APPENDIX H

Quality Assurance Project Plan for Wetland Monitoring and Assessment Demonstration Project: Assessment of Wetland Mitigation Success

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APPENDIX H

Revision to Quality Assurance Project Plan for Wetlands Monitoring and Assessment Demonstration Project: Assessment of Wetlands Mitigation Success (EPA RFA # EPA-REG1_WPDG-2011; 2011-2013)

PROJECT PURPOSE

The purpose of this study is to conduct assessments of wetlands replacement areas to determine:

1) Whether the replacement area meets the regulatory requirements of 310 CMR 10.55(4)(b);
2) Whether the replacement area meets the *Massachusetts Inland Wetlands Replication Guidelines* dated March, 2002. *http://www.mass.gov/eea/docs/dep/water/laws/i-thru-z/replicat.pdf*;
3) Whether forested wetland replacement areas are achieving acceptable biological condition.

This QAPP amendment pertains only to goals 1) and 2) above.

BACKGROUND

To date we have reviewed 5046 files in 44 randomly selected towns across the Commonwealth. Of those we have identified 178 that involved wetlands replacement. In accordance with the protocol established in the QAPP we identified all the landowners for those projects. All landowners were sent a letter requesting permission to enter onto the property in question in order to conduct the assessment of the wetland and the wetland replacement area. If landowners did not respond to that initial letter, a minimum of 2 follow-up phone calls were made to the landowners, and then a third phone call to the town Conservation Commission (if needed) in an attempt to contact the landowner. On many sites much more effort was required. Of all landowners that we attempted to contact, we have been unable to get a response for 59 sites.

NEED FOR AMENDMENT

There are a myriad of reasons why people may have chosen to not respond to our requests. In some cases, we believe the project was never built, thus the landowner never responded thinking that there was nothing there to evaluate. In a few cases we were simply unable to track down landowner's phone numbers, something that may be due to people moving away from traditional landlines and using their cell phone as their primary or sole phone number. In other cases the land has changed hands so many times that we have had difficulty finding the current landowner and the assessor's data does not represent the current owner. In some cases, people may not have responded because they may fear further regulatory involvement

or enforcement. Some landowners may know that the wetland replacement area in question has never been built, in direct conflict with the approved permits for the project. If this is the case with multiple sites it may introduce a bias into our data evaluation if we are only able to access properties where replication areas were built and/or are successful. The purpose of this revision to the QAPP is to address that concern. In the existing approved QAPP, the final step to obtain landowner permission is to have the field investigators visit each site, and "knock on doors." In the case of commercial sites we believe that business owners may be present and we hope to be granted access to some unknown percentage of those sites. In the case of residential homes, we believe we may find many where nobody is home. In either case, even though we are at the site, if we have no permission to enter the site we will not be able to inspect the wetland replacement area in the same manner as the sites where we have permission.

By reviewing the locations of the 59 sites where we have been unable to get landowner permission, we have determined that 38 of them are situated on the property where it is likely to be visible from either the road, the driveway to the home, or an access road to the commercial building. Of these, 20 are likely to be visible from a public road and 18 are likely to be visible from a driveway or private access road. The remaining 21 are not likely to be visible at all from the field. Based on this knowledge we have developed different assessment procedures to address each different scenario. The key thing we hope to get from the procedures is a sense of whether the rates of non-compliance are higher (or lower) for non-permission sites relative to permission sites. Non-compliance could be based on 1) failure to build the replication area, 2) clear indication that replication area is significantly smaller than proposed or 3) clear indication that the replication area substantially fails to demonstrate wetland hydrology (too dry).

These data would not be included in the larger study of mitigation success but could be used in the discussion of results. We are hopeful that we will be able to determine a correction factor that can be used to modify results of the study based on the rapid assessment of non-permission sites. For example, if 30% of sites are non-permission sites and the rate of non-compliance is 100% higher than for permission sites we should be able to calculate an adjustment that could yield a better (non-biased) approximation of non-compliance rates.

Example

Non-permission sites (30% of sites): 40% rate of non-compliance
Permission sites (70% of sites): 20% rate of non-compliance

Overall rate of non-compliance = (0.3 x 40) + (0.7 x 20) = 26%

Using this correction factor we get a more realistic non-compliance rate (26%); otherwise the non-compliance rate of 20% would be biased to make things look better than they really are. This is important because if we cannot account for the non-permission sites it will significantly erode the credibility of the study results.

Because of limitations on the type and quality of data that can be collected at non-permission sites we probably won't be able to "correct" data for other measures of mitigation success (e.g. ability to

replicate plant community; evaluation of wetland hydrology from calculation of prevalence index values) other than a gross assessment of compliance/non-compliance (not built, too small, too dry).

Below are the protocols we have developed to address these situations. Note that for all procedures below, we will not knock on any doors where properties are marked "No Trespassing."

Rapid Assessment Method for Sites Visible from Public Ways

If, after knocking on the landowner's door we are unable to obtain permission to assess the site because the landowner is not home, and if the site is visible from a public way, we are proposing a limited rapid assessment method (RAM). Note that if the landowner is home and denies access, we will not proceed with the RAM if our presence would be visible from the house. Based on previous inspections of wetland replacement areas, we know that the majority of wetlands replacement areas can be readily identified in the field. They exhibit distinct slope grading, and show evidence of recent disturbance. Often silt fence and/or haybales are still present. Very often planted vegetation (trees and shrubs) still have tags on them, usually as a requirement of the permit so that the health and vigor of the planted vegetation can be tracked and they can be differentiated from pioneer species. Dominant, taller, vegetation such as cattails (*Typha latifolia*) or Alders (*Alnus spp*) can be readily identified from a distance. The RAM includes collecting a subset of data from the *Field Data Form* in the approved QAPP, including:

Is the site visible?
Has the replication area been built?
What percent of the site is visible?
What is the dominate vegetation in the replication area?
What is the dominant vegetation in the adjacent wetland?
Is it the general size and shape as depicted in plans?
Is replacement area deeper than the adjacent wetland?
Any evidence of die back resulting from prolonged periods of inundation?
Any evidence of drying out of adjacent wetland?
Is replacement area not excavated deeply enough?
Any evidence that replacement area is converting to a non-jurisdictional wetland? (i.e. upland plants becoming predominant; isolated from adjacent wetland or waterbody, etc.)
Does replacement area have a seasonal source of groundwater and surface water source other than a stormwater discharge or does it appear to be fed by precipitation and sheet runoff flow only?
Does replacement area have unrestricted hydraulic connection to neighboring water body or waterway and wetland: (Contiguous, isolated, channel connection)?
Are any drainage features that supply water to the replacement areas free-flowing without clogging from sediments, trash or other impediments?
Does replacement area contain invasive species listed in replacement guidance?

Any evidence of stormwater discharge to the replacement area that is not treated prior to discharge?
Are all embankments stable and properly vegetated?
Are the plants proposed for the replacement area common in nearby wetlands?
Any signs of human disturbance impacting wetland area and/or functions?

By documenting this information we will be able to determine if the proposed wetland replacement areas have at least been constructed and if they appear to have been constructed in general compliance with the Massachusetts Wetlands Replication Guidelines. This RAM will not allow for direct comparison to sites that have received detailed on-site evaluations, but it will address the issue of bias that was discussed above and will also provide some information as to whether the MassDEP regulatory performance standards and wetlands replication guidelines have been complied with. Keep in mind that the purpose of the site visits is to conduct an onsite evaluation in full compliance with the original QAPP. Every effort will be made to achieve that. The RAM will only be implemented in the subset of sites where, even after knocking on doors, we have still received no permission but we can see the replacement area or the location where the replacement area should be from a public road. The *Rapid Assessment Field Data Form for Sites Visible from a Public Way* is attached (See Attachment A).

Limited Windshield Assessment of Sites Visible only from Residential Driveways or Access Roads to Commercial Developments

For those wetland replacement areas that are visible from the driveway or from a private access road but not from a public way we will be driving right by them to get to the home or business so that we can knock on the door as we attempt to get permission from the landowner. In the event that the landowner does not answer and we cannot get permission to assess the site, we will immediately return to the vehicle. In this case as we drive off the property we will note whether the replacement area has been built and observe whatever features and characteristics are visible and take a photo if possible without leaving the vehicle. Note that if the landowner is home and denies access, we will leave the site immediately and not proceed with the limited windshield assessment. The *Limited Windshield Assessment Form for Sites Visible from a Private Way* is attached (See Attachment B).

Photo-Interpretation of Sites not visible from any field location without access permission
In the remaining 21 sites where we expect to be unable to view the wetland replacement area in the field without landowner permission, for sites without landowner permission and with "No Trespassing" signs, and for any other sites where we are unable to conduct a RAM or limited windshield assessment, we are proposing to review the all available aerial imagery in order to determine only if the replication area has been built: including 1993, 2001, 2005, 2008/9, 2011, MassGIS Orthoimagery as well as pictometry, oblique angle imagery and the most recent Google Map leaf-on imagery. Wetlands replication areas often have very distinct features that are visible on aerial imagery. They exhibit distinct anthropogenic contours and show signs of disturbance. They present as significant changes on the landscape from previous (pre-construction) conditions. The following pages present several examples of what we would

expect to see. The *Photointerpretation of Sites not Visible in the Field and where No Landowner Access Obtained* Form is attached (See Attachment C).

Example 1: Wetland Replacement Clearly Identified by Aerial Photo

Figure 1 entitled Replacement Plan A depicts a wetland replacement area that was approved in the Town of Groton. The plan tells us exactly what the replacement area is supposed to look like and exactly where it is on the landscape.

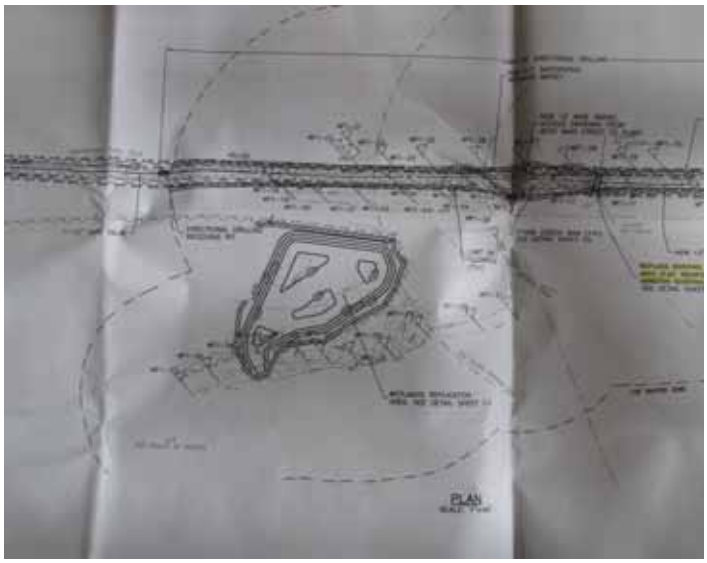

Fig. 1 Replacement Plan A

After reviewing the plan we can then review the most recent aerial imagery (MassGIS 2011 Digital Globe imagery) and view the exact area (Figure 2).

Figure 2: Aerial Image 1

Figure 2 depicts a feature that approximates the size, shape, and grading of the Groton replacement area and is in the location where the wetland replacement area is supposed to be built. Thus we can reasonably conclude that the wetland replacement area has been built. By measuring the photo we can confirm the approximate size of the replacement area. As an additional check that this is the wetland replacement area on the plan, we can then review earlier imagery (2005 or 2008 MassGIS orthophotography) to determine if the feature was constructed after the date of the permit. Figure 3 confirms that the wetland replacement area was built after the date of the permit (i.e. between 2004 and 2008) since it shows the feature has not been built.

Figure 3: Aerial Image 2

Example 2: Aerial Photos Inconclusive on whether Wetland Replacement Area Built

There are limitations to aerial photointerpretation of wetland replacement areas. While sites that involved extensive clearing and grading are readily apparent, sites that are obscured by trees, shadows, or are very small may not be easy to identify. One such example is a site in Princeton that was visited in the Summer of 2012.

The site plan shown in Figure 4 clearly identifies where the proposed wetland replacement area is supposed to be.

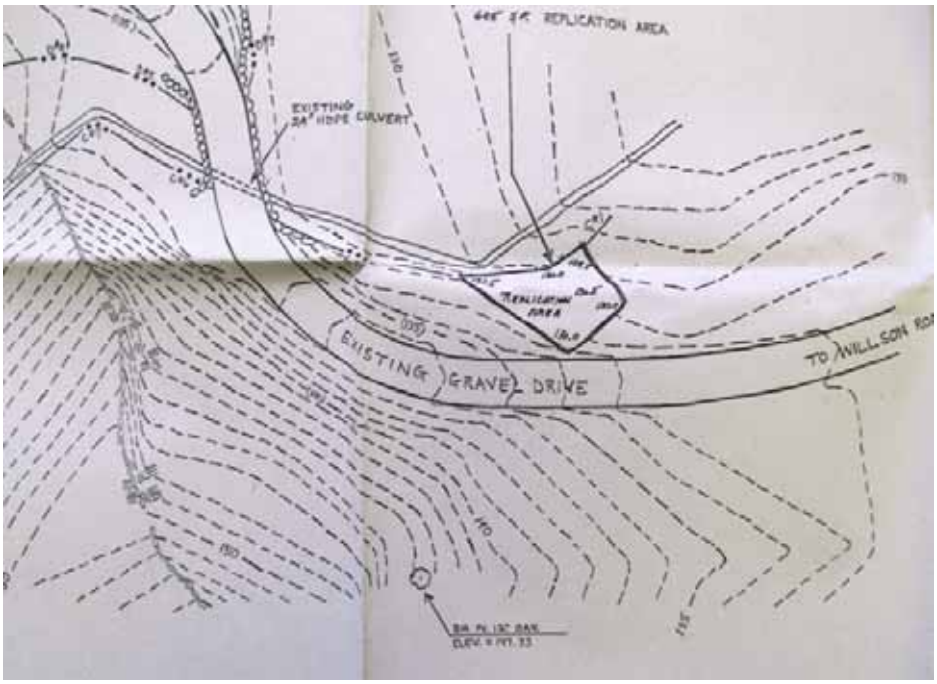

Figure 4: Replication Plan B

Figure 5 below shows recent 2011 aerial imagery that is inconclusive regarding whether or not the site was constructed.

Figure 5: Aerial Image B

An on-site investigation in the Summer of 2012, however confirmed that the wetland replacement area was in fact constructed. In the course of constructing it, all mature red maples (*Acer rubrum*) were preserved, the amount of excavation needed was minimal (approximately 1 foot in depth) to intercept ground water, and the edges were gradually sloped as opposed to abruptly sloped. The area was then planted with both wetlands shrubs and an herbaceous layer. The net effect of these careful and well implemented replacement area construction practices was to make this successful wetland replacement area effectively un-photointerpretable.

With these limitations in mind, we are proposing to use photointerpretation only to confirm the presence of a wetlands replacement area when landowner permission is not received, the site is not visible from any point in the field, and only when such an area is readily visible on the photo as in Example 1 above. All other areas will be classified as "unknown." Therefore, we will eliminate all errors of commission (identifying an area as wetland replication when in fact one does not exist). We realize we will have errors of omission (missed wetlands replication area that was built) but feel it is more important to have completely accurate and precise (i.e. correct and reproducible) data documenting presence of wetland replacement.

Conclusion

The benefit of this amendment to the QAPP is that it addresses one major component of the project: Are wetland replacement areas being constructed? While we have made and will continue to make every effort to gain access directly onto the site where wetlands replacement has occurred, it has always been understood that we would not be able to get access to all sites that have been identified as potentially having wetland replacement areas. It is understood that the data gathered using this amendment procedure is not the same as the data that is gathered by direct on site evaluations and it will be evaluated differently.

ATTACHMENT A

RAPID ASSESSMENT FIELD DATA FORM for Sites Visible from a Public Way

MANDATORY GUIDELINES:

- **DO NOT ENTER PROPERTY IF "NO TRESSPASSING" SIGN IS PRESENT OR THE SITE IS GATED;**
- **IF LANDOWNER DENIES ACCESS, DO NOT PROCEED WITH THE RAM if SITE IS VISIBLE FROM THE HOUSE**

DEP File #:_____ Project location: _____

Date: _____

Property Owner:_____

MassDEP Staff: _____

Project Built: _____ Replacement Area Built_____

List Dominant Plant Species Observed:

_____ _____

_____ _____

_____ _____

_____ _____

_____ _____

_____ _____

Additional Field Data to Determine Adherence to the
Massachusetts Inland Wetlands Replication Guidelines

1. Is replacement area is deeper than the adjacent wetland? _____

2. Any evidence of die back resulting from prolonged periods of inundation?

3. Any evidence of drying out of adjacent wetland?

4. Is replacement area not excavated deeply enough?

5. Any evidence that replacement area is converting to a non-jurisdictional wetland? (i.e. upland plants becoming predominant; isolated from adjacent wetland or waterbody, etc.)

6. Does replacement area have a seasonal source of groundwater and surface water source other than a stormwater discharge or does it appear to be fed by precipitation and sheet runoff flow only? _____

7. Does replacement area have unrestricted hydraulic connection to neighboring water body or waterway and wetland: (Contiguous, isolated, channel connection): _____

8. Are any drainage features that supply water to the replacement areas free-flowing without clogging from sediments, trash or other impediments? _____

9. Does replacement area contain invasive species listed in replacement guidance? _____

10. Any evidence of stormwater discharge to the replacement area that is not treated prior to discharge? _____

11. Are all erosion controls removed and any soils surrounding the replacement area stabilized?

12. Are all embankments stable and properly vegetated? _____

13. Are the plants in the replacement area common in nearby wetlands_____

    If No, list dominant plants in nearby wetlands:

    _____ _____

    _____ _____

    _____ _____

    _____ _____

    _____ _____

14. Any signs of human disturbance impacting wetland area and/or functions?

15. Were photos of the replacement area taken? ____ Were photos of the adjacent wetland taken? ____

ATTACHMENT B
LIMITED WINDSHIELD ASSESSMENT FORM for Sites Visible from a Private Way

MANDATORY GUIDELINES:

- **DO NOT ENTER THE PROPERTY IF "NO TRESSPASSING" SIGN IS PRESENT OR THE SITE IS GATED;**
- **AFTER KNOCKING ON THE DOOR, IF LANDOWNER IS NOT HOME, IMMEDIATELY RETURN TO THE VEHICLE;**
- **DO NOT LEAVE THE VEHICLE TO CONDUCT WINDSHIELD ASSESSMENT**
- **IF LANDOWNER DENIES ACCESS, WINDSHIELD ASSESSMENT SHOULD NOT BE CONDUCTED**

DEP File #:_____ Project location: _____

Date: _____

Property Owner: _____

MassDEP Staff: _____

Project Built: _____ Can Replication Area been seen? _____

If Yes, Does it appear to be the size and shape depicted on the plans? _____

Can Dominant Vegetation be observed? _____

If yes, list vegetation:

_____ _____

_____ _____

_____ _____

_____ _____

_____ _____

Were photos of replacement area taken? _____

Were photos of the adjacent wetland taken? _____

ATTACHMENT C
PHOTOINTERPRETATION of Sites
Not Visible in the Field and where no Landowner Access Obtained

DEP File #:_____ Project location: _____

Date: _____

Property Owner: _____

MassDEP Staff: _____

Project Built: _____ Can Replication Area been seen? _____

If Yes, Does it appear to be the size and shape depicted on the plans? _____

Can Dominant Vegetation be determined? _____

If yes, list vegetation:

_____ _____

_____ _____

_____ _____