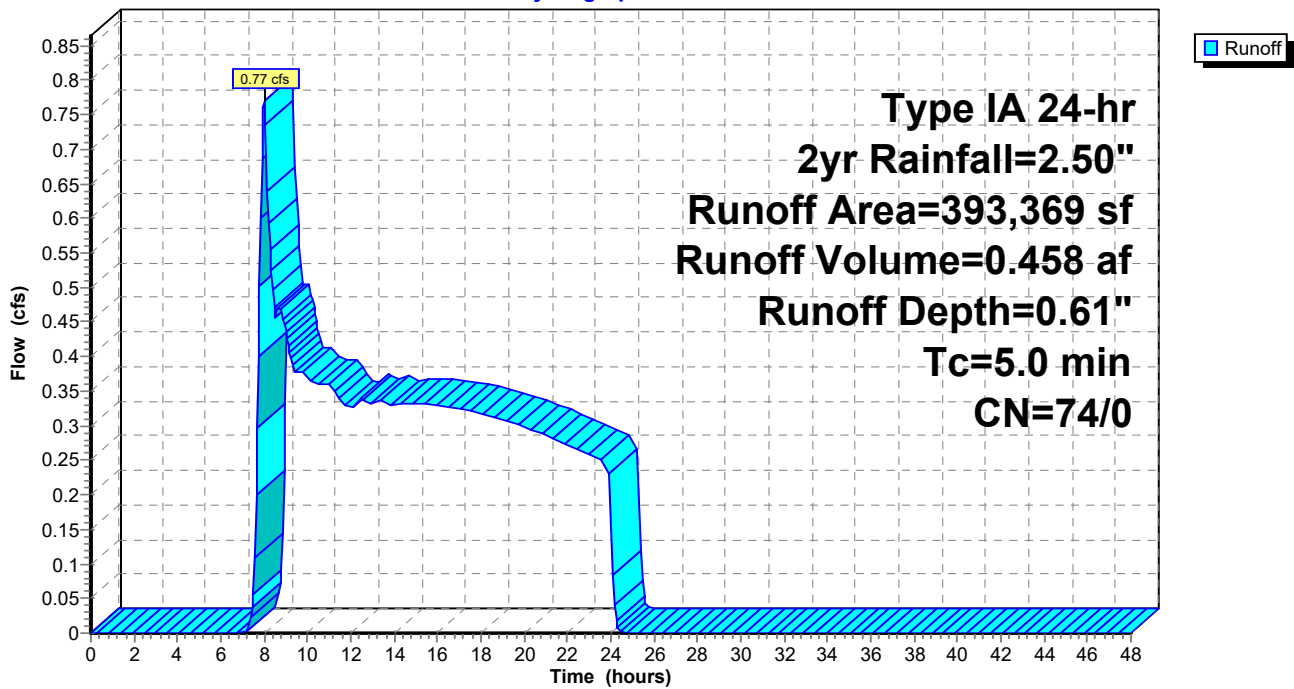
Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.06 hrs  
 Type IA 24-hr 2yr Rainfall=2.50"

Area (sf)	CN	Description
393,369	74	>75% Grass cover, Good, HSG C
393,369	74	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

**Subcatchment 29S: Existing Conditions**

Hydrograph



**Summary for Subcatchment 31S: Northeast Ex Cond**

[49] Hint: Tc<2dt may require smaller dt

Runoff = 0.27 cfs @ 8.02 hrs, Volume= 0.162 af, Depth= 0.61"

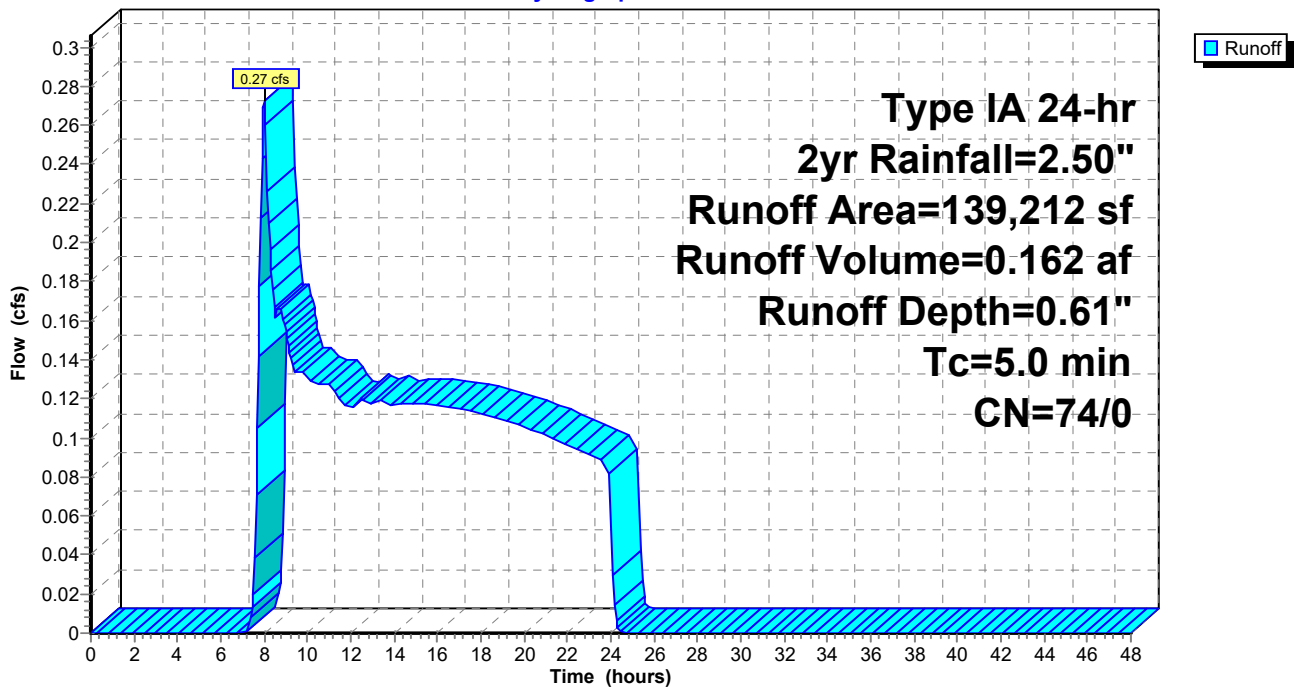
Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.06 hrs  
 Type IA 24-hr 2yr Rainfall=2.50"

Area (sf)	CN	Description
139,212	74	>75% Grass cover, Good, HSG C
139,212	74	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

**Subcatchment 31S: Northeast Ex Cond**

Hydrograph





**Summary for Subcatchment 32S: Building A - East**

[49] Hint: Tc<2dt may require smaller dt

Runoff = 1.78 cfs @ 7.91 hrs, Volume= 0.586 af, Depth= 2.20"

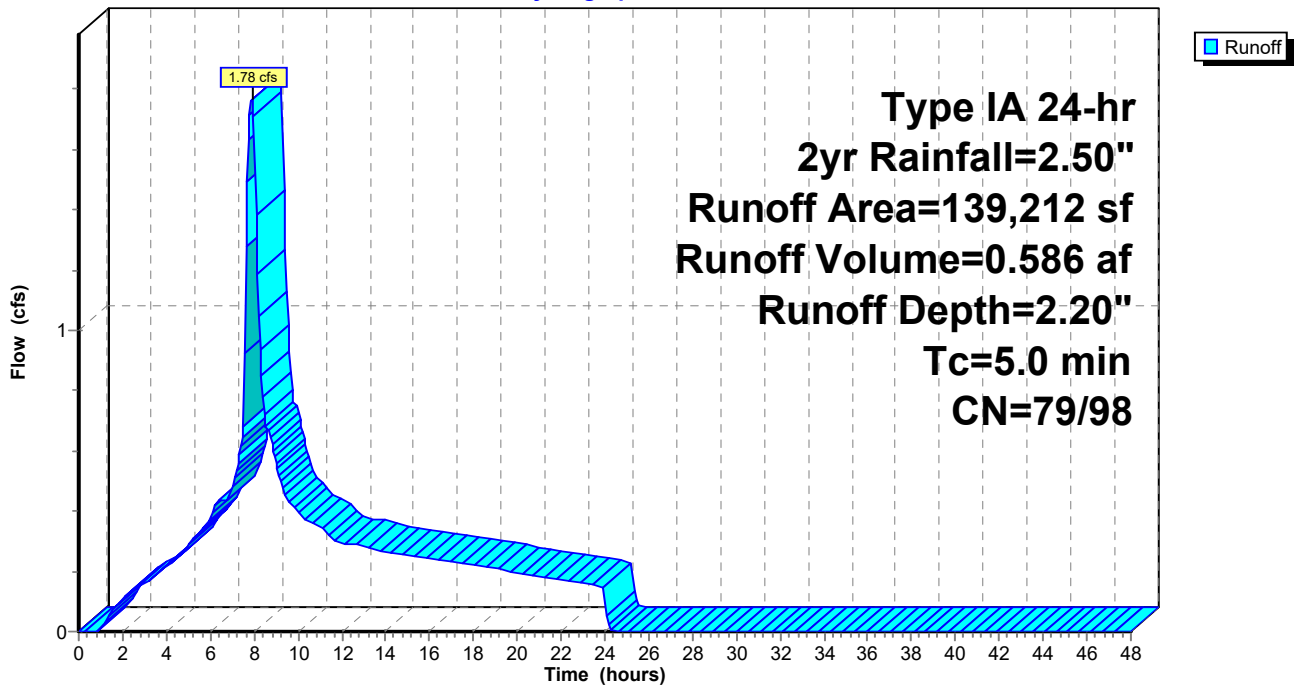
Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.06 hrs  
Type IA 24-hr 2yr Rainfall=2.50"

Area (sf)	CN	Description
132,462	98	Paved parking, HSG C
6,750	79	50-75% Grass cover, Fair, HSG C
139,212	97	Weighted Average
6,750	79	4.85% Pervious Area
132,462	98	95.15% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

**Subcatchment 32S: Building A - East**

Hydrograph



**Summary for Pond 26P: (new Pond)**

[92] Warning: Device #3 is above defined storage

Inflow Area = 3.052 ac, 89.48% Impervious, Inflow Depth = 2.12" for 2yr event  
 Inflow = 1.62 cfs @ 7.91 hrs, Volume= 0.539 af  
 Outflow = 0.26 cfs @ 12.75 hrs, Volume= 0.539 af, Atten= 84%, Lag= 290.4 min  
 Primary = 0.26 cfs @ 12.75 hrs, Volume= 0.539 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.06 hrs  
 Peak Elev= 2.30' @ 12.75 hrs Surf.Area= 0.121 ac Storage= 0.192 af

Plug-Flow detention time= 417.1 min calculated for 0.539 af (100% of inflow)  
 Center-of-Mass det. time= 416.9 min ( 1,098.7 - 681.9 )

Volume	Invert	Avail.Storage	Storage Description
#1A	0.00'	0.169 af	<b>37.08"W x 141.93"L x 5.50"H Field A</b> 0.665 af Overall - 0.243 af Embedded = 0.421 af x 40.0% Voids
#2A	0.75'	0.243 af	<b>ADS_StormTech MC-3500 d +Cap</b> x 95 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 95 Chambers in 5 Rows Cap Storage= +14.9 cf x 2 x 5 rows = 149.0 cf
		0.412 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	<b>2.6" Vert. Orifice/Grate</b> C= 0.600
#2	Primary	2.30'	<b>5.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#3	Primary	10.00'	<b>12.0" Vert. Orifice/Grate</b> C= 0.600

**Primary OutFlow** Max=0.26 cfs @ 12.75 hrs HW=2.30' (Free Discharge)

- 1=Orifice/Grate (Orifice Controls 0.26 cfs @ 7.13 fps)
- 2=Orifice/Grate ( Controls 0.00 cfs)
- 3=Orifice/Grate ( Controls 0.00 cfs)

**A19173.10 - Pascuzzi**

Prepared by {enter your company name here}

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Type IA 24-hr 2yr Rainfall=2.50"

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**Pond 26P: (new Pond) - Chamber Wizard Field A**

**Chamber Model = ADS\_StormTechMC-3500 d +Cap (ADS StormTech®MC-3500 d rev 03/14 with Cap volume)**

Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf

Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap

Cap Storage= +14.9 cf x 2 x 5 rows = 149.0 cf

77.0" Wide + 9.0" Spacing = 86.0" C-C Row Spacing

19 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 139.93' Row Length +12.0" End Stone x 2 = 141.93' Base Length

5 Rows x 77.0" Wide + 9.0" Spacing x 4 + 12.0" Side Stone x 2 = 37.08' Base Width

9.0" Base + 45.0" Chamber Height + 12.0" Cover = 5.50' Field Height

95 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 5 Rows = 10,594.4 cf Chamber Storage

28,947.8 cf Field - 10,594.4 cf Chambers = 18,353.4 cf Stone x 40.0% Voids = 7,341.3 cf Stone Storage

Chamber Storage + Stone Storage = 17,935.8 cf = 0.412 af

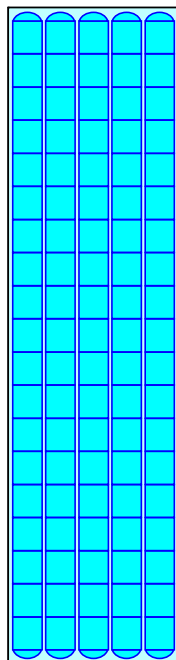
Overall Storage Efficiency = 62.0%

Overall System Size = 141.93' x 37.08' x 5.50'

95 Chambers

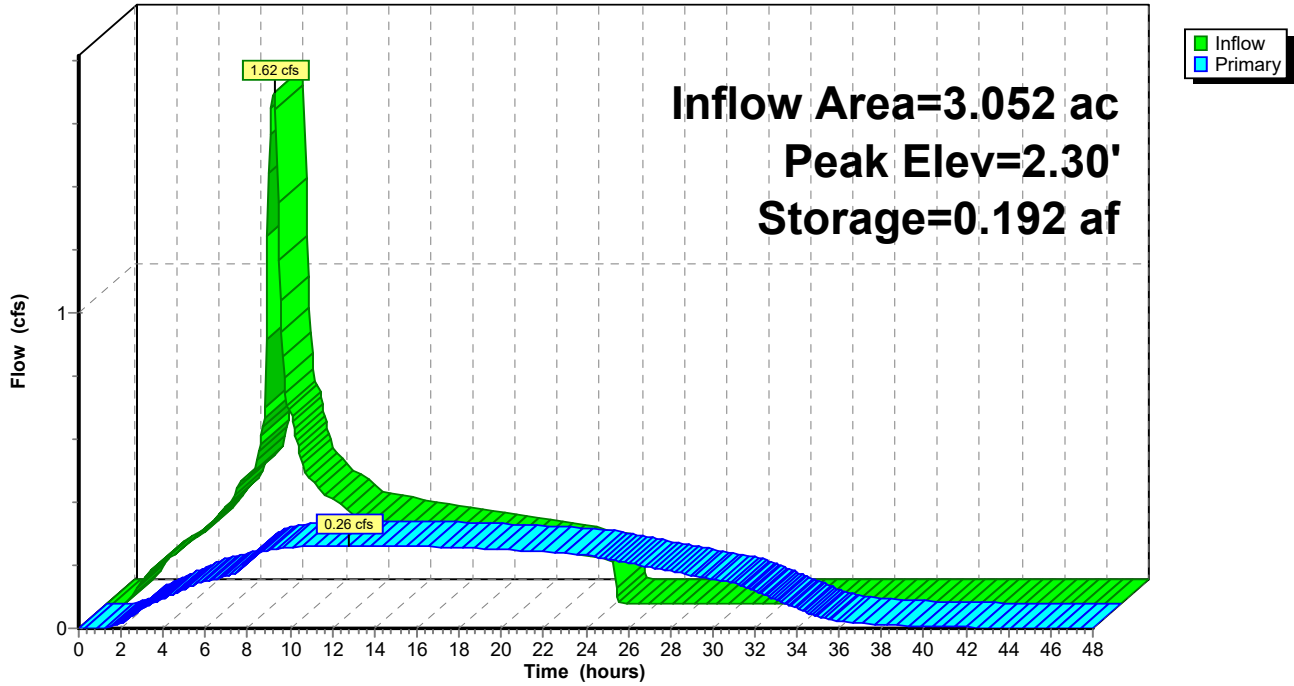
1,072.1 cy Field

679.8 cy Stone



### Pond 26P: (new Pond)

Hydrograph



**Summary for Pond 27P: (new Pond)**

[92] Warning: Device #3 is above defined storage

Inflow Area = 9.031 ac, 84.73% Impervious, Inflow Depth = 2.05" for 2yr event  
 Inflow = 4.62 cfs @ 7.91 hrs, Volume= 1.544 af  
 Outflow = 0.76 cfs @ 13.31 hrs, Volume= 1.542 af, Atten= 84%, Lag= 323.6 min  
 Primary = 0.76 cfs @ 13.31 hrs, Volume= 1.542 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.06 hrs  
 Peak Elev= 2.39' @ 13.31 hrs Surf.Area= 0.328 ac Storage= 0.551 af

Plug-Flow detention time= 421.7 min calculated for 1.540 af (100% of inflow)  
 Center-of-Mass det. time= 421.6 min ( 1,107.3 - 685.7 )

Volume	Invert	Avail.Storage	Storage Description
#1A	0.00'	0.452 af	<b>51.42'W x 278.16'L x 5.50'H Field A</b> 1.806 af Overall - 0.676 af Embedded = 1.130 af x 40.0% Voids
#2A	0.75'	0.676 af	<b>ADS_StormTech MC-3500 d +Cap</b> x 266 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 266 Chambers in 7 Rows Cap Storage= +14.9 cf x 2 x 7 rows = 208.6 cf
		1.128 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	<b>4.4" Vert. Orifice/Grate</b> C= 0.600
#2	Primary	2.39'	<b>8.6" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#3	Primary	10.00'	<b>12.0" Vert. Orifice/Grate</b> C= 0.600

**Primary OutFlow** Max=0.76 cfs @ 13.31 hrs HW=2.39' (Free Discharge)

- 1=Orifice/Grate (Orifice Controls 0.76 cfs @ 7.16 fps)
- 2=Orifice/Grate (Weir Controls 0.00 cfs @ 0.13 fps)
- 3=Orifice/Grate ( Controls 0.00 cfs)

**Pond 27P: (new Pond) - Chamber Wizard Field A**

**Chamber Model = ADS\_StormTechMC-3500 d +Cap (ADS StormTech®MC-3500 d rev 03/14 with Cap volume)**

Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf

Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap

Cap Storage= +14.9 cf x 2 x 7 rows = 208.6 cf

77.0" Wide + 9.0" Spacing = 86.0" C-C Row Spacing

38 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 276.16' Row Length +12.0" End Stone x 2 = 278.16' Base Length

7 Rows x 77.0" Wide + 9.0" Spacing x 6 + 12.0" Side Stone x 2 = 51.42' Base Width

9.0" Base + 45.0" Chamber Height + 12.0" Cover = 5.50' Field Height

266 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 7 Rows = 29,455.8 cf Chamber Storage

78,661.3 cf Field - 29,455.8 cf Chambers = 49,205.5 cf Stone x 40.0% Voids = 19,682.2 cf Stone Storage

Chamber Storage + Stone Storage = 49,138.0 cf = 1.128 af

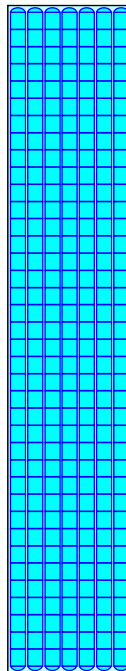
Overall Storage Efficiency = 62.5%

Overall System Size = 278.16' x 51.42' x 5.50'

266 Chambers

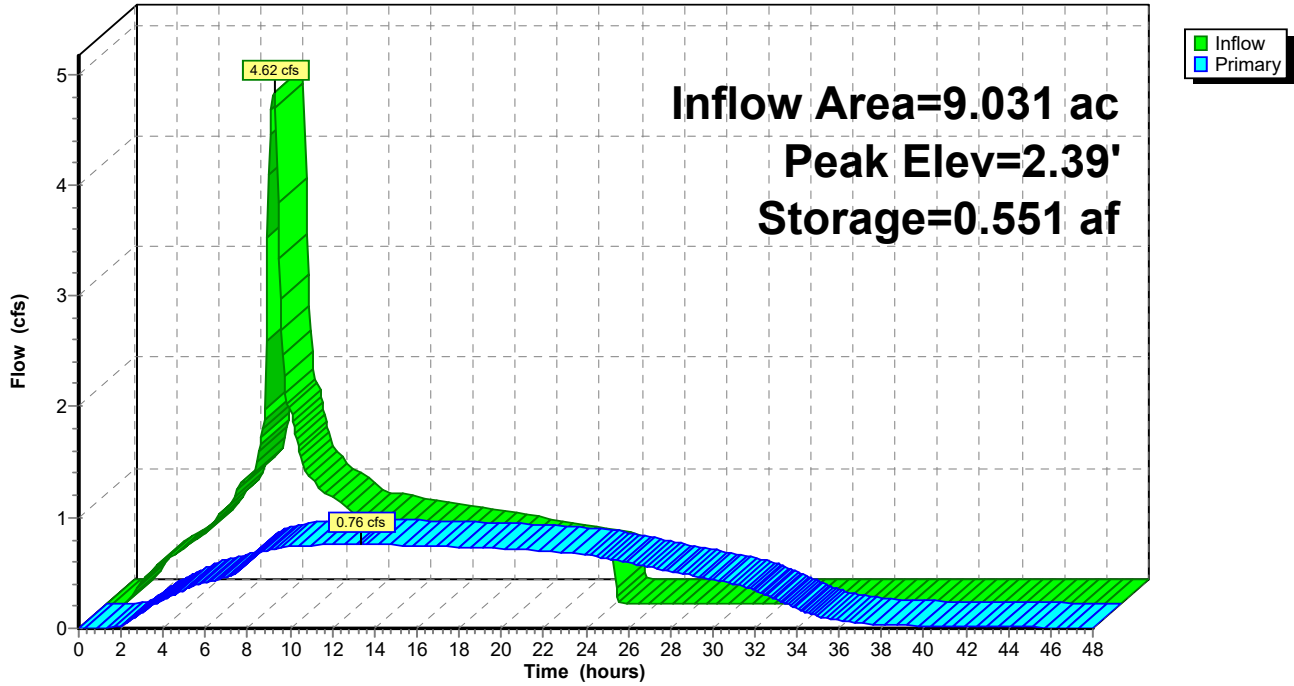
2,913.4 cy Field

1,822.4 cy Stone



Pond 27P: (new Pond)

Hydrograph



**Summary for Pond 33P: (new Pond)**

Inflow Area = 3.196 ac, 95.15% Impervious, Inflow Depth = 2.20" for 2yr event  
 Inflow = 1.78 cfs @ 7.91 hrs, Volume= 0.586 af  
 Outflow = 0.27 cfs @ 13.52 hrs, Volume= 0.585 af, Atten= 85%, Lag= 336.7 min  
 Primary = 0.27 cfs @ 13.52 hrs, Volume= 0.585 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.06 hrs  
 Peak Elev= 2.48' @ 13.52 hrs Surf.Area= 0.127 ac Storage= 0.220 af

Plug-Flow detention time= 458.1 min calculated for 0.585 af (100% of inflow)  
 Center-of-Mass det. time= 457.1 min ( 1,134.7 - 677.5 )

Volume	Invert	Avail.Storage	Storage Description
#1A	0.00'	0.177 af	<b>29.92'W x 184.95'L x 5.50'H Field A</b> 0.699 af Overall - 0.255 af Embedded = 0.443 af x 40.0% Voids
#2A	0.75'	0.255 af	<b>ADS_StormTech MC-3500 d +Cap</b> x 100 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 100 Chambers in 4 Rows Cap Storage= +14.9 cf x 2 x 4 rows = 119.2 cf
		0.433 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	<b>2.6" Vert. Orifice/Grate</b> C= 0.600
#2	Primary	2.49'	<b>5.1" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#3	Primary	3.27'	<b>12.0" Vert. Orifice/Grate</b> C= 0.600

**Primary OutFlow** Max=0.27 cfs @ 13.52 hrs HW=2.48' (Free Discharge)

- 1=Orifice/Grate (Orifice Controls 0.27 cfs @ 7.42 fps)
- 2=Orifice/Grate ( Controls 0.00 cfs)
- 3=Orifice/Grate ( Controls 0.00 cfs)



**A19173.10 - Pascuzzi**

Prepared by {enter your company name here}

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Type IA 24-hr 2yr Rainfall=2.50"

Printed 10/28/2019

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**Pond 33P: (new Pond) - Chamber Wizard Field A**

**Chamber Model = ADS\_StormTechMC-3500 d +Cap (ADS StormTech®MC-3500 d rev 03/14 with Cap volume)**

Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf

Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap

Cap Storage= +14.9 cf x 2 x 4 rows = 119.2 cf

77.0" Wide + 9.0" Spacing = 86.0" C-C Row Spacing

25 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 182.95' Row Length +12.0" End Stone x 2 = 184.95' Base Length

4 Rows x 77.0" Wide + 9.0" Spacing x 3 + 12.0" Side Stone x 2 = 29.92' Base Width

9.0" Base + 45.0" Chamber Height + 12.0" Cover = 5.50' Field Height

100 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 4 Rows = 11,114.4 cf Chamber Storage

30,432.0 cf Field - 11,114.4 cf Chambers = 19,317.6 cf Stone x 40.0% Voids = 7,727.0 cf Stone Storage

Chamber Storage + Stone Storage = 18,841.4 cf = 0.433 af

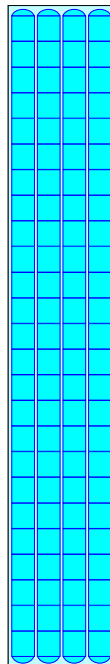
Overall Storage Efficiency = 61.9%

Overall System Size = 184.95' x 29.92' x 5.50'

100 Chambers

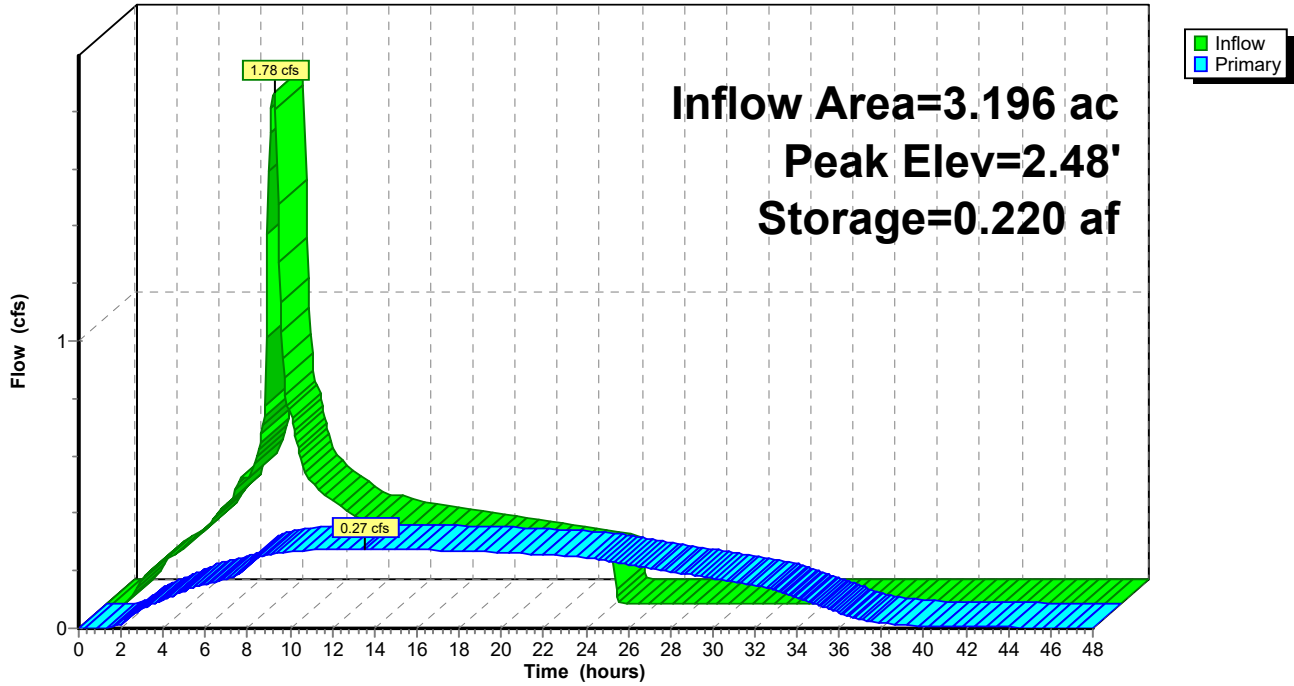
1,127.1 cy Field

715.5 cy Stone



**Pond 33P: (new Pond)**

Hydrograph



**A19173.10 - Pascuzzi**

Type IA 24-hr 10yr Rainfall=3.45"

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Time span=0.00-48.00 hrs, dt=0.06 hrs, 801 points  
 Runoff by SBUH method, Split Pervious/Imperv.  
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

<b>Subcatchment1S: Existing Conditions</b>	Runoff Area=132,930 sf 0.00% Impervious Runoff Depth=1.21" Tc=5.0 min CN=74/0 Runoff=0.72 cfs 0.307 af
<b>Subcatchment23S: Building A - West</b>	Runoff Area=132,930 sf 89.48% Impervious Runoff Depth=3.04" Tc=5.0 min CN=79/98 Runoff=2.31 cfs 0.773 af
<b>Subcatchment24S: Building B</b>	Runoff Area=393,369 sf 84.73% Impervious Runoff Depth=2.96" Tc=5.0 min CN=79/98 Runoff=6.63 cfs 2.227 af
<b>Subcatchment29S: Existing Conditions</b>	Runoff Area=393,369 sf 0.00% Impervious Runoff Depth=1.21" Tc=5.0 min CN=74/0 Runoff=2.12 cfs 0.907 af
<b>Subcatchment31S: Northeast Ex Cond</b>	Runoff Area=139,212 sf 0.00% Impervious Runoff Depth=1.21" Tc=5.0 min CN=74/0 Runoff=0.75 cfs 0.321 af
<b>Subcatchment32S: Building A - East</b>	Runoff Area=139,212 sf 95.15% Impervious Runoff Depth=3.13" Tc=5.0 min CN=79/98 Runoff=2.51 cfs 0.835 af
<b>Pond 26P: (new Pond)</b>	Peak Elev=2.73' Storage=0.232 af Inflow=2.31 cfs 0.773 af Outflow=0.72 cfs 0.773 af
<b>Pond 27P: (new Pond)</b>	Peak Elev=2.83' Storage=0.663 af Inflow=6.63 cfs 2.227 af Outflow=2.12 cfs 2.223 af
<b>Pond 33P: (new Pond)</b>	Peak Elev=2.92' Storage=0.262 af Inflow=2.51 cfs 0.835 af Outflow=0.75 cfs 0.834 af

**Total Runoff Area = 30.556 ac Runoff Volume = 5.369 af Average Runoff Depth = 2.11"**  
**56.07% Pervious = 17.133 ac 43.93% Impervious = 13.423 ac**

**Summary for Subcatchment 1S: Existing Conditions**

[49] Hint: Tc<2dt may require smaller dt

Runoff = 0.72 cfs @ 7.98 hrs, Volume= 0.307 af, Depth= 1.21"

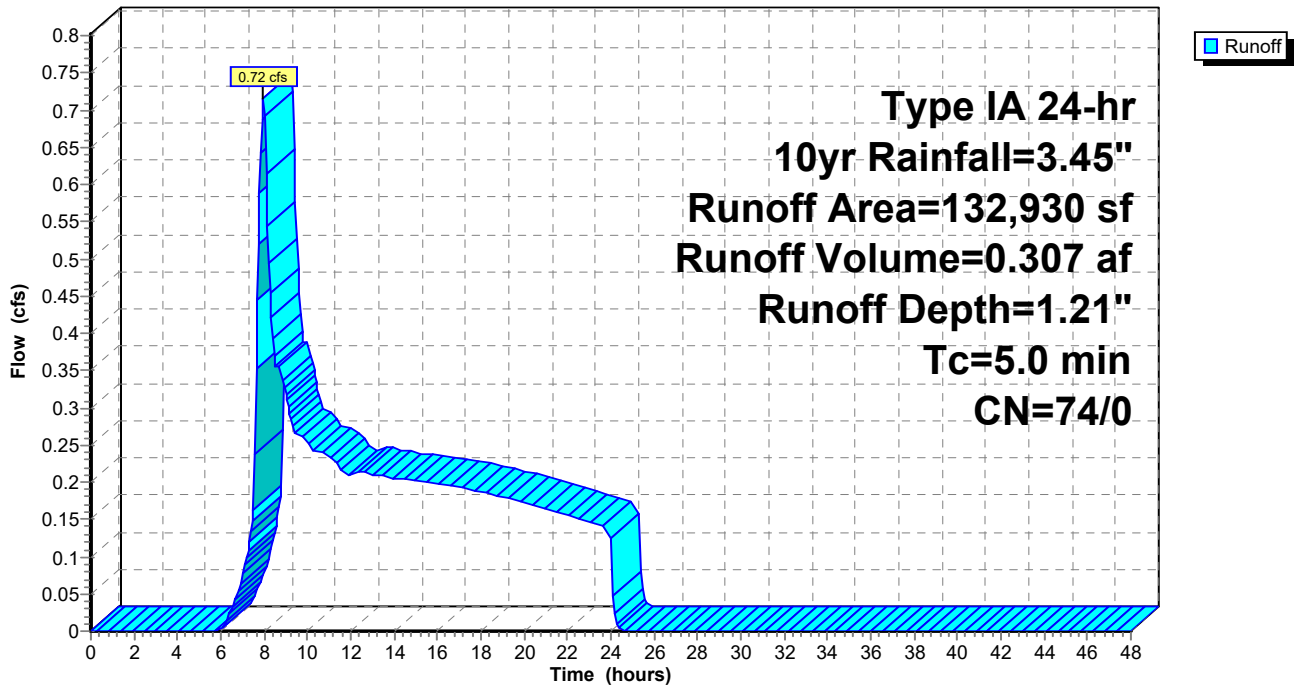
Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.06 hrs  
 Type IA 24-hr 10yr Rainfall=3.45"

Area (sf)	CN	Description
132,930	74	>75% Grass cover, Good, HSG C
132,930	74	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

**Subcatchment 1S: Existing Conditions**

Hydrograph



**Summary for Subcatchment 23S: Building A - West**

[49] Hint: Tc<2dt may require smaller dt

Runoff = 2.31 cfs @ 7.91 hrs, Volume= 0.773 af, Depth= 3.04"

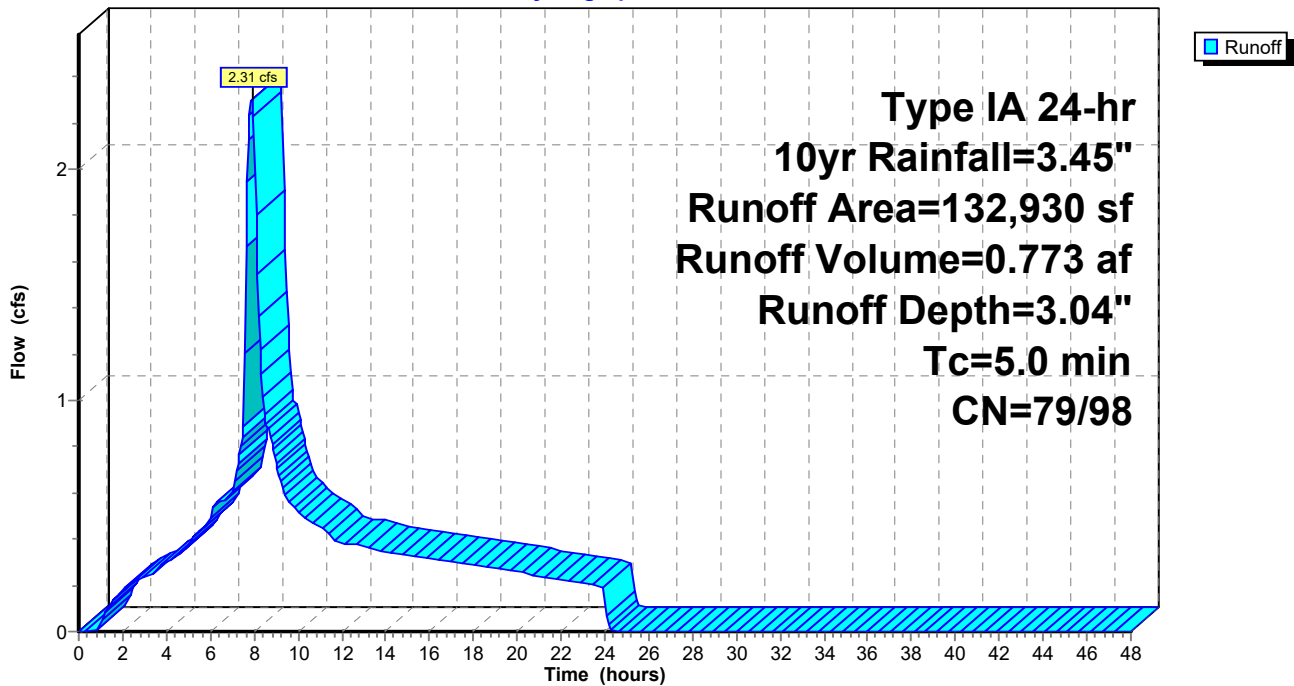
Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.06 hrs  
Type IA 24-hr 10yr Rainfall=3.45"

Area (sf)	CN	Description
118,941	98	Paved parking, HSG C
13,989	79	50-75% Grass cover, Fair, HSG C
132,930	96	Weighted Average
13,989	79	10.52% Pervious Area
118,941	98	89.48% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

**Subcatchment 23S: Building A - West**

Hydrograph



**Summary for Subcatchment 24S: Building B**

[49] Hint: Tc<2dt may require smaller dt

Runoff = 6.63 cfs @ 7.91 hrs, Volume= 2.227 af, Depth= 2.96"

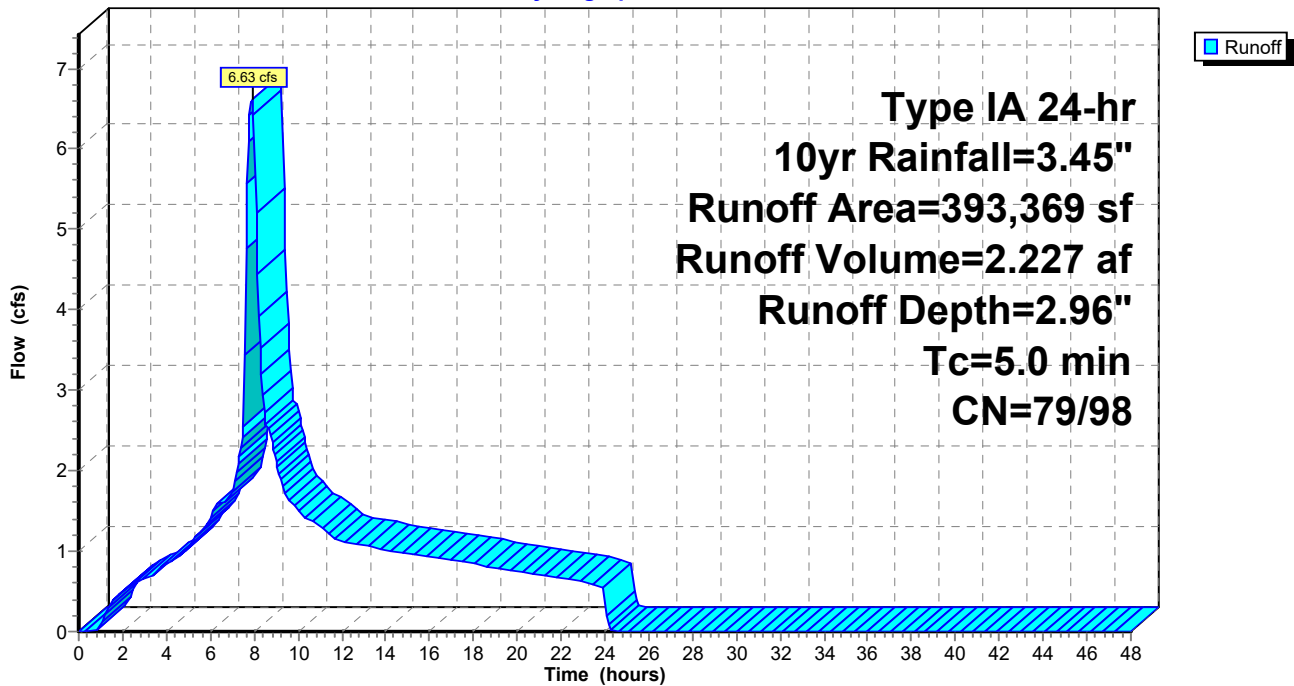
Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.06 hrs  
Type IA 24-hr 10yr Rainfall=3.45"

Area (sf)	CN	Description
333,300	98	Paved parking, HSG C
60,069	79	50-75% Grass cover, Fair, HSG C
393,369	95	Weighted Average
60,069	79	15.27% Pervious Area
333,300	98	84.73% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

**Subcatchment 24S: Building B**

Hydrograph



**Summary for Subcatchment 29S: Existing Conditions**

[49] Hint: Tc<2dt may require smaller dt

Runoff = 2.12 cfs @ 7.98 hrs, Volume= 0.907 af, Depth= 1.21"

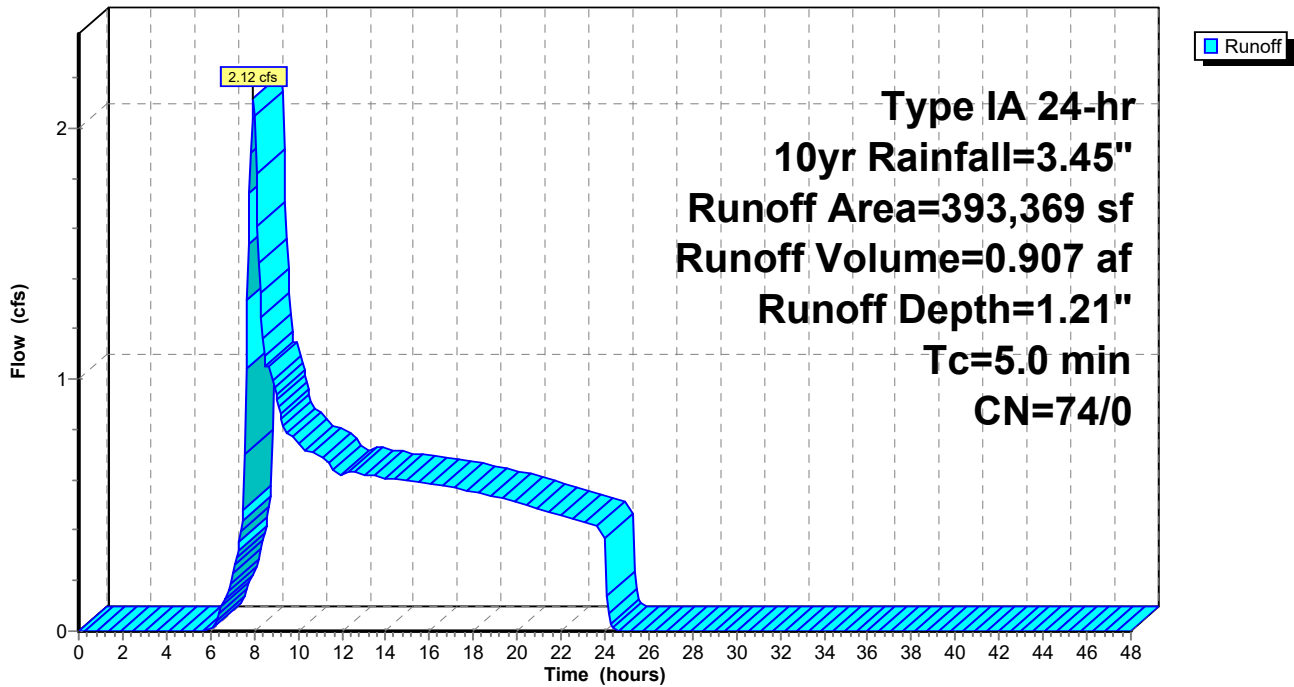
Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.06 hrs  
 Type IA 24-hr 10yr Rainfall=3.45"

Area (sf)	CN	Description
393,369	74	>75% Grass cover, Good, HSG C
393,369	74	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

**Subcatchment 29S: Existing Conditions**

Hydrograph



**Summary for Subcatchment 31S: Northeast Ex Cond**

[49] Hint: Tc<2dt may require smaller dt

Runoff = 0.75 cfs @ 7.98 hrs, Volume= 0.321 af, Depth= 1.21"

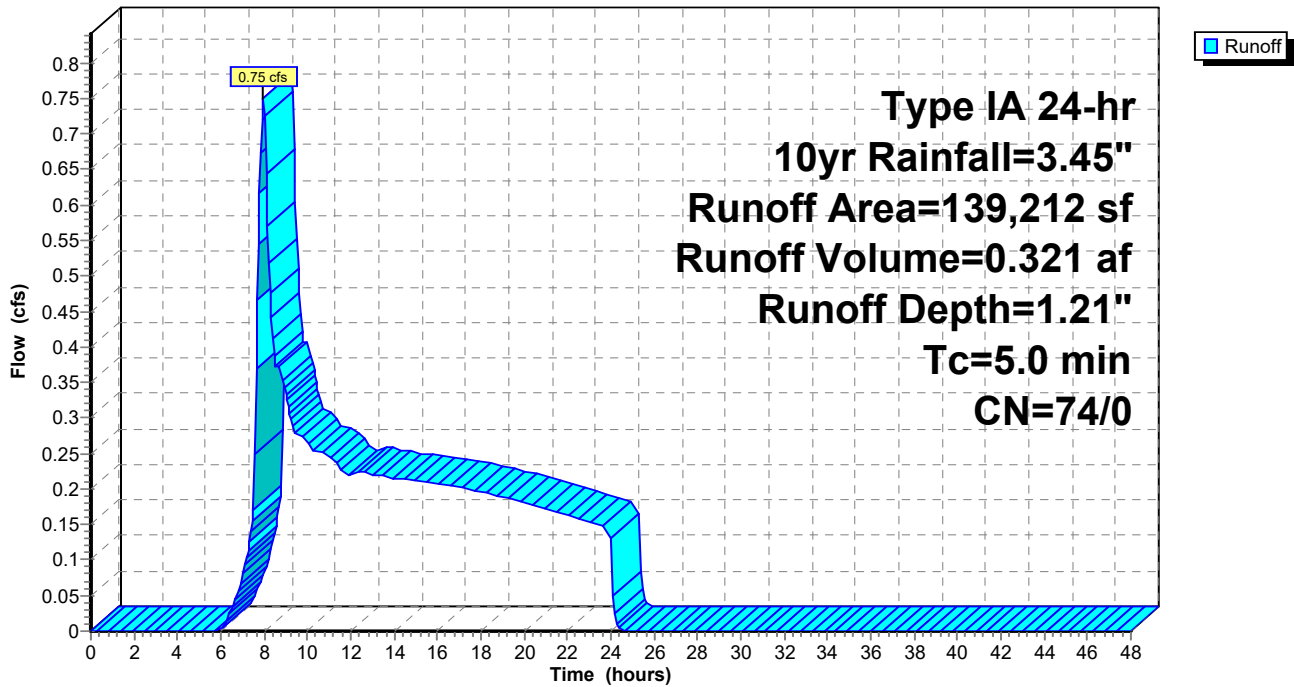
Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.06 hrs  
 Type IA 24-hr 10yr Rainfall=3.45"

Area (sf)	CN	Description
139,212	74	>75% Grass cover, Good, HSG C
139,212	74	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

**Subcatchment 31S: Northeast Ex Cond**

Hydrograph





**Summary for Subcatchment 32S: Building A - East**

[49] Hint: Tc<2dt may require smaller dt

Runoff = 2.51 cfs @ 7.90 hrs, Volume= 0.835 af, Depth= 3.13"

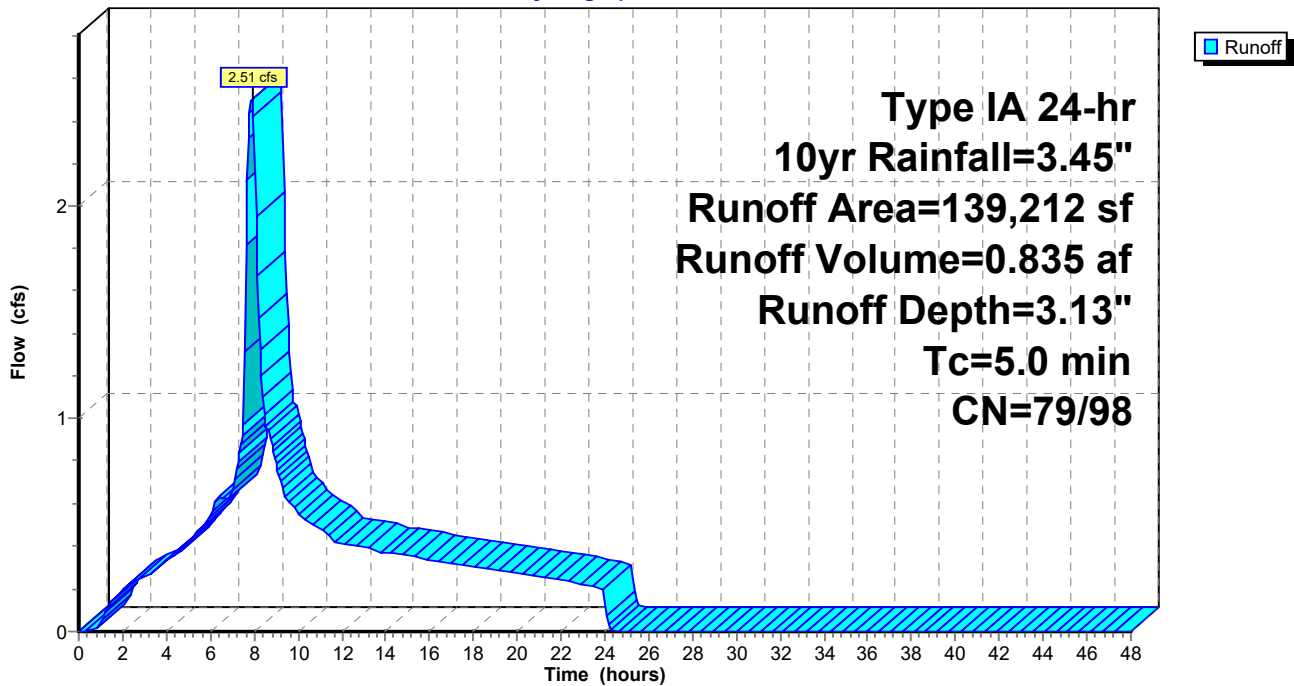
Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.06 hrs  
 Type IA 24-hr 10yr Rainfall=3.45"

Area (sf)	CN	Description
132,462	98	Paved parking, HSG C
6,750	79	50-75% Grass cover, Fair, HSG C
139,212	97	Weighted Average
6,750	79	4.85% Pervious Area
132,462	98	95.15% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

**Subcatchment 32S: Building A - East**

Hydrograph



**Summary for Pond 26P: (new Pond)**

[92] Warning: Device #3 is above defined storage

Inflow Area = 3.052 ac, 89.48% Impervious, Inflow Depth = 3.04" for 10yr event  
 Inflow = 2.31 cfs @ 7.91 hrs, Volume= 0.773 af  
 Outflow = 0.72 cfs @ 9.04 hrs, Volume= 0.773 af, Atten= 69%, Lag= 67.6 min  
 Primary = 0.72 cfs @ 9.04 hrs, Volume= 0.773 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.06 hrs  
 Peak Elev= 2.73' @ 9.04 hrs Surf.Area= 0.121 ac Storage= 0.232 af

Plug-Flow detention time= 356.2 min calculated for 0.773 af (100% of inflow)  
 Center-of-Mass det. time= 356.0 min ( 1,028.9 - 673.0 )

Volume	Invert	Avail.Storage	Storage Description
#1A	0.00'	0.169 af	<b>37.08'W x 141.93'L x 5.50'H Field A</b> 0.665 af Overall - 0.243 af Embedded = 0.421 af x 40.0% Voids
#2A	0.75'	0.243 af	<b>ADS_StormTech MC-3500 d +Cap</b> x 95 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 95 Chambers in 5 Rows Cap Storage= +14.9 cf x 2 x 5 rows = 149.0 cf
		0.412 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	<b>2.6" Vert. Orifice/Grate</b> C= 0.600
#2	Primary	2.30'	<b>5.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#3	Primary	10.00'	<b>12.0" Vert. Orifice/Grate</b> C= 0.600

**Primary OutFlow** Max=0.72 cfs @ 9.04 hrs HW=2.73' (Free Discharge)

- 1=Orifice/Grate (Orifice Controls 0.29 cfs @ 7.79 fps)
- 2=Orifice/Grate (Orifice Controls 0.43 cfs @ 3.14 fps)
- 3=Orifice/Grate ( Controls 0.00 cfs)

**Pond 26P: (new Pond) - Chamber Wizard Field A**

**Chamber Model = ADS\_StormTechMC-3500 d +Cap (ADS StormTech®MC-3500 d rev 03/14 with Cap volume)**

Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf

Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap

Cap Storage= +14.9 cf x 2 x 5 rows = 149.0 cf

77.0" Wide + 9.0" Spacing = 86.0" C-C Row Spacing

19 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 139.93' Row Length +12.0" End Stone x 2 = 141.93' Base Length

5 Rows x 77.0" Wide + 9.0" Spacing x 4 + 12.0" Side Stone x 2 = 37.08' Base Width

9.0" Base + 45.0" Chamber Height + 12.0" Cover = 5.50' Field Height

95 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 5 Rows = 10,594.4 cf Chamber Storage

28,947.8 cf Field - 10,594.4 cf Chambers = 18,353.4 cf Stone x 40.0% Voids = 7,341.3 cf Stone Storage

Chamber Storage + Stone Storage = 17,935.8 cf = 0.412 af

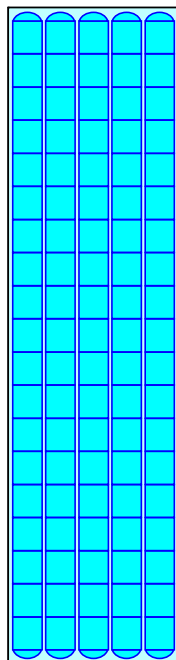
Overall Storage Efficiency = 62.0%

Overall System Size = 141.93' x 37.08' x 5.50'

95 Chambers

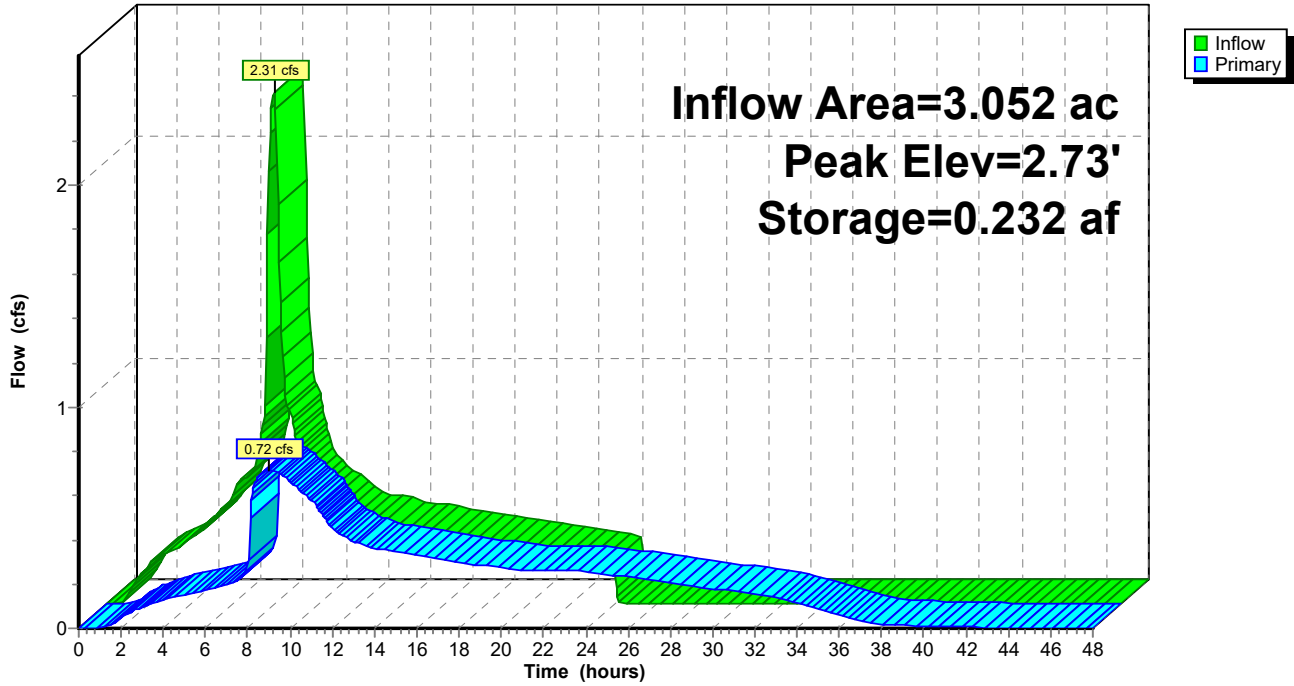
1,072.1 cy Field

679.8 cy Stone



**Pond 26P: (new Pond)**

Hydrograph



**Summary for Pond 27P: (new Pond)**

[92] Warning: Device #3 is above defined storage

Inflow Area = 9.031 ac, 84.73% Impervious, Inflow Depth = 2.96" for 10yr event  
 Inflow = 6.63 cfs @ 7.91 hrs, Volume= 2.227 af  
 Outflow = 2.12 cfs @ 9.00 hrs, Volume= 2.223 af, Atten= 68%, Lag= 65.3 min  
 Primary = 2.12 cfs @ 9.00 hrs, Volume= 2.223 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.06 hrs  
 Peak Elev= 2.83' @ 9.00 hrs Surf.Area= 0.328 ac Storage= 0.663 af

Plug-Flow detention time= 358.5 min calculated for 2.223 af (100% of inflow)  
 Center-of-Mass det. time= 357.3 min ( 1,034.3 - 677.0 )

Volume	Invert	Avail.Storage	Storage Description
#1A	0.00'	0.452 af	<b>51.42'W x 278.16'L x 5.50'H Field A</b> 1.806 af Overall - 0.676 af Embedded = 1.130 af x 40.0% Voids
#2A	0.75'	0.676 af	<b>ADS_StormTech MC-3500 d +Cap</b> x 266 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 266 Chambers in 7 Rows Cap Storage= +14.9 cf x 2 x 7 rows = 208.6 cf
		1.128 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	<b>4.4" Vert. Orifice/Grate</b> C= 0.600
#2	Primary	2.39'	<b>8.6" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#3	Primary	10.00'	<b>12.0" Vert. Orifice/Grate</b> C= 0.600

**Primary OutFlow** Max=2.12 cfs @ 9.00 hrs HW=2.83' (Free Discharge)

- 1=Orifice/Grate (Orifice Controls 0.83 cfs @ 7.83 fps)
- 2=Orifice/Grate (Orifice Controls 1.29 cfs @ 3.20 fps)
- 3=Orifice/Grate ( Controls 0.00 cfs)

**Pond 27P: (new Pond) - Chamber Wizard Field A**

**Chamber Model = ADS\_StormTechMC-3500 d +Cap (ADS StormTech®MC-3500 d rev 03/14 with Cap volume)**

Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf

Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap

Cap Storage= +14.9 cf x 2 x 7 rows = 208.6 cf

77.0" Wide + 9.0" Spacing = 86.0" C-C Row Spacing

38 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 276.16' Row Length +12.0" End Stone x 2 = 278.16' Base Length

7 Rows x 77.0" Wide + 9.0" Spacing x 6 + 12.0" Side Stone x 2 = 51.42' Base Width

9.0" Base + 45.0" Chamber Height + 12.0" Cover = 5.50' Field Height

266 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 7 Rows = 29,455.8 cf Chamber Storage

78,661.3 cf Field - 29,455.8 cf Chambers = 49,205.5 cf Stone x 40.0% Voids = 19,682.2 cf Stone Storage

Chamber Storage + Stone Storage = 49,138.0 cf = 1.128 af

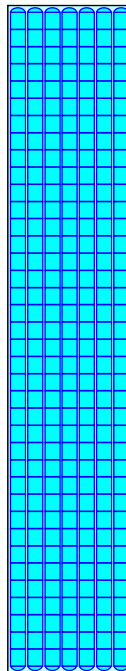
Overall Storage Efficiency = 62.5%

Overall System Size = 278.16' x 51.42' x 5.50'

266 Chambers

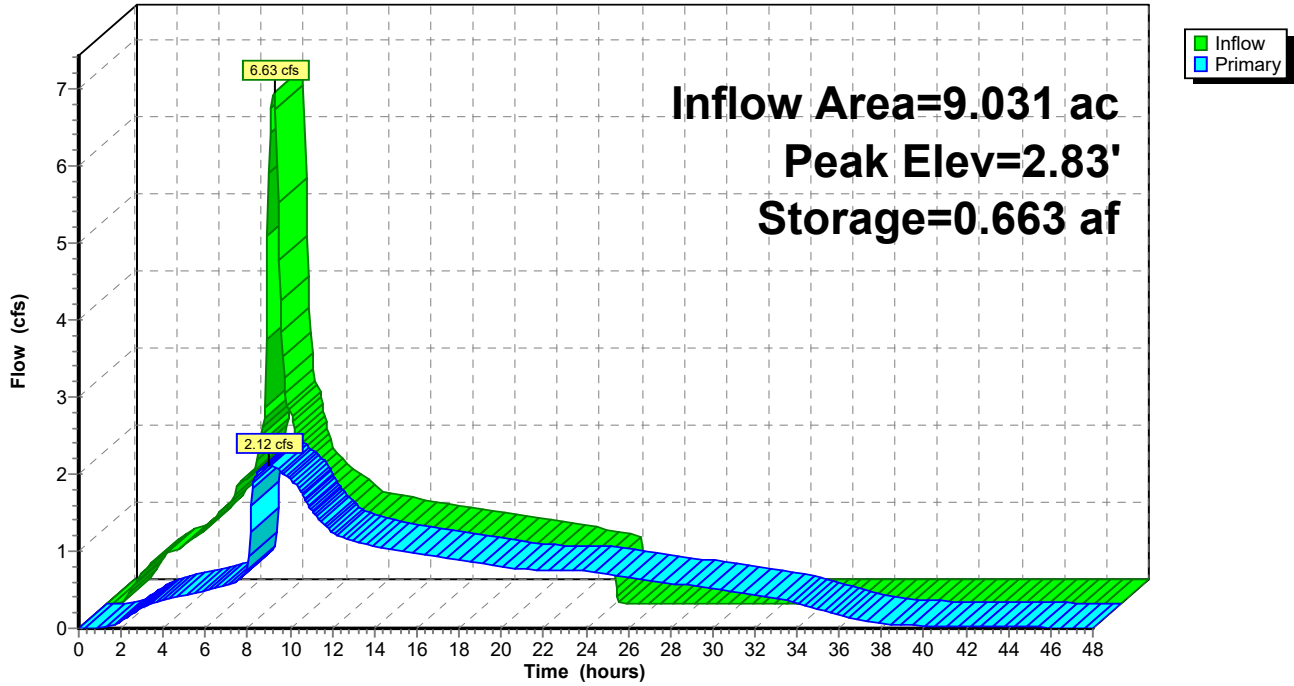
2,913.4 cy Field

1,822.4 cy Stone



**Pond 27P: (new Pond)**

Hydrograph



**Summary for Pond 33P: (new Pond)**

Inflow Area = 3.196 ac, 95.15% Impervious, Inflow Depth = 3.13" for 10yr event  
 Inflow = 2.51 cfs @ 7.90 hrs, Volume= 0.835 af  
 Outflow = 0.75 cfs @ 9.08 hrs, Volume= 0.834 af, Atten= 70%, Lag= 70.5 min  
 Primary = 0.75 cfs @ 9.08 hrs, Volume= 0.834 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.06 hrs  
 Peak Elev= 2.92' @ 9.08 hrs Surf.Area= 0.127 ac Storage= 0.262 af

Plug-Flow detention time= 386.7 min calculated for 0.833 af (100% of inflow)  
 Center-of-Mass det. time= 386.9 min ( 1,055.3 - 668.4 )

Volume	Invert	Avail.Storage	Storage Description
#1A	0.00'	0.177 af	<b>29.92'W x 184.95'L x 5.50'H Field A</b> 0.699 af Overall - 0.255 af Embedded = 0.443 af x 40.0% Voids
#2A	0.75'	0.255 af	<b>ADS_StormTech MC-3500 d +Cap</b> x 100 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 100 Chambers in 4 Rows Cap Storage= +14.9 cf x 2 x 4 rows = 119.2 cf
		0.433 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	<b>2.6" Vert. Orifice/Grate</b> C= 0.600
#2	Primary	2.49'	<b>5.1" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#3	Primary	3.27'	<b>12.0" Vert. Orifice/Grate</b> C= 0.600

**Primary OutFlow** Max=0.75 cfs @ 9.08 hrs HW=2.92' (Free Discharge)

- 1=Orifice/Grate (Orifice Controls 0.30 cfs @ 8.08 fps)
- 2=Orifice/Grate (Orifice Controls 0.45 cfs @ 3.17 fps)
- 3=Orifice/Grate ( Controls 0.00 cfs)



**A19173.10 - Pascuzzi**

Prepared by {enter your company name here}

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Type IA 24-hr 10yr Rainfall=3.45"

Printed 10/28/2019

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**Pond 33P: (new Pond) - Chamber Wizard Field A**

**Chamber Model = ADS\_StormTechMC-3500 d +Cap (ADS StormTech®MC-3500 d rev 03/14 with Cap volume)**

Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf

Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap

Cap Storage= +14.9 cf x 2 x 4 rows = 119.2 cf

77.0" Wide + 9.0" Spacing = 86.0" C-C Row Spacing

25 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 182.95' Row Length +12.0" End Stone x 2 = 184.95' Base Length

4 Rows x 77.0" Wide + 9.0" Spacing x 3 + 12.0" Side Stone x 2 = 29.92' Base Width

9.0" Base + 45.0" Chamber Height + 12.0" Cover = 5.50' Field Height

100 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 4 Rows = 11,114.4 cf Chamber Storage

30,432.0 cf Field - 11,114.4 cf Chambers = 19,317.6 cf Stone x 40.0% Voids = 7,727.0 cf Stone Storage

Chamber Storage + Stone Storage = 18,841.4 cf = 0.433 af

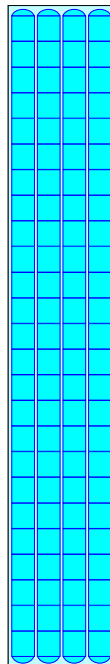
Overall Storage Efficiency = 61.9%

Overall System Size = 184.95' x 29.92' x 5.50'

100 Chambers

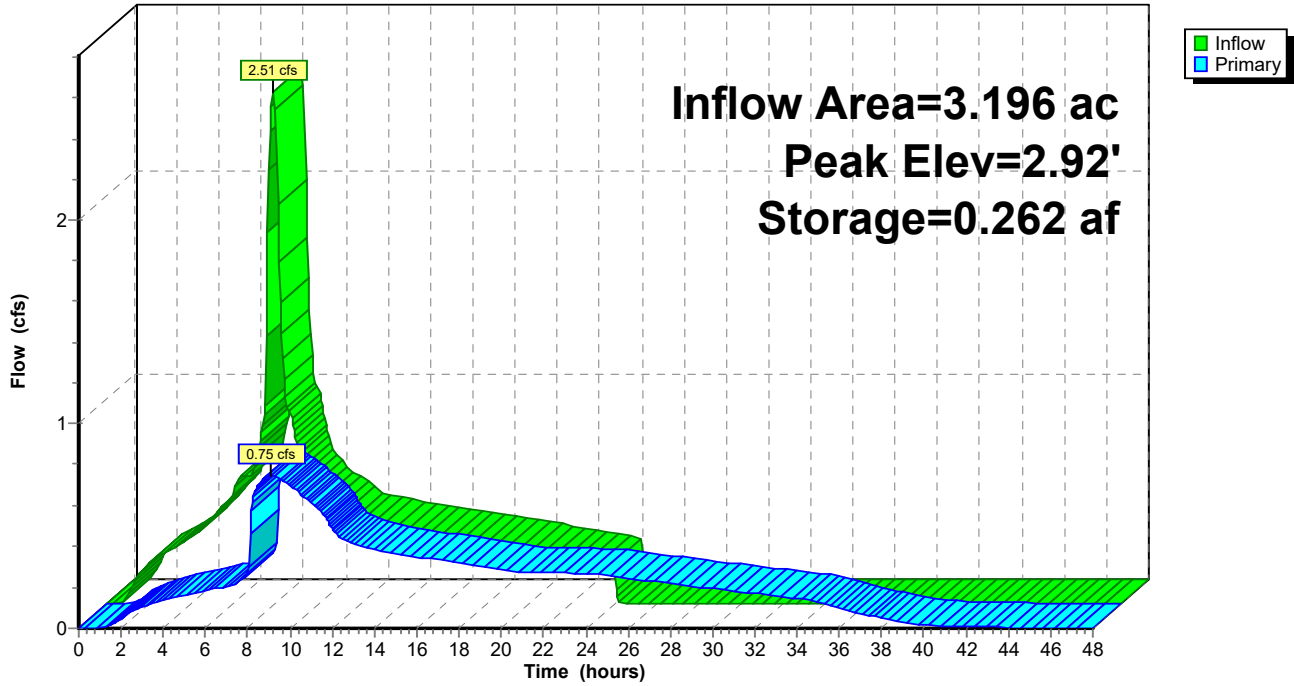
1,127.1 cy Field

715.5 cy Stone



**Pond 33P: (new Pond)**

Hydrograph



**A19173.10 - Pascuzzi**

Type IA 24-hr 25yr Rainfall=3.90"

Prepared by {enter your company name here}

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Time span=0.00-48.00 hrs, dt=0.06 hrs, 801 points  
 Runoff by SBUH method, Split Pervious/Imperv.  
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

<b>Subcatchment1S: Existing Conditions</b>	Runoff Area=132,930 sf 0.00% Impervious Runoff Depth=1.52" Tc=5.0 min CN=74/0 Runoff=0.97 cfs 0.387 af
<b>Subcatchment23S: Building A - West</b>	Runoff Area=132,930 sf 89.48% Impervious Runoff Depth=3.48" Tc=5.0 min CN=79/98 Runoff=2.64 cfs 0.884 af
<b>Subcatchment24S: Building B</b>	Runoff Area=393,369 sf 84.73% Impervious Runoff Depth=3.39" Tc=5.0 min CN=79/98 Runoff=7.59 cfs 2.553 af
<b>Subcatchment29S: Existing Conditions</b>	Runoff Area=393,369 sf 0.00% Impervious Runoff Depth=1.52" Tc=5.0 min CN=74/0 Runoff=2.87 cfs 1.146 af
<b>Subcatchment31S: Northeast Ex Cond</b>	Runoff Area=139,212 sf 0.00% Impervious Runoff Depth=1.52" Tc=5.0 min CN=74/0 Runoff=1.01 cfs 0.406 af
<b>Subcatchment32S: Building A - East</b>	Runoff Area=139,212 sf 95.15% Impervious Runoff Depth=3.58" Tc=5.0 min CN=79/98 Runoff=2.85 cfs 0.953 af
<b>Pond 26P: (new Pond)</b>	Peak Elev=3.05' Storage=0.261 af Inflow=2.64 cfs 0.884 af Outflow=0.87 cfs 0.884 af
<b>Pond 27P: (new Pond)</b>	Peak Elev=3.16' Storage=0.743 af Inflow=7.59 cfs 2.553 af Outflow=2.59 cfs 2.550 af
<b>Pond 33P: (new Pond)</b>	Peak Elev=3.27' Storage=0.293 af Inflow=2.85 cfs 0.953 af Outflow=0.92 cfs 0.952 af

**Total Runoff Area = 30.556 ac Runoff Volume = 6.330 af Average Runoff Depth = 2.49"**  
**56.07% Pervious = 17.133 ac 43.93% Impervious = 13.423 ac**

**Summary for Subcatchment 1S: Existing Conditions**

[49] Hint: Tc<2dt may require smaller dt

Runoff = 0.97 cfs @ 7.98 hrs, Volume= 0.387 af, Depth= 1.52"

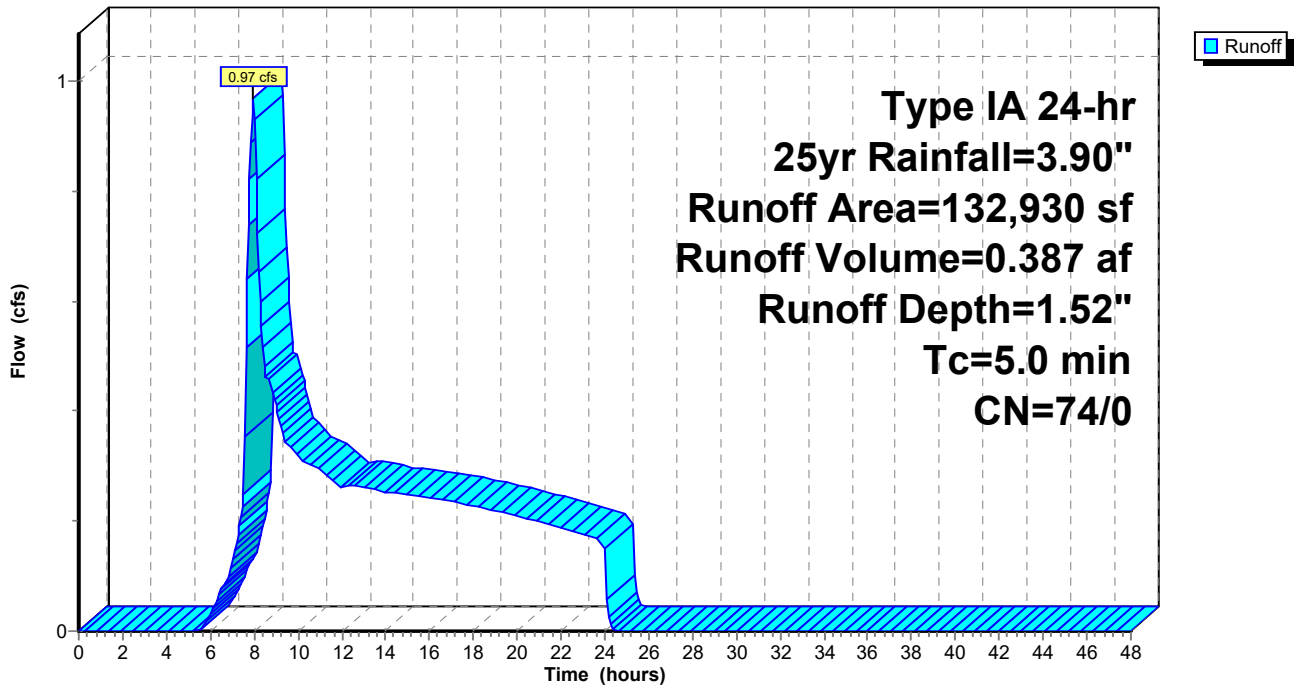
Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.06 hrs  
 Type IA 24-hr 25yr Rainfall=3.90"

Area (sf)	CN	Description
132,930	74	>75% Grass cover, Good, HSG C
132,930	74	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

**Subcatchment 1S: Existing Conditions**

Hydrograph



**Summary for Subcatchment 23S: Building A - West**

[49] Hint: Tc<2dt may require smaller dt

Runoff = 2.64 cfs @ 7.91 hrs, Volume= 0.884 af, Depth= 3.48"

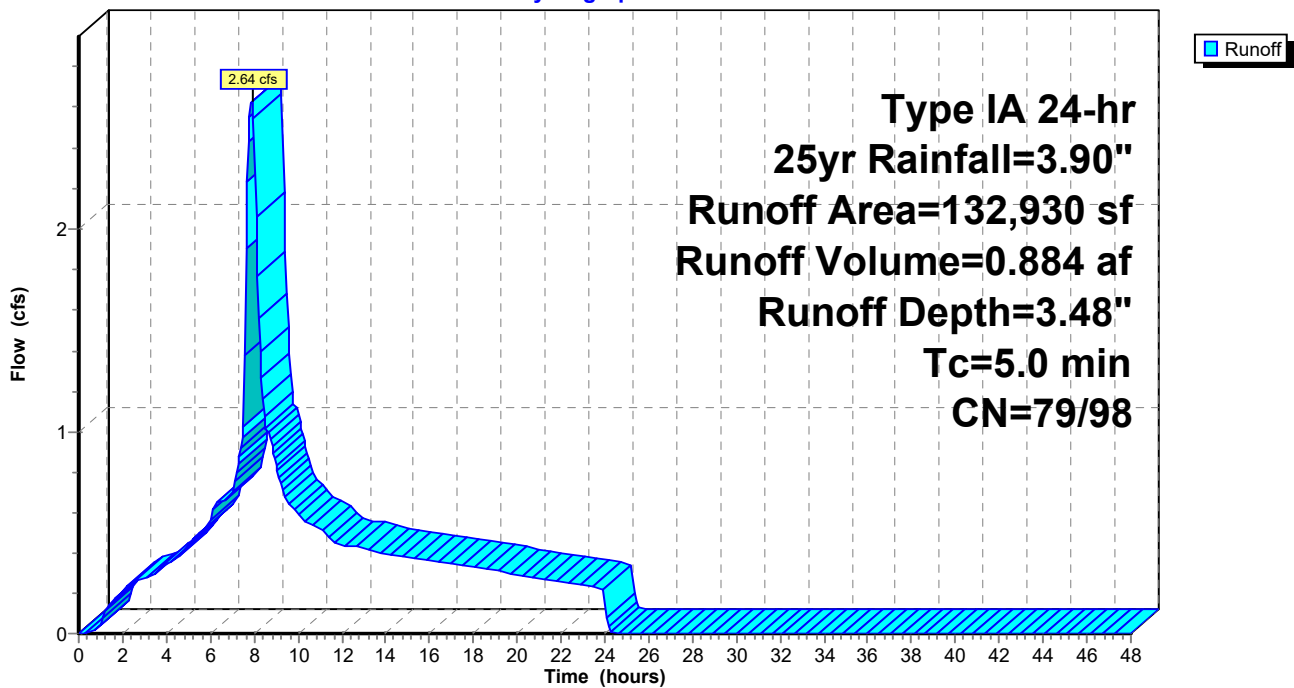
Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.06 hrs  
Type IA 24-hr 25yr Rainfall=3.90"

Area (sf)	CN	Description
118,941	98	Paved parking, HSG C
13,989	79	50-75% Grass cover, Fair, HSG C
132,930	96	Weighted Average
13,989	79	10.52% Pervious Area
118,941	98	89.48% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

**Subcatchment 23S: Building A - West**

Hydrograph



**Summary for Subcatchment 24S: Building B**

[49] Hint: Tc<2dt may require smaller dt

Runoff = 7.59 cfs @ 7.91 hrs, Volume= 2.553 af, Depth= 3.39"

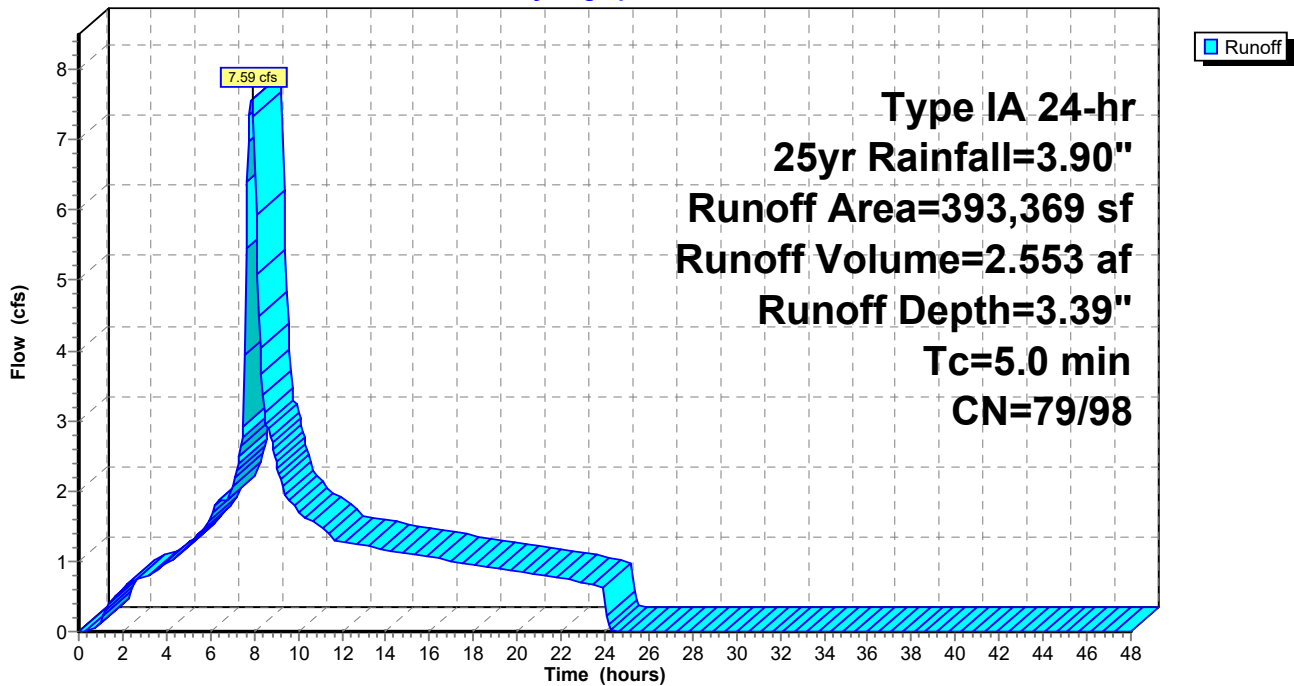
Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.06 hrs  
Type IA 24-hr 25yr Rainfall=3.90"

Area (sf)	CN	Description
333,300	98	Paved parking, HSG C
60,069	79	50-75% Grass cover, Fair, HSG C
393,369	95	Weighted Average
60,069	79	15.27% Pervious Area
333,300	98	84.73% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

**Subcatchment 24S: Building B**

Hydrograph



**Summary for Subcatchment 29S: Existing Conditions**

[49] Hint: Tc<2dt may require smaller dt

Runoff = 2.87 cfs @ 7.98 hrs, Volume= 1.146 af, Depth= 1.52"

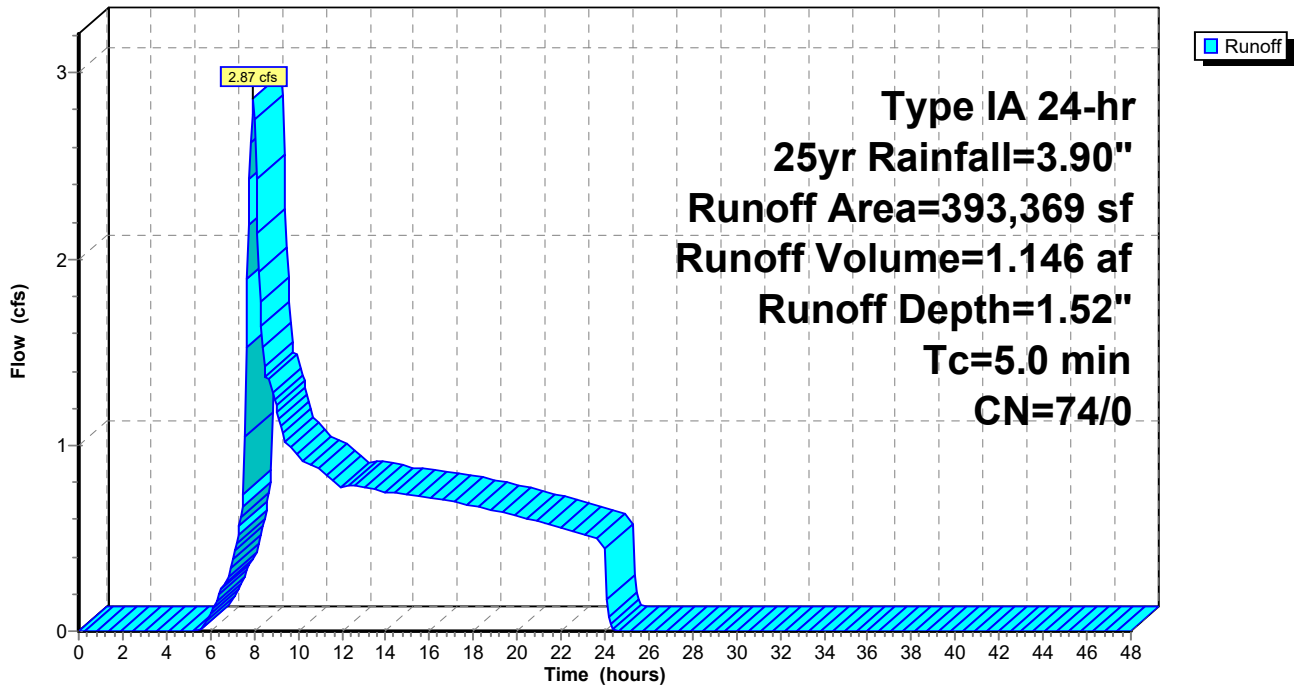
Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.06 hrs  
 Type IA 24-hr 25yr Rainfall=3.90"

Area (sf)	CN	Description
393,369	74	>75% Grass cover, Good, HSG C
393,369	74	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

**Subcatchment 29S: Existing Conditions**

Hydrograph



**Summary for Subcatchment 31S: Northeast Ex Cond**

[49] Hint: Tc<2dt may require smaller dt

Runoff = 1.01 cfs @ 7.98 hrs, Volume= 0.406 af, Depth= 1.52"

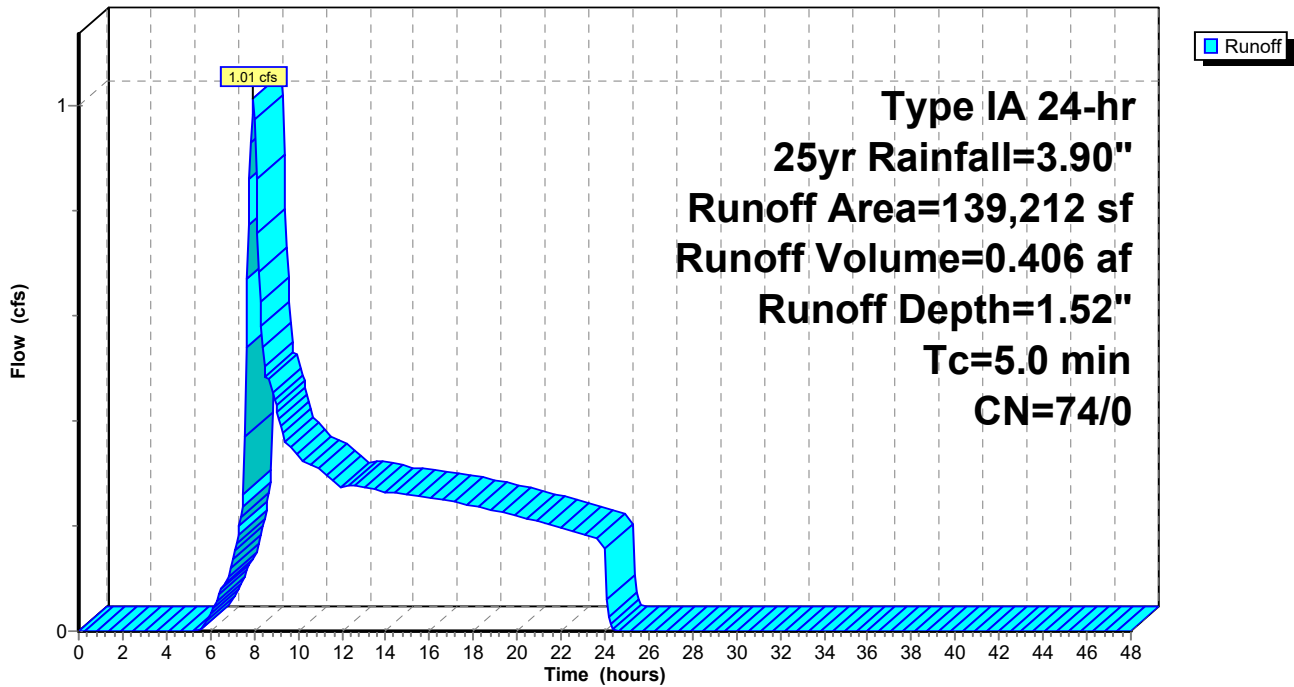
Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.06 hrs  
 Type IA 24-hr 25yr Rainfall=3.90"

Area (sf)	CN	Description
139,212	74	>75% Grass cover, Good, HSG C
139,212	74	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

**Subcatchment 31S: Northeast Ex Cond**

Hydrograph





**Summary for Subcatchment 32S: Building A - East**

[49] Hint: Tc<2dt may require smaller dt

Runoff = 2.85 cfs @ 7.90 hrs, Volume= 0.953 af, Depth= 3.58"

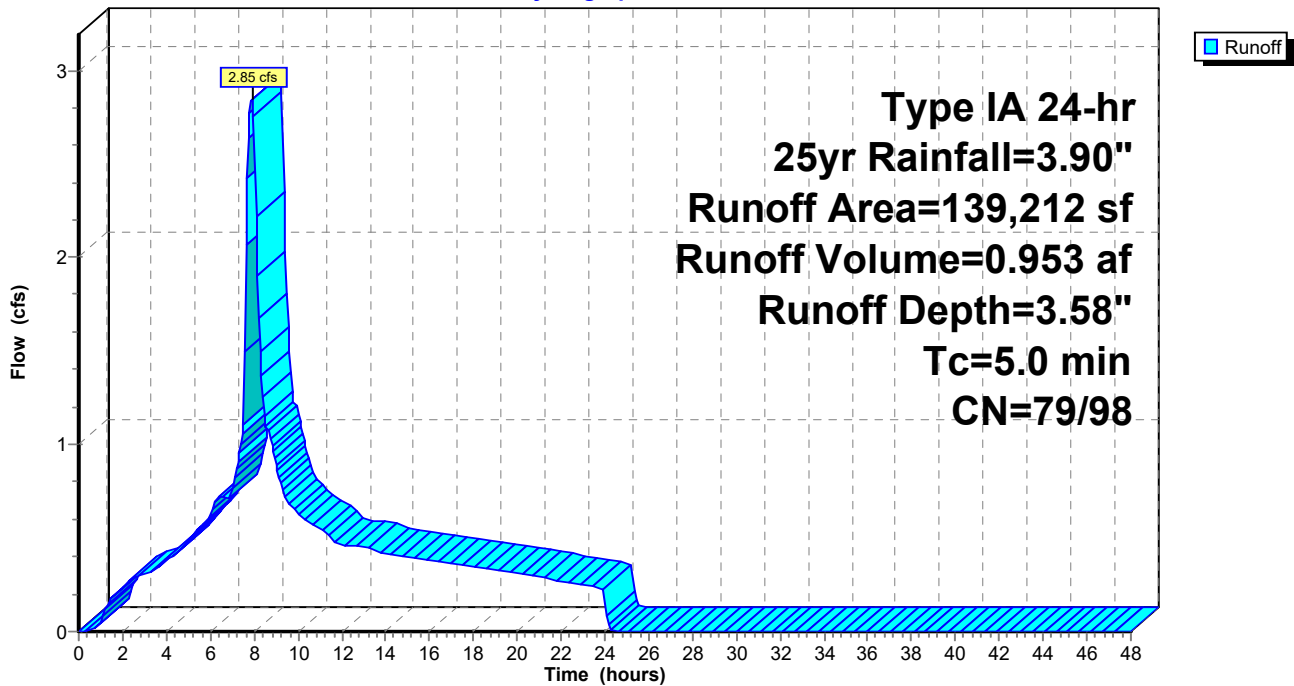
Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.06 hrs  
 Type IA 24-hr 25yr Rainfall=3.90"

Area (sf)	CN	Description
132,462	98	Paved parking, HSG C
6,750	79	50-75% Grass cover, Fair, HSG C
139,212	97	Weighted Average
6,750	79	4.85% Pervious Area
132,462	98	95.15% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

**Subcatchment 32S: Building A - East**

Hydrograph



**Summary for Pond 26P: (new Pond)**

[92] Warning: Device #3 is above defined storage

Inflow Area = 3.052 ac, 89.48% Impervious, Inflow Depth = 3.48" for 25yr event  
 Inflow = 2.64 cfs @ 7.91 hrs, Volume= 0.884 af  
 Outflow = 0.87 cfs @ 8.92 hrs, Volume= 0.884 af, Atten= 67%, Lag= 61.1 min  
 Primary = 0.87 cfs @ 8.92 hrs, Volume= 0.884 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.06 hrs  
 Peak Elev= 3.05' @ 8.92 hrs Surf.Area= 0.121 ac Storage= 0.261 af

Plug-Flow detention time= 328.9 min calculated for 0.883 af (100% of inflow)  
 Center-of-Mass det. time= 329.9 min ( 999.8 - 670.0 )

Volume	Invert	Avail.Storage	Storage Description
#1A	0.00'	0.169 af	<b>37.08'W x 141.93'L x 5.50'H Field A</b> 0.665 af Overall - 0.243 af Embedded = 0.421 af x 40.0% Voids
#2A	0.75'	0.243 af	<b>ADS_StormTech MC-3500 d +Cap</b> x 95 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 95 Chambers in 5 Rows Cap Storage= +14.9 cf x 2 x 5 rows = 149.0 cf
		0.412 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	<b>2.6" Vert. Orifice/Grate</b> C= 0.600
#2	Primary	2.30'	<b>5.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#3	Primary	10.00'	<b>12.0" Vert. Orifice/Grate</b> C= 0.600

**Primary OutFlow** Max=0.87 cfs @ 8.92 hrs HW=3.05' (Free Discharge)

- 1=Orifice/Grate (Orifice Controls 0.30 cfs @ 8.26 fps)
- 2=Orifice/Grate (Orifice Controls 0.57 cfs @ 4.16 fps)
- 3=Orifice/Grate ( Controls 0.00 cfs)

**A19173.10 - Pascuzzi**

Type IA 24-hr 25yr Rainfall=3.90"

Prepared by {enter your company name here}

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**Pond 26P: (new Pond) - Chamber Wizard Field A**

**Chamber Model = ADS\_StormTechMC-3500 d +Cap (ADS StormTech®MC-3500 d rev 03/14 with Cap volume)**

Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf

Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap

Cap Storage= +14.9 cf x 2 x 5 rows = 149.0 cf

77.0" Wide + 9.0" Spacing = 86.0" C-C Row Spacing

19 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 139.93' Row Length +12.0" End Stone x 2 = 141.93' Base Length

5 Rows x 77.0" Wide + 9.0" Spacing x 4 + 12.0" Side Stone x 2 = 37.08' Base Width

9.0" Base + 45.0" Chamber Height + 12.0" Cover = 5.50' Field Height

95 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 5 Rows = 10,594.4 cf Chamber Storage

28,947.8 cf Field - 10,594.4 cf Chambers = 18,353.4 cf Stone x 40.0% Voids = 7,341.3 cf Stone Storage

Chamber Storage + Stone Storage = 17,935.8 cf = 0.412 af

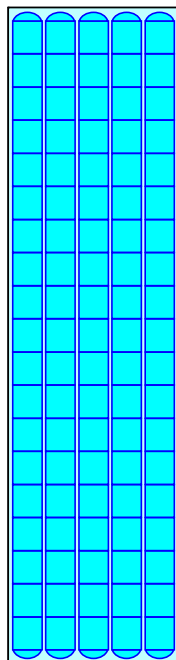
Overall Storage Efficiency = 62.0%

Overall System Size = 141.93' x 37.08' x 5.50'

95 Chambers

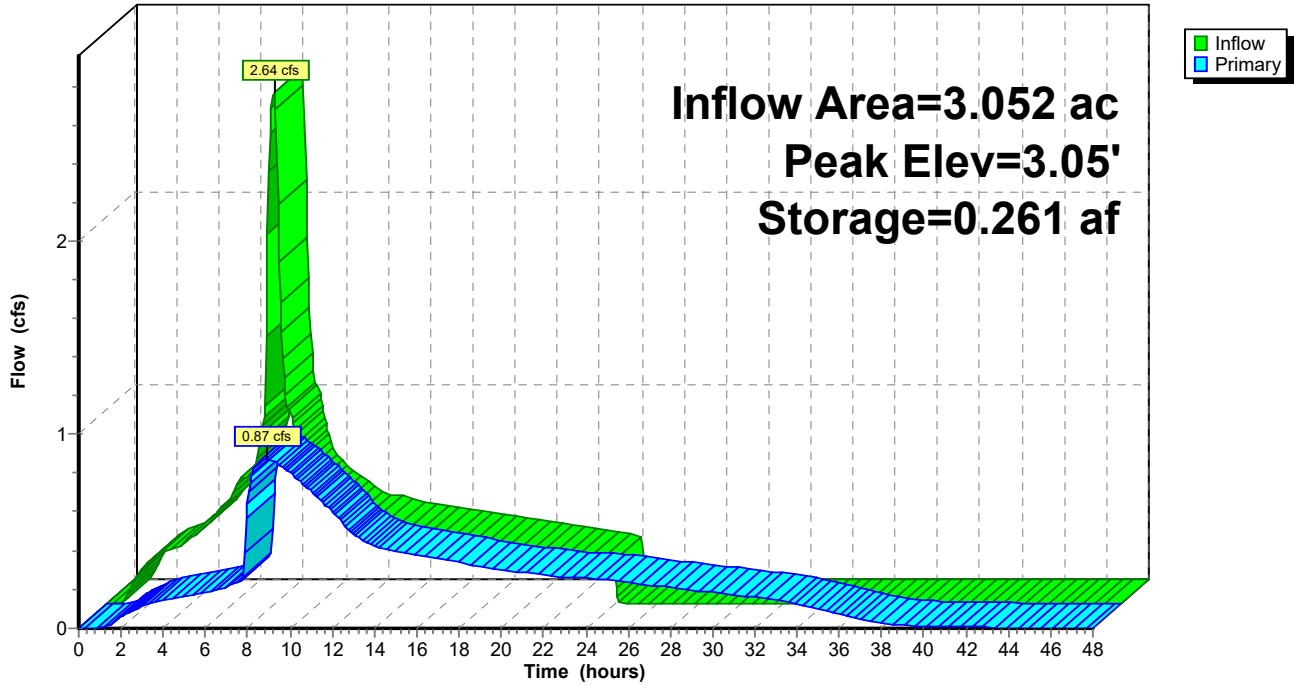
1,072.1 cy Field

679.8 cy Stone



Pond 26P: (new Pond)

Hydrograph



**Summary for Pond 27P: (new Pond)**

[92] Warning: Device #3 is above defined storage

Inflow Area = 9.031 ac, 84.73% Impervious, Inflow Depth = 3.39" for 25yr event  
 Inflow = 7.59 cfs @ 7.91 hrs, Volume= 2.553 af  
 Outflow = 2.59 cfs @ 8.88 hrs, Volume= 2.550 af, Atten= 66%, Lag= 58.5 min  
 Primary = 2.59 cfs @ 8.88 hrs, Volume= 2.550 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.06 hrs  
 Peak Elev= 3.16' @ 8.88 hrs Surf.Area= 0.328 ac Storage= 0.743 af

Plug-Flow detention time= 330.7 min calculated for 2.550 af (100% of inflow)  
 Center-of-Mass det. time= 329.5 min ( 1,003.6 - 674.0 )

Volume	Invert	Avail.Storage	Storage Description
#1A	0.00'	0.452 af	<b>51.42'W x 278.16'L x 5.50'H Field A</b> 1.806 af Overall - 0.676 af Embedded = 1.130 af x 40.0% Voids
#2A	0.75'	0.676 af	<b>ADS_StormTech MC-3500 d +Cap</b> x 266 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 266 Chambers in 7 Rows Cap Storage= +14.9 cf x 2 x 7 rows = 208.6 cf
		1.128 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	<b>4.4" Vert. Orifice/Grate</b> C= 0.600
#2	Primary	2.39'	<b>8.6" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#3	Primary	10.00'	<b>12.0" Vert. Orifice/Grate</b> C= 0.600

**Primary OutFlow** Max=2.59 cfs @ 8.88 hrs HW=3.16' (Free Discharge)

- 1=Orifice/Grate (Orifice Controls 0.88 cfs @ 8.31 fps)
- 2=Orifice/Grate (Orifice Controls 1.71 cfs @ 4.24 fps)
- 3=Orifice/Grate ( Controls 0.00 cfs)

**Pond 27P: (new Pond) - Chamber Wizard Field A**

**Chamber Model = ADS\_StormTechMC-3500 d +Cap (ADS StormTech®MC-3500 d rev 03/14 with Cap volume)**

Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf

Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap

Cap Storage= +14.9 cf x 2 x 7 rows = 208.6 cf

77.0" Wide + 9.0" Spacing = 86.0" C-C Row Spacing

38 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 276.16' Row Length +12.0" End Stone x 2 = 278.16' Base Length

7 Rows x 77.0" Wide + 9.0" Spacing x 6 + 12.0" Side Stone x 2 = 51.42' Base Width

9.0" Base + 45.0" Chamber Height + 12.0" Cover = 5.50' Field Height

266 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 7 Rows = 29,455.8 cf Chamber Storage

78,661.3 cf Field - 29,455.8 cf Chambers = 49,205.5 cf Stone x 40.0% Voids = 19,682.2 cf Stone Storage

Chamber Storage + Stone Storage = 49,138.0 cf = 1.128 af

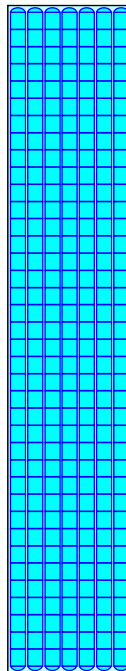
Overall Storage Efficiency = 62.5%

Overall System Size = 278.16' x 51.42' x 5.50'

266 Chambers

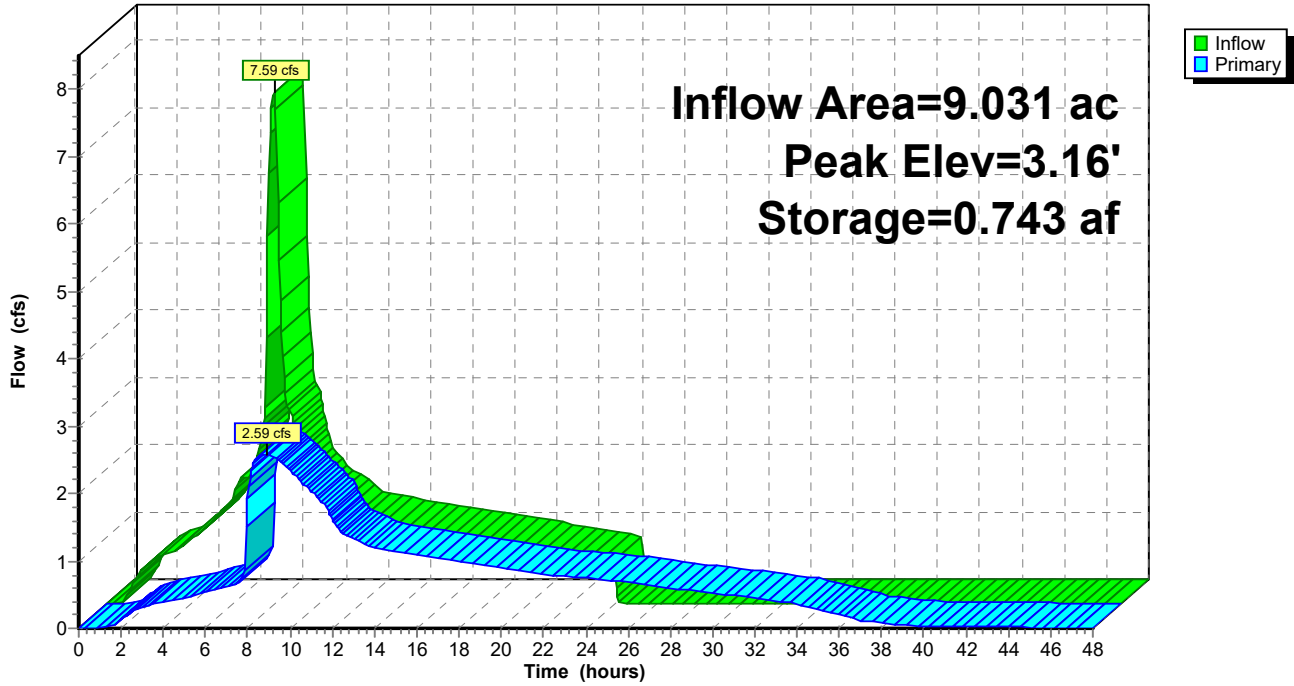
2,913.4 cy Field

1,822.4 cy Stone



Pond 27P: (new Pond)

Hydrograph



**Summary for Pond 33P: (new Pond)**

Inflow Area = 3.196 ac, 95.15% Impervious, Inflow Depth = 3.58" for 25yr event  
 Inflow = 2.85 cfs @ 7.90 hrs, Volume= 0.953 af  
 Outflow = 0.92 cfs @ 8.96 hrs, Volume= 0.952 af, Atten= 68%, Lag= 63.3 min  
 Primary = 0.92 cfs @ 8.96 hrs, Volume= 0.952 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.06 hrs  
 Peak Elev= 3.27' @ 8.96 hrs Surf.Area= 0.127 ac Storage= 0.293 af

Plug-Flow detention time= 357.4 min calculated for 0.951 af (100% of inflow)  
 Center-of-Mass det. time= 357.7 min ( 1,023.1 - 665.4 )

Volume	Invert	Avail.Storage	Storage Description
#1A	0.00'	0.177 af	<b>29.92'W x 184.95'L x 5.50'H Field A</b> 0.699 af Overall - 0.255 af Embedded = 0.443 af x 40.0% Voids
#2A	0.75'	0.255 af	<b>ADS_StormTech MC-3500 d +Cap</b> x 100 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 100 Chambers in 4 Rows Cap Storage= +14.9 cf x 2 x 4 rows = 119.2 cf
		0.433 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	<b>2.6" Vert. Orifice/Grate</b> C= 0.600
#2	Primary	2.49'	<b>5.1" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#3	Primary	3.27'	<b>12.0" Vert. Orifice/Grate</b> C= 0.600

**Primary OutFlow** Max=0.92 cfs @ 8.96 hrs HW=3.26' (Free Discharge)

- 1=Orifice/Grate (Orifice Controls 0.32 cfs @ 8.55 fps)
- 2=Orifice/Grate (Orifice Controls 0.60 cfs @ 4.24 fps)
- 3=Orifice/Grate ( Controls 0.00 cfs)



**A19173.10 - Pascuzzi**

Type IA 24-hr 25yr Rainfall=3.90"

Prepared by {enter your company name here}

Printed 10/28/2019

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**Pond 33P: (new Pond) - Chamber Wizard Field A**

**Chamber Model = ADS\_StormTechMC-3500 d +Cap (ADS StormTech®MC-3500 d rev 03/14 with Cap volume)**

Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf

Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap

Cap Storage= +14.9 cf x 2 x 4 rows = 119.2 cf

77.0" Wide + 9.0" Spacing = 86.0" C-C Row Spacing

25 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 182.95' Row Length +12.0" End Stone x 2 = 184.95' Base Length

4 Rows x 77.0" Wide + 9.0" Spacing x 3 + 12.0" Side Stone x 2 = 29.92' Base Width

9.0" Base + 45.0" Chamber Height + 12.0" Cover = 5.50' Field Height

100 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 4 Rows = 11,114.4 cf Chamber Storage

30,432.0 cf Field - 11,114.4 cf Chambers = 19,317.6 cf Stone x 40.0% Voids = 7,727.0 cf Stone Storage

Chamber Storage + Stone Storage = 18,841.4 cf = 0.433 af

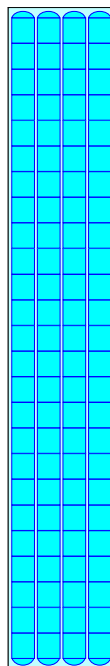
Overall Storage Efficiency = 61.9%

Overall System Size = 184.95' x 29.92' x 5.50'

100 Chambers

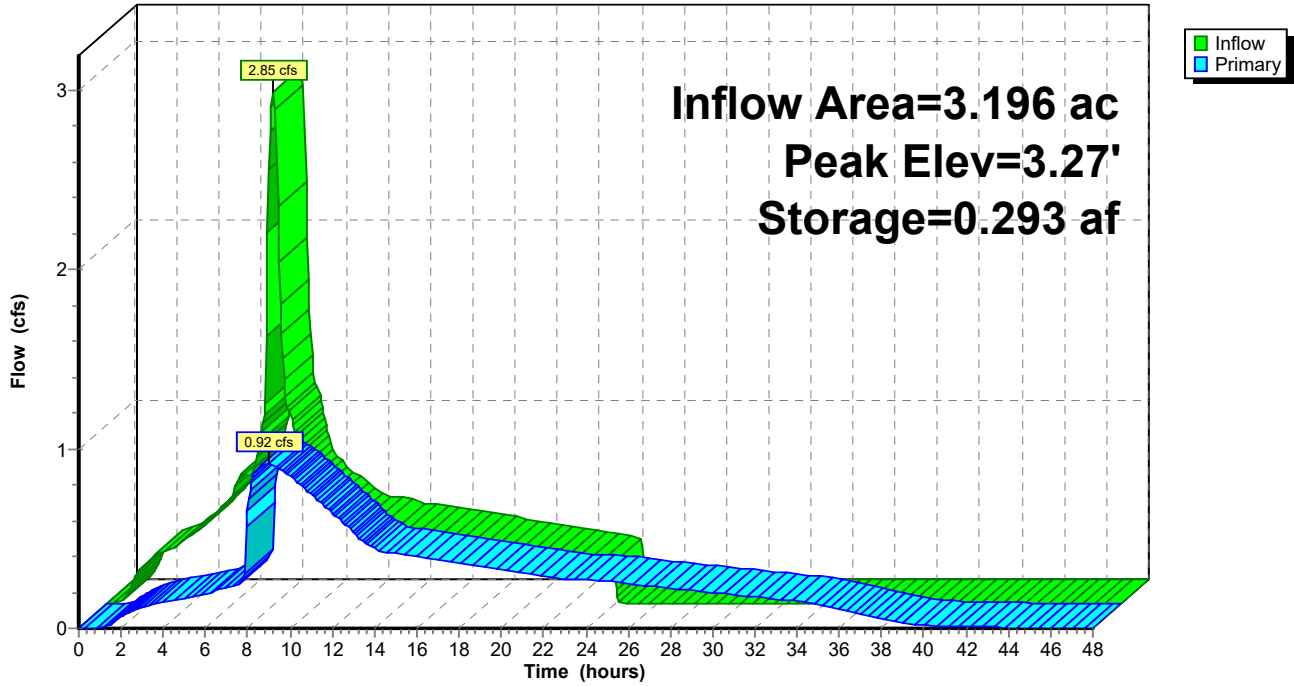
1,127.1 cy Field

715.5 cy Stone



### Pond 33P: (new Pond)

Hydrograph



# Tualatin Industrial Park

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## Appendix E

Conveyance Calculations

*(To be provided with permit submittal)*

## Appendix F

Operations and Maintenance Report

*(To be provided with permit submittal)*