APPENDIX L-2E WETLAND RAP FORMS AND FIGURES

Summary of Methods for Pennsylvania Wetland Condition Level 2 Rapid Assessment Protocol

On behalf of PennEast Pipeline Company, LLC (PennEast), AECOM Biologists conducted a review of delineated wetland resources that are proposed to be impacted by the PennEast Pipeline Project (Project) in accordance with the Pennsylvania Department of Environmental Protection's (PADEP) *Pennsylvania Wetland Condition Level 2 Rapid Assessment Protocol* (L2RAP). The Wetland Condition Assessment Form (Form) was used to evaluate these wetlands as part of the Joint Permit Application (JPA).

The assessment area (AA) consisted of the areas of the wetland that are proposed to be impacted by construction and/or operation of the Project. Each resource with the potential to be impacted by the Project was evaluated using a number of parameters, referred to as condition indices, as outlined by the RAP procedure.

Appendix L-2E provides a form and corresponding map displaying the AA, land use condition category, as well as the 100' and 300' Wetland Zones of Influence (ZOI) of each wetland resource impacted within Bucks County. A brief summary of each condition index is discussed below.

Header Information

Project Number
This is designated as AECOM's internal project number associated with the Project.

Project Name
This was determined to be the name of the project (i.e. PennEast).

Date
The date was determined to be the day the field survey and Form was completed.

Proposed Impact Size (acres)
The proposed wetland impact size was calculated in GIS using the intersection of the proposed right-of-way (ROW) and Project workspace to the delineated boundary of the resource that was field delineated and data points collected in the field using a Trimble GPS unit. This information is provided within the Aquatic Resources Impact Table in JPA Section A-1.

A # The AA is defined by the Feature ID used by AECOM for unique identification of lacustrine features.

AA Size (acres)
After determining the proposed wetland impact size, the wetland AA was determined based upon the following:

- If the entire wetland proposed to be affected is less than or equal to 1.0 acre in size, then the entire wetland will comprise the AA regardless of the proposed impact size area; or

- If the impact is less than 1.0 acre in size and the wetland is greater than 1.0 acre, the AA is established around the proposed impact area until 1.0 acre in size is reached and the area provides a representative sampling of the wetland while still fully encompassing the proposed impact area; or
- If the proposed impact area is greater than 1.0 acre in size, the AA is comprised entirely of the proposed wetland impact area.

Name(s) of Evaluator(s)
The evaluators were the names of the AECOM biologists who completed the evaluation.

Latitude and Longitude
The latitude and longitude was determined in GIS using field collected data to determine the resource's impact.

Notes
The notes section was to inform the reviewer of any additional or pertinent details that were not defined within the form.

Wetland Assessment Form Process - Worksheets

To properly fill out the electronic version of the form, certain observations have to be accounted for before calculating the overall score. Review and estimations for the following three worksheets have to be completed: Roadbed Worksheet, Invasive Species Presence Worksheet, and the Stressors Worksheet.

The Roadbed Worksheet provides data for the number and type of roadbeds that occur in the 0-100-ft and 100-300-ft buffer ranges associated with the wetland AA. These buffers were displayed on aerial maps created by GIS to assist in defining occurrences. The roadbed type column varies by material used (i.e. paved versus gravel road) and number of lanes (i.e. one, two, or greater than four). Generally, paved surfaces and increased number of lanes result in a higher weighting factor. The weighting factor is multiplied by the number of occurrences within the above-mentioned buffer ranges. These scores will then be utilized in filling out the Roadbed Presence Index section of the form.

The Invasive Species Presence Worksheet provides data on the presence of invasive species within the wetland AA. The information is captured by defining the species (provided by a coded common species box within the worksheet) and percent aerial coverage of that species within the wetland AA. Then a total percent relative cover of all invasive species observed onsite is calculated. This score will then be utilized in filling out the Vegetation Condition Index section of the form.

The Stressor Worksheet provides data on other physical stressors that may occur within the feature covering multiple categories, which include: vegetation alteration, hydrologic modification, sedimentation, eutrophication, and contaminant/toxicity. There is a list of

potential impacts under each category (i.e. mowing, storm water inputs, intense livestock grazing, discharges from septic or sewage treatment plants, acidic drainages) that receive a check in either the 'yes' or 'no' column of the worksheet. The sum of the stressors for each category will then be utilized in filling out the following indices on the form: Vegetation Stressor Presence sub-category of the Vegetation Condition Index, the Hydrologic Modification Index, the Sediment Stressor Index, and the Water Quality Stressor Indices.

Wetland Assessment Form Process – Form

Condition Indices

The following section describes each of the six condition indices evaluated for each wetland. Each condition index was assessed and a numerical, qualitative score was determined for each index. The six scores are then averaged together to determine the overall Wetland Condition Index (WCI). This is the final, combined results of the individual assessment categories.

Condition categories were assigned for each parameter in the form. There were categories that had specific details as to properly describe the feature. This was typically based on percentage of visible impact. These categories were optimal, suboptimal, marginal, and poor. Once narrowed down to a single category, a score would be assigned. The scores ranged from 1 to 20 with approximately 3 to 5 scores per category. In certain situations, the percentage range from the condition category was adjusted evenly across the scores and then selected based upon which score matched with the percentage evaluated.

1. Wetland Zone of Influence Condition Index

The evaluation of the Wetland ZOI, which is a 300-ft buffer area around the AA's perimeter, was determined based on the vegetative cover type observed in the area. Prior to the field analysis, the 300' wetland ZOI was evaluated using the most up-to-date aerial imagery available. The percent aerial coverage for each condition category within the ZOI was then determined based on the aerial imagery. During the field evaluation, the percent aerial coverage for each condition category was either confirmed by the evaluating biologists or edited as needed to reflect the actual on site conditions. A qualitative, numerical score was then given to each condition category based on the quality of the vegetative cover observed. The scores were summed for each condition category resulting in the Condition Index (CI) for the wetland ZOI. Coverage where vegetation is comprised of mature forested areas is scored higher than areas that are comprised of maintained lawns or lower quality lots (i.e. impervious surfaces, row crops, mine spoil lands, etc.).

2. Roadbed Presence Index

The evaluation of the Roadbed Presence Index was completed by using information provided by the Roadbed Worksheet. The number of impacts per each buffer area (100' and 300') around the AA as used to select an appropriate score within the condition category. If no roadbeds were present, it would receive the highest score. As the number of occurrences increases, the score decreases. These scores were then multiplied against a weighting factor to produce sub-scores that were then summed for the total index score.

3. Vegetation Condition Index

The evaluation of the Vegetation Condition Index was completed by using information provided by the Invasive Species Presence Worksheet. Condition sub-category A. Invasive Species Presence uses the percent aerial coverage calculated in the worksheet to arrive at a score. The

lower the percent of invasive species present within the AA, the higher the score. Condition sub-category B. Vegetation Stressor Presence is provided by the Stressor Worksheet. The lower the number of occurrences of vegetative stressors within the AA, the higher the score will be. These scores were then used as sub-scores that were then used in a calculation for the total index score.

4. Hydrologic Modification Index

The evaluation of the Hydrologic Modification Index was completed by using information provided by the Stressor Worksheet. The number of impacts observed within the AA was used to select an appropriate score within the condition category. If no stressors were present, it would receive the highest score. These scores were then used in calculating the total index score.

5. Sediment Stressor Index

The evaluation of the Sediment Stressor Index was completed by using information provided by the Stressor Worksheet. The number of impacts observed within the AA is used to select an appropriate score within the condition category. If no stressors were present, it would receive the highest score. As the number of occurrences increases, the score decreases. These scores were then used in calculating the total index score.

6. Water Quality Stressor Index

The evaluation of the Water Quality Stressor Index was completed by using information provided by the Eutrophication and Contaminant/Toxicity portions of the Stressor Worksheet. The number of impacts observed within the AA was used to select an appropriate score within their condition category. If no stressors were present, it received the highest score. As the number of occurrences increases, the score decreases. These scores were then used as sub-scores that were then used in a calculation for the total index score.

Once all these factors have been calculated, they are averaged to determine an overall Wetland Condition Index (WCI) score for the wetland feature. Scores can range from 0.05 to one. A score of one or close to one is interpreted as being a feature that is of higher quality. Wetlands with a lower score can be interpreted as features that have many factors that degrade the quality of the resource and subsequently, lower quality.

Wetland Condition Assessment Form

Pennsylvania Wetland Condition Level 2 Rapid Assessment (Document No. 310-2137-002)

Pennsylvania Department of Environmental Protection

For use in all wetland classifications found within Pennsyvlania except those found within the banks of a watercourse.

Project #	Project Name	Date	Proposed Impact Size (acres)	AA #	AA Size (acres)
60414094	PennEast	4/17/2017	See impact table*	110714_JC_001_PFO	0.33

Name(s) of Evaluator(s)	Lat (dd)	Long (dd)	Notes:
G. McBrien; E. Genuardi	40.584129	-75.196726	

General Comments:

1. Wetland Zone of Influence Condition Index

	Condition Category				
	Optimal	Suboptimal	Marginal	Poor	
Wetland Zone of Influence (300 foot area around AA perimeter)	ZOI area vegetation consists of a tree stratum present (diameter at breast height (dbh) > 3 inches) with greater than or equal to 60% tree canopy cover. Areas comprised of stream channels, wetlands (regardless of classification or condition) and lacustrine resources ≥ 10 acres are scored as optimal.	**High Suboptimal:** ZOI area vegetation consists of a tree stratum (dbh > 3 inches) present, with greater than or equal to 30% and less than 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory. **Low Suboptimal:** ZOI area vegetation consists of a tree stratum (dbh > 3 inches) present, with greater than or equal to 30% and less than 60% tree canopy cover with a maintained understory.	**High Marginal:** ZOI area vegetation consists of non-maintained, dense herbaceous vegetation with either a shrub layer or a tree stratum (dbh > 3 inches) present, with less than 30% tree canopy cover. **Low Marginal:** ZOI area vegetation consists of non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, areas of hay production, and ponds or open water areas (< 10 acres). If trees are present, tree stratum (dbh > 3 inches) present, with less than 30% tree canopy cover with maintained understory.	**High Poor:** ZOI area vegetation consists of lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, pervious trails, recently seeded and stabilized, or other comparable condition. **Low Poor:** ZOI area vegetation consists of impervious surfaces; mine spoil lands, denuded surfaces, row crops, active feed lots, impervious trails, or other comparable conditions.	CI = Total Score/20
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1	

1. Identify all applicable Condition Category areas within the wetland zone of influence using the descriptors above.
2. Estimate the % area within each condition category. Calculators are provided for you below.
3. Enter the % ZOI Area in decimal form (0.00) and Score for each category in the blocks below.

Total Score = SUM(%Areas*Scores)

	Condition Category:	Optimal	High Suboptimal	Low Suboptimal	High Marginal	Low Marginal	High Poor	Low Poor	Total Score:	CI
Scoring:	% ZOI Area:	100%	0%	0%	0%	0%	0%	0%		
	Score:	18	0	0	0	0	0	0		
	Total Sub-score:	18.00	0.00	0.00	0.00	0.00	0.00	0.00	18.00	0.90

Comments:

2. Roadbed Presence Index

	Condition Categories				
	Optimal	Suboptimal	Marginal	Poor	
a. Roadbed Presence (within 0 - 100 foot Wetland ZOI distance)	**High Optimal:** No roadbeds present within 100 feet of the AA boundary **Low Optimal:** Roadbed presence score within 0-100 feet of the AA boundary equal to or less than 2.	**High Suboptimal:** Roadbed presence score within 0-100 foot distance of the AA boundary is greater than to 2 but equal to or less than 4. **Low Suboptimal:** Roadbed presence score within 0-100 foot distance of the AA boundary is greater than to 4 but less than or equal to 6.	**High Marginal:** Roadbed presence score within 0-100 foot distance of the AA boundary is greater than to 6 but less than or equal to 8. **Low Marginal:** Roadbed presence score within 0-100 foot distance of the AA boundary is greater than to 8 but less than or equal to 10.	**High Poor:** Roadbed presence score within 0-100 foot distance of the AA boundary is greater than 10 but less than or equal to 12. **Low Poor:** Roadbed presence score within 0-100 foot distance of the AA boundary is greater than 12.	
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1	

Comments: Roadbed 0-100 Total score is 0

	Condition Categories				
	Optimal	Suboptimal	Marginal	Poor	
b. Roadbed Presence (within 100 - 300 foot Wetland ZOI distance)	**High Optimal:** No roadbeds present within 100 - 300 feet of the AA boundary **Low Optimal:** Roadbed presence score within 100 - 300 feet of the AA boundary equal to or less than 2.	**High Suboptimal:** Roadbed presence score within 100 - 300 feet of the AA boundary is greater than to 2 but equal to or less than 4. **Low Suboptimal:** Roadbed presence score within 100 - 300 feet AA boundary is greater than to 4 but less than or equal to 6.	**High Marginal:** Roadbed presence score within 100 - 300 feet of the AA boundary is greater than to 6 but less than or equal to 8. **Low Marginal:** Roadbed presence score within 100 - 300 feet of the AA boundary is greater than to 8 but less than or equal to 10.	**High Poor:** Roadbed presence score within 100 - 300 feet of the AA boundary is greater than to 10 but less than or equal to 12. **Low Poor:** Roadbed presence score within 100 - 300 feet of the AA boundary is greater than 12.	CI = Total Score/20
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1	

Comments: Roadbed 100-300 Total score is 2

	Condition Score	Weighting	Sub-Scores	
a. Roadbed 0-100:	20	* (0.67)	13	
b. Roadbed 100-300:	17	* (0.33)	6	
		Total Score:	19	0.95

Comments:

* Aquatic Resources Impact Table is Provided in JPA Section A-1

Wetland Condition Assessment Form

Pennsylvania Wetland Condition Level 2 Rapid Assessment (Document No. 310-2137-002)

Pennsylvania Department of Environmental Protection

For use in all wetland classifications found within Pennsyvlania except those found within the banks of a watercourse.

3. Vegetation Condition Index

	Condition Category																			
a. Invasive Species Presence	Optimal					Suboptimal					Marginal					Poor				
	High Optimal: No invasives present.			**Low Optimal:** <5% of the total AA contains invasive species.		**High Suboptimal:** >5% but less than 10% of the total AA contains invasive species.			**Low Suboptimal:** >10% but less than 20% of the total AA contains invasive species.		**High Marginal:** >20% but less than 30% of the total AA contains invasive species.			**Low Marginal:** >30% but less than 50% of the total AA contains invasive species.		> 50% of the total AA contains invasive species.				
SCORE	**20**	**19**	**18**	**17**	**16**	**15**	**14**	**13**	**12**	**11**	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**

Comments: Total % relative cover of all invasives, collectively on site is

	Condition Category																			
b. Vegetation Stressor Presence	Optimal					Suboptimal					Marginal					Poor				
	High Optimal: No vegetation stressors present within the AA boundary.			**Low Optimal:** One vegetation stressor present within the AA boundary.		**High Suboptimal:** Two vegetation stressors present within the AA boundary.			**Low Suboptimal:** Three vegetation stressors present within the AA boundary.		**High Marginal:** Four vegetation stressors present within the AA boundary.			**Low Marginal:** Five vegetation stressors present within the AA boundary.		Greater than five vegetation stressors present within the AA boundary.				
SCORE	**20**	**19**	**18**	**17**	**16**	**15**	**14**	**13**	**12**	**11**	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**

CI = Total Score/40

Comments: Total number of vegetation stressors present - 0

a. Invasive Sub-Score:	20	**Total Score:**
b. Vegetation Sub-Score:	20	**40**

1.00

4. Hydrologic Modification Index

	Condition Category																			
Hydrologic Modification Stressor Presence	Optimal					Suboptimal					Marginal					Poor				
	High Optimal: No hydrologic stressors present within the AA boundary.			**Low Optimal:** One hydrologic stressor present within the AA boundary.		**High Suboptimal:** Two hydrologic stressors present within the AA boundary.			**Low Suboptimal:** Three hydrologic stressors present within the AA boundary.		**High Marginal:** Four hydrologic stressors present within the AA boundary.			**Low Marginal:** Five hydrologic stressors present within the AA boundary.		Greater than five hydrologic stressors present within the AA boundary.				
SCORE	**20**	**19**	**18**	**17**	**16**	**15**	**14**	**13**	**12**	**11**	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**

CI = Total Score/20

Comments: Total number of hydrologic modifications present - 1

19

Score:	**16**	**0.80**

5. Sediment Stressor Index

	Condition Category																			
Sediment Stressor Presence	Optimal					Suboptimal					Marginal					Poor				
	High Optimal: No sediment stressors present within the AA boundary.			**Low Optimal:** One sediment stressor present within the AA boundary.		**High Suboptimal:** Two sediment stressors present within the AA boundary.			**Low Suboptimal:** Three sediment stressors present within the AA boundary.		**High Marginal:** Four sediment stressors present within the AA boundary.			**Low Marginal:** Five sediment stressors present within the AA boundary.		Greater than five sediment stressors present within the AA boundary.				
SCORE	**20**	**19**	**18**	**17**	**16**	**15**	**14**	**13**	**12**	**11**	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**

CI = Total Score/20

Comments: Total number of sediment stressors present - 1

Score:	**17**	**0.85**

6. Water Quality Stressor Index

	Condition Category																			
a. Eutro- phication Stressor Presence	Optimal					Suboptimal					Marginal					Poor				
	No eutrophication stressors present within the AA boundary.					One eutrophication stressors present within the AA boundary.					Two eutrophication stressors present within the AA boundary.					Three eutrophication stressors present within the AA boundary.				
SCORE	**20**	**19**	**18**	**17**	**16**	**15**	**14**	**13**	**12**	**11**	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**

Comments: Total number of Eutrophication stressors present - 0

	Condition Category																			
b. Contaminant / Toxicity Stressor Presence	Optimal					Suboptimal					Marginal					Poor				
	No contaminant / toxicity stressors present within the AA boundary.					One contaminant / toxicitystressors present within the AA boundary.					Two contaminant / toxicity stressors present within the AA boundary.					Three contaminant / toxicity stressors present within the AA boundary.				
SCORE	**20**	**19**	**18**	**17**	**16**	**15**	**14**	**13**	**12**	**11**	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**

CI = Total Score/40

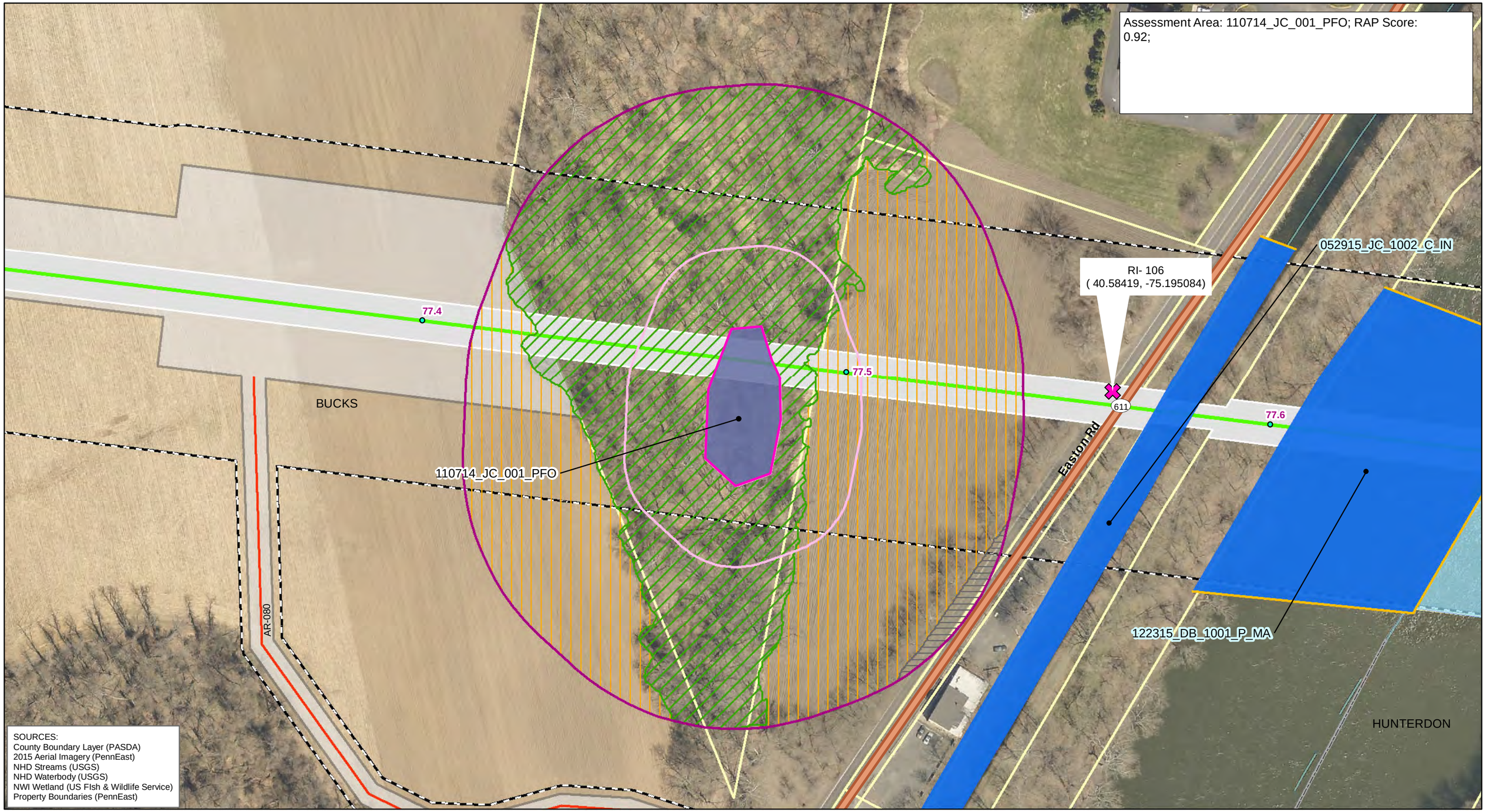
Comments: Total number of Contaminant/Toxicity stressors present - 0

a. Eutrophication Score	20	**Total Score:**
b. Contaminant Score	20	**40**

1.00

Overall Wetland Level 2 Condition Score: Sum all six of the Condition Indexes and divide by 6 to calculate the overall condition score.	**Overall Condition Index:**	**0.92**

* Aquatic Resources Impact Table is Provided in JPA Section A-1



Legend

- 9/19/18 IFC Pipeline Centerline
- 9/19/18 IFC AR Centerline
- 9/19/18 IFC Permanent Easement
- 9/19/18 IFC Limits of Distrubance
- 9/19/18 IFC Survey Area
- Parcel Boundary
- Wetland Assessment Area
- Wetland 100ft ZOI
- Wetland 300ft ZOI

MM Landuse

- Forest/Woodland
- Roadways
- Agriculture

Delineated Waterbody

- Bank Delineation

Delineated Wetland

- PFO
- Open Ended Delineation

Public Features

- NHD Stream
- Road Intersection

Rapid Assessment Protocol Maps

Wetlands

N W E S

0 35 70 140 210 280 Feet