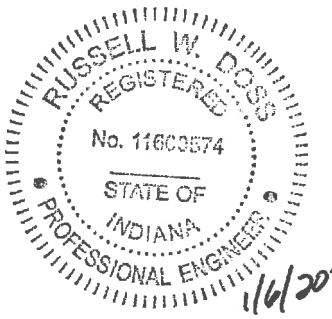
DOLLAR GENERAL

RETAIL STORE #24125

EVANSVILLE, IN

DRAINAGE REPORT



Prepared By:

Overland
ENGINEERING, LLC
1598 IMPERIAL CENTER SUITE 2009
WEST PLAINS, MISSOURI 65775
PH 417-256-8150

I. INTRODUCTION

DGOGEvansvillein10202021 LLC proposes to construct a 10,640 sq ft Dollar General Store on a 1.98 acre site in the Vanderburgh County just west of Highway 57 on Boonville-New Harmony Road. The project will add 40,570 s.f. of impervious area to the property. This drainage report details the impact of the project on storm water runoff and the detention design intended to address runoff concerns.

II. CERTIFICATION

This report was prepared by Overland Engineering, LLC, under the direction of Russell W. Doss, Indiana Professional Engineer No. 11600574.

III. DESIGN SUMMARY

The proposed Dollar General project will add approximately 0.93 acres of pavement and building to the existing 1.98 acre undeveloped property. Without control measures, the increase in impervious area will create a corresponding increase in peak runoff as indicated detailed in calculations included in Appendix IX.

Per Vanderburgh County requirements, the rational runoff equation has been used to estimate peak rates of runoff and required detention volume for the proposed project.

As the watershed map in Appendix XI indicates, there is no offsite runoff contributing to the detention basin and runoff analysis. At total of 1.34 acres drains to the detention basin. This area contains all new impervious area proposed for the project.

Other than the Rule 5 land disturbance requirements, no state or federal permits are required for the project.

A dry detention basin has been chosen as the method to control increased peak flow from the proposed project. Runoff from all developed onsite areas will drain to the detention basin where post-project peak runoff from the 25-year storm event will be limited to the 10-year pre-project peak flow rate. This peak reduction is accomplished through storage of 4,758 c.f. of runoff and flow restriction through a circular orifice. A riprap emergency spillway has also been designed to pass the fully developed 100-year peak flow.

Per the calculations in Appendix IX, 4,266 c.f. of detention volume is required for peak flow control. Adding 10% for sedimentation, the total required volume is 4,700 c.f. The storage volume provided in conjunction with the 5" orifice at elevation 391.00 restricts peak runoff for the 25-year design storm to 0.75 cfs. The 25-year design stage corresponding to 4,758 c.f. of storage is elevation 392.22. The 6' emergency spillway has been set at elevation 393.25 (12" above design elevation), and will pass the 100 year peak developed flow at elevation 393.85. The 100 year stage of 393.85 is also more than 2.0 feet fellow the finished floor elevation of 396.00.

The primary reference used in the calculations is Chapter 13.04 of Vanderburgh County Code.

IV. DESIGN CRITERIA

As noted above, the applicable design criteria for the proposed storm water detention facility is the return period of 25 years.

V. TIME OF CONCENTRATION

Time of concentration values for pre-project and post-project conditions were calculated to be 14 minutes and 5 minutes, respectively. The calculations are detailed on Form 830 included in Appendix V. Exhibits showing the pre-project and post-project flow paths used for time of concentration calculations are also included in Appendix V.

VI. ALLOWABLE DISCHARGE & STORAGE VOLUME

The allowable discharge for the proposed project is 0.75 cfs as indicated by calculations included in Appendix IX. Per County requirements, the allowable discharge is based on the 10-year pre-project peak flow, with no reduction due to downstream inadequacy or other permit conditions.

There are no developed areas that leave the site undetained.

A summary of the detention volume calculations are included in Appendix VI and in Appendix IX.

VII. NOT USED

VIII. OUTLET STRUCTURE

Discharge for the design storm is controlled by a 5" circular orifice at elevation 391.00, connected to the outlet pipe. A 6' wide riprap emergency overflow spillway is provided at elevation 393.25 and conveys the 100-year post-project peak flow without allowance for the 5" orifice. Maximum 100-year stage in the emergency overflow is at elevation 393.85.

IX. DETENTION

The maximum design ponding depth in the detention basin is 1.22 feet (392.22-391.00) and provides 4,758 c.f. of storage volume. At the design elevation of 392.22, 12 inches of freeboard is provided below the spillway elevation of 393.25

Stage-Storage-Discharge plots for the detention basin are included in Appendix IX.

The required detention volume for peak flow control is 4,266 c.f. Per the requirement to add 10% of the volume for sedimentation, the total required volume is 4,700 c.f.

The proposed finished floor elevation is 396.00, while the proposed 100-year stage in the detention basin is 393.85. This meets the 2 foot separation requirement.

The overflow riprap spillway (elev 393.25) will convey the 100-year peak developed flow of 7.22 cfs at a depth of 0.60 feet (elev 393.85). This assumes the low flow orifice is inoperable. $Q= 2.7 * 6 * (0.6)^{1/2} = 7.52$ cfs. V = 7.52 cfs / 3.0 s.f. = 2.5 ft/sec.

Both the low-flow orifice and the riprap overflow spillway will function with little or no maintenance. In the event the 5" orifice becomes clogged, the emergency spillway will convey the required flow with no danger of malfunction. The 5" low-flow can be cleared by simply removing the obstruction.

Seeding of the detention basin floor will be per specifications on Sheet C3.1, and will be maintained equivalent to a residential lawn. The side slopes of the detention basin will be sodded per Sheet C3.

The bottom of the detention basin is sloped between 0.50% and 1.0% slope.

X. STORM SEWERS & CHANNELS

One grate inlet on the west side of the building collects runoff from the west parking lot (14,958 s.f.). Total 100-year peak flow to the grate inlet is calculated as 3.02 cfs. Assuming a clogging factor of 50%, the inlet has a capacity of 3.09 cfs. The inlet will accept the 100-year peak flow rate assuming it is 50% clogged.

A 15" RCP running at 0.50% slope connects this inlet to the detention basin. The pipe has a full capacity of 4.95 cfs. The 15" RCP will convey the 100-year peak runoff from the north parking lot and building to the detention basin.

Similary, the east channel drains 15,560 s.f. of impervious area from the west parking lot. The total 100-year peak flow to the channel is calculated as 3.27 cfs. The west side channel has a base width of 2 feet, side slopes of 4:1, a maximum depth of 1 foot, and a longitudinal slope of 0.8%. As a grass channel, roughness is assumed at 0.038. At a depth of 0.46 feet, the channel will carry 3.27 cfs. The east side channel has adequate capacity to convey the 100-year peak flow to the detention basin. Velocity is calculated at 1.8 feet per second.

Calculations for the storm sewer and channel are located in Appendix X.

XI. DRAINAGE PLAN DRAWINGS

Drawings of the proposed project are included in Appendix XI. They include the ALTA survey, Site Plan – C1, Grading Plan – C2, Drainage Details – C2.1, Erosion Control Plan – C3, Erosion Control Details – C3.1 & C3.2, and Landscaping Plan – C4.

The watershed map and soil map are also included in Appendix XI.

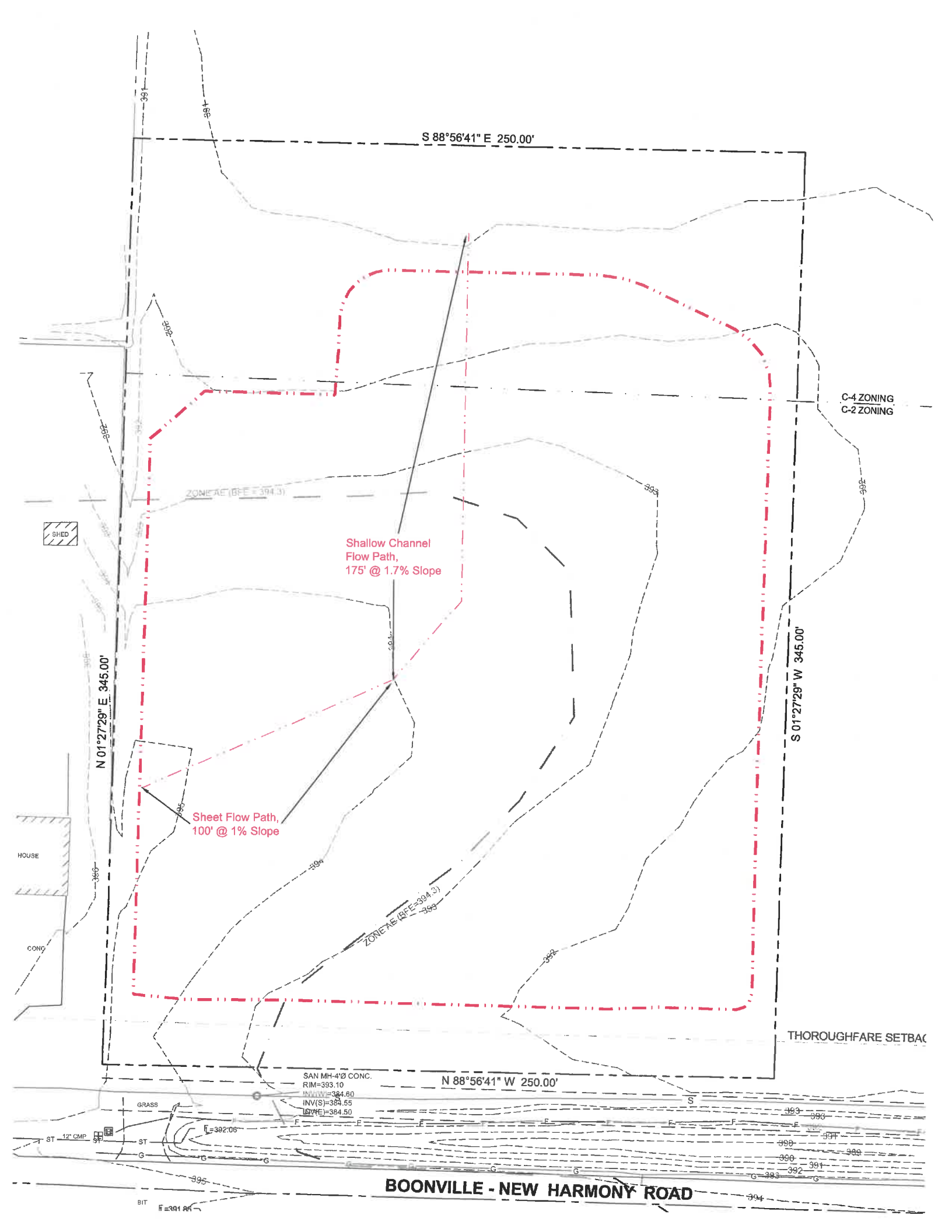
APPENDIX V

Section V

Form 830 Note: Include a map, schematic or description of flow segments

Sheet Flow (Applicable to Tc Only)		Segment ID	Sheet		
1. Surface description					
2. Manning's roughness coefficient, n			.15		
3. Flow length, L (total $L \leq 300\ ft$)		(ft)	100		
4. Two-year 24-hour rainfall, P_2		(in)	3.3	3.3	
5. Land slope, s		(ft/ft)	.01		
6. $T_t = \frac{0.007(nl)^{0.8}}{P_2^{0.5} s^{0.4}}$	Compute T_t	(hr)	.212		.212
Shallow Concentrated Flow		Segment ID	Shallow		
7. Surface description (paved or unpaved)					
8. Flow length, L		(ft)	175		
9. Watercourse slope, s		(ft/ft)	.017		
10. Average velocity, V		(ft/s)	2.1		
11. $T_t = \frac{L}{3600\ V}$	Compute T_t		.0231		.0231
Channel Flow		Segment ID			
12. Cross sectional flow area, a		(ft^2)			
13. Wetted perimeter, P_w		(ft)			
14. Hydraulic radius, $r = \frac{a}{P_w}$	Compute r	(ft)			
15 Channel slope, s		(ft/ft)			
16. Manning's roughness coefficient, n					
17. $V = \frac{1.49\, r^{2/3} s^{1/2}}{n}$	Compute V	(ft/s)			
18. Flow length, L		(ft)			
19. $T_t = \frac{L}{3600\ V}$	Compute T_t	(hr)			
20. Watershed or subarea T_c or T_t (add T_t in steps 6, 11, and 19) (hours)					.235

(Note P_2 for Vanderburgh County-use 3.3)

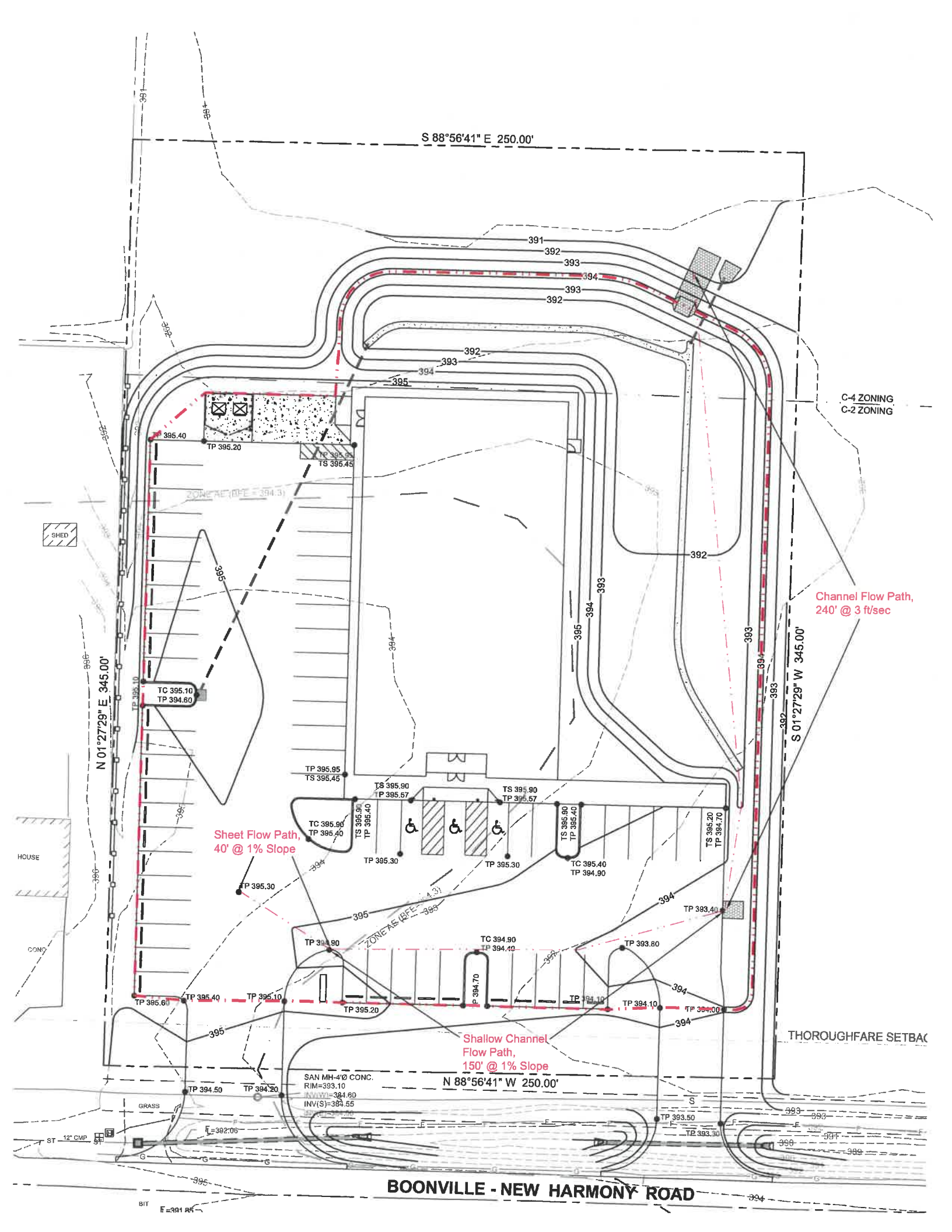

S 88°56'41" E 250.00'
C-4 ZONING
C-2 ZONING
ZONE AE (BFE = 394.3)
SHED
Shallow Channel
Flow Path,
175' @ 1.7% Slope
N 01°27'29" E 345.00'
S 01°27'29" W 345.00'
Sheet Flow Path,
100' @ 1% Slope
HOUSE
CONC
ZONE AE (BFE=394.3)
THOROUGHFARE SETBAC
SAN MH-4'Ø CONC.
RIM=393.10
INV(W)=384.60
INV(S)=384.55
INV(E)=384.50
N 88°56'41" W 250.00'
GRASS
12" CMP
ST
F
G
S
E=392.06
BIT
E=391.85
BOONVILLE - NEW HARMONY ROAD

Section V

Form 830 Note: Include a map, schematic or description of flow segments

Sheet Flow (Applicable to Tc Only)		Segment ID	Sheet		
1. Surface description					
2. Manning's roughness coefficient, n			.011		
3. Flow length, L (total $L \leq 300\ ft$)		(ft)	40		
4. Two-year 24-hour rainfall, P_2		(in)	3.3	3.3	
5. Land slope, s		(ft/ft)	.01		
6. $T_t = \frac{0.007(nl)^{0.8}}{P_2^{0.5} s^{0.4}}$	Compute T_t	(hr)	.0126		.0126
Shallow Concentrated Flow		Segment ID	Shallow		
7. Surface description (paved or unpaved)					
8. Flow length, L		(ft)	150		
9. Watercourse slope, s		(ft/ft)	.01		
10. Average velocity, V		(ft/s)	2.00		
11. $T_t = \frac{L}{3600\,V}$	Compute T_t		.0208		.0208
Channel Flow		Segment ID	Channel		
12. Cross sectional flow area, a		(ft^2)	2.5		
13. Wetted perimeter, P_w		(ft)	7.123		
14. Hydraulic radius, $r = \frac{a}{P_w}$	Compute r	(ft)	.351		
15 Channel slope, s		(ft/ft)	.01		
16. Manning's roughness coefficient, n			.037		
17. $V = \frac{1.49\, r^{2/3} s^{1/2}}{n}$	Compute V	(ft/s)	2.00		
18. Flow length, L		(ft)	240		
19. $T_t = \frac{L}{3600\,V}$	Compute T_t	(hr)	.0333		
20. Watershed or subarea T_c or T_t (add T_t in steps 6, 11, and 19) (hours)					.0667

(Note P_2 for Vanderburgh County-use 3.3)


S 88°56'41" E 250.00'
N 01°27'29" E 345.00'
S 01°27'29" W 345.00'
N 88°56'41" W 250.00'
C-4 ZONING
C-2 ZONING
THOROUGHFARE SETBAC
BOONVILLE - NEW HARMONY ROAD
Channel Flow Path,
240' @ 3 ft/sec
Sheet Flow Path,
40' @ 1% Slope
Shallow Channel
Flow Path,
150' @ 1% Slope
SHED
HOUSE
CONC
GRASS
BIT
ST
12" CMP
SAN MH-4'Ø CONC.
RIM=393.10
INV(W)=384.60
INV(S)=384.55
TC 395.10
TP 394.60
TP 395.40
TP 395.20
TS 395.45
TP 395.95
TS 395.90
TP 395.57
TC 395.90
TP 395.40
TP 395.30
TC 395.40
TP 394.90
TS 395.20
TP 394.70
TP 393.40
TP 393.80
TC 394.90
TP 394.40
TP 394.70
TP 394.10
TP 395.60
TP 395.10
TP 394.50
TP 394.20
TP 393.50
TP 393.30
391
392
393
394
395
396
ZONE AE (BFE = 394.3)

APPENDIX VI

Section VI-Calculation of Undeveloped C

Form VIa | **Watershed** Onsite - Pre

	C	Area	C x A
Surface Type-Woodland, Turfed Meadows, Rough Pasture, Fallow Brush			
Less than 2%	0.12	1.34	.16
2% to 5%	0.24	____	____
5+% to 10%	0.36	____	____
Over 10%	0.48	____	____
Surface Type-Cultivated Fields			
Less than 2%	0.2	____	____
2% to 5%	0.35	____	____
5+% to 10%	0.5	____	____
Over 10%	0.65	____	____
Surface Type-Pavement, Rooftop, Other Impervious Surfaces:			
Less than 2%	0.92	____	____
2% to 5%	0.94	____	____
5+% to 10%	0.96	____	____
Over 10%	0.98	____	____
Surface Type-Lawns with turf			
Less than 2%	0.15	____	____
2% to 5%	0.25	____	____
5+% to 10%	0.40	____	____
Over 10%	0.55	____	____
Gravel Roadway or Parking (10 year storm)	0.5	____	____
Water/Lake	1.00	____	____
Other (Provide Reference)____	____	____	____
TOTAL		1.34	.16
Weighted Undeveloped C			.12

Section VI-Calculation of Developed C

Form VIb | **Watershed** Onsite - Post

	C	Area	C x A
Surface Type-Woodland, Turfed Meadows, Rough Pasture, Fallow Brush			
Less than 2%	0.12	____	____
2% to 5%	0.24	____	____
5+% to 10%	0.36	____	____
Over 10%	0.48	____	____
Surface Type-Cultivated Fields			
Less than 2%	0.2	____	____
2% to 5%	0.35	____	____
5+% to 10%	0.5	____	____
Over 10%	0.65	____	____
Surface Type-Pavement, Rooftop, Other Impervious Surfaces:			
Less than 2%	0.92	.93	.856
2% to 5%	0.94	____	____
5+% to 10%	0.96	____	____
Over 10%	0.98	____	____
Surface Type-Lawns with turf			
Less than 2%	0.15	.41	.062
2% to 5%	0.25	____	____
5+% to 10%	0.40	____	____
Over 10%	0.55	____	____
Gravel Roadway or Parking			
(25 year storm)	0.6	____	____
(50 & 100 year storm)	0.65	____	____
Water/Lake	1.00	____	____
Other_____(Provide Reference for C Value)	____	____	____
TOTAL		1.34	.918
Weighted Developed C			.69

FORM 800

Watershed ID	Onsite
Allowable Outflow Rate	0.75 cfs
Area	1.34 acres
Developed C	0.69
Detention Facility Design Return Period (25, 50 or 100)	25

	Rainfall Intensity			Inflow Rate	Outflow rate	Storage Rate	Storage Required (acre-ft)	Storage Required (cubic ft)
	25	50	100					
5	7.81	8.82	9.95	7.22	0.75	6.47	.045	1941
10	6.32	7.13	8.05	5.84	0.75	5.09	.070	3054
15	5.24	5.92	6.68	4.84	0.75	4.09	.085	3681
20	4.43	5.00	5.64	4.10	0.75	3.35	.092	4020
25	3.80	4.29	4.84	3.51	0.75	2.76	.095	4140
30	3.31	3.73	4.21	3.06	0.75	2.31	.095	4158
40	2.58	2.91	3.29	2.39	0.75	1.64	.090	3936
45	2.31	2.61	2.94	2.14	0.75	1.39	.086	3753
50	2.08	2.35	2.65	1.92	0.75	1.17	.081	3510
60	1.95	2.23	2.56	1.80	0.75	1.05	.087	3780
90	1.67	1.94	2.25	1.54	0.75	0.79	.098	4266
120	1.37	1.59	1.84	1.27	0.75	0.52	.086	3744
180	1.02	1.18	1.37	0.94	0.75	0.19	.047	2052
240	0.82	0.95	1.11	0.76	0.75	0.01	.003	144

APPENDIX IX

DOLLAR GENERAL #24125
HYDRAULIC CALCS
BY: Overland Engineering LLC
Date: 1/6/2022

Rational Method, Q =CIA

Pre Project

TR 55 Method

Sheet Flow

Flow length	100 ft		
Land slope	0.01 ft/ft		
Manning's n	0.15 Short Grass		
2 yr/24hr rainfall	3.3 in		
		t =	12.7 min

Shallow concentrated flow

Flow length	175 ft		
Slope	0.017 ft/ft		
Avg. velocity	2.10 ft/s	Unpaved	
		t =	1.4 min

Open channel flow

Flow length	0 ft		
Avg. velocity	2.0 ft/s		
		t =	0.0 min

Tc = 14.1

Tc (total) = 14.00 min

Intensity $_2$=	**3.51**	**in/hr**
Intensity $_{10}$=	**4.65**	**in/hr**

Weighted Runoff C

c_1 =	0.94	Paved Areas
A_1 =	0.00	
c_2 =	0.12	Grass/Lawns
A_2 =	1.34	

Drain Area Total = 1.34 acres

$c_{(composite)}$ = 0.12

Q_2 =	0.56	cfs
Q_{10} =	0.75	cfs

Post Project

TR 55 Method

Sheet Flow

Flow length	40 ft		
Land slope	0.01 ft/ft		
Manning's n	0.011 Pavement		
2 yr/24hr rainfall	3.3 in		
		t =	0.8 min

Shallow concentrated flow

Flow length	150 ft		
Slope	0.01 ft/ft		
Avg. velocity	2.03 ft/s	PAVED	
		t =	1.2 min

Open channel flow

Flow length	240 ft		
Avg. velocity	2.0 ft/s		
		t =	2.0 min

Tc = 4.0

Tc (total) = 5.00 min (use 5 minute min.)

Intensity $_2$=	**5.02**	**in/hr**
Intensity $_{10}$=	**6.66**	**in/hr**
Intensity $_{25}$ =	**7.81**	**in/hr**
Intensity $_{50}$ =	**8.82**	**in/hr**
Intensity $_{100}$ =	**9.95**	**in/hr**

Weighted Runoff C

c_1 =	0.92	Paved Areas
A_1 =	0.93	
c_2 =	0.15	Open Spaces
A_2 =	0.41	

Area Total = 1.34 acres

$c_{(composite)}$ = 0.68

Q_2 =	4.57	cfs
Q_{10} =	6.07	cfs
Q_{25} =	7.12	cfs
Q_{50} =	8.04	cfs
Q_{100} =	9.07	cfs

25 year - Using $Q10_{pre}$ as allowable outflow

Rainfall Duration (min)	25 yr Rainfall Intensity (in/hr)	Inflow Rate (in-acre/hr)	Allowable Max Outflow (cfs)	Required Storage	Det Volume (acre-ft)	Det Volume (ft^3)
0	---	---	---	---	---	---
5.00	7.81	7.12	0.75	6.37	0.04	1,927
6.00	7.51	6.84	0.75	6.10	0.05	2,213
7.00	7.21	6.57	0.75	5.82	0.06	2,466
8.00	6.91	6.30	0.75	5.55	0.06	2,686
9.00	6.61	6.02	0.75	5.28	0.07	2,872
10.00	6.32	5.76	0.75	5.01	0.07	3,032
11.00	6.10	5.56	0.75	4.81	0.07	3,201
12.00	5.88	5.36	0.75	4.61	0.08	3,347
13.00	5.66	5.16	0.75	4.41	0.08	3,468
14.00	5.44	4.96	0.75	4.21	0.08	3,565
15.00	5.24	4.77	0.75	4.03	0.08	3,654
17.50	4.92	4.48	0.75	3.74	0.09	3,955
20.00	4.60	4.19	0.75	3.44	0.10	4,167
25.00	3.80	3.46	0.75	2.71	0.09	4,106
30.00	3.31	3.02	0.75	2.27	0.09	4,117
40.00	2.58	2.35	0.75	1.60	0.09	3,880
45.00	2.31	2.10	0.75	1.36	0.08	3,695
50.00	2.08	1.90	0.75	1.15	0.08	3,471
60.00	1.95	1.78	0.75	1.03	0.09	3,736
90.00	1.67	1.52	0.75	0.77	0.10	4,214
120.00	1.37	1.25	0.75	0.50	0.08	3,635
180.00	1.02	0.93	0.75	0.18	0.05	1,979
240.00	0.82	0.75	0.75	0.00	0.00	-8

Detention Vol Reqd = Maximum = **4,214**

Detention Volume Provided

CONIC VOLUME			
Water Surface Elevation ft (input)	Corresponding Contour Area square feet (input)	Volume above Datum acre-ft (output)	Volume above Datum Cubic Feet (output)
391.0	0	0.000	0
392.0	5,748	0.066	2,874
393.0	11,377	0.263	11,437

Required Storage Elevation with 10% Additional for Sedimentation

$ELEV_{10}$ = 392.22 ft Total Volume = 4758 c.f.

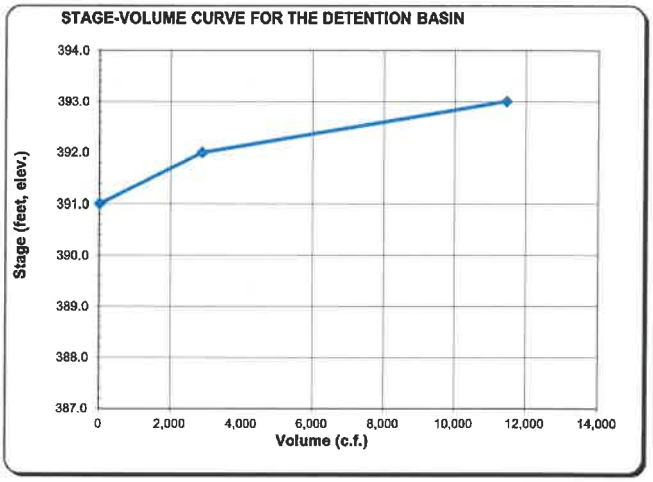
Outlet Structure Design

Inputs

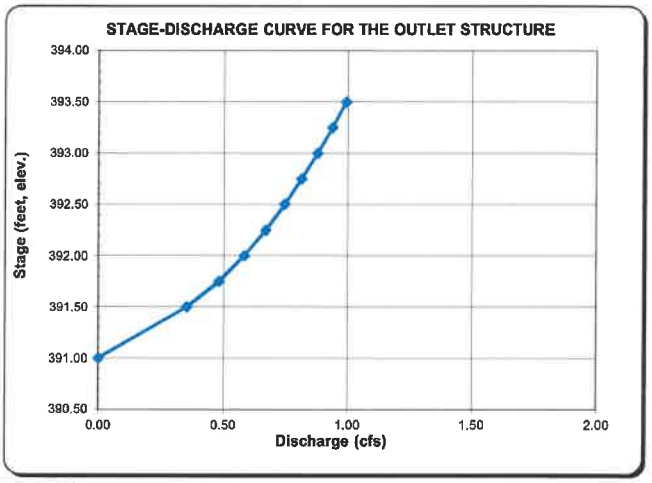
Low Flow	
5" Orifice @ 391.21	
	cfs
391.00	0.00
391.50	0.35
391.75	0.48
392.00	0.58
392.25	0.67
392.50	0.74
392.75	0.81
393.00	0.88
393.25	0.94
393.50	0.99

Weir 1	
L=	6.00
C_w =	2.70
E_o =	393.50

Manning's n-values	
PVC	0.012
PE (<9"dia)	0.015
PE (>12"dia)	0.02
PE(9-12"dia)	0.017
CMP	0.024
ADS N12	0.012
CMP	0.024
Conc	0.013

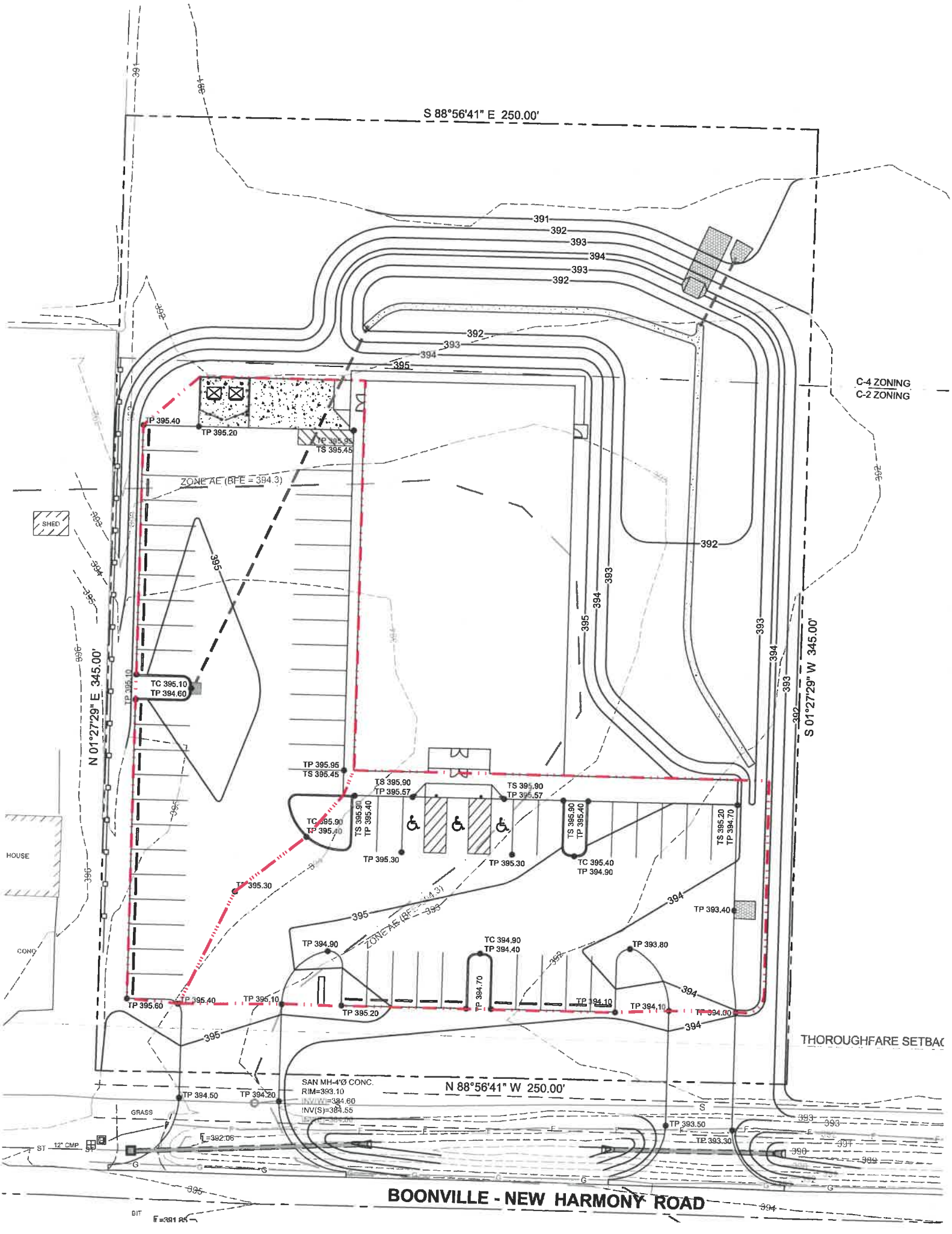


Rating Curve of Outlet Structure			
	Q1	Q2	Resulting
	Low Flow	Weir Flow	Flow
Elevation	cfs	cfs	
391.00	0.00	0.00	0.00
391.50	0.35	0.00	0.35
391.75	0.48	0.00	0.48
392.00	0.58	0.00	0.58
392.25	0.67	0.00	0.67
392.50	0.74	0.00	0.74
392.75	0.81	0.00	0.81
393.00	0.88	0.00	0.88
393.25	0.94	0.00	0.94
393.50	0.99	0.00	0.99



Compare Outflow Elevation to Required Storage Elevation					
	Max Outflow cfs	Occurs at Elevation	Required Elevation	At or above req.?	
$Q_{10\ allowable}$ =	0.75	392.51	392.22	YES	

APPENDIX X


S 88°56'41" E 250.00'
C-4 ZONING
C-2 ZONING
ZONE AE (BFE = 394.3)
SHED
HOUSE
CONC
N 01°27'29" E 345.00'
S 01°27'29" W 345.00'
N 88°56'41" W 250.00'
THOROUGHFARE SETBAC
BOONVILLE - NEW HARMONY ROAD
SAN MH-4'Ø CONC.
RIM=393.10
INV(W)=384.60
INV(S)=384.55
GRASS
12" CMP
TC 395.10
TP 394.60
TP 395.40
TP 395.20
TS 395.45
TP 395.95
TS 395.90
TP 395.57
TC 395.90
TP 395.40
TP 395.30
TC 395.40
TP 394.90
TS 395.20
TP 394.70
TP 393.40
TP 394.90
TC 394.90
TP 394.40
TP 393.80
TP 395.60
TP 395.10
TP 394.10
TP 394.50
TP 394.20
TP 393.50
TP 393.30
391
392
393
394
395

Dollar General
12100 SR57
Inlet and Storm Sewer Calculations
January 6, 2022

Runoff to Grate Inlet

Area = 14,958 s.f. = 0.343 acres
Impervious Area = 14,281 s.f. (C=0.92)
Lanscaped Area = 677 s.f. (C=.15)
Composite C = .885
Tc = 5 minutes (minimum)
100-year intensity = 9.95 in/hr

Q100 = 0.885 * 0.343 * 9.95 = 3.02 cfs

Grate Inlet Capacity – Deeter #2230 (234 in^2)

Q100 = 3.02 cfs
Max depth = 395.10 - 394.60 = 0.5'

$Q = C * A * (2g * d)^{0.5} = 0.67 * (234/144) * (64.4 * 0.50)^{0.5} = 6.18$ cfs
50% CF * 6.2 = 3.09 cfs > 3.02 cfs

Capacity of 15" Pipe from Inlet to Detention

$Q = 1.486 / n * A * R^{2/3} * S^{1/2}$

n = 0.012

$A = 3.14/4 * (1.25)^2 = 1.227$ s.f.

R = 1.25/4 = 0.313'

S = .005 ft/ft

$Q = 1.486 / .012 * 1.227 * (.313)^{2/3} * (.005)^{1/2}$

= 4.95 cfs > 3.02 cfs

Dollar General
12100 SR57
East Side Channel Calculations
January 6, 2022

Runoff to East Side Channel

Area = 15,560 s.f. = 0.357 acres
all impervious (C=0.92)
Tc = 5 minutes (minimum)
100-year intensity = 9.95 in/hr

Q100 = 0.92 * 0.357 * 9.95 = 3.27 cfs

Capacity of East Side Channel

Bottom = 2'

4:1 Side Slopes

Depth = 0.46'

Slope = 1.0%

N=0.037

$Q = 1.486 / n * A * R^{2/3} * S^{1/2}$

A = 1.79 s.f.

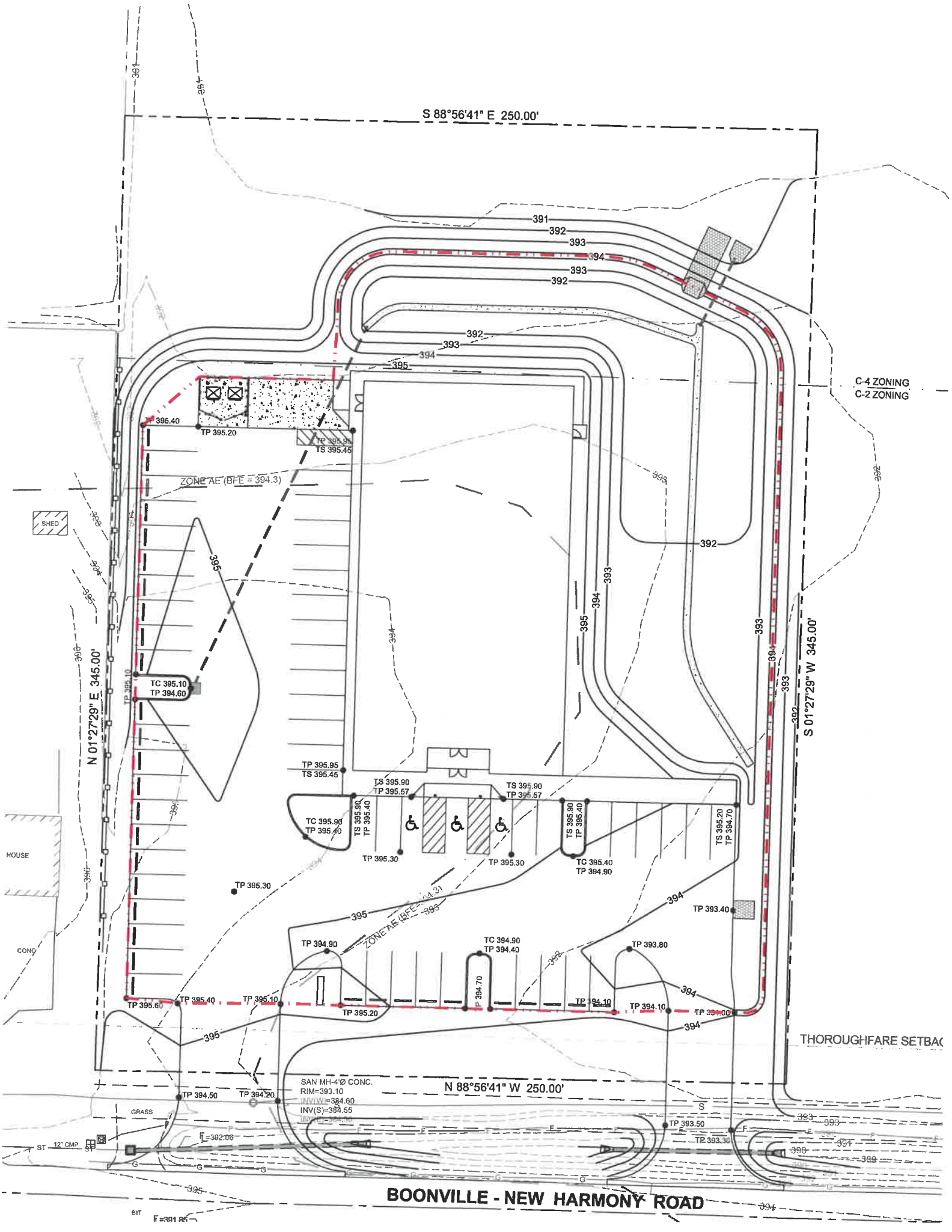
P = 5.83'

R = 1.79/5.83 = 0.31'

$Q = 1.486 / .037 * 1.79 * (.31)^{2/3} * (.01)^{1/2}$

= 3.27 cfs

APPENDIX XI


S 88°56'41" E 250.00'
C-4 ZONING
C-2 ZONING
ZONE AE (BFE = 394.3)
SHED
HOUSE
CONC
N 01°27'29" E 345.00'
S 01°27'29" W 345.00'
TC 395.10
TP 394.60
TP 395.40
TP 395.20
TS 395.45
TP 395.95
TS 395.90
TP 395.57
TC 395.90
TP 395.40
TP 395.30
TC 395.40
TP 394.90
TP 393.40
TP 394.90
TC 394.90
TP 394.40
TP 393.80
TP 394.70
TP 395.60
TP 395.10
TP 394.10
TP 394.00
THOROUGHFARE SETBAC
SAN MH-4'Ø CONC.
RIM=393.10
INV(W)=384.60
INV(S)=384.55
N 88°56'41" W 250.00'
TP 394.50
TP 394.20
GRASS
ST
12" CMP
TP 393.50
TP 393.30
BOONVILLE - NEW HARMONY ROAD

Map Scale: 1:663 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 5 10 20 30

Feet
0 30 60 120 180

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 16N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

Soil Rating Polygons

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features

- Streams and Canals

Transportation

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

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

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

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

Soil Survey Area: Vanderburgh County, Indiana
Survey Area Data: Version 21, Sep 9, 2021

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

Date(s) aerial images were photographed: Feb 12, 2016—Mar 9, 2017

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

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
HoA	Hosmer silt loam, 0 to 2 percent slopes	C/D	0.8	39.5%
HoB2	Hosmer silt loam, 2 to 5 percent slopes, eroded	C/D	0.9	44.7%
St	Stendal silt loam	B/D	0.3	15.8%
Totals for Area of Interest			**2.0**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

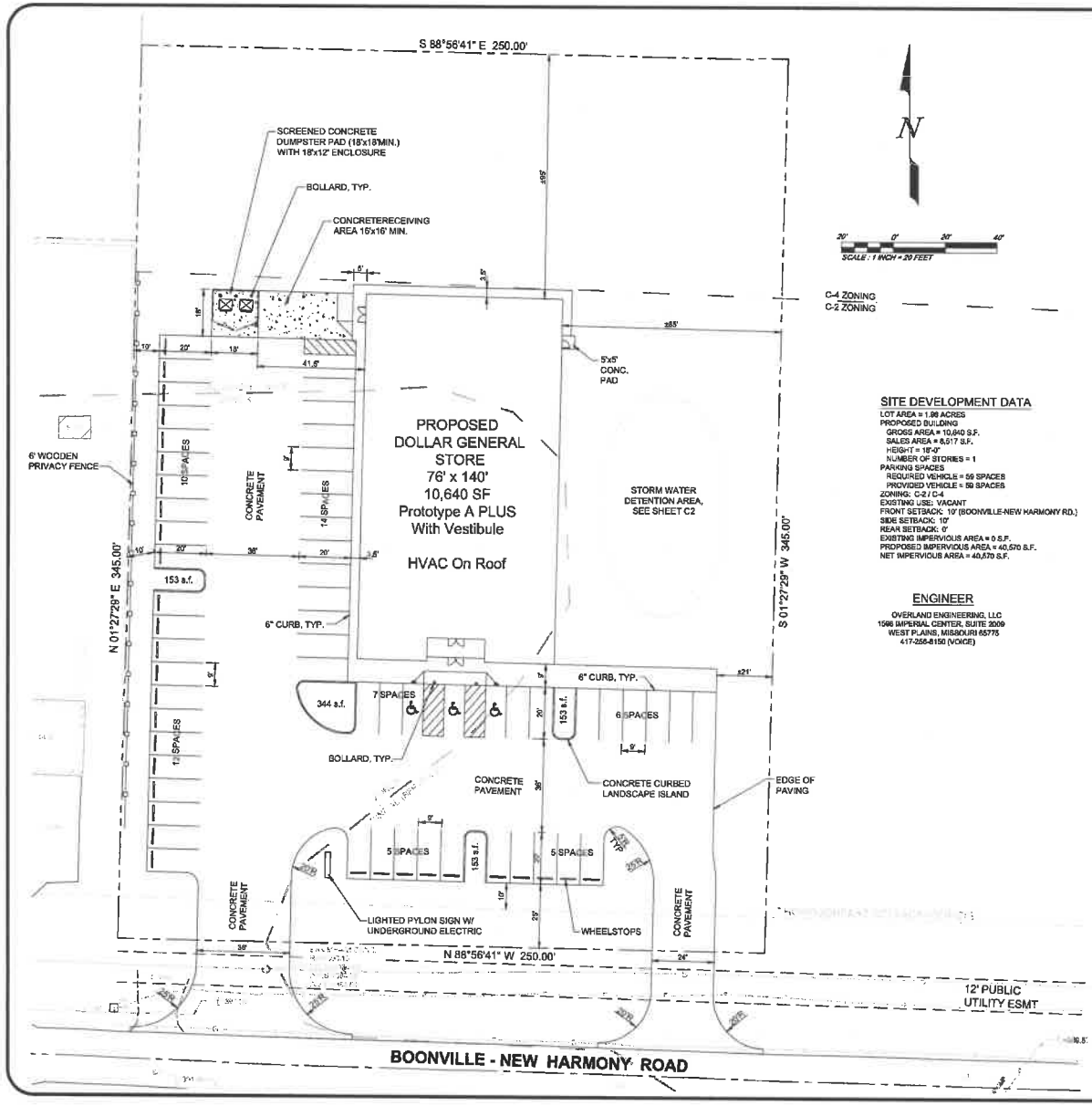
Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.



DOLLAR GENERAL STORE
DAYLIGHT, INDIANA

SITE DEVELOPMENT DATA

LOT AREA = 1.99 ACRES
PROPOSED BUILDING
GROSS AREA = 10,640 S.F.
SALES AREA = 8,517 S.F.
HEIGHT = 18'-0"
NUMBER OF STORIES = 1
PARKING SPACES
REQUIRED VEHICLE = 59 SPACES
PROVIDED VEHICLE = 59 SPACES
ZONING: C-2 / C-4
EXISTING USE: VACANT
FRONT SETBACK: 10' (BOONVILLE-NEW HARMONY RD.)
SIDE SETBACK: 10'
REAR SETBACK: 0'
EXISTING IMPERVIOUS AREA = 0 S.F.
PROPOSED IMPERVIOUS AREA = 40,570 S.F.
NET IMPERVIOUS AREA = 40,570 S.F.

ENGINEER

OVERLAND ENGINEERING, LLC
1598 IMPERIAL CENTER, SUITE 2009
WEST PLAINS, MISSOURI 65775
417-255-8150 (VOICE)

LEGEND

- BOUNDARY OF SURVEY
- U.S. GOVERNMENT SUBDIVISION LINE
- LOT LINE
- PUBLIC UTILITY EASEMENT LINE
- THOROUGHFARE SETBACK LINE
- FLOOD ZONE LINE
- ZONING LINE
- EXISTING SANITARY SEWER LINE
- EXISTING WATER LINE
- EXISTING FIBER OPTIC LINE
- EXISTING GAS LINE
- EXISTING CULVERT
- EXISTING ROADWAY/DITCH CENTERLINE
- EXISTING UTILITY POLE
- EXISTING WATER VALVE
- EXISTING BUFFALO BOX
- EXISTING FIRE HYDRANT
- EXISTING MANHOLE
- EXISTING HANDHOLE
- EXISTING MAILBOX
- EXISTING CLEANOUT
- EXISTING WATER METER
- EXISTING TELEPHONE BOX

BENCHMARKS
BM A
RAILROAD SPIKE IN POWER POLE SOUTH OF BOONVILLE-HARMONY ROAD, 3RD POWER POLE EAST OF BOHANNON DRIVE.
ELEV=393.09

BM B
RECOVERED "X" ON SOUTHWEST BOLT OF FIRE HYDRANT AT SOUTHEAST CORNER OF BOHANNON DRIVE AND BOONVILLE-HARMONY ROAD.
ELEV=396.06

GENERAL NOTES

1. THE CONSTRUCTION COVERED BY THESE PLANS SHALL CONFORM TO ALL CURRENT APPLICABLE STANDARDS AND SPECIFICATIONS OF THE PUBLIC WORKS DEPARTMENT OF VANDERBURGH COUNTY, INDIANA, UNLESS OTHERWISE NOTED.
2. ALL WORKMANSHIP AND MATERIALS SHALL BE SUBJECT TO THE INSPECTION AND APPROVAL OF VANDERBURGH COUNTY, INDIANA.
3. PRIOR TO COMMENCEMENT OF WORK, THE CONTRACTOR SHALL NOTIFY ALL THOSE COMPANIES WHICH HAVE FACILITIES IN THE NEAR VICINITY OF THE CONSTRUCTION TO BE PERFORMED.
4. THE CONTRACTOR MAY UTILIZE THE FOLLOWING TOLL FREE PHONE NUMBER PROVIDED BY ONE CALL SYSTEM, INC.: 1-(800)-382-5544. THIS PHONE NUMBER IS APPLICABLE ANYWHERE WITHIN THE STATE OF INDIANA.
5. ALL DAMAGE TO EXISTING UTILITIES SHALL BE REPAIRED BY AND AT THE EXPENSE OF THE CONTRACTOR.
6. THE CONTRACTOR SHALL UNDER NO CIRCUMSTANCES CLEAR OR DAMAGE ANY TREES OUTSIDE THE CLEARING LIMIT LINE SET BY THE COUNTY WITHOUT THE WRITTEN PERMISSION OF THE COUNTY ENGINEER OR PROPERTY OWNER.
7. CLEARING AND GRUBBING OPERATIONS AND DISPOSAL OF ALL DEBRIS THEREFROM SHALL BE PERFORMED BY THE CONTRACTOR IN STRICT ACCORDANCE WITH ALL LOCAL CODES AND ORDINANCES.
8. THE CONTRACTOR SHALL KEEP THE STREETS CLEAN OF MUD AND DEBRIS.
9. THE CONTRACTOR SHALL PLACE MIN. 4" TOPSOIL AND SEED & MULCH ALL DISTURBED AREAS AT THE DIRECTION OF THE COUNTY ENGINEER.
10. BOONVILLE-NEW HARMONY ROAD SHALL NOT BE CUT FOR INSTALLATION OF ANY IMPROVEMENTS. WATER CONNECTION MUST BE BORED BENEATH ROADWAY.
11. SPRINKLER HEADS SHALL NOT BE INSTALLED IN RIGHT OF WAY. HEADS SHALL BE LOCATED A MINIMUM OF 2 FEET BEHIND RIGHT OF WAY LINE.

THE SUBJECT PROPERTY LIES WITHIN ZONE AE (SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD FOR WHICH BASE FLOOD ELEVATIONS HAVE BEEN DETERMINED) ACCORDING TO THE FEDERAL EMERGENCY MANAGEMENT AGENCY'S NATIONAL FLOOD INSURANCE RATE MAP NO. 18163C0126D, WITH AN EFFECTIVE DATE OF MARCH 17, 2011 FOR THE VANDERBURGH COUNTY UNINCORPORATED AREA (COMMUNITY NO. 180256). VANDERBURGH COUNTY, INDIANA. AN APPROXIMATION OF THE EDGE OF SAID ZONE IS SHOWN HEREON BASED ON INFORMATION AVAILABLE ON THE FEMA FLOOD MAP SERVICE CENTER WEBSITE (HTTPS://MSC.FEMA.GOV/PORTAL/HOME).

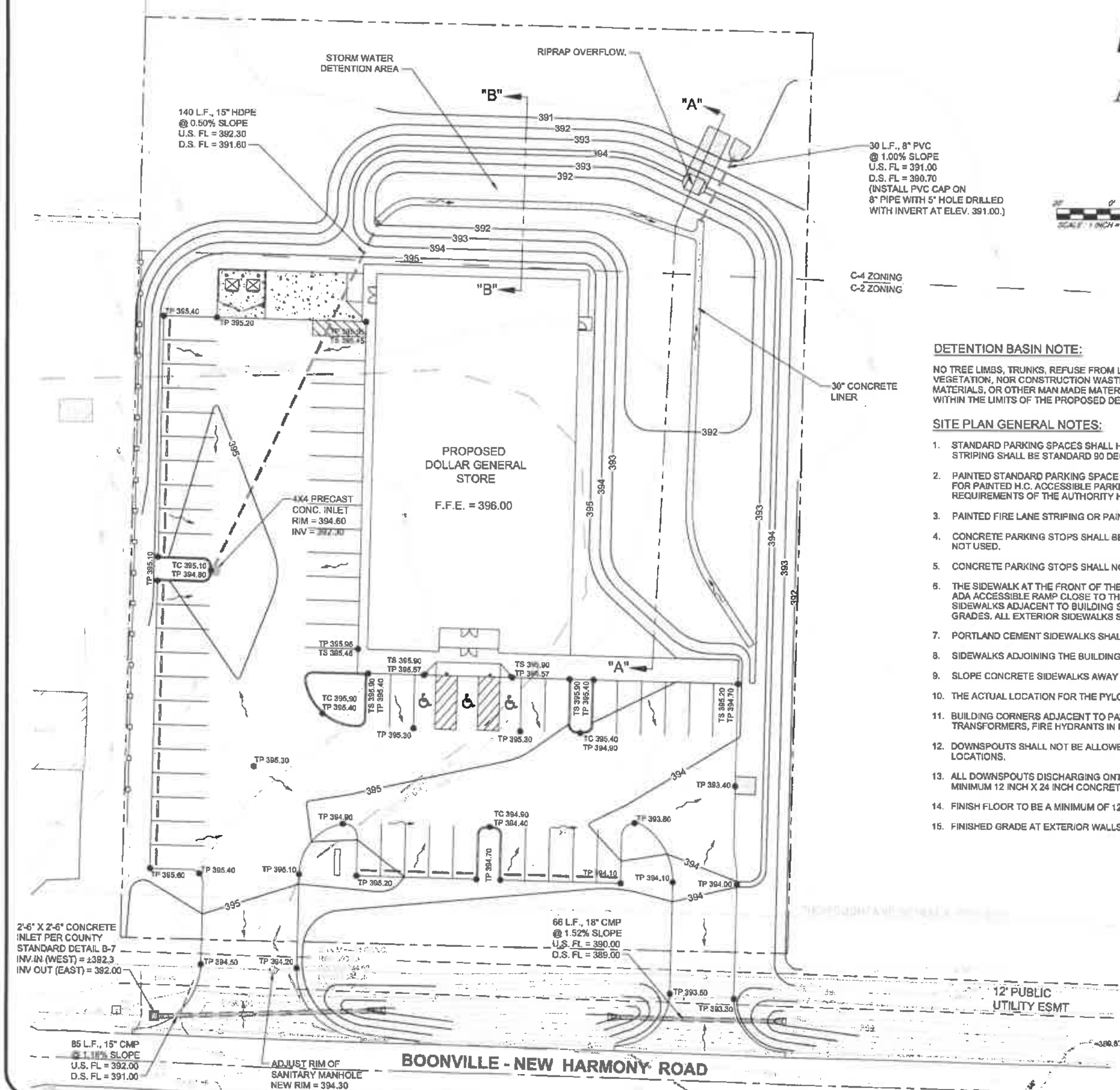
DOLLAR GENERAL
13160 SR 57, Evansville, IN 47725

NO.	DATE	DESCRIPTION	BY

Overland ENGINEERING, LLC
1598 IMPERIAL CTR., STE. 2009, WEST PLAINS, MO 65775
PHONE: (417) 255-8150 FAX: (417) 256-8532
mail@overlandeng.com

DOLLAR GENERAL
DAYLIGHT, INDIANA
SITE PLAN

SHEET
C1



N

SCALE: 1 INCH = 20 FEET

LEGEND

- BOUNDARY OF SURVEY
- U.S. GOVERNMENT SUBDIVISION LINE
- LOT LINE
- PUBLIC UTILITY EASEMENT LINE
- THOROUGHFARE SETBACK LINE
- FLOOD ZONE LINE
- ZONING LINE
- EXISTING SANITARY SEWER LINE
- EXISTING WATER LINE
- EXISTING FIBER OPTIC LINE
- EXISTING GAS LINE
- EXISTING CULVERT
- EXISTING ROADWAY/DITCH CENTERLINE
- EXISTING UTILITY POLE
- EXISTING WATER VALVE
- EXISTING BUFFALO BOX
- EXISTING FIRE HYDRANT
- EXISTING MANHOLE
- EXISTING HANDHOLE
- EXISTING MAILBOX
- EXISTING CLEANOUT
- EXISTING WATER METER
- EXISTING TELEPHONE BOX

DETENTION BASIN NOTE:

NO TREE LIMBS, TRUNKS, REFUSE FROM LEGALLY BURNT VEGETATION, NOR CONSTRUCTION WASTE, DEMOLITION MATERIALS, OR OTHER MAN MADE MATERIAL MAY BE BURIED WITHIN THE LIMITS OF THE PROPOSED DETENTION BASIN.

SITE PLAN GENERAL NOTES:

1. STANDARD PARKING SPACES SHALL HAVE MINIMUM SIZE OF 9'X 20' UNLESS LOCAL JURISDICTION REQUIRE LARGER SPACES. PARKING SPACE STRIPING SHALL BE STANDARD 90 DEGREE STYLE. MINIMUM SIZE OF H.C. PARKING SPACES AND ACCESS AISLE ARE SHOWN ON DETAILS.
2. PAINTED STANDARD PARKING SPACE AND ISLAND STRIPE COLOR SHALL BE YELLOW FOR ASPHALT PAVEMENT AND CONCRETE PAVEMENT. COLOR FOR PAINTED H.C. ACCESSIBLE PARKING SPACE STRIPES, ACCESS AISLE OR ISLAND STRIPES, H.C. SYMBOLS, SHALL BE PAINTED PER THE REQUIREMENTS OF THE AUTHORITY HAVING JURSIDICTION. BOLLARDS SHALL BE PAINTED YELLOW. PAINT SHALL BE REFLECTIVE TYPE.
3. PAINTED FIRE LANE STRIPING OR PAINTED CURBS SHALL BE PROVIDED AS REQUIRED BY JURISDICTIONAL REQUIREMENTS.
4. CONCRETE PARKING STOPS SHALL BE USED AT PARKING SPACES ALONG THE OUTER PERIMETER OF PARKING LOT WHEN CONCRETE CURBS ARE NOT USED.
5. CONCRETE PARKING STOPS SHALL NOT BE USED AT THE FRONT OF THE BUILDING OR ALONG THE PERIMETER (ADJACENT) TO THE BUILDING.
6. THE SIDEWALK AT THE FRONT OF THE BUILDING SHALL BE A MINIMUM OF 9-FEET WIDE. THE SIDEWALK SHALL INCLUDE A 10-FOOT MINIMUM WIDE ADA ACCESSIBLE RAMP CLOSE TO THE STORE MAIN ENTRANCE. SIDEWALKS ALONG OTHER SIDES OF BUILDING SHALL BE MINIMUM 3'-6" WIDE. SIDEWALKS ADJACENT TO BUILDING SLABS SHALL HAVE SEALED ISOLATION JOINTS AND SHALL BE 6" HIGH ABOVE EXTERIOR OR PAVEMENT FINISH GRADES. ALL EXTERIOR SIDEWALKS SHALL HAVE A BROOM FINISH.
7. PORTLAND CEMENT SIDEWALKS SHALL BE MINIMUM 4" THICK WITH WELDED WIRE FABRIC REINFORCING.
8. SIDEWALKS ADJOINING THE BUILDING MUST HAVE A 6" HIGH INTEGRAL CURB.
9. SLOPE CONCRETE SIDEWALKS AWAY FROM BUILDING AT A MINIMUM SLOPE OF 1/8" PER FOOT, INCLUDING RECESSED ENTRY.
10. THE ACTUAL LOCATION FOR THE PYLON SIGN SHALL BE SITUATED FOR OPTIMUM VISIBILITY ALONG THE MAIN FRONT TRAFFIC CORRIDOR.
11. BUILDING CORNERS ADJACENT TO PAVED AREAS SHALL BE BOLLARD PROTECTED. ABOVE GROUND UTILITY APPURTENANCES, SUCH AS METERS, TRANSFORMERS, FIRE HYDRANTS IN PAVED AREAS, ETC. SHALL BE BOLLARD PROTECTED.
12. DOWNSPOUTS SHALL NOT BE ALLOWED TO DISCHARGE ON CONCRETE SIDEWALKS. ROUTE DOWNSPOUTS UNDER SIDEWALKS AT ALL SIDEWALK LOCATIONS.
13. ALL DOWNSPOUTS DISCHARGING ONTO NON PAVED AREAS ARE TO HAVE A MINIMUM FIVE FOOT PERFORATED LANDSCAPE PIPE STRAPPED TO A MINIMUM 12 INCH X 24 INCH CONCRETE SPLASH BLOCK.
14. FINISH FLOOR TO BE A MINIMUM OF 12 INCHES ABOVE 100 YEAR FLOOD PLAIN.
15. FINISHED GRADE AT EXTERIOR WALLS SHALL BE A MINIMUM OF 6" BELOW FINISHED FLOOR AT ALL NON-PAVED AREAS.

BENCHMARKS

BM A
RAILROAD SPIKE IN POWER POLE SOUTH OF BOONVILLE-HARMONY ROAD, 3RD POWER POLE EAST OF BOHANNON DRIVE.
ELEV=393.69

BM B
RECOVERED "X" ON SOUTHWEST BOLT OF FIRE HYDRANT AT SOUTHEAST CORNER OF BOHANNON DRIVE AND BOONVILLE-HARMONY ROAD.
ELEV=396.06

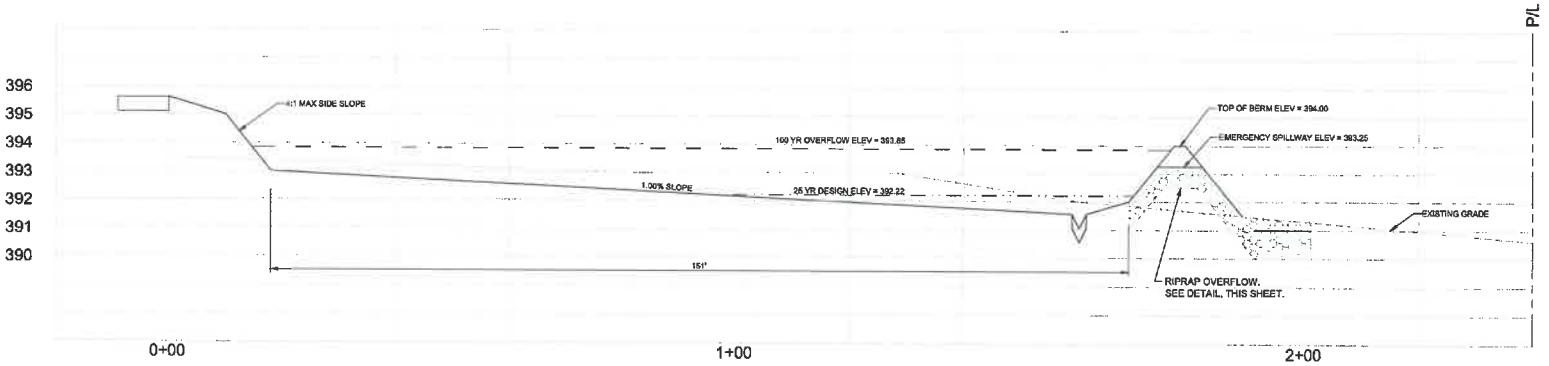
DOLLAR GENERAL

NO.	DATE	DESCRIPTION	BY

Overland ENGINEERING, LLC

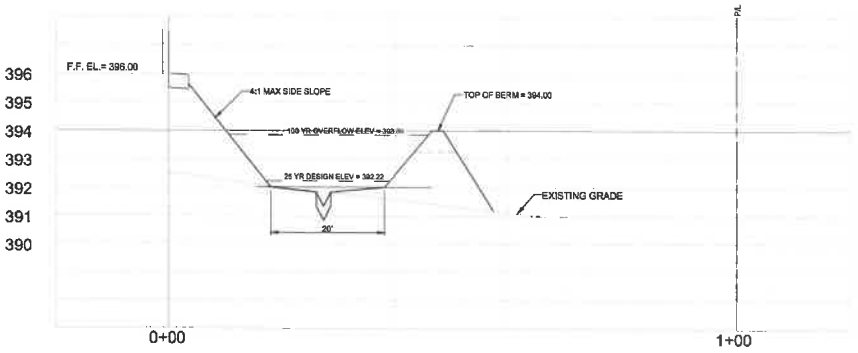
DOLLAR GENERAL
DAYLIGHT, INDIANA
GRADING PLAN

SHEET C2



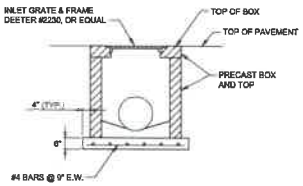
DETENTION AREA SECTION A-A

SCALE 1" = 10'



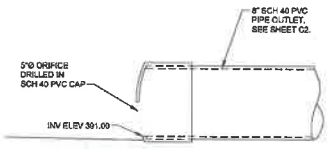
DETENTION AREA SECTION B-B

SCALE 1" = 10'



GRATE INLET DETAIL

NO SCALE

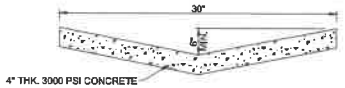


ELEVATION VIEW

END VIEW

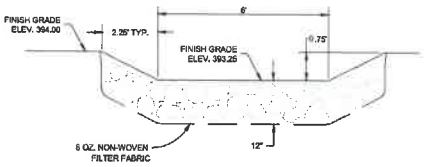
DETENTION OUTLET DETAIL

NO SCALE



CONCRETE LINER DETAIL

NOT TO SCALE



RIPRAP OVERFLOW SECTION

NO SCALE

UTILITY DISCLAIMER

EXISTING UNDERGROUND UTILITIES AND BURIED STRUCTURES IN THE VICINITY OF THE WORK TO BE PERFORMED HEREIN ARE INDICATED ON THE DRAWINGS ONLY TO THE EXTENT THAT SUCH INFORMATION HAS BEEN MADE AVAILABLE TO OR DISCOVERED BY THE ENGINEER IN THE PREPARATION OF THE DRAWINGS. THERE IS NO GUARANTEE AS TO THE ACCURACY OR THE COMPLETENESS OF SUCH INFORMATION AND ALL RESPONSIBILITY FOR THE ACCURACY AND COMPLETENESS THEREOF IS EXPRESSLY DISCLAIMED.

DOLLAR GENERAL

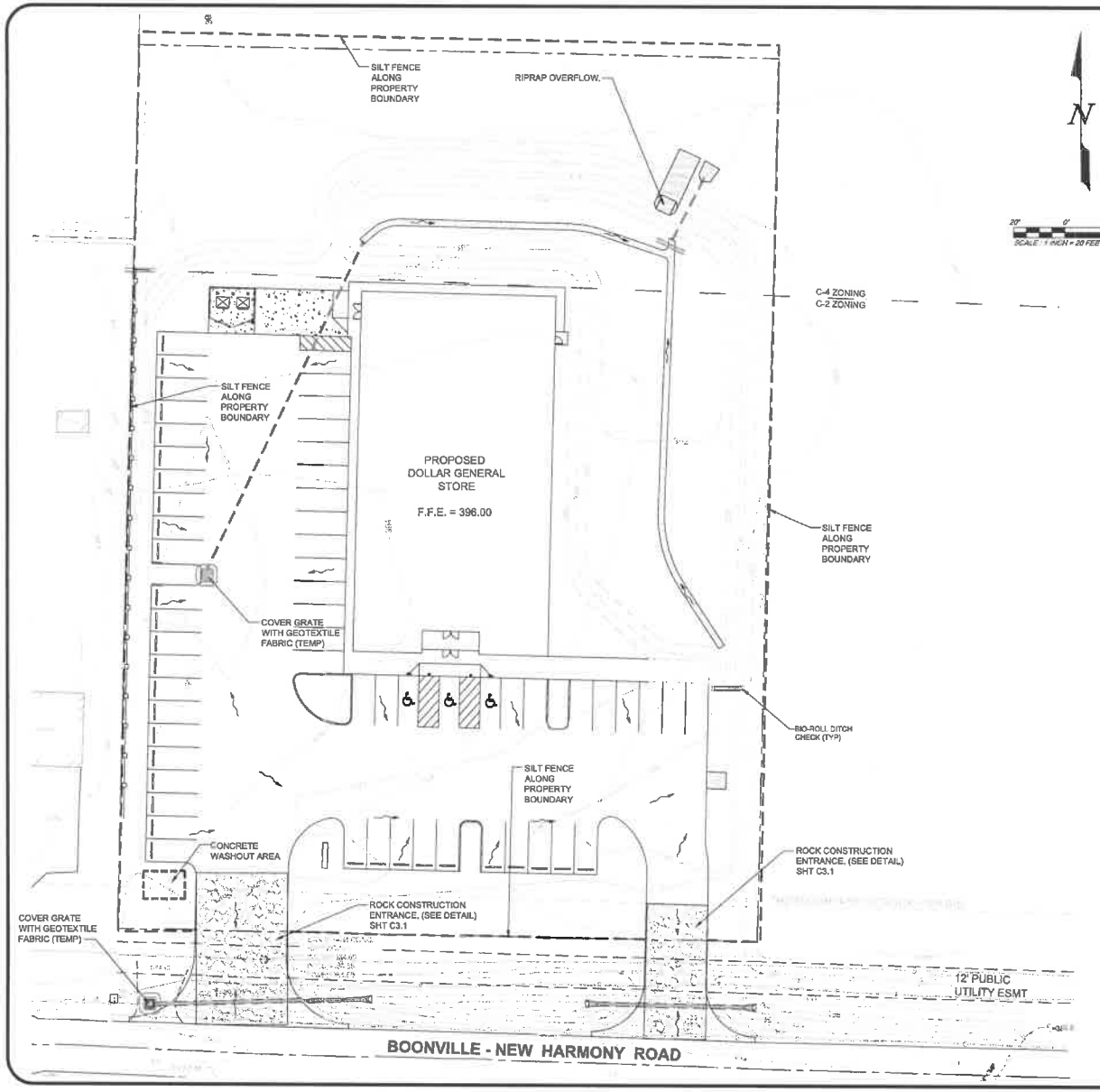
NO.	DATE	DESCRIPTION	BY

Overland ENGINEERING, LLC

DOLLAR GENERAL
DAYLIGHT, INDIANA

DRAINAGE DETAILS

SHEET
C2.1



N

20' 0' 20' 40'
SCALE: 1 INCH = 20 FEET

LEGEND

- BOUNDARY OF SURVEY
- U.S. GOVERNMENT SUBDIVISION LINE
- LOT LINE
- PUBLIC UTILITY EASEMENT LINE
- THOROUGHFARE SETBACK LINE
- FLOOD ZONE LINE
- ZONING LINE
- EXISTING SANITARY SEWER LINE
- EXISTING WATER LINE
- EXISTING FIBER OPTIC LINE
- EXISTING GAS LINE
- EXISTING CULVERT
- EXISTING ROADWAY/DITCH CENTERLINE
- EXISTING UTILITY POLE
- EXISTING WATER VALVE
- EXISTING BUFFALO BOX
- EXISTING FIRE HYDRANT
- EXISTING MANHOLE
- EXISTING HANDHOLE
- EXISTING MAILBOX
- EXISTING CLEANOUT
- EXISTING WATER MISTER
- EXISTING TELEPHONE BOX

GENERAL NOTES FOR SEDIMENTATION & EROSION CONTROL

1. THIS PLAN SHOWS THE LOCATION AND DETAILS FOR PRIMARY SEDIMENT CONTROLS TO BE CONSTRUCTED. THE CONTRACTOR IS RESPONSIBLE FOR CONTROLLING EROSION AND DISCHARGE OF SEDIMENT FROM THE SITE AT ALL TIMES DURING CONSTRUCTION. THE CONTRACTOR SHALL PROVIDE NECESSARY MEASURES DURING ALL PHASES OF HIS OPERATIONS REGARDLESS OF WHETHER THEY ARE SPECIFICALLY NOTED ON THIS PLAN AND SHALL MAINTAIN AND REPLACE CONTROLS AS NECESSARY DURING THE COURSE OF HIS OPERATIONS.

2. SILT FENCES, OR OTHER INITIAL SEDIMENT CONTROLS SHOWN ON THIS PLAN MUST BE INSTALLED PRIOR TO ANY OTHER WORK.

3. THE CONTRACTOR SHALL CLEAN STREETS BOTH INTERIOR AND ADJACENT TO THE SITE, AS NEEDED AFTER EACH RAINFALL, AND AT THE END OF CONSTRUCTION.

4. THE CONTRACTOR IS RESPONSIBLE FOR CONTROLLING DUST DURING CONSTRUCTION AND SHALL WATER CONSTRUCTION AREAS WHENEVER CONDITIONS WARRANT.

5. ALL DISTURBED AREAS NOT RECEIVING OTHER PERMANENT STABILIZATION SUCH AS PAVEMENT, ROOFS, SOD, ETC., SHALL BE SEEDED AND MULCHED, AS SPECIFIED BELOW BEFORE TEMPORARY SEDIMENT CONTROLS CAN BE REMOVED AND PRIOR TO FINAL APPROVAL OF CONSTRUCTION.

IRRIGATION NOTES:

1. IRRIGATION SYSTEM FOR SODDED AND LANDSCAPED AREAS IS NOT SHOWN BUT SHALL BE DESIGNED AND INSTALLED BY CONTRACTOR.
2. IRRIGATION SYSTEM TO INCLUDE ALL SPRAY HEADS, VALVES AND CONTROLLERS.
3. LOCATE HEADS A MINIMUM OF 2'-0" FROM EDGE OF PAVEMENT / CURB.

NOTE: EROSION CONTROL SPECIFICATIONS SHALL BE ACCORDING TO THE INDIANA STORM WATER QUALITY MANUAL, WHICH CAN BE FOUND ONLINE AT:
http://www.in.gov/idem/stormwater/2363.htm

BENCHMARKS
BM A
RAILROAD SPIKE IN POWER POLE SOUTH OF BOONVILLE-HARMONY ROAD, 3RD POWER POLE EAST OF BOHANNON DRIVE.
ELEV=393.69

BM B
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ELEV=365.06

DOLLAR GENERAL
12300 BIG BEND BLVD. ST. LOUIS, MO 63122

NO.	DATE	DESCRIPTION	BY

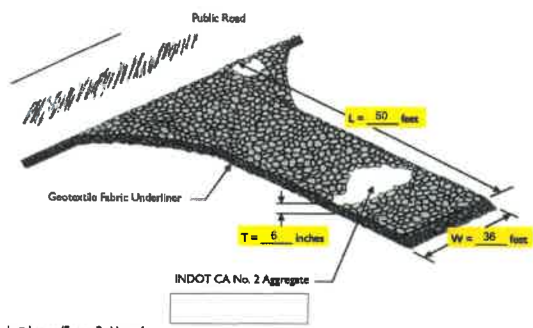
Overland ENGINEERING, LLC
1596 MERIDIAN CTR., STE. 200N BEST PLAINS, MO 55775
PHONE: (417) 799-8152 FAX: (417) 799-8152
mail@overlandeng.com

DOLLAR GENERAL
DAYLIGHT, INDIANA

SEDIMENT & EROSION CONTROL PLAN

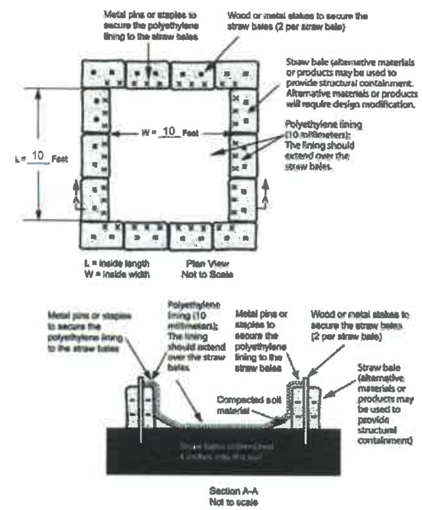
SHEET
C3

Temporary Construction Ingress/Egress Pad Plan View Worksheet (small sites—less than two acres)

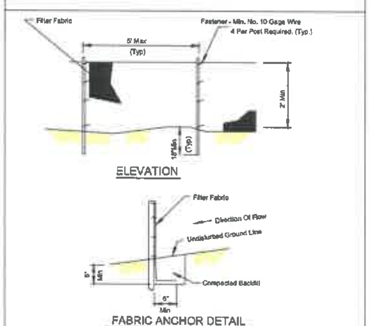


L = Ingress/Egress Pad Length
W = Ingress/Egress Pad Width
T = Aggregate Thickness

Concrete Washout (Above Grade System)

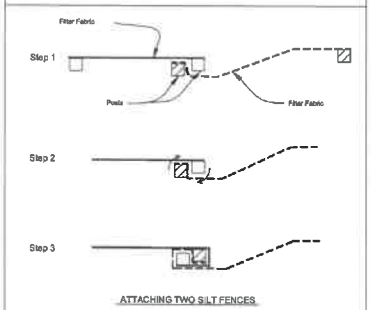


SILT FENCE PLAN



NOTES:
1. Temporary sediment fence shall be installed prior to any grading work in the area to be protected. They shall be maintained throughout the construction period and removed in conjunction with the final grading and site stabilization.
2. Filter fabric shall meet the requirements of material specification 592 Geotextile Table 1 or 2, Class I with equivalent opening size of at least 30 for nonwoven and 40 for woven.
3. Fence posts shall be either standard steel post or wood post with a minimum cross-sectional area of 3.0 sq. in.

SILT FENCE - SPLICING TWO FENCES



Place the end post of the second fence inside the end post of the first fence.
Rotate both posts at least 180 degrees in a clockwise direction to create a tight seal with the fabric material.
Cut the fabric near the bottom of the stakes to accommodate the 6" flap.
Drive both posts a minimum of 18 inches into the ground and bury the flap.
Compact backfill (particularly at splices) completely to prevent stormwater piping.

NOTE: EROSION CONTROL SPECIFICATIONS SHALL BE ACCORDING TO THE INDIANA STORM WATER QUALITY MANUAL, WHICH CAN BE FOUND ONLINE AT:
http://www.in.gov/idem/stormwater/2363.htm

SEEDING AND MULCHING SPECIFICATIONS

ALL DISTURBED AREAS MUST BE REVEGETATED BEFORE TEMPORARY SEDIMENT CONTROLS CAN BE REMOVED.

1. GOVERNING SPECIFICATIONS
ALL SEEDING, MUCHING, FERTILIZING, AND MAINTENANCE SHALL BE IN ACCORDANCE WITH THE INDIANA DOT STANDARD SPECIFICATIONS.
2. TOPSOIL
SEEDBED SHALL BE SMOOTH AND UNIFORM WITH PREPARED LOOSENED TOPSOIL A MINIMUM OF 3 INCHES.
3. FERTILIZER
FERTILIZER SHALL BE 12-12-12 (N-P-K) COMMERCIAL GRADE APPLIED AT A RATE OF 200 LBS PER ACRE.
4. SEEDING
SEED MIX SHALL BE MIXTURE "U" AS SPECIFIED IN THE INDIANA DOT SPECIFICATIONS.
SEED SHALL BE APPLIED AT A RATE OF 150 POUNDS PER ACRE.
5. MULCHING
MULCHING SHALL BE STRAW MULCH (2 TONS/ACRE) OR WOOD CELLULOSE FIBER MULCH (1 TON/ACRE).
MULCH SHALL BE APPLIED BY METHOD A OR METHOD B WITHIN 24 HOURS OF SEEDING.
6. SEASONAL REQUIREMENTS
ALL SEEDING SHALL BE PERFORMED BETWEEN FEBRUARY 1 AND OCTOBER 15.

NO.	DATE	DESCRIPTION	BY

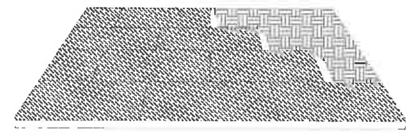
DOLLAR GENERAL

Overland ENGINEERING, LLC
1598 IMPERIAL CTR., STE. 2009 WEST PLAINS, MO 65775
PHONE: (417) 256-8150 FAX: (417) 256-8152

DOLLAR GENERAL
DAYLIGHT, INDIANA

SEDIMENT & EROSION CONTROL DETAILS

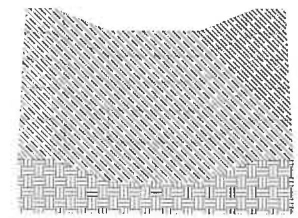
SHEET
C3.1



LAY SOD IN A STAGGERED PATTERN WITH STRIPS BUTTED TIGHTLY AGAINST EACH OTHER

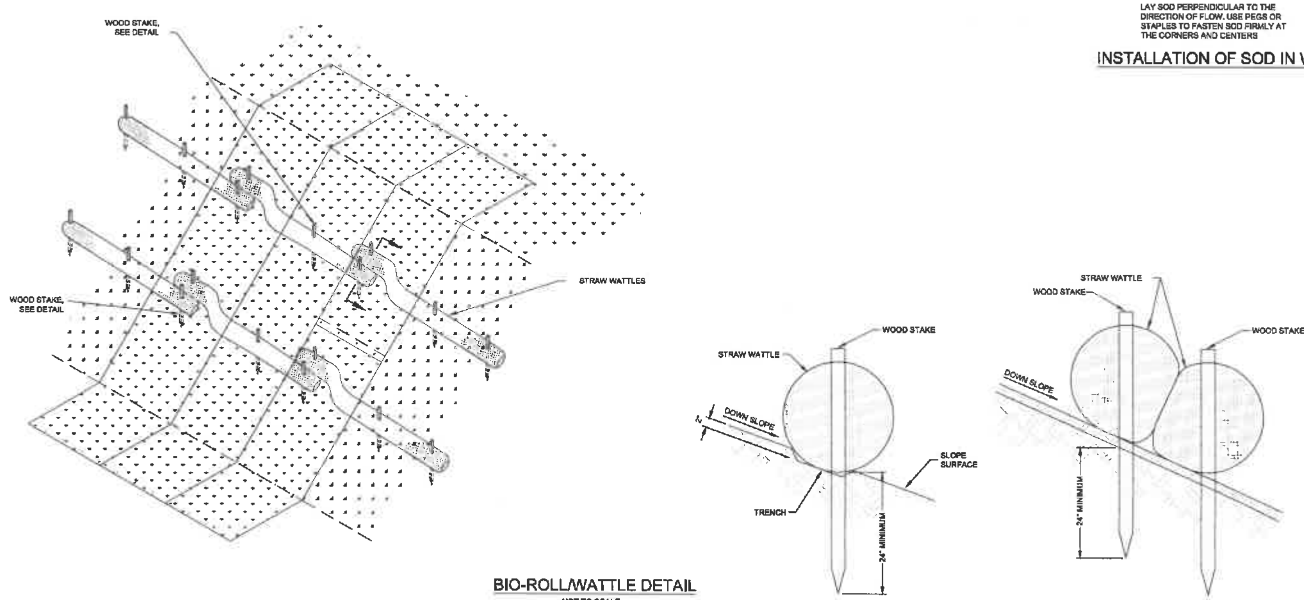
ON SLOPE > 3:1 USE PEGS OR STAPLES TO FASTEN SOD FIRMLY AT THE CORNERS AND CENTERS.

INSTALLATION OF GRASS SOD



LAY SOD PERPENDICULAR TO THE DIRECTION OF FLOW. USE PEGS OR STAPLES TO FASTEN SOD FIRMLY AT THE CORNERS AND CENTERS

INSTALLATION OF SOD IN WATERWAYS



BIO-ROLL/WATTLE DETAIL
NOT TO SCALE

DOLLAR GENERAL

12100 SR 57, Evansville, IN 47725

NO.	DATE	DESCRIPTION	BY

Overland ENGINEERING, LLC
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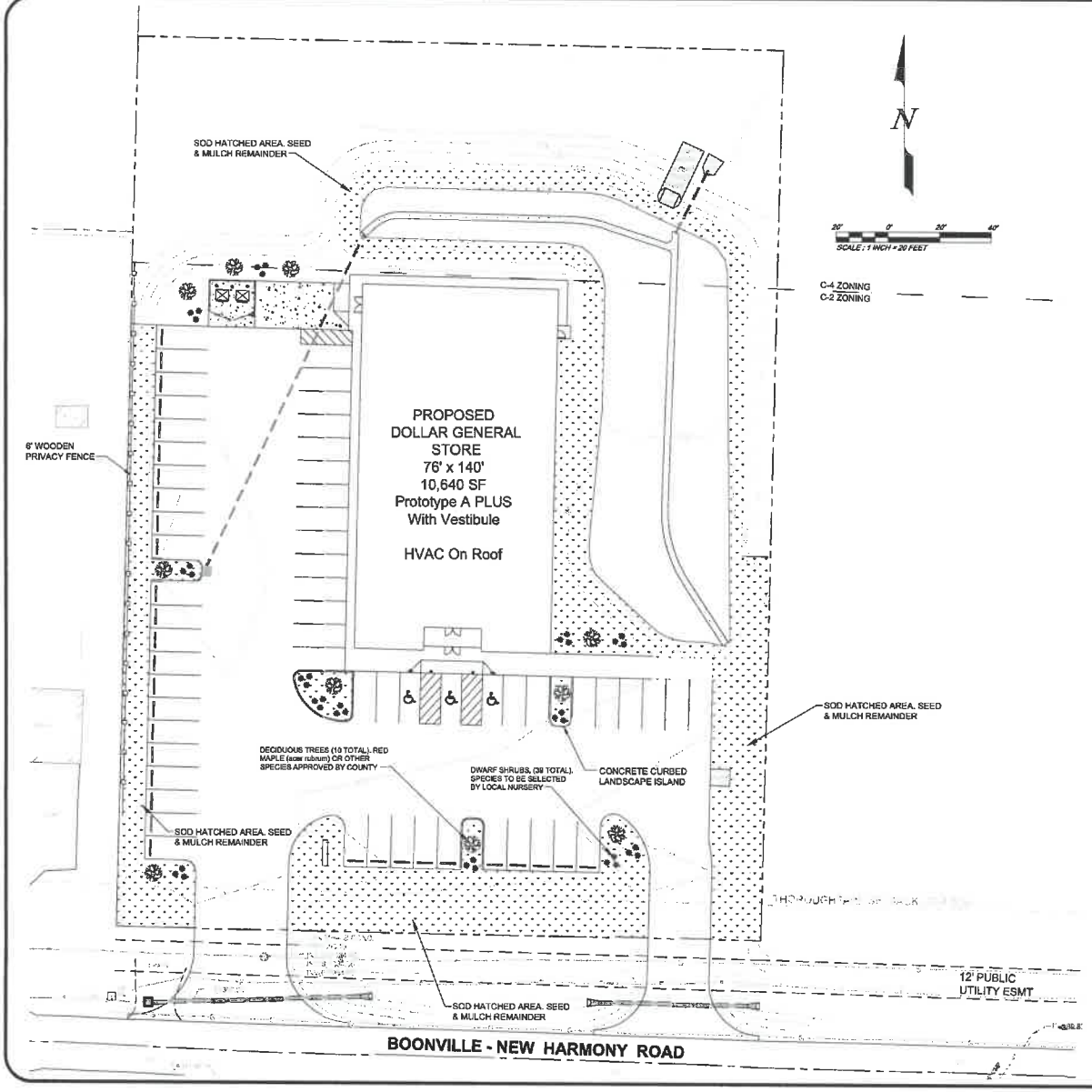
PHONE: (417) 256-8150 FAX: (417) 256-8152
russ@overlanderg.com

DOLLAR GENERAL
DAYLIGHT, INDIANA

SEDIMENT & EROSION CONTROL DETAILS

SHEET
C3.2



LEGEND

- BOUNDARY OF SURVEY
- U.S. GOVERNMENT SUBDIVISION LINE
- LOT LINE
- PUBLIC UTILITY EASEMENT LINE
- THOROUGHFARE SETBACK LINE
- FLOOD ZONE LINE
- ZONING LINE
- EXISTING SANITARY SEWER LINE
- EXISTING WATER LINE
- EXISTING FIBER OPTIC LINE
- EXISTING GAS LINE
- EXISTING CULVERT
- EXISTING ROADWAY/DITCH CENTERLINE
- EXISTING UTILITY POLE
- EXISTING WATER VALVE
- EXISTING BUFFALO BOX
- EXISTING FIRE HYDRANT
- EXISTING MANHOLE
- EXISTING HANDHOLE
- EXISTING MAILBOX
- EXISTING CLEANOUT
- EXISTING WATER METER
- EXISTING TELEPHONE BOX

BENCHMARKS

BM A
RAILROAD SPIKE IN POWER POLE SOUTH OF BOONVILLE-HARMONY ROAD, 3RD POWER POLE EAST OF BOHANNON DRIVE.
ELEV=393.69

BM B
RECOVERED "X" ON SOUTHWEST BOLT OF FIRE HYDRANT AT SOUTHEAST CORNER OF BOHANNON DRIVE AND BOONVILLE-HARMONY ROAD.
ELEV=396.66

Indiana 811
Know what's below. Call before you dig.

UTILITY DISCLAIMER

EXISTING UNDERGROUND UTILITIES AND BURIED STRUCTURES IN THE VICINITY OF THE WORK TO BE PERFORMED HEREIN ARE INDICATED ON THE DRAWINGS ONLY TO THE EXTENT THAT SUCH INFORMATION HAS BEEN MADE AVAILABLE TO OR DISCOVERED BY THE ENGINEER IN THE PREPARATION OF THE DRAWINGS. THERE IS NO GUARANTEE AS TO THE ACCURACY OR THE COMPLETENESS OF SUCH INFORMATION AND ALL RESPONSIBILITY FOR THE ACCURACY AND COMPLETENESS THEREOF IS EXPRESSLY DISCLAIMED

DOLLAR GENERAL

NO.	DATE	DESCRIPTION	BY

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PHONE: (417) 256-8250 FAX: (417) 256-8252
info@overlandeng.com

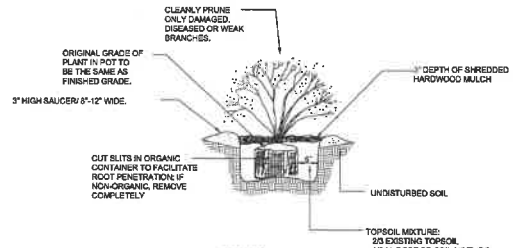
DOLLAR GENERAL
DAYLIGHT, INDIANA

LANDSCAPING PLAN

SHEET
C4

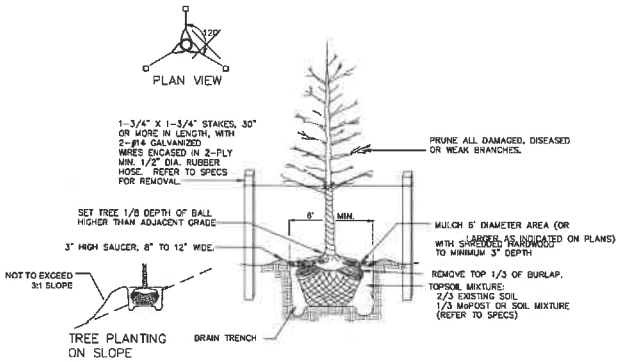
EARTHEN EDGING DETAIL

NO SCALE



SHRUB DETAIL

NO SCALE



TREE DETAIL- LESS THAN 3 1/2" CALIPER

NO SCALE

DG STD. SEEDING, SODDING, LANDSCAPING, AND IRRIGATION REQUIREMENTS:

LAWN SEEDING AND SODDING NOTES:

1. ALL LAWNS FROM FACE OF THE BUILDING AND ON THE SIDE WHERE THERE IS PARKING OR A STREET ARE REQUIRED TO BE FULLY SODDED. ALL OTHER LANDSCAPE AREAS TO RECEIVE SEED.
2. AREAS TO RECEIVE SEED OR SOD SHALL BE CLEAN OF DEBRIS AND FREE OF WEEDS.
3. SEED MIX TO BE DROUGHT TOLERANCE FESCUE OR REGIONAL SPECIFIC BLEND. ¼ TO ⅓ OF THE SEED MIXTURE TO BE ANNUAL RYE TO AIDE IN LIMITING EROSION OF PERENNIAL SEED DURING GERMINATION.
4. STRAW SHALL BE THRESHED STRAW OF HAY, OATS, WHEAT, BARLEY, OR RYE. SPREAD AT A RATE OF 2 1/2 TONS PER ACRE. STRAW, NETTING, AND OTHER ANTI-EROSION MATERIALS TO BE REMOVED AFTER ESTABLISHED LAWN.
5. MAINTENANCE SHALL BEGIN IMMEDIATELY AFTER SEEDING. WATER REGULARLY TO KEEP LAWN AREAS MOIST TO MAXIMIZE GERMINATION AND MAINTAIN OPTIMUM GROWTH AND SURVIVAL TO ACHIEVE AN ACCEPTABLE STAND OF ESTABLISHED LAWN PRIOR TO THE STORE POSSESSION DATE, FREE OF ERODED OR BARE AREAS.

LANDSCAPE NOTES:

1. CONTRACTOR SHALL PROVIDE LANDSCAPING IN ACCORDANCE WITH JURISDICTION REQUIREMENTS.
2. ALL SOIL USED FOR PLANTING SHALL CONSIST OF REGIONALLY APPROPRIATE SOILS.
3. ALL PLANTING BEDS SHALL HAVE A MINIMUM 3" DEPTH OF MULCH, WITH EDGING AS REQUIRED.
4. ALL TREES LOCATED IN SOD AREAS SHALL HAVE A MULCH RING AROUND THEM WITH EDGING.
5. ALL PLANTINGS SHALL BE THOROUGHLY WATERED BY THE LANDSCAPE CONTRACTOR AT THE TIME OF THE PLANTINGS.
6. PRIOR TO FINAL ACCEPTANCE OF STORE BY DOLLAR GENERAL, THE SITE SHALL BE CLEAN OF ALL DEBRIS AND TRASH, AND MEET ALL REQUIREMENTS OUTLINED ABOVE.
7. MAXIMUM SLOPE CUTS SHALL NOT EXCEED 4:1. ALL DISTURBED GRADES GREATER THAN 8:1 SHALL BE STABILIZED BY SODDING. SODDING PINS ARE TO BE USED ON ALL 4:1 GRADES.
8. VEGETATION AT ENTRY SHOULD BE LOW TO ENSURE VISIBILITY OF STORE.
9. IF TREES ARE REQUIRED IN FRONT OF BUILDING, SELECT SMALL LEAFED, NON DENSE SPECIES THAT WILL NOT INTERFERE WITH THE VISIBILITY OF STORE. THE SPACING SHALL CREATE VISUAL CORRIDORS TO STORE.

IRRIGATION NOTES:

1. ALL LANDSCAPE AREAS AND LAWNS ADJACENT TO PAVED AREAS AND/OR STREETS ARE TO BE FULLY IRRIGATED.
2. IRRIGATION SYSTEM TO INCLUDE ALL SPRAY HEADS, VALVES AND CONTROLLERS.
3. A SEPARATE METER AND BACKFLOW PREVENTER WILL BE REQUIRED.
4. LOCATE SPRINKLER HEADS A MINIMUM OF 2'-0" FROM EDGE OF PAVEMENT / CURB. SPRINKLER HEADS SHALL NOT BE INSTALLED IN RIGHT OF WAY. HEADS SHALL BE LOCATED A MINIMUM OF 2 FEET BEHIND RIGHT OF WAY LINE.

DOLLAR GENERAL

NO. | DATE | DESCRIPTION | BY

Overland ENGINEERING, LLC
1586 MAGNAL CTR., STE. 3000 WEST PLAINS, MO 65775
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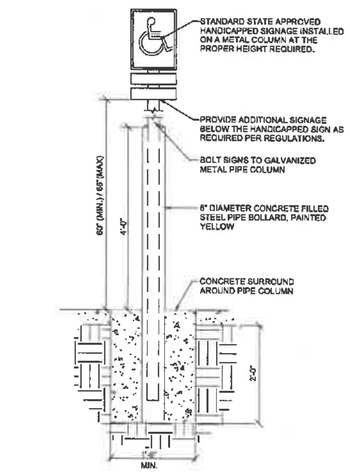
DOLLAR GENERAL
DAYLIGHT, INDIANA

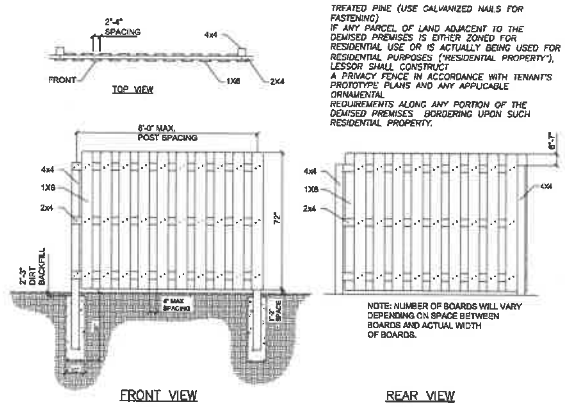
LANDSCAPING DETAILS

SHEET
C4.1



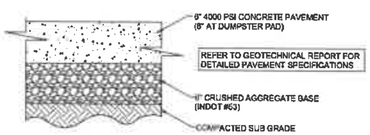
BOLLARD DETAIL

NOT TO SCALE



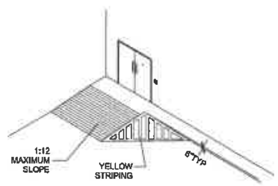
WOOD FENCE DETAIL

NOT TO SCALE



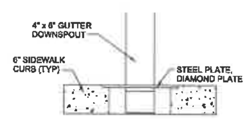
CONCRETE PAVEMENT SECTION

NOT TO SCALE



SIDE ENTRY DETAIL

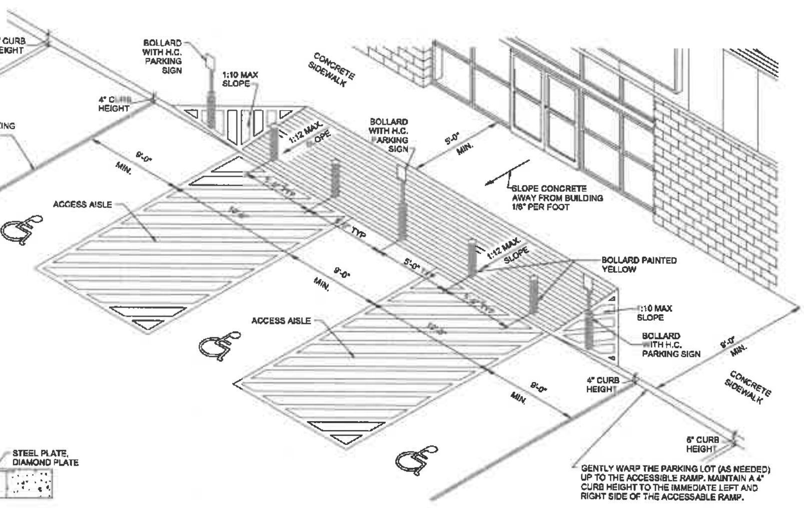
NOT TO SCALE



GUTTER DOWNSPOUT DETAIL

@ SIDEWALK

NOT TO SCALE



FRONT ENTRY ISOMETRIC

NOT TO SCALE

STRIPING NOTES

YELLOW CURBING AND BOLLARDS	SURFACES SHOULD BE CLEAN, DRY AND METAL SURFACES FREE OF HEAVY RUST 2 COATS SHERWIN WILLIAMS - KEM 4000 ACRYLIC ALKYD ENAMEL SAFETY YELLOW B55Y300
STRIPING - PARKING LOT	SURFACES SHOULD BE CLEAN, DRY. TOP COAT SHERWIN WILLIAMS - PROMAR TRAFFIC MARKING PAINT YELLOW TM5495
HANDICAP STRIPING - PARKING LOT	SURFACES SHOULD BE CLEAN, DRY. TOP COAT SHERWIN WILLIAMS - PROMAR TRAFFIC MARKING PAINT "H.C." BLUE

DOLLAR GENERAL

NO.	DATE	DESCRIPTION	BY

Overland ENGINEERING, LLC

DOLLAR GENERAL
DAYLIGHT, INDIANA

DETAILS

SHEET C5

Supplement 2/15/22

DOLLAR GENERAL #24125
HYDRAULIC CALCS
BY: Overland Engineering LLC
Date: 2/15/2022

Rational Method, Q =CIA

Pre Project

TR 55 Method

Sheet Flow
Flow length 100 ft
Land slope 0.01 ft/ft
Manning's n 0.15 Short Grass
2 yr/24hr rainfall 3.3 in
t = 12.7 min

Shallow concentrated flow
Flow length 175 ft
Slope 0.017 ft/ft
Avg. velocity 2.10 ft/s Unpaved
t = 1.4 min

Open channel flow
Flow length 0 ft
Avg. velocity 2.0 ft/s
t = 0.0 min

Tc = 14.1

Tc (total) = 14.00 min

Intensity $_2$=	**3.51**	**in/hr**
Intensity $_{10}$=	**4.65**	**in/hr**

Weighted Runoff C

c_1 =	0.94	Paved Areas
A_1 =	0.00	
c_2 =	0.12	Grass/Lawns
A_2 =	1.34	

Drain Area Total = 1.34 acres

$c_{(composite)}$ = 0.12

Q_2 =	0.56	cfs
Q_{10} =	0.75	cfs

Post Project

TR 55 Method

Sheet Flow
Flow length 40 ft
Land slope 0.01 ft/ft
Manning's n 0.011 Pavement
2 yr/24hr rainfall 3.3 in
t = 0.8 min

Shallow concentrated flow
Flow length 150 ft
Slope 0.01 ft/ft
Avg. velocity 2.03 ft/s PAVED
t = 1.2 min

Open channel flow
Flow length 240 ft
Avg. velocity 2.0 ft/s
t = 2.0 min

Tc = 4.0

Tc (total) = 5.00 min (use 5 minute min.)

Intensity $_2$=	**5.02**	**in/hr**
Intensity $_{10}$=	**6.66**	**in/hr**
Intensity $_{25}$ =	**7.81**	**in/hr**
Intensity $_{50}$ =	**8.82**	**in/hr**
Intensity $_{100}$ =	**9.95**	**in/hr**

Weighted Runoff C

c_1 =	0.92	Paved Areas
A_1 =	0.93	
c_2 =	0.15	Open Spaces
A_2 =	0.41	

Area Total = 1.34 acres

$c_{(composite)}$ = 0.68

Q_2 =	4.57	cfs
Q_{10} =	6.07	cfs
Q_{25} =	7.12	cfs
Q_{50} =	8.04	cfs
Q_{100} =	9.07	cfs

25 year - Using $Q10_{pre}$ as allowable outflow

Rainfall Duration (min)	25 yr Rainfall Intensity (in/hr)	Inflow Rate (in-acre/hr)	Allowable Max Outflow (cfs)	Required Storage	Det Volume (acre-ft)	Det Volume (ft^3)
0	—	—	—	—	—	—
5.00	7.81	7.12	0.75	6.37	0.04	1,927
6.00	7.51	6.84	0.75	6.10	0.05	2,213
7.00	7.21	6.57	0.75	5.82	0.06	2,466
8.00	6.91	6.30	0.75	5.55	0.06	2,686
9.00	6.61	6.02	0.75	5.28	0.07	2,872
10.00	6.32	5.76	0.75	5.01	0.07	3,032
11.00	6.10	5.56	0.75	4.81	0.07	3,201
12.00	5.88	5.36	0.75	4.61	0.08	3,347
13.00	5.66	5.16	0.75	4.41	0.08	3,468
14.00	5.44	4.96	0.75	4.21	0.08	3,565
15.00	5.24	4.77	0.75	4.03	0.08	3,654
17.50	4.92	4.48	0.75	3.74	0.09	3,955
20.00	4.60	4.19	0.75	3.44	0.10	4,167
25.00	3.80	3.46	0.75	2.71	0.09	4,106
30.00	3.31	3.02	0.75	2.27	0.09	4,117
40.00	2.58	2.35	0.75	1.60	0.09	3,880
45.00	2.31	2.10	0.75	1.36	0.08	3,695
50.00	2.08	1.90	0.75	1.15	0.08	3,471
60.00	1.95	1.78	0.75	1.03	0.09	3,736
90.00	1.67	1.52	0.75	0.77	0.10	4,214
120.00	1.37	1.25	0.75	0.50	0.08	3,635
180.00	1.02	0.93	0.75	0.18	0.05	1,979
240.00	0.82	0.75	0.75	0.00	0.00	-8

Detention Vol Reqd = Maximum = **4,214**

Detention Volume Provided

CONIC VOLUME			
Water Surface Elevation ft (input)	Corresponding Contour Area square feet (input)	Volume above Datum acre-ft (output)	Volume above Datum Cubic Feet (output)
391.0	0	0.000	0
392.0	5,194	0.060	2,597
393.0	10,306	0.238	10,347

Required Storage Elevation with 10% Additional for Sedimentation

$ELEV_{10}$ =	392.27 ft	Total Volume = 4690 c.f.

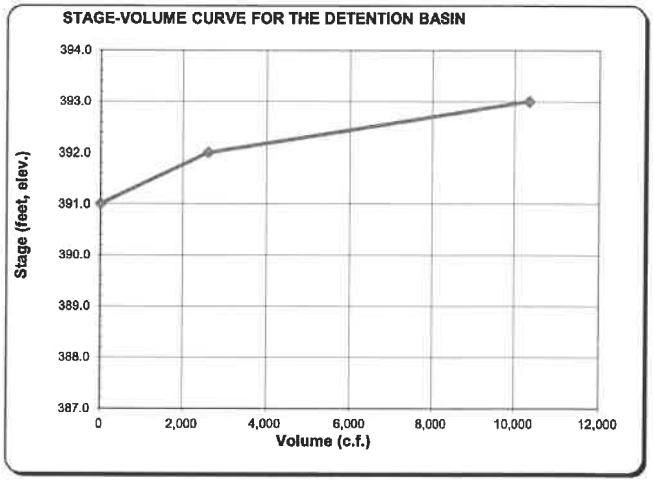
Outlet Structure Design

Inputs

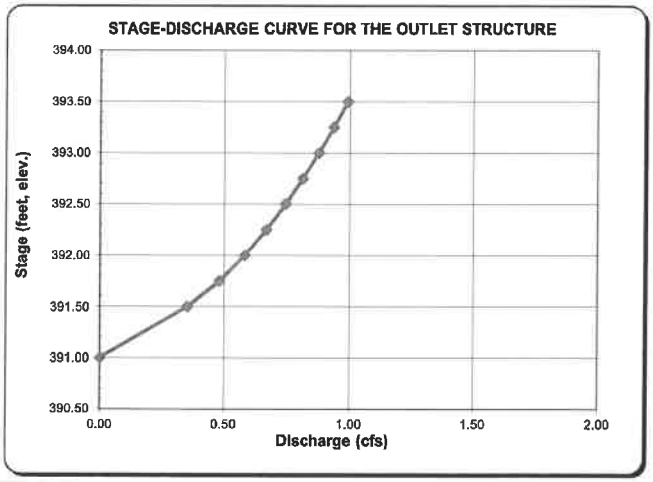
Low Flow	
5" Orifice @ 391.21	
	cfs
391.00	0.00
391.50	0.35
391.75	0.48
392.00	0.58
392.25	0.67
392.50	0.74
392.75	0.81
393.00	0.88
393.25	0.94
393.50	0.99

Weir 1	
L=	6.00
C_w =	2.70
E_o =	393.50

Manning's n-values	
PVC	0.012
PE (<9"dia)	0.015
PE (>12"dia)	0.02
PE(9-12"dia)	0.017
CMP	0.024
ADS N12	0.012
CMP	0.024
Conc	0.013



Rating Curve of Outlet Structure			
	Q1	Q2	Resulting
	Low Flow	Weir Flow	Flow
Elevation	cfs	cfs	
391.00	0.00	0.00	0.00
391.50	0.35	0.00	0.35
391.75	0.48	0.00	0.48
392.00	0.58	0.00	0.58
392.25	0.67	0.00	0.67
392.50	0.74	0.00	0.74
392.75	0.81	0.00	0.81
393.00	0.88	0.00	0.88
393.25	0.94	0.00	0.94
393.50	0.99	0.00	0.99



Compare Outflow Elevation to Required Storage Elevation					
	Max Outflow	Occurs at	Required	At or above	
	cfs	Elevation	Elevation	req.?	
$Q_{10\ allowable}$=	0.75	392.51	392.27	YES	

Detention Basin Maintenance Plan
Dollar General
12100 SR57

The detention basin proposed for the southern portion of the project site includes 4,758 c.f. of storage volume, a concrete liner, a pvc pipe outlet, and a riprap emergency overflow spillway. The concrete liner is intended to provide positive drainage to the pvc pipe outlet, minimizing wet areas in the bottom of the basin. The pvc outlet pipe is the primary control and will function to drain the basin during normal rainfall events. The riprap overflow spillway will function only during major storm events when the capacity of the pvc outlet pipe is unable to convey the peak runoff.

Routine maintenance of the detention basin shall Include:

Inspections: Monthly inspections and inspections after major rainfall events to check for obstructions/damage & to remove debris/ trash.

Vegetation Management: Mowing on a regular basis to prevent erosion and aesthetic problems. Collect grass clippings and all other clippings/trimmings and take offsite for disposal or dispose in trash on site; do not leave in the pond. Remove vegetation adjacent to outlet works that may interfere with operation; note if noxious weeds present and schedule treatment/removal. Limit use of fertilizers and pesticides in and around the ponds to minimize entry into pond and subsequent downstream waters.
Trash, debris and litter removal: Removal of any trash, etc causing any obstructions at the inlet or outlet during and especially after every runoff producing rainfall event. General pickup of trash, etc in and around the pond during all inspections.

Structural Component check: Inspection of the inlet and outlet on a regular basis for additions to the annual Non-routine Maintenance list

Non-routine maintenance shall Include:

Bank erosion/stabilization: It is critical to keep effective ground cover on all vegetated areas in order to see the benefits of proper infiltration of runoff, and effective filtering of pollutants. All areas not vegetated should be re-vegetated and stabilized immediately

Sediment removal: Every six months or so, the accumulated sediment should be removed from the bottom of the basin. When the depth of the accumulated sediment is 10% (330 c.f.) of the original design volume, sediment should be removed.

Structural Repair/Replacement: Repair or replacement of the inlet and outlet as necessary.