

ADDENDUM TO THE MASTER DEVELOPMENT DRAINAGE REPORT FOR DUBLIN COMMONS

SEPTEMBER 2017

Prepared for:

Powers Dublin Development Company
13 S. Tejon St., Suite 200
Colorado Springs, Co 80903

Prepared By:

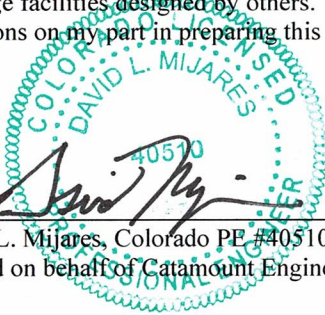


321 W. Henrietta Ave, Suite A
PO BOX 221
Woodland Park, CO 80863
719-426-2124

**AMMENDMENT TO THE MASTER DEVELOPMENT DRAINAGE
REPORT FOR DUBLIN COMMONS**

Engineer's Statement:

This report and plan for the drainage design of DUBLIN COMMONS was prepared by me (or under my direct supervision and is correct to the best of my knowledge and belief. Said report and plan has been prepared in accordance with the City of Colorado Springs Drainage Criteria Manual and is in conformity with the master plan of the drainage basin. I understand that the City of Colorado Springs does not and will not assume liability for drainage facilities designed by others. I accept responsibility for any liability caused by any negligent acts, errors or omissions on my part in preparing this report.



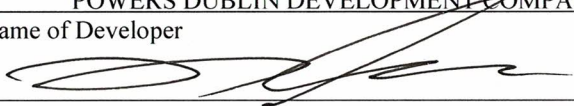
David L. Mijares, Colorado PE #40510
For and on behalf of Catamount Engineering

Date 3.23.18

Developer's Statement:

POWERS DUBLIN DEVELOPMENT COMPANY hereby certifies that the drainage facilities for DUBLIN COMMONS shall be constructed according to the design presented in this report. I understand that the City of Colorado Springs does not and will not assume liability for the drainage facilities designed and/or certified by my engineer and that are submitted to the City of Colorado Springs pursuant to section 7.7.906 of the City Code; and cannot, on behalf of POWERS DUBLIN DEVELOPMENT COMPANY, guarantee that final drainage design review will absolve DUBLIN COMMONS and/or their successors and/or assigns of future liability for improper design. I further understand that approval of the final plat does not imply approval of my engineer's drainage design.

POWERS DUBLIN DEVELOPMENT COMPANY
Name of Developer



Authorized Signature

R. GARDINER

Printed Name

V. PRAE

Title

Address: 13 S. TEJON, SUITE 200
COLORADO SPRINGS, CO 80903

City of Colorado Springs Only:

Filed in accordance with Section 7.7.906 of the Code of the City of Colorado Springs, 2001, as amended.



For the City Engineer

3/28/2018
Date

Conditions:

ADDENDUM TO THE MASTER DEVELOPMENT DRAINAGE REPORT FOR DUBLIN COMMONS

PURPOSE

The purpose of this drainage report is to modify the water quality scenario developed in the original MDDP. Specifically this report will divert easterly portions of the site within the Sand Creek Basin into the Cottonwood Creek Basin, eliminating extended detention basins 2 and 3. Existing detention basin 4 will be expanded to allow for additional tributary area and meet current City of Colorado Springs criteria for full-spectrum detention.

GENERAL LOCATION AND DESCRIPTION

Location:

The proposed development is located within the western ½ of Section 18, Township 13 South, Range 65 West of the 6th principal meridian in the city of Colorado Springs, county of El Paso.

The site is located within the Sand Creek and Cottonwood Creek Drainage Basin. The major basin boundary is created by the vacated portion of Templeton Gap Road which bisects the site from South to North.

The site is bounded to the west by Powers Boulevard, to the North by Dublin Boulevard, to the east by Tutt Boulevard, and to the South by Ridgeview Business Center Filing No. 1A

Description of Property:

The subject property consists of 29.57 that has been overlot graded in accordance with the original overlot grading plan and temporary sedimentation facilities installed. Development has occurred within the northern portions of the site within both the Cottonwood Creek and Sand Creek Basins. The northeast portion of the site is tributary to existing Extended Detention Basin 1 and outfalls to storm drain within Tutt Boulevard and the Sand Creek Basin and will not be altered in this amendment.

The remainder of the development drains to the south and will be conveyed to revised extended detention basin 4 at the southwest corner of the development.

Existing soils on the site consist entirely of Blakeland loamy sand (Map Symbol '8') as determined by the USDA SCS Soil Survey of El Paso County Area, Colorado. Characteristics of the on-site soils, as listed in the SCS Soil Survey, are moderate permeability, high available water capacity, low runoff potential, and a slight hazard of erosion. Blakeland loamy sand is characterized as a Hydrologic Group 'A' Soil.

Floodplain Statement:

No portion of the development lies within an F.E.M.A. designated floodplain per FIRM 08041C0537 F or 08041C0536 F, effective March 17, 1997. The F.E.M.A. Flood Insurance Rate Maps have been provided in the appendix.

DRAINAGE BASINS AND SUB-BASINS

Major Basin Descriptions:

The proposed development is included within the Sand Creek Drainage Basin Planning Study completed by Kiowa Engineering dated March 1996 and the Master Development Drainage Plan for Ridgeview Subdivision completed by URS Greiner dated October 1998. The property's and surrounding development's general drainage pattern is defined by the Final Drainage Report and Erosion Control Plan for Tutt Boulevard Ridgeview at Stetson Hills Filing No. 15 by URS, revised August 02, 2001.

The site and adjacent areas west of Tutt Boulevard are zoned PBC with substantial portions of the overall development completed.

The portion of the site east of the vacated Templeton Gap roadway is proposed in the final drainage report for Tutt Boulevard to drain to the east into the existing Tutt Boulevard storm system. Upon collection within the Tutt Boulevard storm drain system runoff is conveyed south to improved facilities adjacent to Stetson Hills Boulevard which outfall to Sand Creek.

The portion of the site tributary to the Cottonwood Creek Drainage Basin and west of the vacated Templeton Gap roadway is identified as within DBPS Basin H2. Basin H2 as represented in the DBPS was much larger, 67.7 acres and a developed flow of 286.4 cfs was proposed for the 100-yr event. The majority of proposed flow was diverted into the Sand Creek Basin with the construction of Tutt Boulevard and associated storm systems. DBPS Basin H2 historically drains to an existing triple 48" CMP crossing Powers Boulevard. The DBPS developed by Ayers and Associates for Cottonwood Creek did not refine the hydrology presented in the DBPS developed by URS for basin H2, and both reports propose a 72" RCP storm system to convey developed flows from basin H2 to DBPS design point 13D at the intersection of Templeton Gap and Apaloosa Drive. Although the DBPS allows for undetained release from basin H2 release to the Powers Crossing is limited to $Q_5 = 49$ cfs, $Q_{100} = 85$ cfs per the Ridgeview Filing No. 15 (Tutt Blvd) Final Drainage Report until the downstream conveyance to Cottonwood Creek is in place.

The current deficient downstream infrastructure is detailed in the Final Drainage Report for Sundown Villas by Leigh Whitehead & Associates, dated September 1999. The Sundown Villas report accepts flows of $Q_5 = 41.6$ cfs, $Q_{100} = 88.6$ cfs from the triple 48" CMP crossing of Powers Boulevard into a single 42" HDPE constructed with the development

DEVELOPED DRAINAGE BASINS-EXTENDED DETENTION BASIN 4

Basins B and D will be conveyed to the southwest corner of the development and be captured in extended detention basin 4. Extended detention basins 2 and 3 proposed in the initial master development drainage plan will be eliminated. MDDP Basins A-1 and A-2 will remain tributary to extended detention basin 4.

BASIN A

Basin A1 (9.3 acres, $Q_5 = 24$ cfs, $Q_{100} = 42$ cfs) consist of existing commercial development and undeveloped parcels to be collected on site and routed to a privately owned and maintained extended detention basin at DP-9 prior to release to the triple 48" CMP crossing of Powers Boulevard. Runoff generated within Basin A1 is collected in the existing inlet and storm system constructed with the development of Dublin Commons Filing No. 3. Runoff from Basin A1 is conveyed in an existing 36" HDPE storm sewer and outfalls into a forebay sized for developed flows from Basin A1 only.

Basin A2 (4.5 acres, $Q_5 = 14$ cfs, $Q_{100} = 27$ cfs) consists of future development to be collected on site and conveyed by the existing storm drain constructed with Dublin Commons Filing No. 3 to a privately owned and maintained extended detention basin at DP-9 prior to release to the triple 48" CMP crossing of Powers Boulevard. Development of storm sewer conveyance, outfall, and forebay to the extended detention basin at DP-9 within Basin A will be analyzed and constructed with future development of the basin.

BASIN B

Basin B (3.5 acres, $Q_2=10.9$ cfs, $Q_5=14.0$ cfs, $Q_{10}=16.7$ cfs, $Q_{25}=19.5$ cfs, $Q_{50}=22.5$ cfs, and $Q_{100}=25.5$ cfs) consists of future commercial development to be collected within a private inlet and storm drain system on-site and routed to privately owned and maintained extended detention basin 4. Storm conveyance, outfall, and forebay within Basin B will be analyzed and constructed with future development of the basin.

BASIN D

Basin D (6.5 acres, $Q_2=18.0$ cfs, $Q_5=23.1$ cfs, $Q_{10}=27.6$ cfs, $Q_{25}=32.3$ cfs, $Q_{50}=37.2$ cfs, and $Q_{100}=42.1$ cfs) consists of future commercial development to be collected within a private inlet and storm drain system and routed to privately owned and maintained extended detention basin 4 prior to outfall into the existing triple 48" CMP crossing of Powers Boulevard. Storm conveyance, outfall, and forebay within Basin D will be analyzed and constructed with individual filing development.

IMPERVIOUS CALCULATION

Impervious analysis for development tributary to the pond was taken from coverage calculations within the "site data tables" in approved or in-process development plans where available. Developed and planned parcels exhibited an average impervious percentage of 81.9%.

Unplanned parcels were assumed to be developed with 88% impervious surface. The following table illustrates final impervious calculation:

LOT	USE	CALCULATION METHOD	AREA SF	IMPERVIOUS PERCENTAGE
3	CHICK-FILL-A	DP IN PROGRESS	73,531	82.6
4	DC FILING 3	DP-APPROVED	94,359	74.6
5	DC FILING 2	DP-APPROVED	124,582	84.5
6	DC FILING 5	DP-IN PROGRESS	149,872	84.4
7	UNPLANNED	90% ASSUMED	45,056	88.0
8	MEDICAL	DP-IN PROGRESS	72,756	76.8
9	UNPLANNED	90% ASSUMED	121,131	88.0
10	UNPLANNED	90% ASSUMED	68,591	88.0
11	UNPLANNED	90% ASSUMED	45,810	88.0
12	UNPLANNED	90% ASSUMED	45,783	88.0
13	UNPLANNED	90% ASSUMED	41,205	88.0
14	PUBLIC STORAGE	DP IN PROGRESS	79,287	70.5
FILING NO. 1	ROADS	DP APPROVED	21,615	100.0
			WEIGHTED IMPERVIOUS %	83.1%

See exhibit in appendix.

EXTENDED DETENTION BASIN 4

Proposed EDB '4' will be modified to accommodate current city criteria requiring full spectrum detention and allow for diversion of Basins 'B' and 'D' into the Cottonwood Creek Basin. Tributary basins were modeled as 83.1% impervious. Combined runoff at design point 9 is $Q_2=45.4$ cfs, $Q_5=58.2$ cfs, $Q_{10}=69.5$ cfs, $Q_{25}=81.4$ cfs, $Q_{50}=93.7$ cfs, and $Q_{100}=106.1$ cfs. Proposed EDB '4' will require a WQCV of 0.887 acre-feet and 4.307 acre-ft. of storage. The EDB will be designed to meet current Urban Drainage design criteria for forebay, outfall structure, and micropool to be presented in final construction drawings for the development. Proposed EDB '4' will outfall through the existing 30" HDPE storm sewer to the existing triple 48" crossing of Powers Boulevard. Outfall from the basin will be constrained to existing runoff generated within Basin E1 of ($Q_2=1.2$ cfs, $Q_5=4.3$ cfs, $Q_{10}=8.9$ cfs, $Q_{25}=16.6$ cfs, $Q_{50}=22.3$ cfs, and $Q_{100}=29.0$ cfs) to Design Point 10. The existing outlet and micropool will be removed and reconstructed to allow for increased tributary area and ponding depth. The micropool will require 70 sf of surface area. The existing 30" HDPE pipe will remain in place and the box outlet will require a restrictor plate 4" above the pipe invert. The existing outlet riprap dissipater constructed with original pond improvements will remain. The emergency spillway will consist of a 30' wide trapezoidal weir constructed of soil riprap conveying the undetained 100-YR flow at a maximum depth of 0.68'. Emergency overflow will be directed to the existing triple 48" crossing of Powers Boulevard. See Appendix for calculations.

DRAINAGE DESIGN CRITERIA

This drainage report was prepared in accordance to the criteria established in the City of Colorado Springs Drainage Criteria Manual Volumes 1 and 2, as revised May 2014.

The rational method for drainage basin study areas of less than 100 acres was utilized in the analysis. For the Rational Method, flows were calculated for the 2, 5, 10, 25, 50, and 100-year recurrence intervals. The average runoff coefficients, 'C' values, are taken from Table 6-6 and the Intensity-Duration-Frequency curves are taken from Figure 6-5 of the City Drainage Criteria Manual. Time of concentration for overland flow and storm drain or gutter flow are calculated per Section 3.2 of the City Drainage Criteria Manual. Calculations for the Rational Method are shown in the Appendix of this report. Calculations from the UD-Detention spreadsheet were utilized in analysis of extended detention basin 4.

DRAINAGE FEES

Drainage fees within the Cottonwood Creek Basin will be presented in development of individual filings.

COST ESTIMATE

Cost estimates for public and private improvements will be presented in the development of individual filings.

REFERENCES:

City of Colorado Springs Drainage Criteria Manual, revised May 2014

Sand Creek Drainage Basin Planning Study (DBPS), prepared by Kiowa Engineering, dated March 1996

Master Development Drainage Plan for Ridgeview Subdivision (MDDP), prepared by URS Greiner Woodward Clyde Inc., dated October 1998

Final Drainage Report and Erosion Control Plan for Tutt Boulevard/Ridgeview at Stetson Hills Filing No. 15, prepared by URS, revised August 2001

Construction Set Tutt Boulevard Filing No. 5, prepared by URS, dated May 21, 2001

Cottonwood Creek Drainage Basin Planning Study (DBPS), prepared by URS Consultants, dated June 9, 1994

Cottonwood Creek Drainage Basin Planning Study (DBPS), prepared by Ayres Associates, dated June 2000

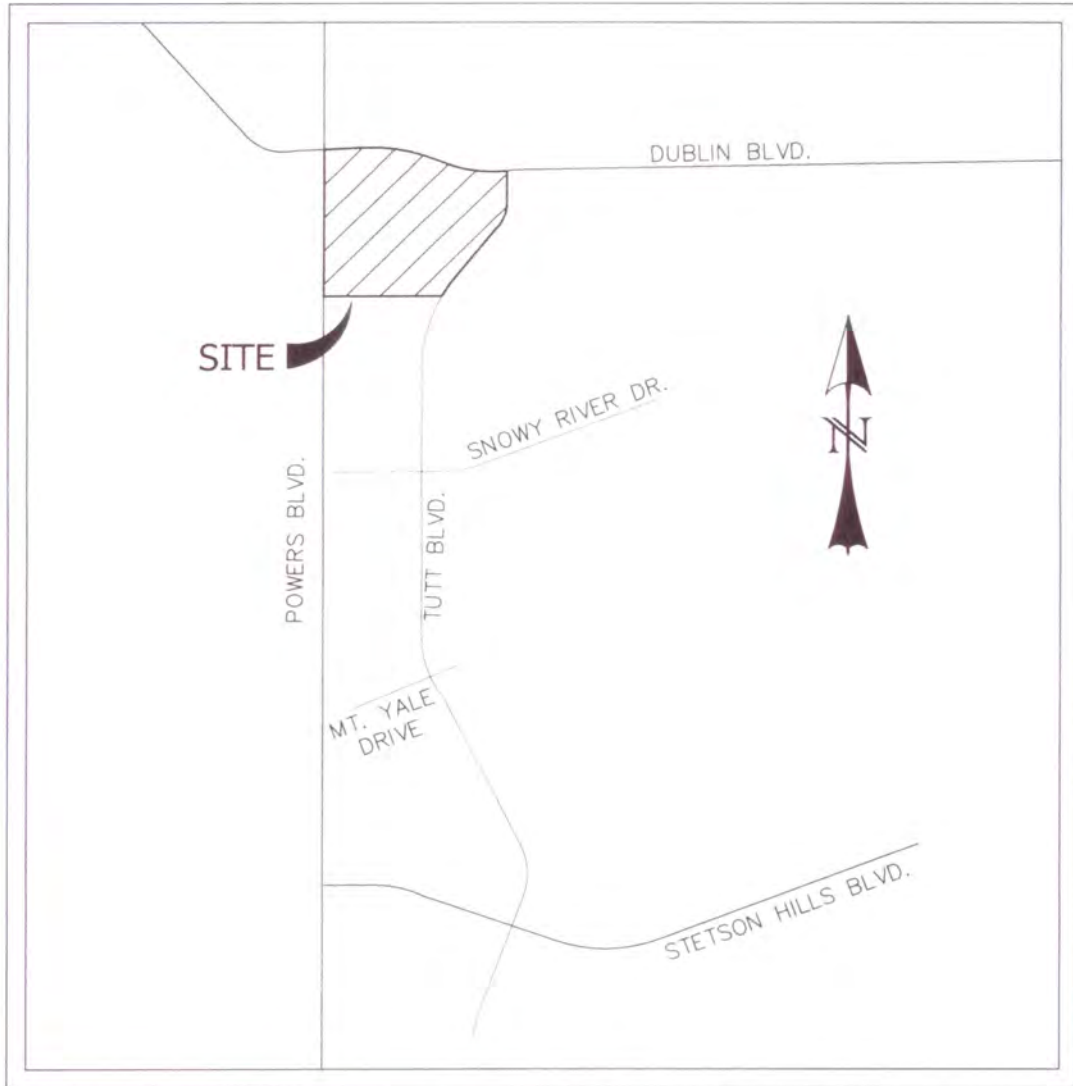
Final Drainage Report for Sundown Villas, prepared by Leigh Whitehead and Associates Inc., dated September 1999

Final Drainage Report for Dublin Boulevard Filing No. 3, prepared by Matrix Design Group, revised July 16, 2002.

Flood Insurance Rate Map Number 08041C0537 F, effective date march 17, 1997

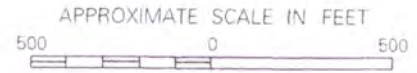
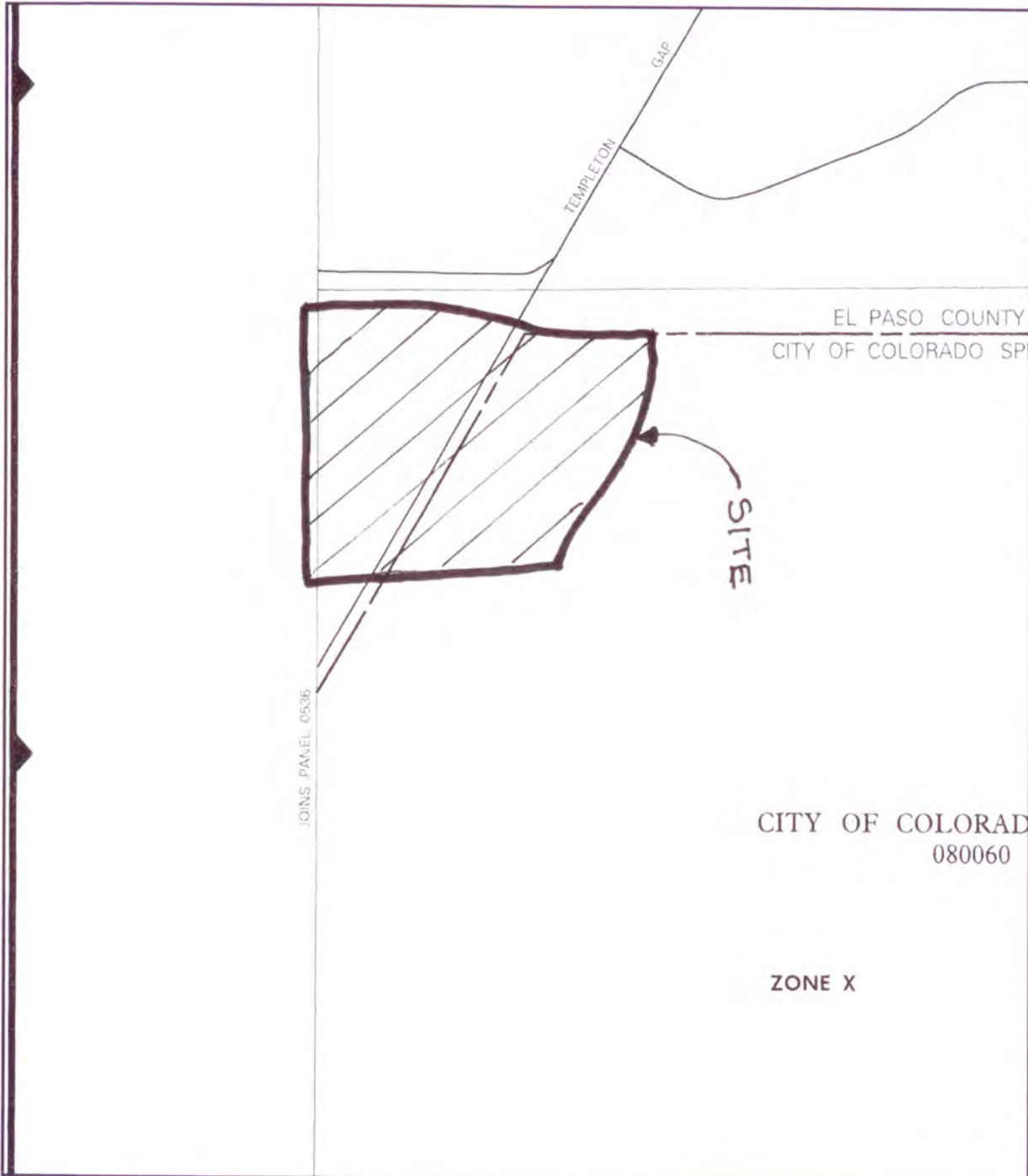
Soil Map-El Paso County Area, Colorado, generated from the Natural Resources Conservation Service Web Soil Survey, generated 10/25/2009

APPENDIX



VICINITY MAP
SCALE: N.T.S.

CATAMOUNT ENGINEERING <small>PO BOX 692E DIVIDE, CO 80814 (719) 337-8351</small>	DUBLIN COMMONS	SCALE: NTS	DATE: 12/03/12
		JOB NO.: 12-025	SHEET: 1 OF 1



NATIONAL FLOOD INSURANCE PROGRAM

**FIRM
FLOOD INSURANCE RATE MAP**

EL PASO COUNTY,
COLORADO AND
INCORPORATED AREAS

PANEL 537 OF 1300

(SEE MAP INDEX FOR PANELS NOT PRINTED)

CONTAINS COMMUNITY	NUMBER	PANEL	SUFFIX
-----------------------	--------	-------	--------

CITY OF COLORADO SPRINGS CITY OF COLORADO	080060	537	F
EL PASO COUNTY			
INCORPORATED AREAS			

**MAP NUMBER
08041C0537 F**

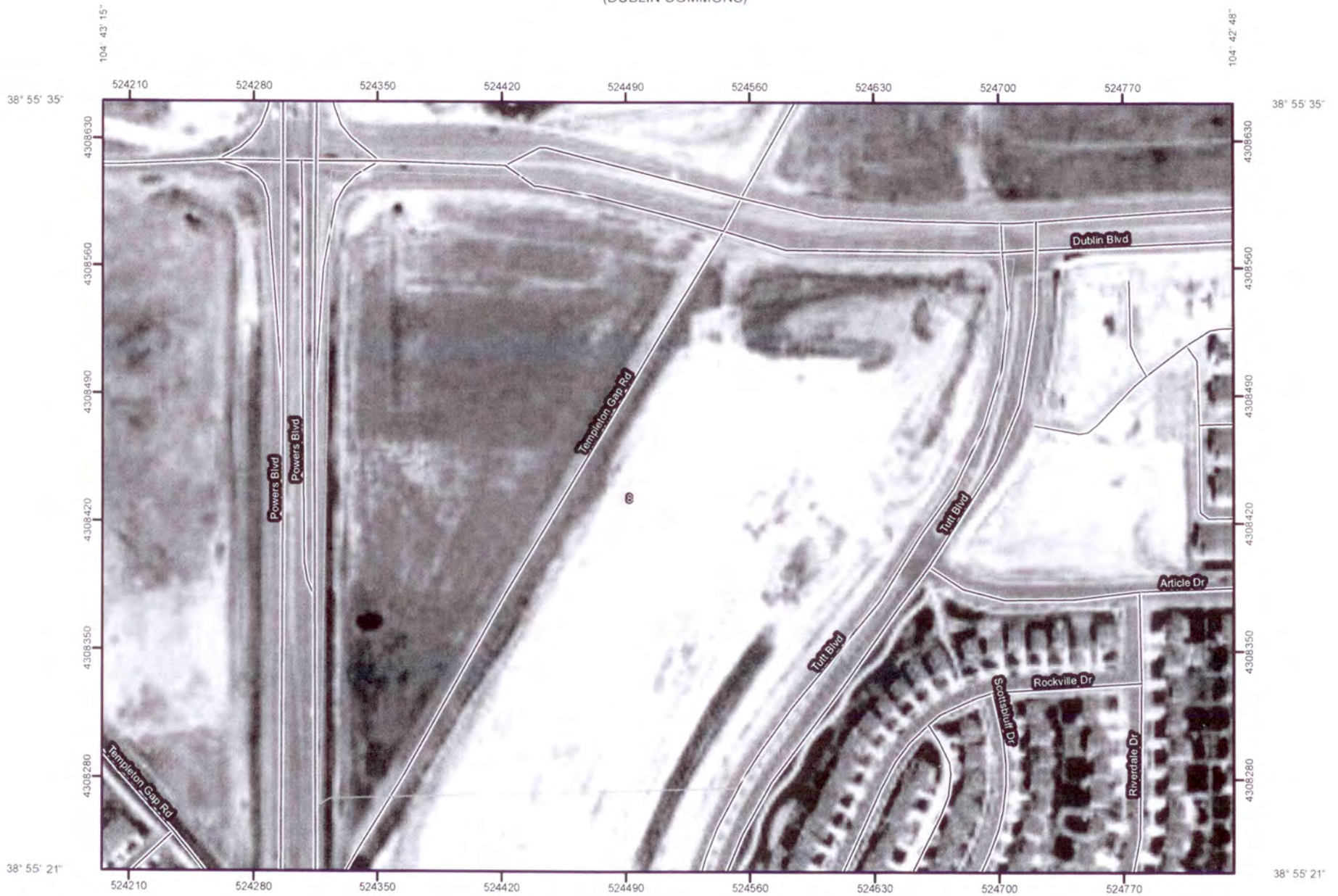
**EFFECTIVE DATE:
MARCH 17, 1997**



Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

Soil Map—El Paso County Area, Colorado
(DUBLIN COMMONS)



Map Scale: 1:3,020 if printed on A size (8.5" x 11") sheet.



Map Unit Legend

El Paso County Area, Colorado (CO625)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
8	Blakeland loamy sand, 1 to 9 percent slopes	25.9	100.0%
Totals for Area of Interest		25.9	100.0%

Report—Water Features

Water Features— El Paso County Area, Colorado										
Map unit symbol and soil name	Hydrologic group	Surface runoff	Month	Water table		Ponding			Flooding	
				Upper limit	Lower limit	Surface depth	Duration	Frequency	Duration	Frequency
				<i>Ft</i>	<i>Ft</i>	<i>Ft</i>				
8—Blakeland loamy sand. 1 to 9 percent slopes										
Blakeland	A	Low	Jan-Dec	—	—	—	—	None	—	—

Data Source Information

Soil Survey Area: El Paso County Area, Colorado
 Survey Area Data: Version 9, Sep 17, 2012

BASIN	AREA TOTAL (Acres)	CONVEYANCE TC											TT	INTENSITY						TOTAL FLOWS									
		C ₂	C ₅	C ₁₀	C ₂₅	C ₅₀	C ₁₀₀	Length	Height	TI	Length	Height	C _V	Slope	Velocity	TC	TOTAL	I ₂	I ₅	I ₁₀	I ₂₅	I ₅₀	I ₁₀₀	Q ₂	Q ₅	Q ₁₀	Q ₂₅	Q ₅₀	Q ₁₀₀
		(ft)	(ft)	(min)	(ft)	(ft)	(%)	(fps)	(min)	(min)	(in/hr)	(in/hr)	(in/hr)	(in/hr)	(in/hr)	(in/hr)	(in/hr)	(in/hr)	(in/hr)	(in/hr)	(in/hr)	(in/hr)	(in/hr)	(c.f.s.)	(c.f.s.)	(c.f.s.)	(c.f.s.)	(c.f.s.)	(c.f.s.)
E1	25.20	0.03	0.09	0.16	0.26	0.31	0.36	100	6	10.7	1461	31	5	2.1%	0.7	33.4	44.1	1.5	1.9	2.2	2.5	2.9	3.2	1.2	4.3	8.9	16.6	22.3	29.0
E2	4.40	0.03	0.09	0.16	0.26	0.31	0.36	126	3	16.3	1677	29	5	1.7%	0.7	42.5	58.8	1.2	1.5	1.7	2.0	2.2	2.5	0.2	0.6	1.2	2.2	3.0	3.9
A-1	9.30	0.79	0.81	0.83	0.85	0.87	0.88	70	4	2.6	2020 400	22 9	20 20	1.1% 2.3%	2.1 3.0	16.1 2.2	18.8 DP1-DP9	2.5	3.2	3.7	4.2	4.8	5.3	18.7	24.0	28.7	33.6	38.7	43.8
A-2	4.50	0.79	0.81	0.83	0.85	0.87	0.88	70	3	2.9	611	4	20	0.7%	1.6	6.3	9.2	3.4	4.3	5.0	5.7	6.4	7.1	12.1	15.5	18.5	21.7	25.0	28.3
B	3.50	0.79	0.81	0.83	0.85	0.87	0.88	50	1.5	2.8	520 463	10 16	20 20	1.9% 3.5%	2.8 3.7	3.1 2.1	5.9 DP2-DP9	3.9	4.9	5.7	6.6	7.4	8.3	10.9	14.0	16.7	19.5	22.5	25.5
D	6.50	0.79	0.81	0.83	0.85	0.87	0.88	70	3.5	2.8	821 163	12 2	20 20	1.5% 1.2%	2.4 2.2	5.7 1.2	8.4 DP9	3.5	4.4	5.1	5.9	6.6	7.4	18.0	23.1	27.6	32.3	37.2	42.1

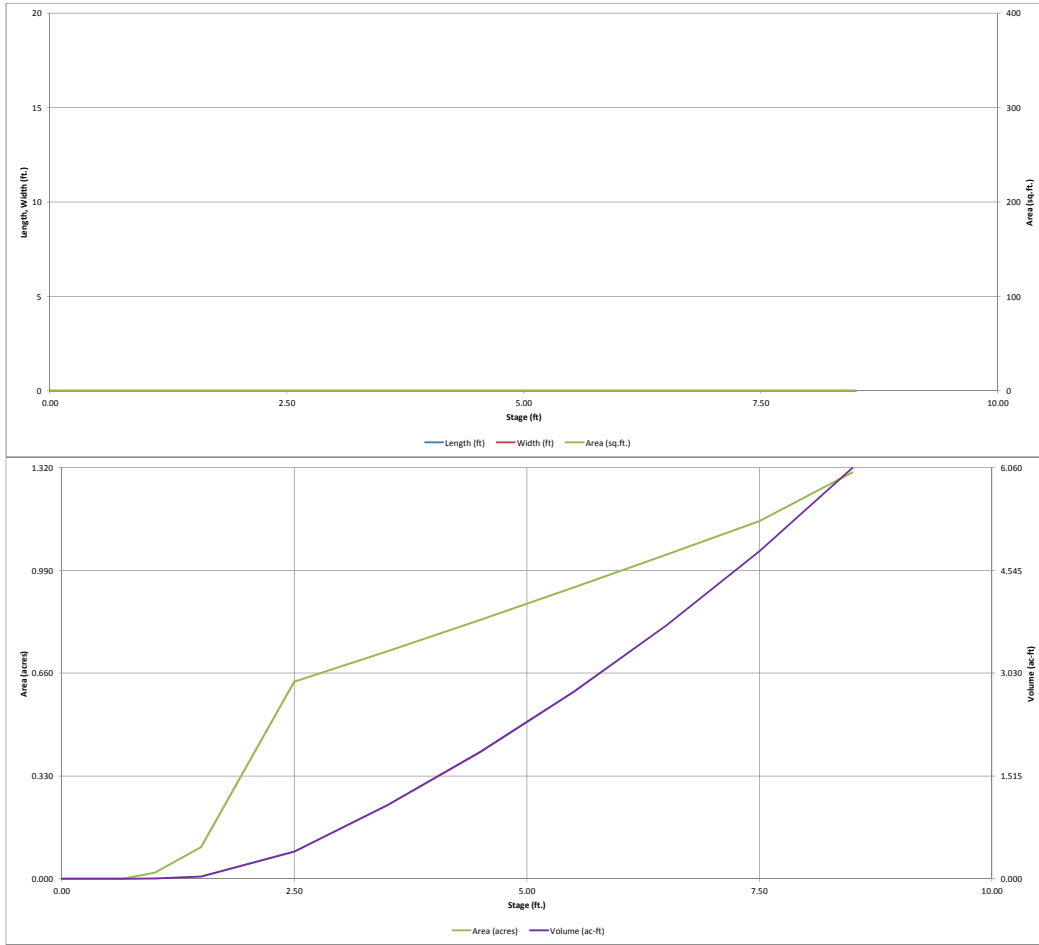
Calculated by: DLM
Date: 8/29/2017

DESIGN POINT	AREA TOTAL (Acres)	WEIGHTED						TT	INTENSITY						TOTAL FLOWS					
		C ₂	C ₅	C ₁₀	C ₂₅	C ₅₀	C ₁₀₀	TOTAL	I ₂	I ₅	I ₁₀	I ₂₅	I ₅₀	I ₁₀₀	Q ₂	Q ₅	Q ₁₀	Q ₂₅	Q ₅₀	Q ₁₀₀
								(min)	(in/hr)	(in/hr)	(in/hr)	(in/hr)	(in/hr)	(in/hr)	(c.f.s.)	(c.f.s.)	(c.f.s.)	(c.f.s.)	(c.f.s.)	(c.f.s.)
9	23.80	0.79	0.81	0.83	0.85	0.87	0.88	21.0	2.4	3.0	3.5	4.0	4.5	5.1	45.4	58.2	69.5	81.4	93.7	106.1
Basin A-1	9.30																			
Basin A-2	4.50																			
Basin B	3.50																			
Basin D	6.50																			

Calculated by: DLM
Date: 8/29/2017

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

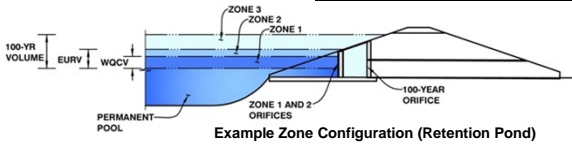
UD-Detention, Version 3.07 (February 2017)



Detention Basin Outlet Structure Design

UD-Detention, Version 3.07 (February 2017)

Project: Dublin Commons
Basin ID: Revisions to Cottonwood EDB-4



	Stage (ft)	Zone Volume (ac-ft)	Outlet Type
Zone 1 (WQCV)	2.95	0.691	Orifice Plate
Zone 2 (EURV)	5.38	1.938	Orifice Plate
Zone 3 (100-year)	6.49	1.092	Weir&Pipe (Restrict)
		3.721	Total

User Input: Orifice at Underdrain Outlet (typically used to drain WQCV in a Filtration BMP)

Underdrain Orifice Invert Depth =	N/A	ft (distance below the filtration media surface)
Underdrain Orifice Diameter =	N/A	inches

Calculated Parameters for Underdrain

Underdrain Orifice Area =	N/A	ft ²
Underdrain Orifice Centroid =	N/A	feet

User Input: Orifice Plate with one or more orifices or Elliptical Slot Weir (typically used to drain WQCV and/or EURV in a sedimentation BMP)

Invert of Lowest Orifice =	0.00	ft (relative to basin bottom at Stage = 0 ft)
Depth at top of Zone using Orifice Plate =	5.38	ft (relative to basin bottom at Stage = 0 ft)
Orifice Plate: Orifice Vertical Spacing =	N/A	inches
Orifice Plate: Orifice Area per Row =	N/A	inches

Calculated Parameters for Plate

WQ Orifice Area per Row =	N/A	ft ²
Elliptical Half-Width =	N/A	feet
Elliptical Slot Centroid =	N/A	feet
Elliptical Slot Area =	N/A	ft ²

User Input: Stage and Total Area of Each Orifice Row (numbered from lowest to highest)

	Row 1 (required)	Row 2 (optional)	Row 3 (optional)	Row 4 (optional)	Row 5 (optional)	Row 6 (optional)	Row 7 (optional)	Row 8 (optional)
Stage of Orifice Centroid (ft)	0.00	1.50	3.00					
Orifice Area (sq. inches)	3.01	3.01	7.07					

	Row 9 (optional)	Row 10 (optional)	Row 11 (optional)	Row 12 (optional)	Row 13 (optional)	Row 14 (optional)	Row 15 (optional)	Row 16 (optional)
Stage of Orifice Centroid (ft)								
Orifice Area (sq. inches)								

User Input: Vertical Orifice (Circular or Rectangular)

	Not Selected	Not Selected	
Invert of Vertical Orifice =	N/A	N/A	ft (relative to basin bottom at Stage = 0 ft)
Depth at top of Zone using Vertical Orifice =	N/A	N/A	ft (relative to basin bottom at Stage = 0 ft)
Vertical Orifice Diameter =	N/A	N/A	inches

Calculated Parameters for Vertical Orifice

	Not Selected	Not Selected	
Vertical Orifice Area =	N/A	N/A	ft ²
Vertical Orifice Centroid =	N/A	N/A	feet

User Input: Overflow Weir (Dropbox) and Grate (Flat or Sloped)

	Zone 3 Weir	Not Selected	
Overflow Weir Front Edge Height, Ho =	5.38	N/A	ft (relative to basin bottom at Stage = 0 ft)
Overflow Weir Front Edge Length =	4.00	N/A	feet
Overflow Weir Slope =	4.00	N/A	H:V (enter zero for flat grate)
Horiz. Length of Weir Sides =	6.00	N/A	feet
Overflow Grate Open Area % =	70%	N/A	%, grate open area/total area
Debris Clogging % =	50%	N/A	%

Calculated Parameters for Overflow Weir

	Zone 3 Weir	Not Selected	
Height of Grate Upper Edge, H ₁ =	6.88	N/A	feet
Over Flow Weir Slope Length =	6.18	N/A	feet
Grate Open Area / 100-yr Orifice Area =	18.04	N/A	should be ≥ 4
Overflow Grate Open Area w/o Debris =	17.32	N/A	ft ²
Overflow Grate Open Area w/ Debris =	8.66	N/A	ft ²

User Input: Outlet Pipe w/ Flow Restriction Plate (Circular Orifice, Restrictor Plate, or Rectangular Orifice)

	Zone 3 Restrictor	Not Selected	
Depth to Invert of Outlet Pipe =	0.33	N/A	ft (distance below basin bottom at Stage = 0 ft)
Outlet Pipe Diameter =	30.00	N/A	inches
Restrictor Plate Height Above Pipe Invert =	7.50		inches

Calculated Parameters for Outlet Pipe w/ Flow Restriction Plate

	Zone 3 Restrictor	Not Selected	
Outlet Orifice Area =	0.96	N/A	ft ²
Outlet Orifice Centroid =	0.37	N/A	feet
Half-Central Angle of Restrictor Plate on Pipe =	1.05	N/A	radians

User Input: Emergency Spillway (Rectangular or Trapezoidal)

Spillway Invert Stage =	6.50	ft (relative to basin bottom at Stage = 0 ft)
Spillway Crest Length =	30.00	feet
Spillway End Slopes =	4.00	H:V
Freeboard above Max Water Surface =	1.00	feet

Calculated Parameters for Spillway

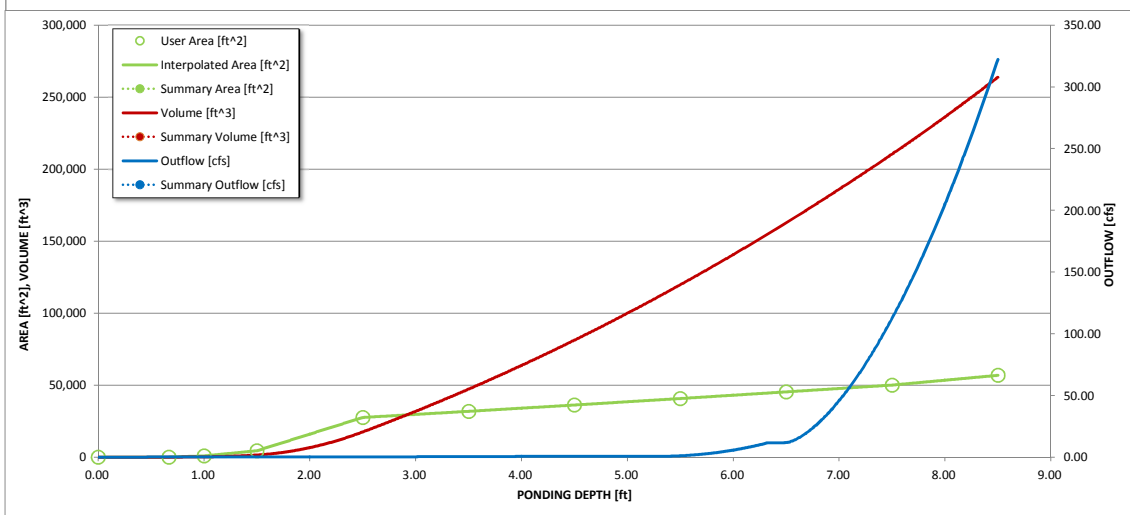
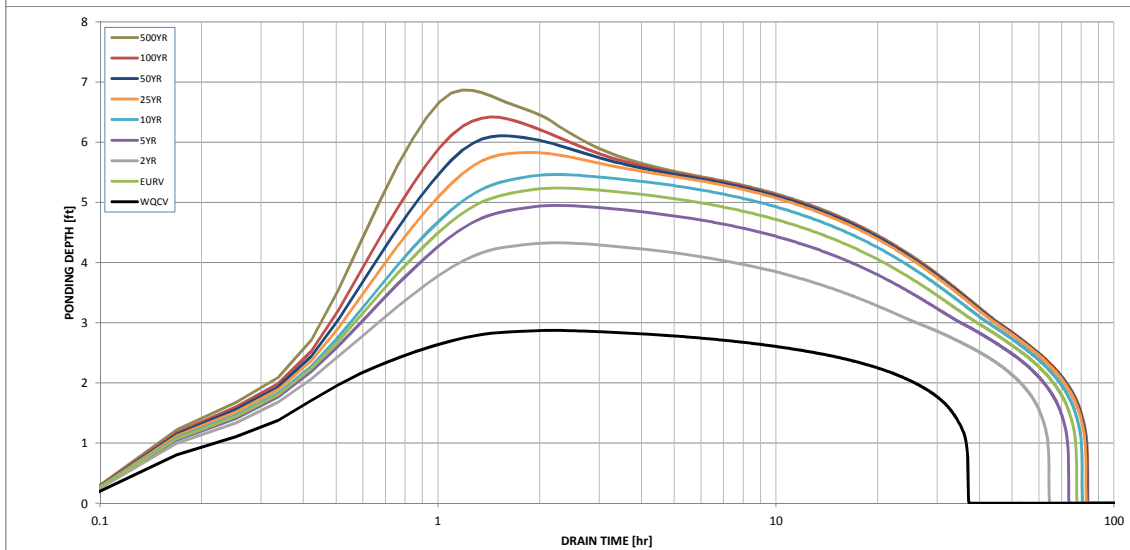
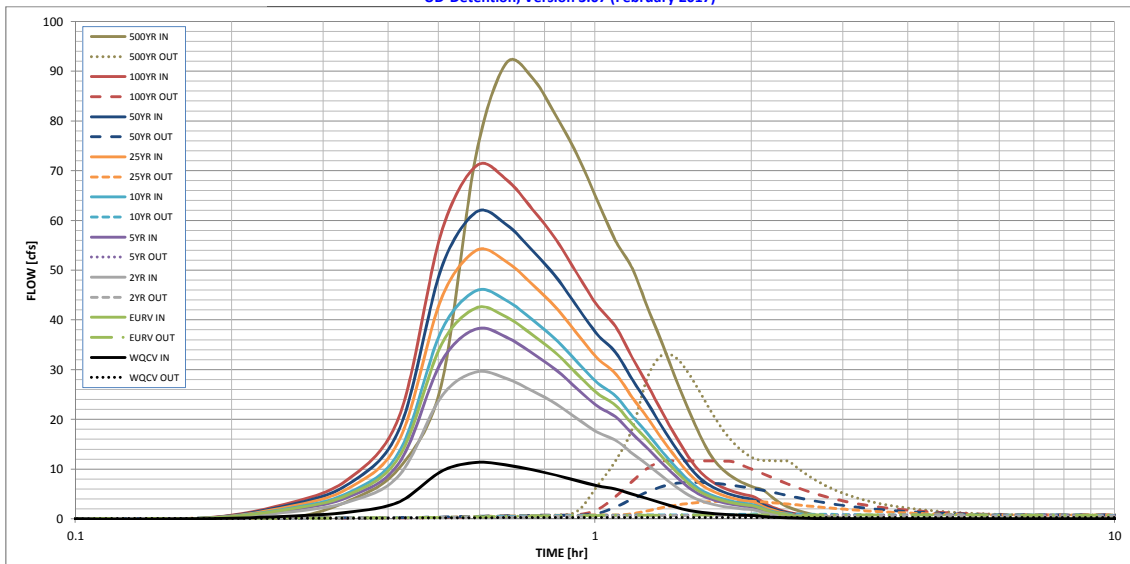
Spillway Design Flow Depth =	0.68	feet
Stage at Top of Freeboard =	8.18	feet
Basin Area at Top of Freeboard =	1.25	acres

Routed Hydrograph Results

	WQCV	EURV	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year	500 Year
Design Storm Return Period =									
One-Hour Rainfall Depth (in) =	0.53	1.07	1.19	1.50	1.75	2.00	2.25	2.52	3.14
Calculated Runoff Volume (acre-ft) =	0.691	2.629	1.822	2.364	2.847	3.358	3.845	4.437	5.768
OPTIONAL Override Runoff Volume (acre-ft) =									
Inflow Hydrograph Volume (acre-ft) =	0.690	2.627	1.820	2.362	2.845	3.355	3.843	4.434	5.759
Predevelopment Unit Peak Flow, q (cfs/acre) =	0.00	0.00	0.00	0.01	0.01	0.03	0.19	0.47	1.06
Predevelopment Peak Q (cfs) =	0.0	0.0	0.0	0.1	0.3	0.6	4.6	11.1	25.2
Peak Inflow Q (cfs) =	11.3	42.4	29.5	38.1	45.8	53.9	61.6	70.9	91.5
Peak Outflow Q (cfs) =	0.3	0.8	0.7	0.7	1.0	3.5	7.4	11.7	33.0
Ratio Peak Outflow to Predevelopment Q =	N/A	N/A	N/A	6.2	3.5	5.7	1.6	1.0	1.3
Structure Controlling Flow =	Plate	Plate	Plate	Plate	Overflow Grate 1	Overflow Grate 1	Overflow Grate 1	Outlet Plate 1	Spillway
Max Velocity through Grate 1 (fps) =	N/A	N/A	N/A	N/A	0.0	0.2	0.4	0.6	0.6
Max Velocity through Grate 2 (fps) =	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Time to Drain 97% of Inflow Volume (hours) =	35	71	59	67	73	74	74	73	71
Time to Drain 99% of Inflow Volume (hours) =	36	75	62	71	78	79	79	79	78
Maximum Ponding Depth (ft) =	2.87	5.24	4.33	4.95	5.46	5.83	6.11	6.42	6.87
Area at Maximum Ponding Depth (acres) =	0.67	0.91	0.81	0.88	0.93	0.97	1.00	1.03	1.08
Maximum Volume Stored (acre-ft) =	0.643	2.499	1.717	2.241	2.710	3.052	3.328	3.642	4.117

Detention Basin Outlet Structure Design

UD-Detention, Version 3.07 (February 2017)



S-A-V-D Chart Axis Override	X-axis	Left Y-Axis	Right Y-Axis
minimum bound			
maximum bound			

Figure 13-12c. Emergency Spillway Protection

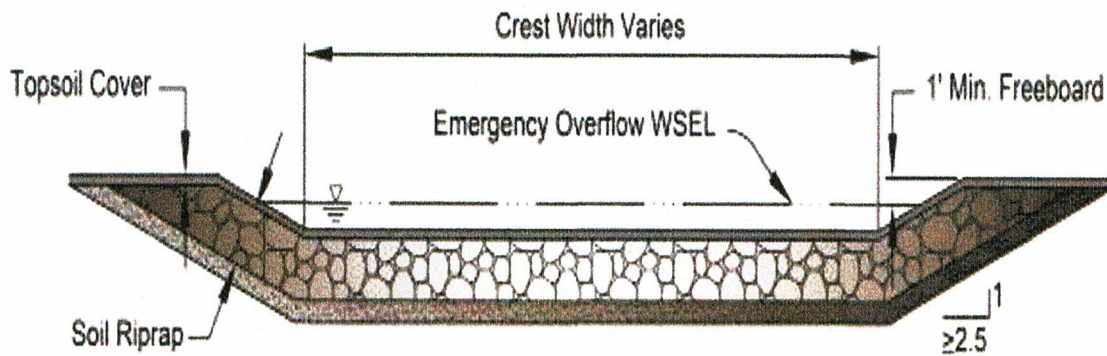
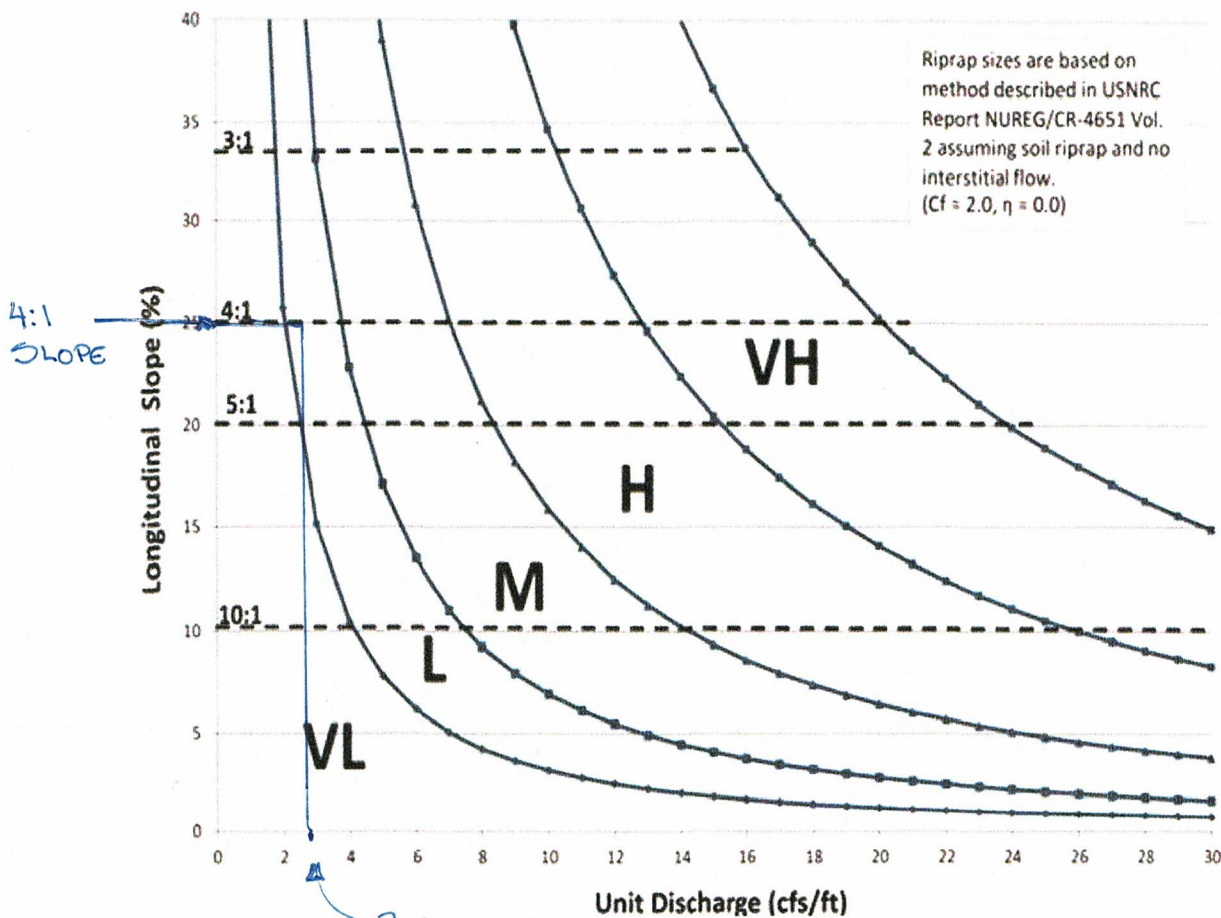
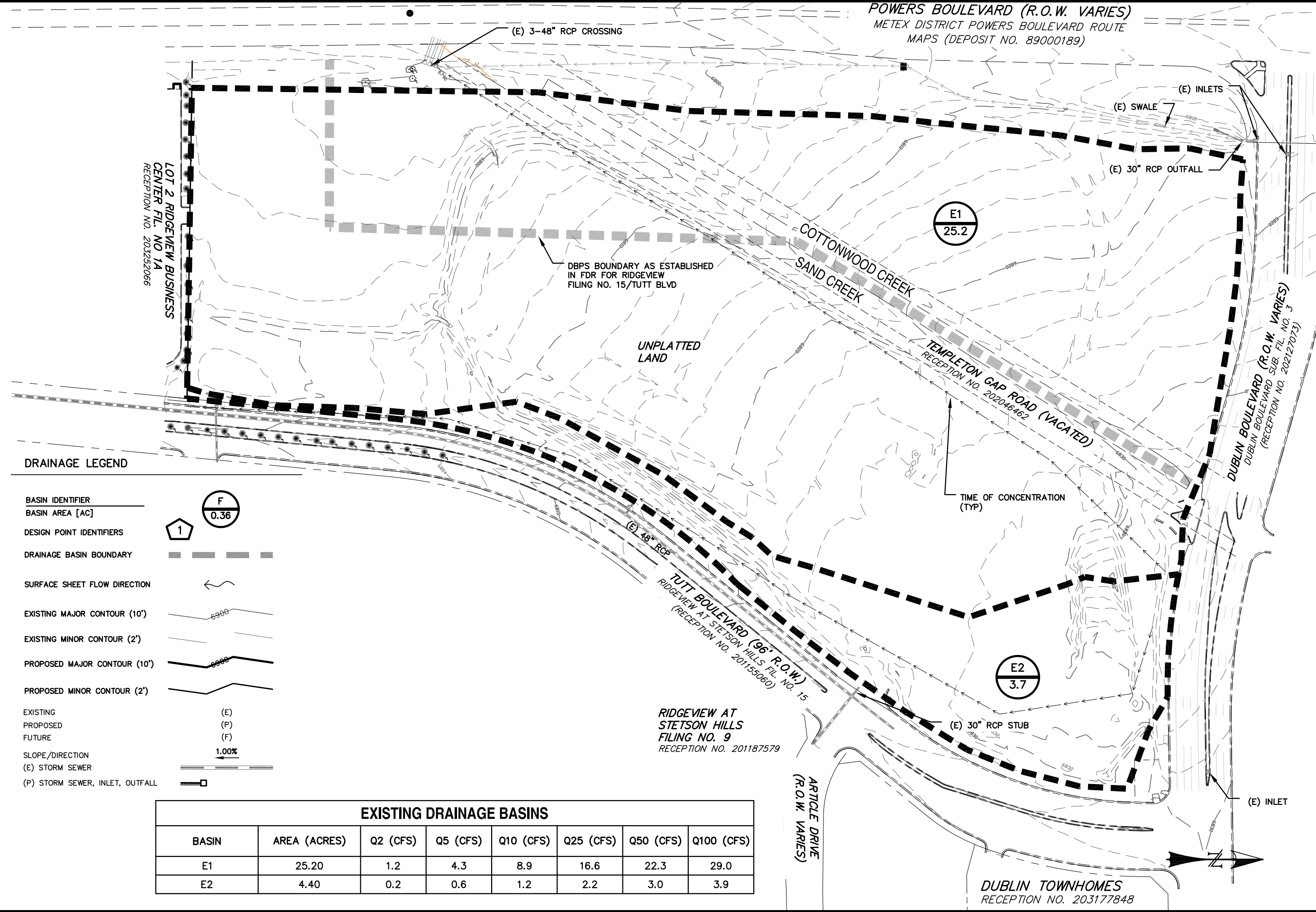


Figure 13-12d. Riprap Types for Emergency Spillway Protection



USE TYPE L SOIL RIPRAP (D₅₀ = 9")



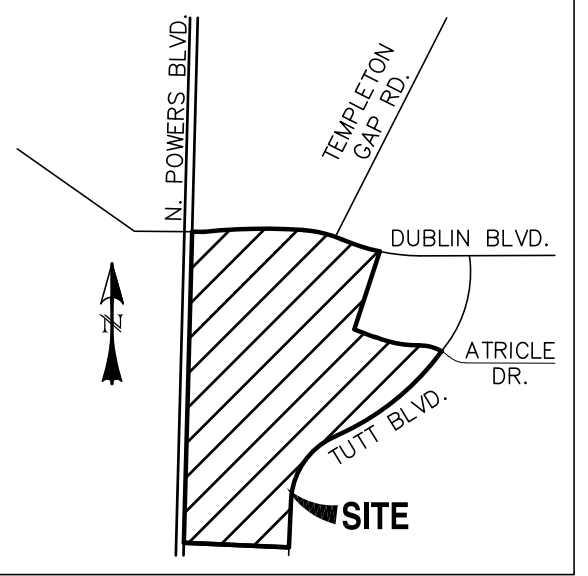
DRAINAGE LEGEND

- BASIN IDENTIFIER (F) 0.36
- BASIN AREA [AC]
- DESIGN POINT IDENTIFIERS 1
- DRAINAGE BASIN BOUNDARY
- SURFACE SHEET FLOW DIRECTION
- EXISTING MAJOR CONTOUR (10')
- EXISTING MINOR CONTOUR (2')
- PROPOSED MAJOR CONTOUR (10')
- PROPOSED MINOR CONTOUR (2')
- EXISTING (E)
- PROPOSED (P)
- FUTURE (F)
- SLOPE/DIRECTION 1.00%
- (E) STORM SEWER
- (P) STORM SEWER, INLET, OUTFALL

EXISTING DRAINAGE BASINS							
BASIN	AREA (ACRES)	Q2 (CFS)	Q5 (CFS)	Q10 (CFS)	Q25 (CFS)	Q50 (CFS)	Q100 (CFS)
E1	25.20	1.2	4.3	8.9	16.6	22.3	29.0
E2	4.40	0.2	0.6	1.2	2.2	3.0	3.9

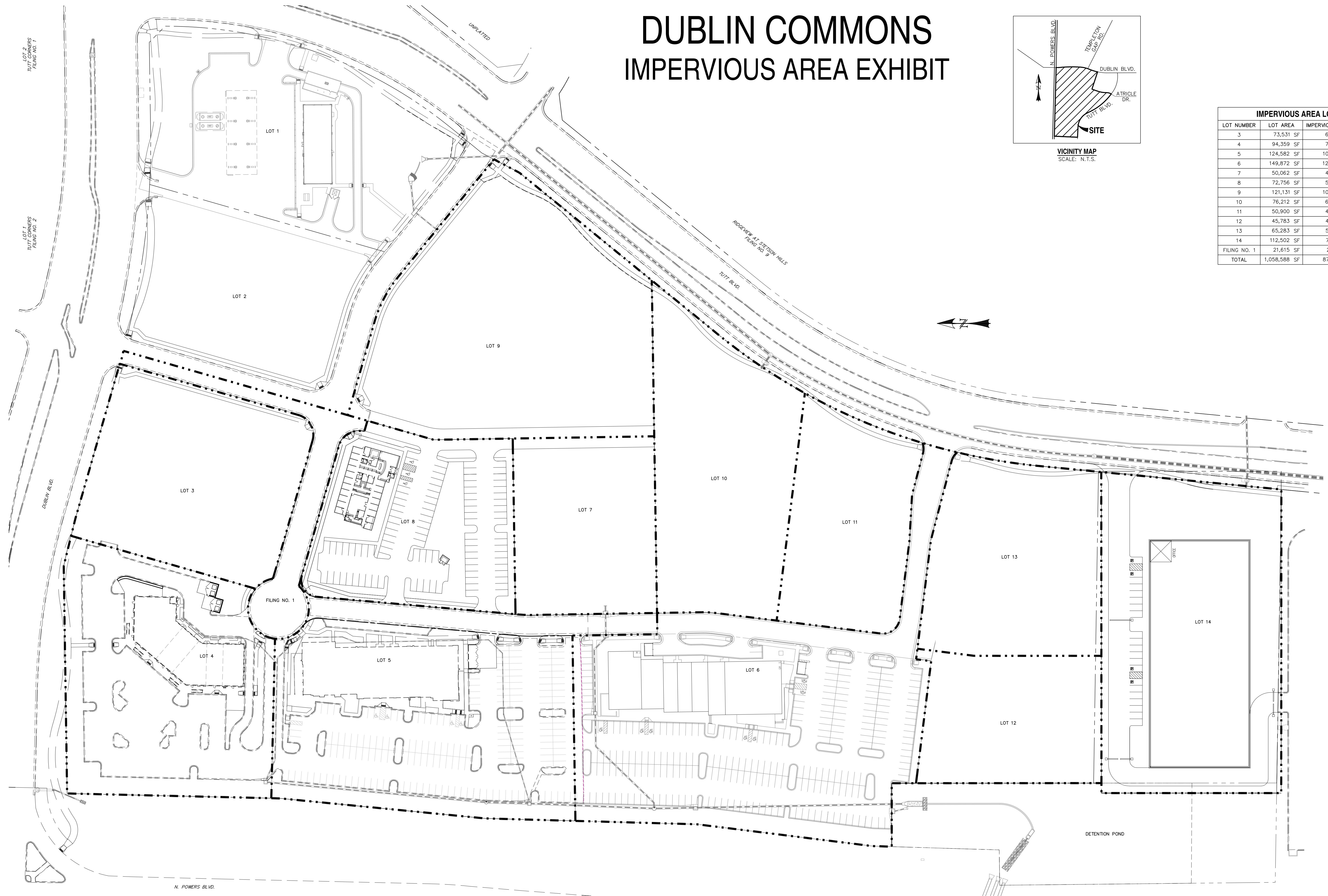
DRAWN BY: DLM	DATE: 8/29/17	SHEET 1 OF 1	
SCALE: 1"=150'	JOB NUMBER 12-025		
DUBLIN COMMONS		PRE-DEVELOPMENT DRAINAGE PLAN	
PREPARED FOR: POWERS DUBLIN DEVELOPMENT COMPANY 102 N. CASCADE AVE, STE 610 COLORADO SPRINGS, CO 80903			
PO BOX 692 DIVIDE, CO 80814 (719) 426-2124 			

DUBLIN COMMONS IMPERVIOUS AREA EXHIBIT



VICINITY MAP
SCALE: N.T.S.

IMPERVIOUS AREA LOT TABLE			
LOT NUMBER	LOT AREA	IMPERVIOUS AREA	PERCENTAGE
3	73,531 SF	60,737 SF	82.6 %
4	94,359 SF	70,392 SF	74.6 %
5	124,582 SF	105,272 SF	84.5 %
6	149,872 SF	126,464 SF	84.4 %
7	50,062 SF	44,055 SF	88.0 %
8	72,756 SF	55,877 SF	76.8 %
9	121,131 SF	106,595 SF	88.0 %
10	76,212 SF	67,067 SF	88.0 %
11	50,900 SF	44,792 SF	88.0 %
12	45,783 SF	40,289 SF	88.0 %
13	65,283 SF	57,449 SF	88.0 %
14	112,502 SF	79,314 SF	70.5 %
FILING NO. 1	21,615 SF	21,615 SF	100.0 %
TOTAL	1,058,588 SF	879,918 SF	83.1 %



REV.	DESCRIPTION	DATE

811 Know what's below.
Call 72 hours before you dig.
For more details visit:
www.call811.com

PREPARED FOR:
**POWERS DUBLIN
DEVELOPMENT COMPANY**
102 NORTH CASCADE AVE. SUITE 610
COLORADO SPRINGS, CO 80903

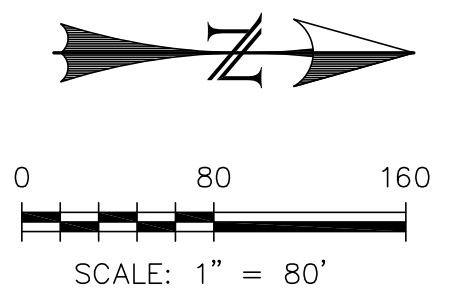
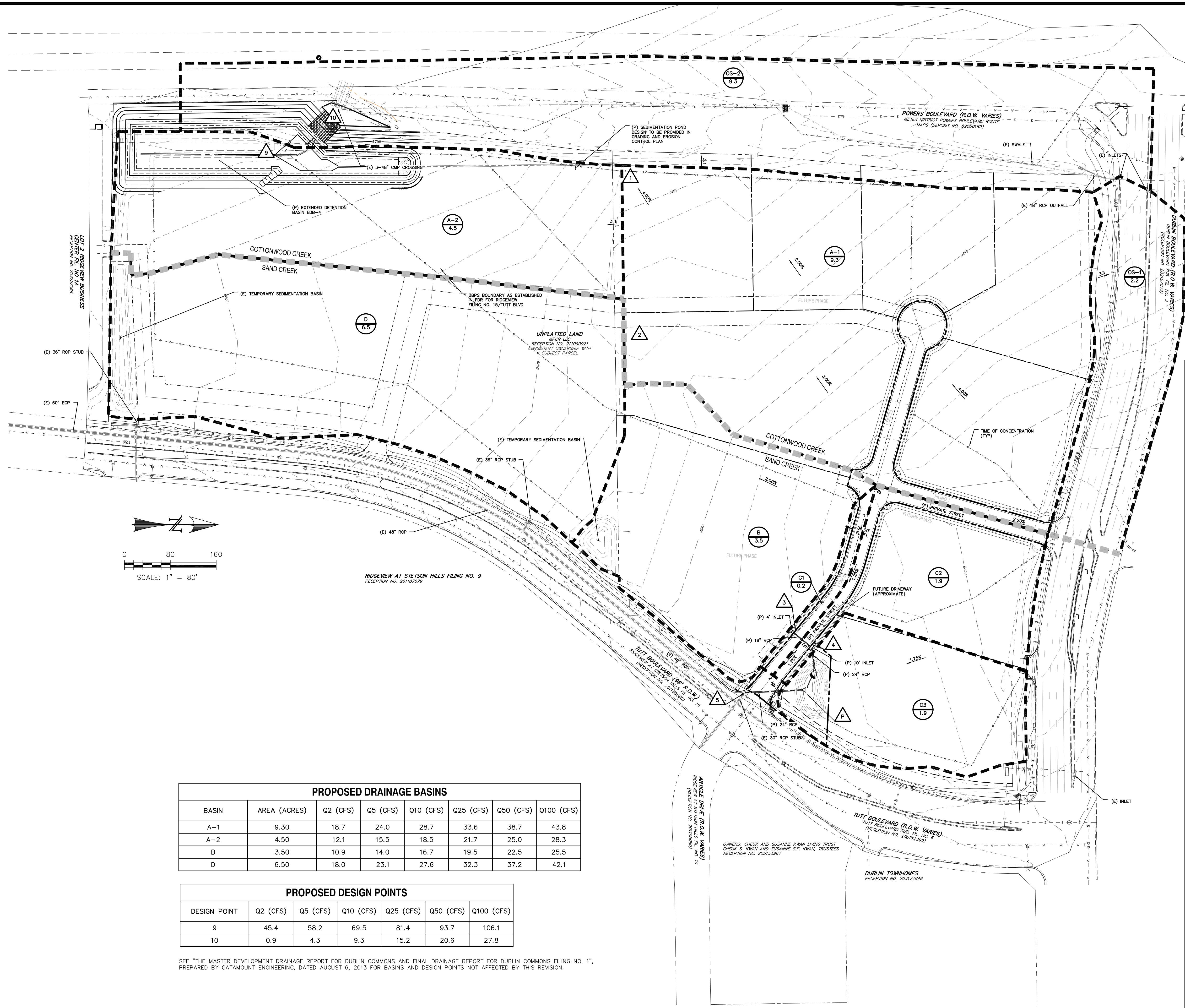
**CATAMOUNT
ENGINEERING**
PO BOX 692 DIVIDE, CO 80814 (719) 425-2124

DUBLIN COMMONS
IMPERVIOUS AREA EXHIBIT

DESIGNED BY: MGP	DRAWN BY: MGP
SCALE: 1"=60'	DATE: 02/27/18
JOB NUMBER 17-124	SHEET 1 OF 1

C:\Users\pca\Desktop\PROJECTS\17-124 DDC Part Powers\DWG\17-124 - Dublin Commons - Impervious Exhibit - 20180227 - IMPERVIOUS EXHIBIT.dwg - 1/7/2018 3:52:50 PM - User

C:\Users\pca\Desktop\PROJECTS\17-124 DDC Part Powers\DWG\17-124 - Dublin Commons - Impervious Exhibit - 20180227 - IMPERVIOUS EXHIBIT.dwg - 1/7/2018 3:52:50 PM - User



DRAINAGE LEGEND

- BASIN IDENTIFIER (F)
- BASIN AREA [AC] 0.36
- DESIGN POINT IDENTIFIERS 1
- DRAINAGE BASIN BOUNDARY ---
- SURFACE SHEET FLOW DIRECTION ~
- EXISTING MAJOR CONTOUR (10')
- EXISTING MINOR CONTOUR (2')
- PROPOSED MAJOR CONTOUR (10')
- PROPOSED MINOR CONTOUR (2')
- EXISTING (E)
- PROPOSED (P)
- FUTURE (F)
- SLOPE/DIRECTION 1.00%
- (E) STORM SEWER ---
- (P) STORM SEWER, INLET, OUTFALL ---

PROPOSED DRAINAGE BASINS							
BASIN	AREA (ACRES)	Q2 (CFS)	Q5 (CFS)	Q10 (CFS)	Q25 (CFS)	Q50 (CFS)	Q100 (CFS)
A-1	9.30	18.7	24.0	28.7	33.6	38.7	43.8
A-2	4.50	12.1	15.5	18.5	21.7	25.0	28.3
B	3.50	10.9	14.0	16.7	19.5	22.5	25.5
D	6.50	18.0	23.1	27.6	32.3	37.2	42.1

PROPOSED DESIGN POINTS						
DESIGN POINT	Q2 (CFS)	Q5 (CFS)	Q10 (CFS)	Q25 (CFS)	Q50 (CFS)	Q100 (CFS)
9	45.4	58.2	69.5	81.4	93.7	106.1
10	0.9	4.3	9.3	15.2	20.6	27.8

SEE "THE MASTER DEVELOPMENT DRAINAGE REPORT FOR DUBLIN COMMONS AND FINAL DRAINAGE REPORT FOR DUBLIN COMMONS FILING NO. 1", PREPARED BY CATAMOUNT ENGINEERING, DATED AUGUST 6, 2013 FOR BASINS AND DESIGN POINTS NOT AFFECTED BY THIS REVISION.

DRAWN BY:	DLM
DATE:	05/15/13
SCALE:	1" = 60'
JOB NUMBER:	12-025
SHEET:	1 OF 1

DUBLIN COMMONS
DRAINAGE PLAN

**CATAMOUNT
ENGINEERING**

PREPARED FOR:
**POWERS DUBLIN
 DEVELOPMENT COMPANY**
 102 NORTH CASCADE AVE. SUITE 610
 COLORADO SPRINGS, CO 80903

PO BOX 692 DUBLIN CO 80814 (719) 428-2124