

MEMORANDUM

To: James Chancellor, P.E. – Town of Fairview
From: Thomas G. Coppin, P.E.
Kimley-Horn and Associates, Inc.
Date: January 6, 2025
Subject: McKinney LDS Temple – Preliminary Drainage Study



This Preliminary Drainage Study summarizes the design approach for the storm drainage and detention basin sizing for the proposed McKinney LDS Temple Project.

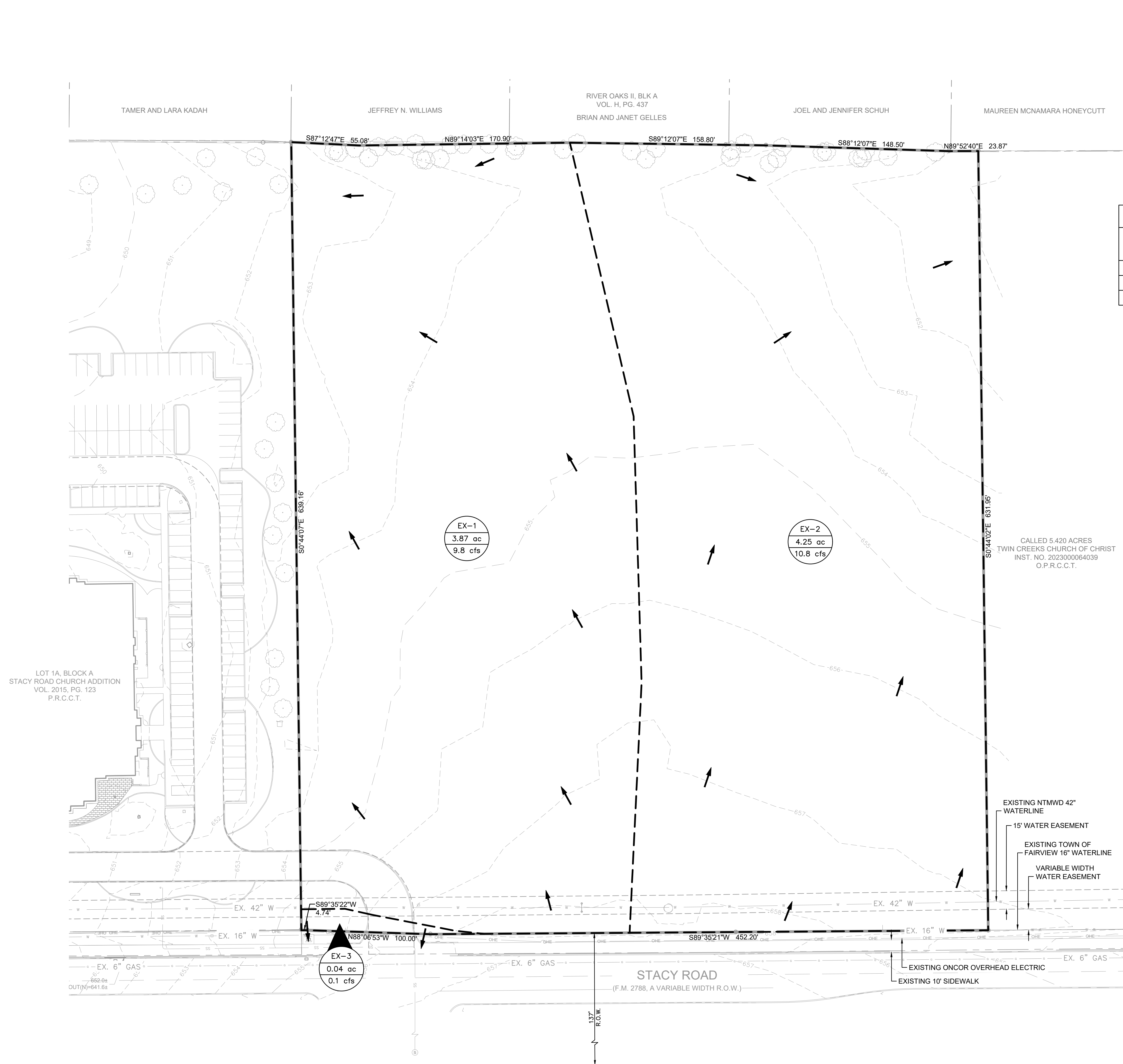
The McKinney LDS Temple is located on 8.16 ac in the Town of Fairview on the north side of Stacy Road and its intersection with River Oaks Drive. The site consists of an undeveloped grass field with a row of trees along the north property line. The site currently drains from south to north, away from Stacy Road, and is generally divided equally east and west by a ridge located at the center of the property. Runoff from the site is currently directed to the northeast and northwest corners of the property where it flows across the adjacent properties. The existing drainage areas and runoff amounts are summarized on the accompany *Existing Drainage Area Map* (**Exhibit 1**).

The proposed site grading will honor the historic drainage patterns of the property. The temple will be located on the ridge at the center of the property, and drainage will be directed east and west through the parking lots to the landscaped areas that border the property. Depressions in the landscaping will direct runoff to inlets and to storm drain lines that will convey runoff to a detention basin at the north end of the property. Two additional storm drains adjacent to the temple will direct roof runoff directly to the detention basin. The proposed drainage areas and runoff amounts are summarized on the accompanying *Proposed Drainage Area Map* (**Exhibit 2**).

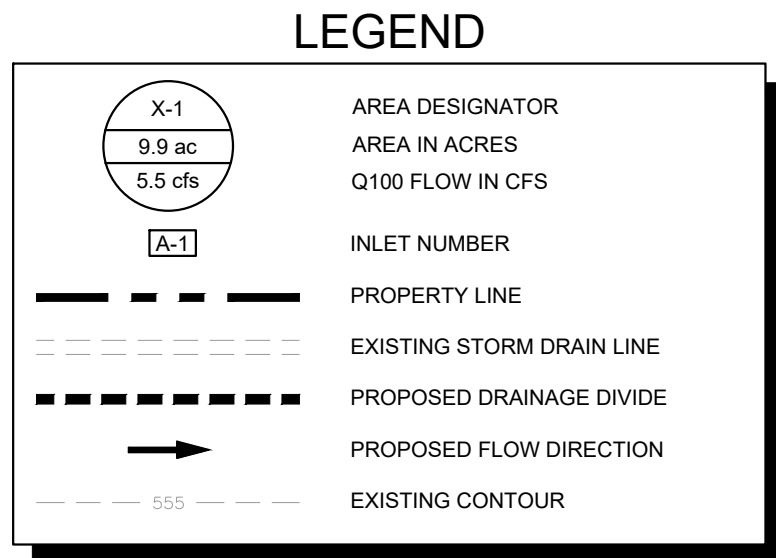
The detention basin will be sized to reduce site runoff to pre-development levels for the 100-year storm event. Smaller storm events will be fully contained within the basin and will drain west via a low flow drain, beneath the existing LDS chapel lawn, to the existing outfall structure that currently serves the chapel. From there flows will continue to the west, across the Chase Oaks Church site as they have historically. Low flows from the temple detention basin will be limited to pre-development flows currently draining to the west. Runoff from storm events equal or greater than the 100-year event will overtop the detention basin via two concrete spillways and drain east and west as they have

historically at the same or reduced rates as pre-development conditions. The proposed storm drain plan is shown in the accompanying *Proposed Storm Drain Plan* (**Exhibit 3**).

Attachments: Exhibit 1 – Existing Drainage Area Map
Exhibit 2 – Proposed Drainage Area Map
Exhibit 3 – Proposed Storm Drain Plan



DRAINAGE AREA TABLE						
DRAINAGE AREA NO.	AREA (ac)	ANTECEDENT FACTOR	RUNOFF COEFFICIENT "C"	RAINFALL INTENSITY "I" 100 (in/hr)	TIME OF CONCENTRATION (minutes)	TOTAL FLOW Q100 (cfs)
EX-1	3.87	1.00	0.35	7.26	17.2	9.8
EX-2	4.25	1.00	0.35	7.26	17.2	10.8
EX-3	0.04	1.00	0.35	7.26	17.2	0.1



DRAINAGE DESIGN CRITERIA

Q100 = C*1/A

Q = FLOW IN CUBIC FEET PER SECOND (CFS)

C = RUNOFF COEFFICIENT = 0.35 (UNDEVELOPED)
0.65 (DEVELOPED)

I = INTENSITY (TIME OF CONCENTRATION = TC)

TC OF 17.2 MINUTES (UNDEVELOPED) = 7.26 IN/HR
TC OF 10.0 MINUTES (DEVELOPED) = 8.74 IN/HR

A = DRAINAGE AREA IN ACRES

BENCHMARKS

BM 1: "X" CUT SET ON TOP OF A CONCRETE CURB AT THE NOSE OF A PARKING MEDIAN LOCATED NORTH OF THE CHURCH BUILDING LOCATED AT 651 E. STACY ROAD. THE MARK IS APPROXIMATELY 100 FEET EAST OF THE WEST EDGE OF THE PARKING LOT.

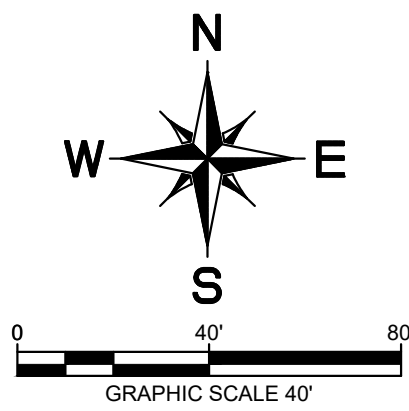
ELEV. = 649.67

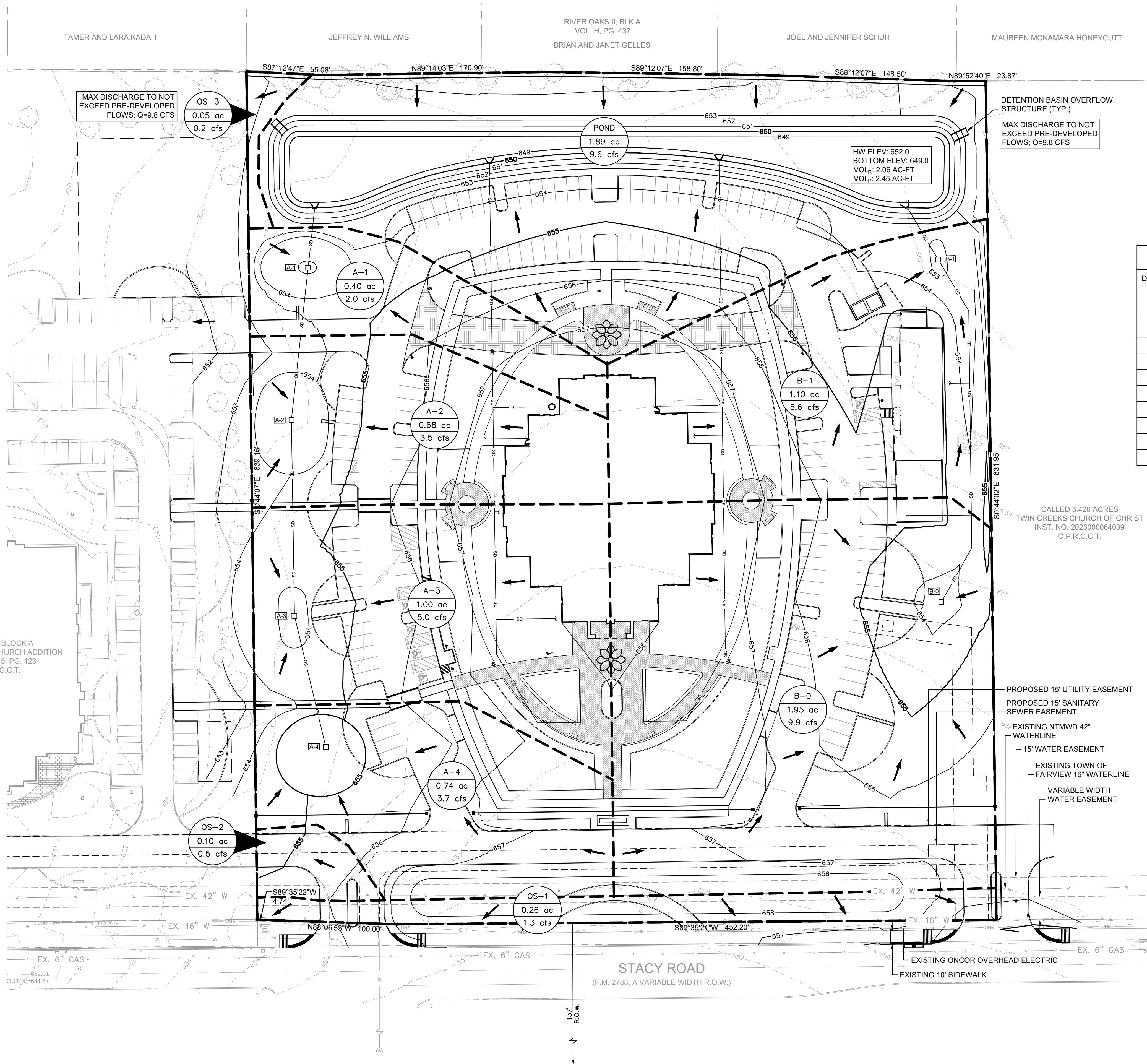
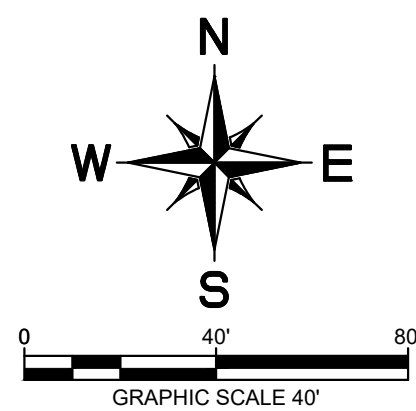
BM 2: "X" CUT SET ON TOP OF A CONCRETE CURB ON THE EAST EDGE OF THE PARKING LOT LOCATED AT 651 E. STACY ROAD. THE MARK IS APPROXIMATELY 454 FEET NORTH OF THE NORTH CURB LINE OF E. STACY ROAD.

ELEV. = 651.87

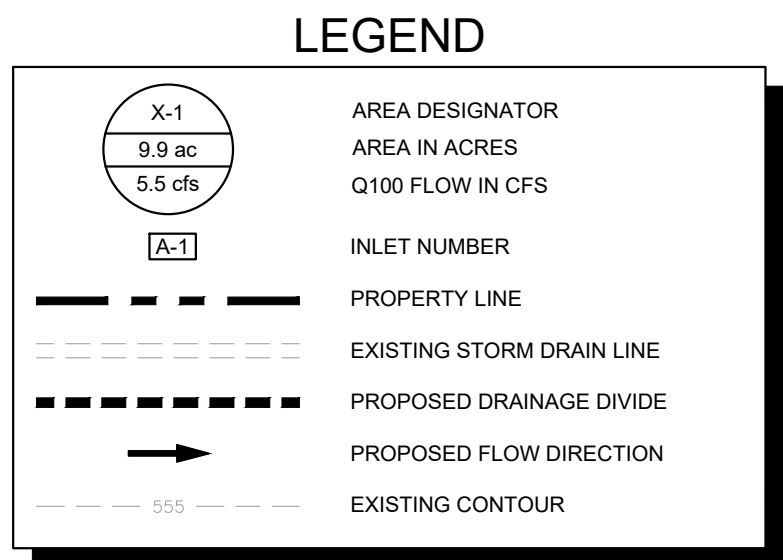
BM 3: "X" CUT SET ON TOP OF A CONCRETE CURB ON THE EAST EDGE OF THE PARKING LOT LOCATED AT 651 E. STACY ROAD. THE MARK IS APPROXIMATELY 272 FEET NORTH OF THE NORTH CURB LINE OF E. STACY ROAD.

ELEV. = 651.85





DRAINAGE AREA TABLE						
DRAINAGE AREA NO.	AREA (ac)	ANTECEDENT FACTOR	RUNOFF COEFFICIENT "C"	RAINFALL INTENSITY "I"100 (in/hr)	TIME OF CONCENTRATION (minutes)	TOTAL FLOW Q100 (cfs)
A-1	0.40	1.00	0.58	8.74	10.0	2.0
A-2	0.68	1.00	0.58	8.74	10.0	3.5
A-3	1.00	1.00	0.58	8.74	10.0	5.0
A-4	0.74	1.00	0.58	8.74	10.0	3.7
B-0	1.95	1.00	0.58	8.74	10.0	9.9
B-1	1.10	1.00	0.58	8.74	10.0	5.6
OS-1	0.26	1.00	0.58	8.74	10.0	1.3
OS-2	0.10	1.00	0.58	8.74	10.0	0.5
OS-3	0.05	1.00	0.58	8.74	10.0	0.2
POND	1.89	1.00	0.58	8.74	10.0	9.6



DRAINAGE DESIGN CRITERIA

$Q100 = C \cdot I \cdot A$
 $Q = \text{FLOW IN CUBIC FEET PER SECOND (CFS)}$
 $C = \text{RUNOFF COEFFICIENT} = 0.35 \text{ (UNDEVELOPED)}$
 0.58 (DEVELOPED)
 $I = \text{INTENSITY (TIME OF CONCENTRATION} = TC)$
 $TC \text{ OF } 17.2 \text{ MINUTES (UNDEVELOPED)} = 7.26 \text{ IN/HR}$
 $TC \text{ OF } 10.0 \text{ MINUTES (DEVELOPED)} = 8.74 \text{ IN/HR}$
 $A = \text{DRAINAGE AREA IN ACRES}$

WEIGHTED 'C' FACTOR

<u>LAND USE</u>	<u>AREA (AC)</u>	<u>C-FACTOR</u>
LANDSCAPE	5.3	0.40
IMPERMEABLE	2.9	0.90

$$\text{TOTAL C} = \frac{(A1 \times C1) + (A2 \times C2)}{(A1 + A2)}$$

→ TOTAL WEIGHTED C FACTOR = 0.58

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ELEV. = 649.67

BM 2: "X" CUT SET ON TOP OF A CONCRETE CURB ON THE EAST EDGE OF THE PARKING LOT LOCATED AT 651 E. STACY ROAD. THE MARK IS APPROXIMATELY 45 FEET NORTH OF THE NORTH CURB LINE OF E. STACY ROAD.

ELEV. = 651.87

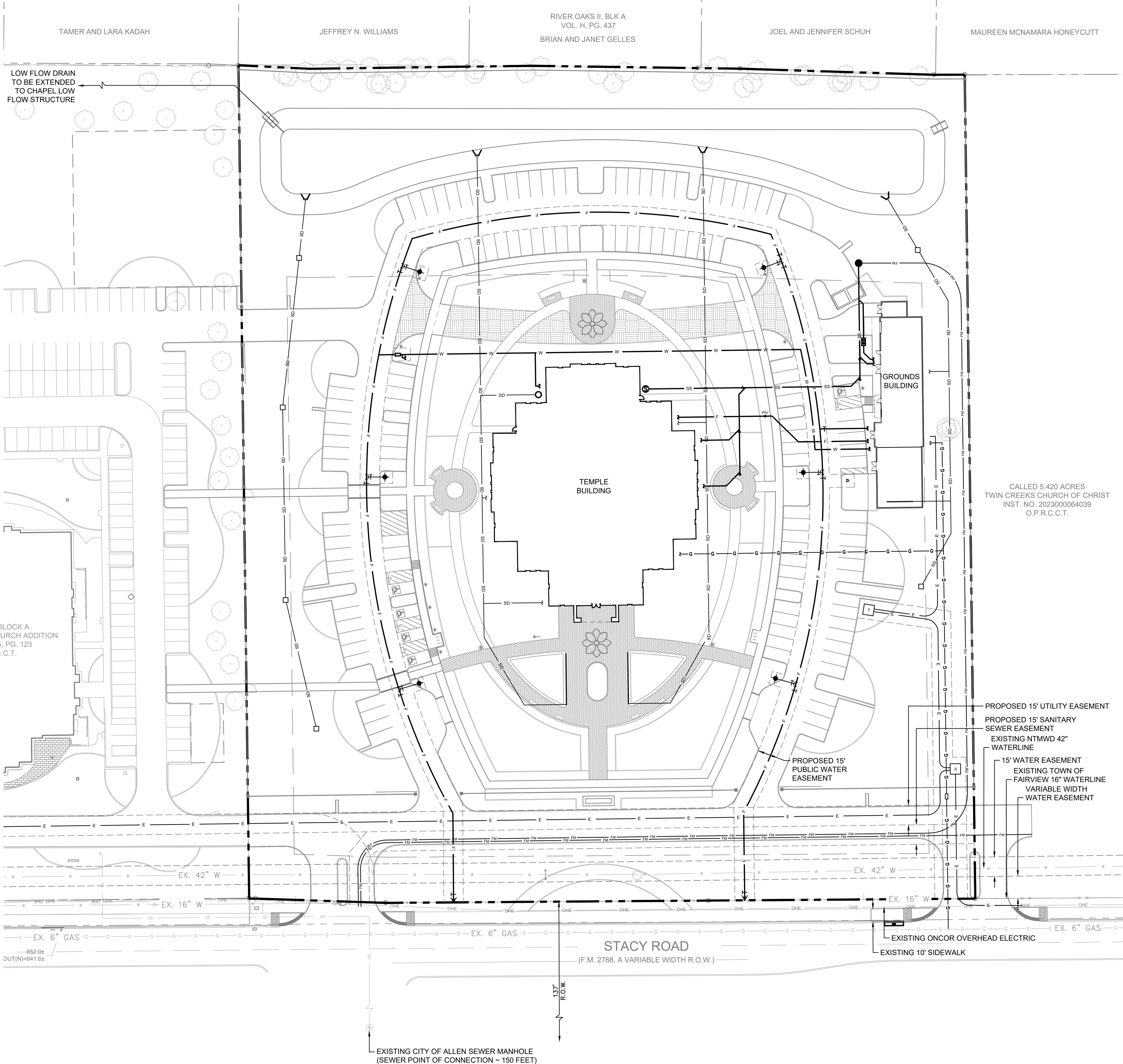
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ELEV. = 651.85

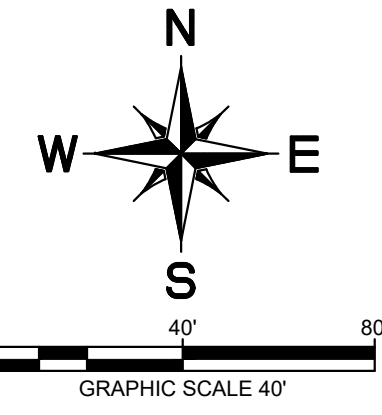
Plotted By: Whitley, Jack Date: December 17, 2024 04:50:56pm File Path: K:\P\civil\061275909-mckinney_temple\Cad\preliminary\plan\sheet\U-1_Utility_Plan.dwg

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LOT 1A, BLOCK A
STACY ROAD CHURCH ADDITION
VOL. 2015, PG. 123
P.R.C.C.T.



CALLED 5.420 ACRES
TWIN CREEKS CHURCH OF CHRIST
INST. NO. 2023000064039
O.P.R.C.C.T.



UTILITY LEGEND

- PROPERTY LINE
- PROPOSED WATER LINE
- PROPOSED FIRE LINE
- PROPOSED SANITARY SEWER LINE
- PROPOSED FORCE MAIN
- PROPOSED STORM DRAIN
- PROPOSED GAS LINE
- PROPOSED UNDERGROUND ELECTRIC
- PROPOSED TRANSFORMER
- PROPOSED SANITARY SEWER MANHOLE
- PROPOSED E-ONE LIFT STATION
- PROPOSED SANITARY SEWER CLEANOUT
- SANITARY SEWER FLOW DIRECTION
- PROPOSED FIRE HYDRANT
- PROPOSED TAPPING SLEEVE & VALVE
- PROPOSED GATE VALVE
- PROPOSED WATER METER
- PROPOSED BACKFLOW PREVENTER
- EXISTING OVERHEAD POWER LINE
- EXISTING WATER LINE
- EXISTING SANITARY SEWER LINE
- EXISTING STORM SEWER LINE
- EXISTING POWER POLE
- EXISTING FIRE HYDRANT
- EXISTING WATER METER
- EXISTING SANITARY SEWER MANHOLE

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EXHIBIT 3

PROJECT

061275909

DATE

DECEMBER 2024

SCALE

AS SHOWN

DESIGNED BY

JTW

DRAWN BY

JTW

CHECKED BY

TCC

PROPOSED

UTILITY PLAN

MCKINNEY TEMPLE

TOWN OF FAIRVIEW

COLLIN COUNTY, TEXAS

SHEET NUMBER

1 OF 1

Kimley»Horn

© 2024 KIMLEY-HORN AND ASSOCIATES, INC.
6160 WARREN PARKWAY, SUITE 210, FRISCO, TX 75034
PHONE: 972-335-3580
WWW.KIMLEY-HORN.COM

TEXAS REGISTERED ENGINEERING FIRM F-928

REVISIONS

NO.

DATE

BY