

Radnor Township Wide Assessment Update

September 8, 2016



Township Wide Assessment Schedule Update

Task 1 – ID Flood Locations (complete)

Task 2 – Data Collection

- May-July: File review at Township; Survey for North Wayne
- July-Aug: Create a GIS-based stormwater network; annotate with critical information pulled from record plans, and cross-check with Township review
- Sept: Supplement with survey as needed in spot/critical locations

Task 3 – Enhanced Modeling Existing Conditions

- July-Sept: North Wayne modeling baseline
- Sept-Oct: Remaining 6 priority Problem Areas

Task 4 – Develop and Model Conceptual Solutions

- Sept-Oct: Prepare Projects and costs
- Oct-Nov: Model conceptual Solutions
- Oct/Nov: Present to Board of Commissioners

Task 5 – Prioritization of Projects

- Sept-Oct : Develop Criteria with input from Public

? October Workshop to share first round of potential projects and get public input on priorities?

- Nov-Dec: Present Prioritized list of projects

North Wayne Basin – Updated Modeling & Results

Model Uses and Limitations

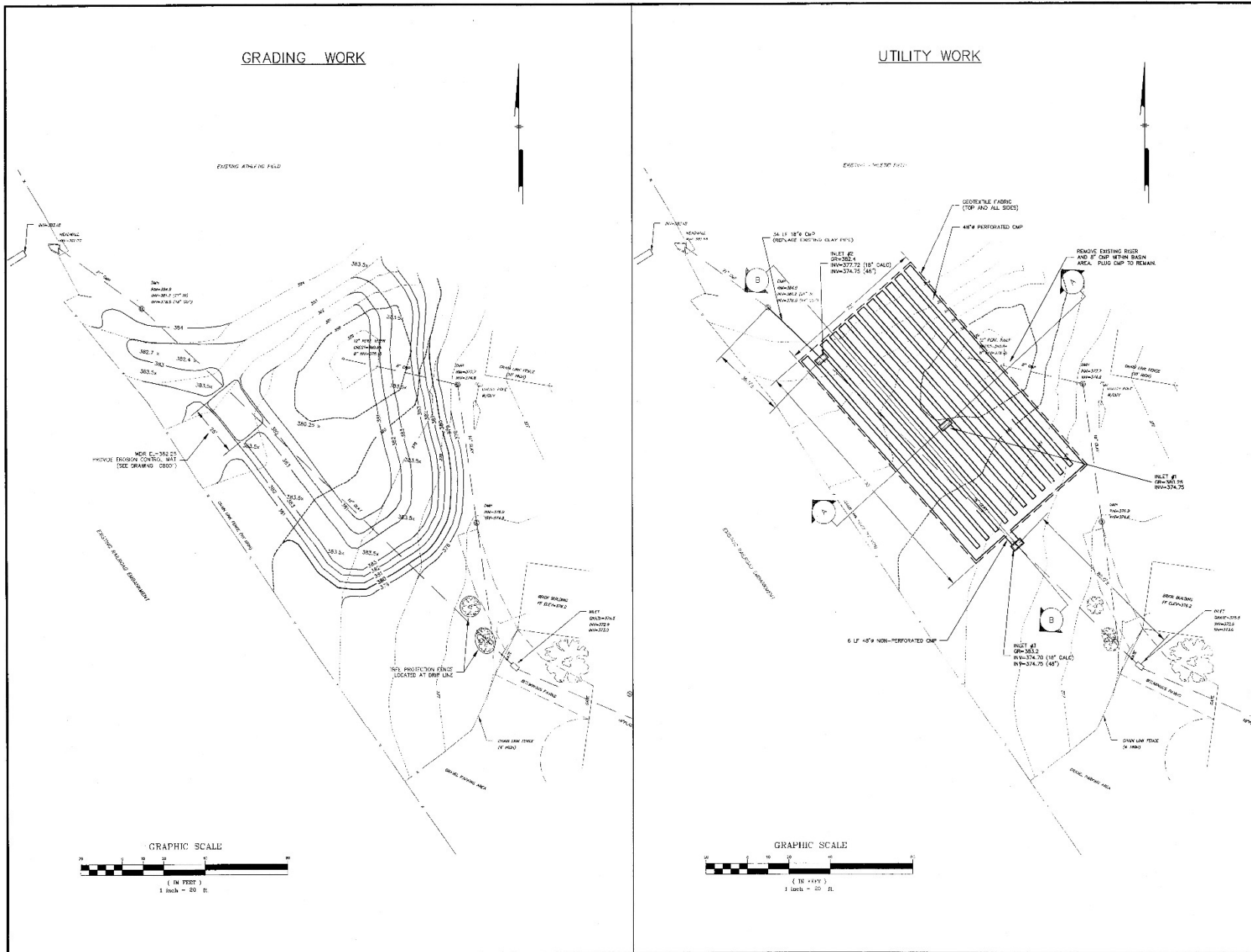
- Design Storms:

- 10-year storm event has a 10% *probability* of happening in a year and can happen more than once in a year (2-year: 50%, 5-year: 20%, 25-year: 4%, 100-year: 1%)
- Return frequency is based on historical data and is constantly changing
- Depth vs. volume: 2 inches of rain falling on 1 acre will not cause as much flooding as 2 inches of rain falling on 100 acres

- Models are tools for decision making

- Combine many variables and assumptions: total rainfall (inches), rainfall intensity and duration, rainfall extent, hydraulic data, topographic data, etc.
- Can be effectively used to compare and contrast alternatives

N. Wayne Basin – Existing



Pennoni Associates Inc. Consulting Engineers

One Riverbank Centre - Suite 3530
5000 Spring Street
Wilmington, Delaware 19801

ALL DIMENSIONS UNLESS SPECIFIED BY
DRAWING OR FIELD SURVEY TO BE
IN ACCORDANCE WITH THE
PENNSYLVANIA PROFESSIONAL ENGINEERING
ACT OF 1988

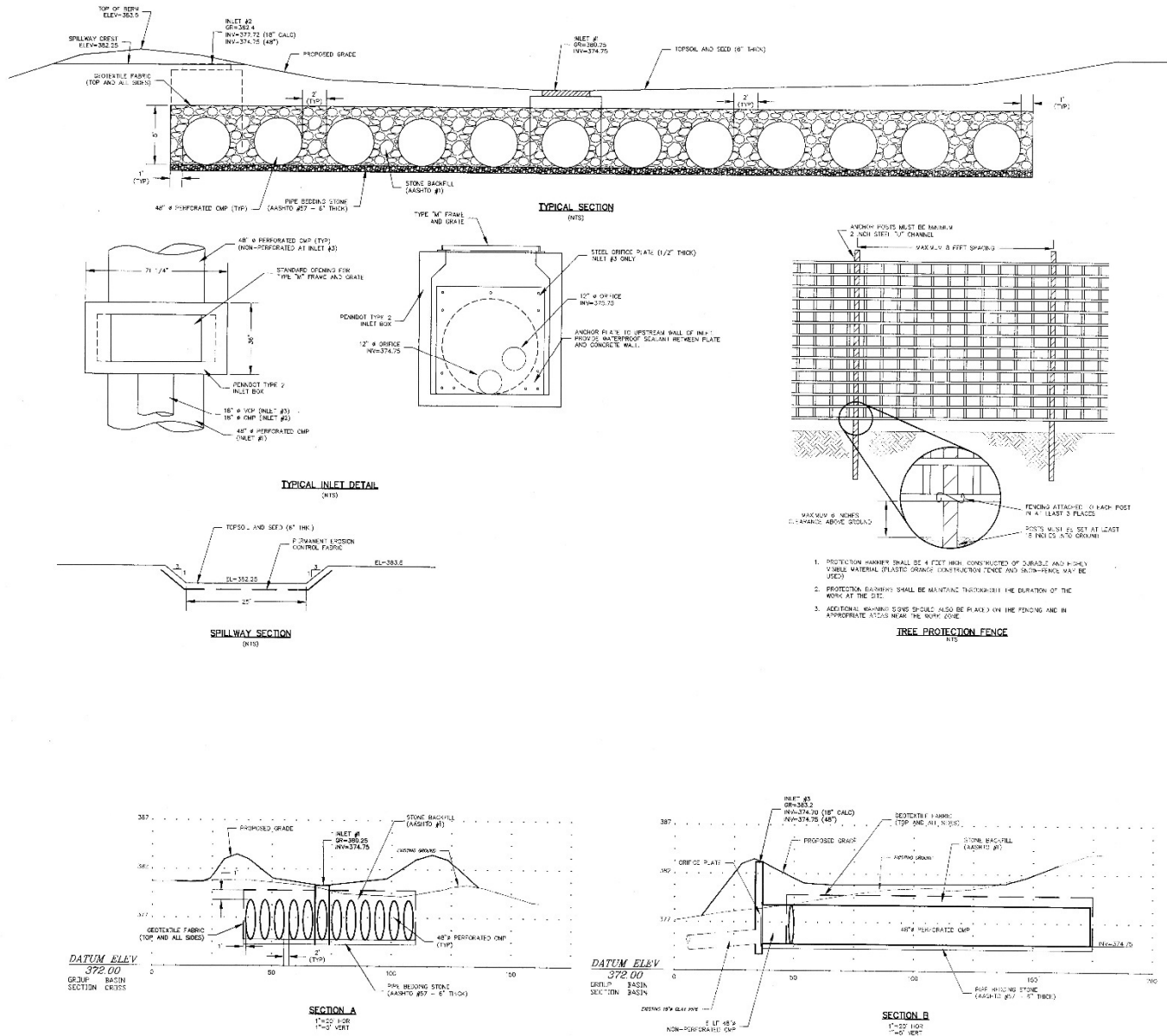
NORTH WAYNE AVENUE PARK
RADNOR TOWNSHIP
DELAWARE COUNTY - PENNSYLVANIA
SITE PLAN
TOWNSHIP OF RADNOR
301 IREN AVENUE
WAYNE, PA 19087-3237

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DATE	REV

JOB NO.	RAEN 0757-051.00
DATE	2 OF 5
SCALE	1" = 20'
DRAWN BY	RPU
CHECK BY	RPU
DATE	JULY, 1995
PROJECT	C1001

N. Wayne Basin – Existing



Pennoni

Consulting Engineers

One Riverside Center - Suite 328
110 South Poplar Street
Wilmington, Delaware 19801

Pennoni Associates Inc.

North Wayne Avenue Park
Radnor Township
Delaware County - Pennsylvania
Site Details
Township of Radnor
301 Men Avenue
Wayne, PA 19387-6287

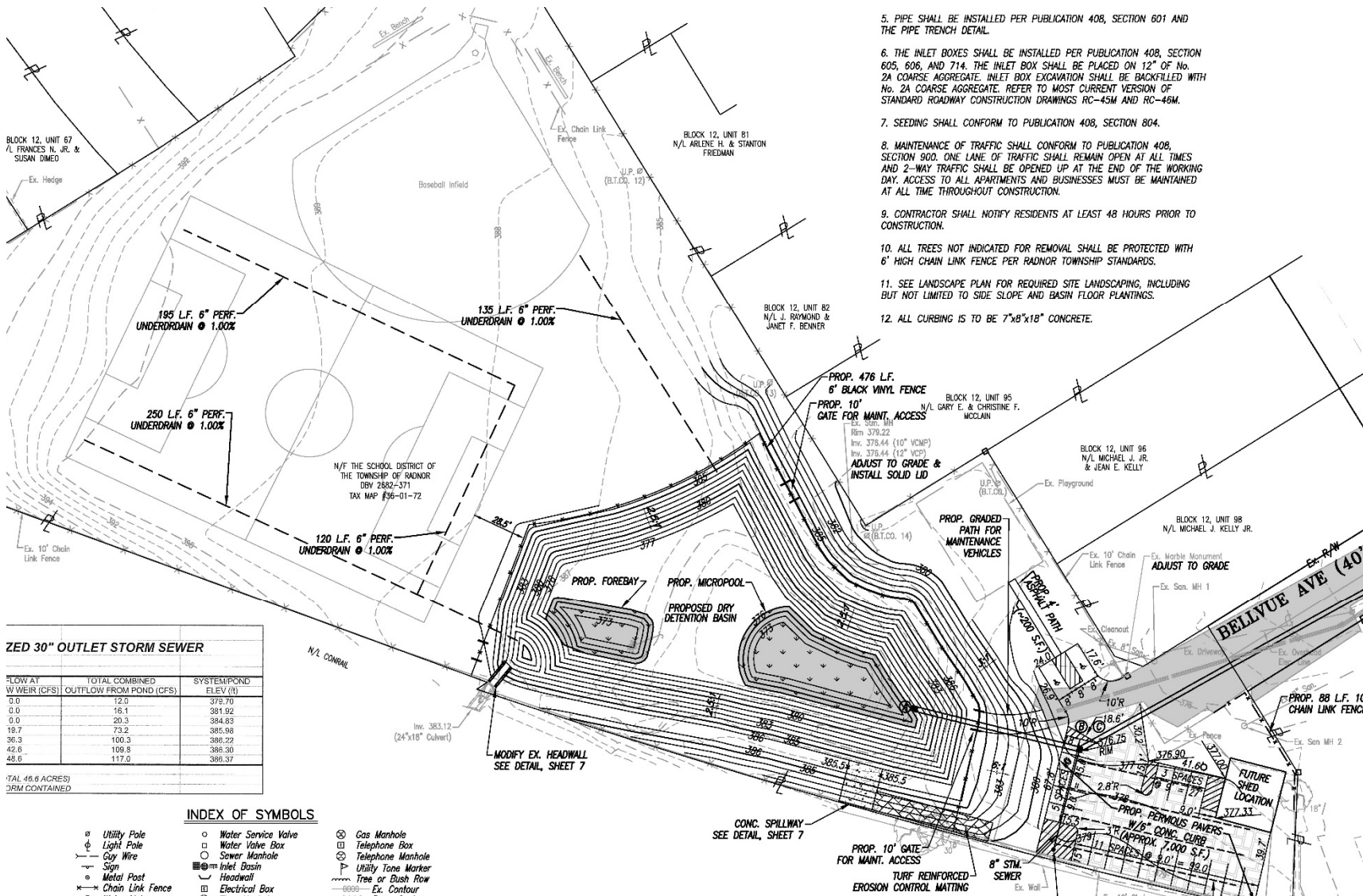
ALL DIMENSIONS SHOWN ARE UNLESS OTHERWISE SPECIFIED. ALL DIMENSIONS ARE TO FACE UNLESS OTHERWISE NOTED. DIMENSIONS TO FACE UNLESS OTHERWISE NOTED. DIMENSIONS TO FACE UNLESS OTHERWISE NOTED.

DATE	NO.	REVISION

JOB NO.	RADN 0757-051.00
ROOM NO./AL.	SHEET
P.A.	3 OF 5

SHEET	DRIVING NO.
NONE	
DRAWN BY:	
RFU	
DATE:	
JULY, 1998	
PROJECT:	C6001

N. Wayne Basin – Proposed



5. PIPE SHALL BE INSTALLED PER PUBLICATION 408, SECTION 601 AND THE PIPE TRENCH DETAIL.
6. THE INLET BOXES SHALL BE INSTALLED PER PUBLICATION 408, SECTION 605, 606, AND 714. THE INLET BOX SHALL BE PLACED ON 12" OF No. 2A COARSE AGGREGATE. INLET BOX EXCAVATION SHALL BE BACKFILLED WITH No. 2A COARSE AGGREGATE. REFER TO MOST CURRENT VERSION OF STANDARD ROADWAY CONSTRUCTION DRAWINGS RC-45M AND RC-46M.
7. SEEDING SHALL CONFORM TO PUBLICATION 408, SECTION 804.
8. MAINTENANCE OF TRAFFIC SHALL CONFORM TO PUBLICATION 408, SECTION 900. ONE LANE OF TRAFFIC SHALL REMAIN OPEN AT ALL TIMES AND 2-WAY TRAFFIC SHALL BE OPENED UP AT THE END OF THE WORKING DAY. ACCESS TO ALL APARTMENTS AND BUSINESSES MUST BE MAINTAINED AT ALL TIME THROUGHOUT CONSTRUCTION.
9. CONTRACTOR SHALL NOTIFY RESIDENTS AT LEAST 48 HOURS PRIOR TO CONSTRUCTION.
10. ALL TREES NOT INDICATED FOR REMOVAL SHALL BE PROTECTED WITH 6' HIGH CHAIN LINK FENCE PER RADNOR TOWNSHIP STANDARDS.
11. SEE LANDSCAPE PLAN FOR REQUIRED SITE LANDSCAPING, INCLUDING BUT NOT LIMITED TO SIDE SLOPE AND BASIN FLOOR PLANTINGS.
12. ALL CURBING IS TO BE 7"x8"x18" CONCRETE.

ZED 30" OUTLET STORM SEWER

FLOW AT WEIR (CFS)	TOTAL COMBINED OUTFLOW FROM POND (CFS)	SYSTEM POND ELEV. (ft)
0.0	12.0	379.70
0.0	16.1	381.92
0.0	20.3	384.83
18.7	73.2	385.98
36.3	100.3	386.22
42.6	109.8	386.30
48.6	117.0	386.37

TOTAL 46.6 ACRES)
DEM CONTAINED

- INDEX OF SYMBOLS**
- Utility Pole
 - Light Pole
 - Guy Wire
 - Sign
 - Metal Post
 - Chain Link Fence
 - Water Service Valve
 - Water Valve Box
 - Sewer Manhole
 - Inlet Basin
 - Headwall
 - Electrical Box
 - Gas Manhole
 - Telephone Box
 - Telephone Manhole
 - Utility Tone Marker
 - Tree or Bush Row
 - Ex. Contour



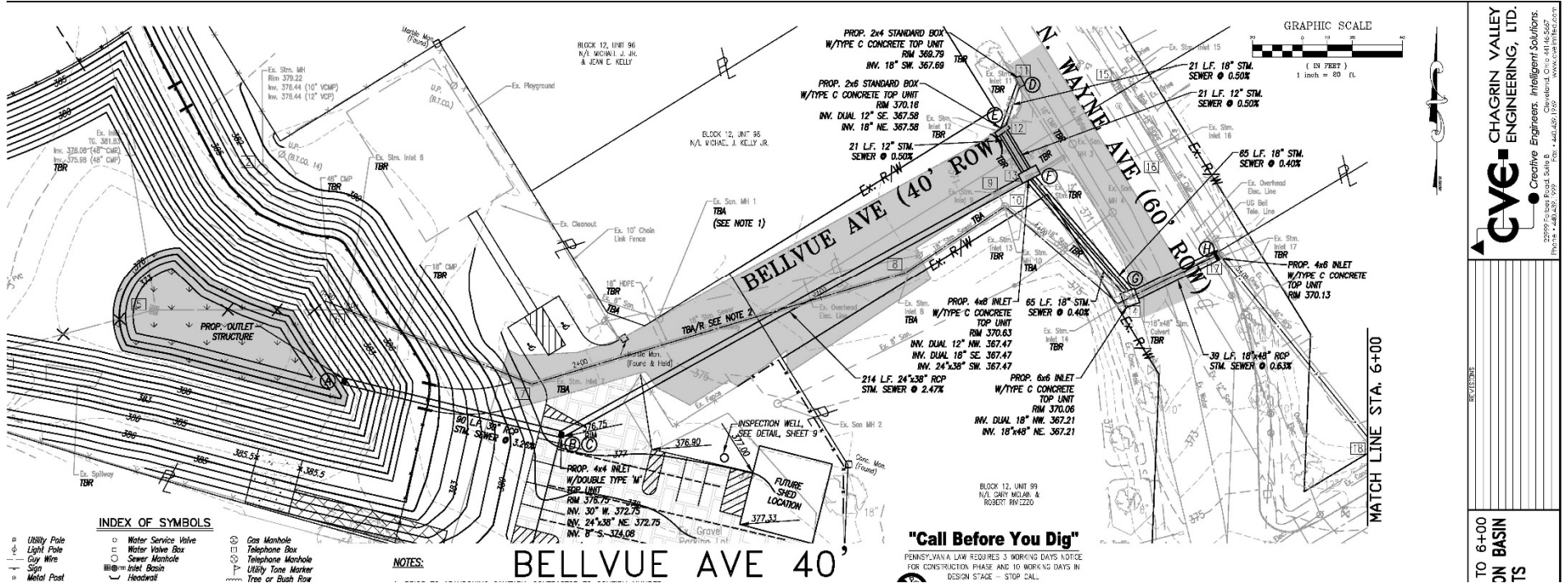
22799 Forbes Rd
Plymouth, PA 15468-1019

REVISIONS

PROPOSED PARK IMPROVEMENTS
NORTH WAYNE PARK DETENTION BASIN
& SEWER IMPROVEMENTS
RADNOR TOWNSHIP
PENNSYLVANIA

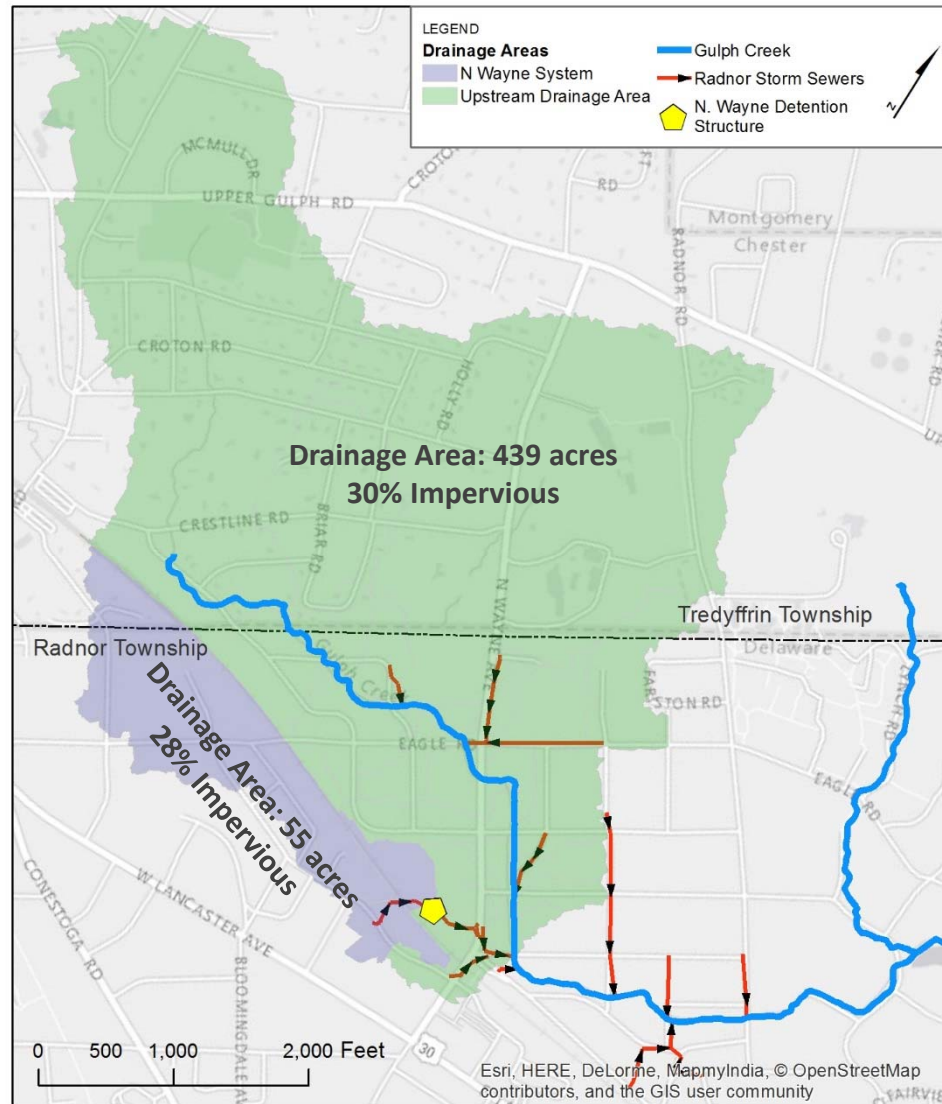
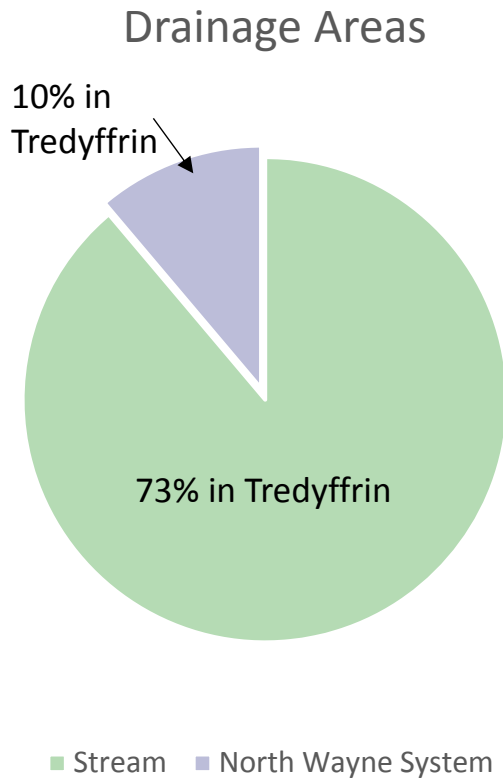
DESIGNED BY: _____
 DRAWN BY: _____
 CHECKED BY: _____
 DATE: 5-6-2014
 SCALE: 1" = 30'
 SHEET: _____
 PROJECT NUMBER: 14422

N. Wayne Basin – Proposed



CHAGRIN VALLEY ENGINEERING, LTD.
 Creative Engineers. Intelligent Solutions.
 22977 N. State Road, Suite B, Dayton, OH 45424-6667
 Phone: 937.233.7777 Fax: 937.233.7777 www.cveinc.com

N. Wayne detention system is 11% of drainage area to stream at N. Wayne & Poplar Ave



Map prepared by CH2M on 8/18/2016 for presentation to township

Drainage Area to North Wayne Basin

Runoff comes predominantly from the residential area south of the RR tracks and west of the AT&T development



Preliminary Model:

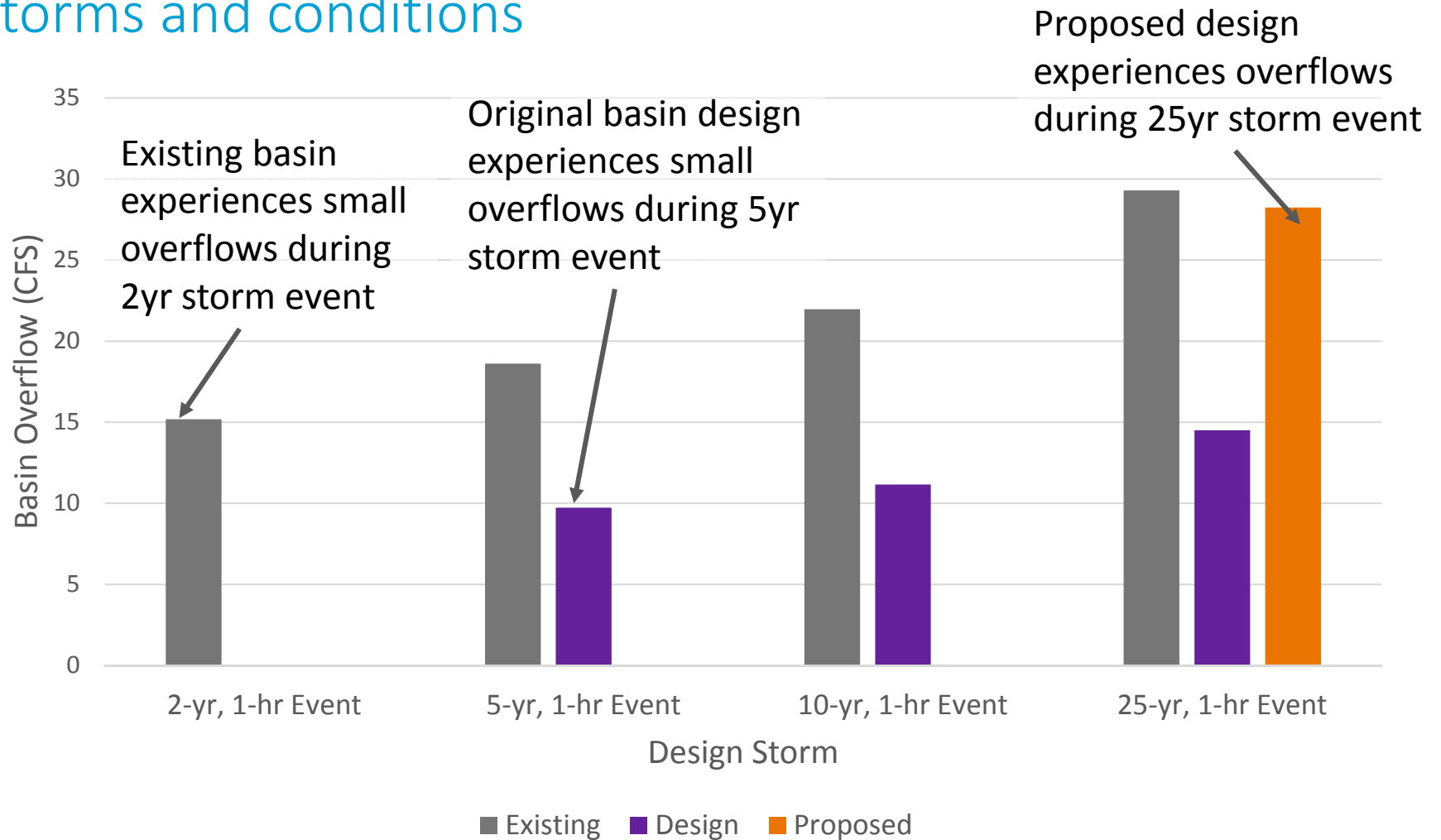
Original design, existing conditions, and proposed improvements for several storm events

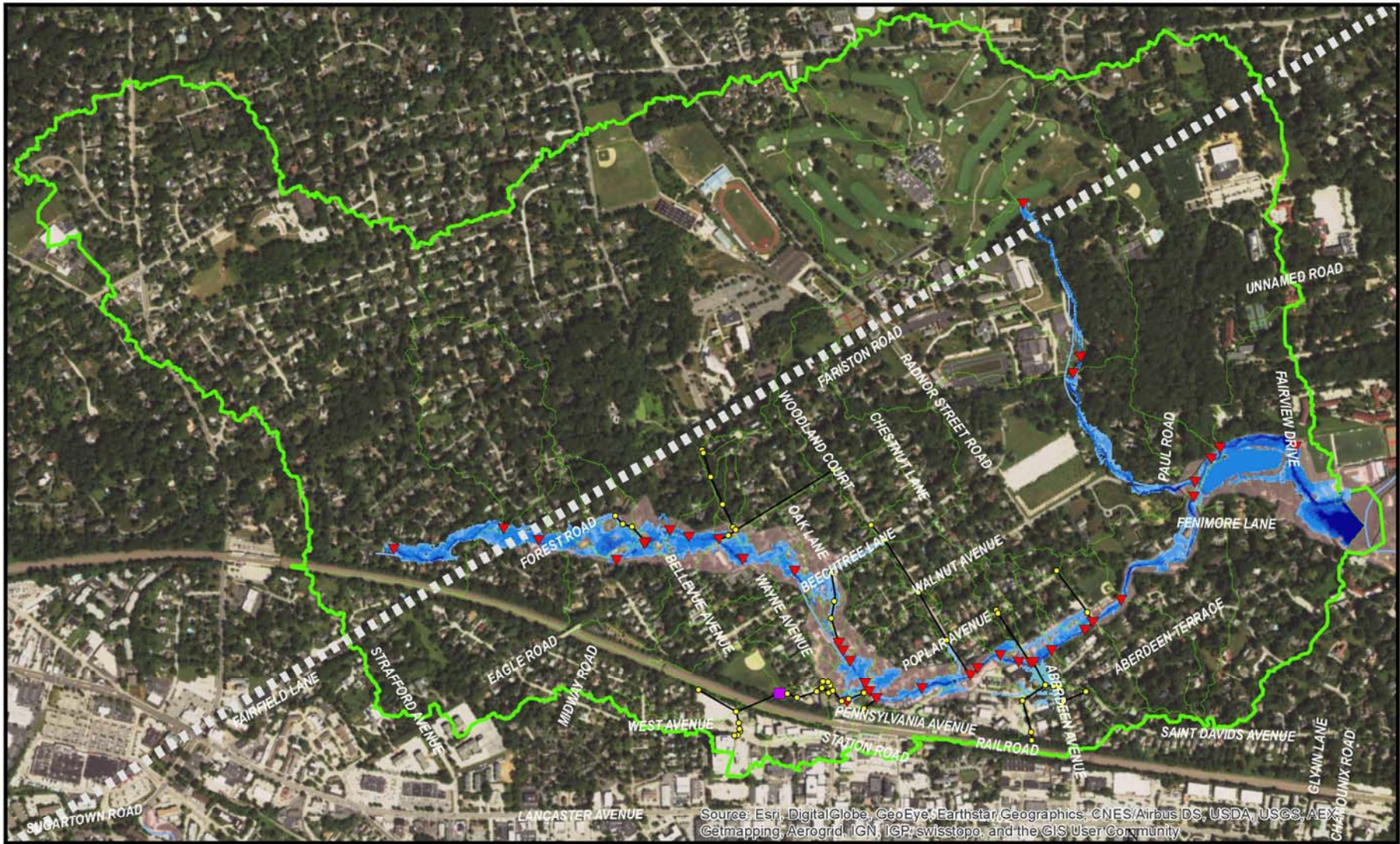
- Existing Conditions
 - 12-18 inches of sedimentation
 - Less than 30,000 ft³ of storage
 - Obstructed inlet
- Original Design
 - Approx. 49,000 ft³ of storage
 - Unobstructed inlet
- Proposed Improvements
 - Approx. 147,000 ft³ of storage
 - Reconfigured outlet structure

Design Storm	Total Rainfall (in)
2 year, 1 hour	1.44
5 year, 1 hour	1.79
10 year, 1 hour	2.03
25 year, 1 hour	2.40

Preliminary Results

Overflow from North Wayne Basin for various design storms and conditions



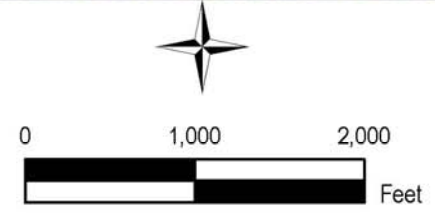


Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, IGP, swisstopo, and the GIS User Community

- Modeled Junctions
- ▼ Modeled Outfalls
- Modeled North Wayne Basin
- Modeled Pipes
- Surface Waterways
- ◻ Model Subcatchments
- ◻ Model Extents
- ◻ Radnor Township Boundary
- ◻ 100-year FEMA Flood Zone

2-yr, 1-hr Max Flood Depth Grid

- 0.01 - 0.17 ft
- 0.17 - 0.5 ft
- 0.5 - 1 ft
- 1 - 2 ft
- 2 - 3 ft
- 3 - 4 ft
- 4 - 5 ft
- 5 - 6 ft



NOTE: Flood Depth Results modeled by CH2M HILL using Flood Modeller Suite.

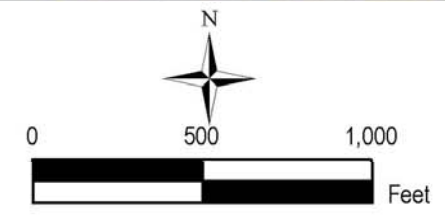


Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

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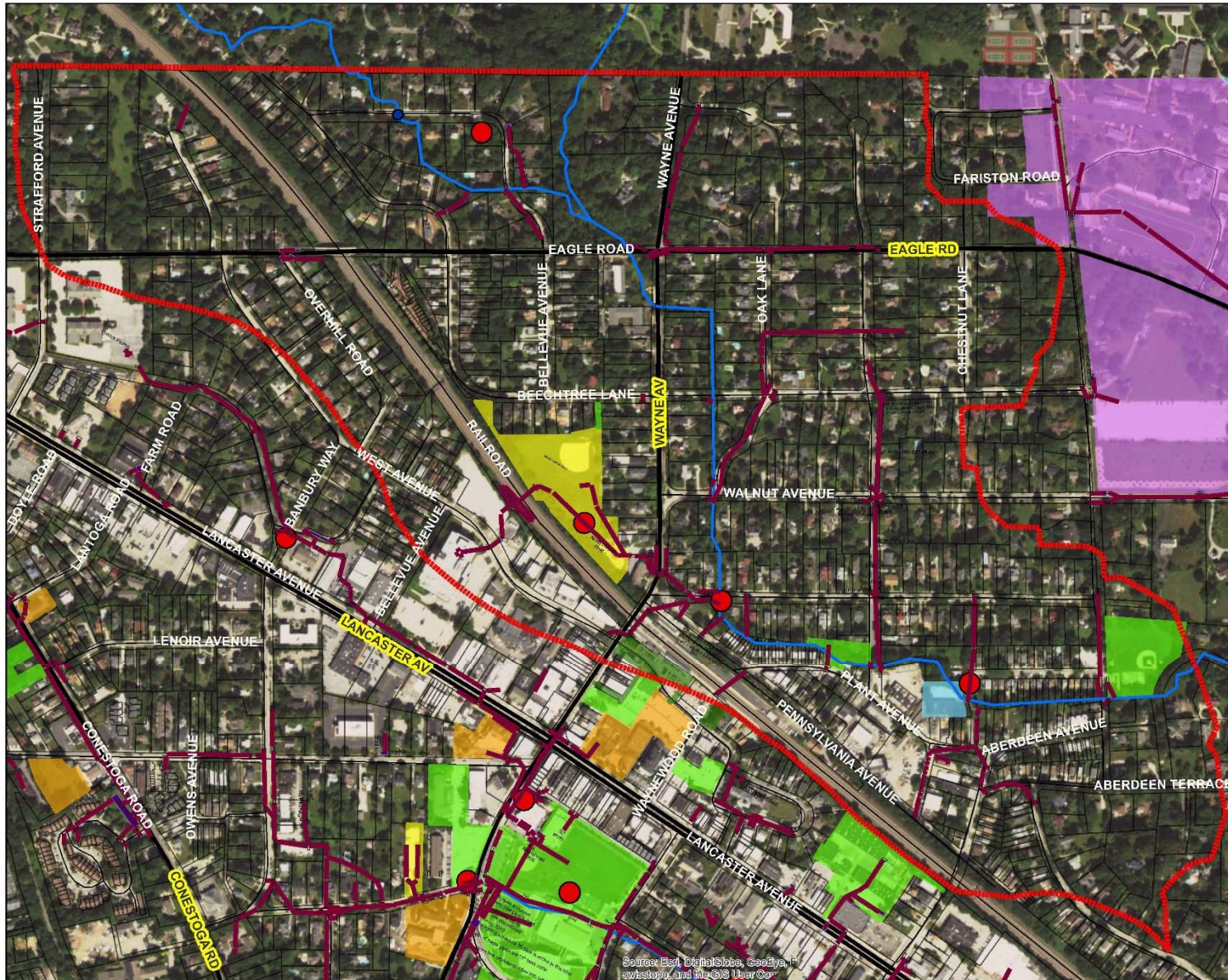
NOTE: Flood Depth Results modeled by CH2M HILL using Flood Modeller Suite.



Path Forward and Public Input Request

- Where does the ‘wall of water’ come from?
 - Over the east or south side of the basin?
 - Through the parking lot and down the driveway?
- What is specifically meant when it is said that the basin ‘ruptures’ or ‘fails’?
- Where else does flooding occur
 - West Avenue?
 - South side of RR tracks?

North Wayne – Potential Flood Mitigation Solutions?



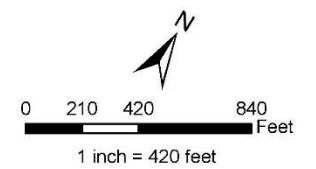
Radnor Township Field Map

North Wayne Study Area

Legend

- North Wayne Study Area
- Storm Sewers (lines)
- Storm Sewers (polygons)
- Problem Locations Overlap
- Streams
- Radnor Township
- Radnor School
- SEPTA/AMTRAK
- College/University
- Private School
- Religious
- PA State Roads (Yellow Label)

Note: The "bracket" [] symbols represent inlets.



ch2m

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNR Aero, IGN, Swisstopo, and the GIS User Community

Radnor Township Field Maps August 30, 2016

Area I



LEGEND

- ▲ Documented Problems
- ▲ Model Problems
- ▲ Overlap Problems

Storm Junctions

- Other

Type

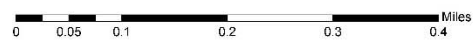
- ★ BMP
- Inlet
- Manhole
- * Pipe IO

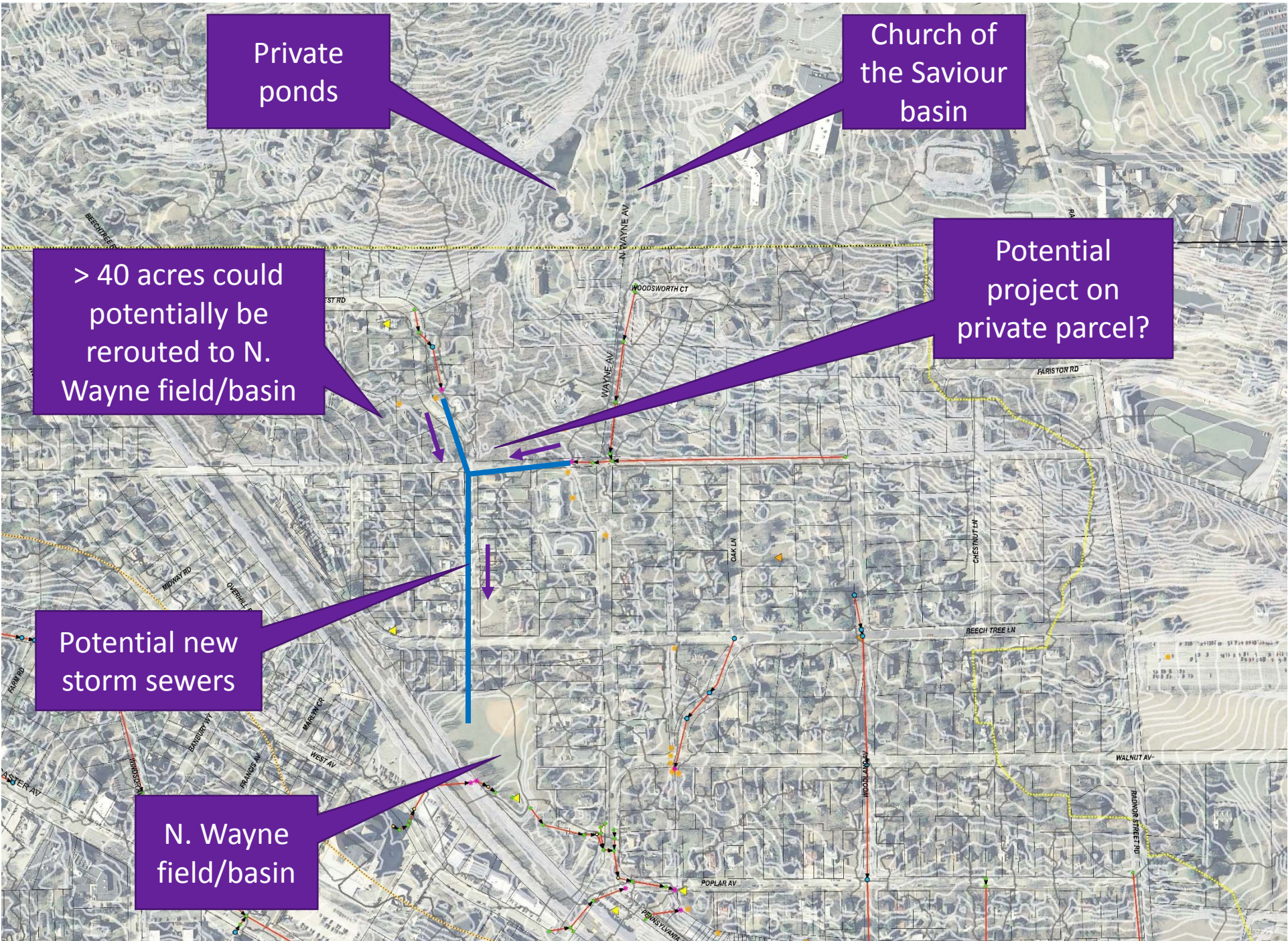
StormSewers

- Not Modeled
- Modeled
- Streets

2ft Contours

- ▭ Problem Area
- ▭ Catchments - 10k
- ▭ Parcels
- ▭ Township Boundary





Private ponds

Church of the Saviour basin

> 40 acres could potentially be rerouted to N. Wayne field/basin

Potential project on private parcel?

Potential new storm sewers

N. Wayne field/basin

> 40 acres could potentially be rerouted to N. Wayne field/basin

