Conewago Creek Floodplain Restoration

Londonderry Township, Dauphin County, PA

March 4, 2026

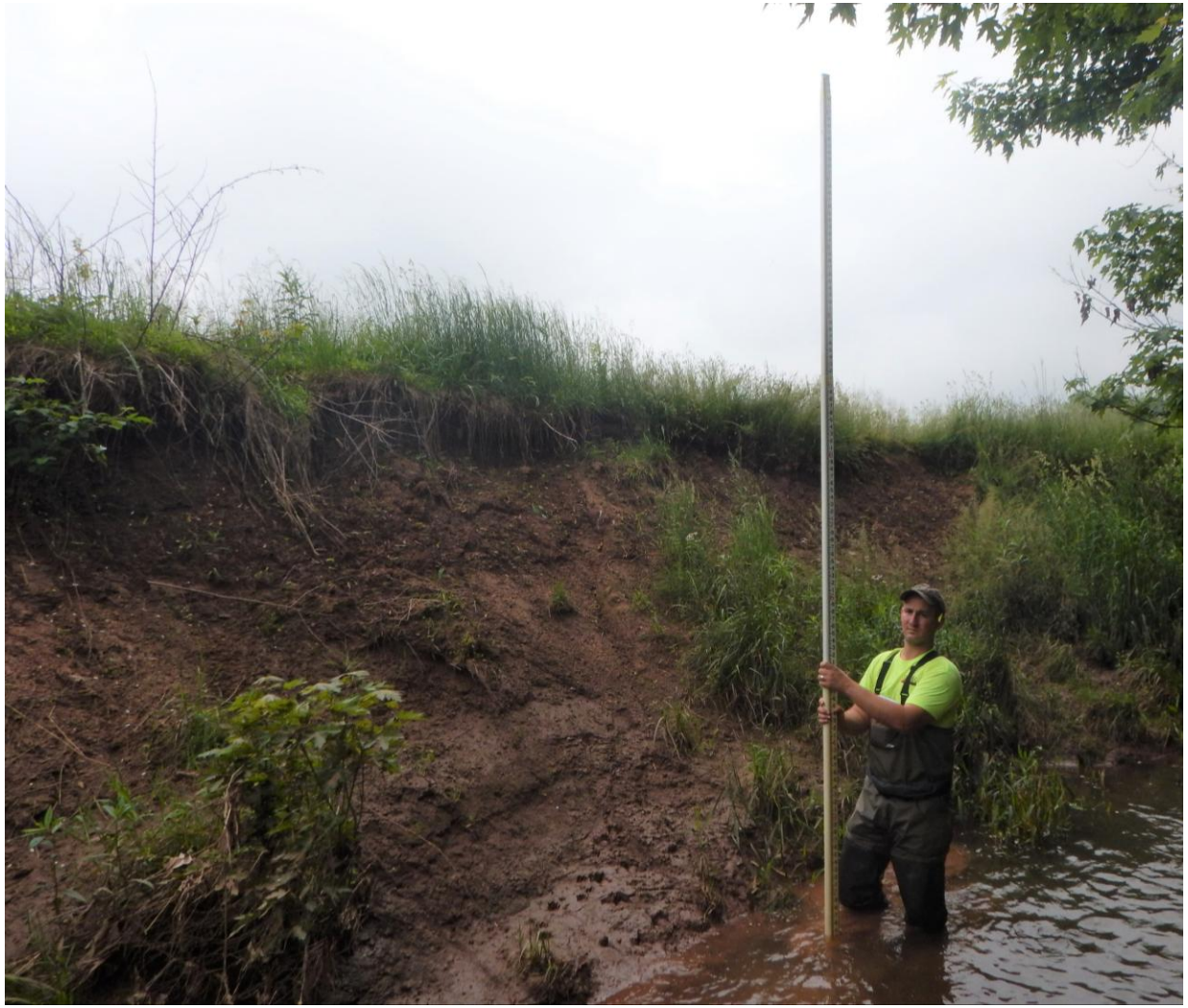
Land Studies
a DAVEY company

Project Timeline

- May 2018 –Feasibility study assessing 3 miles of Conewago identifying optimal restoration reach
- July 2019 – Begin engineering design & permitting
- May 2020 – Initial permit submittal
- July 2021 – Receive USACE Section 404 and PA DEP Chapter 105 Permits
- May to July 2022 – Phase 1 (Brills Run) Construction Complete
- June 2023 – Phase 2 & 3 Complete*

Land Studies
a DAVEY company

Pre-Construction - Brills Run



Pre-Construction - Conewago Creek

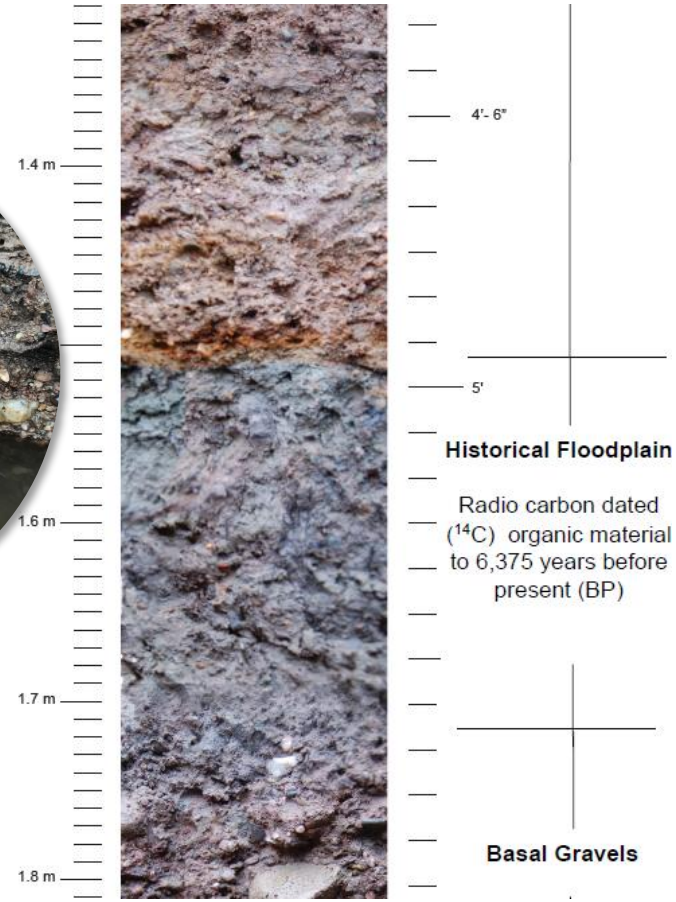
Project Constraints

- Conewago Creek Drainage Area – 37.4 square miles, excessive sand and gravel bedload.
- Bank Height 6+ feet throughout project reach; resulting in over 125,000 cy of sediment burying pre-settlement wetlands and floodplain.
- Agricultural Crossing middle of Project Reach
- Restore and address Brills Run confluence w/Conewago Creek at Upstream Extent
- Manage incoming sediment loadings from Conewago Creek
- Manage spoil material
- Provide Vertical stability and controls
- Cost

Land Studies
a DAVEY company

- Assessment
  - Cut Bank Indicators
  - Trench Investigation
    - Carbon Dating
  - Tile Probe Transects
  - Historical Documentation

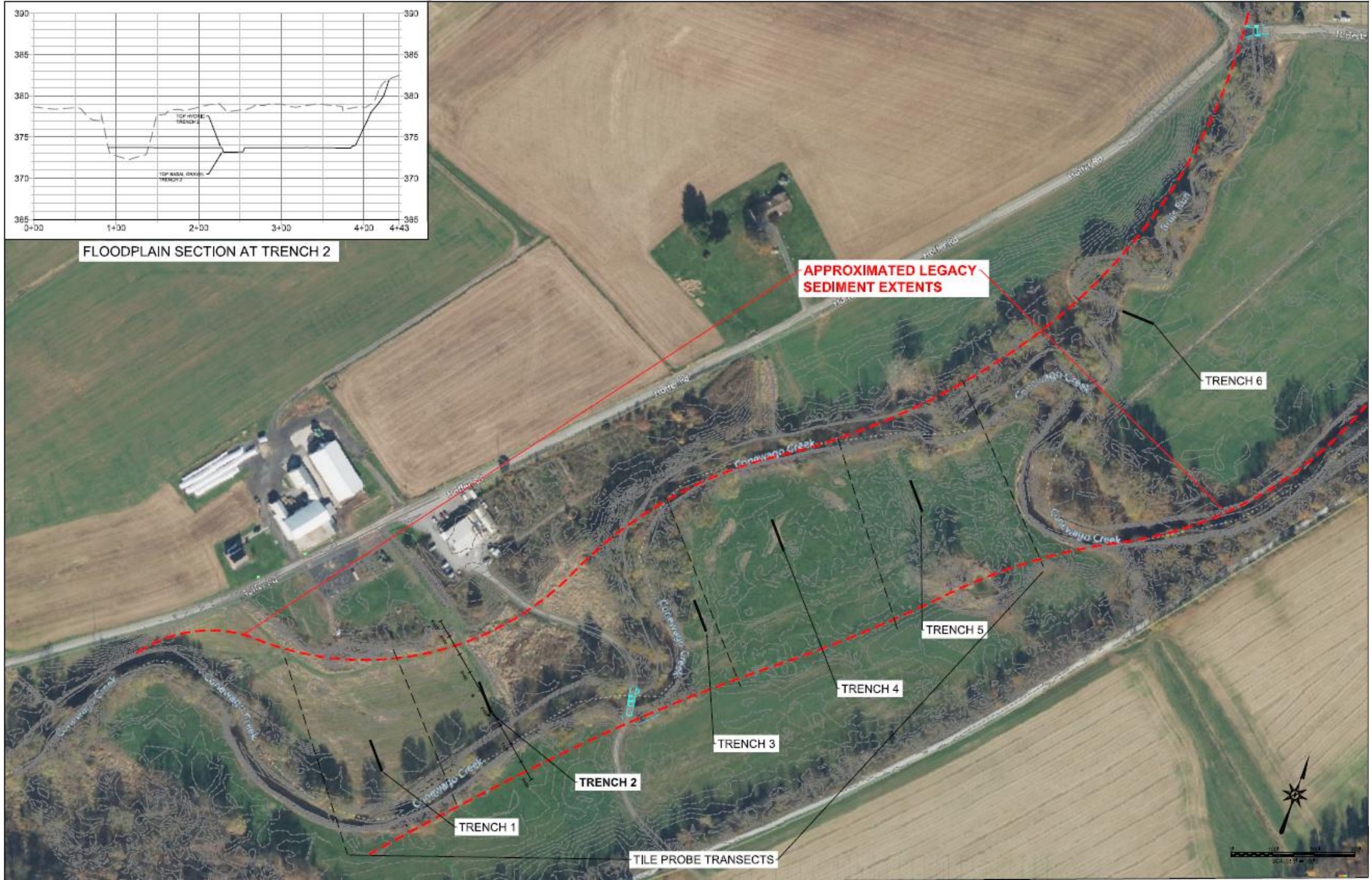
Establish Legacy Impairment Extents & the ***Historical Reference Condition***

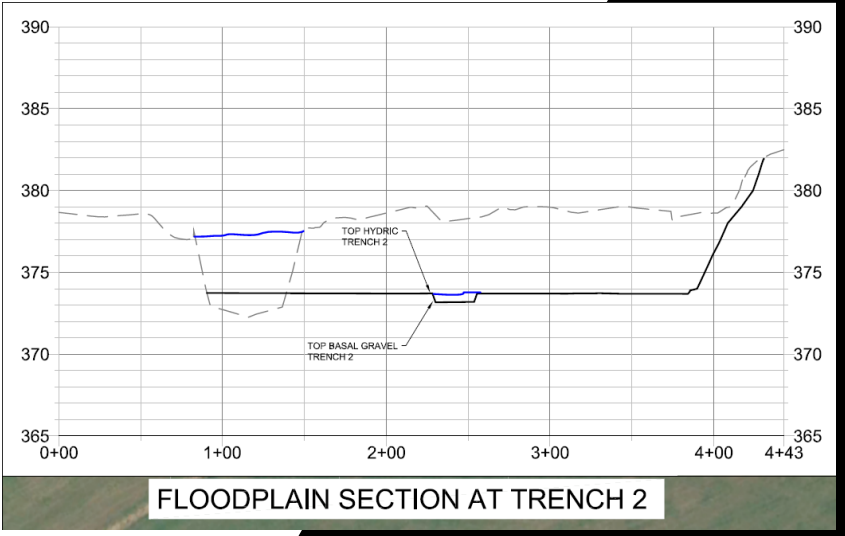


- Design
  - Target Historical Reference Condition
    or Processes Based on Project Objectives
  - Ensure Hydraulic Stability
  - Within Project Constraints

- Results
  - Hydraulic Stability, Hydrologic Connectivity
  - Was Conveyance System ➔ Now Recruitment System
    - Retaining Carbon, Biota, Nutrients
  - Brook Trout Example – Temperature Regulation, Spawning (clean, substrate), Young of Year (springs, macros), Fry (shelter, detritus)

Land Studies
a DAVEY company


390
385
380
375
370
365
0+00
1+00
2+00
3+00
4+00
4+43
FLOODPLAIN SECTION AT TRENCH 2
APPROXIMATED LEGACY SEDIMENT EXTENTS
TRENCH 1
TRENCH 2
TRENCH 3
TRENCH 4
TRENCH 5
TRENCH 6
TILE PROBE TRANSECTS
Hotter Rd
Conewago Creek

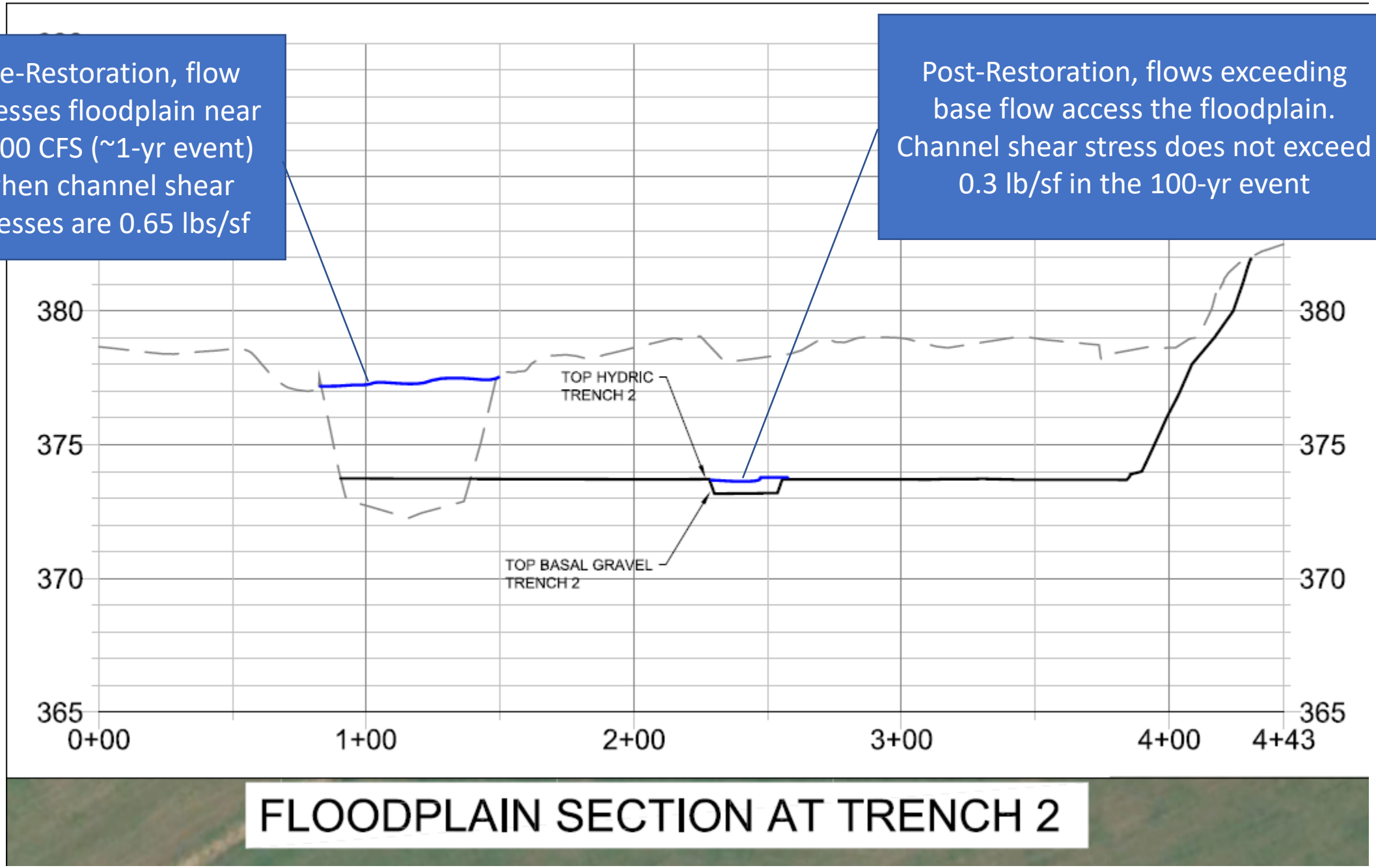


FLOODPLAIN SECTION AT TRENCH 2

Land Studies
a DAVEY company

Pre-Restoration, flow accesses floodplain near 1,000 CFS (~1-yr event) when channel shear stresses are 0.65 lbs/sf

Post-Restoration, flows exceeding base flow access the floodplain. Channel shear stress does not exceed 0.3 lb/sf in the 100-yr event



FLOODPLAIN SECTION AT TRENCH 2

Land Studies
a DAVEY company

717-627-4440
landstudies.com
land@landstudies.com
315 North Street
Lititz, PA 17543

NO.	REVISION	DATE	BY
2	REVISED PER PADEP COMMENTS	3/30/2021	JBR
1	REVISED PER PADEP COMMENTS	10/06/20	JBR

HRG
Engineering & Related Services
AN EMPLOYEE-OWNED COMPANY
340 West Park Drive
Harrisburg, PA 17111
(717) 944-1331
FAX (717) 944-1338
hrg@hrg-inc.com
www.hrg-inc.com

LONDONDERRY TOWNSHIP
783 SOUTH GEYERS CHURCH ROAD
MIDDLETOWN, PA 17057
(717) 944-1803

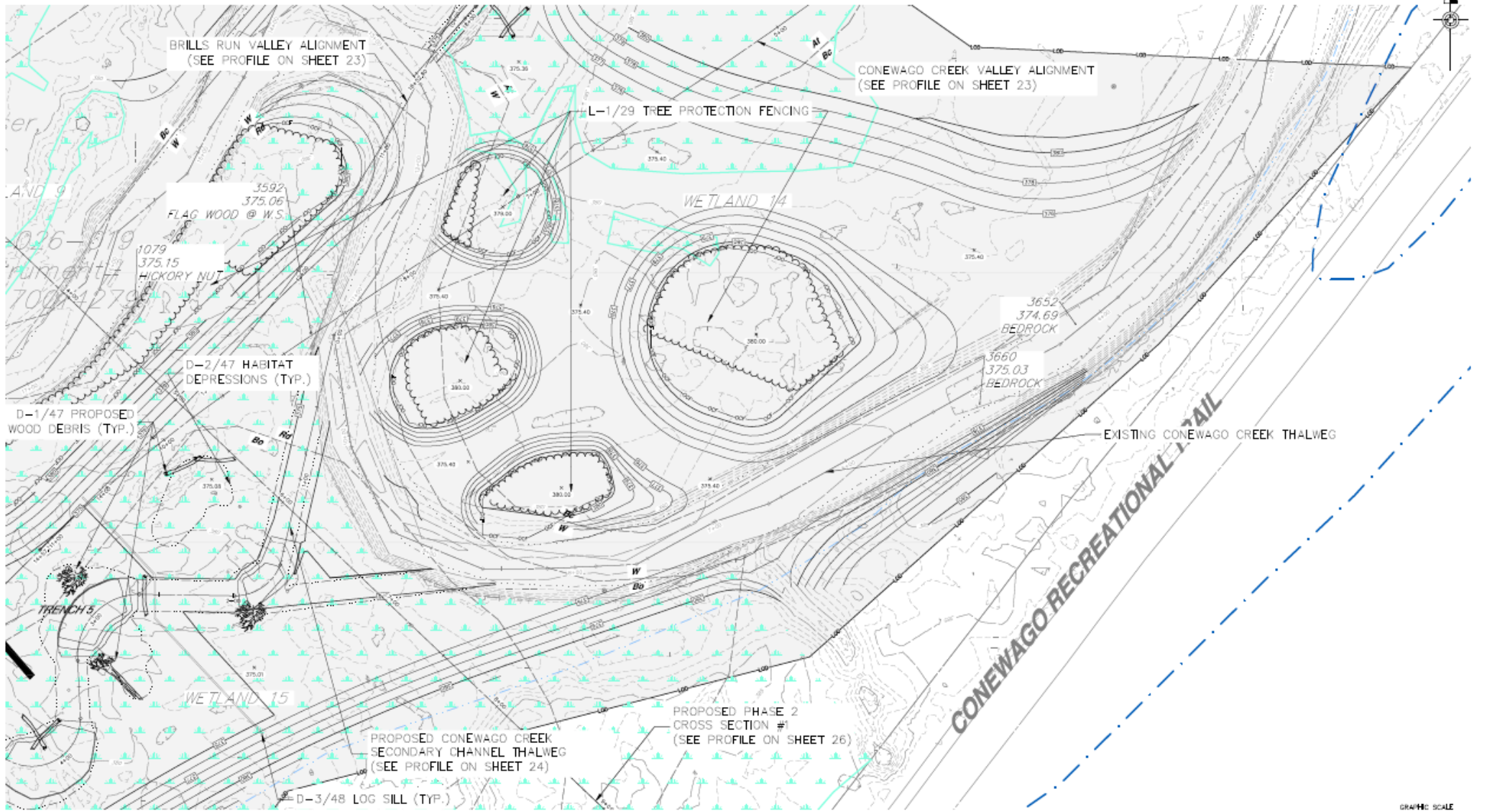
PROPOSED CONDITIONS - OVERALL
FOR
CONEWAGO CREEK STREAM RESTORATION
LONDONDERRY TWP
CONEWAGO TWP
MOUNT JOY TWP
DAUPHIN COUNTY
LANCASTER COUNTY
PENNSYLVANIA

PROJ. MGR. – SEF	
DESIGN– LSI	
CADD– ILU	
CHECKED–SEF	
SCALE– AS SHOWN	
DATE– MAY, 2020	

DRAWING NO.
SI-01
SHEET NO.
12 OF 49
PROJECT R001068.0521

Land Studies
a DAVEY company

717-627-4440
landstudies.com
land@landstudies.com
315 North Street
Lititz, PA 17543



AREA 3

NO.	REVISION	DATE	BY
2	REVISED PER PADEP COMMENTS	3/30/2021	JRR
1	REVISED PER PADEP COMMENTS	10/06/20	JRR

HRG
Engineering & Related Services
AN EMPLOYEE-OWNED COMPANY

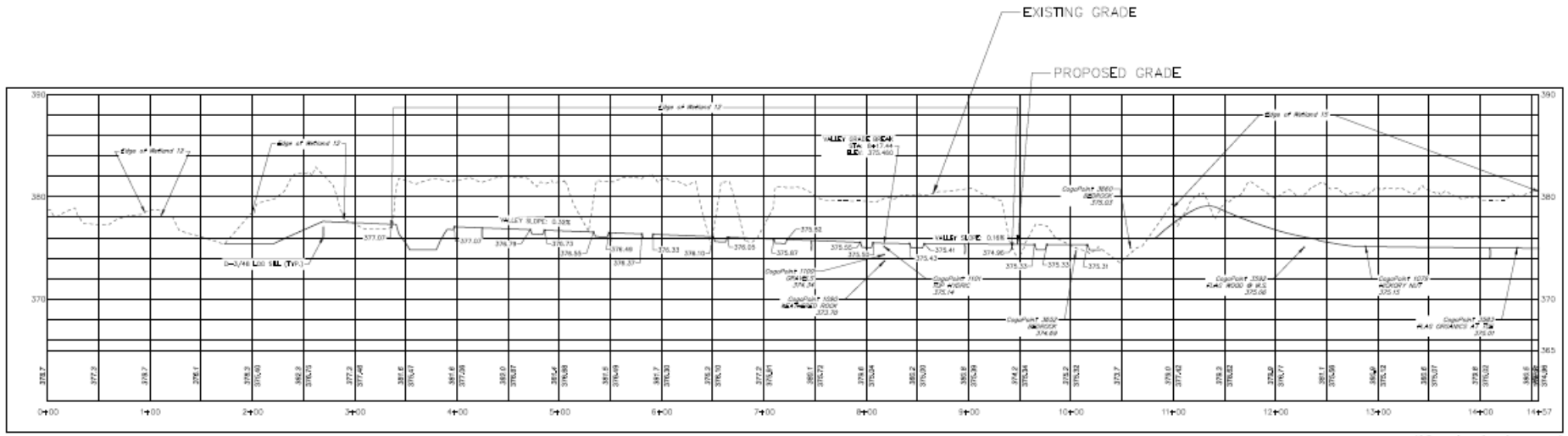
LONDONDERRY TOWNSHIP
783 SOUTH GEYERS CHURCH ROAD
MIDDLETOWN, PA 17057
(717) 944-1803

PROPOSED CONDITIONS - AREA 3
FOR
CONEWAGO CREEK STREAM RESTORATION
LONDONDERRY TWP
CONEWAGO TWP
MOUNT JOY TWP
DAUPHIN COUNTY
LANCASTER COUNTY
PENNSYLVANIA

PROJ. MGR. – SEF	
DESIGN– LSI	
CADD– ILU	
CHECKED–SEF	
SCALE– AS SHOWN	
DATE– MAY, 2020	

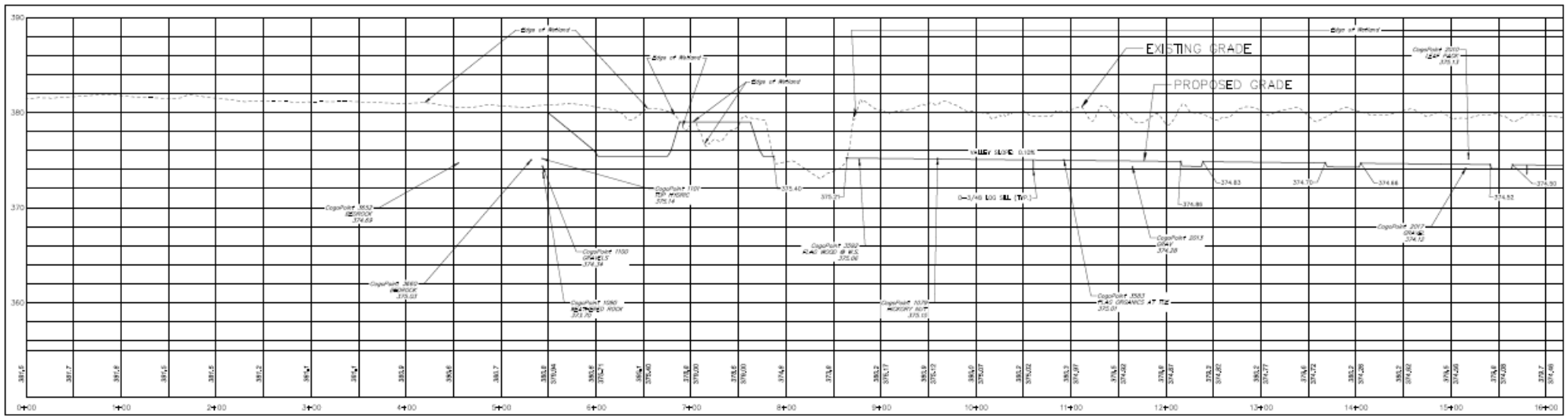
DRAWING NO.
SI-04
SHEET NO.
15 OF 49
PROJECT R001068.0521

Land Studies
a DAVEY company



BRILLS RUN VALLEY

HORIZ: 50' 25' 0' 50'
VERT: 5' 2.5' 0' 5'
SCALE IN FEET



CONEWAGO CREEK VALLEY

MATCH LINE TO CONEWAGO CREEK VALLEY (CONTINUED, 1)

HORIZ: 50' 25' 0' 50'
VERT: 5' 2.5' 0' 5'
SCALE IN FEET

Land Studies
717-627-4440
landstudies.com
land@landstudies.com
315 North Street
Lititz, PA 17543

NO.	REVISION	DATE	BY
2	REVISED PER PA&P COMMENTS	5/30/2021	JBR
1	REVISED PER PA&P COMMENTS	10/09/20	JBR

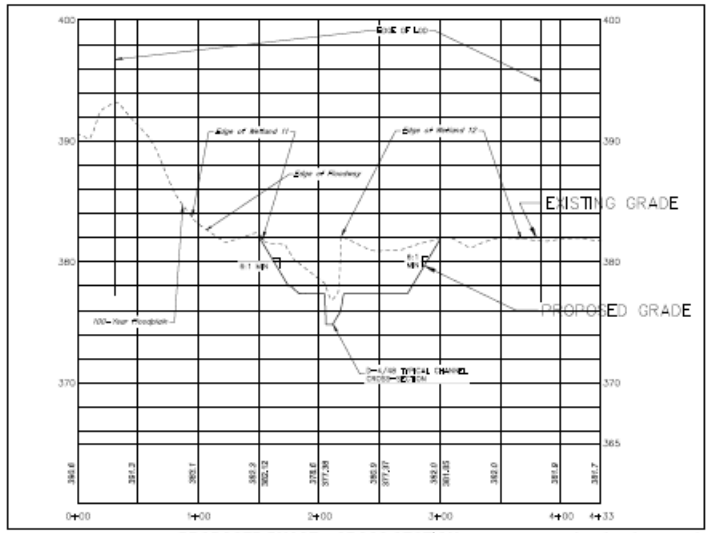
HRG
Engineering & Related Services
AN EMPLOYEE-OWNED COMPANY

LONDONDERRY TOWNSHIP
783 SOUTH GEYERS CHURCH ROAD
MIDDLETOWN, PA 17057
(717) 944-1803

PROPOSED STREAM CHANNEL PROFILES
FOR
CONEWAGO CREEK STREAM RESTORATION
LONDONDERRY TWP
CONEWAGO TWP
MOUNT JOY TWP
DAUPHIN COUNTY
LANCASTER COUNTY
PENNSYLVANIA

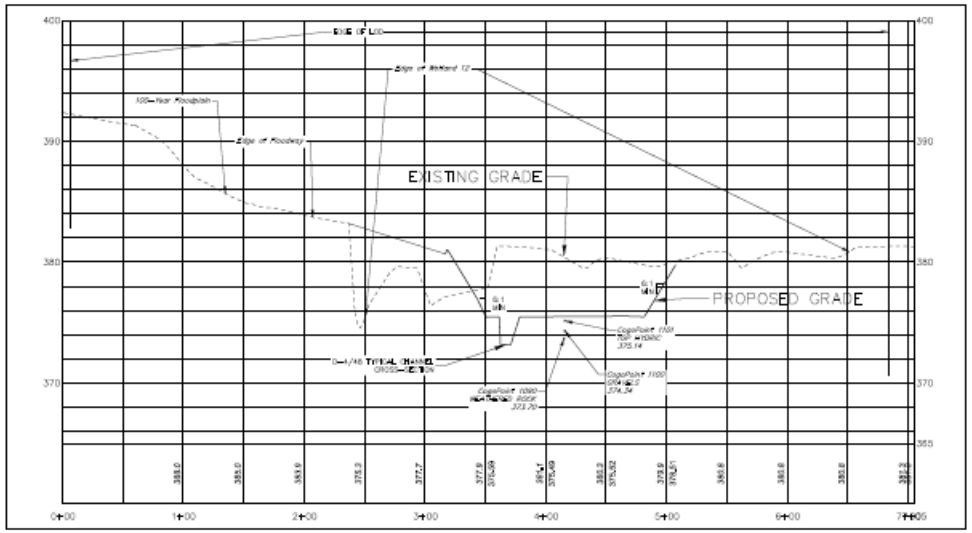
PROJ. MGR. – SEF
DESIGN – LJH
DRAWN – ILJ
CHECKED – SEF
SCALE – AS SHOWN
DATE – MAY, 2020

DRAWING NO.
PR-01
SHEET NO.
23 OF 49
PROJECT R001068.0523



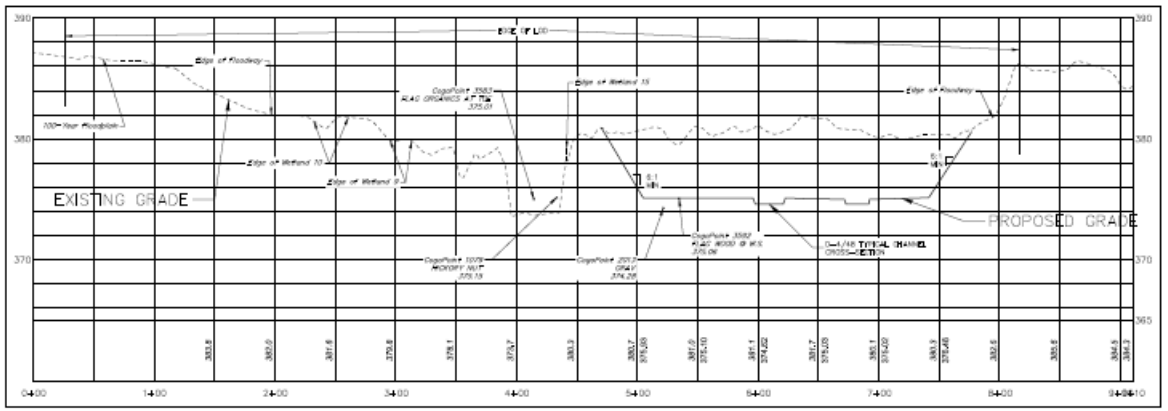
PROPOSED PHASE 1 CROSS SECTION #1

HORIZ: 50' 25' 0' 50'
VERT: 5' 2.5' 0' 5'
SCALE IN FEET



PROPOSED PHASE 1 CROSS SECTION #2

HORIZ: 50' 25' 0' 50'
VERT: 5' 2.5' 0' 5'
SCALE IN FEET



PROPOSED PHASE 2 CROSS SECTION #1

HORIZ: 50' 25' 0' 50'
VERT: 5' 2.5' 0' 5'
SCALE IN FEET

717-627-4440
landstudies.com
land@landstudies.com
315 North Street
Lititz, PA 17543

NO.	REVISION	DATE	BY
2	REVISED PER PARE COMMENTS	5/30/2021	JRK
1	REVISED PER PARE COMMENTS	10/09/20	JRK

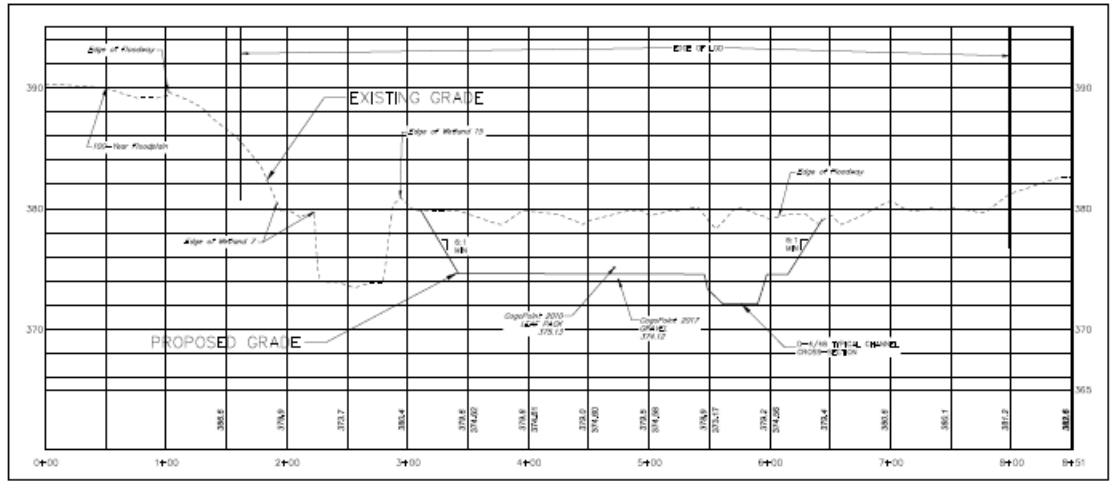
HRG
Engineering & Related Services
AN EMPLOYEE-OWNED COMPANY
Harrisburg, PA 17111
(717) 564-1121
Fax (717) 564-1459
hrg@hrginc.com
www.hrginc.com

LONDONDERRY TOWNSHIP
783 SOUTH GEYERS CHURCH ROAD
MIDDLETOWN, PA 17057
(717) 944-4003

PROPOSED STREAM CROSS SECTION PER PHASE
FOR
CONEWAGO CREEK STREAM RESTORATION
LONDONDERRY TWP
CONEWAGO TWP
MOUNT JOY TWP
DAUPHIN COUNTY
LANCASTER COUNTY
PENNSYLVANIA

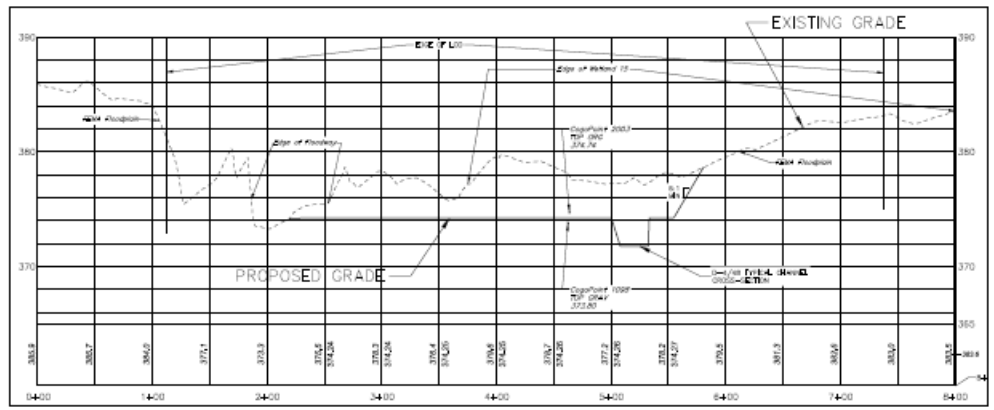
PROJ. MGR. – SEF
DESIGN – LJH
DRAWN – ILU
CHECKED – SEF
SCALE – AS SHOWN
DATE – MAY, 2020

DRAWING NO.
PR-04
SHEET NO.
26 OF 30
PROJECT NO. 01068.0521



PROPOSED PHASE 2 CROSS SECTION #2

HORIZ: 50' 25' 0' 50'
VERT: 5' 2.5' 0' 5'
SCALE IN FEET



PROPOSED PHASE 2 CROSS SECTION #3

HORIZ: 50' 25' 0' 50'
VERT: 5' 2.5' 0' 5'
SCALE IN FEET

717-627-4440
landstudies.com
land@landstudies.com
315 North Street
Lititz, PA 17543

NO.	REVISION	DATE	BY
2	REVISED PER PADEP COMMENTS	5/20/2021	JRR
1	REVISED PER PADEP COMMENTS	10/06/20	JRR

HRG
Engineering & Related Services
AN EMPLOYEE-OWNED COMPANY

LONDONDERRY TOWNSHIP
783 SOUTH GEYERS CHURCH ROAD
MIDDLETOWN, PA 17057
(717) 944-1803

PROPOSED STREAM CROSS SECTION PER PHASE
FOR
CONEWAGO CREEK STREAM RESTORATION
LONDONDERRY TWP
CONEWAGO TWP
MOUNT JOY TWP
DAUPHIN COUNTY
LANCASTER COUNTY
PENNSYLVANIA

PROJ. MGR. – SEF
DESIGN– LSI
CADD– ILU
CHECKED–SEF
SCALE– AS SHOWN
DATE– MAY, 2020

DRAWING NO.
PR-05
SHEET NO.
27 OF 30
PROJECT R001088.0521

Conewago Creek

Construction

Conewago Creek

Post-Construction First Season

Conewago Creek

Post-Construction Second Season

Conewago Creek

Post-construction Third Season

Conewago Creek

Sure..
but does it work?

Video courtesy of Londonderry Township

Results

- 14.5 Acres of Restored Wetlands
- 132,000 CY of Legacy Sediment Removed
- 80 acre-feet of floodwater storage for downstream flood reduction
- Pollutant Load Reductions (Prelim.) –Prevented Sediment; Base Flow Nutrient Processing; & Floodplain Reconnection
  - 1,518,935 lbs TSS/yr
  - 10,452 lbs TN/yr
  - 3,525 lbs TP/yr
- 3,320-LF Added Channel Length
- Hydrologic Connectivity & Hydraulic Stability
- Resilient Heterogeneous Habitat
- Diverse Native Vegetation

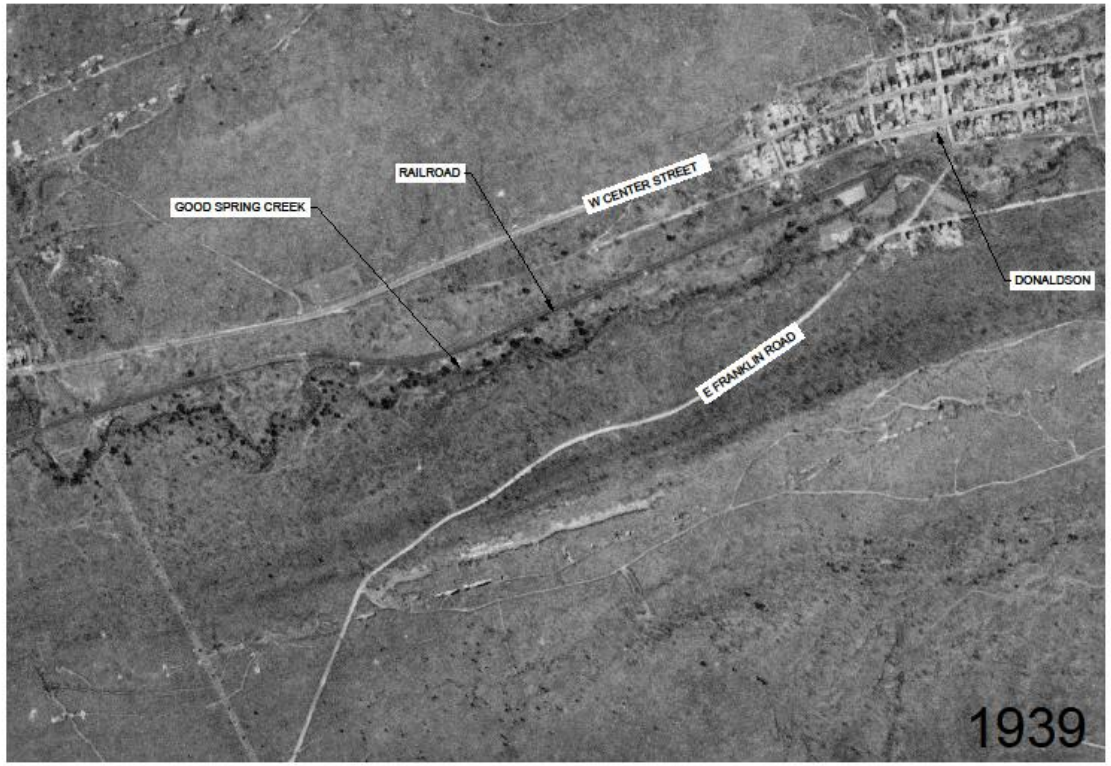
Land Studies
a DAVEY company

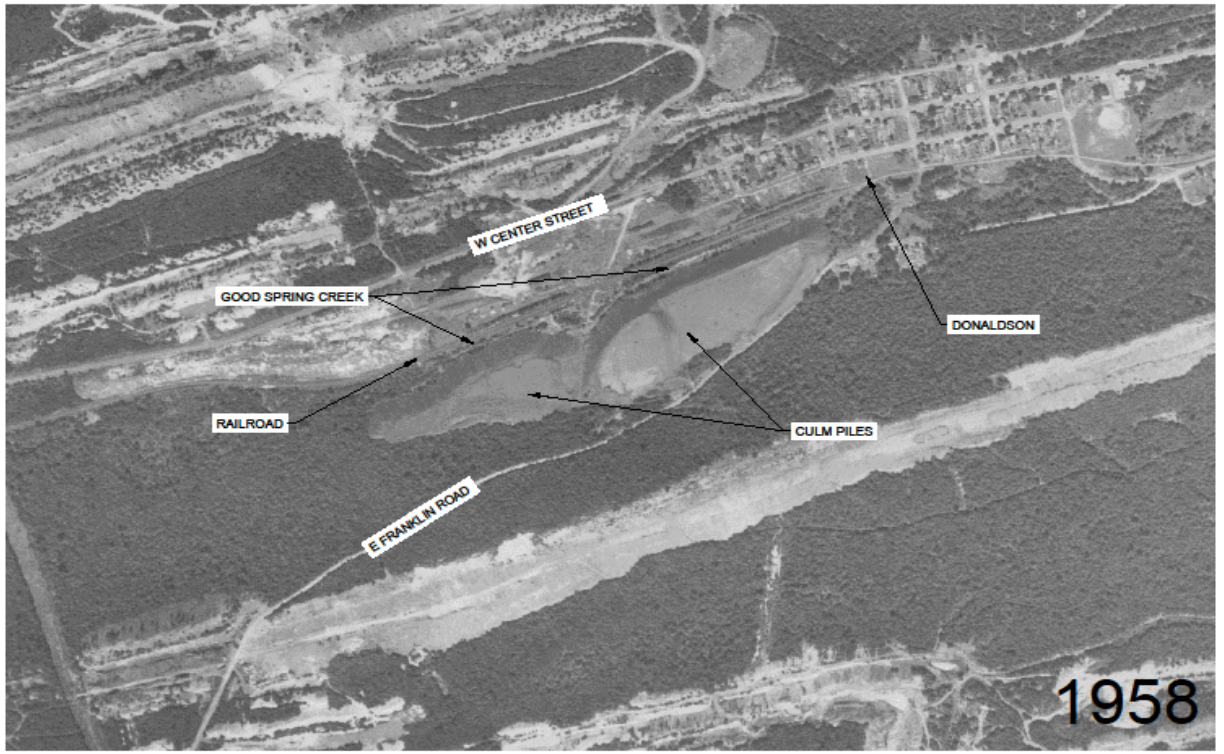
Good Spring Run Floodplain Restoration

Frailey Township, Schuylkill County, PA

Land Studies
a DAVEY company

Historical Aerials – 1939 & 1958





Existing On-Site Conditions

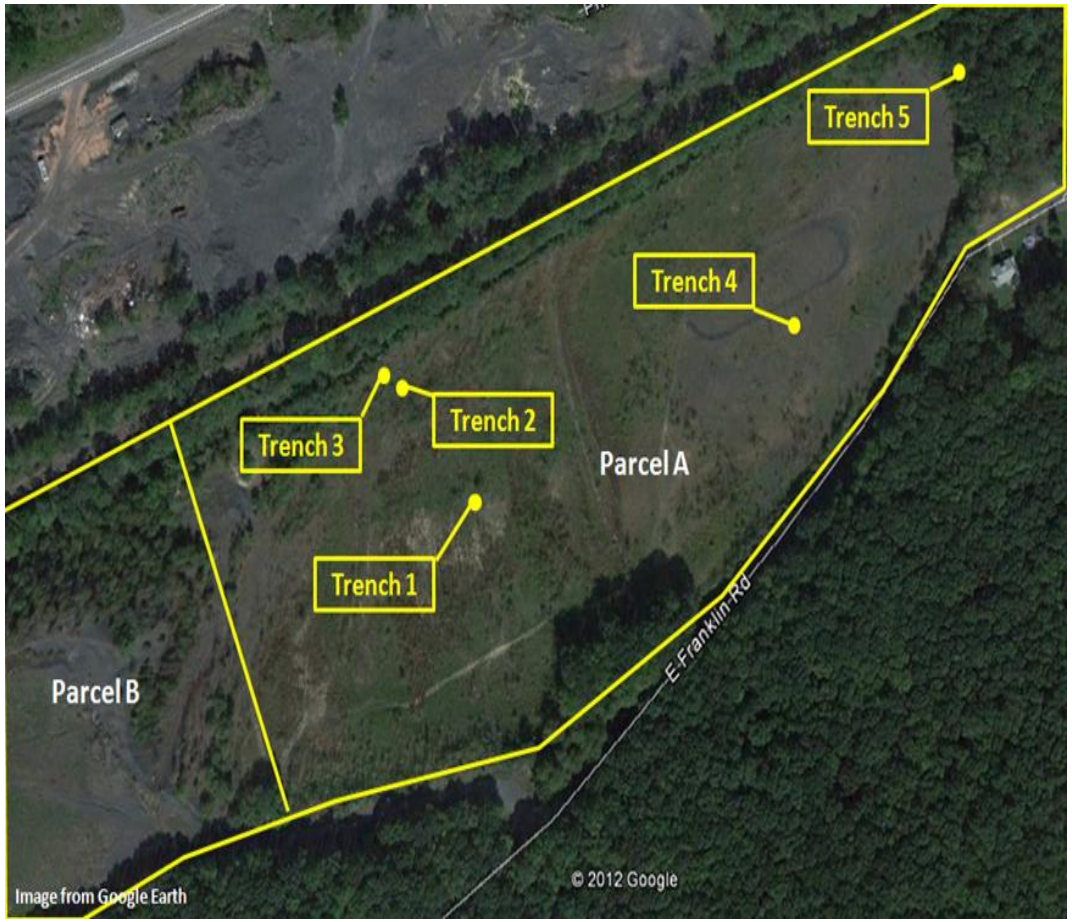
- Proposed Project Site - Good Spring Run, 4,600 feet and approximately 40+ acres
- Waste coal/sediment deposition in Tremont downstream
- Good Spring Run migrated into Donaldson Culm Bank transporting waste coal into Donaldson and Tremont
- Impaired Cold-Water Fishery – TMDL's heavy metals, pH, suspended solids – abandoned mine drainage
- Ditched channel primarily armored (rock) on sections of the railroad side
- Immature trees and forest located upstream and downstream of culm pile
- Trenching and subsurface investigation showed subsurface conditions varied with nothing similar to a natural valley subsurface condition

LandStudies
a DAVEY company

Pennsylvania
Department of Environmental Protection

Acid Mine Drainage

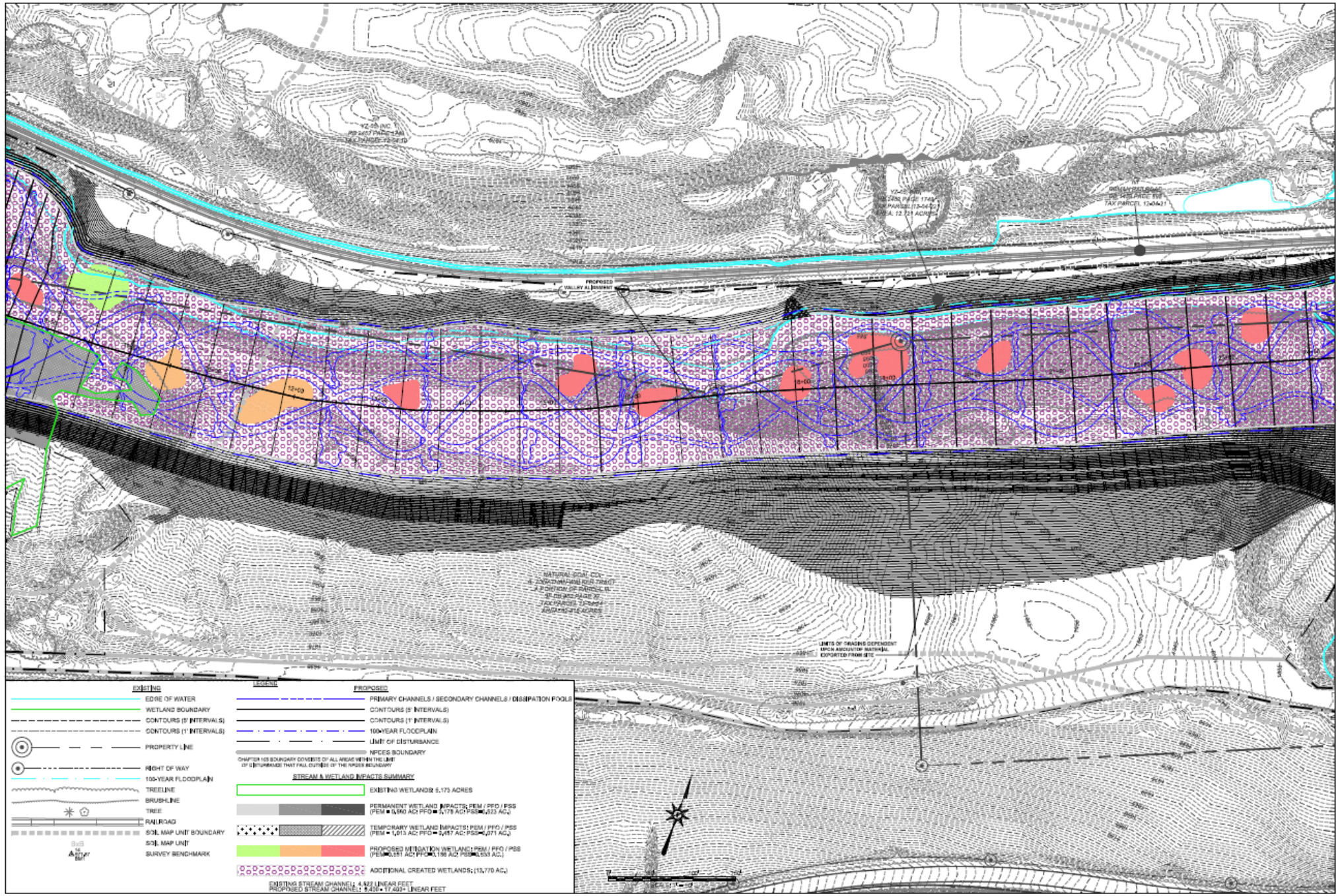
Subsurface Investigation (Trenches)



Subsurface Investigation (Trenches)

Initial Project Objectives & Goals

- Significantly reduce supply of waste coal and sediment depositing downstream
- Improve downstream flooding impacts
- Improve water quality
- Improve wildlife habitat
- Meet minimum mitigation requirements on 1:1 basis for waters and wetlands
- Proposed channel length 9,400+ ft. Multiple channels were proposed



PA 043334
717-627-4440
fax: 717-627-4660
landstu@ptd.net
landstu@landstudies.com
315 North Street | Lititz, PA 17543

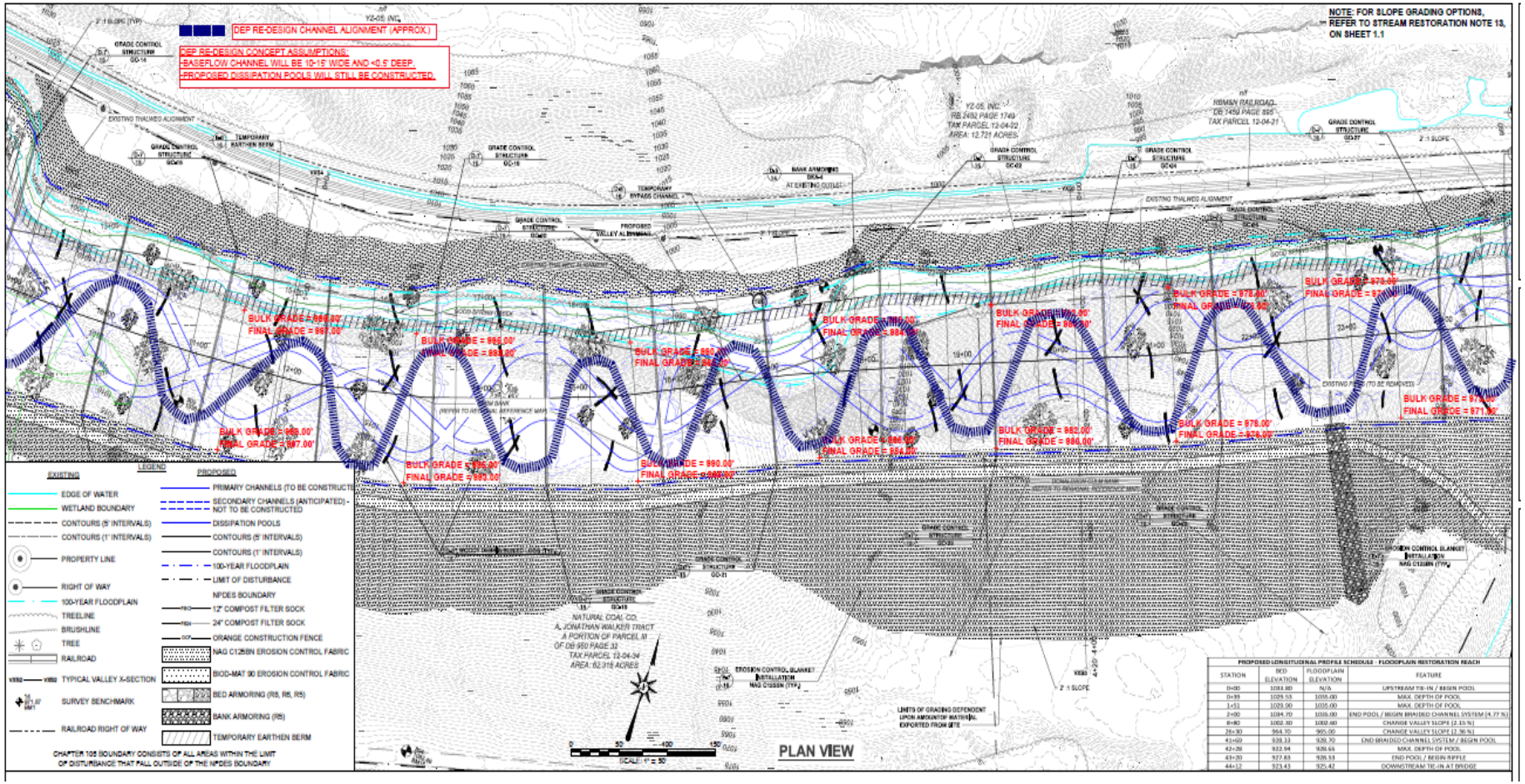
CLIENT:
SCHUYLKILL COUNTY CONSERVATION DISTRICT
1206 AG CENTER DRIVE
POTTSVILLE, PENNSYLVANIA 17901-8733

SHEET TITLE:
IMPACTS PLAN
DEVIL'S HOLE FLOODPLAIN RESTORATION
FRAILEY TOWNSHIP
SCHUYLKILL COUNTY, PENNSYLVANIA

REVISIONS		
NO.	DATE	DESCRIPTION

PROJECT NUMBER: 0415b512
DRAWN BY: BUTCHRG
CHECKED BY: SE
DATE: 10/12/15
SCALE: 1" = 50'
IMPACTS PLAN
SHEET NUMBER:
19
OF 25

Revised Design Requirements



After Nationwide Permit was Obtained Agencies amended the permit and required the following:

One Proposed Single Thread Channel (STC) for Fish Passage

Revised Design Concerns

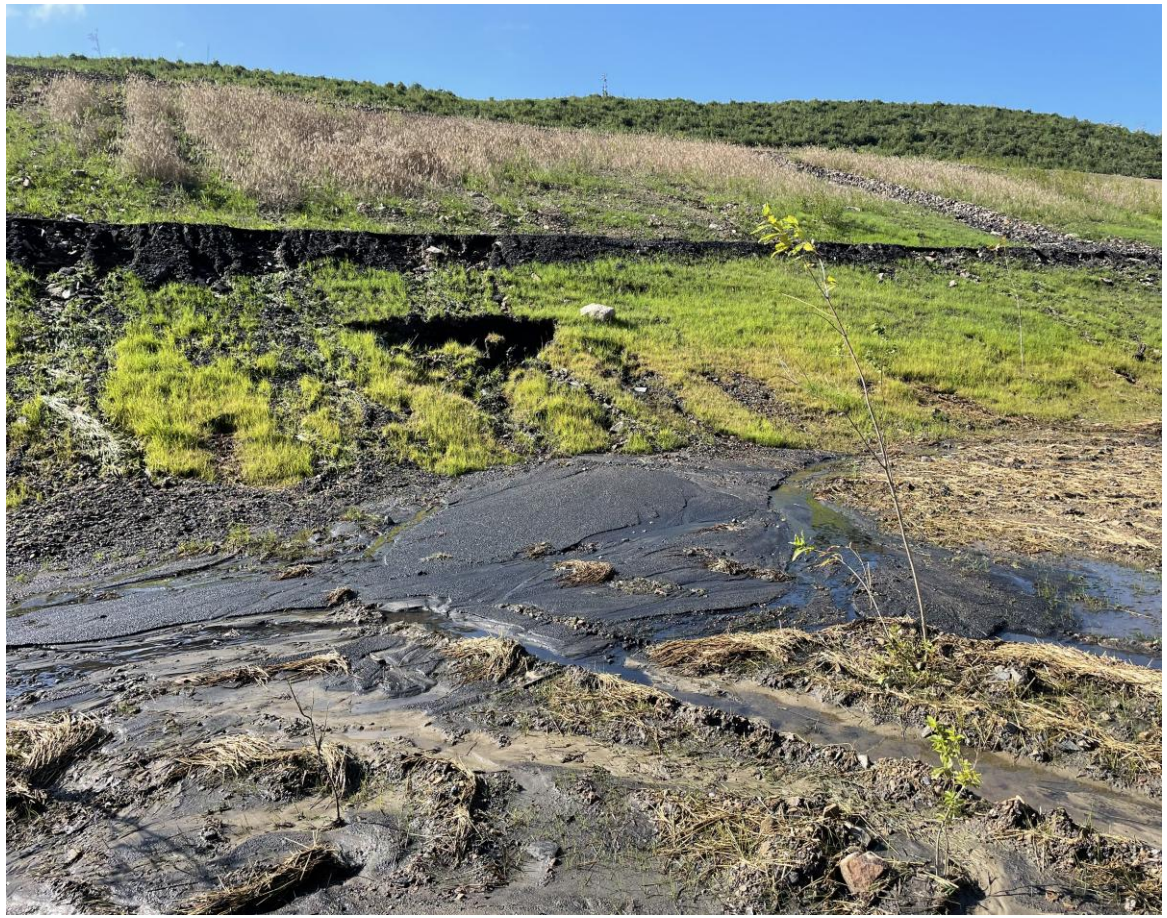
- Hyporheic exchange between channel & floodplain – soils are poor and inconsistent
- Multiple channels provide reduction of fine and coarse sediment being transported
- Single Thread Channels (STC) are more prone to erosion while reducing nutrient processing
- Potential for incision and head-cutting increases with STC during construction
- Project costs

Initial Construction Issues

- Logging removed all woody material to be used for valley wide grade control and surface debris
- Sequence of construction – not followed as site remained disturbed without temporary or permanent stabilization the entire period.
- Single Thread Channel was formed using a dozer which increased the channel depth and thus stress and velocity
- Fill/spoil material extended 50 to 75 feet further into the proposed floodplain in some locations
- Construction funds completely spent - additional large woody debris and logs could not be purchased

Flood Damage After Construction

Flood Damage During Construction



Stage Zero Restoration – Post Construction

Stage Zero Restoration – Post Construction

Stage Zero Restoration – Post Construction

Stage Zero Restoration – Post Construction

Stage Zero Restoration – Post Construction

Stage Zero Restoration – Post Construction

Thank you!

Pioneering innovative solutions to water resource management.

www.landstudies.com

Ward Oberholtzer, PE
WOberholtzer@landstudies.com

Land Studies
a DAVEY company