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Memorandum

To	Michael Liberati, DuPont CRG Ralph Stahl, DuPont CRG	Page 1 of 3
CC	Nancy Grosso, DuPont CRG Ceil Mancini, AECOM	
Subject	Spring 2017 Short-term Monitoring Field Summary Memo Former DuPont Waynesboro Site, Area of Concern 4	
From	Bill Reese, AECOM Joshua Collins, AECOM	
Date	August 31, 2017	

In accordance with the United States Environmental Protection Agency (USEPA) Resource Conservation and Recovery Act (RCRA) Corrective Action Permit Number VAD005114832, amended February 2014, interim measures are being implemented by E.I. du Pont de Nemours and Company (DuPont) to address mercury released to Area of Concern (AOC) 4, South River from the former DuPont facility in Waynesboro, Virginia. The Phase 1 interim measures involve bank stabilization, which is being implemented at Bank Management Areas (BMAs) beginning with the first two relative river miles (RRM), RRM 0 to RRM 2.0 downstream of the facility (Anchor QEA and URS Corporation, 2015).

Spring 2017 Short-term Monitoring (STM) field activities included assessment of pre-remediation (baseline) and post-remediation (Constitution Park) conditions at the BMAs and a maintenance inspection of completed bank remediation at Constitution Park. This technical memorandum summarizes the spring 2017 STM field activities, which represent the first post remediation data collection effort for the AOC 4 program, and specifically for the Constitution Park BMA which was completed February 2017. It also summarizes post-storm maintenance activities necessitated at the Constitution Park BMA after a series of storms caused the river discharge to exceed 1,000 cubic feet per second (cfs) on three occasions in April and May of 2017.

APPROACH

STM and Long-term Monitoring (LTM) are being conducted to evaluate the performance of the interim measures and proposed remedial approach on BMA-specific and watershed level scales. Specifically, STM data will be used to evaluate the effectiveness of the remedial approach over a short period of time (i.e., two to ten years) within a limited spatial extent (i.e., adjacent to a particular BMA).

The effort was conducted in accordance with the Final AOC 4 Short-term Monitoring Plan (URS Corporation, 2015) and modifications, including revised habitat metrics (AECOM, 2015) and monitoring locations (AECOM, 2016). Table 1 provides an overview of the monitoring plan design, including performance objectives, metrics, success criteria, and adaptive management outcomes; additional detail is provided in the Monitoring Plan and associated appendices (URS Corporation, 2015).

The effort included monitoring of the following:

- Bank stability
- Mercury concentrations in:
    - Sediment

  - Filtered pore water
  - Periphyton
  - Transplanted Asiatic clams (*Corbicula fluminea*)
- Riparian vegetation
- Aquatic and riparian habitat [Rapid Bioassessment Protocols (RBPs; Barbour et al., 1999)]

The following ancillary habitat assessments and public access feature surveys were also conducted in order to address stakeholder concerns:

- Reach condition evaluation [Unified Stream Methodology (USM; USACE, 2007) and Evaluation of Planned Wetlands (EPW; Bartoldus, 1994)]
- Canopy cover
- Substrate grain size distribution
- Benthic community structure
- River access / aesthetics

The spring 2017 STM program included pre-remediation monitoring at STM-05 and STM-07. Station STM-08 on the east bank across from STM-07, was also sampled to establish pre-remediation, baseline conditions (see Figure 1). With the completion of interim measures at the Constitution Park BMA in February 2017, the spring 2017 monitoring at STM-01 was the first post-remediation monitoring conducted as part of the STM program.

MONITORING

The following activities were conducted as part of the spring 2017 STM program:

- Bulk sediment, pore water, and epilithic periphyton samples were collected at the four BMAs described above during the week of June 5th; laboratory analyses and validation of existing data are on-going.
- Riparian vegetation plots were monitored; additionally, aquatic and riparian habitats were evaluated per the RBP protocol (Barbour et al., 1999).
- Seeded and caged *Corbicula* were deployed the week of May 22nd and retrieved the week of June 26th after a 5-week exposure period; laboratory analyses and validation of existing data are on-going.
- Benthic community samples were collected at RRM 0.5, 1.0, 1.5, and 2.0 the week of June 5th; benthic community data are pending sample analyses and metrics calculations.
- Improvised river access and large woody debris (LWD) features observed at STM-01, STM-05, STM-07, and STM-08 during the spring 2017 field activities were documented and found to be generally consistent with those observed in previous STM events (2015 and 2016) (Figure 1).

MAINTENANCE INSPECTION

The first post-construction maintenance inspection was conducted at STM-01 (Constitution Park) on June 8th, per the Maintenance Plan included as Appendix M of the Basis of Design Report, Phase 1A BMAs, South River AOC 4 (Anchor QEA et al., 2016). The purpose of the post-construction inspection was to identify BMA maintenance needs, focusing on vegetative development, bank stability, and the integrity of the installed bank remediation features. Details of the maintenance inspection conducted at the Constitution Park BMA are included in Table 2, the photographic log is provided in Appendix A, and findings are summarized below:

- River banks generally maintained a consistent bank angle throughout the BMA, ranging from approximately 15 to 70 degrees; few minor deviations were localized and generally related to the installed rock toe features.
- There was no evidence of recent erosion (e.g., no exposed roots were observed).
- No at-risk trees (i.e., partially uprooted and leaning) were observed.
- Some areas exhibited healthy growth of planted vegetation such as grass, live stakes, and saplings; however, other areas had a significant loss of planted vegetation as a result of incidental drift during recent vegetative maintenance.
- Installed rock toe features were intact; sediment deposition, filling in the interstices of the rock toe had begun.
- The installed LWD feature was stable and anchor chains were intact.
- Installed coir logs were intact following completion of recent maintenance activities; however, there were a few areas of wear associated with foot traffic along the toe of the slope (i.e., 00 + 50').
- Installed geocell was generally intact, with the exception of a few minor exposed areas around the base of established trees and/or planted saplings (i.e., 00 + 200', 250', and 400'), and near the toe of the slope (i.e., 00 + 50' and 525').
- Installed erosion control fabric was generally intact but exposed along a significant portion of the BMA, primarily near areas of recent vegetative maintenance.
- There was no evidence of local scour, however, coir logs at Station 00 + 350' showed signs of wear and potential for future scouring.

The spring 2017 maintenance inspection conducted at the Constitution Park BMA confirmed the integrity of the installed bank stabilization treatments. Extensive vegetative colonization by the invasive Japanese knotweed and its subsequent removal with herbicide treatment has also impacted native planted vegetation to some degree. Vegetative growth will be re-evaluated during the fall STM monitoring event and corrective actions will be implemented with the fall invasive species management activities, if warranted.

PATH FORWARD

Monitoring. Fall 2017 STM field activities will begin in October 2017. A similar technical memorandum will be developed after the completion of the fall effort.

The 2017 Annual STM Report (1Q2018) will be developed after all 2017 monitoring is complete; it will provide a data evaluation and summary of findings of the entire 2017 STM program. An initial assessment of the effectiveness of the completed Constitution Park interim measures in the context of the established success criteria will also be provided, as well as a comparison with the framework of the Pilot Bank Study (Anchor QEA and URS, 2013). Consistent with adaptive management principles for AOC 4, the STM approach may be revised based on documented progress towards the achievement of success criteria, contingency actions, and emerging decision analysis options (URS, 2015). More specifically, monitoring data that do not materially impact the remedial decision process may be reduced or eliminated from the STM program with the concurrence of the VDEQ.

Maintenance. The following maintenance activities are planned for the stabilized Constitution Park BMA:

- An invasive species treatment program to address Japanese knotweed,
- Replanting of shrubs and trees which did not survive, and
- On-going monitoring of the BMA.

References

Anchor QEA, AECOM, and E.I. du Pont de Nemours and Company. 2016. Basis of Design Report, Phase 1A Bank Management Areas, South River Area of Concern 4. September 2016.

AECOM. 2016. Memorandum to DuPont – AOC 4 Short-term Monitoring 2016 Monitoring Locations. DuPont Former Waynesboro Site, Area of Concern 4. Dated May 9, 2016.

AECOM. 2015. Memorandum to DuPont – Short-term Monitoring Plan – Revised Habitat Metrics. DuPont Former Waynesboro Site, Area of Concern 4.

Anchor QEA and URS Corporation. 2015. Interim Measures Design, Implementation and Monitoring Work Plan. Phase I, South River Area of Concern 4. February 2015.

Barbour, M.T., J. Gerritsen, B.D. Snyder, and J.B. Stribling. 1999. Rapid Bioassessment Protocols for Use in Streams and Wadeable Rivers: Periphyton, Benthic Macroinvertebrates and Fish, Second Edition. USEPA 841-B-99-002. USEPA Office of Water, Washington, D.C.

Bartoldus, C.C., E.W. Garbisch, and M.L. Kraus. 1994. Evaluation for Planned Wetlands (EPW). Environmental Concern Inc., St. Michaels, MD. 327 pp.

USACE. 2007. Norfolk District and Virginia Department of Environmental Quality (VADEQ). Unified Stream Methodology for use in Virginia. January 2007.

URS Corporation. 2015. Final AOC 4 Short-term Monitoring Plan - Relative River Mile 0-2 of the South River, Virginia. DuPont Former Waynesboro Site, Area of Concern 4.

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APPENDIX A
PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
DuPont	STM-01 (Constitution Park)	60532579

Photo No. 1	Date: 6/8/2017

Direction Photo Taken:

West

Description:

Station 00 – 25’

~30 degree bank angle; no at-risk trees present

Photo No. 2	Date: 6/8/2017

Direction Photo Taken:

NA

Description:

Station 00 – 25’

Minimal exposed roots observed; however, no woody plants adjacent to river

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Client Name:	Site Location:	Project No.
DuPont	STM-01 (Constitution Park)	60532579

Photo No. 3	Date: 6/8/2017

Direction Photo Taken:

Southwest

Description:

Station 00 – 25’

Low presence of scour ~5' upstream of inspection point

Photo No. 4	Date: 6/8/2017

Direction Photo Taken:

West

Description:

Station 00 + 00’

~40 degree bank angle; no at-risk trees present; limited vegetation present; coir logs intact; no scour present

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Client Name:	Site Location:	Project No.
DuPont	STM-01 (Constitution Park)	60532579

Photo No. 5	Date: 6/8/2017

Direction Photo Taken:

NA

Description:

Station 00 + 00’

No woody plants adjacent to edge of river; no exposed roots; coir logs intact; no scour present

Photo No. 6	Date: 6/8/2017

Direction Photo Taken:

West

Description:

Station 00 + 00’

Installed geocell and erosion control fabric intact; potential river access observed at edge of bank treatment

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Client Name:	Site Location:	Project No.
DuPont	STM-01 (Constitution Park)	60532579

Photo No. 7	Date: 6/8/2017

Direction Photo Taken:

West

Description:

Station 00 + 00’

Installed geocell and erosion control fabric intact; potential river access observed

Photo No. 8	Date: 6/8/2017

Direction Photo Taken:

West

Description:

Station 00 + 00’

Installed geocell and erosion control fabric intact; potential river access observed

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PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
DuPont	STM-01 (Constitution Park)	60532579

Photo No. 9	Date: 6/8/2017

Direction Photo Taken:

NA

Description:

Between station 00 + 00' and 00 + 50'

Installed geocell intact, but beginning to be exposed near the toe of the slope; installed erosion control fabric intact, but exposed

Photo No. 10	Date: 6/8/2017

Direction Photo Taken:

West

Description:

Station 00 + 50'

~45 degree consistent bank angle; no at-risk trees present; no exposed roots; coir logs intact; no scour present; evidence of recent vegetative maintenance, including cut stakings; evidence of foot traffic along toe of slope, along coir logs

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PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
DuPont	STM-01 (Constitution Park)	60532579

Photo No. 11	Date: 6/8/2017

Direction Photo Taken:

NA

Description:

Station 00 + 50’

Installed geocell intact, but beginning to be exposed near the toe of the slope; installed erosion control fabric intact, but exposed

Photo No. 12	Date: 6/8/2017

Direction Photo Taken:

West

Description:

Station 00 + 100’

~40 degree bank angle; no at-risk trees present; no exposed roots; no scour present; installed rock toe intact with evidence of sediment deposition; installed river access steps intact; well-established planted rye grass on bank

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PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
DuPont	STM-01 (Constitution Park)	60532579

Photo No. 13	Date: 6/8/2017

Direction Photo Taken:

West

Description:

Station 00 + 100’

Depression adjacent to rock toe boulders, likely related to recent sediment deposition; well-established planted rye grass on bank

Photo No. 14	Date: 6/8/2017

Direction Photo Taken:

West

Description:

Station 00 + 150’

~45 degree bank angle; no at-risk trees present; no exposed roots; no scour present; installed rock toe and large woody debris (LWD) intact; installed geocell and erosion control fabric intact; well-established planted rye grass on bank

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Client Name:	Site Location:	Project No.
DuPont	STM-01 (Constitution Park)	60532579

Photo No. 15	Date: 6/8/2017

Direction Photo Taken:

West

Description:

Station 00 + 150’

Installed rock toe intact with evidence of sediment deposition; well-established planted rye grass on bank

Photo No. 16	Date: 6/8/2017

Direction Photo Taken:

NA

Description:

Station 00 + 150’

Installed rock toe and large woody debris (LWD) intact with evidence of sediment deposition

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Client Name:	Site Location:	Project No.
DuPont	STM-01 (Constitution Park)	60532579

Photo No. 17	Date: 6/8/2017

Direction Photo Taken:

NA

Description:

Station 00 + 200’

Evidence of recent vegetative maintenance, including cut stakings; exposed erosion control fabric

Photo No. 18	Date: 6/8/2017

Direction Photo Taken:

Southeast

Description:

Station 00 + 200’

Evidence of recent vegetative maintenance, including cut stakings and dead sycamore sapling

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PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
DuPont	STM-01 (Constitution Park)	60532579

Photo No. 19	Date: 6/8/2017

Direction Photo Taken:

West

Description:

Station 00 + 200’

Evidence of recent vegetative maintenance, including cut stakings and dead sycamore sapling

Photo No. 20	Date: 6/8/2017

Direction Photo Taken:

West

Description:

Station 00 + 200’

~55 degree consistent bank angle; no exposed roots; no scour present; recent vegetative maintenance, exposing erosion control fabric; installed coir logs, geocell and erosion control fabric intact

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Client Name:	Site Location:	Project No.
DuPont	STM-01 (Constitution Park)	60532579

Photo No. 21	Date: 6/8/2017

Direction Photo Taken:

NA

Description:

Station 00 + 250’

Evidence of recent vegetative maintenance, including cut stakings; minimal exposed geocell around planted vegetation

Photo No. 22	Date: 6/8/2017

Direction Photo Taken:

NA

Description:

Station 00 + 250’

Evidence of recent vegetative maintenance, including cut stakings; minimal exposed geocell around planted vegetation

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Client Name:	Site Location:	Project No.
DuPont	STM-01 (Constitution Park)	60532579

Photo No. 23	Date: 6/8/2017

Direction Photo Taken:

West

Description:

Station 00 + 250’

Evidence of recent vegetative maintenance, including cut stakings; dead shrub to be replaced

Photo No. 24	Date: 6/8/2017

Direction Photo Taken:

West

Description:

Station 00 + 250’

~55 degree consistent bank angle; no exposed roots; no scour present; evidence of recent vegetative maintenance; installed coir logs and geocell intact; edge of erosion control fabric exposed near toe of slope

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Client Name:	Site Location:	Project No.
DuPont	STM-01 (Constitution Park)	60532579

Photo No. 25	Date: 6/8/2017

Direction Photo Taken:

West

Description:

Station 00 + 300’

~70 degree consistent bank angle; no exposed roots; no at-risk trees; no scour present; established herbaceous vegetation on river bank; minimal evidence of cut stakings; installed coir logs, erosion control fabric, and geocell intact

Photo No. 26	Date: 6/8/2017

Direction Photo Taken:

West

Description:

Station 00 + 350’

~70 degree consistent bank angle; no exposed roots; no at-risk trees; recent vegetative maintenance, exposing erosion control fabric throughout; installed coir logs intact, but showing signs of wear and potential for scour

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PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
DuPont	STM-01 (Constitution Park)	60532579

Photo No. 27	Date: 6/8/2017

Direction Photo Taken:

NA

Description:

Station 00 + 350’

Edge of installed erosion control fabric exposed along toe of slope; installed coir logs intact, but showing signs of wear and potential for scour

Photo No. 28	Date: 6/8/2017

Direction Photo Taken:

NA

Description:

Station 00 + 350’

Edge of installed erosion control fabric exposed along toe of slope; installed coir logs intact, but showing signs of wear and potential for scour

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PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
DuPont	STM-01 (Constitution Park)	60532579

Photo No. 29	Date: 6/8/2017

Direction Photo Taken:

West

Description:

Station 00 + 400’

~60 degree consistent bank angle; no exposed roots; no at-risk trees; no scour present; established herbaceous vegetation at top of bank; evidence of vegetative maintenance near bottom of bank

Photo No. 30	Date: 6/8/2017

Direction Photo Taken:

Southwest

Description:

Station 00 + 400’

Installed coir logs intact; erosion control fabric exposed near bottom of bank

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PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
DuPont	STM-01 (Constitution Park)	60532579

Photo No. 31	Date: 6/8/2017

Direction Photo Taken:

West

Description:

Station 00 + 400’

Installed coir logs intact; erosion control fabric exposed near bottom of bank

Photo No. 32	Date: 6/8/2017

Direction Photo Taken:

Northwest

Description:

Station 00 + 400’

Installed coir logs intact; erosion control fabric exposed near; some geocell and edge of erosion control fabric exposed around base of black walnut tree unvegetated

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PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
DuPont	STM-01 (Constitution Park)	60532579

Photo No. 33	Date: 6/8/2017

Direction Photo Taken:

NA

Description:

Station 00 + 400’

Edge of erosion control fabric exposed near bottom of bank

Photo No. 34	Date: 6/8/2017

Direction Photo Taken:

West

Description:

Station 00 + 400’

Some geocell and edge of erosion control fabric exposed around base of black walnut tree

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PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
DuPont	STM-01 (Constitution Park)	60532579

Photo No. 35	Date: 6/8/2017

Direction Photo Taken:

West

Description:

Station 00 + 450’

~50 degree consistent bank angle; no exposed roots; no at-risk trees; no scour present; established herbaceous vegetation at top of bank; evidence of vegetative maintenance near bottom of bank

Photo No. 36	Date: 6/8/2017

Direction Photo Taken:

West

Description:

Station 00 + 500’

~40 degree consistent bank angle; no exposed roots; no at-risk trees; no scour present; evidence of vegetative maintenance for most of the bank

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PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
DuPont	STM-01 (Constitution Park)	60532579

Photo No. 37	Date: 6/8/2017

Direction Photo Taken:

NA

Description:

Station 00 + 500’

Evidence of recent vegetative maintenance, including cut stakings; minimal exposed geocell and erosion control fabric around some planted vegetation

Photo No. 38	Date: 6/8/2017

Direction Photo Taken:

West

Description:

Station 00 + 525’

~15 degree consistent bank angle; no exposed roots; no at-risk trees; no scour present; installed stabilization features recently repaired; majority of erosion control fabric unvegetated

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PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
DuPont	STM-01 (Constitution Park)	60532579

Photo No. 39	Date: 6/8/2017

Direction Photo Taken:

Northwest

Description:

Station 00 + 525’

No exposed roots; no at-risk trees; no scour present; installed stabilization features recently repaired; planted stakings appear to be healthy; majority of erosion control fabric nonvegetated

Photo No. 40	Date: 6/8/2017

Direction Photo Taken:

Northwest

Description:

Station 00 + 525’

No exposed roots; no at-risk trees; no scour present; installed stabilization features recently repaired; planted stakings appear to be healthy; majority of erosion control fabric unvegetated

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APPENDIX A
PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
DuPont	STM-01 (Constitution Park)	60532579

Photo No. 41	Date: 6/8/2017

Direction Photo Taken:

Northwest

Description:

Station 00 + 525’

No exposed roots; no at-risk trees; no scour present; installed stabilization features recently repaired; planted stakings appear to be healthy; majority of erosion control fabric unvegetated

Photo No. 42	Date: 6/8/2017

Direction Photo Taken:

West

Description:

Station 00 + 525’

~15 degree consistent bank angle; no exposed roots; no at-risk trees; no scour present; installed stabilization features recently repaired; majority of erosion control fabric unvegetated

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APPENDIX A
PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
DuPont	STM-01 (Constitution Park)	60532579

Photo No. 43	Date: 6/8/2017

Direction Photo Taken:

West

Description:

Station 00 + 525’

~15 degree consistent bank angle; no exposed roots; no at-risk trees; no scour present; installed stabilization features recently repaired; majority of erosion control fabric unvegetated along bank

Photo No. 44	Date: 6/8/2017

Direction Photo Taken:

NA

Description:

Station 00 + 525’

Installed stabilization features recently repaired; majority of erosion control fabric exposed along bank; minor amount of geocell unvegetated near bottom of bank

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APPENDIX A
PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
DuPont	STM-01 (Constitution Park)	60532579

Photo No. 45	Date: 6/8/2017

Direction Photo Taken:

NA

Description:

Station 00 + 525’

Installed stabilization features recently repaired; majority of erosion control fabric unvegetated along bank; minor amount of geocell exposed near bottom of bank

Photo No. 46	Date: 6/8/2017

Direction Photo Taken:

South

Description:

Station 00 + 525’

Installed stabilization features recently repaired; edge of erosion control fabric exposed along bottom of bank, near intact coir logs

Table 1
Short-term Monitoring Plan Summary
Spring 2017 Short-Term Monitoring Field Summary Memo
Former DuPont Waynesboro Site, Area of Concern 4

Short-Term Remedial Action Objectives				Monitoring Plan Designs			Adaptive Management Outcomes	
General Objective	**Performance Objective**	**Measurable Metric**	**Preliminary Success Criteria**	**General Station Locations**	**Monitoring Frequency (post construction)**	**Analytical Parameters**	**Contingency Actions**	**Decision Analysis**
Reduce Mercury Transport and Exposure	Increase in Bank Stability	Topography	Maintenance of Post-Construction Bank Condition	BMA Evaluated Holistically	Twice Annually for First 3 Years; Post-storm	Continuous Bank Angle / Grade	Structural and/or Vegetative Stabilization	Refine Effectiveness Estimates
		Vegetation	>80% Cover; <10% Invasives	Vegetation Plots at Each BMA	Twice Annually for First 3 Years; Post-storm	Cover and Species Composition	Additional Vegetation Enhancement	Refine Effectiveness Estimates
		Design and Implementation	Landowner Approvals and Permits	BMA Properties	NA	NA	NA	Refine Implementation Estimates
	Reduce Mercury Loading from Bank	Surface Sediment	>75% Mercury Concentration Reduction	Transects Spaced ~100-200' at each BMA	Twice Annually for First 3 Years	IHg and MeHg Concentrations	NA	Refine Effectiveness Estimates
		Pore Water	>75% Mercury Concentration Reduction	Transects Spaced ~100-200' at each BMA	Twice Annually for First 3 Years	IHg and MeHg Concentrations	NA	Refine Effectiveness Estimates
		Periphyton	>75% Mercury Concentration Reduction	Downstream of Representative BMAs (Near-shore)	Twice Annually for First 3 Years	IHg and MeHg Concentrations	NA	Refine Effectiveness Estimates
		Asiatic Clam Sampling	>75% Mercury Concentration Reduction	Downstream of Representative BMAs (Near-shore)	Twice Annually for First 3 Years	IHg and MeHg Concentrations	NA	Refine Effectiveness Estimates
	Reduce In-Channel Mercury Exposure	Periphyton	>50% Mercury Concentration Reduction	Downstream of Representative BMAs (Channel)	Annually for First 10 Years	IHg and MeHg Concentrations	NA	Refine CSM
		Asiatic Clam Sampling	>50% Mercury Concentration Reduction	Downstream of Representative BMAs (Channel)	Annually for First 10 Years	IHg and MeHg Concentrations	NA	Refine CSM
Maintain or Improve Riparian and Aquatic Habitat	Improve Bank Vegetation	Vegetation	>80% Cover; <10% Invasives	Vegetation Plots at Each BMA	Twice Annually for First 3 Years	Cover and Species Composition	Additional Vegetation Enhancement	Refine Effectiveness Estimates
	Improve In-Stream Habitat	Rapid Bioassessment Protocols	Visual Stream Classification	Each BMA Assessed Independently	Quarterly for the First Year and Semi Annually (Q1/Q3) for years 2-10[1]	Rapid Bioassessment Protocol Scores	NA	Refine Effectiveness Estimates
	Maintain Detrital Input/Stream Shading	Canopy Cover	Achievement of Baseline Canopy Coverage	Transects Spaced ~ 100-200' at each BMA	Annually for First 3 Years	Percent Canopy Coverage (Spherical Densiometer)	Additional Vegetation Enhancement	Refine Effectiveness Estimates
	Maintain Stream Substrate Condition	Wolman Pebble Counts	Maintenance / Improvement of Baseline Conditions	Transects Spaced ~100-200' at each BMA	Annually for First 3 Years	Particle Size Analysis	Structural and/or Vegetative Stabilization	Refine Effectiveness Estimates
	Maintain In-stream Habitat Features	# of In-stream Habitat Features	Maintenance / Improvement of Baseline Conditions	Each BMA Assessed Independently	Twice Annually for First 3 Years	# of In-stream Habitat Features	Structural Stabilization	Refine Effectiveness Estimates
	Habitat Function and Ecological Value	EPW & USM	Maintenance / Improvement of Baseline Conditions	Each BMA Assessed Independently	Annually for first 3 Years	USM Methodology & EPW Non-tidal Stream - Fish FCI	Structural and/or Vegetative Stabilization	Refine Effectiveness Estimates
Maintain or Improve Benthic Community	Maintenance of Benthic Community	Benthic Invertebrate Metrics	Maintenance / Improvement of Baseline Conditions	Four Locations Within the Interim Measures Area (RRM 0.5, RRM 1.0, RRM 1.5, RRM 2.0)	Twice Annually for First 3 Years	300 Organism Sub-count	NA	Refine Effectiveness Estimates
River Access / Aesthetics	Provide Stable River Access Points	Stable Access Points	Maintenance / Improvement of Baseline Conditions	Each BMA Assessed Independently	Twice Annually for First 3 Years	# of Stable and Improvised Access Points	Structural Stabilization	Refine Effectiveness Estimates

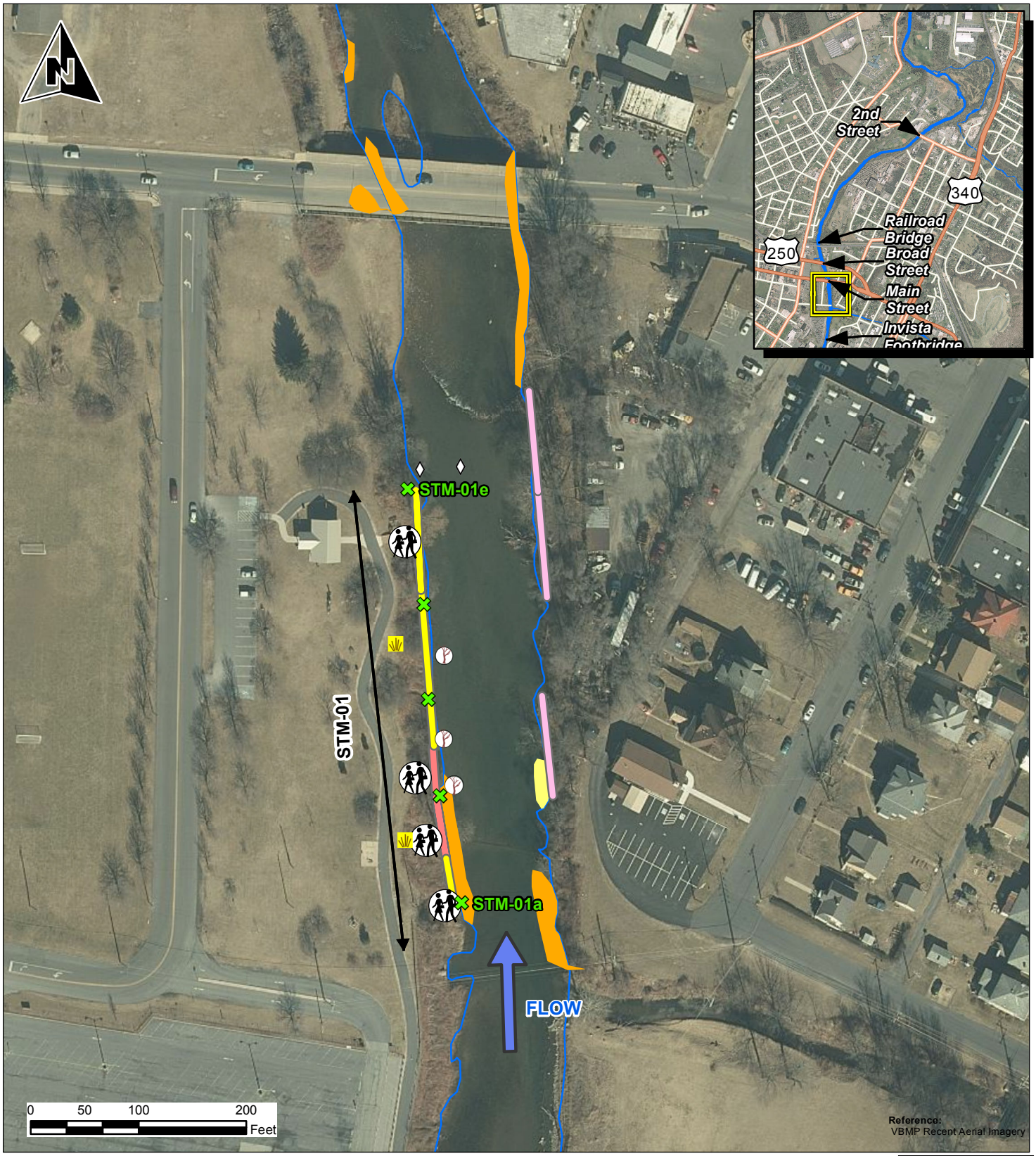
Notes:
EPW, Evaluation for Planned Wetlands
FCI, Functional Capacity Index
USM, Unified Stream Methodology
RRM, Relative River Mile
NA, Not applicable
IHg, Inorganic mercury
MeHg, Methylmercury
CSM, Conceptual Site Model
BMA, Bank Management Area
Ancillary habitat/ public access metrics

Table 2
Spring 2017 BMA Maintenance Inspection- STM-01
Spring 2017 Short-term Monitoring Field Summary Memo
Former DuPont Waynesboro Site, Area of Concern 4

	Undercutting				Exposed Roots			At Risk Trees			Installed Stabilization Features Intact					Local Scour		
Station (ft)[1]	Approximate Bank Angle (Degrees)	Consistent Grade (Y/N)[2]	Notes	Photo # (Appendix A)	Exposed Roots (L /M /H)[3]	Notes	Photo # (Appendix A)	At Risk Trees Present (Y/N + #)[4]	Notes	Photo # (Appendix A)	Rock Toe/LWD (Y/N)[5]	Geocell (Y/N)[6]	Erosion Control Fabric (Y/N)[6]	Notes	Photo # (Appendix A)	Scour Present (Y/N)[7]	Notes	Photo # (Appendix A)
00 - 25	30	N (see notes)	Lower bank ~30 degrees; Upper bank ~55 degrees	1	L	No woody plants adjacent to edge of water	2	N	No woody plants adjacent to edge of water	1	NA	NA	NA		1, 2	Y	Low presence of scour 5' upstream of 00 - 25	3
00 + 00	40	N (see notes)	Lower bank ~30 degrees; Upper bank ~55 degrees	4	NA	No woody plants adjacent to edge of water; Minimal vegetation present on bank	5	N	No woody plants adjacent to edge of water	4, 5	NA	Y	Y	Coir logs intact, some erosion control fabric is visible	4, 5, 6, 7, 8	N	Potential river access point observed	4, 5, 6, 7, 8
00 + 50	45	Y		10	NA	No woody plants adjacent to edge of water; Evidence of recent vegetative maintenance	10	N	No woody plants adjacent to edge of water	10	NA	Y (beginning to be exposed at toe of slope)	Y (exposed throughout)	Geocell intact, but beginning to be exposed near the toe of the slope between 00 + 00 and 00 + 50	9, 10, 11	N	Evidence of foot traffic along the toe of slope, along coir logs	10
00 + 100	40	N (see notes)	Lower bank ~10 degrees (rock toe); Upper bank ~45 degrees	12	NA	No woody plants adjacent to edge of water; Rye grass from stabilization of slope	12	N	No woody plants adjacent to edge of water	12	Y (rock toe)	Y	Y	Rock toe along bank and constructed river access steps intact	12, 13	N	Depression adjacent to boulders	12, 13
00 + 150	45	N (see notes)	Lower bank <5 degrees (rock toe); Upper bank ~45 degrees	14	NA	No vegetation, boulders with silt and LWD at toe of slope; Rye grass from stabilization of slope	14	N	No woody plants adjacent to edge of water	14	Y (LWD and Rock toe)	Y	Y		14,15,16	N	Silt filling in behind LWD and in boulders	14, 15, 16
00 + 200	55	Y		20	NA	Evidence of recent vegetative maintenance, including cut stakings and deceased sycamore sapling	17, 18, 19, 20	N	No woody plants adjacent to edge of water	20	NA	Y	Y (edge exposed along entire bank)	Coir logs intact; Small sections of exposed geocell around cut plantings	17, 20	N		20
00 + 250	55	Y		24	NA	Evidence of recent vegetative maintenance, including cut stakings and deceased woody plants	21, 22, 23, 24	N	No woody plants adjacent to edge of water	24	NA	Y	Y (edge exposed along toe of slope)	Coir logs intact; Small sections of exposed geocell around cut plantings	21, 22, 24	N		24
00 + 300	70	Y		25	NA	Established grasses on river bank; minimal evidence of cut stakings	25	N	No woody plants adjacent to edge of water	25	NA	Y	Y (exposed near toe of slope)		25	N		25
00 + 350	70	Y		26	NA	Evidence of recent vegetative maintenance	26	N	No woody plants adjacent to edge of water	26	NA	Y (some geocell exposed below observation platform)	Y (exposed throughout)	Coir log 5' downstream slightly loose and appears to have shifted towards the stream;	26, 27, 28	N	Installed coir logs intact, but showing signs of wear and potential for scour	27, 28
00 + 400	60	Y		29	NA	Evidence of recent vegetative maintenance near bottom of bank	29	N	No woody plants adjacent to edge of water	29	NA	Y (small amount exposed upstream around black walnut)	Y (exposed near bottom of bank)		30, 31, 32, 33, 34	N		29, 30 ,31, 32, 33
00 + 450	50	Y		35	NA	Evidence of recent vegetative maintenance near bottom of bank	35	N	No woody plants adjacent to edge of water	35	NA	Y	Y (40% exposed)		35	N		35
00 + 500	40	Y	Decreased vertical bank height (~6')	36	NA	Evidence of recent vegetative maintenance	36, 37	N	No woody plants adjacent to edge of water	36	NA	Y	Y (70% exposed)		36, 37	N		36
00 + 525	15	Y		38, 42, 43	NA	Stakings growing well	38 ,39, 40, 41, 42, 43	N	No woody plants adjacent to edge of water	43	NA	Y (small amount exposed along coir log and edge of remediation)	Y (85% exposed)		44, 45, 46	N		43

Notes:

1, Inspection station is described as the distance (feet) upstream (-) or downstream (+) from the start of the BMA (00); example, Station 00 + 50' is 50 feet downstream from the start of the BMA
2, A significant deviation from continuous bank slope or break in grade may be used as an indicator of undercutting; consistent bank grade is evaluated as Y (yes) or N (no)
3, The extent to which roots are exposed may provide a relative measure of the magnitude of apparent erosion; extent of exposed roots is evaluated as L (low), M (moderate), H (high), or NA (not applicable- no exposed roots)
4, At-risk trees (i.e., trees that lean towards the river) typically have a greater potential to fall into the river dislodge the bank soil and erosion-control products immediately around and above the tree; presence of at-risk trees is evaluated as Y (yes, plus number of at-risk trees) or N (no)
5, Installed rock toe and large woody debris (LWD) features are monitored to ensure that they are anchored and determine whether material has sloughed, or been eroded, or moved downstream; these installed features are evaluated as Y (yes, intact), N (no, not intact), or NA (not applicable- no installed features to monitor)
6, Installed geocell and erosion control fabric are monitored to ensure that they are intact and determine whether material is exposed or visible; these installed features are evaluated as Y (yes, intact), N (no, not intact), or NA (not applicable- no installed features to monitor)
7, The presence of local scour is assessed at the toe and center of the bank, per inspection station, as well as approximately 25 feet upstream and downstream of the start and end of the BMA; the presence of scour is evaluated as Y (yes) or N (no)

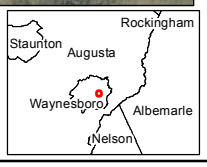


Legend

- Periphyton/Clam
- Benthic Community
- Vegetative Plots
- Sediment/PoreWater/ Canopy/Pebble Count
- Large Woody Debris
- River Access
- Extent of Short-term Monitoring Location
- Clay and Silt Deposits
- Fine Sand Deposits
- Shoreline

Bank Management Area

- Non-Use BMAs
- Phase 1A Primary BMAs
- Phase 1A Secondary BMAs
- Phase 1B Primary BMAs
- Phase 1B Secondary BMAs



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Date:	7/11/2017

Figure 1: Sheet 1 of 4
Short-Term Monitoring Stations Overview Map
Spring 2017 Short-Term Monitoring Field Summary Memo
Former Dupont Waynesboro Site, Area of Concern 4
Waynesboro, Virginia

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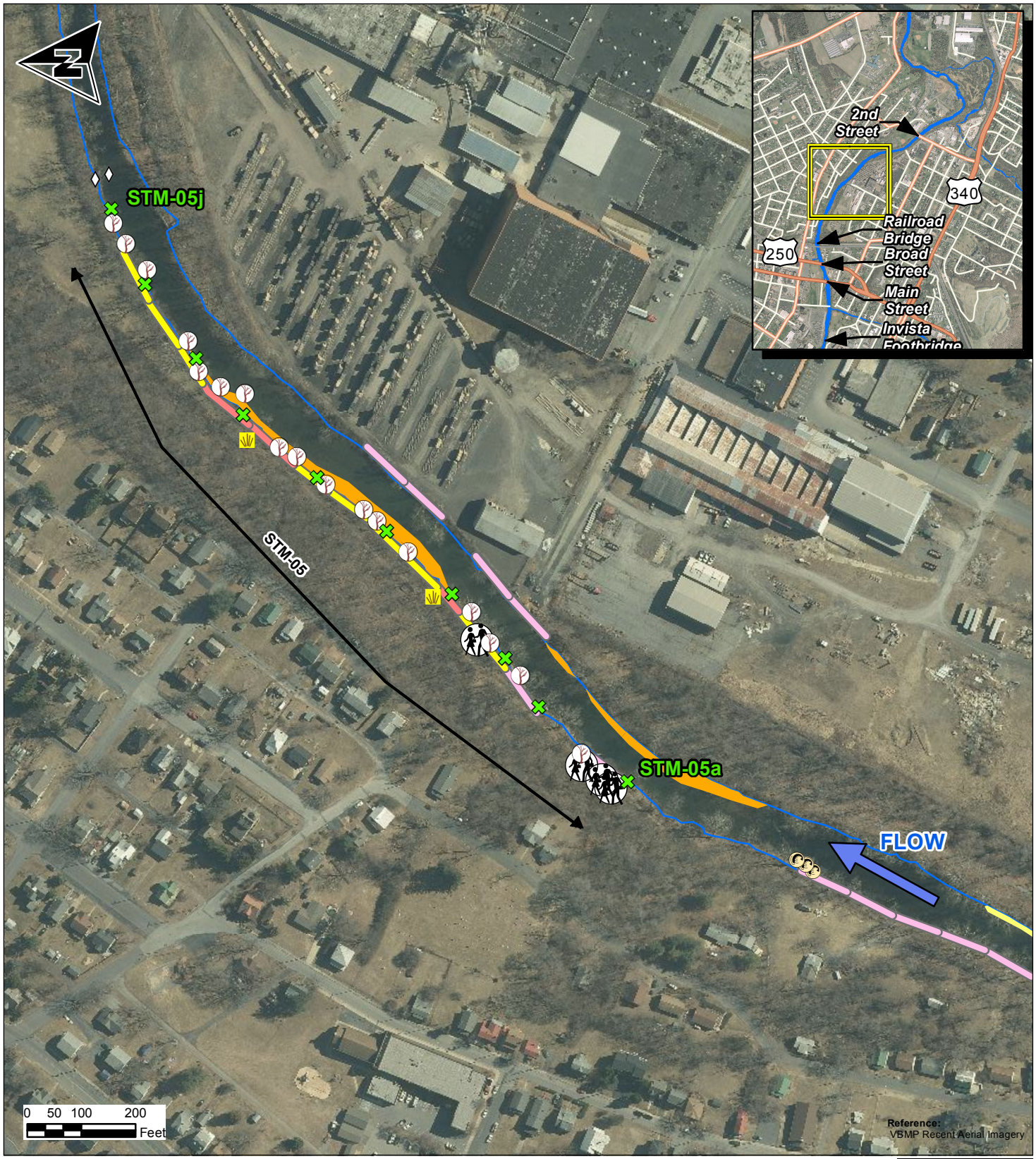

Legend

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- Benthic Community
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- Sediment/PoreWater/ Canopy/Pebble Count
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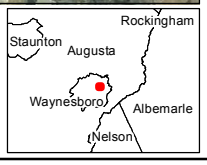
- Shoreline

Bank Management Area

- Non-Use BMAs
- Phase 1A Primary BMAs
- Phase 1A Secondary BMAs
- Phase 1B Primary BMAs
- Phase 1B Secondary BMAs



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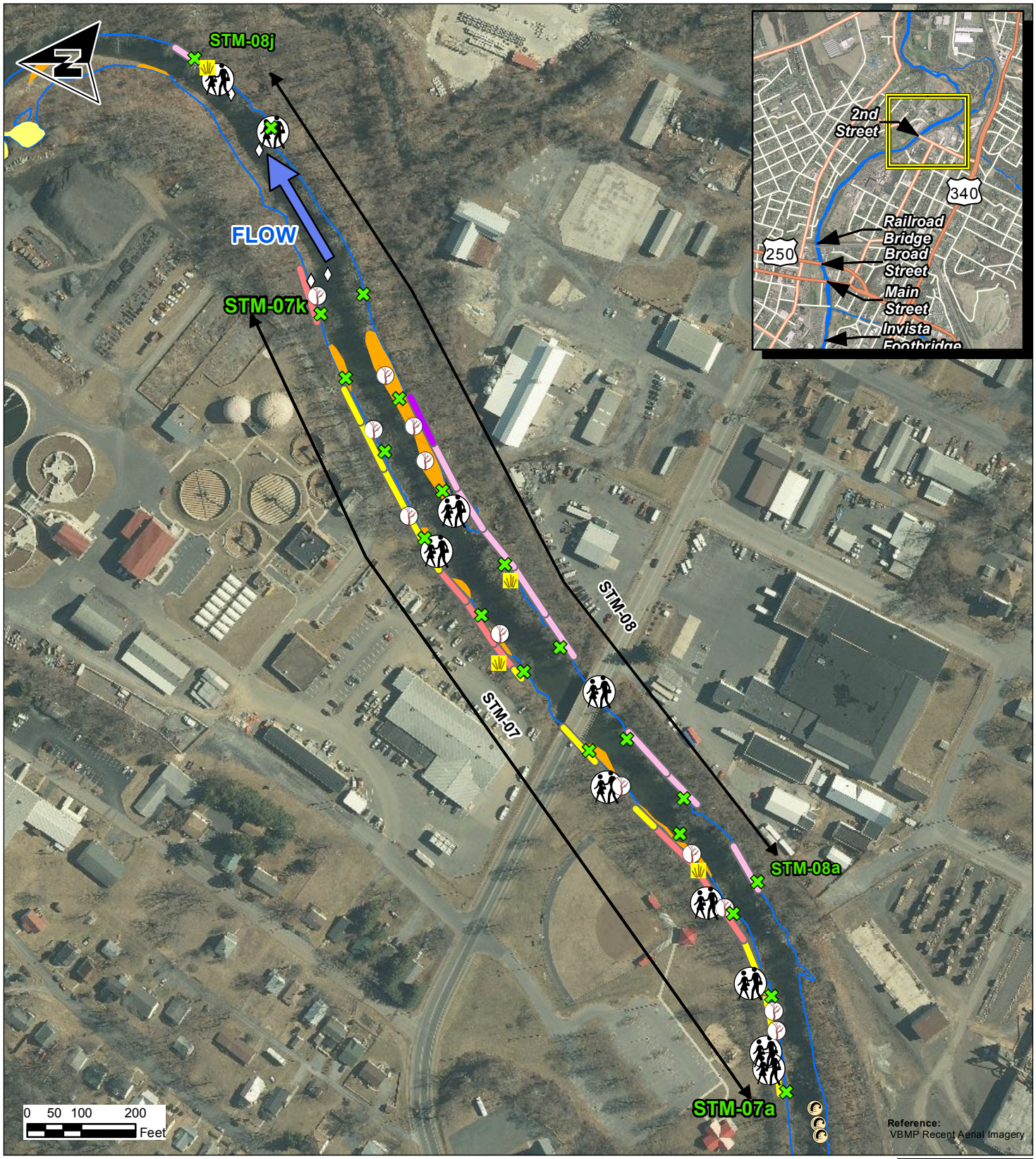

Legend

- Periphyton/Clam
- Benthic Community
- Vegetative Plots
- Sediment/PoreWater/ Canopy/Pebble Count
- Large Woody Debris
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- Fine Sand Deposits
- Shoreline

Bank Management Area

- Non-Use BMAs
- Phase 1A Primary BMAs
- Phase 1A Secondary BMAs
- Phase 1B Primary BMAs
- Phase 1B Secondary BMAs

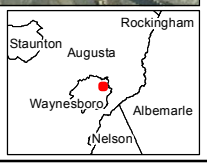

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Figure 1: Sheet 3 of 4
Short-Term Monitoring Stations Overview Map
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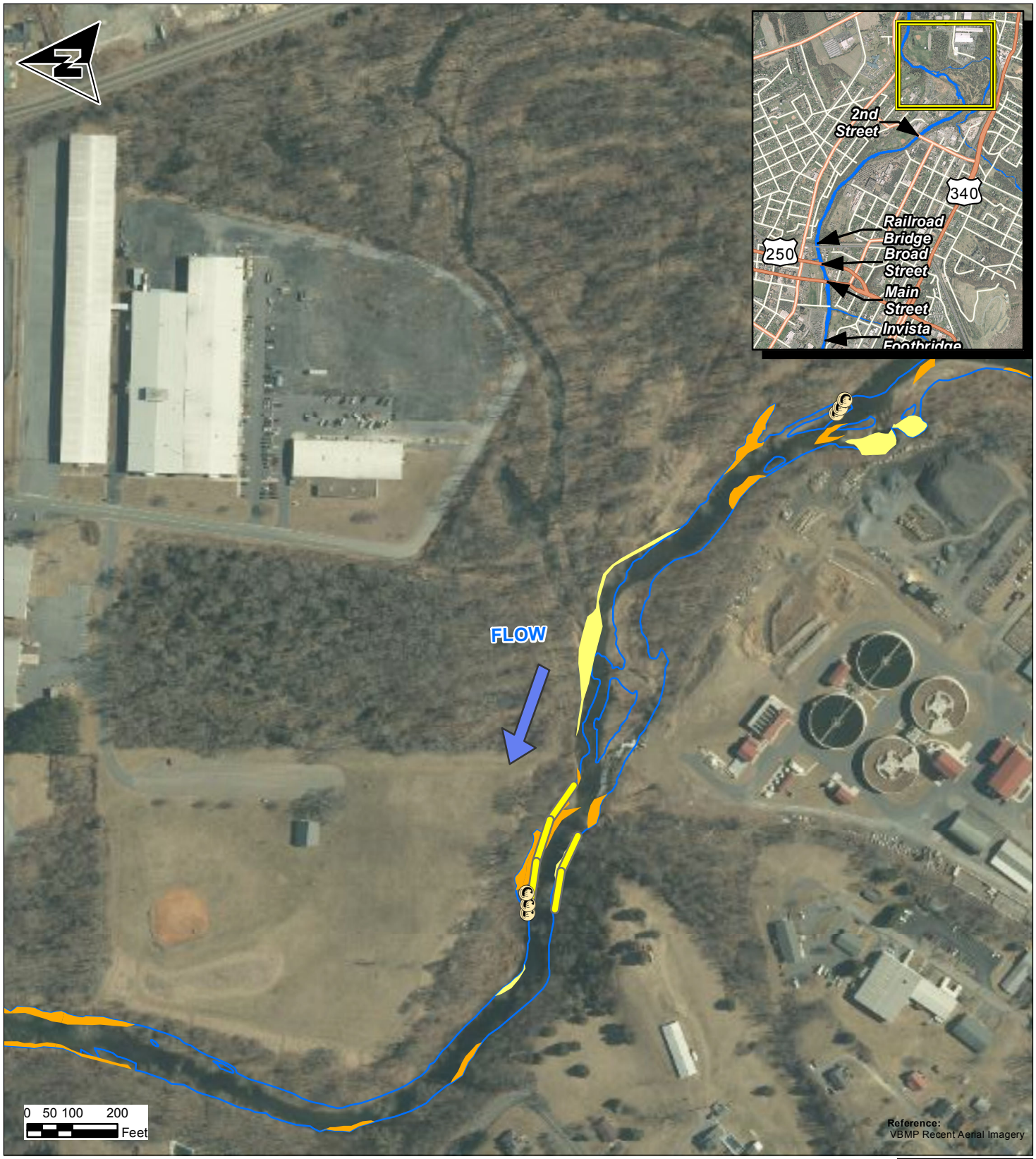

Legend

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- Benthic Community
- Vegetative Plots
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- Shoreline

Bank Management Area

- Non-Use BMAs
- Phase 1A Primary BMAs
- Phase 1A Secondary BMAs
- Phase 1B Primary BMAs
- Phase 1B Secondary BMAs

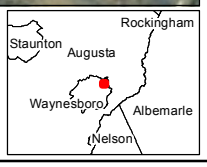

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Figure 1: Sheet 4 of 4
Short-Term Monitoring Stations Overview Map
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