



Final Drainage Letter

**Pike's Peak
Christian Church
Phase III Addition
Storage Facility**

Project Number 61181

PCD File No. PPR-22-042

October 13, 2022

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Final Drainage Letter

for

Pike's Peak Christian Church
Storage Building

Project No. 61181

October 13, 2022

prepared for

Pike's Peak Christian Church
4955 Bradley Road
Colorado Springs, Colorado 80901

prepared by

MVE, Inc.
1903 Lelaray Street, Suite 200
Colorado Springs, CO 80909
719.635.5736

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61181 Drainage Letter and coverpage.odt

Statements and Acknowledgments

Engineer's Statement

This report and plan for the drainage design of Pike's Peak Christian Church was prepared by me (or under my direct supervision) in accordance with the provisions of El Paso County Drainage Criteria Manual for the owners thereof. I understand that the El Paso County does not and will not assume liability for drainage facilities designed by others.

10/14/22

31672

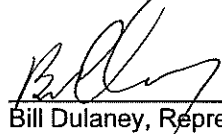
David R. Gorman, P.E. Colorado No. 31672
For and on Behalf of MVE, Inc.

10/14/2022

Date

Developer's Statement

I, the owner/developer have read and will comply with all of the requirements specified in this drainage report and plan.



Bill Dulaney, Representative of Pike's Peak Christian Church

9/8/2022

Date

El Paso County

Filed in accordance with the requirements of the Drainage Criteria Manual, Volumes 1 and 2, El Paso County Engineering Criteria Manual and Land Development Code as amended.

Joshua Palmer, P.E.,
County Engineer

Date

Conditions:



October 7, 2022

El Paso County
Planning Community Development Department
Engineering Review Division
2880 International Circle, Suite 110
Colorado Springs, CO 80910

**Re: *Drainage Letter Pikes Peak Christian Church Building Addition
Project No. 61181***

Engineering Review:

This Drainage Letter is to address the Drainage Report requirements for the new "Phase 3 Addition" to the Pikes Peak Christian Church project. There are several previous drainage reports/amendments for the overall site prepared by Nolte Associates, Inc. These include: 2010 Drainage Report (June 2010 and filed under County File No. PPR-10-16), Drainage Amendment (November 2002, filed under County File No. PPR-00-009), and a Drainage Report (June 1998, filed under County File No. SF-96-032). A map has been attached to this Drainage Letter showing the proposed improvements.

Location and Description:

Pikes Peak Christian Church is located on the SW Quarter of Section 1, Township 15 South, Range 66 West of the Sixth Principal Meridian, County of El Paso, in the State of Colorado. This 16.125± acre lot is adjacent to Bradley Road to the north, Alturas Drive to the east, and Main Street to the west side of the property. The property is also adjacent to an existing drainage ditch to the south which is owned by El Paso County. This lot is currently zoned: A-5 CAD-O with its current land use for religious worship. The address of the site is 4955 Bradley Road, and the Tax ID Number is 6501318001. The site currently includes the original Phase 1 building and the Phase 2 addition. There is also paved drives and parking, a gravel overflow parking lot, landscaping, and a water quality and storm detention pond. This detention pond was designed for future development which originally included a large asphalt parking lot located where the Phase 3 Addition is to be placed.

The intent of this project is build a 5,000 SF storage building located on the southeast side of the property. This area was previously identified as asphalt parking and was considered to be 100% impervious according to the previous drainage reports. It will have a limit of disturbance of 0.4 acres and will require minimal grading. In addition, a five-foot sidewalk and minor grading will be added next to this building. This building will replace the current storage sheds located to the south of the proposed building. These sheds are to be removed once the storage building construction is complete.

Engineers • Surveyors
1903 Lelaray Street, Suite 200 • Colorado Springs, CO 80909 • Phone 719-635-5736
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Existing Drainage Patterns for Basin 3 (5.79± Acres):

The soil is made up of “Blakeland loamy sand, 1 to 9 percent slopes” which is classified as Group A with a time of concentration of 20 minutes. The original calculation from Nolte assumes that Basin 3 will account for flows for everything located on the east side of the property including half the area of the Phase 1 & 2 buildings and the existing gravel parking lot. The flows for Basin 3 start at the north-northwest corner of the basin and travels southwest alongside the asphalt drive. The flow exits the drives at the curb openings shown on the drainage map where it flows southeast into an existing sand filter detention basin which was enlarged in 2010. Currently the imperviousness for Basin 3 is 39.6% which is much lower than Nolte’s pond design calculation of 60% imperviousness.

Proposed Drainage Patterns:

Basin 3 will have the same drainage paths with the exception of the proposed building of the pervious area for the proposed building. Within this pervious area, flows from the north-most corner will travel in a southeast direction. Runoff that flow perpendicular to the building will be directed into one of two swales of no less than 1% grade to prevent erosion. Drainage patterns of additional flows traveling into this pervious area will be unchanged as the grading around the proposed building will not affect the direction or discharge.

The swale on the northeast side of the building will have a grade of 1% that will channelize the majority of incoming sheet flow along the northeast side and a portion of roof runoff for approximately 150 feet. After which the runoff will transition back into sheet flow and continue southeast into the existing Sand Filter basin pond, similar to existing conditions.

Runoff that flows to the northwest side of the building will flow into a swale of 1.1% will accept and channelize a minor amount of incoming sheet flow for approximately 55 feet. These flows will flow over the proposed sidewalk and remain in the pervious area. After which the runoff will transition back into sheet flow and continue southeast within the existing riprap channel to the southwest and eventually into Pond 3, similar to existing conditions.

Runoff from the building's roof will drain toward the northeast and southwest sides of the building. Roof drains will connect to proposed 5 foot wide gravel area that surrounds the northwest, northeast, and southeast sides of the building. These flows will travel in to these swales and toward the existing pond to the southeast, similar to existing conditions.

For the proposed Phase 3 Addition, the peak flows for Basin 3 would not change significantly to require resizing of the current detention basin due to Nolte’s overestimation of impervious area in their calculations. According to Nolte’s calculations in their 2010 Drainage Report, 60% of the area in Basin 3 was classified as impervious. It included a future Phase 3 & 4 parking lot that would replace the current gravel overflow lot and most of the landscape southwest of the gravel lot. Therefore, Nolte redesigned the detention pond in 2010 for these future conditions.

In MVE’s calculations, the proposed imperviousness for Basin 3 is 41.5% which includes the proposed sidewalk, storage building addition, and removal of the storage sheds. This addition is within parameters for the current size of the detention pond as the current flow path for Basin 3 is unaffected by the addition. This project will require minimal amount of grading and will drain toward the southeast side of the addition. Therefore, the existing basin boundaries will remain the same.

Existing Water Quality Treatment / Storm Detention Ponds:

Personnel of M.V.E., Inc. observed the existing Existing Water Quality Treatment / Storm Detention Ponds on the site, focusing on the southeastern pond which receives the storm runoff from the proposed project area. The existing ponds have functioning outlet structures, embankments that are intact and vegetated, and inflow points that are protected with riprap. There is not appreciable build up of sediment within the ponds. The ponds are found to be functioning as intended and do not require maintenance at this time.

Four Step Process:**1. Employ Runoff Reduction Practices.**

In the overall site, a level of MDCIA is provided by Grass Swales and Grass Buffers which are utilized around the existing church building complex. Paved areas around the building drain into grassed areas before draining to the surrounding parking and drive areas and eventually to the site water quality and storm detention ponds.

2. Stabilize Drainageways.

There are no major drainageways located inside the site boundaries. However, significant swales in the site have existing riprap erosion protection installed, specifically to the east of the proposed storage building and to the south of the proposed storage building which drain into the southeast detention pond. Other minor swales have mild slopes of 0.5% to 1% and carry minute flows that will not cause erosion.

3. Provide Water Quality Capture Volume (WQCV).

Water Quality Capture Volume is provided for the entire site by two existing sand filter basins that incorporate storm detention. The existing sand filter basin located in the northwestern part of the site provides half of the WQCV necessary for the site (labeled as Pond 2 on provided map). The other existing Sand Filter Basin located in the southwest portion of the site only accepts flows from the existing Basin 3 area and provides half of the WQCV necessary for the site (labeled as Pond 3 on provided map). Flows from Pond 2 and 3 are filtered and flow southwest into the adjacent drainage canal. These existing ponds are adequately sized to accommodate the existing site needs as well as the current proposed improvements. There is also a shallow depression located in the northwestern part of the site labeled as Pond 1. The depression collects runoff from a small portion of pavement and overflows into Pond 2. The existing ponds are adequately sized to accommodate the existing site needs as well as the currently proposed improvements.

4. Consider Need for Industrial and Commercial BMPs.

This site is used for religious purposes and will have no industrial or commercial uses or activities. Therefore it will not be required to have Industrial/Commercial BMPs commonly used for spill containment and safe storage/handling areas.

Drainage Fees Assessment:

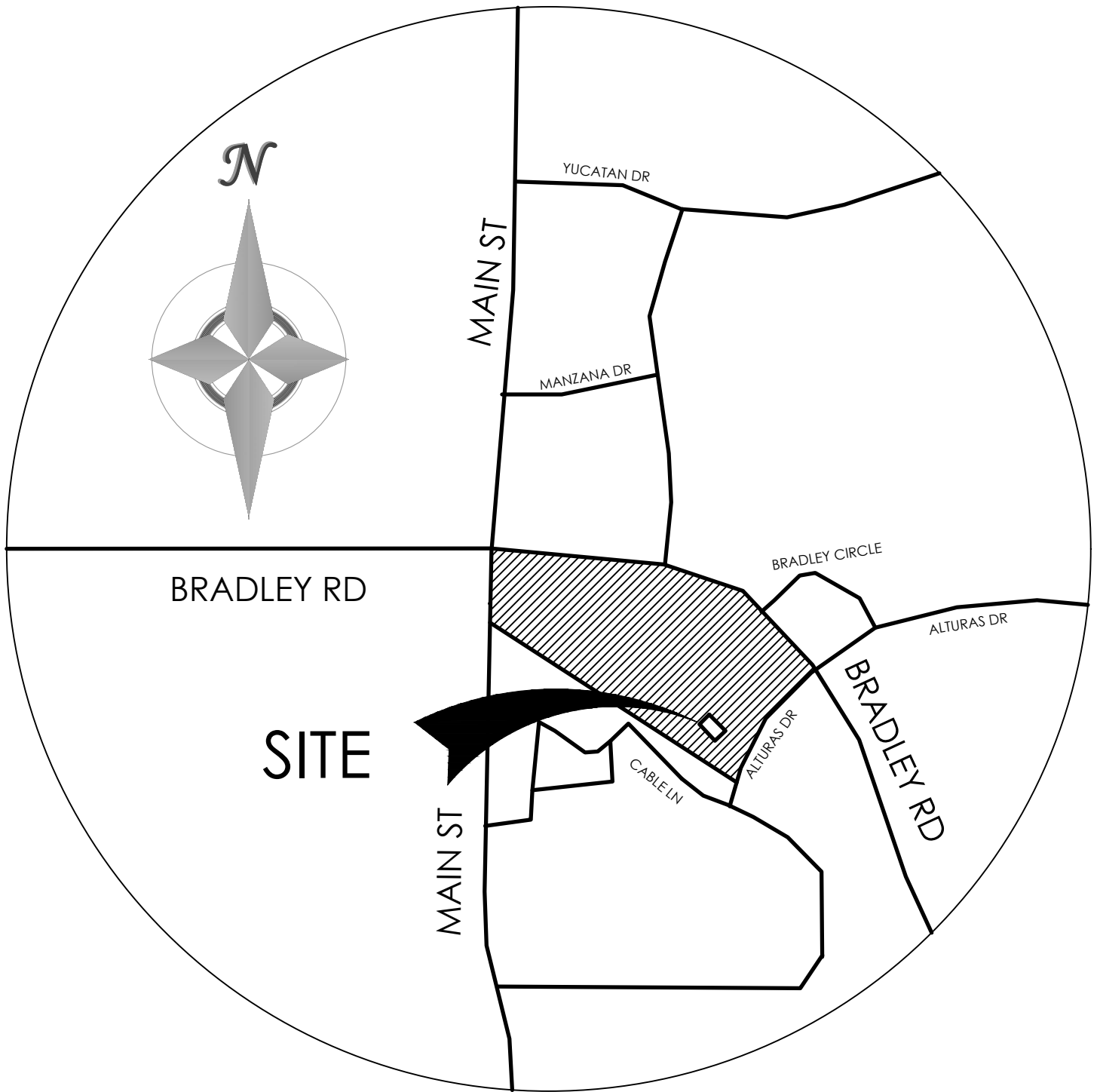
This property was platted in 1998 and Drainage and Bridge Fees were paid at the time of platting. The fees were paid according to a set fee per acre as was done in 1998. However, the percent imperviousness of the site as determined from the hydrologic calculations contained within the 1998 Final Drainage Report is 69.8%. The proposed improvements will bring the actual total site imperviousness to 41%. Calculations for Percent Imperviousness are attached. Since there is not a increase from the percent imperviousness calculated in the 1998 report, no Drainage or Bridge Fees are due.

Conclusion:

The proposed Storage Building Addition may be completed on the site with no significant impacts to drainage pattern or quantities. The existing drainage facilities, including the detention basins, are adequate to serve the site with no modifications.

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Enc.



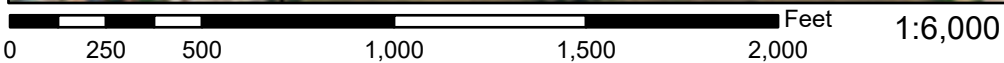
VICINITY MAP

NOT TO SCALE

National Flood Hazard Layer FIRMMette



104°44'27"W 38°46'21"N



104°43'49"W 38°45'53"N

Basemap: USGS National Map: Orthoimagery: Data refreshed October, 2020

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

- | | |
|------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SPECIAL FLOOD HAZARD AREAS | Without Base Flood Elevation (BFE)
<i>Zone A, V, A99</i>
With BFE or Depth <i>Zone AE, AO, AH, VE, AR</i>
Regulatory Floodway |
| OTHER AREAS OF FLOOD HAZARD | 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile <i>Zone X</i>
Future Conditions 1% Annual Chance Flood Hazard <i>Zone X</i>
Area with Reduced Flood Risk due to Levee. See Notes. <i>Zone X</i>
Area with Flood Risk due to Levee <i>Zone D</i> |
| OTHER AREAS | NO SCREEN Area of Minimal Flood Hazard <i>Zone X</i>
Effective LOMRs
Area of Undetermined Flood Hazard <i>Zone D</i> |
| GENERAL STRUCTURES | Channel, Culvert, or Storm Sewer
Levee, Dike, or Floodwall |
| OTHER FEATURES | 20.2 Cross Sections with 1% Annual Chance
17.5 Water Surface Elevation
Coastal Transect
Base Flood Elevation Line (BFE)
Limit of Study
Jurisdiction Boundary
Coastal Transect Baseline
Profile Baseline
Hydrographic Feature |
| MAP PANELS | Digital Data Available
No Digital Data Available
Unmapped |
- N
 The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on **8/31/2022 at 5:59 PM** and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

Christian Church of Security - New Ministry Center

Job No. CS0176

Date: October, 1996 / Revised January, 1997

LAND USE SUMMARY

Basin	Zoning	Area (Acres)	C(5)	C(100)
H1	Existing Grassland w/ Few Trees	5.4	0.25	0.35
H2	Existing Grassland w/ Few Trees	9.3	0.25	0.35
1	Neighborhood Area	4.76	0.68	0.78
2	Neighborhood Area	5.15	0.80	0.85
3	Neighborhood Area	4.52	0.66	0.72

Basin No. 1

1.59 Acres of Landscaping / 3.17 Acres of Paving

$$C(5) = (0.25)(1.59 / 4.76) + (0.90)(3.17 / 4.76) = 0.68$$

$$C(100) = (0.35)(1.59 / 4.76) + (0.95)(3.17 / 4.76) = 0.78$$

Basin No. 2

1.00 Acres of Landscaping / 2.70 Acres of Paving / 1.45 Acres of Bldg. & Hardscape

$$C(5) = (0.25)(1.00 / 5.15) + (0.90)(2.70 / 5.15) + (1.0)(1.45 / 5.15) = 0.80$$

$$C(100) = (0.35)(1.00 / 5.15) + (0.95)(2.70 / 5.15) + (1.0)(1.45 / 5.15) = 0.85$$

Basin No. 3

1.80 Acres of Landscaping / 1.78 Acres of Paving / 0.94 Acres of Bldg. & Hardscape

$$C(5) = (0.25)(1.80 / 4.52) + (0.90)(1.78 / 4.52) + (1.0)(0.94 / 4.52) = 0.66$$

$$C(100) = (0.35)(1.80 / 4.52) + (0.95)(1.78 / 4.52) + (1.0)(0.94 / 4.52) = 0.72$$

Soil type taken from the 'Soil Survey of El Paso County Area, Colorado,' shown on Sheet No. 17 as Soil No. 8

Predominately 'Blakeland' soils. Use Hydrologic Soil Group "A".

Percent Imperviousness Calculations using data from approved 1998 Nolte Final Drainage Report

Basin 1
 $(3.17ac@100\% + 1.59ac@0\%) / 4.76ac = 66.6\%$

Basin 2
 $(4.15ac@100\% + 1.00ac@0\%) / 5.15ac = 80.6\%$

Basin 3
 $2.72ac@100\% + 1.80ac@0\% / 4.52ac = 60.2\%$

Total Site
 $(10.04ac@100\% + 4.39ac@0\%) / 14.43ac = 69.6\%$

PERCENT IMPERVIOUS CALCULATION

Includes Basins EX-BASIN 1 & 2 PP-BASIN 3

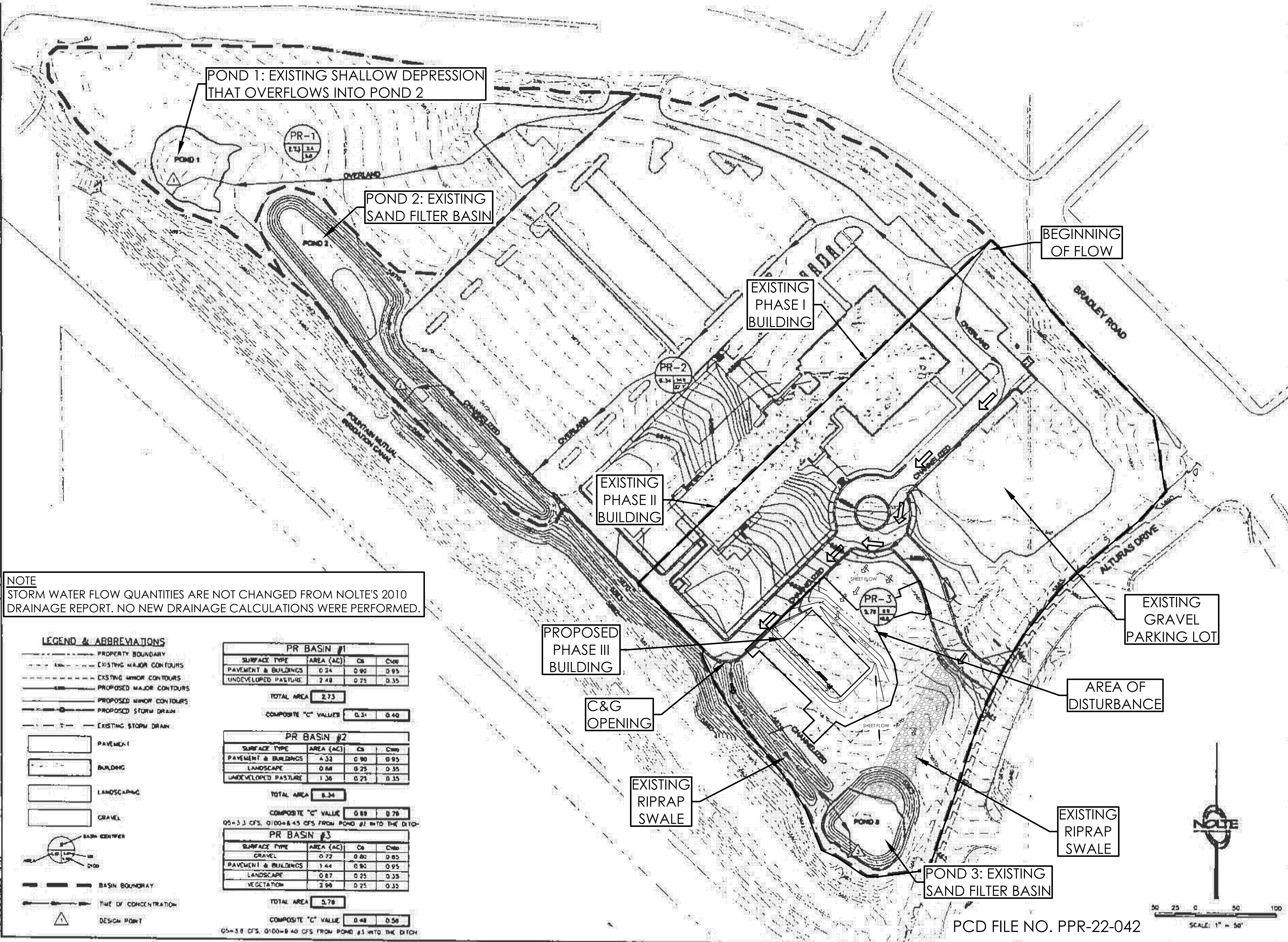
Job No.:	61181	Date:	9/8/2022 14:14
Project:	PIKE'S PEAK CHRIST. CHURCH, PHASE III	Calcs by:	JO
Jurisdiction	UDFCD	Checked by:	
Runoff Coefficient	Surface Type	Soil Type	A
		Urbanization	Urban

Basin Land Use Characteristics

Surface	Area		Runoff Coefficient						% Imperv.
	(SF)	(Acres)	C2	C5	C10	C25	C50	C100	
Roofs	40,929	0.94	0.71	0.73	0.75	0.78	0.8	0.81	90%
Paved	210,104	4.82	0.89	0.9	0.92	0.94	0.95	0.96	100%
Gravel	37,695	0.87	0.57	0.59	0.63	0.66	0.68	0.7	80%
Landscaping	413,679	9.50	0.03	0.09	0.17	0.26	0.31	0.36	2%
Combined	702,408	16.125	0.36	0.40	0.45	0.52	0.55	0.58	40.6%

Percent imperviousness calculation of current improvements plus new Phase 3 Storage Building Addition

DATE: 11/02/10, TIME: 11:51:22 AM, DRAWING NAME: DRAINAGE MAP, DRAWING NUMBER: 100, SHEET NO.: 2 OF 2, PROJECT NO.: 100, PROJECT NAME: PIKES PEAK CHRISTIAN CHURCH



POND 1: EXISTING SHALLOW DEPRESSION THAT OVERFLOWS INTO POND 2

POND 2: EXISTING SAND FILTER BASIN

BEGINNING OF FLOW

EXISTING PHASE I BUILDING

EXISTING PHASE II BUILDING

PROPOSED PHASE III BUILDING

C&G OPENING

EXISTING RIPRAP SWALE

EXISTING GRAVEL PARKING LOT

AREA OF DISTURBANCE

EXISTING RIPRAP SWALE

POND 3: EXISTING SAND FILTER BASIN

NOTE
STORM WATER FLOW QUANTITIES ARE NOT CHANGED FROM NOLTE'S 2010 DRAINAGE REPORT. NO NEW DRAINAGE CALCULATIONS WERE PERFORMED.

LEGEND & ABBREVIATIONS

- PROPERTY BOUNDARY
- EXISTING MAJOR CONTOURS
- EXISTING MINOR CONTOURS
- PROPOSED MAJOR CONTOURS
- PROPOSED MINOR CONTOURS
- PROPOSED STORM DRAIN
- EXISTING STORM DRAIN
- PAVEMENT
- BUILDING
- LANDSCAPING
- GRAVEL
- BASH CENTER
- BASIN BOUNDARY
- TIME OF CONCENTRATION
- △ DESIGN POINT

PR BASIN #1				
SURFACE TYPE	AREA (AC)	Cs	C100	C100
PAVEMENT & BUILDINGS	0.24	0.90	0.95	
UNDEVELOPED PASTURE	2.48	0.25	0.35	
TOTAL AREA	2.73			
COMPOSITE "C" VALUE		0.31	0.40	

PR BASIN #2				
SURFACE TYPE	AREA (AC)	Cs	C100	C100
PAVEMENT & BUILDINGS	4.32	0.90	0.95	
LANDSCAPE	0.68	0.25	0.35	
UNDEVELOPED PASTURE	1.36	0.25	0.35	
TOTAL AREA	6.34			
COMPOSITE "C" VALUE		0.89	0.78	

Q5=5.3 CFS, Q100=8.45 CFS FROM POND #1 INTO THE DITCH

PR BASIN #3				
SURFACE TYPE	AREA (AC)	Cs	C100	C100
GRAVEL	0.72	0.80	0.85	
PAVEMENT & BUILDINGS	1.44	0.90	0.95	
LANDSCAPE	0.87	0.25	0.35	
VEGETATION	2.96	0.25	0.35	
TOTAL AREA	5.99			
COMPOSITE "C" VALUE		0.48	0.58	

Q5=3.8 CFS, Q100=9.40 CFS FROM POND #3 INTO THE DITCH

PIKES PEAK CHRISTIAN CHURCH
DRAINAGE LETTER
PROPOSED CONDITIONS DRAINAGE MAP

NOLTE
BEYOND ENGINEERING
3975 RESEARCH PARKWAY, SUITE 100, COLO SPRINGS, CO 80909
PULMONO TEL: 719.572.0100 FAX: 719.572.0101 WWW.NOLTE.COM

PRELIMINARY
NOT FOR CONSTRUCTION

PROJECT NUMBER
PR01

SHEET NUMBER
2 OF 2 SHEETS

SCALE
VERTICAL: AS SHOWN
HORIZONTAL: 1" = 50'

JOB NUMBER
C88024900

DATE SUBMITTED: JUNE 2010
PREPARED FOR: PIKES PEAK CHRISTIAN CHURCH

PCD FILE NO. PPR-22-042