

COMPOSITE BASIN COEFFICIENTS

Subdivision: Trails at Crowfoot

Project Name: Trails at Crowfoot

Soil Type B/C/D

Project No. 254103

Calculated By: MRS

Date: 8/11/2021

Soil Type B 49.80%

Land Use	Imp.	C ₂	C ₅	C ₁₀₀
Residential (Single Family)	45%	0.40	0.42	0.67
School	55%	0.49	0.51	0.72
Business	95%	0.85	0.88	0.92
Residential (Multi Family)	75%	0.67	0.70	0.82
Streets	100%	0.89	0.93	0.94
Paved	90%	0.80	0.84	0.90
Parks	10%	0.09	0.09	0.50
Open Space / Lawns	2%	0.02	0.02	0.46
Mixed Use	30%	0.27	0.28	0.60

Soil Type C/D 50.20%

Land Use	Imp.	C ₂	C ₅	C ₁₀₀
Residential (Single Family)	45%	0.40	0.44	0.71
School	55%	0.49	0.53	0.76
Business	95%	0.85	0.88	0.96
Residential (Multi Family)	75%	0.67	0.70	0.85
Streets	100%	0.89	0.92	0.96
Paved	90%	0.80	0.83	0.91
Parks	10%	0.09	0.14	0.55
Open Space / Lawns	2%	0.02	0.07	0.52
Mixed Use	30%	0.27	0.31	0.64

Composite Runoff Co-eff

Land Use	Imp.	C ₂	C ₅	C ₁₀₀
Residential (Single Family)	45%	0.40	0.43	0.69
School	55%	0.49	0.52	0.74
Business	95%	0.85	0.88	0.94
Residential (Multi Family)	75%	0.67	0.70	0.84
Streets	100%	0.89	0.92	0.95
Paved	90%	0.80	0.83	0.91
Parks	10%	0.09	0.12	0.53
Open Space / Lawns	2%	0.02	0.05	0.49
Mixed Use	30%	0.27	0.30	0.62

OS11

Total Area

3.20 acres

Composite Calculations

Land Use	Imp.	C ₂	C ₅	C ₁₀₀	Area	Imp%	C ₂	C ₅	C ₁₀₀
Open Space / Lawns	2%	0.02	0.02	0.46	3.20	2.0	0.02	0.02	0.46
TOTAL					3.20	2.0	0.02	0.02	0.46

STANDARD FORM SF-2 TIME OF CONCENTRATION

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SUB-BASIN			INITIAL/OVERLAND			TRAVEL TIME				T _c CHECK			FINAL
DATA			(T _i)			(T _t)				(URBANIZED BASINS)			
BASIN	D.A.	C _s	L	S	T _i	L	S	VEL.	T _t	COMP. T _c	TOTAL	MIN. T _c	T _c
ID	(AC)		(FT)	(%)	(MIN)	(FT)	(%)	(FPS)	(MIN)	(MIN)	LENGTH(FT)	(MIN)	(MIN)
OS11	3.20	0.02	300	3.5	22.2	1400	3.5	3.7	6.2	28.4	1700.0	19.4	19.4

NOTES:

$$T_i = (1.8 * (1.1 - C_s) * L^{0.5}) / (S^{0.33})$$

$$T_t = L / 60V \text{ (Velocity From Fig. 3-2)}$$

$$T_c \text{ Check} = 10 + L / 180$$

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

Subdivision Trails at Crowfoot

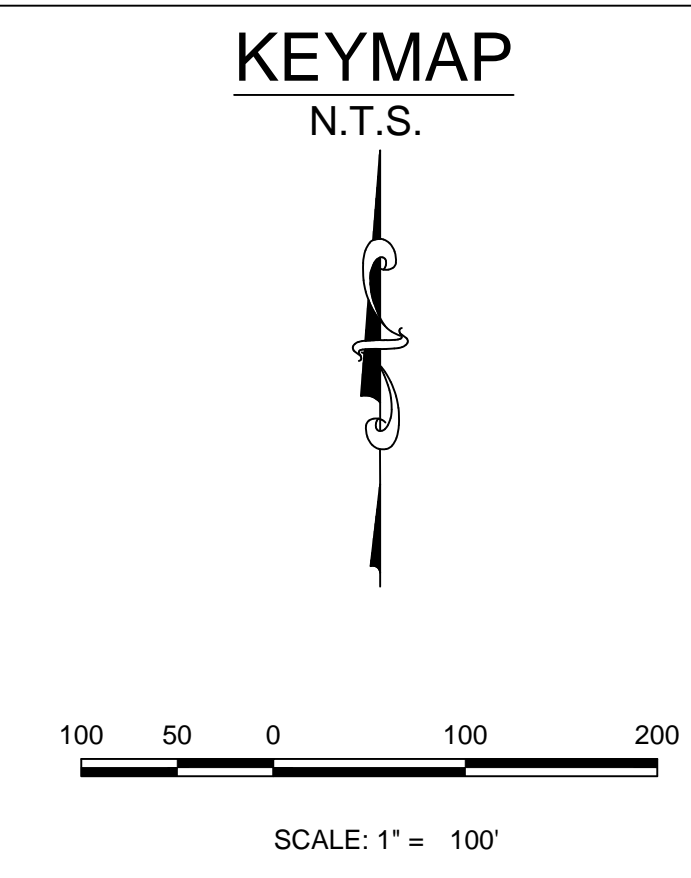
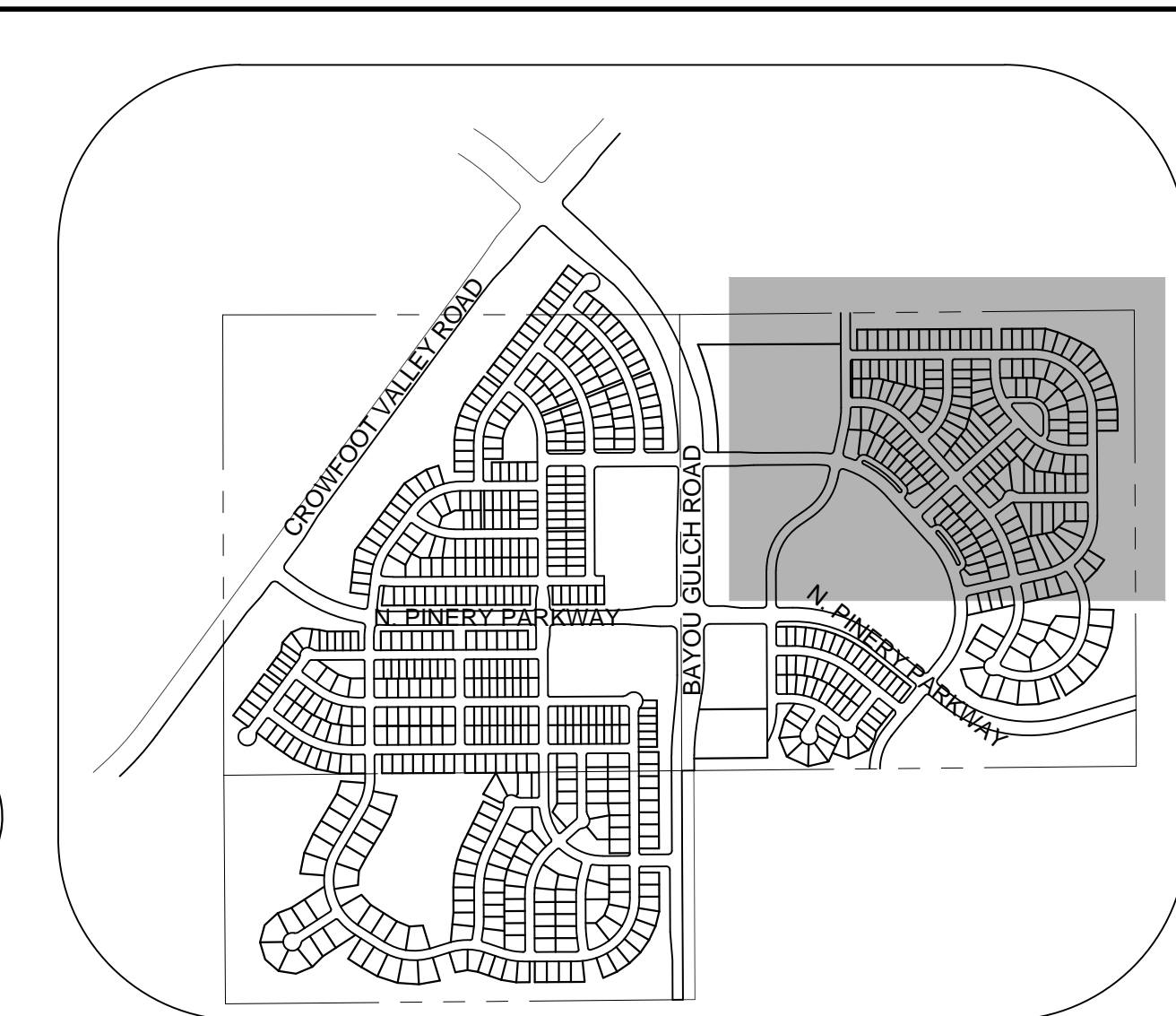
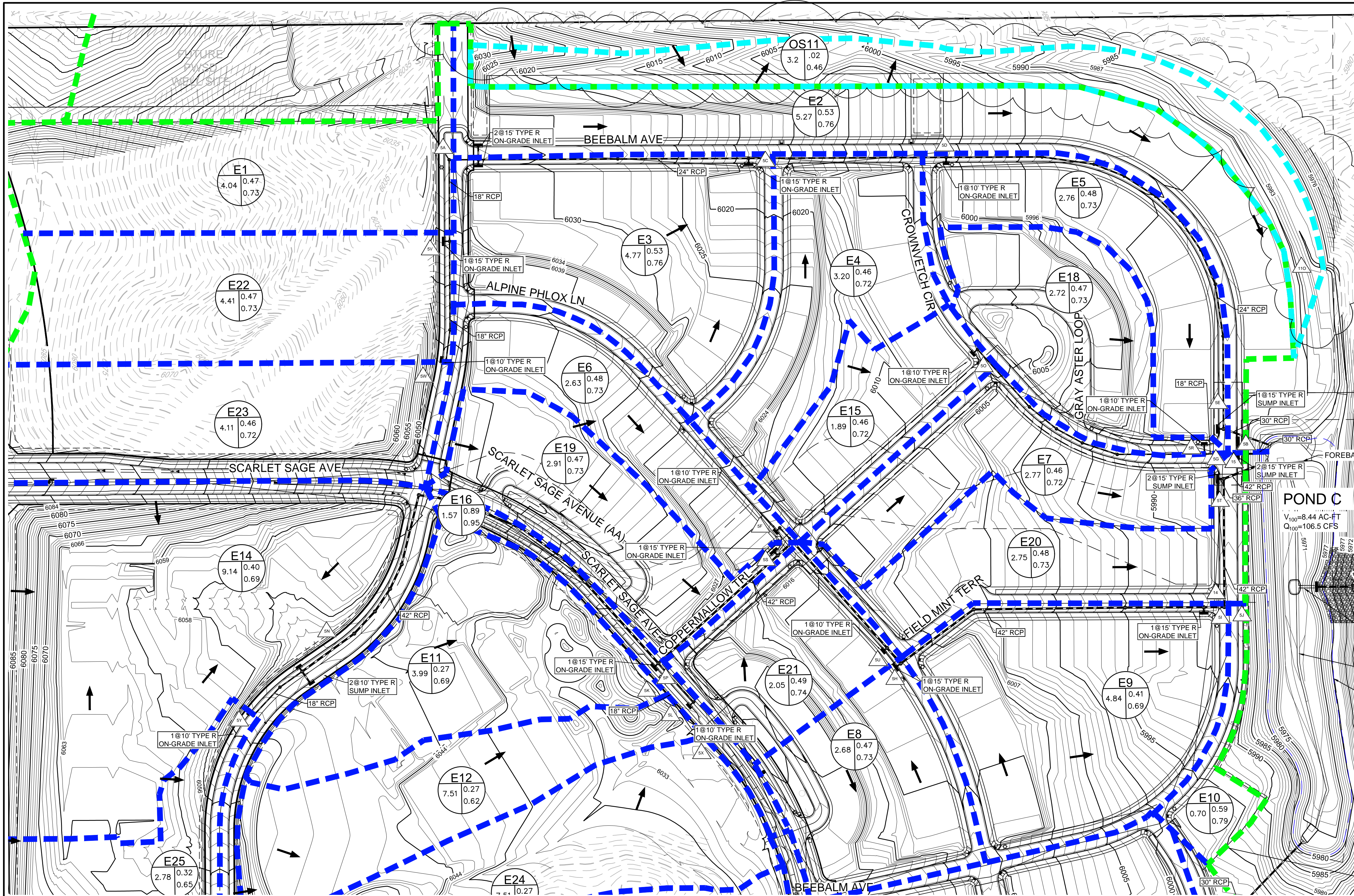
Design Storm $\frac{100 \text{ Yr}}{100\text{-Year P1} = 2.6}$ in.

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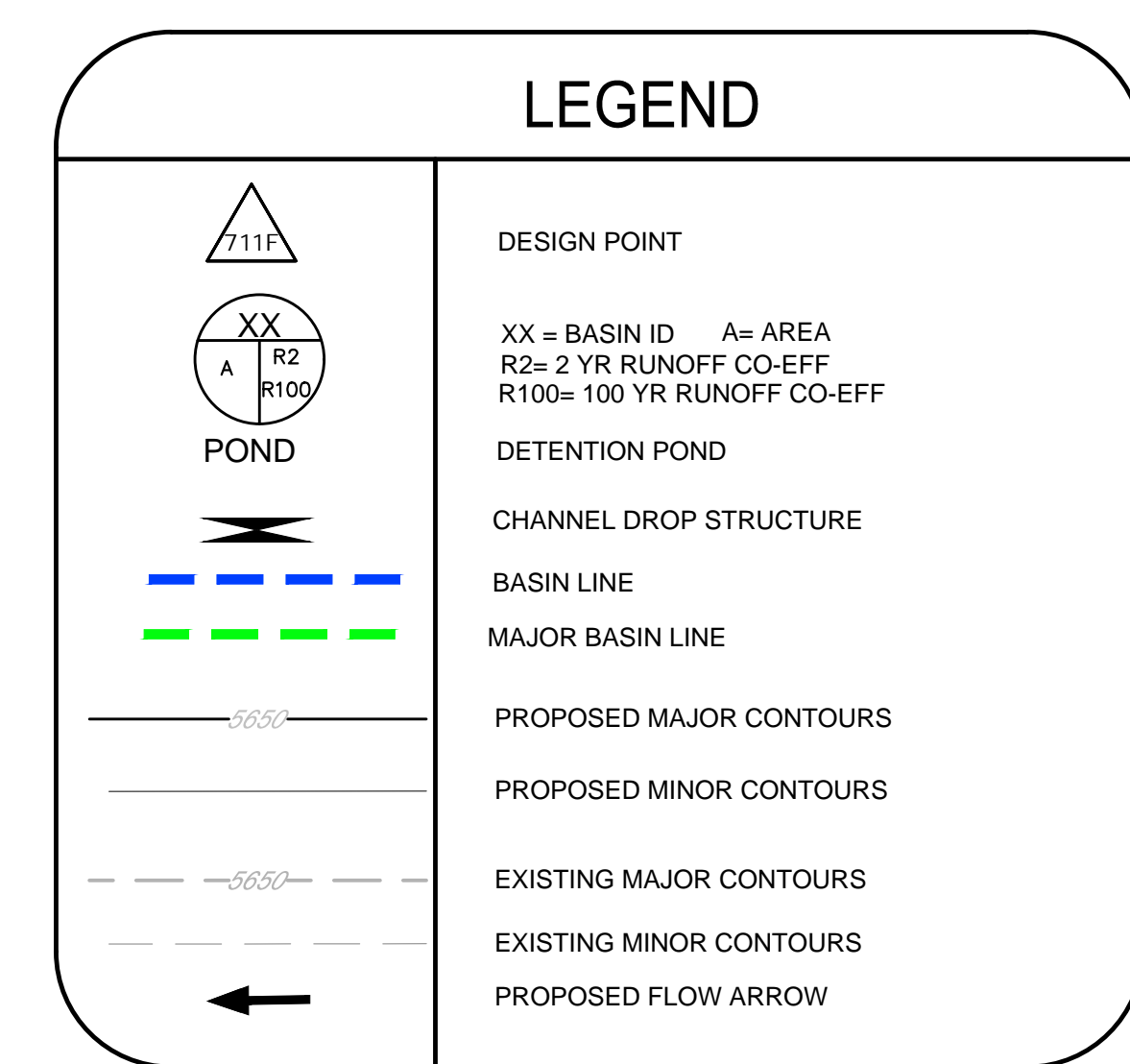
COMBINED BASINS	DIRECT RUNOFF									TOTAL RUNOFF					STREET		PIPE			TRAVEL TIME			REMARKS	
	Design Point	Area Design.	Area (Ac)	Runoff Coeff.	Tc (min)	C* A (Ac)	I (in/hr)	Q (cfs)	Inlet Type	Q (Interscp)	Q (Carry-Over)	Tc (min)	C* A (Ac)	I (in/hr)	Q (cfs)	Slope (%)	Street Flow (cfs)	Design Flow (cfs)	Slope (%)	Pipe Size (inches)	Length (ft)	Velocity (fps)		Tt (min)
OS11	110	OS11	3.20	0.46	19.4	1.47	5.2	7.6	Curb Chase			19.4	1.47	5.2	7.6	2.0	7.6				30.0	2.83	0.2	Outfall to existing

Non-Residential Curb Chase Drain (Dual)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth
Input Data	
Roughness Coefficient	0.013
Channel Slope	0.020 ft/ft
Height	6.0 in
Bottom Width	36.00 in (2-18")
Discharge	7.60 cfs
Results	
Normal Depth	4.3 in
Flow Area	1.1 ft ²
Wetted Perimeter	44.6 in
Hydraulic Radius	3.5 in
Top Width	36.00 in
Critical Depth	6.0 in
Percent Full	71.7 %
Critical Slope	0.005 ft/ft
Velocity	7.07 ft/s
Velocity Head	0.78 ft
Specific Energy	1.13 ft
Froude Number	2.080
Discharge Full	8.68 cfs
Slope Full	0.020 ft/ft
Flow Type	Supercritical
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 in
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	71.7 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	4.3 in
Critical Depth	6.0 in
Channel Slope	0.020 ft/ft
Critical Slope	0.005 ft/ft



- EMERGENCY OVERFLOW WEIR
- POND OUTLET W/ MICROPOOL
- TRICKLE CHANNEL
- 100 YEAR WSE



POND C	
Description	
Drainage Area (FT)	101.09
Percent Imperviousness (%)	44.49
WQCV (AC-FT)	1.50
EURV Volume (including WQCV) (AC-FT)	4.26
EURV Water Surface (FT)	5975.55
100-YR Volume (including EURV) (AC-FT)	8.44
100-year water surface elevation (FT)	5977.94
Emergency Spillway Crest Elevation (FT)	5978.15
100-year Peak Inflow (CFS)	204.80
100-year Peak Outflow (CFS)	106.50
100-year Peak Allowable (CFS)	111.36

BASIN ID	AREA (AC)	DIRECT FLOW		Street Type	Slope
		Imperviousness %	Q2 (CFS)		
E1	4.04	52.65	4.95	Local	2.70
E2	5.27	52.02	4.71	Local	0.00
E3	4.77	52.31	5.64	Local	3.00
E4	3.20	52.07	3.78	Local	4.00
E5	2.76	53.77	3.09	Local	0.00
E6	2.63	53.59	3.06	Local	1.00
E7	2.77	51.99	3.21	Local	0.00
E8	2.68	53.33	3.13	Local	2.00
E9	4.84	39.52	3.92	Local	2.00
E10	0.70	56.03	0.85	Local	1.00
E11	3.99	30.00	2.48	Local	1.00
E12	3.28	30.00	2.04	Local	6.00
E13	4.45	30.00	2.76	Local	1.00
E14	9.14	44.35	8.62	Local	0.00
E15	1.89	51.97	2.08	Local	2.00
E16	1.57	73.60	2.68	Local	6.00
E17	1.55	73.60	2.64	Local	1.00
E18	2.72	52.96	3.45	Local	1.50
E19	2.91	53.40	3.58	Local	1.20
E20	2.75	53.49	3.12	Local	2.00
E21	2.05	54.72	2.56	Local	2.00
E22	4.41	53.09	5.39	Local	2.70
E23	4.11	51.69	4.81	Local	2.70
E24	4.23	30.00	2.63	Local	2.00
E25	2.78	35.90	2.16	Local	2.00

Design Point ID	CUMULATIVE FLOW	
	Q2 (CFS)	Q100 (CFS)
14	32.04	124.18
15	36.95	142.09
5A	14.28	56.31
5B	9.56	77.69
5C	18.85	70.87
5D	21.89	79.87
5E	23.45	83.44
5F	3.96	12.34
5G	6.16	142.25
5H	29.48	81.28
5I	3.92	19.46
5J	0.85	3.31
5K	2.48	14.96
5L	4.60	27.74
5M	2.76	16.67
5N	10.74	49.99
5O	2.08	8.55
5P	19.53	49.94
5Q	5.06	23.96
5R	4.86	14.00
5S	24.94	67.90
5T	3.12	12.57
5U	2.56	10.18
5V	9.85	39.52
5W	4.81	19.86
5X	2.63	15.87
5Y	2.16	11.51

BASIN ID	AREA (AC)	DIRECT FLOW		Street Type	Slope
		Imperviousness %	Q2 (CFS)		
OS11	3.20	2.00	0.13	N/A	3.00

Design Point ID	CUMULATIVE FLOW	
	Q2 (CFS)	Q100 (CFS)
110	0.13	7.60

- NOTE:
- THE TOWN OF PARKER REVIEW CONSTITUTES GENERAL COMPLIANCE WITH THE TOWN'S STANDARDS AND APPROVED VARIANCES, SUBJECT TO THESE PLANS BEING STAMPED, SIGNED, AND DATED BY THE PROFESSIONAL ENGINEER OF RECORD. REVIEW BY THE TOWN DOES NOT CONSTITUTE APPROVAL OF THE PLAN DESIGN OR ACCURACY AND CORRECTNESS OF ENGINEERING CALCULATIONS. ERRORS IN THE DESIGN OR CALCULATIONS REMAIN THE RESPONSIBILITY OF THE REGISTERED PROFESSIONAL ENGINEER WHOSE STAMP AND SIGNATURE ARE AFFIXED TO THIS DOCUMENT.
 - PONDS ARE MAINTAINED BY METRO DISTRICT.
 - OUTLET STRUCTURE AND OVERFLOW WEIR DETAILS ARE PROVIDED WITH CIVIL PLANS.
 - DROP STRUCTURE DETAILS ARE PROVIDED IN CHANNEL PLAN AND PROFILE SHEET.

BENCHMARK
DOUGLAS COUNTY CONTROL POINT KNOWN AS 1.060032, BEING A 3-1/4" ALUMINUM CAP, BEING LOCATED IN THE SOUTHWEST QUARTER OF SECTION 33, TOWNSHIP 6 SOUTH, RANGE 66 WEST OF THE SIXTH PRINCIPAL MERIDIAN, HAVING A PUBLISHED ELEVATION OF 1799.2870 METERS (5903.13 FEET) NAVD '88 DATUM.

BASIS OF BEARINGS:
THE EAST LINE OF THE NORTHEAST QUARTER OF SAID SECTION 9 BEING MONUMENTED AT THE NORTHEAST CORNER OF SAID SECTION 9 BY A 3-1/4" ALUMINUM CAP STAMPED LS 23053 AND AT THE EAST QUARTER CORNER OF SAID SECTION 9 BY A 2-1/2" ALUMINUM CAP STAMPED LS 6935 BEING CONSIDERED TO BEAR SOUTH 00°15'06" EAST, 2648.70 FEET.

CALL 811
TWO WORKING DAYS
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PREPARED UNDER THE SUPERVISION OF

MARK SCHEURER
COLORADO P.E. 48988

10333 E. Dry Creek Rd., Suite 240, Englewood, CO 80112
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CVL CONSULTANTS

EX MANAGEMENT
1552 South Union Way, CENTENNIAL, CO 80112

TRAILS AT CROWFOOT
FINAL DRAINAGE MAP
DRAINAGE MAP

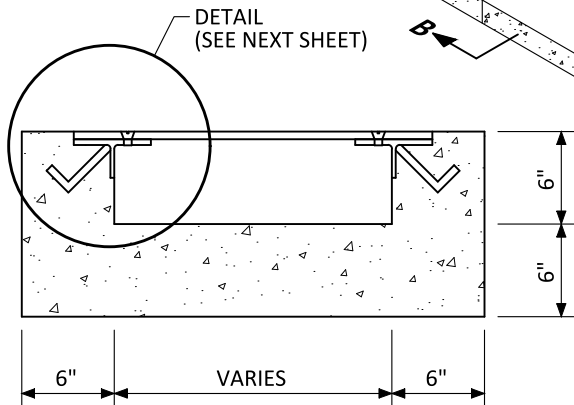
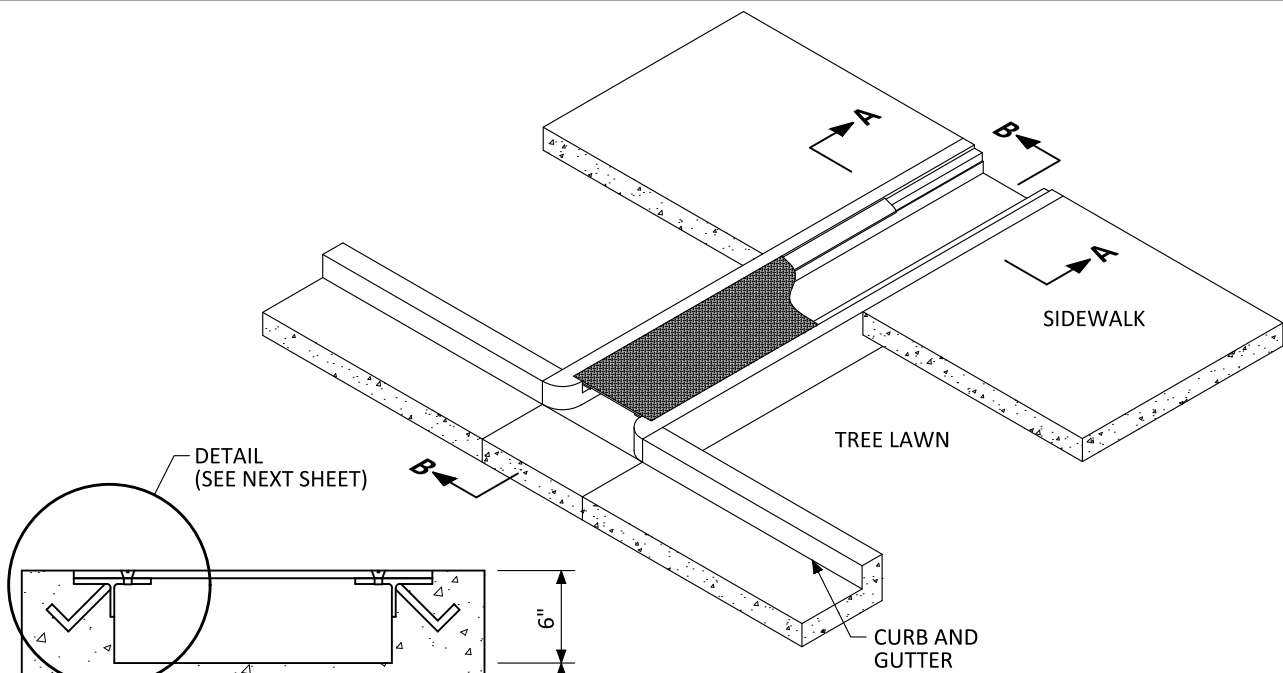
SCALE: AS SHOWN
FILE NO: 8130283701

DRAWN BY: ATK
CHECKED BY: JJJ
DATE: MAY 2017

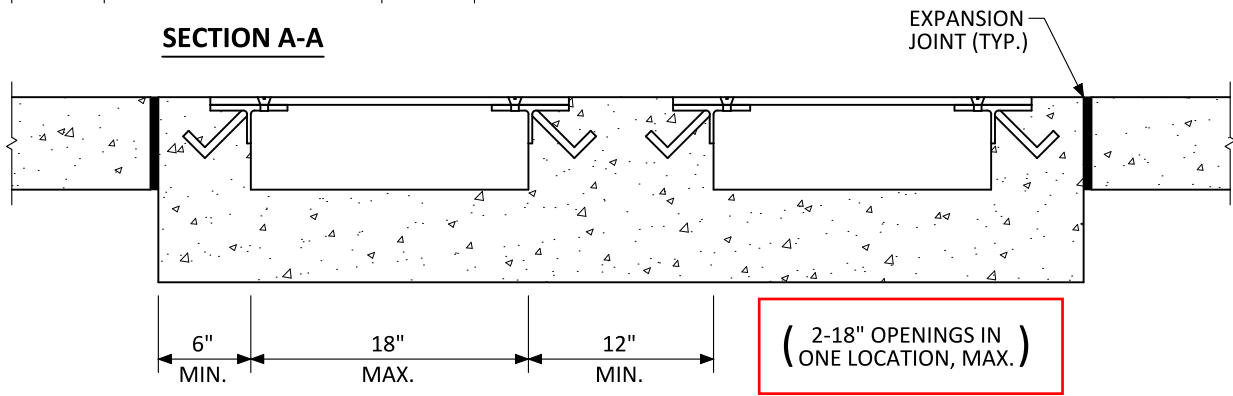
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1 ADDING OFFSITE BASIN OS11

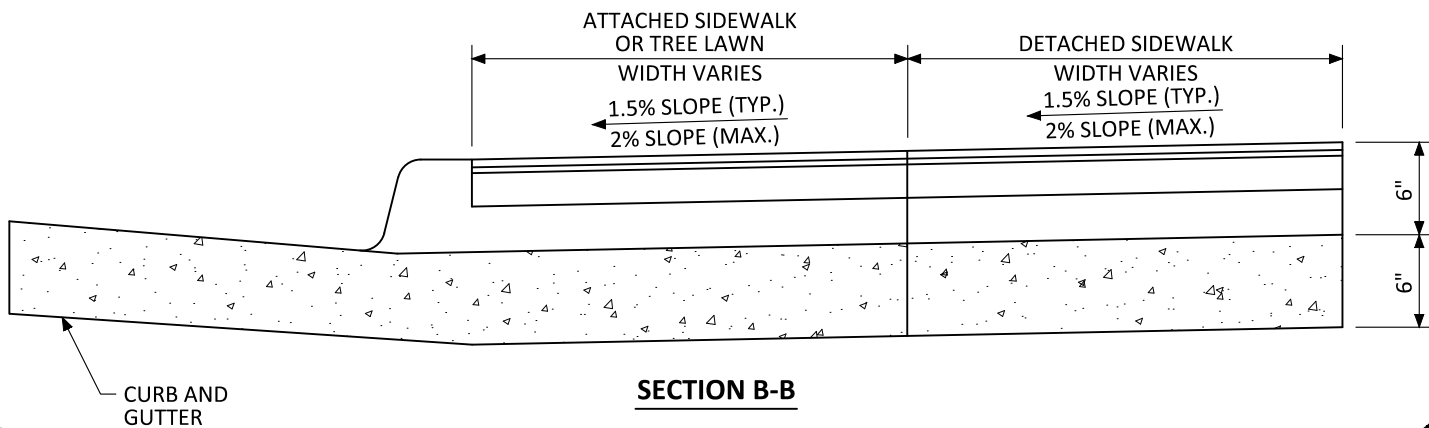
No.	Revisions	Date	Int.	Appr.	Date



SECTION A-A



MULTIPLE CHASE



SECTION B-B

NO CHANGES ARE TO BE MADE TO THIS DRAWING WITHOUT WRITTEN PERMISSION OF THE TOWN OF PARKER.

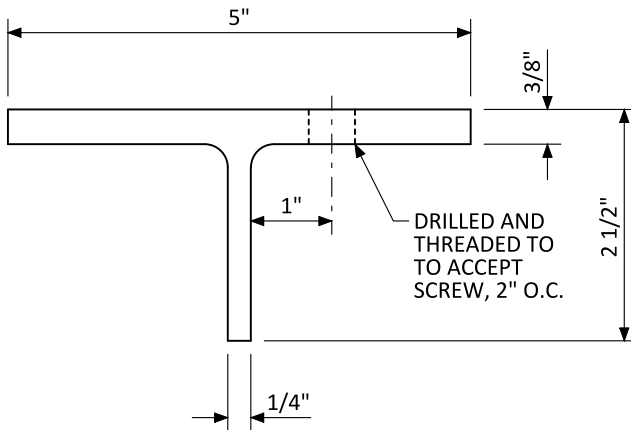
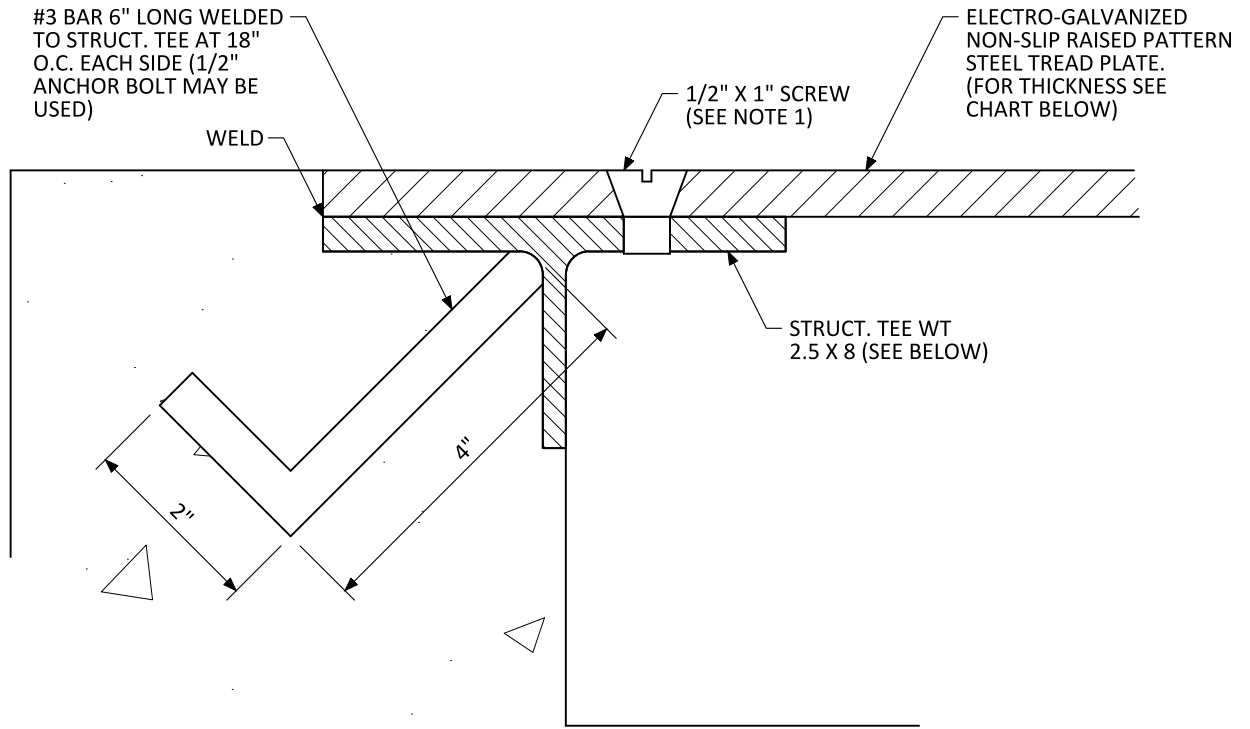


PARKER
COLORADO

**CURB CHASE DRAIN
(NON-RESIDENTIAL) LAYOUT
STANDARD DETAIL**

DATE
NOVEMBER
2020

DETAIL
29
1 OF 2



WIDTH OF OPENING	TREAD PLATE THICKNESS
6"	3/8"
6"-18"	1/2"

- NOTES:
1. STARHEAD SCREW ELECTRO-GALVANIZED FINISH (RECESS HEAD)
 2. ASSEMBLY SHALL BE GALVANIZED

NO CHANGES ARE TO BE MADE TO THIS DRAWING WITHOUT WRITTEN PERMISSION OF THE TOWN OF PARKER.



PARKER
COLORADO

**CURB CHASE DRAIN
(NON-RESIDENTIAL) LAYOUT
STANDARD DETAIL**

DATE
NOVEMBER
2020

DETAIL

29

2 OF 2