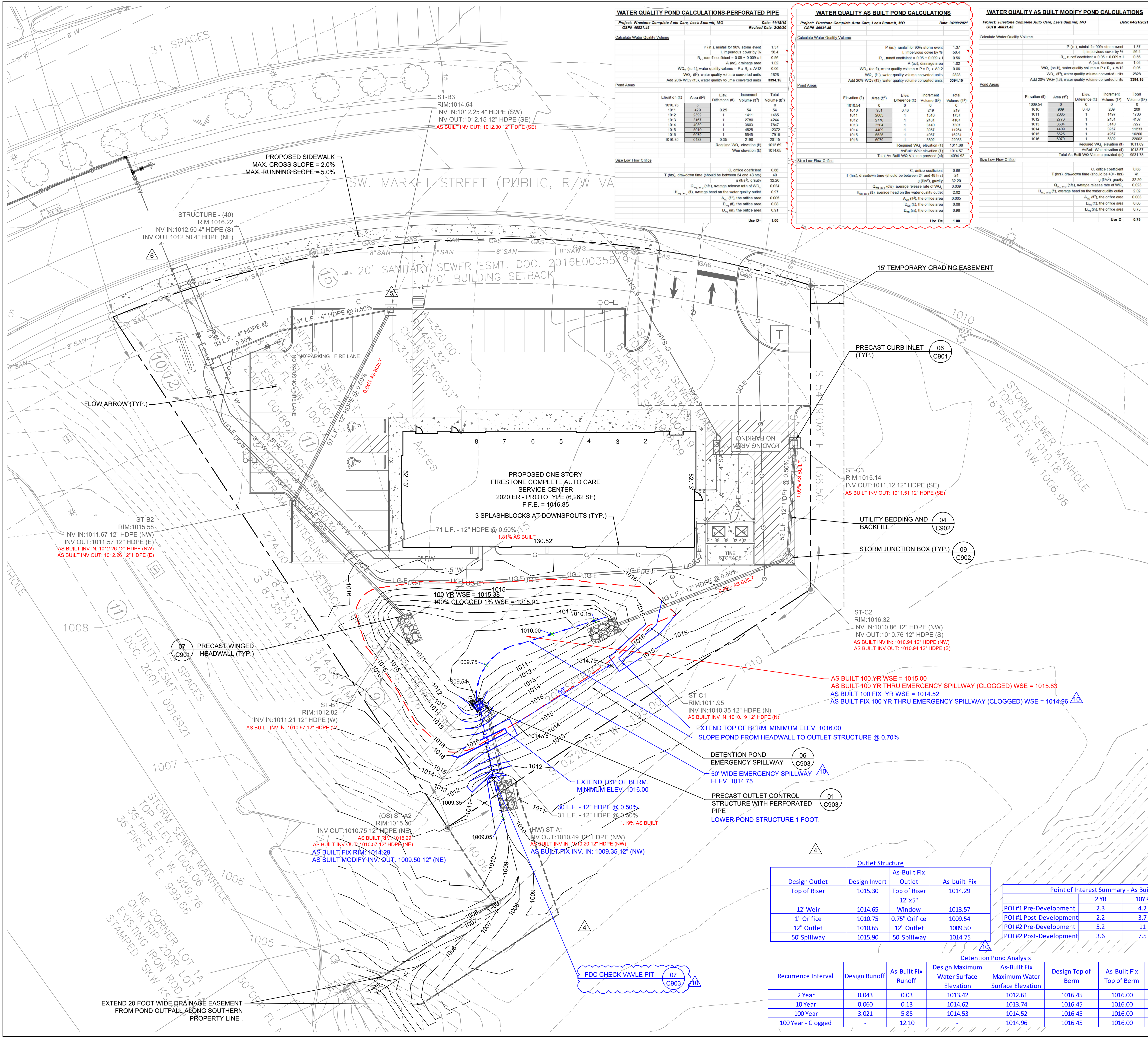


I:\WA-FS-04\na_rft0514083145\07CAGm100RecordDwgs\Pond AsBuilt Check\4083145-C300_AsBuilt06.23.2021 - AsBuilt Fix.dwg - Elhan Kluding - 7/7/2021 3:29:20 PM



WATER QUALITY POND CALCULATIONS-PERFORATED PIPE

Project: Firestone Complete Auto Care, Lee's Summit, MO
GSP# 40831.45

Date: 11/18/19
Revised Date: 2/20/20

Calculate Water Quality Volume

P (in.), rainfall for 90% storm event	1.37
I, impervious cover by %	56.4
R ₁ , runoff coefficient = 0.05 + 0.009 x I	0.56
A (ac), drainage area	1.02
WQ ₁ (ac-ft), water quality volume = P x R ₁ x A x I/2	0.08
WQ ₂ (ft ³), water quality volume converted units	2028
Add 20% WQ ₂ (ft ³), water quality volume converted units	3394.15

Pond Areas

Elevation (ft)	Area (ft ²)	Elev. Difference (ft)	Increment Volume (ft ³)	Total Volume (ft ³)
1010.75	5	0	0	0
1011	429	0.25	54	54
1012	2392	1	1411	1465
1013	3167	1	2780	4244
1014	4039	1	3603	7847
1015	5010	1	4525	12372
1016	6079	1	5445	17816
1016.35	6483	0.35	2198	20015
Required WQ ₂ elevation (ft)				1011.69
Actual WQ ₂ elevation (ft)				1014.57
Use D=				1.00

Size Low Flow Orifice

	C, orifice coefficient	0.66
T (hrs), drawdown time (should be between 24 and 48 hrs)		40
	g (ft/s ²), gravity	32.2
	Q _{avg w2} (cfs), average release rate of WQ ₂	0.024
H _{avg w2} (ft), average head on the water quality outlet		0.97
	A _{or} (ft ²), the orifice area	0.005
	D _{or} (ft), the orifice area	0.08
	D _{or} (in), the orifice area	0.91
	Use D=	1.00

WATER QUALITY AS BUILT POND CALCULATIONS

Project: Firestone Complete Auto Care, Lee's Summit, MO
GSP# 40831.45

Date: 04/21/2021

Calculate Water Quality Volume

P (in.), rainfall for 90% storm event	1.37
I, impervious cover by %	56.4
R ₁ , runoff coefficient = 0.05 + 0.009 x I	0.56
A (ac), drainage area	1.02
WQ ₁ (ac-ft), water quality volume = P x R ₁ x A x I/2	0.08
WQ ₂ (ft ³), water quality volume converted units	2028
Add 20% WQ ₂ (ft ³), water quality volume converted units	3394.15

Pond Areas

Elevation (ft)	Area (ft ²)	Elev. Difference (ft)	Increment Volume (ft ³)	Total Volume (ft ³)
1010.54	0	0	0	0
1010	867	0.46	219	219
1011	2085	1	1516	1737
1012	2776	1	2431	4167
1013	3504	1	3140	7707
1014	4409	1	3957	11664
1015	5525	1	4967	16631
1016	6079	1	5802	22433
Required WQ ₂ elevation (ft)				1011.69
Actual WQ ₂ elevation (ft)				1014.57
Total As Built WQ Volume provided (cfs)				14094.92

Size Low Flow Orifice

	C, orifice coefficient	0.66
T (hrs), drawdown time (should be between 24 and 48 hrs)		0.66
	g (ft/s ²), gravity	32.2
	Q _{avg w2} (cfs), average release rate of WQ ₂	0.029
H _{avg w2} (ft), average head on the water quality outlet		2.02
	A _{or} (ft ²), the orifice area	0.005
	D _{or} (ft), the orifice area	0.08
	D _{or} (in), the orifice area	0.98
	Use D=	1.00

WATER QUALITY AS BUILT MODIFY POND CALCULATIONS

Project: Firestone Complete Auto Care, Lee's Summit, MO
GSP# 40831.45

Date: 04/21/2021

Calculate Water Quality Volume

P (in.), rainfall for 90% storm event	1.37
I, impervious cover by %	56.4
R ₁ , runoff coefficient = 0.05 + 0.009 x I	0.56
A (ac), drainage area	1.02
WQ ₁ (ac-ft), water quality volume = P x R ₁ x A x I/2	0.08
WQ ₂ (ft ³), water quality volume converted units	2028
Add 20% WQ ₂ (ft ³), water quality volume converted units	3394.15

Pond Areas

Elevation (ft)	Area (ft ²)	Elev. Difference (ft)	Increment Volume (ft ³)	Total Volume (ft ³)
1009.54	0	0	0	0
1010	909	0.46	269	269
1011	2085	1	1467	1736
1012	2776	1	2431	4167
1013	3504	1	3140	7707
1014	4409	1	3957	11664
1015	5525	1	4967	16631
1016	6079	1	5802	22433
Required WQ ₂ elevation (ft)				1011.69
Actual WQ ₂ elevation (ft)				1013.57
Total As Built WQ Volume provided (cfs)				9531.78

Size Low Flow Orifice

	C, orifice coefficient	0.66
	T (hrs), drawdown time (should be 40+ hrs)	41
	g (ft/s ²), gravity	32.20
	Q _{avg w2} (cfs), average release rate of WQ ₂	0.023
	H _{avg w2} (ft), average head on the water quality outlet	2.02
	A _{or} (ft ²), the orifice area	0.003
	D _{or} (ft), the orifice area	0.06
	D _{or} (in), the orifice area	0.75
	Use D=	0.75

LEGEND

---	PROPERTY LINE
---	BUILDING LINE
---	EXISTING MAJOR CONTOUR
---	EXISTING MINOR CONTOUR
---	MAJOR CONTOUR
---	MINOR CONTOUR
---	STORM PIPE
---	HEADWALL
---	STORM MANHOLE
---	AREA INLET
---	CURB INLET
---	STORM CLEANOUT
---	SPOT ELEVATION
---	FLUSH ELEVATION
---	MATCH EXISTING FINISH GRADE ELEVATION
---	CURB TOP/BOTTOM ELEVATIONS
---	FLOW ARROW

STORM STRUCTURE ABBREVIATIONS

(SCI)	SINGLE CURB INLET	DETAIL 06, SHEET C901
(JB)	JUNCTION BOX	DETAIL 09, SHEET C902
(HW)	HEADWALL	DETAIL 07, SHEET C901
(OS)	OUTLET STRUCTURE	DETAIL 08, SHEET C901

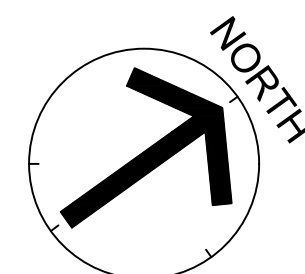
NOTES:

- FOR SITE PREPARATION AND GEOTECHNICAL RECOMMENDATIONS, REFER TO INTERTEK PSI GEOTECHNICAL REPORT 03381947, DATED 7/24/2019.
- ITEMS IN RED AND CLOUDED IN RED INDICATE AS BUILT CONDITIONS.
- ITEMS IN BLUE AND CLOUDED IN BLUE INDICATE AS BUILT FIX, ONCE FIX IS COMPLETED, PROVIDE TOPO SURVEY OF THE ENTIRE SITE INCLUDING PARKING, BUILDING FFE, AREA INLET TOP OF CASTING, POND, POND STRUCTURE INVERTS AND DIMENSIONS.

POND CONTOUR AREAS - DESIGN		
DESIGN ELEVATION	GN CAD AREA	DESIGN CAD VOLUME (CF.) AVG. END METHOD
1010.75	5	0
1011.00	429	54
1012.00	2392	1,465
1013.00	3167	4,244
1014.00	4039	7,847
1015.00	5010	12,372
1016.00	6079	17,916
1016.35	6483	20,115

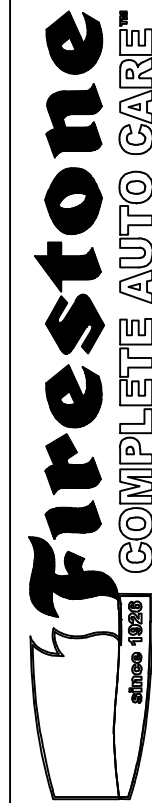
POND CONTOUR AREAS - AS BUILT FIX		
ASBUILT ELEVATION	ASBUILT modify CAD AREA (SF.)	ASBUILT CAD VOLUME (CF.) AVG. END METHOD
1009.54	0	0
1010.00	909	209
1011.00	2085	1,706
1012.00	2776	4,137
1013.00	3504	7,777
1014.00	4409	11,234
1015.00	5525	16,201
1016.00	6079	22,003

RELEASE FOR CONSTRUCTION
AS NOTED ON PLANS REVIEW
DEVELOPMENT SERVICES
LEE'S SUMMIT, MISSOURI
07/08/2021

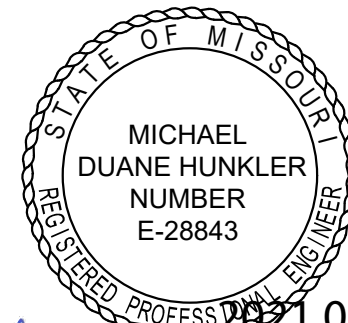


GreshamSmith.com

222 Second Avenue South
Suite 1400
Nashville, TN 37201
615.770.8100



3561 SW MARKET STREET
LEE'S SUMMIT, MISSOURI 64082



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16:04:36 -05'00'

Revision

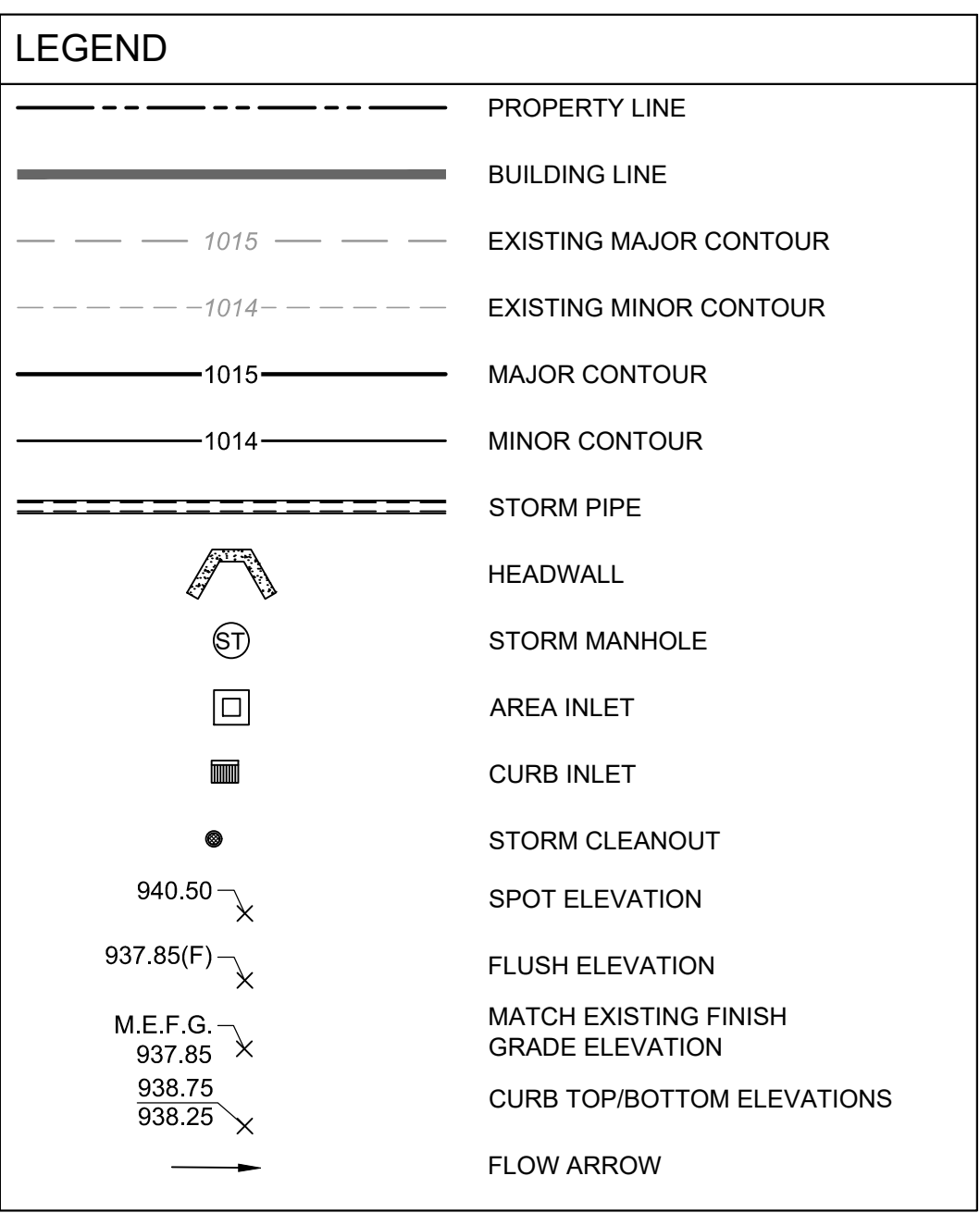
No.	Date	Description
1	02.07.2020	CITY COMMENTS
2	02.21.2020	CITY COMMENTS
3	03.27.2020	CITY COMMENTS
4	04.28.2020	CITY COMMENTS
5	05.15.2020	CITY COMMENTS
6	06.01.2020	CITY COMMENTS
7	04.12.2021	AS BUILT
8	04.15.2021	AS BUILT
9	04.22.2021	AS BUILT FIX
10	06.29.2021	AS BUILT FIX
11	07.07.2021	AS BUILT FIX

GRADING AND
DRAINAGE PLAN

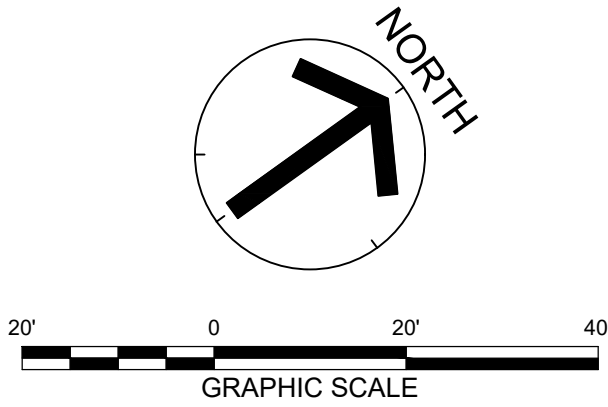
C300

40831.45
JANUARY 8, 2020

This Line Is 3 Inches When Printed Full Size



<u>STORM STRUCTURE ABBREVIATIONS</u>		
(SCI)	SINGLE CURB INLET	DETAIL 06, SHEET C901
(JB)	JUNCTION BOX	DETAIL 09, SHEET C902
(HW)	HEADWALL	DETAIL 07, SHEET C901
(OS)	OUTLET STRUCTURE	DETAIL 08, SHEET C901



NOTES:

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This Line Is 3 Inches When Printed Full Size

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