January 11, 2013

Ref: 57276.03

Ms. Martha Abair
Senior Project Manager
U.S. Army Corps of Engineers – Regulatory Branch – Vermont Project Office
8 Carmichael Street, Suite 205
Essex, VT 05452

RE: Jay Peak Resort - Jay, Vermont
Permit Number: NAE-2008-1314
Golf Course Wetland and Stream Mitigation
Second Annual (2012) Monitoring Report

Dear Marty:

On behalf of Jay Peak Resort ("JPR"), Vanasse Hangen Brustlin, Inc. ("VHB") has prepared the enclosed report and supporting documentation to summarize the results of the second year of monitoring of the wetland and stream features which were restored or created as part of mitigation for the golf course, which was constructed without U.S. Army Corps of Engineer ("USACE") authorization. This monitoring was completed in accordance with Special Condition #4 of the Section 404 Individual Permit ("IP") (Permit Number NAE-2008-1314), which was issued after-the-fact.

As described in the IP application narrative and subsequently approved, the monitoring methods used for this site were developed to determine if the mitigation goals were being met. The goals are described in Special Condition #2 of the IP, and include:

- The restoration of natural vegetation communities in the restored/ created wetlands and streams, and
- The replacement of the functions and values provided by the impacted wetlands and streams.

Please find enclosed one hardcopy of the complete *Jay Peak Resort, Golf Course Wetland and Stream Mitigation, Second Annual (2012) Mitigation Report* and Appendix with supporting documentation, as well as a complete electronic copy on compact disc.

Vanasse Hangen Brustlin, Inc.
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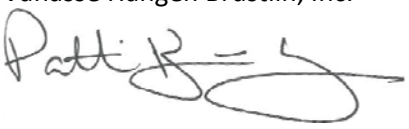
802.497.6100 ▪ FAX 802.425.7799
www.vhb.com

On behalf of JPR, I want to thank you for your continued collaboration with JPR and VHB with the ongoing golf course monitoring efforts, and for reviewing this monitoring report. Please do not hesitate to contact me if you have any questions or comments.

Sincerely,
Vanasse Hangen Brustlin, Inc.



Patti B. Kallfelz-Werts
Environmental Scientist

PBW/pwe

cc: Denise Leonard, U. S. Environmental Protection Agency
USACE Policy Analysis/ Technical Support Branch ("PATS"),
Robert Moore, JPR (electronic copy only)

Enclosure:

- *Jay Peak Resort – Golf Course Wetland and Stream Mitigation – Second Annual (2012) Mitigation Monitoring Report* (one hardcopy and one electronic copy)

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Second Annual (2012) Mitigation Monitoring Report

JAY PEAK RESORT
GOLF COURSE WETLAND AND STREAM MITIGATION
Jay, Vermont

Prepared for: **Jay Peak Resort**
Jay, Vermont

Prepared by: **Vanasse Hangen Brustlin, Inc.**
7056 U.S. Route 7
North Ferrisburgh, VT 05473

January 11, 2013

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Appendix:

1.0 Introduction

On behalf of Jay Peak Resort ("JPR"), Vanasse Hangen Brustlin, Inc. ("VHB") has prepared this report to present the findings of the second year of post-construction monitoring of the restoration work which was conducted by JPR to mitigate for impacts which resulted from the construction of an 18-hole golf course at the resort between 2004 and 2006 (see JPR Golf Course Site Location Map in the Appendix). This mitigation was necessary for JPR to qualify for an after-the-fact Individual Permit ("IP") under Section 404 of the Clean Water Act, for dredge and fill work conducted in jurisdictional waters of the U.S., including wetlands ("Waters"). The IP (Permit Number: NAE-2008-1314), was issued June 23, 2011, and required JPR to monitor the restoration and creation areas within the golf course for a period of five years, and included reference to the criteria and success standards which were used to conduct these monitoring activities and evaluate performance (USACE 2011). The purpose of the annual monitoring and reporting is to measure the progress of the mitigation areas relative to the success standards and to offer recommendations to ultimately achieve site success standards.

The mitigation activities, which were completed during the 2009 and 2010 construction seasons (VHBP 2010 and VHB 2010), included the restoration of 19 stream segments, and 0.58 acre of wetland, in addition to the creation of 1.86 acres of wetland (VHB 2010). The first year of annual monitoring was conducted by VHB in July 2011, and all performance standards were being met at that time. The field activities for the Year Two (2012) monitoring took place on August 8, 2012, and was conducted by VHB Environmental Scientists. A summary description of each standard and Year Two (2012) monitoring results are provided in Table 1, with greater detail provided in Section 2.0.

Table 1: Performance Standard Outline and Success Measure

Performance Standard	Success Criteria	Monitoring Method	Performance Standard Met (?) Year 1 (2011)	Performance Standard Met (?) Year 2 (2012)
1. Re-establish (or establish in created wetlands) a natural wetland vegetation community in restored wetland areas	Herbaceous vegetation coverage of a minimum 80% of native, wetland plants within the restored and created wetland areas	Monitor herbaceous vegetation from permanent 1 square meter herbaceous vegetation monitoring plots (established in Year One (2011) within the restored and created wetlands and adjacent to large stream restorations	**Yes;** based on extrapolation of 1 square meter plots, average coverage within the wetland mitigation areas is 100%	**Yes;** based on extrapolation of 1 square meter plots, average coverage within the wetland mitigation areas is over 100%
	Survival rate of 80% of the planted native, wetland shrubs	Establish permanent 0.02-acre (5m radius) monitoring plots within the restored and created wetlands	**Yes;** based on extrapolation of 0.02-acre (5m radius) plots, shrub stem survival within the mitigation wetlands is 93%	**Yes;** based on extrapolation of 0.02-acre (5m radius) plots, shrub stem survival within the mitigation wetlands is 84%
	Wetlands develop a natural community, which blends into the adjacent, undisturbed features	Establish at least one permanent photograph monitoring station within each restored or created wetland which shows the adjacent undisturbed feature	**Yes**; permanent photograph stations were established in each wetland feature which shows the restored or created feature, and the adjacent undisturbed features	**Yes;** photographs recorded from permanent photograph stations (established in 2011) ; photos illustrate the restored or created feature, & the adjacent undisturbed features
2. Re-establish (or establish in the created wetlands) wetland hydrology	Clear evidence of hydrology based on the criteria in the R*egional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region* ("Regional Supplement") (USACE 2011)	Visual assessment of restored or created wetlands for evidence hydrology indicators	**Yes**; all but one feature (H15-WT1) of the restored/ created wetlands show evidence of persistent wetland hydrology	**Yes**; despite the below average precipitation during July & August 2012, all mitigation wetlands show evidence of persistent wetland hydrology

Table 1: Performance Standard Outline and Success Measure

Performance Standard	Success Criteria	Monitoring Method	Performance Standard Met (?) Year 1 (2011)	Performance Standard Met (?) Year 2 (2012)
3. Re-establish (or establish in the created wetlands) the functions and values provided by the wetlands within and adjacent to the golf course.	Clear evidence of the functions and values are being performed by the restored and created wetlands (previously identified as Groundwater Recharge/ Discharge and Wildlife Habitat)	Assess each wetland using methods in *The Highway Methodology Workbook Supplement: Wetland Functions and Values: A Descriptive Approach* ("Highway Methodology") (USACE 1999)	**Yes**; all but one (H15-WT1) of the restored wetlands are showing evidence of performing the function of groundwater recharge; some of the restored/ created wetlands are functioning as wildlife habitat	**Yes**; all of the restored wetlands are showing evidence of performing the function of groundwater recharge; some of the restored/ created wetlands are functioning as wildlife habitat
	Evidence of breeding use by vernal pool indicator species	Investigate the selected restored wetlands (WH-WT1, H13-WT2, & H14-WT1) at the appropriate time of year for signs of breeding use by vernal pool indicator species	**Yes**; all of the selected wetlands showed evidence of breeding use by vernal pool indicator species	**No**; none of the previously identified wetlands contained evidence of breeding use by vernal pool indicator species (H13-WT2 did contain other breeding amphibians)
4. Visually assess each restored stream segment for evidence of natural channel development and stability	Restored stream segments show signs of naturalization, and minimal evidence of erosion	Visually assess each restored stream segment for signs of natural stream development; permanent photograph stations established to record progress throughout the monitoring period	**Yes**; the restored stream segments showed signs of ongoing substrate sorting, minimal erosion or undercutting of banks, and use of created floodplains (where applicable)	**Yes**; the restored streams continue to show evidence of naturalization. New areas of erosion in 2 restored streams (P2-TB1 & H16-SC1) have been repaired in 2012, or will be early in 2013.
	Vegetation communities in the adjacent re-created floodplain areas are developing with native, wetland vegetation	Same as with restored/ created wetlands (1 square meter and 0.02-acre (5m radius) plots)	**Yes;** average herbaceous vegetation cover is 95%; average planted shrub survival is 91%	**Yes;** TOTAL average herbaceous vegetation cover is over 100%; average planted shrub survival is 84%

An earlier site visit was conducted, prior to the Year Two monitoring, with representatives from USACE, U.S. Environmental Protection Agency ("EPA"), JPR, and VHB on May 23, 2012, in order to assess the overall condition of the mitigation areas, and to determine if any features required repair after the spring snow melt. Overall, the

mitigation features were found to be in good condition following winter 2011/2012, with remedial repairs needed in certain locations. The problem areas and the proposed repairs are discussed below in Section 6 (Stream Assessments) and Section 8 (Remedial Actions).

2.0 Summary and Monitoring Methodologies

The Year Two monitoring effort identified minor corrective measures needed within the mitigation areas. Two streams, P2-TB1, upstream of the golf course and H16-SC1, experienced areas of erosion which need remediative measures in order to ensure the streams remain stable. P2-TB1 had three areas of erosion on the right bank (looking downstream), approximately 50 feet upstream of the cart path bridge; these areas of excessive bank scouring were associated with the partial failure of one grade control structure. The areas of erosion and repair plan were discussed in the field during a site visit conducted October 4, 2012 with USACE, JPR, and VHB; the erosion and repairs are discussed in detail below. H16-SC1 has one small area of erosion on the left bank (looking downstream) in the upper reach of the feature, within Wetland H11/16-WT1. The proposed repair to this feature is discussed below.

The mitigation features are in general performing consistent with expectations. The wetland vegetation communities continue to develop (including new species observed to be colonizing from adjacent previously undisturbed wetlands), all of the mitigation wetland features show evidence of wetland hydrology, all of the wetland features appear to be functioning for groundwater recharge/ discharge, several of the wetland features are also functioning for wildlife habitat; the majority of the restored streams are stable and developing natural stream channel characteristics.

The following sections detail the mitigation goals and the methods used to assess adherence to the success criteria.

1. ***Re-establish a native wetland vegetation community within the restored wetlands and adjacent to restored stream segments; establish a native wetland vegetation community within created wetlands.***

In order to ensure a consistent data collection approach which could be compared throughout the 5-year monitoring period, VHB conducted the Year Two monitoring in approximately the same locations (using the same data plot designations) and using the same methodologies that were established in Year One. As stated above, the Year Two monitoring data collection was completed in early August, at the height of the growing season, which is consistent with procedures outlined in the Mitigation Plan, and with the Year One monitoring, which was conducted on July 25 and 26, 2011. A full description of data collection methodologies is included in the *Jay Peak Resort – Golf Course Wetland and Stream Mitigation - First Annual (2011) Mitigation Monitoring Report* ("Year One Report") (VHB 2012). Data collection to determine overall herbaceous coverage was conducted using the one-meter square plots or wetland determination data plots, established during the 2011 monitoring (see Mitigation Monitoring Map Set on pages 2 through 9 of the Appendix for plot locations). Data collection for Year Two monitoring was repeated at approximately the same points as in Year One.

VHB also completed USACE Wetland Determination Data Forms for a selection of restored or created wetland features (see pages 13 through 39 of the Appendix). Those wetlands which were determined to need full wetland data collection to monitor the development of the three wetland criteria, prior to the Year One monitoring (2011), were again the subject of full wetland data collection during 2012. These features include: H11-Create, H11-WT6, H13-WT1/1a/1b, H14-WT2/3, H15-WT1, H16-Create, H5-Create, H6-WT1, and H8-Create.

The one square meter herbaceous vegetation monitoring plots also served as the centers for the 0.02 acre (five-meter radius) shrub survival monitoring plots. The number of surviving planted shrub stems were counted within the 0.02-acre plots; this number was then extrapolated from the 0.02-acre monitoring plot (or plots) to the size of the restored or created feature and compared to the total number of stems planted within each feature (NEE 2010), to determine the overall survival rate of survival of the planted shrubs. For features that were close to or smaller in size than the 0.02-acre monitoring plots used, all the planted shrubs within the feature were counted. Natural recruits will be included in the shrub tally as they become established.

Photographs were also recorded from the permanent photograph locations, established in Year One, in order to continue to provide visual documentation of the restored and created wetlands, as well as the restored stream channels (see Jay Peak Resort Golf Course Year 2 (2012) Monitoring Photographs on pages 40 through 61 of the Appendix) to ensure the restored and created features are developing naturally and blending with the adjacent, undisturbed features.

2. ***Re-establish (or establish in created wetlands) wetland hydrology (and hydrologic connections) through earthwork within restored and created wetlands to connect to existing Waters.***

The purpose of establishing wetland hydrology and hydrologic connections was not only to ensure the development of functioning wetlands, but to ensure that the restored and created features meet USACE jurisdictional requirements. Evidence of hydrology was assessed within each restored/ created wetland during the visual assessment conducted within each feature, and the wetland data determination data collection conducted in a selection of features, based on guidance found from Regional Supplement indicators, and is summarized in Table 2, in Section 4.0 below.

3. ***Re-establish (or establish in created wetlands) the wetland functions and values within restored and created wetlands previously provided by the wetlands within and adjacent to the golf course.***

   Using the methods described in the USACE's Highway Methodology, VHB assessed each restored and created wetland during the monitoring activities. VHB previously identified the functions and values of Groundwater Recharge/ Discharge and Wildlife Habitat as the target functions to be restored. The results of this assessment are provided in Table 2 in Section 4.0.

   In addition to the function and values analysis, VHB conducted a vernal pool assessment within three restored wetlands, which were previously assessed in Year One (WH-WT1, H13-WT2, and H14-WT1) previously identified as having potential to develop into vernal pools, based on the presence of surface water since restoration, and their location adjacent to upland wooded areas which could serve as appropriate non-breeding habitat for vernal pool indicator species. During Year Two, these three features were surveyed at the appropriate time of year (May 23, 2012) for the evidence of vernal pool species using these features for breeding. The results of this survey are summarized below in Table 3 in Section 5.1.

4. ***Visually assess each restored stream segment for evidence of natural channel development and stability.***

   During the monitoring activities, VHB walked the length of each stream channel to observe the development of the stream channel naturalization, and to look for potential problems to be addressed, such as bank erosion, grade control structure instability, incursion by golfers, etc. Signs of channel naturalization included stream bed material sorting, natural sediment deposition, and floodplain use. As described above, a pre-monitoring site visit conducted with the USACE and the EPA on May 23, 2012 found one stream which had sustained erosional damage, including bank scouring and

excessive material deposition in a pool feature, resulting from altered flow around one grade control structure on Stream P2-TB1. During the August monitoring, this feature still had these same areas of erosion, with no evidence of further deterioration since May, perhaps due to the low overall precipitation during summer 2012. A post-monitoring site visit with USACE, conducted on October 4, 2012, showed the same areas of erosion had become more pronounced since August, likely due to two unusually high rain events in early September (approximately 6 inches of rain over approximately 24 hours on September 5 and 4.5 inches of rain on September 9[1]). USACE, JPR and VHB discussed various steps that could be implemented to repair this area (see Jay Peak Golf Course Restoration - October 4, 2012 Golf Course Meeting with USACE memorandum, Appendix pages 62 through 69). Originally, waiting until Spring 2013 to complete the repairs on this feature was discussed, but given the level of effort that would required to implement the temporary stabilization measured was almost the same as for completing the full repair, Stream P2-TB1 was completely repaired in November 2012. During the October site visit areas of erosion on two other streams, H16-SC1 and H14-SC1 were also found. Stream H16-SC1 had a small area of bank scouring, and H14-SC1 has developed a small headcut (less than one foot in height). These areas are less severe and less likely to fail completely, than in Stream P2-TB1. Repairs on H16-SC1 were completed in November 2012; several large cobbles were placed at the outlet of the headcut on H14-SC1, as a temporary stabilization measure, in order to disperse the flow from the headcut. This feature will be checked in Spring 2013, and a determination of whether further repairs are necessary will be made then.

[1] Precipitation data for September 2012 from the Jay Peak Climatological Station (Index No: 43-4189-1), provided by the National Weather Service.

3.0 Vegetation Data Results

3.1 Herbaceous

Monitoring efforts found that the total average herbaceous cover within the wetlands and within the floodplains of the restored streams is over 100 percent, and was approximately 108 percent overall (see Herbaceous Species and Cover Summary Data from 1m^2 Plots and Wetland Data Plots table on pages 10 and 11 of the Appendix), all of which exceeds the performance standards of 80 percent coverage by non-invasive wetland herbaceous species. It is noteworthy that additional, native wetland species were recorded during the monitoring, that were not part of the wetland seed mix applied to the mitigation areas; which suggests the surrounding, undisturbed features are contributing seed, and therefore increased species richness and diversity to the vegetation communities.

3.2 Shrub Species

Four shrub species were planted within the restored and created wetlands, and adjacent to the large stream restoration segments after the completion of restoration activities in 2010; the species include:

- Winterberry Holly (*Ilex verticillata*),
- Elderberry (*Sambucus canadensis*),
- American cranberrybush (*Viburnum trilobum*)[2], and
- Red-osier dogwood (*Cornus sericea*).

Willow (*Salix* spp.) and dogwood (*Cornus* sp.) tubelings were planted at the same time as the shrubs, adjacent to all restored stream segments in order to increase bank stability. Since these tubelings were planted for the purposes of enhancing stream bank stability

[2] The accepted scientific name for American cranberry bush was *Viburnum trilobum* at the time of the restoration activities; the currently accepted name for this species is *V. opulus* (Lichvar 2012).

and not as vegetation community enhancement, these were not included in the shrub survival assessments. Very few dead tubelings were observed during the various site visits conducted in 2012. Rather, the tubelings were observed to be thriving, with the large majority of the stems showing significant added height and/or leaf density.

Based on the data obtained from the permanent vegetation monitoring plots, the overall shrub survival rate for the restored and created wetlands is 84 percent, and within the larger stream segment restorations is also approximately 84 percent (see Woody Stem Survival Assessment Based on 0.02-acre Permanent Vegetation Monitoring Plots and Wetland Data Plots summary table on page 12 of the Appendix), which continues to exceed the performance standards of 80 percent survival rate of planted shrubs.

3.3 Natural Woody Recruitment

Although there continues to be minimal natural woody recruitment within the restored and created wetlands and adjacent to restored stream segments, it is anticipated that additional species will eventually "volunteer" from the surrounding, undisturbed woodlands. Although not captured by the representative vegetation plots, VHB noted small numbers of such volunteer species as yellow birch (*Betula alleghaniensis*) and red maple (*Acer rubrum*) on the edges of a few of the wetland restoration areas. It is expected that these and other volunteer species will continue to naturally propagate and may be represented within the permanent vegetations monitoring plots during future monitoring efforts.

4.0 Hydrology

Based on the results summarized in Table 2 below, all of the restored and created wetlands show evidence of at least one primary, principal hydrology indicator, which would indicate hydrology is present within all of these features, and therefore that this

success criterion is being met. The results of the assessment of hydrology within each restored or created wetland are detailed in Table 2.

Table 2: Summary of Hydrology Indicators and Functions and Values in the Restored and Created Wetlands

Feature	Hole #	VHB Map #	Evidence of Hydrology[3]	Principal Functions and Values[4]
H5-Create	5	1	A1 (Surface water); A2 (High water table); A3 (Saturated); B4 (Algal mat or crust); B9 (Water-stained leaves); B13 (Aquatic fauna)	Groundwater recharge/ discharge and Floodflow alteration (evidence of water retention and adjacent to perennial stream)); Wildlife habitat (pickerel frogs (*Rana palustris*) and various songbirds observed);
H6-WT1	6	1	B4 (Algal mat or crust); B9 (Water-stained leaves); C3 (Oxidized rhizospheres on Living Roots)	Groundwater recharge/ discharge (evidence of water retention)
WH-WT1	6	1	A1 (Surface water); A2 (High water table); A3 (Saturation); B13 (Aquatic fauna)	Groundwater recharge/ discharge (standing water at time of monitoring)
WH-WT2	6	1	B1 (Water marks); B4 (Algal mat or crust); B10 (Drainage patterns)	Groundwater recharge/ discharge (evidence of water retention and ground water discharge)
H4-WT1/2	4	2	A1 (Surface water); A2 (High water table); A3 (Saturation); B10 (Drainage patterns);	Groundwater recharge/ discharge and Floodflow alteration (groundwater discharge present; adjacent to small perennial stream with very dense vegetation)
H4-WT3	4	2	A3 (Saturation); B9 (Water-stained leaves); B10 (Drainage patterns)	Groundwater recharge/ discharge (evidence of standing water)
H8-Create	8	3	A3 (Saturation); B1 (Water marks); B9 (Water-stained leaves); B10 (Drainage patterns)	Groundwater recharge/ discharge and Floodflow alteration (adjacent to intermittent stream with dense vegetation)
H1-WT1	1	4	B4 (Algal mat or crust); B10 (Drainage patterns)	Groundwater recharge/ discharge and Floodflow alteration (adjacent to two perennial streams with little capacity up-gradient)
H11-WT2/3	11	6	A3 (Saturation); B2 (Sediment deposits); B10 (Drainage patterns)	Groundwater recharge/ discharge (surface water present and adjacent to small perennial stream)
H11-Create	11	6	B9 (Water-stained leaves); C3 (Oxidized rhizospheres on living roots)	Groundwater recharge/ discharge (evidence of water retention)

[3] Alpha-numeric codes representing Evidence of Hydrology are from Regional Supplement (Section 4). "A" indicators represent direct observations of surface or groundwater; "B" indicators represent evidence an area is subject to regular ponding or flooding; "C" indicators include other evidence and area is normally saturated; and "D" indicators include other landscape/soil/vegetation features that indicate contemporary (not historic) wet conditions.

[4] Principal Functions and Values are from the USACE Highway Methodology.

Table 2: Summary of Hydrology Indicators and Functions and Values in the Restored and Created Wetlands

Feature	Hole #	VHB Map #	Evidence of Hydrology[3]	Principal Functions and Values[4]
H11-WT6	11	6	B9 (Water-stained leaves; B10 (Drainage patterns)	Groundwater recharge/ discharge (evidence of water retention and ground water discharge)
H16-WT1/ H11-WT1	16	6	B4 (Algal mat or crust); B10 (Drainage patterns)	Groundwater recharge/ discharge and Floodflow alteration (evidence of water retention; adjacent to small perennial stream with little capacity up-gradient)
H16-Create	16	6	B2 (Sediment deposits); B4 (Algal mat or crust); B10 (Drainage patterns)	Groundwater recharge/ discharge and Floodflow alteration (evidence of water retention and groundwater discharge; large wetland adjacent to perennial stream)
H13-WT1/1a/1b	13	7	B10 (Drainage patterns); C3 (Oxidized rhizospheres on Living Roots)	Groundwater recharge/ discharge and Floodflow alteration (groundwater discharge points found; adjacent to small perennial stream with little capacity up-gradient)
H13-WT2	13	7	A1 (Surface water); A2 (High water table): A3 (Saturation); B1 (Water marks); B13 (Aquatic fauna)	Groundwater recharge/ discharge and Wildlife habitat (groundwater discharge points observed; pickerel frog tadpoles observed
H13-WT3	13	7	A3 (Saturation); B10 (Drainage patterns)	Groundwater recharge/ discharge (standing water at the time of monitoring)
H14-WT2/3	14	7	A3 (Saturation); B4 (Algal mat or crust); B10 (Drainage patterns)	Groundwater recharge/ discharge (evidence of water retention and adjacent to small perennial stream)
H14-WT1	14	7	A1 (Surface water); A2 (High water table); A3 (Saturation); B2 (Sediment deposits); B10 (Drainage patterns)	Groundwater recharge/ discharge (groundwater discharge points observed
H15-WT1	15	7	B9 (Water-stained leaves); B10 (Drainage patterns)	Groundwater recharge/ discharge

It should be noted that while Wetland H11-WT6 has met the criteria for evidence of wetland hydrology, but the results of the wetland determination data collection indicate that the soils in this feature do not meet any of the criteria for hydric soils. It should be noted that this feature met all three wetland criteria during the 2011 monitoring. This feature will continue to be monitored, however if this wetland (or others in subsequent

monitoring years) do not display evidence of all three wetland indicators (dominance of hydrophytic vegetation, hydric soils, and hydrology), JPR will coordinate with the USACE and decide how to address the issue.

5.0 Functions and Values Assessment

VHB conducted an assessment of wetland functions and values during the Year Two monitoring efforts, using the methods outlined in the Highway Methodology, in order to ensure that the wetland functions and values impacted by golf course construction were restored. It was determined during the mitigation planning process that the principal functions and values provided by the impacted wetlands were groundwater recharge/ discharge and wildlife habitat. Each wetland feature was visually assessed during the monitoring efforts to determine if these previously identified functions and values (or any additional functions) were being provided. Based on this assessment, VHB determined that as of 2012, all of the restored and created wetlands are providing the function of Groundwater Recharge/ Discharge and /or Wildlife Habitat, thus meeting performance standards; in addition, several of the restored or created wetlands showed evidence of functioning for Floodflow Alteration. The results of this assessment are listed, by feature, above in Table 2.

5.1 Vernal Pool Assessment

In addition to the general functions and values assessment conducted within each wetland, a vernal pool assessment was conducted within the wetland restoration and creation areas. This assessment was conducted within the appropriate survey season (USACE 2010) on May 23, 2012, prior to the formal monitoring activities. Although there was evidence of use by amphibian species in one wetland (H13-WT2), there was no evidence of breeding activity by vernal pool indicator species. In Year One (2011), use of three wetlands (WH-WT1, H13-WT2, and H14-WT1) by vernal pool indicator species for breeding, was observed during the appropriate season. These wetlands were

identified as potential breeding habitat for vernal pool species prior to the start of mitigation monitoring in 2011.

6.0 Stream Assessments

In addition to the assessment of the herbaceous and shrub vegetation communities within the restored floodplains of the larger stream restoration sites, VHB conducted a visual assessment of the stream conditions within the restored stream segments. In order to assess stream condition, VHB observed and noted such characteristics as signs of erosion, and evidence of channel development (including substrate sorting, occupation of the floodplain, and sediment deposition). Overall, the restored streams continue to develop and naturalize in a stable manner. Several streams show evidence of accessing the created floodplains during high precipitation events, with minimal erosion occurring; signs include sediment deposits in the floodplain and continued healthy vegetation (herbaceous and woody) growth after the high precipitation events. Evidence was observed that significant substrate sorting has taken place in all of the restored streams.

As described above, prior to the August monitoring activities, during a May site visit with USACE and EPA, one stream was observed exhibiting signs of erosion which required repair. The banks of Stream P2-TB1 had been severely eroded, and one grade control structure compromised during a high precipitation event during Spring 2012. There was evidence of vertical channel migration in one feature, and observed areas of undercutting or erosion of the stream banks was typical of what would be found within high gradient mountain streams. Each restored stream was photographed to show representative conditions (see Golf Course Mitigation Monitoring – Year Two Photographs on pages 40 through 61 of the Appendix).

7.0 Invasive Plant Species

In 2012, VHB observed the same small population (approximately 10 feet by 10 feet) of common reed (*Phragmites australis*) within Wetland H4-WT1/2. This population has previously been hand cut and treated with herbicide at various times during the growing seasons of 2009, 2010, 2011 and 2012, prior to which time it is was approximately the same dimensions. During the October site visit with the USACE, adjusting the treatment to include hand-removal of the seed heads, before the seeds become viable and disperse was discussed in order to further inhibit its growth and potential spread. Although it has not spread within the wetland, or to other features following treatment, it should continue to be monitored and treated as necessary to ensure that it does not spread to other restored or created features.

VHB also observed a new, small population (approximately three feet by three feet) of reed canary grass (*Phalaris arundinacea*), in Wetland H11-WT6. At the time of the monitoring, the seeds had already been released, so no treatment was conducted. This population should be treated as soon as there are identifiable vegetative parts are above ground in Spring 2013, by hand removal and treatment with herbicide. This area should continue to be monitored closely, and treated if necessary, to prevent its spread.

Finally, VHB observed purple loosestrife (*Lythrum salicaria*) within two wetlands: H8-Create and H11-Create. This is the first time purple loosestrife has been observed within any of the mitigation wetlands or stream floodplains. VHB hand removed one stem from H8-Create and two stems from H11-Create, and disposed of them off-site. The mitigation areas should be monitored closely to ensure purple loosestrife doesn't return to these features or appear in other features.

8.0 Remedial Actions

As discussed above and detailed in the October 4, 2012 USACE Meeting minutes (Appendix), JPR undertook minor repairs in Stream H16-SC1, which had sustained a small area of bank scouring between the August monitoring and the October USACE meeting. This area will be monitored in the future to ensure the repair is stable. JPR undertook minor stabilization efforts at the outlet of a small headcut within Stream H14-SC1, immediately upstream of Wetland H14-WT1d, in Fall 2012. If this area of instability appears to be spread, VHB has recommended potential repairs that should halt the erosion of this stream.

Finally, JPR made repairs to P2-TB1 in November 2012. The repairs were made in order to ensure the three areas of bank scouring and failing grade control structure would not continue, and potentially spread downstream. These steps, discussed in the field with the USACE, included the removal of excess material (large cobbles less than one foot in diameter) from on top of the affected grade control structure; additionally, the smaller material (sand and pebble-sized material) was removed from the pool of the failing structure to facilitate flow through the re-created channel (instead of toward the scoured areas). The larger material was used to re-create the right stream bank at the three areas of erosion. It was determined that the level of effort required to implement temporary reinforcement and stabilization measures (removal of small material from the affected pool and relocation of larger material to the outside of the bend in the stream) was similar to that required to conduct the permanent repairs, so JPR completed the permanent repairs in November 2012. As discussed during the October field meeting, the larger material, both that displaced from the failed grade control structure and the material removed from the top of the grade control structure, was used to recreate the outside of the right bank at the three areas of erosion. The space behind filled with a mix of smaller stone material, and topped with the dirt-mulch-seed-filled bags that have been used successfully in other stream repairs. These bags were tightly stacked until the

slope and elevation of the repaired bank matches the adjacent, intact stream banks. Coconut fiber matting (the same which was used during the original stream restoration) will be used to cover and secure the repaired banks. The heavy-duty matting was secured behind the armoring stones, over the mixed material and dirt bags, and over the top of the bank to the existing bank. This are of Stream P2-TB1 will be closely monitored in Spring 2013 to ensure the repairs remain secure, and to halt any erosion that may occur in this area.

9.0 Conclusions

Overall, the JPR golf course mitigation areas are meeting performance standards. Field efforts identified average, overall herbaceous vegetation cover of over 100 percent; and overall shrub survival rates of approximately 84 percent. Both of these results exceed the 80 percent herbaceous cover and 80 percent shrub survival rate performance standards. Based on the 2012 results, VHB anticipates that both the herbaceous cover and shrub survival rates within the various restoration and creation areas should continue to meet or surpass the performance criteria.

VHB, in coordination with JPR and the USACE, has developed a general plan of remediation for two streams which required repair after the erosion in the two features (P2-TB1 and H16-SC1) was determined that these features would likely suffer further failures if the areas were not repaired. Stream P2-TB1 underwent repairs in November 2012, in order to prevent further erosion during the winter and spring. This feature will be closely monitored during Spring 2013 to ensure the repair remains stable. H16-SC1 was repaired in November 2012 as described in the October 4, 2012 USACE Meeting minutes (attached).

Finally, the signed *Mitigation Report Transmittal and Self-Certification* form as provided by the USACE's 7-20-10 New England District Compensatory Mitigation Guidance is provided on page 70 of the Appendix.

10.0 References

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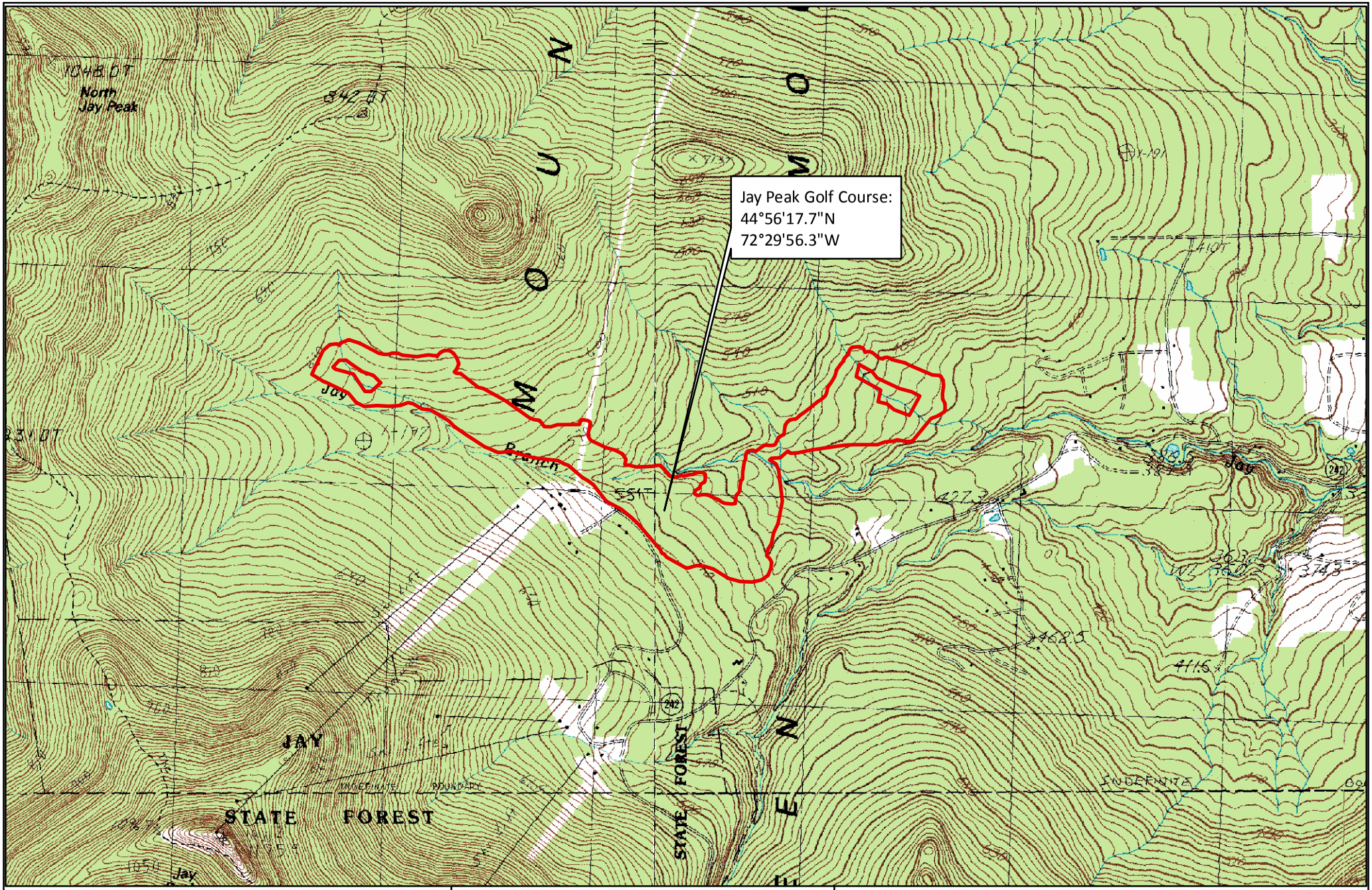
VHB 2012. *Jay Peak Resort – Golf Course Wetland and Stream Mitigation – First Annual (2011) Mitigation Monitoring Report*.

APPENDIX



Legend

Golf Course Investigation Area

N

Jay Peak Resort Golf Course
Jay, Vermont
Site Location Map

December 5, 2012

2,000 1,000 0 2,000

Feet

Sources: USGS Topos Jay Peak (1986) and North Troy (1986) Quads from VCGI; Investigation area digitized by VHB (2008).

VHB Vanasse Hangen Brustlin, Inc.

1

Map 7
Map 6
Map 5
Map 4
Map 3
Map 2
Map 1
Hole 13
Hole 14
Hole 15
Hole 12
Hole 11
Hole 16
Hole 17
Hole 10
Hole 18
Driving Range
Hole 8
Hole 3
Hole 9
Hole 1
Hole 2
Hole 7
Hole 6
Hole 5
Hole 4
WEST BOWL RD
CLUBHOUSE RD
SLOPESIDE RD
SLOPESIDE RD
JAY PEAK VILLAGE
JAY PEAK VILLAGE RD
SHORTCUT
BRIDGE RD
S VILLAGE RD
ACCESS RD
ACCESS RD
ROUTE 242
ROUTE 242
OLD JAY-MONTGOMERY RD
POPLAR DR
RESERVOIR RD

Legend

- Approximate Golf Course Investigation Area
- Sheet Index
- Roads

700 350 0 700
Feet

Jay Peak Resort Golf Course
Jay, Vermont
Golf Course Mitigation Monitoring Index Map

December 5, 2012

N

Sources: Ortho from BingI (2011); VTrans Roads from VCGI (2008); Sheet Index of VHB Maps and VHB Investigation Area (2010).

Vanasse Hangen Brustlin, Inc.

Prepared by: PBW

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H6-WT1
H6-WT1
H6-WT1-W1
H6-WT1-V1
H6-WT1-P2
H6-WT1-P1
WH-WT1a
WH-WT1-V1
WH-WT1-P1
WH-WT1b
H6-WT2
H6-TB1-P1
H6-TB1-V1
H6-TB1-P2
Hole 6
H6-TB1
H6-TB1
WH-WT2-P1
WH-WT2
WH-WT2-V1
H5-WT1
H5-WT2
H7-TB1
Hole 5
H5-TB2
H5-TB1-P1
H5-TB1-V1
H5-TB1
H5-Create-W1
H7-WT5
H5-Create-P1
H5-Create-V1
H7-SC1-P1
H7-SC1
H7-SC1
H5-SC2
H5-Create
H7-WT4
H5-TB3
H5-TB3-P1
H5-SC3
H7-WT2
H7-WT1

Legend

Permanent Monitoring Points
- Wetland Data Plot
- Vegetation Plot
- Photo Point

- Wetland Restoration/ Creation
- Stream Channel Restoration
- VHB Wetlands (2008-2012)
- VHB Streams (2008-2012)
- VHD Streams Layer

Culverts
- New Culvert
- Remaining Culvert
- Stormwater Drainage Culvert

Jay Peak Resort - Jay, Vermont
Golf Course Mitigation Monitoring
Map 1 of 7
December 5, 2012

150 75 0 150
Feet

N

Prepared by: PBW

Vanasse Hangen Brustlin, Inc.

Sources: Background: Ortho from Bing (2011); VHDStreams provided by VCGI (2010); Wetlands, Culverts and Stream Features field- delineated by VHB (2008-2012); Restoration Areas GPS'd by VHB (2009-2010); Permanent wetland data, vegetation and photograph monitoring points established and GPS'd by VHB (2011).

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Legend

Permanent Monitoring Points
- Wetland Data Plot
- Vegetation Plot
- Photo Point

- Wetland Restoration/ Creation
- Stream Channel Restoration
- VHB Wetlands (2008-2012)
- VHB Streams (2008-2012)
- VHD Streams Layer

Culverts
- New Culvert
- Remaining Culvert
- Stormwater Drainage Culvert

Jay Peak Resort - Jay, Vermont
Golf Course Mitigation Monitoring
Map 2 of 7
December 5, 2012

150 75 0 150
Feet

N

Prepared by: PBW

Vanasse Hangen Brustlin, Inc.

Sources: Background: Ortho from Bing (2011); VHDStreams provided by VCGI (2010); Wetlands, Culverts and Stream Features field- delineated by VHB (2008-2012); Restoration Areas GPS'd by VHB (2009-2010); Permanent wetland data, vegetation and photograph monitoring points established and GPS'd by VHB (2011).

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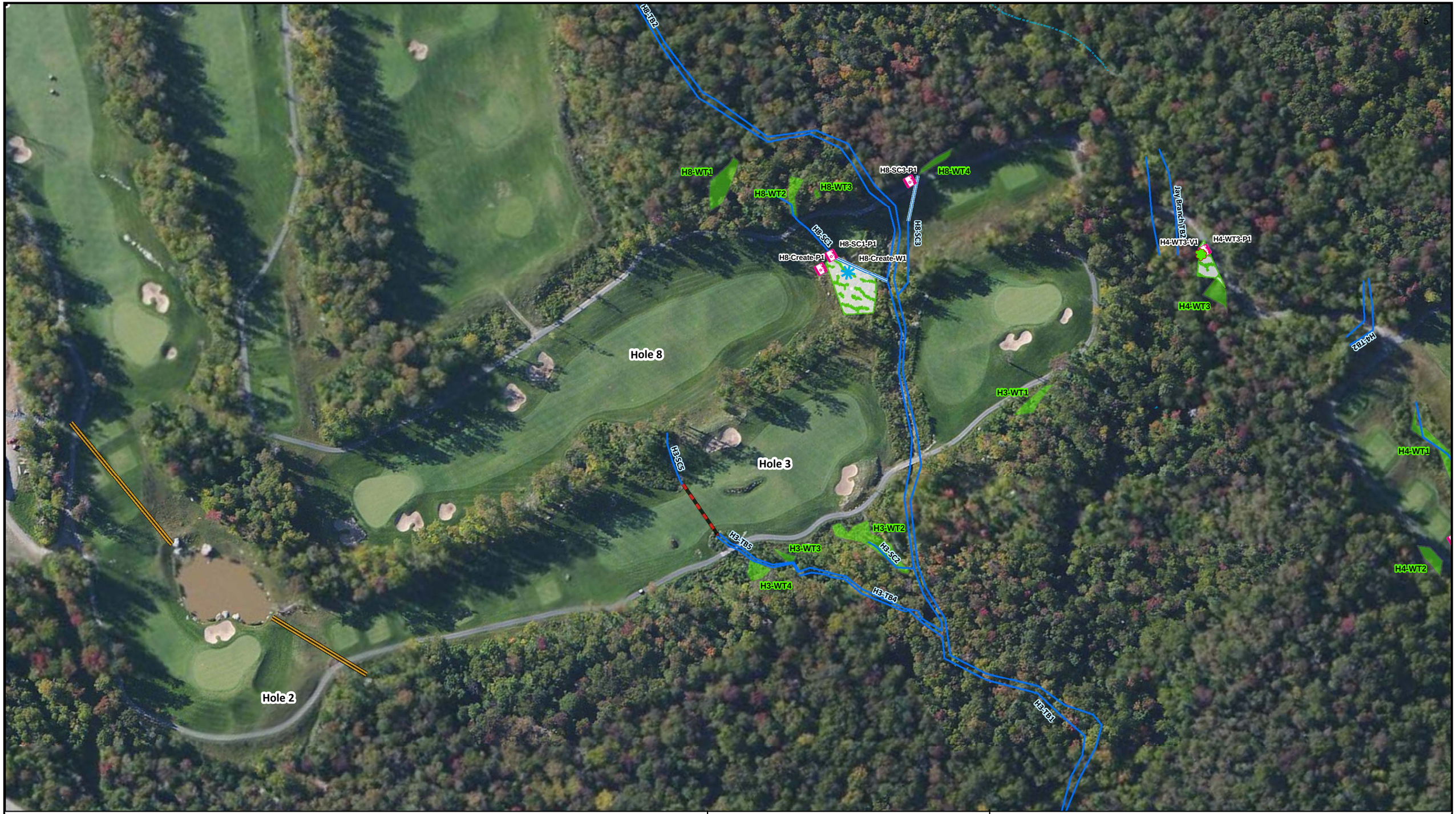

Legend

Permanent Monitoring Points
- Wetland Data Plot
- Vegetation Plot
- Photo Point

- Wetland Restoration/ Creation
- Stream Channel Restoration
- VHB Wetlands (2008-2012)
- VHB Streams (2008-2012)
- VHD Streams Layer

Culverts
- New Culvert
- Remaining Culvert
- Stormwater Drainage Culvert

Jay Peak Resort - Jay, Vermont
Golf Course Mitigation Monitoring
Map 3 of 7
December 5, 2012

150 75 0 150
Feet

Prepared by: PBW

VHB Vanasse Hangen Brustlin, Inc.

Sources: Background: Ortho from Bing (2011); VHDStreams provided by VCGI (2010); Wetlands, Culverts and Stream Features field- delineated by VHB (2008-2012); Restoration Areas GPS'd by VHB (2009-2010); Permanent wetland data, vegetation and photograph monitoring points established and GPS'd by VHB (2011).

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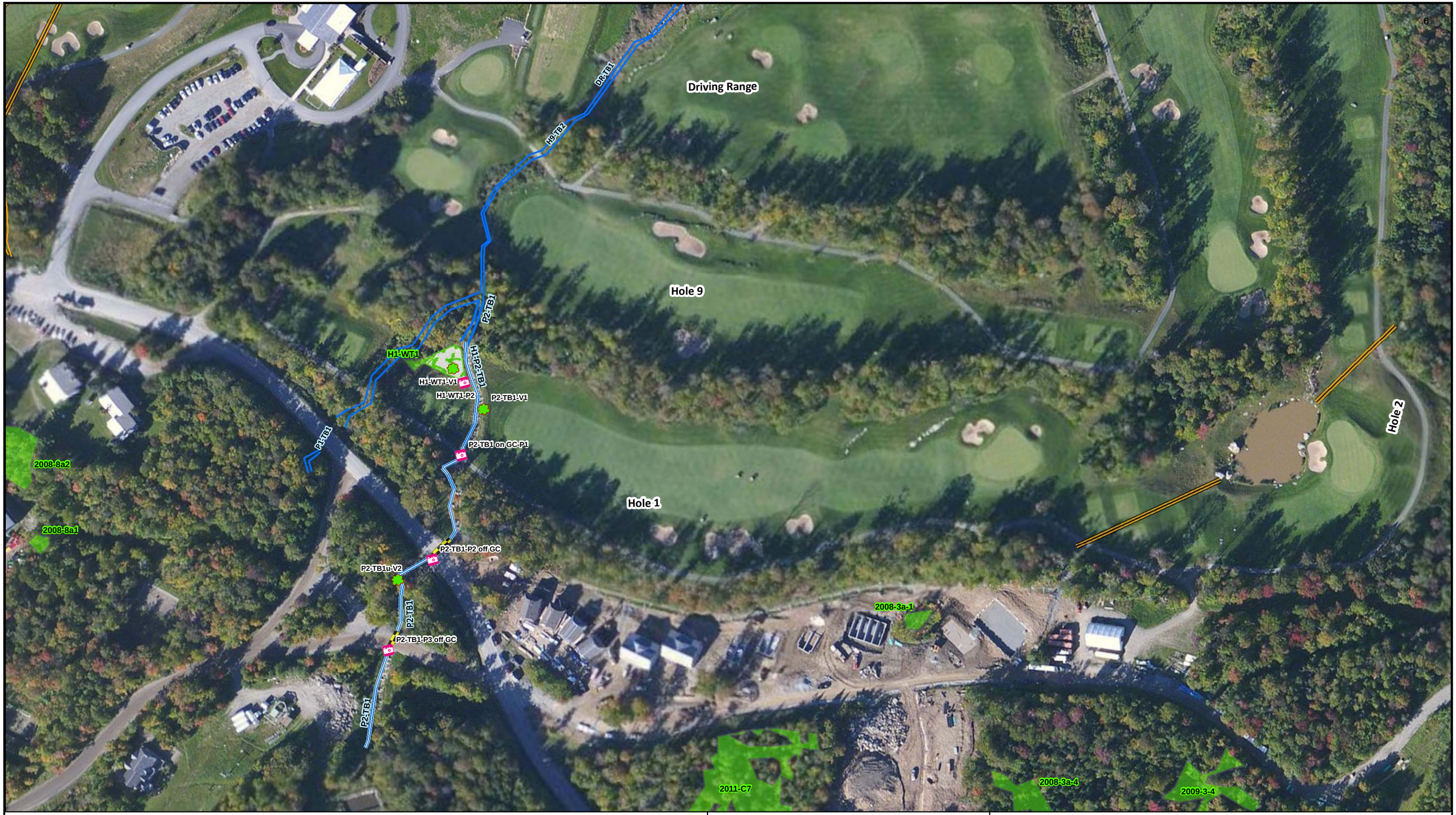

Legend

Permanent Monitoring Points
- Wetland Data Plot
- Vegetation Plot
- Photo Point

- Wetland Restoration/ Creation
- Stream Channel Restoration
- VHB Wetlands (2008-2012)
- VHB Streams (2008-2012)
- VHD Streams Layer

Culverts
- New Culvert
- Remaining Culvert
- Stormwater Drainage Culvert

Jay Peak Resort - Jay, Vermont
Golf Course Mitigation Monitoring
Map 4 of 7
December 5, 2012

150 75 0 150
Feet

N

Prepared by: PBW

Vanasse Hangen Brustlin, Inc.

Sources: Background: Ortho from Bing (2011); VHDStreams provided by VCGI (2010); Wetlands, Culverts and Stream Features field- delineated by VHB (2008-2012); Restoration Areas GPS'd by VHB (2009-2010); Permanent wetland data, vegetation and photograph monitoring points established and GPS'd by VHB (2011).

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H11-WT4
H11-WT5
H11-SC4
H11-TB1
H11-TB1-P1
H11-TB3
H17-WT1
H11-WT3
H11-WT2/3-V1
H11-WT2/3-P1
H17-WT2
H11-WT2
H11-Create-W1
H11-Create-P1
H11-Create
Hole 17
Hole 10
H17-TB1
H18-WT3
H10-SC2
H10-WT3
H10-TB1
H10-WT1
H10-WT2
H18-WT1
H18-WT2
Hole 18
Jay Branch TB1
Base-WT1
TB-Base-1

Legend

Permanent Monitoring Points
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- Photo Point

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- Stream Channel Restoration
- VHB Wetlands (2008-2012)
- VHB Streams (2008-2012)
- VHD Streams Layer

Culverts
- New Culvert
- Remaining Culvert
- Stormwater Drainage Culvert

Jay Peak Resort - Jay, Vermont
Golf Course Mitigation Monitoring
Map 5 of 7
December 5, 2012

150 75 0 150
Feet

N

Prepared by: PBW

Vanasse Hangen Brustlin, Inc.

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Legend

Permanent Monitoring Points
- Wetland Data Plot
- Vegetation Plot
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- VHB Wetlands (2008-2012)
- VHB Streams (2008-2012)
- VHD Streams Layer

Culverts
- New Culvert
- Remaining Culvert
- Stormwater Drainage Culvert

Jay Peak Resort - Jay, Vermont
Golf Course Mitigation Monitoring
Map 6 of 7
December 5, 2012

150 75 0 150
Feet

N

Prepared by: PBW

VHB Vanasse Hangen Brustlin, Inc.

Sources: Background: Ortho from Bing (2011); VHDStreams provided by VCGI (2010); Wetlands, Culverts and Stream Features field- delineated by VHB (2008-2012); Restoration Areas GPS'd by VHB (2009-2010); Permanent wetland data, vegetation and photograph monitoring points established and GPS'd by VHB (2011).

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Legend

Permanent Monitoring Points
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- Stream Channel Restoration
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- VHB Streams (2008-2012)
- VHD Streams Layer

Culverts
- New Culvert
- Remaining Culvert
- Stormwater Drainage Culvert

Jay Peak Resort - Jay, Vermont
Golf Course Mitigation Monitoring
Map 7 of 7
December 5, 2012

150 75 0 150
Feet

N

Prepared by: PBW

Vanasse Hangen Brustlin, Inc.

Sources: Background: Ortho from Bing (2011); VHDStreams provided by VCGI (2010); Wetlands, Culverts and Stream Features field- delineated by VHB (2008-2012); Restoration Areas GPS'd by VHB (2009-2010); Permanent wetland data, vegetation and photograph monitoring points established and GPS'd by VHB (2011).

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Jay Peak Resort Golf Course Mitigation
Year Two (2012) Mitigation Monitoring Report
Herbaceous Species and Cover Summary Data from 1m^2 Plots and Wetland Data Plots
December 21, 2012

Scientific Name[1,2]	Common Name	Indicator Status[3]	VHB Mitigation Monitoring Map 1 of 7[5]								Map 2 of 7		Map 3 of 7	Map 4 of 7			Map 5 of 7	Map 6 of 7										Map 7 of 7						
			H5-TB1	H5-Create		H6-WT1		WH-WT1	H6-TB1	WH-WT2	H4-WT1	H4-WT3	H8-Create	H1-WT1	P2-TB1		H11-WT2/3	H11-TB2	H11-Create		H11-WT6		H12-TB1u	H16-WT1/ H11-WT1	H16-Create			H16-SC1	H13-WT1/1a/1b	H13-WT2		H13-WT3	H14-WT2/3	H14-WT1	H15-WT1
			Stream	Wetland		Wetland		Wetland	Stream	Wetland	Wetland	Wetland	Wetland	Wetland	Stream		Wetland	Stream	Wetland		Wetland		Stream	Wetland	Wetland			Stream	Wetland	Wetland		Wetland	Wetland	Wetland	Wetland
			H5-TB1-V1[6]	H5-Create-V1	H5-Create-W1[6]	H6-WT1-V1	H6-WT1-W1	WH-WT1-V1	H6-TB1-V1	WH-WT2-V1	H4-WT1/2-V1	H4-WT3-V1	H8-Create-W1	H1-WT1-V1	P2-TB1 (in GC) -V1	P2-TB1 (off GC)-V1	H11-WT2/3-V1	H11-TB2-V1	H11-Create-W1	H11-Create-V1	H11-WT6-W1	H11-WT6-V1	H12-TB1u-V1	H16-WT1/ H11-VT1	H16-Create-W1	H16-Create-V1	H16-Create-V2	H16-SC1-V1	H13-WT1/1a/1b-W1	H13-WT2-V1	H13-WT2-V2	H13-WT3-V1	H14-WT2/3-W1	H14-WT1d-V1	H15-WT1-W1
			APPROXIMATE COVERAGE WITHIN VEGETATION MONITORING AND WETLAND DATA PLOTS[4]																																
Agrostis stolonifera L.	creeping bentgrass	FACW	3	38	3	3	3			3			38		15		38	15	63	38	15	15		15	15	15	38	38					15	15	38
Alisma subcordatum Raf.	American water plantain	OBL																						3										15	
Bidens cernua L.	nodding beggartick	OBL						3	15	3					5	3	3		3					3											3
Carex comosa Boott	longhair sedge	OBL	15			15	15	63	3	38	15	3	15	38	15		3	15			15	15	38	15	3				38	15		3		3	3
Carex crinita Lam.	fringed sedge	OBL				3	3	3			3	38	3							15	15	15					15		15		38	15	38		15
Carex echinata Murr.	star sedge	OBL					3								3						3		3												
Carex scoparia Schkuhr ex Willd.	broom sedge	FACW	3	3	3	3				3	3	3	3	3	15		15	15		15	3	15		15		15	15	15	3				15	15	
Carex stipata Muhl. ex Willd.	owlfruit sedge	OBL				3																													
Carex vulpinoidea Michx.	fox sedge	OBL	15	3	15	15	15	15	15	15	1	3	3	15	15		3	3		15		15	15	15	15	38	15		15		3		15	3	
Eleocharis obtusa (Willd.) J.A. Schultes	blunt spikerush	OBL		3																											3				
Elymus virginicus L.	Virginia wildrye	FACW	3												3	15		15	3							3		15							
Epilobium coloratum Biehler	purpleleaf willowherb	OBL	3	3	3		3							3					3		3														3
Epilobium palustre L.	Marsh willowherb	OBL	3		3		3																												
Equisetum arvense L.	field horsetail	FAC																											3						
Equisetum fluviatile L.	water horsetail	OBL																													3				
Eupatorium perfoliatum L.	common boneset	FACW	38	15	38	63	38	38	15	38			3	15	3		3	15	15	3	3			3	15	15			3		3		15	3	15
Euthamia graminifolia (L.) Nutt.	flat-top goldentop	FAC	3		15	3	15			3	15	15	3				3	3	3	3	3	15	15		15	3	3	15			3		15	3	
Eutrochium maculatum (L.) E.E. Lamont	spotted joepyeweed	OBL			15			3	15						3		3							3	3	3	3			3	3			3	15
Galium palustre L.	common marsh bedstraw	OBL													3			3								15						3			
Glyceria canadensis (Michx.) Trin.	rattlesnake mannagrass	OBL												3																		38			
Glyceria striata (Lam.) A.S. Hitchc.	fowl mannagrass	OBL						3	3				15	15																		38	38		
Hypericum canadense L.	lesser Canadian St. Johnswort	FACW																						3		3									
Impatiens capensis Meerb.	jewelweed	FACW								3	15		3			3	3	15						3				15	15	15		15	3	3	
Juncus effusus L.	common rush	OBL	3	3	3	3	3			15	3	15	15	3			38	15		15	38	15	38	15	38	15	38		15	85	15		15	15	
Juncus tenuis Willd.	poverty rush	FAC			3									3			3			15	3	3	3	15	3	15			3					3	
Lycopus americanus Muhl. ex W. Bart.	American water horehound	OBL													3																3				3
Lysimachia nummularia L.	creeping jenny	FACW		15																															
Mimulus ringens L.	Allegheny monkeyflower	OBL																	3							15								3	
Onoclea sensibilis L.	sensitive fern	FACW																			3								3						
Phleum pratense L.	timothy	FACU	3			3							3	3	3	15																			

Jay Peak Resort Golf Course Mitigation
Year Two (2012) Mitigation Monitoring Report
Herbaceous Species and Cover Summary Data from 1m^2 Plots and Wetland Data Plots
December 21, 2012

Scientific Name[1,2]	Common Name	Indicator Status[3]	VHB Mitigation Monitoring Map 1 of 7[5]								Map 2 of 7		Map 3 of 7	Map 4 of 7			Map 5 of 7	Map 6 of 7										Map 7 of 7						
			H5-TB1	H5-Create		H6-WT1		WH-WT1	H6-TB1	WH-WT2	H4-WT1	H4-WT3	H8-Create	H1-WT1	P2-TB1		H11-WT2/3	H11-TB2	H11-Create		H11-WT6		H12-TB1u	H16-WT1/ H11-WT1	H16-Create			H16-SC1	H13-WT1/1a/1b	H13-WT2		H13-WT3	H14-WT2/3	H14-WT1	H15-WT1
			Stream	Wetland		Wetland		Wetland	Stream	Wetland	Wetland	Wetland	Wetland	Wetland	Stream		Wetland	Stream	Wetland		Wetland		Stream	Wetland	Wetland			Stream	Wetland	Wetland		Wetland	Wetland	Wetland	Wetland
			H5-TB1-V1[6]	H5-Create-V1	H5-Create-W1[6]	H6-WT1-V1	H6-WT1-W1	WH-WT1-V1	H6-TB1-V1	WH-WT2-V1	H4-WT1/2-V1	H4-WT3-V1	H8-Create-W1	H1-WT1-V1	P2-TB1 (in GC) -V1	P2-TB1 (off GC)-V1	H11-WT2/3-V1	H11-TB2-V1	H11-Create-W1	H11-Create-V1	H11-WT6-W1	H11-WT6-V1	H12-TB1u-V1	H16-WT1/ H11-VT1	H16-Create-W1	H16-Create-V1	H16-Create-V2	H16-SC1-V1	H13-WT1/1a/1b-W1	H13-WT2-V1	H13-WT2-V2	H13-WT3-V1	H14-WT2/3-W1	H14-WT1d-V1	H15-WT1-W1
			APPROXIMATE COVERAGE WITHIN VEGETATION MONITORING AND WETLAND DATA PLOTS[4]																																
Plantago major L.	common plantain	FACU																3																	
Polygonum sagittatum L.	arrowleaf tearthumb	OBL															3			3								15	3	3			3		
Schoenoplectus acutus (Muhl. ex Bigelow) A.& D.	hardstem bulrush	OBL																											15					3	
Schoenoplectus tabernaemontani (K.C.	softstem bulrush	OBL																																15	
Scirpus atrovirens Willd.	green bulrush	OBL	15	15		3	15	38			15	38	15	15	3												3		3		3			3	
Scirpus cyperinus (L.) Kunth	woolgrass	OBL								3		15	3														3			15				
Solidago rugosa P. Mill.	wrinkleleaf goldenrod	FAC																				3							3						3
Symphyotrichum novae-angliae (L.) Nesom	New England aster	FACW									3								3	3			3					15							
Thelypteris palustris Schott	eastern marsh fern	FACW																			3														
Trifolium pratense L.	red clover	FACU												3	3																				
Trifolium repens L.	white clover	FACU														63																			
Typha angustifolia L.	narrowleaf cattail	OBL		15							38						15													3				3	
Typha latifolia L.	broadleaf cattail	OBL												3																					
Verbena hastata L.	swamp verbena	FACW						3	3								5		15				15		3	3	15							3	3
Vicia sativa L.	garden vetch	FACU																3		3															
Phalaris arundinacea L.	*reed canarygrass*	FACW																				3										3			
Phragmites australis (Cav.) Trin. ex Steud.	*common reed*	FACW									3																								
% Cover/Sampling Plot[4]			**107**	**113**	**101**	**117**	**116**	**169**	**69**	**124**	**111**	**130**	**122**	**122**	**92**	**99**	**138**	**120**	**111**	**128**	**107**	**111**	**130**	**108**	**110**	**143**	**163**	**128**	**134**	**139**	**80**	**112**	**172**	**111**	**101**
Average % Cover/ Feature			**107**	**107**		**117**		**169**	**69**	**124**	**111**	**130**	**122**	**122**	**96**		**138**	**120**	**120**		**109**		**130**	**108**	**139**			**128**	**134**	**110**		**112**	**172**	**111**	**101**

Total Average % Cover for All Mitigation Wetlands:	**124**
Total Average % Cover for Restored Stream Floodplains:	**108**
TOTAL Average % Herbaceous Cover:	**120**

Notes:

[1] Species nomenclature follows the USDA Plants Database (USDA - NRCS 2012)

[2] Species identification follows Haines, Arthur. 2011. *Flora Novae Angliae: A Manual for the Identificaiton of Native and Naturalized Higher Vascular Plants of New England*. New England Wildflower Society.

[3] Indicator status follows The National Wetland Plant List (Robert W. Lichvar. 2012. ERDC/CRREL TR-12-11. U.S. Army Corps of Engineers (USACE) - Engineer Research and Development Center - Cold Regions Research and Engineering Laboratory.

[4] Cover class percentages from visual assessment of 1m^2 quadrats (including those within wetland data plots) and represents approximate coverage within the quadrat.

[5] Mapping refers to Jay Peak Resort Golf Course Mitigation Monitoring Set, prepared by VHB, and dated December 21, 2011

[6] Plot names including "V" refer to 1m2 plots used to assess herbaceous vegetation only; plot names incluing "W" refer to data from wetland data plots.

[7] Italics indicate invasive species per the Vermont Class A or B Noxious Weed list (Quarantine #3-Noxious Weeds)

Jay Peak Resort Golf Course Mitigation
Year Two (2012) Mitigation Monitoring Report
Woody Stem Survival Assessment Based on 0.02-acre (5-meter radius) Permanent Vegetation Monitoring Plots and Wetland Data Plots
December 4, 2012

Mitigation Feature	Feature Type	Mitigation Feature Size (acres)	Mitigation Feature Plot	Planted Shrubs within 0.02-acre (5m-radius) Plots	Approximate Total Planted Shrubs Within Feature	Total Shrubs Planted[1]	Approximate Survival Rate of Shrubs/ Feature (%)
H6-WT1	WETLANDS	0.31	H6-WT1-V1	8	123	150	82%
			H6-WT1-W1	8			
WH-WT2		0.10	WH-WT2-V1	4	20	20	98%
WH-WT1		0.03	WH-WT1-V1	17	27	35	78%
H5-Create		0.24	H5-Create-V1	12	141	152	92%
			H5-Create-W1	11			
H14-WT2/3		0.05	H14-WT2/4-W1	14	37	46	80%
H14-WT1		0.07	H14-WT1-V1	2	7	8	93%
H16-WT1/Create/ H11-WT1[2]		0.66	H16-WT1/H11-WT1-V1	4	115	150	77%
			H16-Create-W1	3			
			H16-Create-V1	4			
			H16-Create-V2	3			
H1-WT1		0.06	H1-WT1-V1	10	28	37	76%
H11-WT6		0.09	H11-WT6-V1	7	33	41	79%
			H11-WT6-W1	8			
H11-WT2/3		0.03	H11-WT2/3-V1	15	20	25	79%
H11-Create		0.36	H11-Create-W1	7	135	185	73%
			H11-Create-V1	8			
H4-WT1/2		0.02	H4-WT1/2-V1	9	8	10	85%
H4-WT3		0.04	H4-WT3-V1	5	9	10	89%
H8-Create		0.13	H8-Create-W1	4	26	30	85%
H13-WT1/1a/1b		0.06	H13-WT1/1a/1b-W1	5	14	16	87%
H13-WT2		0.18	H13-WT2-V1	4	36	45	79%
			H13-WT2-V2	4			
H13-WT3		0.01	H13-WT3-V1	13	15	16	94%
H15-WT1		0.03	H15-WT1-W1	17	23	25	92%
H6-TB1	STREAMS	0.26	H6-TB1-V1	5	65	75	86%
H5-TB1		0.17	H5-TB1-V1	9	75	81	92%
H16-SC1		0.18	H16-SC1-V1	5	44	55	80%
H11-TB2		0.19	H11-TB2-V1	6	56	80	70%
H12-TB1u		0.15	H12-TB1u-V1	6	44	45	97%
P2-TB1		0.25	P2-TB1-V1	4	43	54	80%
			P2-TB1-V2	3			
					AVERAGE SURVIVAL RATE OF PLANTED SHRUBS WITHIN WETLANDS:		84%
					AVERAGE SURVIVAL RATE OF PLANTED SHRUBS WITHIN RESTORED STREAM FLOODPLAINS:		84%
					TOTAL AVERAGE SURVIVAL RATE OF PLANTED SHRUBS:		**84%**

[1]Total plantings as reported in the *Post Construction Report - Wetland/Stream Restoration - Jay Peak Golf Course* , by New England Environmental, Inc. (NEE), dated August 23, 2010; this assessment of planted shrub survival includes those shrubs planted for wetland and stream enhancement (winterberry holly (*Ilex verticillata*), elderbery (*Sambucus canadensis*), American cranberry (*Viburnum trilobum*), and red-osier dogwood (*Cornus sericea*)), but does not include the additional *Salix* sp. and *Cornus* sp. tublelings planted as part of the streambank stabilization plan.

[2] The shrub planting summary provided by NEE combined the wetlands areas H16-WT1/H11-WT1 and H16-Create, although for permitting purposes these were considered separate features.

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project Site: JPR Golf Course Wetland Mitigation | City/County: Jay, Orleans Co. | Samp. Date: 8/8/2012

Applicant/Owner: Jay Peak Resort | State: VERMONT | Sampling Point: H5-Create-W1

Investigator(s): CMM/NRS | Section, Township, Range: Jay

Landform (hillslope, terrace, etc.): Terrace | Local relief (concave, convex, none): Concave | Slope (%):

Subregion (LRR or MLRA): LRR R | Lat: 44°56'32.6"N | Long: 72°29'0.2"W | Datum: NAD 83

Soil Map Unit: Cabot | NWI Class: PEM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes (If no, explain in Remarks.)

Are Vegetation, Soil, or Hydrology significantly disturbed? No | Normal Circumstances? Yes

Are Vegetation, Soil, or Hydrology naturally problematic? No | (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	YES	**Is This Sample Area**	
Hydric Soil Present?	YES	**Within a Wetland?**	YES
Wetland Hydrology Present?	YES	**If yes, optional Wetland Site ID:**	H5-Create

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

	Surface Water (A1)		Water-Stained Leaves (B9)
	High Water Table (A2)		Aquatic Fauna (B13)
X	Saturation (A3)		Marl Deposits (B15)
	Water Marks (B1)		Hydrogen Sulfide Odor (C1)
	Sediment Deposits (B2)		Oxidized Rhizospheres on Living Roots (C3)
	Drift Deposits (B3)		Presence of Reduced Iron (C4)
	Algal Mat or Crust (B4)		Recent Iron Reduction in Tilled Soils (C6)
	Iron Deposits (B5)		Thin Muck Surface (C7)
	Inundation Visible on Aerial (B7)		Other (Explain in Remarks)
	Sparsely Vegetated Concave Surface (B8)		

Secondary Indicators (minimum of two required)

	Surface Soil Cracks (B6)
	Drainage Patterns (B10)
	Moss Trim Lines (B16)
	Dry-Season Water Table (C2)
	Crayfish Burrows (C8)
	Saturation Visible on Aerial (C9)
	Stunted or Stressed Plants (D1)
	Geomorphic Position (D2)
	Shallow Aquitard (D3)
	Microtopographic Relief (D4)
	FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?		Depth (inches):	
Water Table Present?		Depth (inches):	
Saturation Present? (includes capillary fringe)	X	Depth (inches):	10"

Wetland Hydrology Present? YES

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

0.56" of rain in 5 days prior recorded in Morrisville; 1.27" of rain total for July 2012 (2.86" below normal); 1.77" of rain total for August 2012 (2.26" below normal) (NOAA 2012)

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: H5-Create-W1

	Absolute % Cover	Dom. Sp?	Indicator Status
Tree Stratum (Plot size: 30' RAD)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling Stratum (Plot size: 30' RAD)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size: 15' RAD)			
1. Cornus sericea L.	15	X	FACW
2.			
3.			
4.			
5.			
6.			
7.			
	15	= Total Cover	
Herb Stratum (Plot size: 1m2)			
1. Agrostis stolonifera L.	3		FACW
2. Carex scoparia Schkuhr ex Willd.	3		FACW
3. Carex vulpinoidea Michx.	15		OBL
4. Epilobium coloratum Biehler	3		OBL
5. Epilobium palustre L.	3		OBL
6. Eutrochium maculatum (L.) E.E. Lamont	15		OBL
7. Eupatorium perfoliatum L.	38	X	FACW
8. Euthamia graminifolia (L.) Nutt.	15		FAC
9. Juncus effusus L.	3		OBL
10. Juncus tenuis Willd.	3		FAC
11.			
12.			
	101	= Total Cover	
Woody Vines (Plot size: 15' RAD)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	

Dominance Test Worksheet:

Dominants OBL, FACW, FAC: 2 (A)

Dominants across all strata: 2 (B)

% Dominants OBL, FACW, FAC: 100% (A/B)

Prevalence Index Worksheet:

Total % Cover of:			Multiply By:
OBL	39	x 1 =	39
FACW	59	x 2 =	118
FAC	18	x 3 =	54
FACU		x 4 =	
UPL		x 5 =	
Sum:	116 (A)		211 (B)

Prevalence Index = B/A = 1.82

Hydrophytic Vegetation Indicators:

X Dominance Test is > 50%

X Prevalence Index is <= 3.0[1]

___ Problematic Hydrophytic Vegetation[1] (explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20ft (6m) or more in height and 3in (7.6cm) or larger in diameter at breast height (DBH).

Sapling - Woody plants, excluding woody vines, approximately 20ft (6m) or more in height and less than 3in (7.6cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20ft (1 to 6m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3ft (1m) in height.

Woody vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present? YES

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: H5-Create-W1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(in)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6"	10YR 4/1		7.5YR 4/6				Sandy Loam	CMPM Redox
6-12"+	10YR 4/2		5YR 4/6				Sandy Loam	CMPM Redox

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

	Histosol (A1)		Polyvalue Below Surface (S8) (LRR R, MLRA 149B)		2cm Muck (A10) (LRR K, L, MLRA 149B)
	Histic Epipedon (A2)		Thin Dark Surface (S9) (LRR R, MLRA 149B)		Coast Prairie Redox (A16) (LRR K, L, R)
	Black Histic (A3)		Loamy Mucky Mineral (F1) (LRR K, L)		5cm Mucky Peat or Peat (S3) (LRR K, L, R)
	Hydrogen Sulfide (A4)		Loamy Gleyed Matrix (F2)		Dark Surface (S7) (LRR K, L)
	Stratified Layers (A5)	X	Depleted Matrix (F3)		Polyvalue Below Surface (S8) (LRR K, L)
	Depleted Below Dark Surface (A11)		Redox Dark Surface (F6)		Thin Dark Surface (S9) (LRR K, L)
	Thick Dark Surface (A12)		Depleted Dark Surface (F7)		Iron-Manganese Masses (F12) (LRR K, L, R)
	Sandy Mucky Mineral (S1)		Redox Depressions (F8)		Piedmont Floodplain Soils (F19) (MLRA 149B)
	Sandy Gleyed Matrix (S4)				Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
X	Sandy Redox (S5)				Red Parent Material (TF2)
	Stripped Matrix (S6)				Very Shallow Dark Surface (TF12)
	Dark Surface (S7) (LRR R, MLRA 149B)				Other (Explain in Remarks)

Indicators for Problematic Hydric Soils[3]:

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? YES

Remarks:

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project Site: JPR Golf Course Wetland Mitigation | City/County: Jay, Orleans Co. | Samp. Date: 8/8/2012

Applicant/Owner: Jay Peak Resort | State: VERMONT | Sampling Point: H6-WT1-W1

Investigator(s): CMM/NRS | Section, Township, Range: Jay

Landform (hillslope, terrace, etc.): Terrace | Local relief (concave, convex, none): Concave | Slope (%):

Subregion (LRR or MLRA): LRR R | Lat: 44°56'40.7"N | Long: 72°29'7.5"W | Datum: NAD 83

Soil Map Unit: Cabot | NWI Class: PEM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes (If no, explain in Remarks.)

Are Vegetation, Soil, or Hydrology significantly disturbed? No | Normal Circumstances? Yes

Are Vegetation, Soil, or Hydrology naturally problematic? No | (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	YES	**Is This Sample Area**	
Hydric Soil Present?	YES	**Within a Wetland?**	YES
Wetland Hydrology Present?	YES	**If yes, optional Wetland Site ID:**	H6-WT1

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)	___ Water-Stained Leaves (B9)	___ Surface Soil Cracks (B6)
___ High Water Table (A2)	___ Aquatic Fauna (B13)	___ Drainage Patterns (B10)
___ Saturation (A3)	___ Marl Deposits (B15)	___ Moss Trim Lines (B16)
___ Water Marks (B1)	___ Hydrogen Sulfide Odor (C1)	___ Dry-Season Water Table (C2)
___ Sediment Deposits (B2)	X Oxidized Rhizospheres on Living Roots (C3)	___ Crayfish Burrows (C8)
___ Drift Deposits (B3)	___ Presence of Reduced Iron (C4)	___ Saturation Visible on Aerial (C9)
X Algal Mat or Crust (B4)	___ Recent Iron Reduction in Tilled Soils (C6)	___ Stunted or Stressed Plants (D1)
___ Iron Deposits (B5)	___ Thin Muck Surface (C7)	___ Geomorphic Position (D2)
___ Inundation Visible on Aerial (B7)	___ Other (Explain in Remarks)	___ Shallow Aquitard (D3)
___ Sparsely Vegetated Concave Surface (B8)		___ Microtopographic Relief (D4)
		___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? ___ Depth (inches): ___

Water Table Present? ___ Depth (inches): ___

Saturation Present? ___ Depth (inches): ___

(includes capillary fringe)

Wetland Hydrology Present? YES

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

0.56" of rain in 5 days prior recorded in Morrisville; 1.27" of rain total for July 2012 (2.86" below normal); 1.77" of rain total for August 2012 (2.26" below normal) (NOAA 2012)

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: H6-WT1-W1

Tree Stratum (Plot size: 30' RAD)	Absolute % Cover	Dom. Sp?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling Stratum (Plot size: 30' RAD)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size: 15' RAD)			
1. Cornus sericea L.	3	X	FACW
2. Ilex verticillata (L.) A. Gray	3	X	FACW
3.			
4.			
5.			
6.			
7.			
	6	= Total Cover	
Herb Stratum (Plot size: 1m2)			
1. Eupatorium perfoliatum L.	38	X	FACW
2. Scirpus atrovirens Willd.	15		OBL
3. Epilobium coloratum Biehler	3		OBL
4. Carex comosa Boott	15		OBL
5. Carex vulpinoidea Michx.	15		OBL
6. Juncus effusus L.	3		OBL
7. Carex crinita Lam.	3		OBL
8.			
9.			
10.			
11.			
12.			
	92	= Total Cover	
Woody Vines (Plot size: 15' RAD)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	

Dominance Test Worksheet:

Dominants OBL, FACW, FAC: 3 (A)

Dominants across all strata: 3 (B)

% Dominants OBL, FACW, FAC: 100% (A/B)

Prevalence Index Worksheet:

Total % Cover of:			Multiply By:
OBL	54	x 1 =	54
FACW	44	x 2 =	88
FAC		x 3 =	
FACU		x 4 =	
UPL		x 5 =	
Sum:	98 (A)		142 (B)

Prevalence Index = B/A = 1.45

Hydrophytic Vegetation Indicators:

X Dominance Test is > 50%

X Prevalence Index is <= 3.0[1]

___ Problematic Hydrophytic Vegetation[1] (explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20ft (6m) or more in height and 3in (7.6cm) or larger in diameter at breast height (DBH).

Sapling - Woody plants, excluding woody vines, approximately 20ft (6m) or more in height and less than 3in (7.6cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20ft (1 to 6m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3ft (1m) in height.

Woody vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present? YES

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: H6-WT1-W1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(in)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-10"	10YR 3/1		5YR 4/6				Loam	CMPP Redox
10-14"+	10YR 4/1		7.5YR 4/4				Loam	MMPM Redox

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (LRR R, MLRA 149B)
- ___ Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- ___ Thin Dark Surface (S9) (LRR R, MLRA 149B)
- ___ Loamy Mucky Mineral (F1) (LRR K, L)
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2cm Muck (A10) (LRR K, L, MLRA 149B)
- ___ Coast Prairie Redox (A16) (LRR K, L, R)
- ___ 5cm Mucky Peat or Peat (S3) (LRR K, L, R)
- ___ Dark Surface (S7) (LRR K, L)
- ___ Polyvalue Below Surface (S8) (LRR K, L)
- ___ Thin Dark Surface (S9) (LRR K, L)
- ___ Iron-Manganese Masses (F12) (LRR K, L, R)
- ___ Piedmont Floodplain Soils (F19) (MLRA 149B)
- ___ Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? YES

Remarks:

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project Site: JPR Golf Course Wetland Mitigation | City/County: Jay, Orleans Co. | Samp. Date: 8/8/2012

Applicant/Owner: Jay Peak Resort | State: VERMONT | Sampling Point: H8-Create-W1

Investigator(s): CMM/NRS | Section, Township, Range: Jay

Landform (hillslope, terrace, etc.): Terrace | Local relief (concave, convex, none): Concave | Slope (%):

Subregion (LRR or MLRA): LRR R | Lat: 44°56'21.3"N | Long: 72°29'37.3"W | Datum: NAD 83

Soil Map Unit: Dixfield | NWI Class: PEM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes (If no, explain in Remarks.)

Are Vegetation, Soil, or Hydrology significantly disturbed? No | Normal Circumstances? Yes

Are Vegetation, Soil, or Hydrology naturally problematic? No | (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	YES	**Is This Sample Area**	
Hydric Soil Present?	YES	**Within a Wetland?**	YES
Wetland Hydrology Present?	YES	**If yes, optional Wetland Site ID:**	H8-Create

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

	Surface Water (A1)		Water-Stained Leaves (B9)
	High Water Table (A2)		Aquatic Fauna (B13)
X	Saturation (A3)		Marl Deposits (B15)
	Water Marks (B1)		Hydrogen Sulfide Odor (C1)
	Sediment Deposits (B2)		Oxidized Rhizospheres on Living Roots (C3)
	Drift Deposits (B3)		Presence of Reduced Iron (C4)
	Algal Mat or Crust (B4)		Recent Iron Reduction in Tilled Soils (C6)
	Iron Deposits (B5)		Thin Muck Surface (C7)
	Inundation Visible on Aerial (B7)		Other (Explain in Remarks)
	Sparsely Vegetated Concave Surface (B8)		

Secondary Indicators (minimum of two required)

	Surface Soil Cracks (B6)
X	Drainage Patterns (B10)
	Moss Trim Lines (B16)
	Dry-Season Water Table (C2)
	Crayfish Burrows (C8)
	Saturation Visible on Aerial (C9)
	Stunted or Stressed Plants (D1)
	Geomorphic Position (D2)
	Shallow Aquitard (D3)
	Microtopographic Relief (D4)
	FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?		Depth (inches):	
Water Table Present?		Depth (inches):	
Saturation Present? (includes capillary fringe)	X	Depth (inches):	10"

Wetland Hydrology Present? YES

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

0.56" of rain in 5 days prior recorded in Morrisville; 1.27" of rain total for July 2012 (2.86" below normal); 1.77" of rain total for August 2012 (2.26" below normal) (NOAA 2012)

Remarks:

Saturation at 10"

VEGETATION - Use scientific names of plants.

Sampling Point: H8-Create-W1

Tree Stratum (Plot size: 30' RAD)	Absolute % Cover	Dom. Sp?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling Stratum (Plot size: 30' RAD)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size: 15' RAD)			
1. Cornus sericea L.	15	X	FACW
2. Viburnum opoulus L.	3		FACW
3.			
4.			
5.			
6.			
7.			
	18	= Total Cover	
Herb Stratum (Plot size: 1m2)			
1. Juncus effusus L.	15		OBL
2. Scirpus atrovirens Willd.	15		OBL
3. Carex comosa Boott	15		OBL
4. Carex vulpinoidea Michx.	3		OBL
5. Phleum pratense L.	3		FACU
6. Eupatorium perfoliatum L.	3		FACW
7. Agrostis stolonifera L.	38	X	FACW
8. Glyceria striata (Lam.) Hitchc.	15		OBL
9.			
10.			
11.			
12.			
	107	= Total Cover	
Woody Vines (Plot size: 15' RAD)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	

Dominance Test Worksheet:

Dominants OBL, FACW, FAC: 2 (A)

Dominants across all strata: 2 (B)

% Dominants OBL, FACW, FAC: 100% (A/B)

Prevalence Index Worksheet:

Total % Cover of:			Multiply By:
OBL	63	x 1 =	63
FACW	59	x 2 =	118
FAC		x 3 =	
FACU	3	x 4 =	12
UPL		x 5 =	
Sum:	125 (A)		193 (B)

Prevalence Index = B/A = 1.54

Hydrophytic Vegetation Indicators:

X Dominance Test is > 50%

X Prevalence Index is <= 3.0[1]

___ Problematic Hydrophytic Vegetation[1] (explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20ft (6m) or more in height and 3in (7.6cm) or larger in diameter at breast height (DBH).

Sapling - Woody plants, excluding woody vines, approximately 20ft (6m) or more in height and less than 3in (7.6cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20ft (1 to 6m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3ft (1m) in height.

Woody vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present? YES

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: H8-Create-W1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(in)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-10"	10YR 3/1		7.5YR 3/4				Sandy Loam	CMDM Redox
10-14"+	10YR 4/1		7.5YR 4/6				Sandy Loam	CMPM Redox

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- X Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (LRR R, MLRA 149B)
- ___ Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- ___ Thin Dark Surface (S9) (LRR R, MLRA 149B)
- ___ Loamy Mucky Mineral (F1) (LRR K, L)
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2cm Muck (A10) (LRR K, L, MLRA 149B)
- ___ Coast Prairie Redox (A16) (LRR K, L, R)
- ___ 5cm Mucky Peat or Peat (S3) (LRR K, L, R)
- ___ Dark Surface (S7) (LRR K, L)
- ___ Polyvalue Below Surface (S8) (LRR K, L)
- ___ Thin Dark Surface (S9) (LRR K, L)
- ___ Iron-Manganese Masses (F12) (LRR K, L, R)
- ___ Piedmont Floodplain Soils (F19) (MLRA 149B)
- ___ Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? YES

Remarks:

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project Site: JPR Golf Course Wetland Mitigation | City/County: Jay, Orleans Co. | Samp. Date: 8/8/2012

Applicant/Owner: Jay Peak Resort | State: VERMONT | Sampling Point: H11-Create-W1

Investigator(s): PBW/OWM | Section, Township, Range: Jay

Landform (hillslope, terrace, etc.): Terrace | Local relief (concave, convex, none): Concave | Slope (%):

Subregion (LRR or MLRA): LRR R | Lat: 44°56'29.8"N | Long: 72°30'25.1"W | Datum: NAD 83

Soil Map Unit: Cabot | NWI Class: PEM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes (If no, explain in Remarks.)

Are Vegetation, Soil, or Hydrology significantly disturbed? NO | Normal Circumstances? YES

Are Vegetation, Soil, or Hydrology naturally problematic? NO (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	YES	**Is This Sample Area**	
Hydric Soil Present?	YES	**Within a Wetland?**	YES
Wetland Hydrology Present?	YES	**If yes, optional Wetland Site ID:**	H11-Create

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

	Surface Water (A1)	X	Water-Stained Leaves (B9)
	High Water Table (A2)		Aquatic Fauna (B13)
	Saturation (A3)		Marl Deposits (B15)
	Water Marks (B1)		Hydrogen Sulfide Odor (C1)
	Sediment Deposits (B2)	X	Oxidized Rhizospheres on Living Roots (C3)
	Drift Deposits (B3)		Presence of Reduced Iron (C4)
	Algal Mat or Crust (B4)		Recent Iron Reduction in Tilled Soils (C6)
	Iron Deposits (B5)		Thin Muck Surface (C7)
	Inundation Visible on Aerial (B7)		Other (Explain in Remarks)
	Sparsely Vegetated Concave Surface (B8)		

Secondary Indicators (minimum of two required)

	Surface Soil Cracks (B6)
X	Drainage Patterns (B10)
	Moss Trim Lines (B16)
	Dry-Season Water Table (C2)
	Crayfish Burrows (C8)
	Saturation Visible on Aerial (C9)
	Stunted or Stressed Plants (D1)
	Geomorphic Position (D2)
	Shallow Aquitard (D3)
	Microtopographic Relief (D4)
	FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Depth (inches):

Water Table Present? Depth (inches):

Saturation Present? Depth (inches):
(includes capillary fringe)

Wetland Hydrology Present? YES

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

0.56" of rain in 5 days prior recorded in Morrisville; 1.27" of rain total for July 2012 (2.86" below normal); 1.77" of rain total for August 2012 (2.26" below normal) (NOAA 2012)

Remarks:

Saturated soils below 16"

VEGETATION - Use scientific names of plants.

Sampling Point: H11-Create-W1

Tree Stratum (Plot size: 30' RAD)	Absolute % Cover	Dom. Sp?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling Stratum (Plot size: 30' RAD)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size: 15' RAD)			
1. Cornus sericea L.	15	X	FACW
2.			
3.			
4.			
5.			
6.			
7.			
	15	= Total Cover	
Herb Stratum (Plot size: 1m2)			
1. Verbena hastata L.	15		FACW
2. Eupatorium perfoliatum L.	15		FACW
3. Agrostis stolonifera L.	38	X	FACW
4. Mimulus ringens L.	3		OBL
5. Epilobium coloratum Biehler	3		OBL
6. Euthamia graminifolia (L.) Nutt.	3		FAC
7. Elymus virginicus L.	3		FACW
8. Bidens cernua L.	3		OBL
9.			
10.			
11.			
12.			
	83	= Total Cover	
Woody Vines (Plot size: 15' RAD)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	

Dominance Test Worksheet:

Dominants OBL, FACW, FAC: 2 (A)

Dominants across all strata: 2 (B)

% Dominants OBL, FACW, FAC: 100% (A/B)

Prevalence Index Worksheet:

Total % Cover of:			Multiply By:
OBL	9	x 1 =	9
FACW	86	x 2 =	172
FAC	3	x 3 =	9
FACU		x 4 =	
UPL		x 5 =	
Sum:	98 (A)		190 (B)

Prevalence Index = B/A = 1.94

Hydrophytic Vegetation Indicators:

X Dominance Test is > 50%

X Prevalence Index is <= 3.0[1]

___ Problematic Hydrophytic Vegetation[1] (explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20ft (6m) or more in height and 3in (7.6cm) or larger in diameter at breast height (DBH).

Sapling - Woody plants, excluding woody vines, approximately 20ft (6m) or more in height and less than 3in (7.6cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20ft (1 to 6m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3ft (1m) in height.

Woody vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present? YES

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: H11-Create-W1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(in)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-8"	10YR 3/2		10YR 3/6				Fine Sandy Loam	CMDP Redox
8-16"+	2.5Y 5/3						Fine Sand	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- X Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (LRR R, MLRA 149B)
- ___ Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- ___ Thin Dark Surface (S9) (LRR R, MLRA 149B)
- ___ Loamy Mucky Mineral (F1) (LRR K, L)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2cm Muck (A10) (LRR K, L, MLRA 149B)
- ___ Coast Prairie Redox (A16) (LRR K, L, R)
- ___ 5cm Mucky Peat or Peat (S3) (LRR K, L, R)
- ___ Dark Surface (S7) (LRR K, L)
- ___ Polyvalue Below Surface (S8) (LRR K, L)
- ___ Thin Dark Surface (S9) (LRR K, L)
- ___ Iron-Manganese Masses (F12) (LRR K, L, R)
- ___ Piedmont Floodplain Soils (F19) (MLRA 149B)
- ___ Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? YES

Remarks:

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project Site: JPR Golf Course Wetland Mitigation | City/County: Jay, Orleans Co. | Samp. Date: 8/8/2012

Applicant/Owner: Jay Peak Resort | State: VERMONT | Sampling Point: H11-WT6-W1

Investigator(s): PBW/OWM | Section, Township, Range: Jay

Landform (hillslope, terrace, etc.): Terrace | Local relief (concave, convex, none): Concave | Slope (%):

Subregion (LRR or MLRA): LRR R | Lat: 44°56'37.8"N | Long: 72°30'40.4"W | Datum: NAD 83

Soil Map Unit: Cabot | NWI Class: PEM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes (If no, explain in Remarks.)

Are Vegetation, Soil, or Hydrology significantly disturbed? No | Normal Circumstances? Yes

Are Vegetation, Soil, or Hydrology naturally problematic? No | (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	YES	**Is This Sample Area**	
Hydric Soil Present?	NO	**Within a Wetland?**	YES
Wetland Hydrology Present?	YES	**If yes, optional Wetland Site ID:**	H11-WT6

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

Surface Water (A1)	X Water-Stained Leaves (B9)	Aquatic Fauna (B13)
High Water Table (A2)	Marl Deposits (B15)	Hydrogen Sulfide Odor (C1)
Saturation (A3)	Oxidized Rhizospheres on Living Roots (C3)	Presence of Reduced Iron (C4)
Water Marks (B1)	Recent Iron Reduction in Tilled Soils (C6)	Thin Muck Surface (C7)
Sediment Deposits (B2)	Other (Explain in Remarks)	
Drift Deposits (B3)		
Algal Mat or Crust (B4)		
Iron Deposits (B5)		
Inundation Visible on Aerial (B7)		
Sparsely Vegetated Concave Surface (B8)		

Secondary Indicators (minimum of two required)

Surface Soil Cracks (B6)	
X	Drainage Patterns (B10)
Moss Trim Lines (B16)	
Dry-Season Water Table (C2)	
Crayfish Burrows (C8)	
Saturation Visible on Aerial (C9)	
Stunted or Stressed Plants (D1)	
Geomorphic Position (D2)	
Shallow Aquitard (D3)	
Microtopographic Relief (D4)	
FAC-Neutral Test (D5)	

Field Observations:

Surface Water Present? Depth (inches):

Water Table Present? Depth (inches):

Saturation Present? Depth (inches):
(includes capillary fringe)

Wetland Hydrology Present? YES

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

0.56" of rain in 5 days prior recorded in Morrisville; 1.27" of rain total for July 2012 (2.86" below normal); 1.77" of rain total for August 2012 (2.26" below normal) (NOAA 2012)

Remarks:

Saturated soils below 20"

VEGETATION - Use scientific names of plants.

Sampling Point: H11-WT6-W1

Tree Stratum (Plot size: 30' RAD)	Absolute % Cover	Dom. Sp?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling Stratum (Plot size: 30' RAD)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size: 15' RAD)			
1. Cornus sericea L.	3	X	FACW
2.			
3.			
4.			
5.			
6.			
7.			
	3	= Total Cover	
Herb Stratum (Plot size: 1m2)			
1. Juncus effusus L.	38	X	OBL
2. Thelypteris palustris Schott	3		FACW
3. Carex comosa Boott	15		OBL
4. Carex scoparia Schkuhr ex Willd.	3		FACW
5. Eupatorium perfoliatum L.	3		FACW
6. Epilobium coloratum Biehler	3		OBL
7. Euthamia graminifolia (L.) Nutt.	3		FAC
8. Carex crinita Lam.	15		OBL
9. Juncus tenuis Willd.	3		FAC
10. Onoclea sensibilis L.	3		FACW
11. Carex echinata Murray	3		OBL
12.			
	92	= Total Cover	
Woody Vines (Plot size: 15' RAD)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	

Dominance Test Worksheet:

Dominants OBL, FACW, FAC: 2 (A)

Dominants across all strata: 2 (B)

% Dominants OBL, FACW, FAC: 100% (A/B)

Prevalence Index Worksheet:

Total % Cover of:			Multiply By:
OBL	74	x 1 =	74
FACW	15	x 2 =	30
FAC	6	x 3 =	18
FACU		x 4 =	
UPL		x 5 =	
Sum:	95 (A)		122 (B)

Prevalence Index = B/A = 1.28

Hydrophytic Vegetation Indicators:

X Dominance Test is > 50%

X Prevalence Index is <= 3.0[1]

___ Problematic Hydrophytic Vegetation[1] (explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20ft (6m) or more in height and 3in (7.6cm) or larger in diameter at breast height (DBH).

Sapling - Woody plants, excluding woody vines, approximately 20ft (6m) or more in height and less than 3in (7.6cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20ft (1 to 6m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3ft (1m) in height.

Woody vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present? YES

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: H11-WT6-W1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(in)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-12"	10YR 3/2						Silt Loam	
12-20"+	2.5Y 4/1						Silt Loam	Some gravel in this horizon

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (LRR R, MLRA 149B)
- ___ Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- ___ Thin Dark Surface (S9) (LRR R, MLRA 149B)
- ___ Loamy Mucky Mineral (F1) (LRR K, L)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2cm Muck (A10) (LRR K, L, MLRA 149B)
- ___ Coast Prairie Redox (A16) (LRR K, L, R)
- ___ 5cm Mucky Peat or Peat (S3) (LRR K, L, R)
- ___ Dark Surface (S7) (LRR K, L)
- ___ Polyvalue Below Surface (S8) (LRR K, L)
- ___ Thin Dark Surface (S9) (LRR K, L)
- ___ Iron-Manganese Masses (F12) (LRR K, L, R)
- ___ Piedmont Floodplain Soils (F19) (MLRA 149B)
- ___ Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? NO

Remarks:

Although the soils in this area do not yet meet any of the accepted hydric soils criteria, the presence of primary and secondary hydrology indicators, and prevalance of hydrophytic vegetation suggests this area has sufficient water for most of the growing season, and that soils will continue to develop hydric characteristics

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project Site: JPR Golf Course Wetland Mitigation | City/County: Jay, Orleans Co. | Samp. Date: 8/8/2012

Applicant/Owner: Jay Peak Resort | State: VERMONT | Sampling Point: H13-WT-1a/1b-W1

Investigator(s): PBW/OWM | Section, Township, Range: Jay

Landform (hillslope, terrace, etc.): Terrace | Local relief (concave, convex, none): Concave | Slope (%):

Subregion (LRR or MLRA): LRR R | Lat: 44°56'40.3"N | Long: 72°30'51.5"W | Datum: NAD 83

Soil Map Unit: Cabot | NWI Class: PEM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes (If no, explain in Remarks.)

Are Vegetation, Soil, or Hydrology significantly disturbed? No | Normal Circumstances? Yes

Are Vegetation, Soil, or Hydrology naturally problematic? No | (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	YES	**Is This Sample Area**	
Hydric Soil Present?	YES	**Within a Wetland?**	YES
Wetland Hydrology Present?	YES	**If yes, optional Wetland Site ID:**	H13-WT-1a/1b

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

Surface Water (A1)	Water-Stained Leaves (B9)	
High Water Table (A2)	Aquatic Fauna (B13)	
Saturation (A3)	Marl Deposits (B15)	
Water Marks (B1)	Hydrogen Sulfide Odor (C1)	
Sediment Deposits (B2)	X Oxidized Rhizospheres on Living Roots (C3)	
Drift Deposits (B3)	Presence of Reduced Iron (C4)	
Algal Mat or Crust (B4)	Recent Iron Reduction in Tilled Soils (C6)	
Iron Deposits (B5)	Thin Muck Surface (C7)	
Inundation Visible on Aerial (B7)	Other (Explain in Remarks)	
Sparsely Vegetated Concave Surface (B8)		

Secondary Indicators (minimum of two required)

Surface Soil Cracks (B6)	
X Drainage Patterns (B10)	
Moss Trim Lines (B16)	
Dry-Season Water Table (C2)	
Crayfish Burrows (C8)	
Saturation Visible on Aerial (C9)	
Stunted or Stressed Plants (D1)	
Geomorphic Position (D2)	
Shallow Aquitard (D3)	
Microtopographic Relief (D4)	
FAC-Neutral Test (D5)	

Field Observations:

Surface Water Present? Depth (inches):

Water Table Present? Depth (inches):

Saturation Present? Depth (inches):
(includes capillary fringe)

Wetland Hydrology Present? YES

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

0.56" of rain in 5 days prior recorded in Morrisville; 1.27" of rain total for July 2012 (2.86" below normal); 1.77" of rain total for August 2012 (2.26" below normal) (NOAA 2012)

Remarks:

Saturated soils below 16"

VEGETATION - Use scientific names of plants.

Sampling Point: H13-WT-1a/1b-W1

	Absolute % Cover	Dom. Sp?	Indicator Status
Tree Stratum (Plot size: 30' RAD)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling Stratum (Plot size: 30' RAD)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size: 15' RAD)			
1. Viburnum opoulus L.	3	X	FACW
2. Cornus sericea L.	3	X	FACW
3.			
4.			
5.			
6.			
7.			
	6	= Total Cover	
Herb Stratum (Plot size: 1m2)			
1. Scirpus atrovirens Willd.	3		OBL
2. Carex crinita Lam.	15		OBL
3. Solidago rugosa Mill.	3		FAC
4. Carex comosa Boott	38	X	OBL
5. Carex scoparia Schkuhr ex Willd.	3		FACW
6. Juncus tenuis Willd.	3		FAC
7. Juncus effusus L.	15		OBL
8. Carex vulpinoidea Michx.	15		OBL
9. Impatiens capensis Meerb.	15		FACW
10. Polygonum sagittatum L.	3		OBL
11. Equisetum arvense L.	3		FAC
12.			
	116	= Total Cover	
Woody Vines (Plot size: 15' RAD)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	

Dominance Test Worksheet:

Dominants OBL, FACW, FAC: 3 (A)

Dominants across all strata: 3 (B)

% Dominants OBL, FACW, FAC: 100% (A/B)

Prevalence Index Worksheet:

Total % Cover of:			Multiply By:
OBL	89	x 1 =	89
FACW	24	x 2 =	48
FAC	9	x 3 =	27
FACU		x 4 =	
UPL		x 5 =	
Sum:	122 (A)		164 (B)

Prevalence Index = B/A = 1.34

Hydrophytic Vegetation Indicators:

X Dominance Test is > 50%

X Prevalence Index is <= 3.0[1]

Problematic Hydrophytic Vegetation[1] (explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20ft (6m) or more in height and 3in (7.6cm) or larger in diameter at breast height (DBH).

Sapling - Woody plants, excluding woody vines, approximately 20ft (6m) or more in height and less than 3in (7.6cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20ft (1 to 6m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3ft (1m) in height.

Woody vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present? YES

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: H13-WT-1a/1b-W1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(in)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-8"	10YR 2/2		7.5YR 4/6				Fine Sandy Loam	CMPP Redox
8-16"+	2.5Y 4/2						Gravelly Sandy Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- X Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (LRR R, MLRA 149B)
- ___ Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- ___ Thin Dark Surface (S9) (LRR R, MLRA 149B)
- ___ Loamy Mucky Mineral (F1) (LRR K, L)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2cm Muck (A10) (LRR K, L, MLRA 149B)
- ___ Coast Prairie Redox (A16) (LRR K, L, R)
- ___ 5cm Mucky Peat or Peat (S3) (LRR K, L, R)
- ___ Dark Surface (S7) (LRR K, L)
- ___ Polyvalue Below Surface (S8) (LRR K, L)
- ___ Thin Dark Surface (S9) (LRR K, L)
- ___ Iron-Manganese Masses (F12) (LRR K, L, R)
- ___ Piedmont Floodplain Soils (F19) (MLRA 149B)
- ___ Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? YES

Remarks:

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project Site: JPR Golf Course Wetland Mitigation | City/County: Jay, Orleans Co. | Samp. Date: 8/8/2012

Applicant/Owner: Jay Peak Resort | State: VERMONT | Sampling Point: H14-WT 2/3-W1

Investigator(s): PBW/OWM | Section, Township, Range: Jay

Landform (hillslope, terrace, etc.): Terrace | Local relief (concave, convex, none): Concave | Slope (%):

Subregion (LRR or MLRA): LRR R | Lat: 44°56'39.4"N | Long: 72°31'12.5"W | Datum: NAD 83

Soil Map Unit: Cabot | NWI Class: PEM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes (If no, explain in Remarks.)

Are Vegetation, Soil, or Hydrology significantly disturbed? No | Normal Circumstances? Yes

Are Vegetation, Soil, or Hydrology naturally problematic? No | (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	YES	**Is This Sample Area**	
Hydric Soil Present?	YES	**Within a Wetland?**	YES
Wetland Hydrology Present?	YES	**If yes, optional Wetland Site ID:**	H14-WT 2/3

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

	Surface Water (A1)	
	High Water Table (A2)	
X	Saturation (A3)	
	Water Marks (B1)	
	Sediment Deposits (B2)	
	Drift Deposits (B3)	
X	Algal Mat or Crust (B4)	
	Iron Deposits (B5)	
	Inundation Visible on Aerial (B7)	
	Sparsely Vegetated Concave Surface (B8)	
		Water-Stained Leaves (B9)
		Aquatic Fauna (B13)
		Marl Deposits (B15)
		Hydrogen Sulfide Odor (C1)
		Oxidized Rhizospheres on Living Roots (C3)
		Presence of Reduced Iron (C4)
		Recent Iron Reduction in Tilled Soils (C6)
		Thin Muck Surface (C7)
		Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

	Surface Soil Cracks (B6)
X	Drainage Patterns (B10)
	Moss Trim Lines (B16)
	Dry-Season Water Table (C2)
	Crayfish Burrows (C8)
	Saturation Visible on Aerial (C9)
	Stunted or Stressed Plants (D1)
	Geomorphic Position (D2)
	Shallow Aquitard (D3)
	Microtopographic Relief (D4)
	FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?		Depth (inches):	
Water Table Present?		Depth (inches):	
Saturation Present? (includes capillary fringe)	X	Depth (inches):	10"

Wetland Hydrology Present? YES

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

0.56" of rain in 5 days prior recorded in Morrisville; 1.27" of rain total for July 2012 (2.86" below normal); 1.77" of rain total for August 2012 (2.26" below normal) (NOAA 2012)

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: H14-WT 2/3-W1

	Absolute % Cover	Dom. Sp?	Indicator Status
Tree Stratum (Plot size: 30' RAD)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling Stratum (Plot size: 30' RAD)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size: 15' RAD)			
1. Cornus sericea L.	15	X	FACW
2.			
3.			
4.			
5.			
6.			
7.			
	15	= Total Cover	
Herb Stratum (Plot size: 1m2)			
1. Carex crinita Lam.	38	X	OBL
2. Glyceria striata (Lam.) Hitchc.	38	X	OBL
3. Euthamia graminifolia (L.) Nutt.	15		FAC
4. Eupatorium perfoliatum L.	15		FACW
5. Juncus effusus L.	15		OBL
6. Carex vulpinoidea Michx.	15		OBL
7. Impatiens capensis Meerb.	3		FACW
8. Carex scoparia Schkuhr ex Willd.	15		FACW
9. Polygonum sagittatum L.	3		OBL
10. Agrostis stolonifera L.	15		FACW
11.			
12.			
	172	= Total Cover	
Woody Vines (Plot size: 15' RAD)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	

Dominance Test Worksheet:

Dominants OBL, FACW, FAC: 3 (A)

Dominants across all strata: 3 (B)

% Dominants OBL, FACW, FAC: 100% (A/B)

Prevalence Index Worksheet:

Total % Cover of:			Multiply By:
OBL	109	x 1 =	109
FACW	63	x 2 =	126
FAC	15	x 3 =	45
FACU		x 4 =	
UPL		x 5 =	
Sum:	187 (A)		280 (B)

Prevalence Index = B/A = 1.50

Hydrophytic Vegetation Indicators:

X Dominance Test is > 50%

X Prevalence Index is <= 3.0[1]

__ Problematic Hydrophytic Vegetation[1] (explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20ft (6m) or more in height and 3in (7.6cm) or larger in diameter at breast height (DBH).

Sapling - Woody plants, excluding woody vines, approximately 20ft (6m) or more in height and less than 3in (7.6cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20ft (1 to 6m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3ft (1m) in height.

Woody vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present? YES

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: H14-WT 2/3-W1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(in)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6"	10YR 2/2						Silt Loam	
6-18"+	Gley 1 N 4/1		7.5YR 4/6				Silt Loam	CMPM Redox

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (LRR R, MLRA 149B)
- ___ Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- ___ Thin Dark Surface (S9) (LRR R, MLRA 149B)
- ___ Loamy Mucky Mineral (F1) (LRR K, L)
- X Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2cm Muck (A10) (LRR K, L, MLRA 149B)
- ___ Coast Prairie Redox (A16) (LRR K, L, R)
- ___ 5cm Mucky Peat or Peat (S3) (LRR K, L, R)
- ___ Dark Surface (S7) (LRR K, L)
- ___ Polyvalue Below Surface (S8) (LRR K, L)
- ___ Thin Dark Surface (S9) (LRR K, L)
- ___ Iron-Manganese Masses (F12) (LRR K, L, R)
- ___ Piedmont Floodplain Soils (F19) (MLRA 149B)
- ___ Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? YES

Remarks:

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project Site: JPR Golf Course Wetland Mitigation | City/County: Jay, Orleans Co. | Samp. Date: 8/8/2012

Applicant/Owner: Jay Peak Resort | State: VERMONT | Sampling Point: H15-WT-1-W1

Investigator(s): PBW/OWM | Section, Township, Range: Jay

Landform (hillslope, terrace, etc.): Terrace | Local relief (concave, convex, none): Concave | Slope (%):

Subregion (LRR or MLRA): LRR R | Lat: 44°56'35.4"N | Long: 72°30'46.9"W | Datum: NAD 83

Soil Map Unit: Cabot | NWI Class: PEM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes (If no, explain in Remarks.)

Are Vegetation, Soil, or Hydrology significantly disturbed? No | Normal Circumstances? Yes

Are Vegetation, Soil, or Hydrology naturally problematic? No | (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	YES	**Is This Sample Area**	
Hydric Soil Present?	YES	**Within a Wetland?**	YES
Wetland Hydrology Present?	YES	**If yes, optional Wetland Site ID:**	H15-WT1

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

Surface Water (A1)	X Water-Stained Leaves (B9)	Aquatic Fauna (B13)
High Water Table (A2)	Marl Deposits (B15)	Hydrogen Sulfide Odor (C1)
Saturation (A3)	Oxidized Rhizospheres on Living Roots (C3)	Water Marks (B1)
Sediment Deposits (B2)	Presence of Reduced Iron (C4)	Drift Deposits (B3)
Algal Mat or Crust (B4)	Recent Iron Reduction in Tilled Soils (C6)	Iron Deposits (B5)
Thin Muck Surface (C7)	Other (Explain in Remarks)	Inundation Visible on Aerial (B7)
Sparsely Vegetated Concave Surface (B8)		

Secondary Indicators (minimum of two required)

- Surface Soil Cracks (B6)
- Drainage Patterns (B10)
- Moss Trim Lines (B16)
- Dry-Season Water Table (C2)
- Crayfish Burrows (C8)
- Saturation Visible on Aerial (C9)
- Stunted or Stressed Plants (D1)
- Geomorphic Position (D2)
- Shallow Aquitard (D3)
- Microtopographic Relief (D4)
- FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Depth (inches):

Water Table Present? Depth (inches):

Saturation Present? Depth (inches):
(includes capillary fringe)

Wetland Hydrology Present? YES

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

0.56" of rain in 5 days prior recorded in Morrisville; 1.27" of rain total for July 2012 (2.86" below normal); 1.77" of rain total for August 2012 (2.26" below normal) (NOAA 2012)

Remarks:

Soils moist, but saturated below 16"

VEGETATION - Use scientific names of plants.

Sampling Point: H15-WT-1-W1

	Absolute % Cover	Dom. Sp?	Indicator Status
Tree Stratum (Plot size: 30' RAD)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling Stratum (Plot size: 30' RAD)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size: 15' RAD)			
1. Cornus sericea L.	15	X	FACW
2.			
3.			
4.			
5.			
6.			
7.			
	15	= Total Cover	
Herb Stratum (Plot size: 1m2)			
1. Carex crinita Lam.	15		OBL
2. Lycopus americanus Muhl. ex W. Bartram	3		OBL
3. Carex comosa Boott	3		OBL
4. Solidago rugosa Mill.	3		FAC
5. Eutrochium maculatum (L.) E.E. Lamont	15		OBL
6. Eupatorium perfoliatum L.	3		FACW
7. Agrostis stolonifera L.	38	X	FACW
8. Verbena hastata L.	3		FACW
9. Epilobium coloratum Biehler	3		OBL
10. Bidens cernua L.	3		OBL
11.			
12.			
	89	= Total Cover	
Woody Vines (Plot size: 15' RAD)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	

Dominance Test Worksheet:

Dominants OBL, FACW, FAC: 2 (A)

Dominants across all strata: 2 (B)

% Dominants OBL, FACW, FAC: 100% (A/B)

Prevalence Index Worksheet:

Total % Cover of:			Multiply By:
OBL	42	x 1 =	42
FACW	59	x 2 =	118
FAC	3	x 3 =	9
FACU		x 4 =	
UPL		x 5 =	
Sum:	104 (A)		169 (B)

Prevalence Index = B/A = 1.63

Hydrophytic Vegetation Indicators:

X Dominance Test is > 50%

X Prevalence Index is <= 3.0[1]

___ Problematic Hydrophytic Vegetation[1] (explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20ft (6m) or more in height and 3in (7.6cm) or larger in diameter at breast height (DBH).

Sapling - Woody plants, excluding woody vines, approximately 20ft (6m) or more in height and less than 3in (7.6cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20ft (1 to 6m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3ft (1m) in height.

Woody vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present? YES

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: H15-WT-1-W1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(in)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-10"	10YR 3/2						Silt Loam	
10-16"+	2.5Y 5/2		10YR 4/6				Fine Sandy Silt Loam	CMPM Redox

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

	Histosol (A1)		Polyvalue Below Surface (S8) (LRR R, MLRA 149B)		2cm Muck (A10) (LRR K, L, MLRA 149B)
	Histic Epipedon (A2)		Thin Dark Surface (S9) (LRR R, MLRA 149B)		Coast Prairie Redox (A16) (LRR K, L, R)
	Black Histic (A3)		Loamy Mucky Mineral (F1) (LRR K, L)		5cm Mucky Peat or Peat (S3) (LRR K, L, R)
	Hydrogen Sulfide (A4)		Loamy Gleyed Matrix (F2)		Dark Surface (S7) (LRR K, L)
	Stratified Layers (A5)	X	Depleted Matrix (F3)		Polyvalue Below Surface (S8) (LRR K, L)
	Depleted Below Dark Surface (A11)		Redox Dark Surface (F6)		Thin Dark Surface (S9) (LRR K, L)
	Thick Dark Surface (A12)		Depleted Dark Surface (F7)		Iron-Manganese Masses (F12) (LRR K, L, R)
	Sandy Mucky Mineral (S1)		Redox Depressions (F8)		Piedmont Floodplain Soils (F19) (MLRA 149B)
	Sandy Gleyed Matrix (S4)				Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
	Sandy Redox (S5)				Red Parent Material (TF2)
	Stripped Matrix (S6)				Very Shallow Dark Surface (TF12)
	Dark Surface (S7) (LRR R, MLRA 149B)				Other (Explain in Remarks)

Indicators for Problematic Hydric Soils[3]:

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? YES

Remarks:

VHB

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project Site: JPR Golf Course Wetland Mitigation | City/County: Jay, Orleans Co. | Samp. Date: 8/8/2012

Applicant/Owner: Jay Peak Resort | State: VERMONT | Sampling Point: H16-Create-W1

Investigator(s): PBW/OWM | Section, Township, Range: Jay

Landform (hillslope, terrace, etc.): Terrace | Local relief (concave, convex, none): Concave | Slope (%):

Subregion (LRR or MLRA): LRR R | Lat: 44°56'32.1"N | Long: 72°30'40.6"W | Datum: NAD 83

Soil Map Unit: Cabot | NWI Class: PEM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes (If no, explain in Remarks.)

Are Vegetation, Soil, or Hydrology significantly disturbed? No | Normal Circumstances? Yes

Are Vegetation, Soil, or Hydrology naturally problematic? No | (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	YES	**Is This Sample Area**	
Hydric Soil Present?	YES	**Within a Wetland?**	YES
Wetland Hydrology Present?	YES	**If yes, optional Wetland Site ID:**	H16-Create

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

	Surface Water (A1)	X	Water-Stained Leaves (B9)		Surface Soil Cracks (B6)
	High Water Table (A2)		Aquatic Fauna (B13)	X	Drainage Patterns (B10)
	Saturation (A3)		Marl Deposits (B15)		Moss Trim Lines (B16)
	Water Marks (B1)		Hydrogen Sulfide Odor (C1)		Dry-Season Water Table (C2)
	Sediment Deposits (B2)		Oxidized Rhizospheres on Living Roots (C3)		Crayfish Burrows (C8)
	Drift Deposits (B3)		Presence of Reduced Iron (C4)		Saturation Visible on Aerial (C9)
X	Algal Mat or Crust (B4)		Recent Iron Reduction in Tilled Soils (C6)		Stunted or Stressed Plants (D1)
	Iron Deposits (B5)		Thin Muck Surface (C7)		Geomorphic Position (D2)
	Inundation Visible on Aerial (B7)		Other (Explain in Remarks)		Shallow Aquitard (D3)
	Sparsely Vegetated Concave Surface (B8)				Microtopographic Relief (D4)
					FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?		Depth (inches):	
Water Table Present?		Depth (inches):	
Saturation Present? (includes capillary fringe)		Depth (inches):	
Wetland Hydrology Present?	YES		

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

0.56" of rain in 5 days prior recorded in Morrisville; 1.27" of rain total for July 2012 (2.86" below normal); 1.77" of rain total for August 2012 (2.26" below normal) (NOAA 2012)

Remarks:

Saturated soils below 14"

VEGETATION - Use scientific names of plants.

Sampling Point: H16-Create-W1

		Absolute % Cover	Dom. Sp?	Indicator Status
Tree Stratum	(Plot size: 30' RAD)			
1.				
2.				
3.				
4.				
5.				
6.				
7.				
			= Total Cover	
Sapling Stratum	(Plot size: 30' RAD)			
1.				
2.				
3.				
4.				
5.				
6.				
7.				
			= Total Cover	
Shrub Stratum	(Plot size: 15' RAD)			
1.	Cornus sericea L.	15	X	FACW
2.	Sambucus nigra L.	3		FACW
3.	Ilex verticillata (L.) A. Gray	3		FACW
4.				
5.				
6.				
7.				
		21	= Total Cover	
Herb Stratum	(Plot size: 1m2)			
1.	Carex vulpinoidea Michx.	15		OBL
2.	Juncus effusus L.	38	X	OBL
3.	Agrostis stolonifera L.	15		FACW
4.	Eupatorium perfoliatum L.	15		FACW
5.	Carex comosa Boott	3		OBL
6.	Juncus tenuis Willd.	3		FAC
7.	Verbena hastata L.	3		FACW
8.	Eutrochium maculatum (L.) E.E. Lamont	3		OBL
9.	Euthamia graminifolia (L.) Nutt.	15		FAC
10.				
11.				
12.				
		110	= Total Cover	
Woody Vines	(Plot size: 15' RAD)			
1.				
2.				
3.				
4.				
5.				
			= Total Cover	

Dominance Test Worksheet:

Dominants OBL, FACW, FAC: 2 (A)

Dominants across all strata: 2 (B)

% Dominants OBL, FACW, FAC: 100% (A/B)

Prevalence Index Worksheet:

Total % Cover of:			Multiply By:
OBL	59	x 1 =	59
FACW	54	x 2 =	108
FAC	18	x 3 =	54
FACU		x 4 =	
UPL		x 5 =	
Sum:	131 (A)		221 (B)

Prevalence Index = B/A = 1.69

Hydrophytic Vegetation Indicators:

X Dominance Test is > 50%

X Prevalence Index is <= 3.0[1]

___ Problematic Hydrophytic Vegetation[1] (explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20ft (6m) or more in height and 3in (7.6cm) or larger in diameter at breast height (DBH).

Sapling - Woody plants, excluding woody vines, approximately 20ft (6m) or more in height and less than 3in (7.6cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20ft (1 to 6m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3ft (1m) in height.

Woody vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present? YES

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: H16-Create-W1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(in)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-5"	10YR 3/2						Silt Loam	
5-14"+	5Y 4/2		2.5Y 5/6				Fine Sandy Loam	CMPM Redox

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (LRR R, MLRA 149B)
- ___ Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- ___ Thin Dark Surface (S9) (LRR R, MLRA 149B)
- ___ Loamy Mucky Mineral (F1) (LRR K, L)
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2cm Muck (A10) (LRR K, L, MLRA 149B)
- ___ Coast Prairie Redox (A16) (LRR K, L, R)
- ___ 5cm Mucky Peat or Peat (S3) (LRR K, L, R)
- ___ Dark Surface (S7) (LRR K, L)
- ___ Polyvalue Below Surface (S8) (LRR K, L)
- ___ Thin Dark Surface (S9) (LRR K, L)
- ___ Iron-Manganese Masses (F12) (LRR K, L, R)
- ___ Piedmont Floodplain Soils (F19) (MLRA 149B)
- ___ Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? YES

Remarks:

Photograph 1: H5-TB3 from Station H5-TB3-P1, facing east (P. Werts, 5/23/12)

Photograph 2: H5-TB1 from Station H5-TB1-P1, facing south (C. Martin, 8/8/12)

Photograph 3: H5-Create from Station H5-Create-P1, facing northeast (P. Werts, 5/23/12)

Photograph 4: H6-WT1, from Station H6-WT1-P1, facing southeast (C. Martin, 8/8/12)

Photograph 5: H6-WT1, from Station H6-WT1-P2, facing east (C. Martin, 8/8/12)

Photograph 6: H6-TB1 from Station H6-TB1-P1, facing south (C. Martin, 8/8/12)

Photograph 7: H6-TB1 from Station H6-TB1-P2, facing northwest (P. Werts, 5/23/12)

Photograph 8: WH-WT1 from Station WH-WT1-P1, facing northeast (P. Werts, 5/23/12)

Photograph 9: WH-WT2 from Station WH-WT2-P1, facing southwest (C. Martin, 8/8/12)

Photograph 10: H7-SC1 from Station H7-SC1-P1, facing southeast (C. Martin, 8/8/12)

Photograph 11: H4-WT1/2 from Station H4-WT1-P1, facing southeast (C. Martin, 8/8/12)

Photograph 12: H4-WT3 from Station H4-WT3-P1, facing southeast (C .Martin, 8/8/12)

Photograph 13: H8-SC3 from Station H8-SC3-P1, facing east (C. Martin, 8/8/12)

Photograph 14: H8-SC1 from Station H8-SC1-P1, facing northeast (P. Werts, 5/23/12)

Photograph 15: H8-Create from Station H8-Create-P1, facing northeast (P. Werts, 5/23/12)

Photograph 16: H1-WT1 from Station H1-WT1-P1, facing north (C. Martin, 8/8/12)

Photograph 17: P2-TB1 looking upstream from Station P2-TB1-P1, facing southwest (C. Martin, 8/8/12)

Photograph 18: P2-TB1 looking downstream from Station P2-TB1-P1, facing northeast (C. Martin, 8/8/12)

Photograph 19: P2-TB1 looking upstream from Station P2-TB1-P2, facing southwest (P. Werts, 8/8/12)

Photograph 20: P2-TB1 looking upstream from Station P2-TB1-P3, facing southwest (P. Werts, 8/8/12)

Photograph 21: H11-WT2/3 from Station H11-WT2/3-P1, facing southwest (P. Werts, 8/8/12)

Photograph 22: H11-TB1 from Station H11-TB1-P1, facing northwest (P. Werts, 8/8/12)

Photograph 23: H11-Create from Station H11-Create-P1, facing northwest (P. Werts, 8/8/12)

Photograph 24: H11-Create from Station H11-Create-P2, facing southeast (P. Werts, 8/8/12)

Photograph 25: H11-TB2 from Station H11-TB2-P1 facing north (P. Werts, 8/8/12)

Photograph 26: H11-WT6 from Station H11-WT6-P1, facing northeast (P. Werts, 8/8/12)

Photograph 27: H12-TB1u from Station H12-TB1u-P1, facing south (P. Werts, 8/8/12)

Photograph 28: H13-TB1u from Station H13-TB1u-P1, facing north (P. Werts, 8/8/12)

Photograph 29: H13-TB2 from Station H13-TB2-P1, facing south (P. Werts, 8/8/12)

Photograph 30: H13-SC/TB3 from Station H13-SC/TB3-P1, facing north (P. Werts, 8/8/12)

Photograph 31: H13-WT1/a/b from Station H13-WT1/a/b-P1, facing north (P. Werts, 8/8/12)

Photograph 32: H13-WT2-from Station H13-WT2-P1, facing west (P. Werts, 8/8/12)

Photograph 33: H13-WT3 from Station H13-WT3-P1, facing southwest (P. Werts, 8/8/12)

Photograph 34: H14-WT1u from Station H14-WT1u-P1, facing southeast (P.Werts, 8/8/12)

Photograph 35: H14-SC1 from Station H14-SC1-P1, facing northwest (P. Werts, 8/8/12)

Photograph 36: H14-WT2/3 from Station H14-WT2/3-P1, facing southwest (P. Werts, 5/24/12)

Photograph 37: H14-WT1d from Station H14-WT1d-P1, facing southeast (P. Werts, 8/8/12)

Photograph 38: H15-TB1 from Station H15-TB1-P1, facing south (P. Werts, 8/8/12)

Photograph 39: H15-WT1 from Station H15-WT1-P1, facing south (P. Werts, 8/8/12)

Photograph 40: H13-TB1d from Station H15-TB1d-P1, facing north (P. Werts, 8/8/12)

Photograph 41: H12-TB1d from Station H12-TB1d-P1, facing south (P. Werts, 8/8/12)

Photograph 42: H16-Create from Station H16-Create-P1, facing southwest (P. Werts, 8/8/12)

Photograph 43: H16-Create from Station H16-Create-P2, facing northwest (P. Werts, 8/8/12)

Photograph 44: H16-SC1 from Station H16-SC1-P1, facing northwest (P. Werts, 8/8/12)

Environmental
Transportation
Land Development
Services

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Memorandum

To: Jay Peak Golf Course Restoration Project File

Date: October 29, 2012

Project No: 57276.03

From: Patti B. Kallfelz-Werts, VHB

Re: October 4, 2012 Golf Course Field Meeting with USACE

This memorandum has been prepared to summarize the site meeting with the U.S. Army Corps of Engineers (USACE) held on October 4, 2012 regarding the Jay Peak Golf Course Restoration and Mitigation. Because previous site visits and monitoring efforts, conducted in 2012, had shown that the majority of the restored and created wetlands and stream are stable, most of these features were reviewed briefly, and were not evaluated in depth. Only the features which had displayed areas of erosion earlier in the year were assessed thoroughly.

The meeting was held at the Jay Peak Resort (JPR) Golf Course, Jay, Vermont, and participants included: Martha Abair (USACE), Robert Moore (JPR), and Patti Kallfelz-Werts (VHB). The golf course restoration and mitigation was completed during the 2009 and 2010 construction seasons; seeding of these areas was completed as soon as final grading was finished, and planting of woody material occurred for all features in 2010. The Year One monitoring, conducted during the 2011 growing season, and subsequent data analysis found that the features were all meeting the performance criteria established in the two mitigation plans prepared for the golf course.

Overall, Marty was very pleased with the condition of all the restored/ created wetlands and streams. The majority of the features are continuing to develop and naturalize. Several features were found to need corrective actions, including four stream segments that were found to have areas of erosion which will require remediative action, the removal of Tropical Storm related debris, and one wetland requiring invasive species treatment:

P2-TB1 (Hole 1) - the segment between the golf cart bridge and the main Jay Peak Access Road, approximately 50 feet upstream of the cart path, contains three areas of bank erosion

(see Photographs 1 through 3 in Attachment). The proposed repair, which was discussed in the field, would occur in two parts. This fall, the large stones can be removed from the top "layers" of the grade control structures can be used to reinforce the eroded bank areas in order to prevent further erosion during high flow events next spring.

The remaining repairs would be done next spring, following high spring flows; these would consist of the following components:

- Use excess stone material to reinforce and build up the lower part of the bank failure(s); this should be well tamped into place to prevent future failures;
- The area behind and above this reinforced area can then be built up and filled in with landscaping bags filled with grubbing material/ grass plugs and seed;
- This can then be covered with heavy-duty coconut matting and stapled into place.

H4-WT1 – The small population of common reed (*Phragmites australis*) (Photograph 4) should have the heads cut off this fall to minimize the potential seed source. Follow-up treatment next spring should include cutting the stalks after they emerge, and treating the remaining cut ends with herbicide. (*Spraying occurred the week of September 2nd; the cutting took place the week of October 7th; follow up spraying is proposed for spring 2013*).

H8-TB2 – This stream was not part of the mitigation for the golf course (since it was originally bridged), but was included since it experienced a significant failure twice during 2012 (and it is located in the golf course) (Photographs 5 and 6). This stream will require major repair, as well as Section 404 Authorization since it was not part of the mitigation work. The repairs discussed in the field included the use of some of the rock found in the stream channel to reinforce the outside of the channel, which needs to be narrowed to what it was before the erosion occurred. Then the area would be backfilled with (landscaping) bags filled with grass plugs and seed (similar to the fixes used in other areas in 2011 and 2012), and covered with coconut fiber matting.

H14-WT1d – The drainage from stream H14-SC1 through the wetland has started a small head cut (ordinary high water width is approximately 12 inches, and the head cut is approximately 12 inches tall) upstream from Marty's bridge (Photograph 7). Because the vegetation is so thick in the wetland above and could stabilize the cut, this one will be watched to ensure that it does not continue to develop. If it appears to be "creeping backwards" a small grade control feature could be installed upstream of the cut, such as a small log weir, or a similar structure made of coir logs.

H16-SC1 – This small stream within the restored/created wetland has an area of erosion that has developed this Fall (Photograph 8). This area should be repaired using the methods that were used on this feature in 2011; including re-establishing the edge of the bank with (landscaping) bags filled with soil and seed; backfilling with grass plugs; and cover with coconut matting (securing with staples).

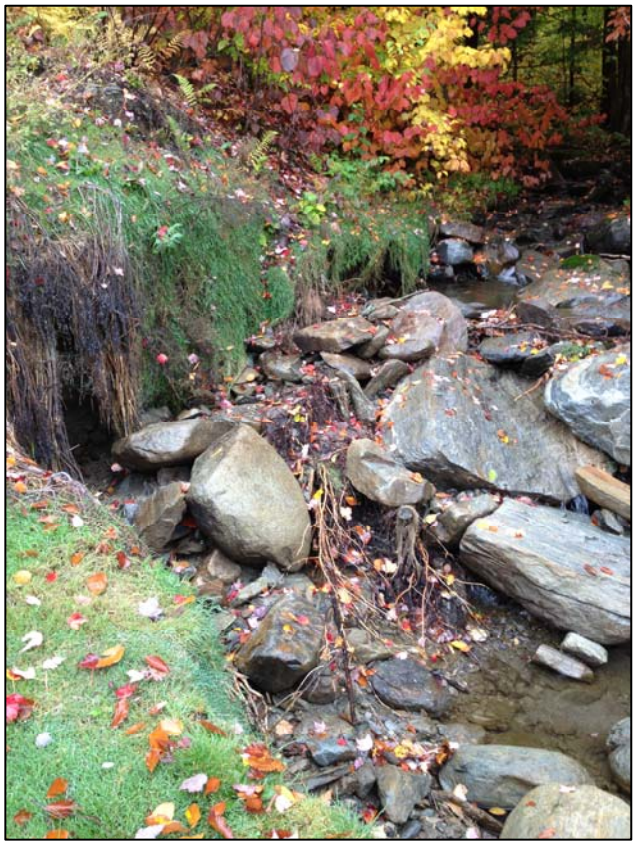
Jay Branch (Near Hole 10) – The large pipe that used to serve as the under the cart path (and utility access road), was washed downstream by the rains from Tropical Storm Irene and remains in the channel (Photograph 9). Marty requested the pipe be removed as soon as possible to prevent erosion which could occur due to altered flow paths around the pipe. (*Work scheduled for the week of October 28th).*

Photograph 1: P2-TB1 Upstream of cart path, main area of erosion (PBW, 10/4/12)

Photograph 2: P2-TB1, Upstream of cart path, two smaller areas of erosion (PBW, 10/4/12)

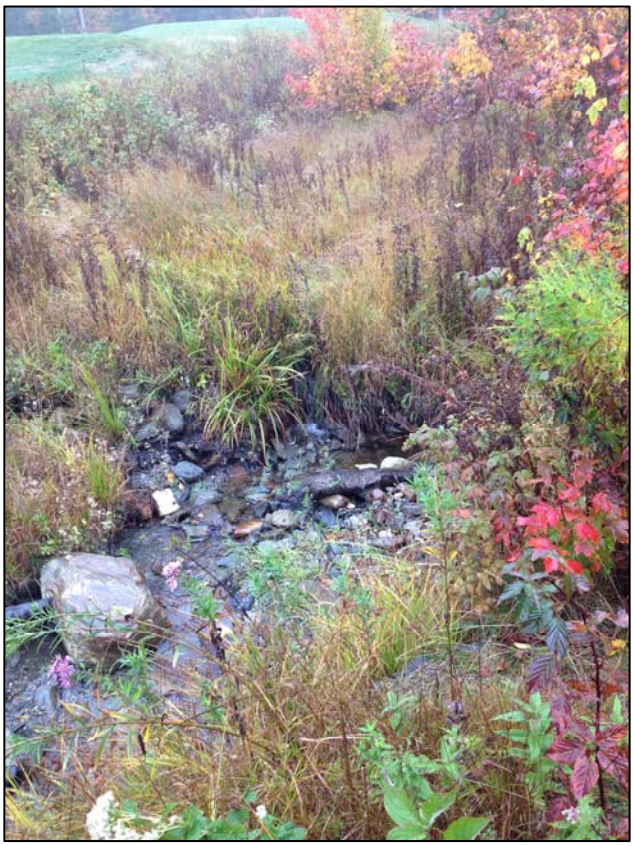
Photograph 3: P2-TB1, Upstream of cart path, front of two grade-control structures with excess material to be removed (PBW, 10/4/12)

Photograph 4: H4-WT1 small population of *Phragmites australis* in wetland (PBW, 5/23/12)



Photograph 5: H8-TB2, area of erosion US of cart path (PBW, 10/4/12)

Photograph 6: H8-TB2, area of erosion DS of cart path (PBW, 10/4/12)



Photograph 7: H14-WT1/SC1, small head cut forming (PBW, 10/4/12)

Photograph 8: H16-SC1, small area of erosion (PBW, 10/4/12)

Photograph 9: Former culvert under cart path near Hole 10, blown out by Tropical Storm Irene, remains in channel (PBW, 5/23/12)

APPENDIX E

MITIGATION REPORT
TRANSMITTAL AND SELF-CERTIFICATION

DEPARTMENT OF THE ARMY PERMIT NUMBER: NAE-2008-1314
PROJECT TITLE: Jay Peak Resort Golf Course

PERMITTEE:	
MAILING ADDRESS:	4850 VT Route 242 Jay, VT 05859
TELEPHONE:	802-988-2726
AUTHORIZED AGENT:	Vanasse Hangen Brustlin, Inc.
MAILING ADDRESS:	7056 US Route 7, P.O. Box 120 North Ferrisburgh, VT 05473
TELEPHONE:	802-497-6100

ATTACHED MITIGATION REPORT TITLE:	Jay Peak Resort Golf Course Mitigation - Second Annual (2012) Mitigation Monitoring Report
PREPARERS:	Vanasse Hangen Brustlin, Inc.
DATE:	January 11, 2013

CERTIFICATION OF COMPLIANCE: I certify that the attached report is accurate and discloses that the mitigation required by the Department of the Army Permit **[is]** **[is not]** in full compliance with the terms and conditions of that permit.

CORRECTIVE ACTION: A need for corrective action **[is]** **[is not]** identified in the attached report.

CONSULTATION: I **[do]** **[do not]** request consultation with the Corps of Engineers to discuss a corrective strategy or permit modification.

CERTIFIED: Howard Mosher 1-10-13
(Signature of permittee) Date