CITY OF ALBUQUERO

Hydrology Section Planning Department David S. Campbell, Director



Timothy M. Keller, Mayor

May 10, 2019

Matt Korte Adams Engineering 513 Main St Suite 300 Fort Worth, TX 76102

Re: McDonalds - 8315 Montgomery Blvd NE Tract A-1-F of the Los Pastores Shopping Center Grading and Drainage Plan - Engineer's Stamp date 4/4/2019 (F19D013A)

Dear Mr. Korte,

Based on the application received 5/9/2019, the above referenced plan cannot be approved for building permit until the following comments are addressed.

Prior to approval for Building Permit

- 1. Please state the <u>Drainage Management Plan</u> for this site (ie. Retention, Detention, or Free Discharge). The "Conclusion" on sheet C8.1 is a misstatement of the pertinent facts and should be replaced with "Drainage Management Plan - This site will drain in accordance with the Los Pastores Shopping Center DMP with engineers stamp date 5/2/2019 which includes a combination of Free Discharge and Detention. The other statements in the "Conclusion are not pertinent and should be deleted.
- 2. The flow rates shown along the alley do not agree with the Los Pastores Shopping Center DMP. It is not necessary for this development to duplicate the flow rates that are identified in that DMP, but if the flow rates are going to be called out on Sheet C8.1 then they must agree with the DMP.
- 3. Please change "Bio-retention (0.34")" to "Redevelopment SWQV (0.26")" in the "Proposed Conditions" Paragraph on sheet C8.1.
- 4. The plan must clearly identify how the Stormwater Quality Volume (SWQV) requirements are being met. If the response to comments letter, which says "It is McDonald's desire to provide payment in lieu of the total required storage volume", is correct, then please add that statement to the plan including the specific area of impervious not served by onsite BMPs and the volume associated with the Payment in Lieu of Construction.
- 5. Ponds #1 and #4 appear to have been deleted from the plan, Sheet C8.1 or are not labeled. If so, please delete the Stage Storage Volume table from sheet C8.2 for those two ponds. Also delete them from the "Pond FF Elevation Table" on that sheet. The second table titled "First Flush Volume Calculations" should look more like the one below using the volumes from the "Stage Storage Volume" tables.

PO Box 1293

Albuquerque

NM 87103

www.cabq.gov

		SWQV			
Basin ID	Area (Ac.)	Req. (CF) ⁽¹⁾	SWQV Prov. (CF)	Pond #	Deficiency (CF)
A1	0.038	36	0	N/A	36
				Los	
A2	0.175	165	165	Pastores	0
A3	0.041	39	0	N/A	39
A4	0.182	172	48	5	124
A5	0.091	86	82	3	4
A6	0.052	49	130	2 ⁽²⁾	-81
A7	0.035	33	0	N/A	33
R1	0.098	92	0	N/A	92
Total	0.712	672	425	N/A	247
_					

Footnotes:

- (1) The required volume is 0.26" from the impervious surface.
- (2) Pond #2 serves more than just area A6, it also captures the excess from Ponds #3 and #5.

Payment in Lieu for 247 CF @ \$8/CF = \$1,976.00

- 6. Hydrology will generate an invoice after the G&D Plan has been revised and resubmitted with the correct area of impervious and the missing volume shown clearly in a note on the plan together with the intention of the owner to pay the fee in lieu of constructing the required SWQV, then the fee must be paid prior to approval of the G&D Plan for Building Permit.
- 7. A Private Drainage Easement is required for the offsite storm drain on Tract A-1-E. Please provide a copy of the recorded easement that clearly indicates maintenance responsibilities and beneficiary. Also show the easement on the G&D Plan sheet C7.0 and label Tract A-1-E, Access A, and A-1-D and the other easements and utilities in the offsite area of construction north of this site.
- 8. A Drainage covenant is required for the offsite Los Pastores Shopping Center Pond using the recently approved plan to make the exhibit.

Prior to acceptance for Certificate of Occupancy

- 9. An Engineer's Certification must be submitted for approval to Hydrology showing that the site has been graded and will drain in accordance with the approved plan.
- 10. A Drainage Covenant is required for the onsite BMP ponds. The original notarized form, pond exhibits (legible on 8.5x11 paper), and recording fee (\$25, payable to City of Albuquerque) must be turned into DRC (4th, Plaza del Sol) for routing. Please contact Charlotte LaBadie (clabadie@cabq.gov, 924-3996) or Madeline Carruthers (mtafoya@cabq.gov, 924-3997) regarding the routing and recording process for covenants.

CITY OF ALBUQUERQUE

Hydrology Section Planning Department David S. Campbell, Director

Sincerely,

James D. Hughes, P.E.

Principal Engineer, Planning Dept.



Timothy M. Keller, Mayor

11. As a reminder, if the project total area of disturbance (including the staging area and any work within the adjacent Right-of-Way) is 1 acre or more, then an Erosion and Sediment Control (ESC) Plan and Owner's certified Notice of Intent (NOI) is required to be submitted to the Stormwater Quality Engineer (Curtis Cherne, PE, ccherne@cabq.gov, 924-3420) 14 days prior to any earth disturbance, Building Permit, or Work Order.

If you have any questions, you can contact me at 924-3986 or E-mail at $\underline{jhughes@cabq.gov}$.

	Development and Review Services
	CC Cesar Segovia, Architect
PO Box 1293	
Albuquerque	
NM 87103	
vww.cabq.gov	





Thursday, May 09, 2019

City of Albuquerque
Development Review Services (Hydrology)

RE: 8315 Montgomery Blvd. NE (F19D013A)— HYDROLOGY COMMENTS

Thank you for taking the time to review Site Development plans for the McDonald's at 8315 Montgomery Blvd. NE. We have addressed your comments related to the Civil Construction Plans as follows:

Hydrology Comments:

- 1) Please use the new DTIS form. The most current version of the DTIS form on the City's website has been utilized (REV 11/2018).
- 2) An engineer's stamp and signature are required on the G&D Plan. During review phase, plans are submitted with the preliminary seal to help protect against someone utilizing preliminary plans for construction. Grading and Drainage plan has been sealed for this submittal.
- 3) The floor elevation of the building must be set a minimum of 1.0' above the adjacent floodplain elevation. There is a Special Flood Hazard Are in Montgomery Blvd. It is an AO (depth 1 feet) zone which may have been rounded down from 1.4' depth. The street flow line elevation in front of the east edge of the building 5420.7 so the minimum floor elevation should be 5423.1. Please add a note addressing the floodplain, show the floodplain on the G&D Plan, show the floor elevation on the G&D plan and indicate the direction of the roof drainage. A floodplain development permit is required for any work in the floodplain. The building floor elevation has been raised to 5423.1 and is shown on the G&D plans, and floodplain note has been added and shown. Roof drains go through downspouts and into a landscape / SWQ area in the SW corner of the site.
- 4) The alley and Montgomery Blvd. both have limited drainage and the plan increases the peak rate of runoff to both. The City engineer cannot approve any development who's increased runoff exceeds the downstream capacity per Section 14-5-2-12(G). The Drainage Management Plan for the Los Pastores Shopping Center (Hydro#F19D013C) established an allowable discharge of 26.47cfs from the 21.18 acres draining to the pond which equates to 1.25cfs/acre. The 0.6 acre portion of this site that currently drains to the Los Pastores Pond only contributes 0.75cfs to Montgomery after going through the pond, but that area will contribute 2.86cfs to Montgomery with the new plan. The existing floodplain on Montgomery indicates that it does not have capacity for any increased flow from this site. This site must either drain 0.6 acres to the Los Pastores Pond, or provide an equivalient onsite pond or some combination of those two. Per meeting with Doug Hughes, the engineer for Los Pastores (Tierra West) has modified their DMP to reflect the altered as-built condition. Additionally, McDonald's



has revised their drainage plan to release water into the alley rather than directly onto Montgomery. The result of all changes is overall LOWER alley flow and LOWER flow into Montgomery compared to the previous condition, thereby improving the drainage situation in both locations. Several design points have been updated in both the Los Pastores DMP and the McDonald's plans to reflect these updates.

- 5) This proposed G&D Plan also shows about a 1.5 cfs increase in direct runoff to the alley from the north half of this site which is partially offset by about 0.75 cfs decrease flow from the Los Pastores Pond if 0.6 acres of this site no longer drains to the pond. The increased flow to the alley may be allowed if the applicant can demonstrate that the alley has capacity for more flow than was shown in the Drainage Management Plan Addendum for Los Pastores Shopping Center. Otherwise ponds may have to be used to mitigate the increased flow to the alley. The Drainage Management Plan and Addendum for Los Pastores Shopping Center are available thru the City's GIS Advanced Map Viewer. See the Hydrology Section web page for instructions on how to access the files. Per meeting with Doug Hughes and engineer for Los Pastores (Tierra West), several modifications have been made to the overall Los Pastores DMP to show lowered flow rate from the pond in the as-built condition. This demonstrates additional alley capacity for McDonald's. Several design points have been updated in both the Los Pastores DMP and the McDonald's plans to reflect these updates.
- 6) The drainage management summary on sheet 8.1 needs to be revised to include discussion of the diversion of flow from the Los Pastores Pond and the limited capacity downstream of this site in the alley and in Montgomery. The narrative should acknowledge the Drainage Management Plan for the Los Pastores Shopping Center and discuss specifically how the proposed site will conform to that plan. This level of analysis, hydrograph development, pond routing, and detailed hydraulic analysis is more easily bound into a report than spread out on 24" x 36" sheets, but either way the calculations must be stamped and signed by a registered Professional Engineer in the state of New Mexico. Narratives and calculations have been updated to match the revised Los Pastores DMP and McDonald's flow off-site.
- 7) 7. Any portion of the peak 100 year flow rate that drains into Montgomery Blvd. will have to do so through appropriately sized sidewalk culverts. Use the weir equation to size the culvert not Manning's normal depth. The typical capacity is about 1.25 cfs per foot of opening, so two 2' wide culverts should be used. The sidewalk culvert must also extend all of the way from the curb to the right of way, and the invert should be specified at that location instead of the back of sidewalk. The culverts should be moved as far west as possible to the low comer of the pond. Culverts have been removed and flow over a lowered-curb weir into the alleyway has been added. Lost Pastores DMP and McDonald's plans reflect this modification.
- 8) 8. Additional Stormwater Quality Volume (SWQV) is required for this site. The City Council and Mayor signed a new Drainage Ordinance into effect October 24, 2018 which requires a waiver for onsite management of anything less than 100% of the SWQV. It appears that onsite management of the Stormwater Quality Volume (SWQV) may be waived if private offsite mitigation is provided by



deepening the existing pond north of this site. The basis for requesting a waiver of management onsite is to be clearly demonstrated on the plan. If the site does not qualify for a waiver in accordance with § I 4-5-2-6(H), then the developer may choose payment in lieu or provide the total SWQV onsite by adding below grade infiltration trenches to complete the volume. The new ordinance is available on the City Hydrology Section web page (see link in footer). It is McDonald's desire to provide payment in lieu of the total required storage volume. The site is severely limited by space, existing topography, redevelopment standards and available surrounding storm infrastructure to reach an economically feasible solution.

- 9) Private Drainage Easement and Drainage Covenant is required for the offsite storm drain on Tract A-1-E. It is near other easements which need to be shown and labeled on the plan as well as any conflicting utilities. Label Tract A-1-E, Access A, and A-1-D. A private drainage easement and covenant have been drafted and will be submitted to accommodate this request.
- 10) A Drainage Covenant is required for the first flush ponds. The original notarized form, pond exhibits (legible on 8.5xl 1 paper), and recording fee (\$25, payable to City of Albuquerque) must be turned into DRC (4th, Plaza del Sol) for routing. Please contact Charlotte LaBadie (clabadie@cabq.gov, 924-3996) or Madeline Carruthers (mtafoya@cabq.gov, 924-3997) regarding the routing and recording process for covenants. Drainage Covenants will be provided.
- 11) As a reminder, if the project total area of disturbance (including the staging area and any work within the adjacent Right-of-Way) is 1 acre or more, then an Erosion and Sediment Control (ESC) Plan and Owner's certified Notice of Intent (NOI) is required to be submitted to the Stormwater Quality Engineer (Curtis Cherne, PE, ccherne@cabq.gov, 924-3420) 14 days prior to any earth disturbance, Building Permit, or Work Order. Acknowledged McDonald's sub-consultant Evniroserve has prepared the SWPPP and will submit to the appropriate contacts.

Please let us know if any further corrections are needed.

Sincerely,

Matthew Korte

Attachments: 1 (Updated Civil Plans)



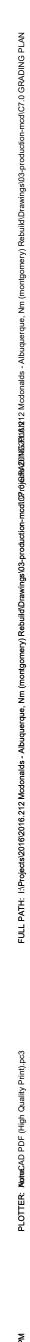
City of Albuquerque

Planning Department Development & Building Services Division

DRAINAGE AND TRANSPORTATION INFORMATION SHEET (REV 11/2018)

Project Title: McDonald's Montgomery Blvd			
DRB#: N/A			Work Order#: N/A
Legal Description: A Portion of Tract A-1, Los	Pastores Shoppin	g Center, Albuquerque	, Bernalillo County, New Mexico
City Address: 8315 Montgomery Blvd NE, Albuqu	uerque, NM 87109	9	
Applicant: Adams Engineering			Contact: Matthew Korte
Address: 8951 Cypress Waters Blvd			Contact: Matthew Korte
	Farr#.		E
			E-mail: mkorte@adams-engineering.com
Owner: Rogue Architects			Contact: Cesar Segovia
Address: 513 Main Street #300			
Phone#: 8175296874	Fax#:		E-mail: cesar@roguearchitects.com
TYPE OF SUBMITTAL: 1 PLAT (# OF			RB SITE ADMIN SITE
DEPARTMENT: TRAFFIC/ TRANSPO	RTATION X	HYDROLOGY/	DRAINAGE
Check all that Apply:			
TYPE OF SUBMITTAL: ENGINEER/ARCHITECT CERTIFICATION PAD CERTIFICATION CONCEPTUAL G & D PLAN GRADING PLAN DRAINAGE MASTER PLAN DRAINAGE REPORT FLOODPLAIN DEVELOPMENT PERMIT ELEVATION CERTIFICATE CLOMR/LOMR TRAFFIC CIRCULATION LAYOUT (TC) TRAFFIC IMPACT STUDY (TIS) OTHER (SPECIFY) PRE-DESIGN MEETING?	'APPLIC	X BUILDIN CERTIFIC PRELIMI SITE PLA SITE PLA FINAL PI SIA/ REL FOUNDA GRADING SO-19 AF PAVING GRADING CLOMR/I FLOODPI	PERMIT APPROVAL G/ PAD CERTIFICATION RDER APPROVAL
DATE SUBMITTED: 5/9/2019	By: Matth	new Korte	
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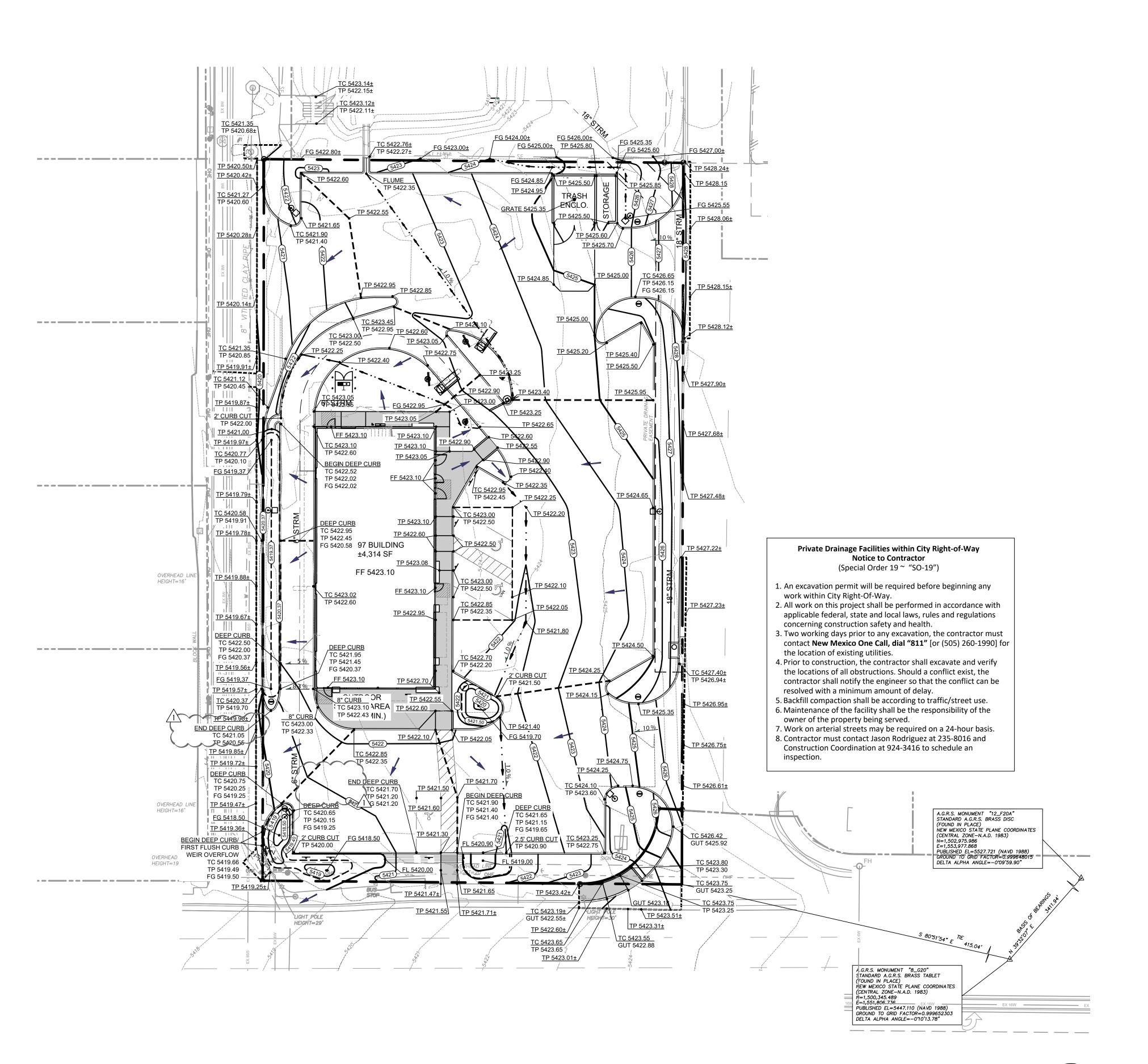
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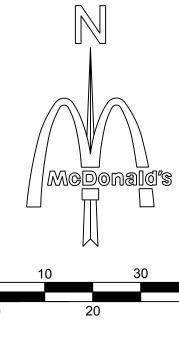
April 04, 2019 PLOT TIME: 6:17:46 PM

: Heather Macomber PLOT DA

FILENAME: C7.0 GRADING PLAN.dwg







SCALE: 1" = 20'

THESE PLANS ARE SUBJECT TO REVIEW & APPROVAL BY JURISDICTIONAL ENTITIES.

OWNER INFORMATION

MCDONALD'S USA, LLC
MOUNTAIN SOUTHWEST
FIELD EXECUTION TEAM
511 E. JOHN CARPENTER FRWY, STE. 375
IRVING, TX 75062
(214) 533-7382
CONTACT: LEE MORRIS

LEGEND

- TC = TOP OF CURB
 TP = TOP OF PAVEMENT
- FG = FINISHED GRADE
- FF = FINISHED FLOOR ± = MATCH EXISTING GRADE
 - _...._

— — GRADE BREAK

RIDGE LINE

------ XXX ------ EXISTING CONTOUR

LEVEL LANDING @ 2% MAX SLOPE IN ANY DIRECTION

BENCHMARK

BENCHMARK 1

A.G.R.S. MONUMENT "12_F20A" STANDARD A.G.R.S. BRASS DISC (FOUND IN PLACE) NEW MEXICO STATE PLANE COORDINATES (CENTRAL ZONE-N.A.D. 1983) N=1,502,975.986, E=1,553,977.868

N=1,502,975.986, E=1,553,977.868 PUBLISHED EL=5527.721 (NAVD 1988) GROUND TO GRID FACTOR= 0.999648015 DELTA ALPHA ANGLE=-0°09'59.90"

BENCHMARK 1

A.G.R.S. MONUMENT "8_G20"

STANDARD A.G.R.S. BRASS TABLET (FOUND IN PLACE)

NEW MEXICO STATE PLANE COORDINATES

(CENTRAL ZONE-N.A.D. 1983)

N=1,500,345.489, E=1,551,806.736

PUBLISHED EL=5447.110 (NAVD 1988)

STANDARD ACCESSIBILITY REQUIREMENTS

GROUND TO GRID FACTOR= 0.999652303

DELTA ALPHA ANGLE=-0°10'13.78"

PARKING:

ACCESSIBLE PARKING SPACES SHALL BE AS NOTED TO A MIN. 96" WIDE OR A MIN. 132" WIDE FOR VAN DESIGNATED SPACES WITH A MAXIMUM SLOPE OF 2% (IN ALL DIRECTIONS). ALL BUILDINGS SHALL HAVE AT LEAST ONE VAN ACCESSIBLE SPACE.

EACH ACCESSIBLE PARKING SPACE SHALL HAVE A VERTICALLY MOUNTED (OR SUSPENDED) SIGN SHOWING THE SYMBOL OF ACCESSIBILITY. AT LEAST ONE SPACE MUST INCORPORATE "VAN-ACCESSIBLE" BELOW THE SYMBOL OF ACCESSIBILITY. SIGN SHALL BE LOCATED AS NOTED TO 80" (MIN.) ABOVE THE ADJACENT PAVED SURFACE TO BOTTOM OF TEXT.

ALL ACCESS AISLES SERVING ACCESSIBLE PARKING SPACES SHALL BE AS NOTED TO A 60" WIDE MINIMUM.

RAMPS:

RAMPS EXCEEDING 6" IN RISE (EXCLUDING CURB RAMPS) SHALL HAVE APPROPRIATE EDGE PROTECTION WITH HANDRAILS ON EACH SIDE AT BETWEEN 34" AND 38", AND EXTEND 12" BEYOND THE TOP AND BOTTOM OF RAMP. HANDRAIL SHALL NOT DIMINISH THE CLEAR AREA REQUIRED FOR TOP AND BOTTOM LANDINGS SERVING THE RAMPS.

IF REQUIRED BY LOCAL OR STATE JURISDICTION, RAMPS SHALL CONTAIN A TRUNCATED DOME SURFACE ARRANGED SO THAT WATER WILL NOT ACCUMULATE. COLOR OF RAMP FINISH MATERIAL (INCLUDING CONCRETE) SHALL HAVE A LIGHT AND REFLECTIVE VALUE AND MUST CONTRAST SIGNIFICANTLY TO DISTINGUISH IT FROM ADJACENT SURFACES - (OR PAINT STRIPE).

LANDINGS FOR RAMPS SHALL BE AS WIDE AS THE RAMP AND 60" LONG MINIMUM (36" MINIMUM FOR CURB RAMPS).

RAMPS SHALL NOT EXCEED A 1:12 RUNNING SLOPE OR 30" VERTICAL RISE.

RAMPS AND LANDING SHALL NOT EXCEED 1:48 (2% CROSS SLOPE).

SIDEWALKS AND ACCESSIBLE ROUTES:

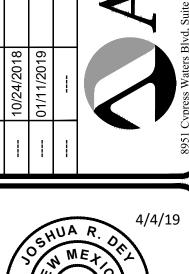
SIDEWALKS MUST BE AT LEAST 36" WIDE WITH A CROSS SLOPE THAT SHALL NOT EXCEED 1:48 (2%).

LONGITUDINAL SLOPE OF ANY SIDEWALK (ACCESSIBLE ROUTE) SHALL NOT EXCEED 1:20 (5%).

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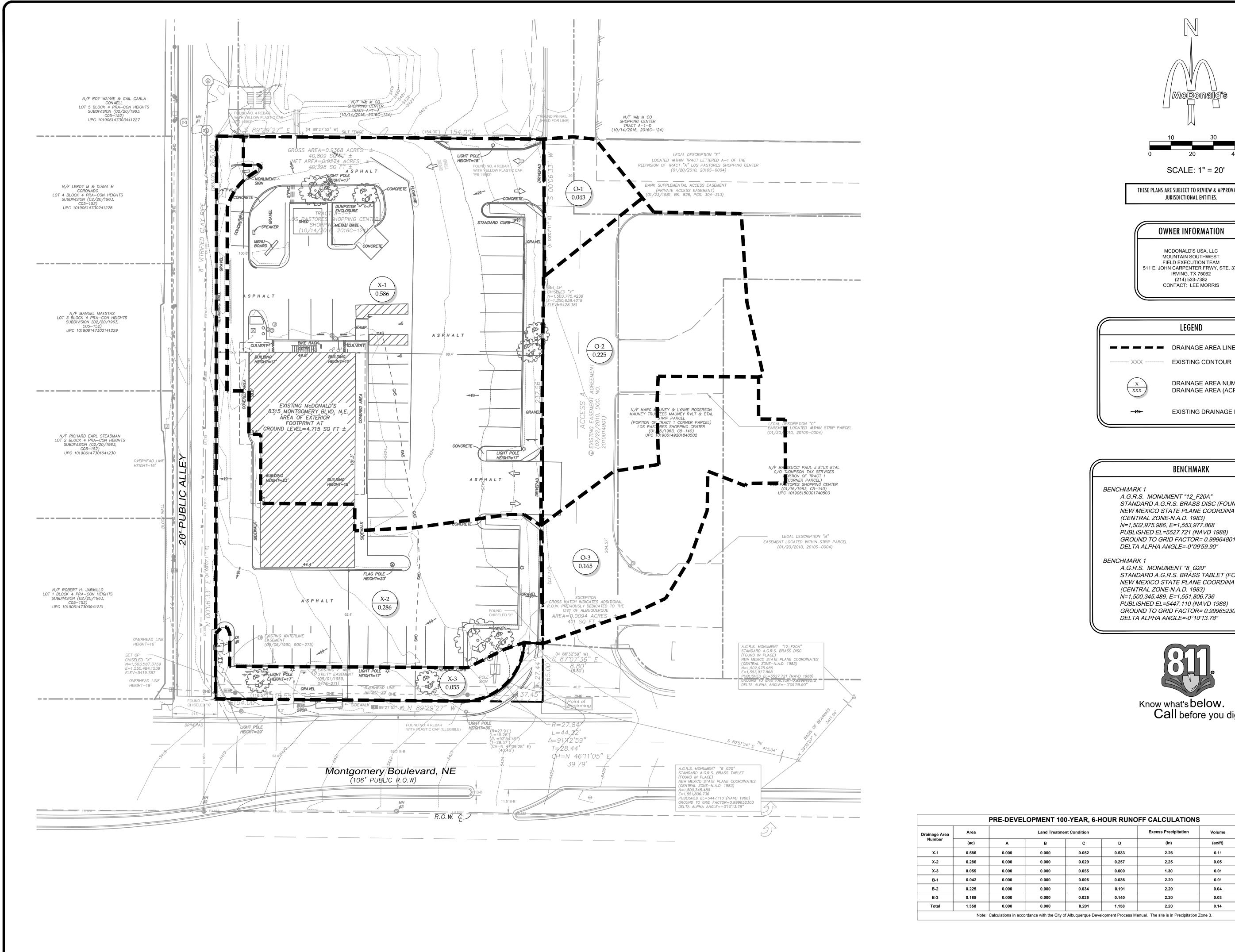
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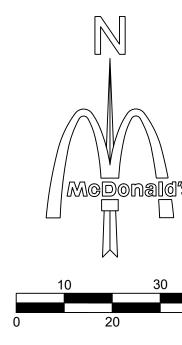
DATE						
SIGNATURE (2 REQUIRED)					CO-SIGN SIGNATURES	
	REGIONAL MGR.	CONST. MGR.	OPERATIONS DEPT.	REAL ESTATE DEPT.		CONTRACTOR

NAME OF TAXABLE PARTY.		
	DATE	BY
DESIGNED	MAR 2018	НЈМ
DRAWN	MAR 2018	НЈМ
CHECKED	04/04/2018	DWL
AS-BUILT		
		•

GRADING PLAN

C7.(





SCALE: 1" = 20'

THESE PLANS ARE SUBJECT TO REVIEW & APPROVAL BY JURISDICTIONAL ENTITIES.

OWNER INFORMATION

MCDONALD'S USA, LLC MOUNTAIN SOUTHWEST FIELD EXECUTION TEAM 511 E. JOHN CARPENTER FRWY, STE. 375 IRVING, TX 75062 (214) 533-7382 CONTACT: LEE MORRIS

LEGEND

■ ■ ■ ■ DRAINAGE AREA LINE

DRAINAGE AREA NUMBER DRAINAGE AREA (ACRES)

EXISTING DRAINAGE DIRECTION

BENCHMARK

A.G.R.S. MONUMENT "12 F20A" STANDARD A.G.R.S. BRASS DISC (FOUND IN PLACE) NEW MEXICO STATE PLANE COORDINATES (CENTRAL ZONE-N.A.D. 1983) N=1,502,975.986, E=1,553,977.868 PUBLISHED EL=5527.721 (NAVD 1988) GROUND TO GRID FACTOR= 0.999648015 DELTA ALPHA ANGLE=-0°09'59.90"

A.G.R.S. MONUMENT "8_G20" STANDARD A.G.R.S. BRASS TABLET (FOUND IN PLACE) NEW MEXICO STATE PLANE COORDINATES (CENTRAL ZONE-N.A.D. 1983) N=1,500,345.489, E=1,551,806.736 PUBLISHED EL=5447.110 (NAVD 1988) GROUND TO GRID FACTOR= 0.999652303



Know what's **below. Call** before you dig.

RE-DEVELOPMENT 100-YEA	AR, 6-HOUR RUNOF	F CALCULATION
	•	

Drainage Area	Area		Land Treatmer	nt Condition		Excess Precipitation	Volume	Peak Discharge	l
Number	(ac)	Α	В	С	D	(in)	(ac/ft)	(cfs)	
X-1	0.586	0.000	0.000	0.052	0.533	2.26	0.11	2.86	
X-2	0.286	0.000	0.000	0.029	0.257	2.25	0.05	1.39	
X-3	0.055	0.000	0.000	0.055	0.000	1.30	0.01	0.19	
B-1	0.042	0.000	0.000	0.006	0.036	2.20	0.01	0.20	
B-2	0.225	0.000	0.000	0.034	0.191	2.20	0.04	1.08	
B-3	0.165	0.000	0.000	0.025	0.140	2.20	0.03	0.79	l
Total	1.358	0.000	0.000	0.201	1.158	2.20	0.14	6.50	l

PRE-DEVELOPED

DRAINAGE PLAN

DESIGNED

DRAWN

CHECKED

AS-BUILT

DATE

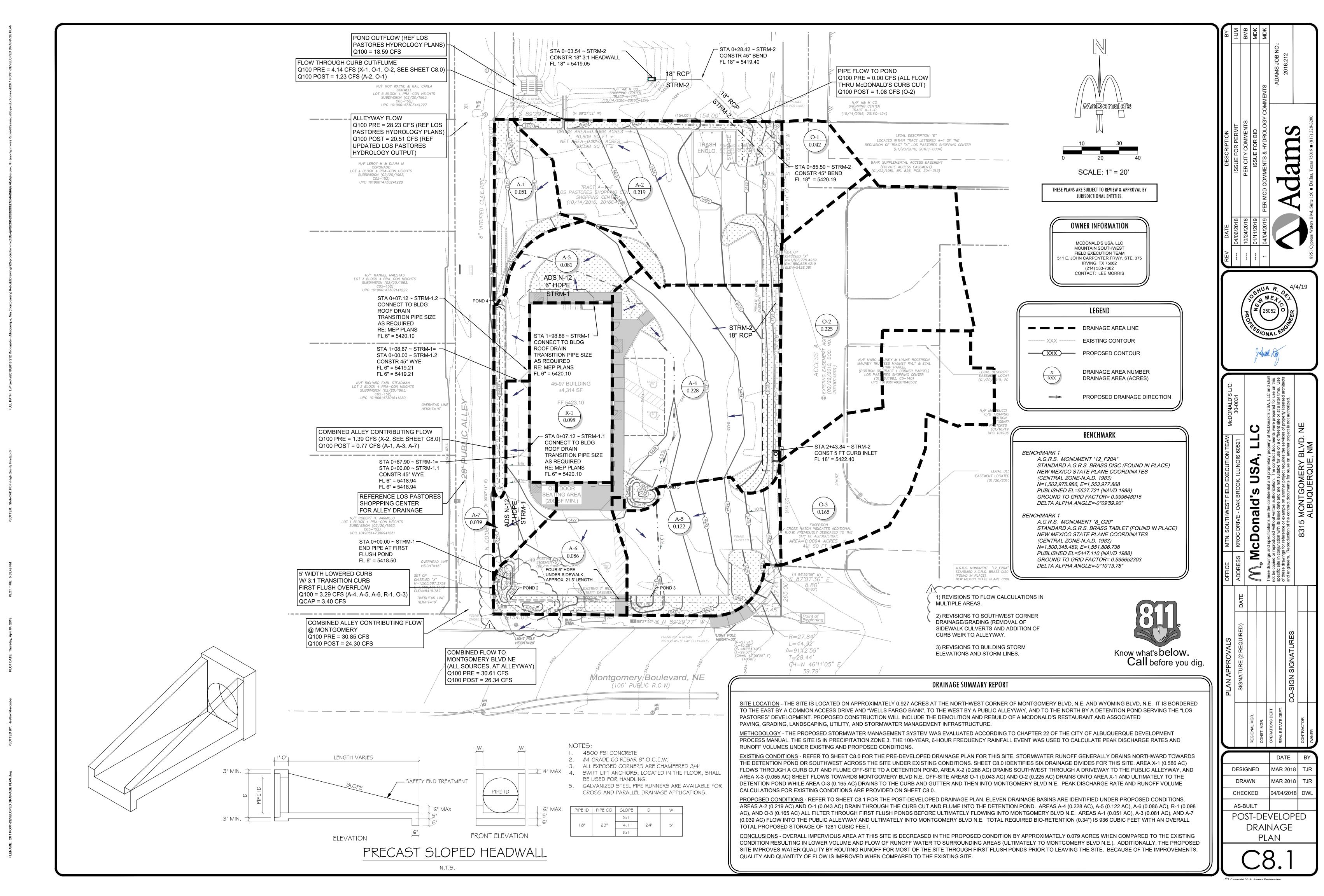
MAR 2018 TJR

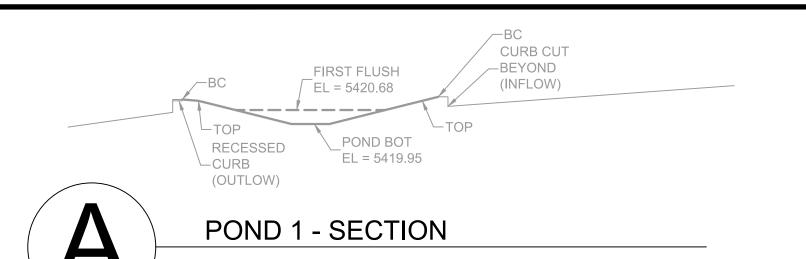
MAR 2018 TJR

04/04/2018 DWL

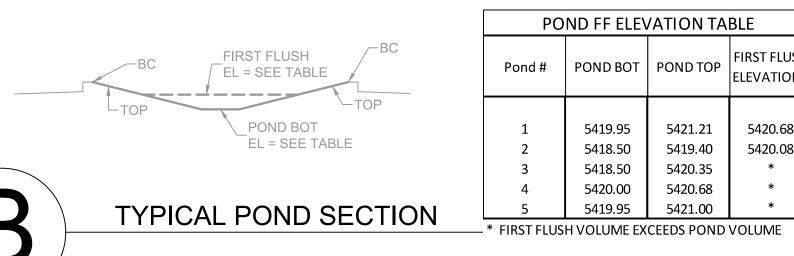
McDonald's

8315





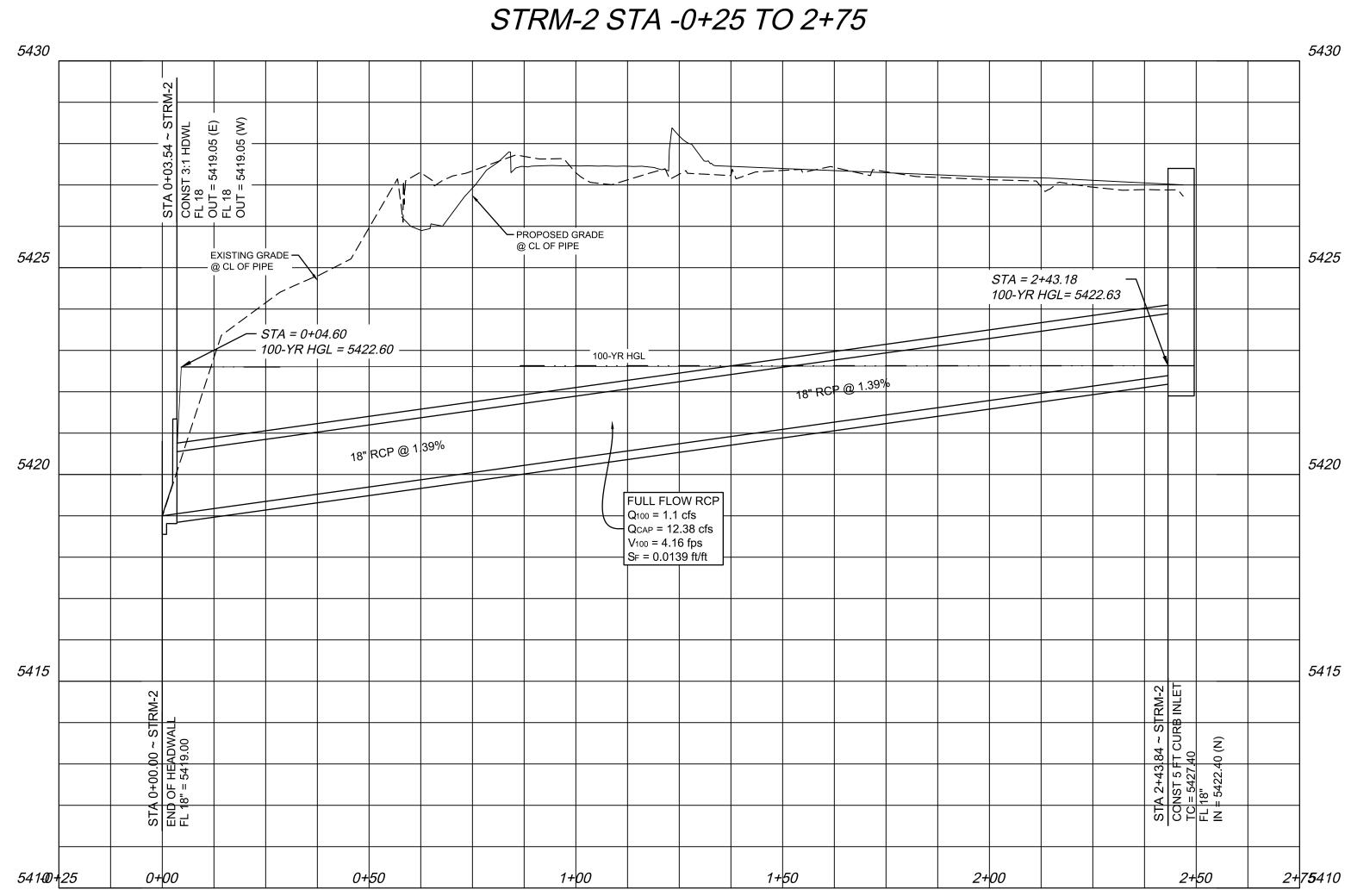
									100-YEAF	R, 6-HOUR H	YDRAULIC	CALCULATI	ONS									
Line ID	Upstream Station	Downstream Station	Pipe Length	Pipe Slope	Drainage Area Designation	Time at Inlet	Time in Pipe	Cumulative Time	Peak Flow	Cumulative Peak Flow	Pipe Diameter	Friction Slope	Hydraul	ic Gradient	Velocity In	Velocity Out	V1^2/2g	V2^2/2g	Loss Coefficient	Velocity Head Loss	Upstream Invert Elev.	Downstream Invert
													Upstream	Downstream								
-	-	-	(ft)	(ft/ft)	-	(min)	(min)	(min)	(cfs)	(cfs)	(in)	(ft/ft)	-	-	(ft/sec)	(ft/sec)	(ft)	(ft)	"Kj"	(ft)	(ft)	(ft)
STRM-1.2	0+07.12	0+00.00	7.12	0.0828	A-5	5.00	0.14	5.14	0.2	0.2	6	0.0009	5419.50	5419.50	0.00	0.86	0.00	0.01	0.35	0.01	5418.49	5418.10
STRM-1.1	0+07.12	0+00.00	7.12	0.0500	A-5	5.00	0.14	5.14	0.2	0.2	6	0.0009	5419.47	5419.46	0.00	0.86	0.00	0.01	0.35	0.01	5418.49	5418.10
STRM-1	1+98.86	1+08.67	90.19	0.0065	A-5	5.00	1.31	6.31	0.2	0.2	6	0.0014	5419.62	5419.50	0.00	1.15	0.00	0.02	0.35	0.02	5419.18	5419.21
STRM-1	1+08.67	0+67.90	40.77	0.0065	STRM-1.2	6.31	0.79	7.10	0.2	0.4	6	0.0008	5419.49	5419.46	1.15	0.86	0.02	0.01	0.35	0.00	5419.21	5418.94
STRM-1	0+67.90	0+00.00	67.90	0.0065	STRM-1.1	7.10	1.31	8.41	0.2	0.6	6	0.0008	5419.45	5419.40	0.86	0.86	0.01	0.01	0.35	0.01	5418.94	5418.50
STRM-2	2+43.84	0+00.00	243.84	0.0139	B-3	5.00	6.68	11.68	1.1	1.1	18	0.0001	5422.63	5422.60	0.00	0.61	0.00	0.01	0.35	0.01	5422.40	5419.00



FIRST FLUSH VOLUME CALCULATIONS							
SF / CF ac / ac-ft							
Total On-site Impervious Area =	31014.72	0.712					
Required Retention Volume (0.26"/acre) =	672	0.015					
Retention Volume Provided =	442	0.010					

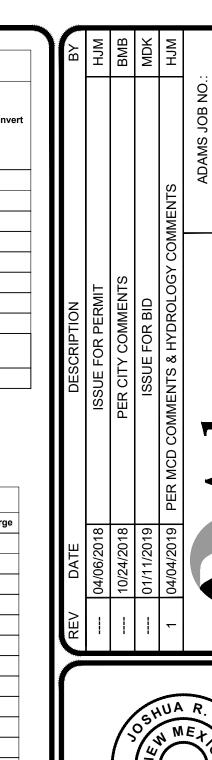
	FIRST FLUSH	VOLUME CAL	CULATIONS	
Pond #	Drainage Areas	Impervious Area (Ac)	FF Required Volume (cf)	FF Provided Volume (cf)
1	A-1	0.038	36	105
2	A-5, A-7	0.126	119	131
3	A-3	0.041	39	83
4	A-8	0.098	92	76
5	A-6	0.052	49	48
Off-Site	A-2, A-4	0.357	337	-
Total	All	0.712	672	442
<u> </u>		<u> </u>		<u> </u>

Drainage Area	Area		Land Treatme	nt Condition		Excess Precipitation	Volume	Peak Discharge
Number	(ac)	A	В	С	D	(in)	(ac/ft)	(cfs)
A-1	0.051	0.000	0.000	0.013	0.038	2.09	0.01	0.24
A-2	0.219	0.000	0.000	0.044	0.175	2.15	0.04	1.03
A-3	0.081	0.000	0.000	0.040	0.041	1.83	0.01	0.34
A-4	0.228	0.000	0.000	0.046	0.182	2.14	0.04	1.07
A-5	0.122	0.000	0.000	0.031	0.091	2.09	0.02	0.56
A-6	0.086	0.000	0.000	0.034	0.052	1.94	0.01	0.38
A-7	0.039	0.000	0.000	0.004	0.035	2.25	0.01	0.19
R-1	0.098	0.000	0.000	0.000	0.098	2.36	0.02	0.49
0-1	0.042	0.000	0.000	0.006	0.036	2.20	0.01	0.20
0-2	0.225	0.000	0.000	0.034	0.191	2.20	0.04	1.08
0-3	0.165	0.000	0.000	0.025	0.140	2.20	0.03	0.79
Total	1.356	0.000	0.000	0.277	1.079	2.14	0.24	6.37



			-STORAGE V	<u> </u>
Elevation	Area	Inc. Depth	Inc. Volume	Total Volum
Lievation	(sq. ft.)	(ft.)	(cu. Ft.)	(cu. ft.)
5419.95	0.0			0.0
		0.1	0.2	
5420.00	9.6			0.2
		1.0	67.5	
5421.00	154.5			67.7
		0.2	36.9	
5421.21	198.4			104.6
"FIRST	FLUSH" PO	ND 2 STAGE	-STORAGE V	OLUME
Elevation	Area	Inc. Depth	Inc. Volume	Total Volum
	(sq. ft.)	(ft.)	(cu. Ft.)	(cu. ft.)
5418.50	27.9			0.0
		0.5	39.9	
5419.00	147.3			39.9
		0.4	90.6	
5419.40	316.6			130.5
	'FIRST FLUSH"	POND 3 STAGE-S	TORAGE VOLUME	
Elevation	Area	Inc. Depth	Inc. Volume	Total Volum
Lievation	(sq. ft.)	(ft.)	(cu. Ft.)	(cu. ft.)
5418.50	2.2			0.0
		0.5	4.2	
5419.00	16.8			4.2
		1.0	44.9	
5420.00	80.9			49.1
		0.4	33.4	
5420.35	110.5			82.5
•	'FIRST FLUSH"	POND 4 STAGE-S	TORAGE VOLUME	
	Area	Inc. Depth	Inc. Volume	Total Volum
Elevation	(sq. ft.)	(ft.)	(cu. Ft.)	(cu. ft.)
5420.00	0.0	, ,	,	0.0
		0.7	75.8	
5420.68	334.4	0.7	75.5	75.8

	Area	Inc. Depth	Inc. Volume	Total Volume
Elevation	(sq. ft.)	(ft.)	(cu. Ft.)	(cu. ft.)
5419.95	0.0			0.0
		0.1	0.1	
5420.00	6.7			0.1
		1.0	48.2	
5421.00	110.7			48.3



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	DATE	BY
DESIGNED	MAR 2018	TJR
DRAWN	MAR 2018	TJR
CHECKED	04/04/2018	DWL
AS-BUILT		
	_	

DRAINAGE CALCULATIONS



Compute by:

Known Depth (ft)

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Friday, Aug 10 2018

POND 4: 0.25-FT DEEP SPILLWAY

Known Depth

= 0.25

Trapezoidal Weir		Highlighted	
Crest	= Sharp	Depth (ft)	= 0.25
Bottom Length (ft)	= 2.00	Q (cfs)	= 1.08
Total Depth (ft)	= 0.25	Area (sqft)	= 0.75
Side Slope (z:1)	= 4.00	Velocity (ft/s)	= 1.45
Activities and an activities of the second s		Top Width (ft)	= 4.00
Calculations		in the Particular State of the Control of the Contr	
Weir Coeff. Cw	= 3.10		

Weir Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Friday, Aug 10 2018

2.5-foot Curb Cut

Known Depth (ft)

Rectangular Weir		Highlighted	
Crest	= Sharp	Depth (ft)	= 0.50
Bottom Length (ft)	= 2.50	Q (cfs)	= 2.943
Total Depth (ft)	= 0.50	Area (sqft)	= 1.25
		Velocity (ft/s)	= 2.35
Calculations		Top Width (ft)	= 2.50
Weir Coeff. Cw	= 3.33	via data t an inginisasi databasaga V asin Z ir	
Compute by:	Known Depth		
TOTAL SERVICE STATE OF THE PROPERTY OF THE PRO	Soldier No Architectus		

= 0.50

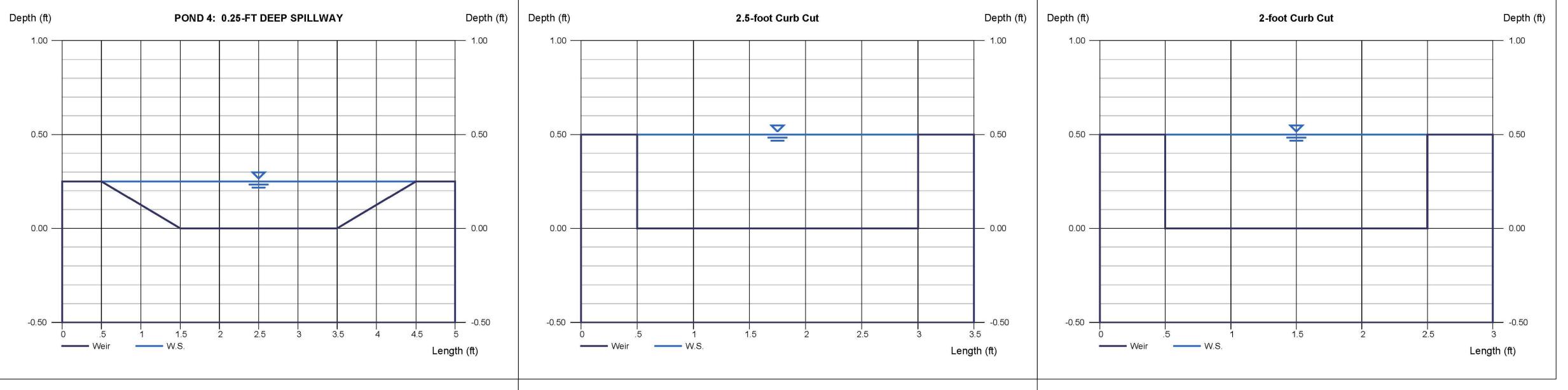
Weir Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Friday, Aug 10 2018

2-foot Curb Cut

Rectangular Weir		Highlighted	
Crest	= Sharp	Depth (ft)	= 0.50
Bottom Length (ft)	= 2.00	Q (cfs)	= 2.35
Total Depth (ft)	= 0.50	Area (sqft)	= 1.00
		Velocity (ft/s)	= 2.35
Calculations		Top Width (ft)	= 2.00

Calculations	
Weir Coeff. Cw	= 3.33
Compute by:	Known De
Known Depth (ft)	= 0.50
raieun Bopar (ii)	0.00



Weir Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Friday, Aug 10 2018

POND 1: 0.19-FT DEEP SPILLWAY

rapezoidal Weir		Highlighted	
crest	= Sharp	Depth (ft)	= 0.19
ottom Length (ft)	= 2.00	Q (cfs)	= 0.670
otal Depth (ft)	= 0.19	Area (sqft)	= 0.52
Side Slope (z:1)	= 4.00	Velocity (ft/s)	= 1.28
And the state of t		Top Width (ft)	= 3.52
Calculations		or on 1: Assessment Army	

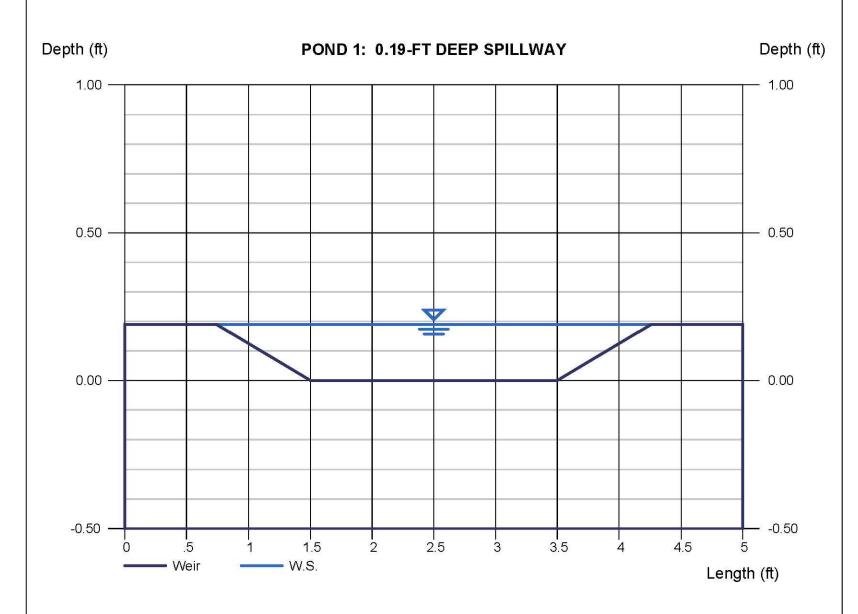
Calculations	
Weir Coeff. Cw	= 3.10
Compute by:	Known Dep
Known Depth (ft)	= 0.19

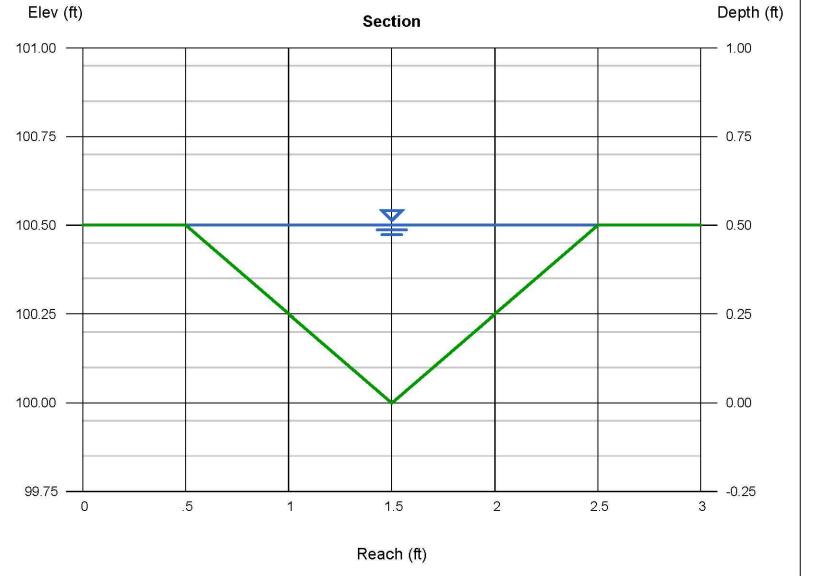
Channel Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc.	Friday, Aug 10 2018
600 / 000 000 000 000 000 000 000 000 00	or anymodes and another an entire an

CONC. SWALE FROM POND 2 TO S/W CULVERT

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DRAINAGE CALCULATIONS