CEEn-2018CPST-007

CITYWIDE DRAINAGE ANALYSIS

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Introduction

What?

- Drainage Analysis of Woodland Hills
- Culvert and Channel Design

Why?

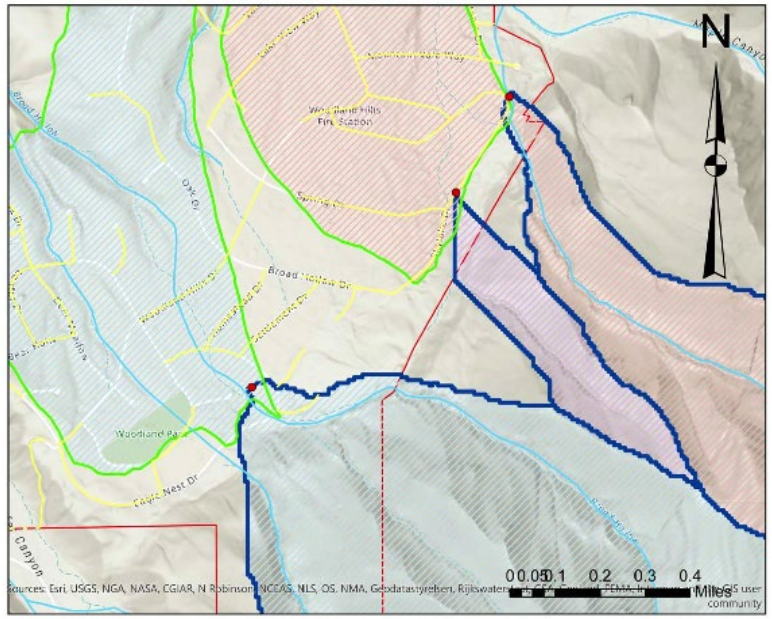
- Help mitigate negative effects of snow and rain run-off

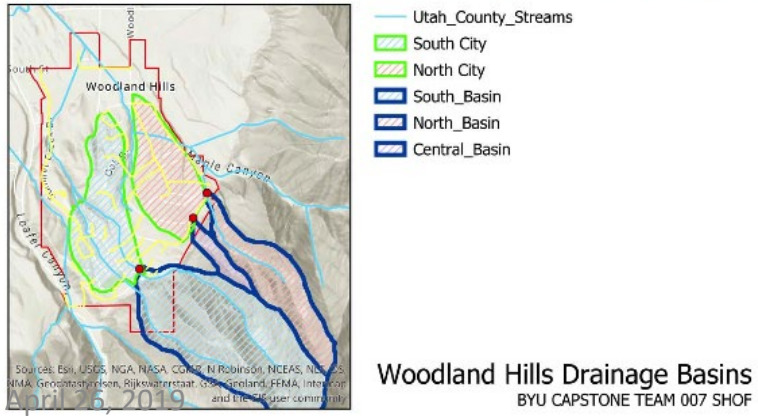
Project Tasks and Deliverables

Project Tasks:

- Task 1: Data Collection
  - Flow, Elevation, and Watershed data
- Task 2: System Analysis
  - HY-8 and Hydraulic Toolbox Programs
- Task 3: Recommendations

Design and Analysis





Woodland Hills Drainage Basins

Task 1: Data Collection

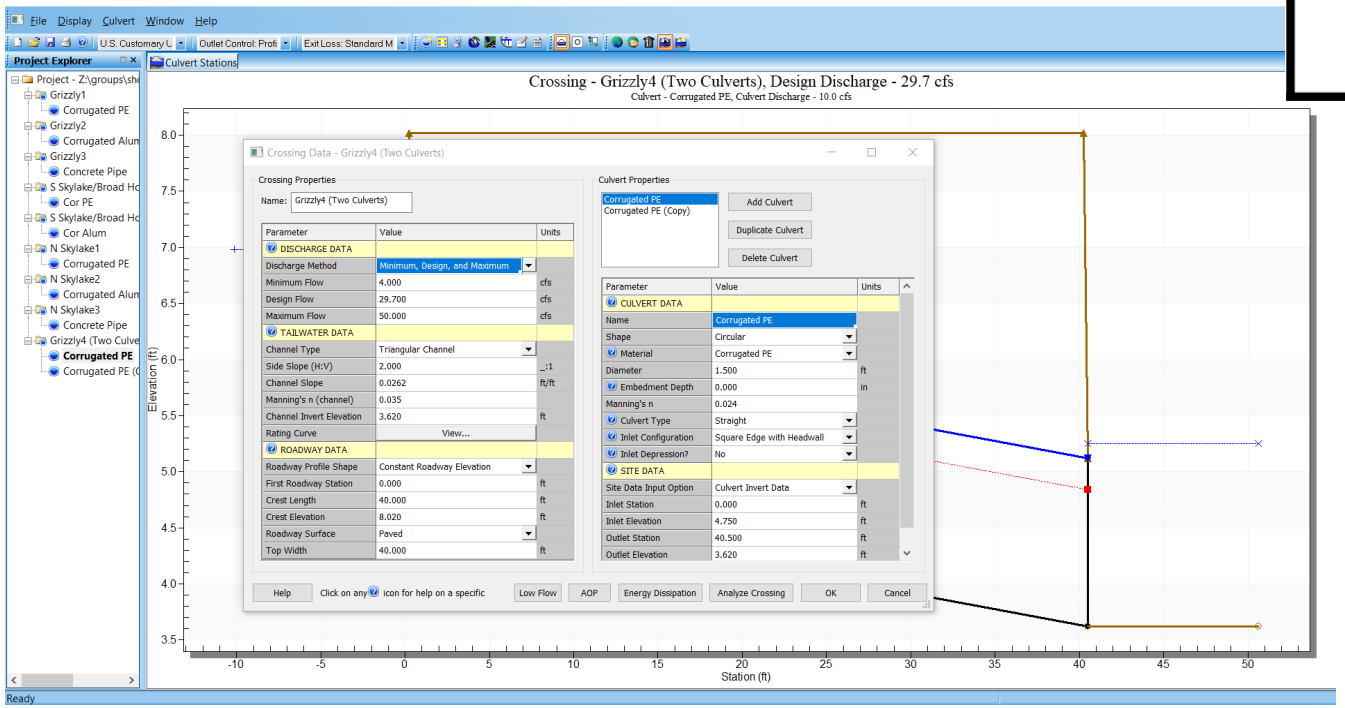
- What data is on the map?
  - Stream network, city limits, outlet points
  - Three major watersheds that effect the City of Woodland Hills:
    - ➢ North, Central, South
- Where it came from?
  - StreamStats to find mountainous drainage flow
  - Estimate city drainage flow
  - Find total drainage flow for each basin

Design and Analysis Cont'd

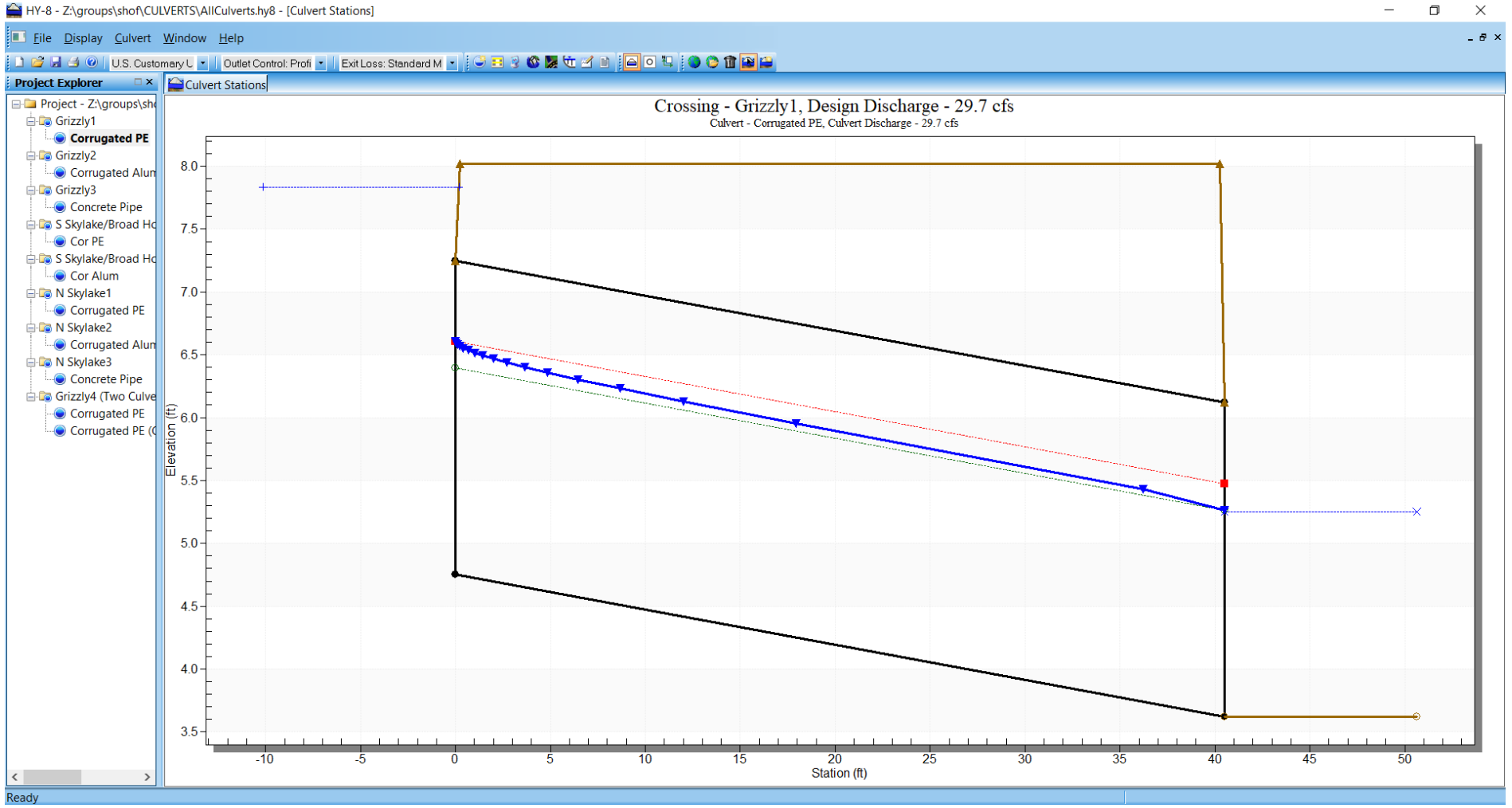
Task 2: System Analysis

- Hydraulic Toolbox (Channels)
- HY-8 (Culverts)
- Design flows

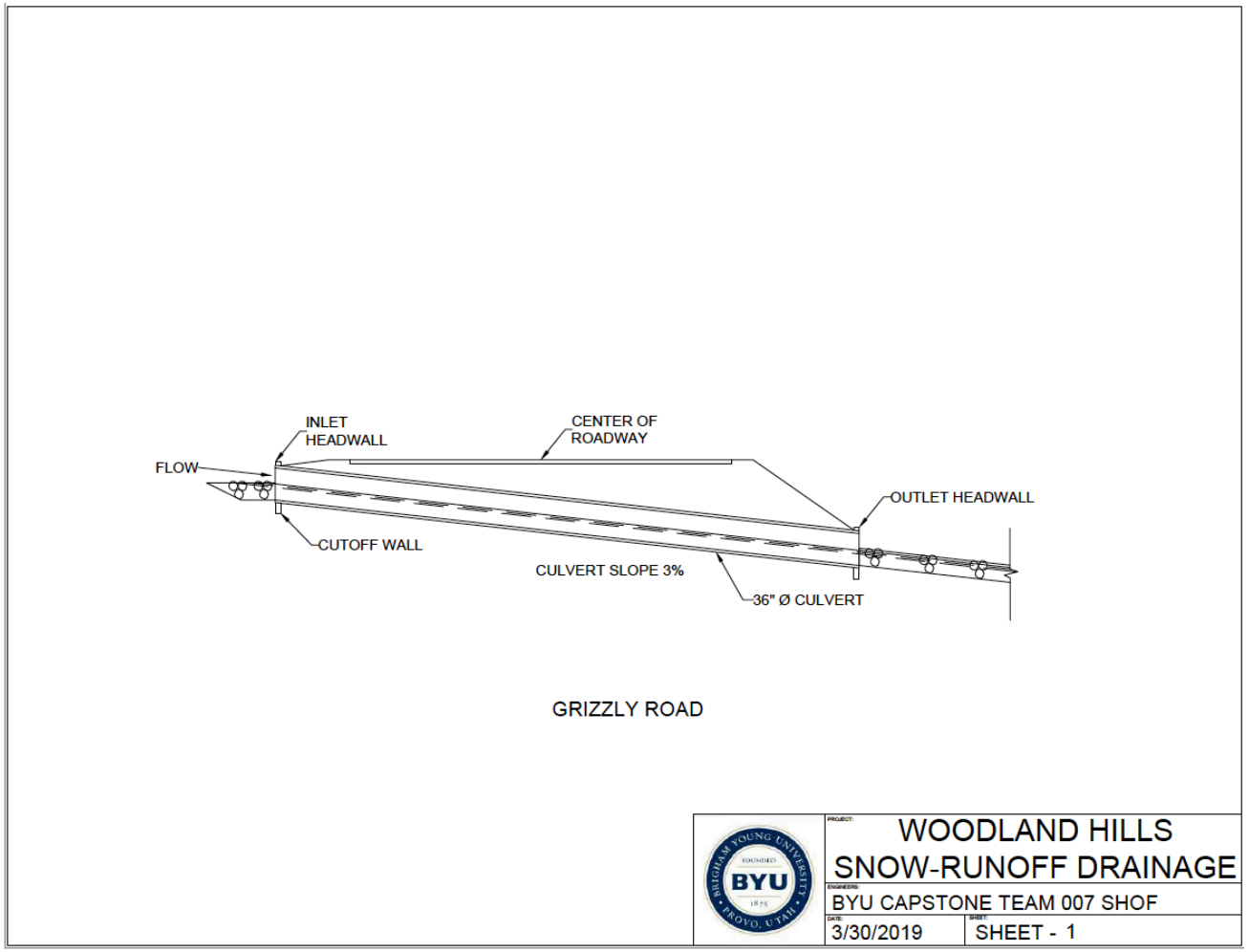
Field Location	10-year Peak Flow (cfs)	Tailwater Channel Slope	Culvert Type	Culvert Size (in)	Overtop Flow (cfs)
N Skylake (North)	17.7	0.0890 (max 0.110)	Corr. PE	24	22.38
			Corr. Al	24	22.38
			Concrete Pipe	24	22.20
Broad Hollow (Central)	4.82	0.0705	Corr. PE	18	8.34
			Corr. Al	18	8.33
Grizzly (South)	29.7	0.0262	Corr. PE	30	31.6
			Corr. Al	30	30.92
			Concrete Pipe	30	31.40



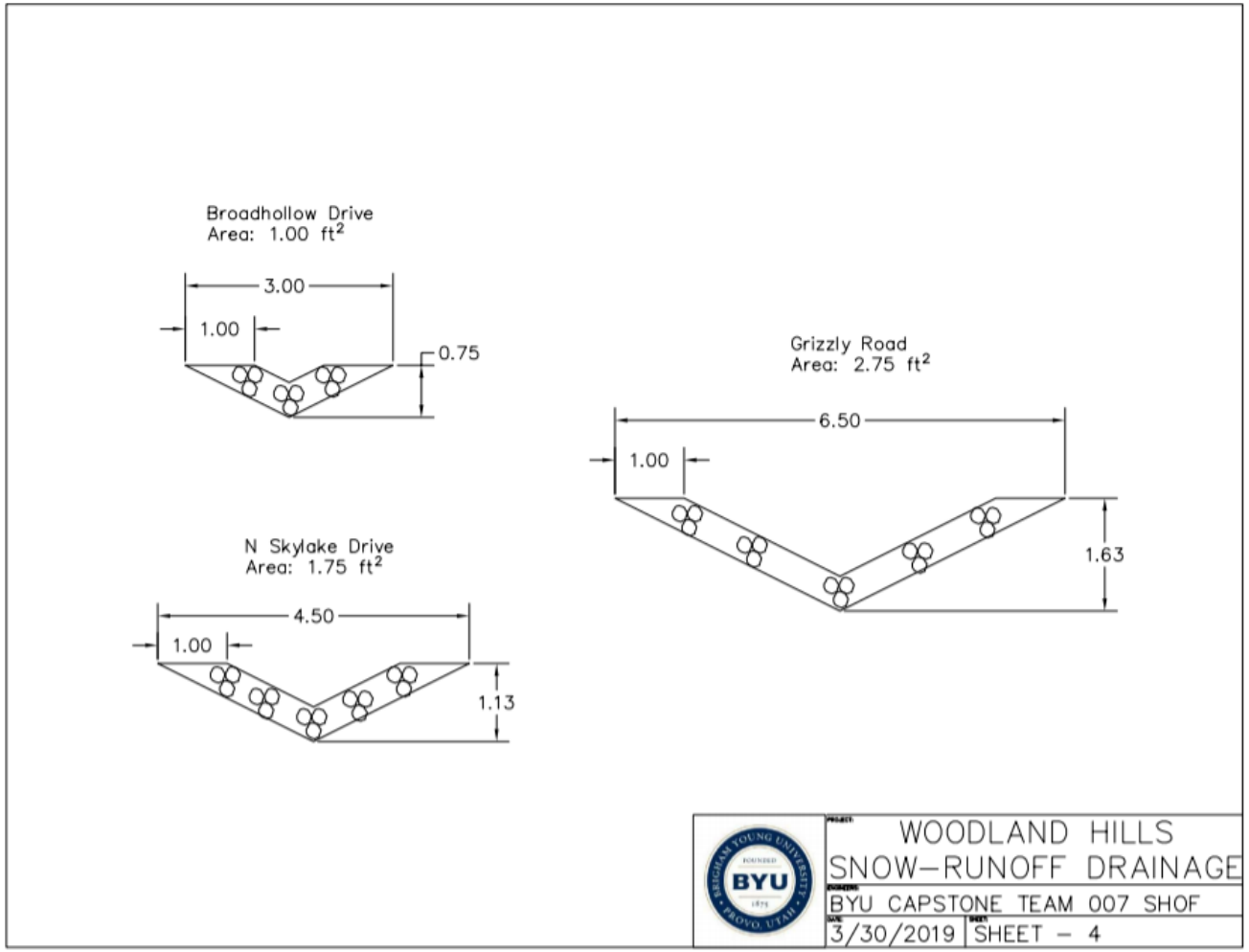
Design and Analysis Cont'd



Discussion of Results



Discussion of Results Cont'd



Conclusions

Location	Item	Size	Price Estimate	Unit	Quantity	Probable Total Cost
N Skylake	Corrugated Polyethylene	24in	$ 25.43	linear foot	18ft	$ 457.74
	Corrugated Aluminum	24in	$ 64.00	linear foot	18ft	$ 1,152.00
	Concrete Pipe (Class V)	24in	$ 68.50	linear foot	18ft	$ 1,233.00
Broad Hollow	Corrugated Polyethylene	18in	$ 16.34	linear foot	24ft	$ 392.16
	Corrugated Aluminum	18in	$ 44.00	linear foot	24ft	$ 1,056.00
Grizzly	Corrugated Polyethylene	30in	$ 41.56	linear foot	40ft	$ 1,662.40
	Corrugated Aluminum	30in	$ 86.00	linear foot	40ft	$ 3,440.00
	Concrete Pipe (Class V)	30in	$ 94.00	linear foot	40ft	$ 3,760.00

Corrugated PE, Corrugated Aluminum, or Concrete culverts will be the most efficient options for balancing cost and size of upgrades.

Conclusions Cont'd

Deliverables

- Final report summarizing design, analysis, and results
- GIS Map including delineated drainage basins and outlet points
- Culvert and channel design files (HY-8 and Hydraulic Toolbox)
- Drawings showing roadway cross-sections

Recommendations

Channels

- Triangular
- Class I riprap
- Divide flow into two channels in Southern Basin (Grizzly Road)

Culverts

- Corrugated plastic most economical
- Inlet configuration: mitered or square edge with headwall
- Consider wingwalls and debris mitigation on culverts at outlet points indicated on GIS Map
- Develop mitigation plan for 25- and 50-year storm events

The End