

Fitzgerald Environmental Associates, LLC.

Applied Watershed Science & Ecology

### Town of Richmond Phase I Stream Geomorphic Assessment Report

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Prepared for:

Chittenden County Regional Planning Commission South Burlington, Vermont

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### **1.0 Executive Summary**

This report summarizes data collected by Fitzgerald Environmental Associates, LLC. for three small tributary watersheds draining directly to the Winooski River in the Town of Richmond, Vermont. The watersheds have been named according to their proximity to Richmond Town roads, as follows: Governor Peck Road Tributary; Jericho Road Tributary; Stage Road Tributary. The watersheds have drainage areas of 2.6, 1.9 and 1.4 square miles, respectively. The three tributaries were identified for assessment by the Town of Richmond and the Chittenden County Regional Planning Commission, and the Phase 1 approach of the VTANR Stream Geomorphic Assessment (SGA) Protocol (VTDEC, 2006) was utilized for data collection and analysis.

The Governor Peck Road Tributary watershed contains a mix of agricultural, forested, and low to medium-density residential land use with a low degree of urbanization (3.7% impervious cover). The mainstem channel network is largely characterized by high-gradient reaches with gravel and cobble substrate found in unconfined valley settings. The primary stressors to geomorphic stability and habitat conditions in the watershed include: 1) historic impacts to the channel boundary conditions (e.g., straightening) in the lower watershed; 2) current impacts from encroachment of residential and commercial land uses on the stream corridor along Governor Peck Road; 3) undersized culverts associated with upper Governor Peck Road crossings. Based on the results of the Phase 1 analysis, a total of 7 reaches have been identified for future assessment using the SGA Phase 2 approach.

The Jericho Road Tributary watershed also contains a mix of agricultural, forested, and low to medium-density residential land use with a low degree of urbanization (2.8% impervious cover). The mainstem channel network is largely characterized by highgradient reaches with cobble substrate and steep valley side slopes. The primary stressors to geomorphic stability and habitat conditions in this tributary watershed include: 1) historic impacts to the channel boundary conditions (e.g., straightening) in the lower watershed; 2) aggradation of fine sediment in the middle reaches caused by road (and ATV trail) runoff, floodplain reduction along the Old Jericho Road Trail, and large-scale mass wasting. Based on the results of the Phase 1 analysis, a total of 6 reaches have been identified for future assessment using the SGA Phase 2 approach.

The Stage Road Tributary watershed contains a mix of forested and low-density residential land use with a very low degree of urbanization (1.7% impervious cover). The mainstem channel network is characterized by high-gradient reaches with cobble

substrate and steep valley side slopes, with the exception of two depositional reaches in the lower watershed. The primary stressors to geomorphic stability and habitat conditions in this tributary watershed are channelization, straightening and river corridor development in the lower watershed. Based on the results of the Phase 1 analysis, a total of 3 reaches have been identified for future assessment using the SGA Phase 2 approach.

Additional recommendations for data analysis beyond the SGA Phase 2 approach include the development of rainfall-runoff models for those reaches where culverts have been identified as problematic and potentially undersized. Little additional effort would be required to develop the data needed to run the rainfall-runoff models (much of the data has been generated through the Phase 1 analysis), and the resulting discharge data would provide a sound basis for prioritizing structures for replacement for the Town of Richmond. This approach is described in further detail in the conclusions in Section 7.0.

#### 2.0 Introduction:

The Town of Richmond and the Chittenden County Regional Planning Commission (CCRPC) identified three tributary watersheds within Richmond for assessment of fluvial geomorphic condition and erosion hazards. Fitzgerald Environmental Associates, LLC. (FEA) was retained by CCRPC to carry out a Phase 1 assessment following the Stream Geomorphic Assessment (SGA) Protocols developed by VTANR. The Phase 1 SGA approach utilizes the Stream Geomorphic Assessment Tool (SGAT), a GIS extension developed by VTANR for the collection of reach and watershed scale data. In addition to the GIS and remote sensing effort, a cursory field assessment ("windshield survey") is included for the verification of stream and valley forms, significant channel features and the location of man-made infrastructure. The Phase 1 SGA approach results in watershed-scale data about the landscape (e.g., soils and land cover) and the stream channel (e.g., slope and form), providing a basis for understanding the natural and human-impacted conditions within the watershed. The SGA data also aids in the identification of specific stressors affecting the physical conditions of the stream channels and structures (e.g., bridges and culverts). Included in the Phase 1 approach is a rigorous Quality Assurance Protocol carried out by VTANR staff to ensure the integrity of the final dataset.

Each of the three tributary watersheds has a drainage area less than 3 square miles and outlets directly to the Winooski River in Richmond. The tributary watersheds were previously unnamed, and were named during this analysis according to their proximity to Richmond Town roads. The SGA convention for reach numbering is consistent with that

used in the analysis of the Winooski mainstem, where the "R" refers to the Winooski River reach where each small tributary (S) enters. Separate summaries of the watershed data are provided below for the three tributaries. These summaries include descriptions of the watershed zones and specific reaches where land cover and soils characteristics indicate potential areas for channel adjustments and fluvial erosion hazards. Following these descriptions are recommendations for future monitoring and data collection that would aid in the identification of projects that that could protect, sustain, or restore fluvial geomorphic equilibrium conditions, through the implementation of either passive or active stream corridor management strategies.

Tables summarizing the data compiled through the Phase 1 analysis are found in Appendix B. These tables include summaries of the watershed land use and land cover (Table 1), the physical conditions and reference stream types in the watershed (Table 2), impact ratings and priorities for future assessment (Table 3), and predicted stream channel adjustment processes (Tables 4). The relative reach impact score within each watershed was evaluated to determine the priority for future Phase 2 assessment. Generally, reaches with higher impact scores received a higher priority ranking. However some reaches with low impact scores were considered high priorities for future assessment if they contain problematic stream crossings (e.g., culverts), or had channel adjustment processes observed during the windshield surveys that warrant further investigation. Data specific to each reach are summarized in the reach summary sheets in Appendix C. These data form the basis for the impact ratings and prioritization as described above.

#### **3.0** Governor Peck Road Tributary Watershed (R8.S1)

The Governor Peck Road Tributary watershed is found in the northwestern part of Richmond and extends into the town of Jericho in the vicinity of Browns Trace Road (see map in Appendix A). The watershed encompasses an area of 2.6 square miles, with 4.5 miles of stream channel along the mainstem from the headwaters to the outlet. The overall slope of the mainstem channel is 2.9%, reflecting the moderate to high-gradient nature of a majority of the reaches in the watershed. One additional subtributary draining a residential area along Sunset Ridge Road was included in the analysis (R8.S1.04-S1).

The land use within this tributary watershed is dominated by forested and agricultural areas, with a mix of low and medium-density residential and commercial land along Governor Peck Road. Currently the impervious cover of the watershed is 3.7%, below

levels (5-10%) associated with decline of channel stability and biotic integrity in small watersheds in Chittenden County (Fitzgerald, 2007).

The surficial geology of the watershed is dominated by lacustrine clays deposited during the early Holocene when Lake Vermont occupied much of the Champlain Valley and persisted at an elevation of 620 feet above sea level for approximately 4,000 years (Wright, 2003). Some areas of glacial till and alluvial substrates are also found in the headwaters zone and near the tributary outlet to the Winooski River, respectively. In the lower part of the watershed, the highly erosive properties of the soils have led to the development of steep valley side walls in two low-gradient reaches. These reaches are characterized by narrow, meandering gravel-bottomed channels found within unconfined valleys with recurring beaver ponding. In the middle and upper reaches of the watershed where glacial till is present and the channel slopes are greater, coarse-bottomed (e.g., gravel and cobble) channels are found in mostly confined valley settings.

Below are narrative descriptions of three zones of the Governor Peck Road Tributary watershed summarized during the Phase 1 analysis:

#### Upper Watershed Zone (R8.S1.06 through R8.S1.08)

The upper watershed zone of this tributary area above Browns Trace Road and south of Milo White Road is occupied by forested terrain that has been only minimally impacted by low-density residential development. Due to the steep topography of this watershed zone, B and C-type channels (Rosgen, 1994) are found where the valley setting is more confined and substrates are coarser. Due to the limited human impacts in this watershed zone, no reaches have been identified from the Phase 1 analysis as having a high priority for further assessment, but recommendations have been made for the Phase 2 assessment of two reaches with medium priority (see Section 6.0).

#### Middle Watershed Zone (R8.S1.03-R8.S1.05; R8.S1.04-S1)

The middle zone of the watershed is found along Governor Peck Road up to the crossing with Browns Trace Road. Throughout the middle zone of the watershed most of the mainstem reaches are characterized by coarse-bottomed channels with B and C-type geometry found in unconfined and semi-confined valley settings. The subtributary stemming from the fourth mainstem reach (R8.S1.04-S1) is found in very steep terrain (channel slopes greater than 5%) in a confined valley

setting. Impacts from road encroachment, two undersized culverts, and stormwater runoff concentrated by roadside ditches were observed along the Governor Peck Road during the windshield survey. Few impacts from the residential area associated with Sunset Ridge Road were noted. From the Phase 1 analysis, two reaches from this watershed zone have been identified as having high impact ratings and high priorities for further assessment.

• **R8.S1.03:** This mainstem reach is found to the east of Governor Peck Road upstream of an area of historic beaver activity. The reach is characterized by a moderate-gradient, gravel-bottomed channel with Ctype geometry. This reach has received a high impact rating due to the observed changes in planform (28% of the reach has been straightened), and the road encroachment which has led to a reduced floodplain and corridor. Some depositional features were observed during the field visit (Figure 1), indicating the potential for future lateral adjustments.



Figure 1. Depositional feature in reach R8.S1.03

• **R8.S1.05:** This mainstem reach is found along Governor Peck Road from the confluence with the subtributary upstream to where the channel bends to the east away from the road. The reach is characterized by a moderate-gradient, gravel-bottomed channel with C-type geometry. This reach has received a high impact rating due to the encroachments, stormwater

discharges, and undersized culverts associated with Governor Peck Road. Two culvert crossings appear to be inadequately sized, resulting in aggradation of sediment above the structure and scour below. One roadside drainage along Governor Peck Road enters main channel in upper reach and delivers significant amounts sediment to the downstream section. Numerous depositional features were observed during the field visit (Figure 2), indicating the potential for future lateral adjustments. Despite these impacts, numerous brook trout were observed in the reach in plunge pools (at the culvert outfalls) during August, indicating that reach provides important cold water refugia for trout in late summer.



Figure 2. Depositional features in reach R8.S1.05

Lower Watershed Zone (R8.S1.01 & R8.S1.02)

The lower watershed zone is found from the outlet to the Winooski River up to the reach break with R8.S1.03. In this watershed zone the channel slope lessens, maintaining a highly sinuous planform (in the absence of straightening) with Etype channel geometry. Although no beaver activity was observed during the windshield surveys in this watershed zone, a review of aerial photography from 1999 and 2003 suggests that beaver ponding occurs frequently in reach R8.S1.02. Impacts to channel stability were noted due to encroachment on the stream corridor by the road and adjacent commercial land uses, as well as historic straightening associated with the Verberg farm near the outlet. Numerous meander migrations in reach R8.S1.02 suggest that the channel is active in its lateral migration, perhaps in partial response to beaver influences. From the Phase 1 analysis, both reaches have been identified as having high impact ratings and high priorities for further assessment.

• **R8.S1.01:** This mainstem reach is found from the outlet to the Winooski River up to the reach break approximately 250 feet upstream of the I-89 culvert inlet. This reach has had severe historic impacts to the planform (44% of the channel has been straightened). In addition, a section of the reach in the vicinity of the I-89 crossing lacks a vegetative buffer greater than 25 feet, which likely elevates surface water temperatures during the summer months due to lack of canopy cover.



Figure 3. Stormwater outfall and lack of woody vegetative buffer in R8.S1.01

• **R8.S1.02:** This reach is found from the reach break with R8.S1.01 up to an area of historic beaver activity along Governor Peck Road. Although this reach has had limited direct impacts to the channel boundary conditions (channel straightening in 15% of reach), its changes in planform and abundant depositional features indicate that it is undergoing significant lateral migration. Additionally, the adjacent commercial and

delivery to the channel (Figure 4).

industrial land use in the lower reach is causing significant fine sediment

Figure 4. Suspended sediments in lower R8.S1.02 during baseflow conditions.

### 4.0 Jericho Road Tributary Watershed (R8.S2)

The Jericho Road Tributary watershed is also found in the northwestern part of Richmond (see map in Appendix A). The watershed encompasses an area of 1.9 square miles, with 2.7 miles of stream channel along the mainstem from the headwaters to the outlet. The overall slope of the mainstem channel is 5.4%, reflecting the high-gradient nature of a majority of the reaches in the watershed. Three additional small subtributaries stemming from the mainstem were included in the analysis.

The land use within this tributary watershed is dominated by forested and agricultural areas, with a mix of low and medium-density residential land along Jericho Road. Currently the impervious cover of the watershed is 2.8%, below levels (5-10%) associated with decline of channel stability and biotic integrity in small watersheds in Chittenden County (Fitzgerald, 2007).

The surficial geology of the watershed is very similar to that described for the Governor Peck Road tributary; it is dominated by lacustrine clays in the lower watershed with areas of glacial till and alluvial substrates found in the headwaters zone and near the tributary outlet to the Winooski River, respectively. With the exception of two reaches, much of the watershed is characterized by steep topography and sediment transport reaches with A and B-type geometry. The lowermost reach upstream of the outlet (R8.S2.01) is a low gradient, sand-bottomed channel with E-type geometry. Reach R8.S2.05, found just upstream of the Jericho Road crossing, is moderate-gradient, gravel-bottomed channel with C-type geometry.

Below are narrative descriptions of three zones of the Jericho Road Tributary watershed summarized during the Phase 1 analysis:

#### *Upper Watershed Zone (R8.S2.05, R8.S2.06, R8.S2.05-S1)*

The upper watershed zone of this tributary area above the Jericho Road crossing is occupied by forested terrain that has been only minimally impacted by lowdensity residential development. Due to the steep topography of this watershed zone, A-type channels are found where the valley setting is more confined and substrates are coarser. However, the reach immediately above the Jericho Road crossing (R8.S2.05) is found in an unconfined setting with C-type geometry. Due to the channel straightening associated with an adjacent pond, this reach has a medium priority and has been recommended for further assessment.

#### Middle Watershed Zone (R8.S2.02-R8.S2.04)

The middle zone of the watershed is found above the I-89 crossing up to the crossing with Jericho Road. Throughout this watershed zone the mainstem reaches are characterized by coarse-bottomed channels with A and B-type geometry found in confined valley settings. The two subtributaries stemming from the second (R8.S2.02.S1) and third mainstem (R8.S3.02.S1) reaches are found in very steep terrain (channel slopes greater than 5%) in confined valley settings. Sedimentation impacts from road and ATV trail encroachment (Figure 5) and failing valley side slopes were observed in this watershed zone during the windshield survey. Although no reaches have been identified as having high impact ratings, four reaches impacted by the stressors described above have a medium priority for further assessment, and are included in the list of recommended reaches for Phase 2 assessment in Section 6.0 of this report.



Figure 5. Deposition of fine sediments in R8.S2.02

### Lower Watershed Zone (R8.S2.01)

The lower watershed zone is encompassed by a single reach, R8.S2.01. This reach is found in the alluvial setting of the historic Winooski River floodplain where the mainstem channel slope mush less than upslope reaches (reach slope is 0.6%) and agriculture has impacted the channel planform and buffer conditions for over a century. This reach has been identified as having a high impact rating and a high priority for further assessment.



Figure 6. Coarse substrate downstream of Rt. 2 crossing in reach R8.S2.01

• **R8.S2.01:** This mainstem reach is found from the outlet to the Winooski River up to the reach break approximately 150 feet downstream of the I-89 culvert outlet. The channel is characterized by E-type geometry with sand substrates, with the exception of an area of coarse substrate downstream of the Route 2 crossing (Figure 6). This reach has had severe historic impacts to the planform (68% of the channel has been straightened). In addition, much of the reach lacks a vegetative buffer greater than 25 feet, which likely contributes to the direct input of sediment and nutrients from the adjacent agricultural fields, and also elevates surface water temperatures during the summer months due to lack of canopy cover.

### 5.0 Stage Road Tributary Watershed (R9.S2)

The Stage Road Tributary watershed is found in the eastern part of Richmond and extends into the town of Bolton east of Stage Road (see map in Appendix A). The watershed encompasses an area of 1.4 square miles, with 2.1 miles of stream channel along the mainstem from the headwaters to the outlet. The overall slope of the mainstem channel is 5.0%, reflecting the very high gradient of a majority of the reaches in the watershed. One additional subtributary draining a forested area to the east of Stage Road was included in the analysis (R9.S2.04-S1).

The land use within this tributary watershed is dominated by forested areas, with some agricultural land in the lower watershed along Route 2 and some low-density residential land along Stage Road. Currently the impervious cover of the watershed is 1.7%, well below levels (5-10%) associated with decline of channel stability and biotic integrity in small watersheds in Chittenden County (Fitzgerald, 2007).

The surficial geology of the watershed is very different from the two other tributaries to the west. With the exception of an area of alluvial soils associated with the historic Winooski River floodplain in the lower reaches, the watershed soils are dominated by glacial till and some areas of exposed bedrock where the terrain is very steep (slope greater than 15%). Upslope of the alluvial setting in the lower watershed, most reaches are characterized by coarse-bottomed (e.g., gravel and cobble) channels found in confined valley settings.

Below are narrative summaries of two zones of the Stage Road Tributary watershed summarized during the Phase 1 analysis:

#### Upper Watershed Zone (R9.S2.04 – R9.S2.07)

The upper watershed zone of this tributary along Stage Road is occupied by forested terrain that has been only minimally impacted by low-density residential development. Due to the steep topography of this zone, A and B-type channels are found where the valley setting is more confined and cobble, boulder, and bedrock substrates are present. Numerous grade controls were observed in reach R9.S2.04 during the field visit. One unconfined reach (R9.S2.06) with C-type geometry is found in the upper watershed to the west of Stage Road. Due to the limited human impacts in this watershed zone, and the absence of problematic stream crossings, no reaches have been identified from the Phase 1 analysis for further assessment.

#### Lower Watershed Zone (R9.S2.01-R9.S2.03)

The lower zone of the watershed is found from the tributary outlet to the Winooski River up to a change in valley slope at the reach break with R9.S2.04. The first (R9.S2.01) and third (R9.S2.03) reaches are similar in their confinement and stream type geometry. Both reaches are found in unconfined valley settings and have C-type geometry with coarse bed substrates. The second reach (R9.S2.02) has been severely altered by the I-89 culvert crossing, resulting in a straightened channel with a steep slope and confined valley setting. The channel impacts noted in this zone include channel straightening, encroachment from agricultural and residential land uses, and depositional features causing lateral channel migration. From Phase 1 analysis, all three reaches from this watershed zone have been identified as having high impact ratings and high priorities for further assessment.

• **R9.S2.01:** This reach is found from the tributary outlet up to a 90 degree bend in the channel at the upstream reach break. The reach is characterized by a low-gradient, sand and gravel-bottomed channel with C-type geometry. This reach has received a high impact rating due to the observed changes in planform (20% of the reach has been straightened), the encroachment on the corridor by adjacent agricultural and residential land, and the depositional features causing lateral channel migration. In addition, the channel was observed to be dry during the field visit in August, 2007 (Figure 7).



Figure 7. Dry channel below Rt. 2 box culvert in reach R9.S2.01

- **R9.S2.02:** This mainstem reach is found from the downstream reach break up to the I-89 culvert inlet. The reach is characterized by a high-gradient, cobble-bottomed channel with B-type geometry. This reach has received a high impact rating due to the impacts associated with the I89 culvert, which has straightened over 90% of the channel. Although a Phase 2 assessment of this reach is only appropriate for the unchannelized lower section, this part of the reach (found in a residential area) should be assessed to determine if fluvial erosion hazards exist downstream of the I-89 culvert outfall.
- **R9.S2.03:** This reach is found from the I-89 culvert inlet up to a change in valley slope and confinement at the upstream reach break. The reach is characterized by a low-gradient, gravel-bottomed channel with C-type geometry. This reach has received a high impact rating due to the observed changes in planform (40% of the reach has been straightened), the encroachment on the corridor by adjacent residential land, and the depositional features causing lateral channel migration.

### 6.0 Future Assessment Recommendations

Based on the results of the Phase 1 analysis, 15 tributary reaches and 1 subtributary reach have been selected for recommendation for further assessment (see priority rankings in Appendix B; Table 3) using the Phase 2 approach of the SGA protocols (including bridge and culvert assessments).

- **Governor Peck Road Tributary:** Seven reaches are recommended for further Phase 2 assessment in this watershed:
  - **Reaches R8.S1.01 to R8.S1.03 (high priority)** should be investigated in further detail to determine the impacts of historic straightening and a lack of vegetative buffer, and to evaluate the potential for stream corridor protection given the encroachment of agricultural, commercial, and residential land uses. This effort would also involve landowner outreach to assess the social constraints to stream restoration.
  - **Reach R8.S1.04 (medium priority)** should be assessed to determine the connectivity of adjustments along the channel network, as a high degree of lateral channel migration was observed in the upstream reach.
  - **Reach R8.S1.05 (high priority)** contains two culvert beneath Governor Peck Road which appear to be undersized. The culverts should be assessed to determine whether they are a priority for the replacement by the Town of Richmond. In addition, one problematic stormwater discharge was noted (previously described), and multiple depositional features were noted throughout the reach.
  - Reaches R8.S1.06 & R8.S1.07 (medium priority) are priority reaches for assessment due to the high degree of lateral migration observed in the downstream reach (R8.S1.05), and the possibility of these impacts being longitudinally-connected to reaches upstream. In addition, given that brook trout appear to be using this tributary as cold-water refugia in the summer months, assessment of habitat in the upper reaches is recommended.
- Jericho Road Tributary: Six reaches are recommended for further Phase 2 assessment in this watershed:
  - **Reach R8.S2.01 (high priority)** should be investigated in further detail to determine the impacts of historic straightening and a lack of vegetative buffer, and to evaluate the potential for stream corridor protection given the encroachment of agricultural and residential land uses. This effort

would also involve landowner outreach to assess the social constraints to stream restoration.

- **Reaches R8.S2.02 to R8.S2.04 (medium priority)** should be assessed to investigate the sedimentation impacts from road and ATV trail encroachment and failing valley side slopes that were observed during the windshield survey. In addition, the I-89 culvert should be evaluated for impediments to fish passage, given that no brook trout were observed in this tributary during August (unlike in the Governor Peck Road tributary).
- **R8.S2.05** (medium priority) should be assessed to evaluate the impacts of channel straightening resulting from the construction of a pond in the stream corridor. The straightening through this depositional reach may be resulting in additional sediment delivery to downstream reaches.
- **Reach R8.S2.02-S1.01 (medium priority)** is a small subtributary which drains a residential area along Southview Drive and Joan Ave. One headcut was noted in the channel just upstream of the confluence with reach R8.S2.02, and may be a source of fine sediment for the mainstem reaches.
- **Stage Road Tributary:** Three reaches are recommended for further Phase 2 assessment in this watershed:
  - **Reach R9.S2.01 & R9.S2.03 (high priority)** should both be investigated in further detail to determine the impacts of historic straightening and a lack of vegetative buffer, and to evaluate the potential for stream corridor protection given the encroachment of agricultural and residential land uses. This effort would also involve landowner outreach to assess the social constraints to stream restoration.
  - **Reaches R9.S2.02 (high priority)** should also be assessed to determine if fluvial erosion hazards exist downstream of the I-89 culvert outfall.

### 7.0 Conclusions

The Phase 1 approach for the Richmond tributary watersheds has provided initial data to describe the topographic, geologic and anthropogenic settings within the Town of Richmond. The overall conditions within the Governor Peck Road Tributary watershed vary significantly depending on the adjacent land use (historic and current) and the presence or absence of undersized culverts. Many reaches in this watershed are predicted to have significant channel adjustment processes with fair to poor geomorphic conditions. As a result, a total of 7 reaches have been recommended for future Phase 2 assessment.

The overall conditions within Jericho Road Tributary watershed also vary significantly depending on the adjacent land use, historic channel straightening, and impacts from residential land use. Two reaches in this watershed are predicted to have significant channel adjustment processes with fair geomorphic conditions, and a total of five reaches have been recommended for future Phase 2 assessment. The overall conditions within Stage Road Tributary watershed are impacted in the lower watershed by the encroachment of agricultural and residential land use on the stream corridor, and by historic channel straightening. Three reaches in this watershed are predicted to have significant channel adjustment processes with fair to poor geomorphic conditions, and are recommended for future Phase 2 assessment.

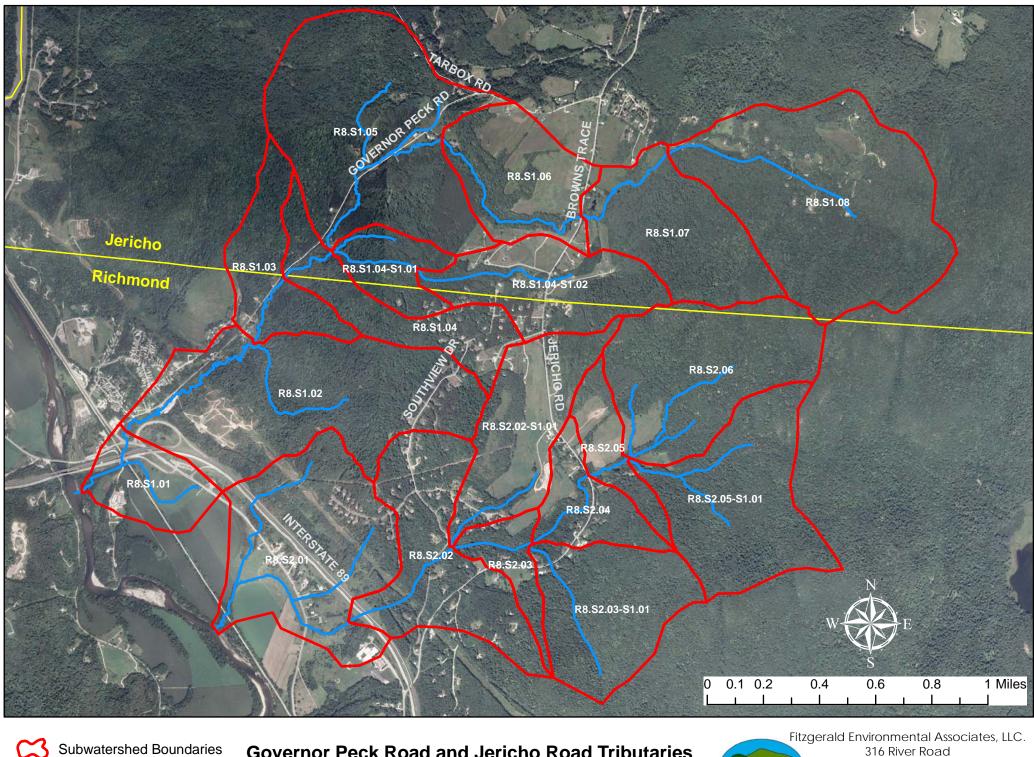
For the fifth mainstem reach in the Governor Peck Road Tributary (R8.S1.05), two undersized culverts appear to be dominant stressors on channel stability. Additional data describing the hydrologic regime (e.g., magnitude and frequency of discharge events) could be coupled with culvert survey data (ANR methods during Phase 2 assessment) to further evaluate and prioritize these structures. The Phase 1 data generated by this study provide a convenient basis for developing rainfall-runoff models (using the NRCS approach with the TR20 model) that can determine the peak flow rates through these structures during larger storm events. Much of the data required to develop these models is inherent in the Phase 1 results (including watershed areas, soils data, and land use), and little additional effort using GIS would be needed. It is recommended that discharge data for a spectrum of large storm events (10, 25 and 100 year return) be generated for these two stream crossings.

### 8.0 References

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# **APPENDIX** A

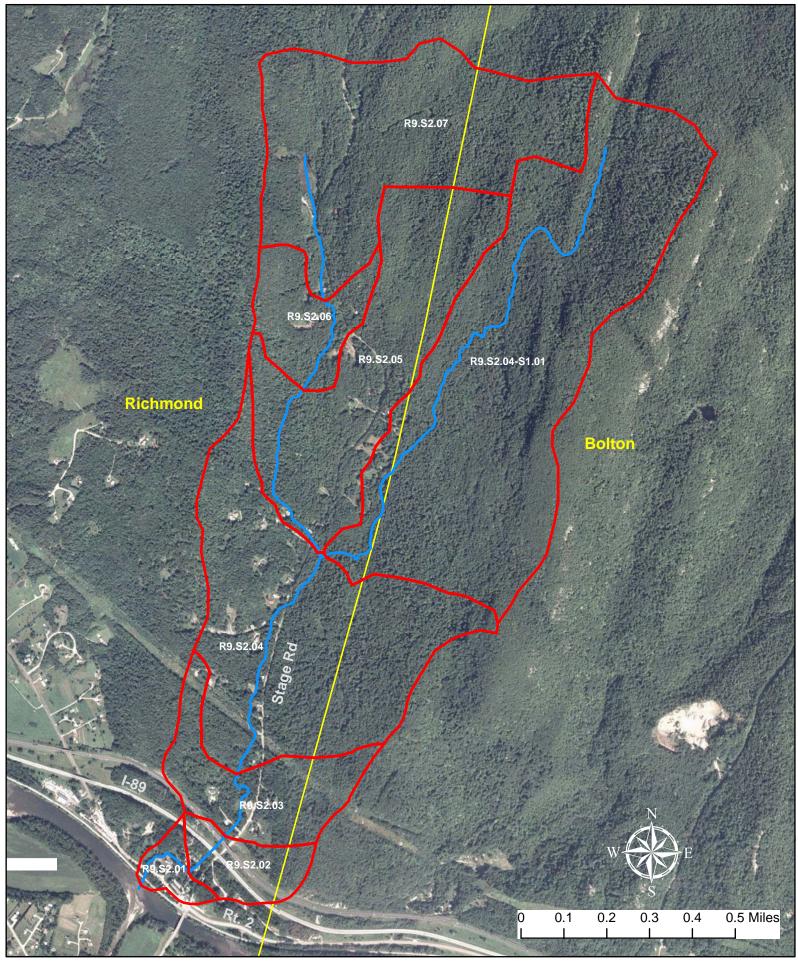
# SUBWATERSHED MAPPING



<sup>5</sup> Governor Peck Road and Jericho Road Tributaries Subwatershed Map

**~~~** Surface Waters

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Stage Road Tributary Subwatershed Map



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# **APPENDIX B**

# WATERSHED SUMMARY DATA

Land Cover Type*	Gov. Peck Rd. Tributary	Jericho Rd. Tributary	Stage Rd. Tributary
Forested	68.0%	64.3%	84.3%
Agriculture	17.8%	22.8%	5.1%
Residential	3.1%	2.2%	1.7%
Commercial	0.2%	0.4%	0.0%
Transportation	5.4%	4.2%	2.7%
Barren Land	1.0%	0.0%	0.0%
Water & Wetland	4.4%	6.1%	6.2%

Table 1. Land Cover for Richmond Tributaries

\* 2002 LandSat Data from UVM Spatial Analysis Lab (2005)

	Elev	ation	Valley	Valley	Channel	Channel		Watershed	Channel	Valley					
	Up	Down	Length	Slope	Length	Slope		Area	Width	Width	Confir	ement	Reference		Bed
Reach ID	(ft.)	(ft.)	(ft.)	(%)	(ft.)	(%)	Sinuosity	(sq. mi.)	(ft.)	(ft.)	Ratio	Type*	Stream Type	Bedform	Substrate
R8.S1.01	300	295	1515	0.33	1711	0.29	1.13	2.58	19.9	353	17.8	VB	E	Dune-Ripple	Sand
R8.S1.02	318	300	3024	0.60	4354	0.41	1.44	2.47	19.5	350	17.9	VB	E	Riffle-Pool	Gravel
R8.S1.03	338	318	1452	1.38	1556	1.29	1.07	2	17.8	282	15.9	VB	С	Riffle-Pool	Gravel
R8.S1.04	360	338	1071	2.05	1304	1.69	1.22	1.86	17.2	209	12.1	VB	С	Riffle-Pool	Gravel
R8.S1.04-S1.01	580	360	1712	12.85	1713	12.84	1	0.29	7.6	30	4	SC	А	Step-Pool	Cobble
R8.S1.04-S1.02	740	580	3125	5.12	3204	4.99	1.03	0.2	6.5	25	3.9	SC	А	Step-Pool	Cobble
R8.S1.05	485	360	3398	3.68	3928	3.18	1.16	1.42	15.3	259	17	VB	С	Riffle-Pool	Gravel
R8.S1.06	720	485	3516	6.68	3997	5.88	1.14	0.94	12.7	30	2.4	SC	В	Step-Pool	Cobble
R8.S1.07	760	720	2097	1.91	2555	1.57	1.22	0.75	11.5	358	31.1	VB	С	Riffle-Pool	Gravel
R8.S1.08	1120	760	3967	9.07	4061	8.86	1.02	0.51	9.8	30	3.1	SC	В	Step-Pool	Cobble
R8.S2.01	320	296	3340	0.72	4030	0.60	1.21	1.93	17.5	434	24.8	VB	E	Dune-Ripple	Sand
R8.S2.02	460	320	2525	5.54	2570	5.45	1.02	1.57	16	40	2.5	SC	В	Step-Pool	Cobble
R8.S2.02-S1.01	680	460	2235	9.84	2317	9.50	1.04	0.21	6.6	25	3.8	SC	А	Step-Pool	Cobble
R8.S2.03	560	460	1485	6.73	1540	6.49	1.04	1.09	13.6	30	2.2	SC	В	Step-Pool	Cobble
R8.S2.03-S1.01	810	560	2895	8.64	2941	8.50	1.02	0.23	6.9	25	3.6	SC	В	Step-Pool	Cobble
R8.S2.04	680	560	1889	6.35	2101	5.71	1.11	0.79	11.8	25	2.1	SC	В	Step-Pool	Cobble
R8.S2.05	695	680	844	1.78	912	1.64	1.08	0.69	11.1	244	22	VB	С	Riffle-Pool	Gravel
R8.S2.05-S1.01	900	695	2600	7.88	2639	7.77	1.02	0.29	7.6	40	5.2	NW	А	Step-Pool	Cobble
R8.S2.06	1060	695	2768	13.19	2953	12.36	1.07	0.32	7.9	30	3.8	SC	А	Step-Pool	Cobble
R9.S2.01	315	310	781	0.64	933	0.54	1.19	1.42	15.3	262	17.1	VB	С	Riffle-Pool	Gravel
R9.S2.02	355	315	635	6.30	636	6.29	1	1.4	15.2	35	2.3	SC	В	Step-Pool	Cobble
R9.S2.03	380	355	800	3.13	1046	2.39	1.31	1.37	15	299	19.9	VB	С	Riffle-Pool	Cobble
R9.S2.04	620	380	3072	7.81	3140	7.64	1.02	1.28	14.6	20	1.4	NC	А	Cascade	Bedrock
R9.S2.04-S1.01	1400	620	7444	10.48	7721	10.10	1.04	0.46	9.3	20	2.2	SC	В	Step-Pool	Cobble
R9.S2.05	860	620	2353	10.20	2366	10.14	1.01	0.53	9.9	15	1.5	NC	А	Step-Pool	Cobble
R9.S2.06	900	860	1138	3.51	1300	3.08	1.14	0.33	8	120	15	VB	С	Plane Bed	Cobble
R9.S2.07	1000	900	1800	5.56	1853	5.40	1.03	0.27	7.3	30	4.1	NW	В	Step-Pool	Cobble

Table 2. Richmond Tributaries Preliminary Stream Types (Step 2)

\* NW = Narrow; SC = Semi-confined; BD = Broad; VB = Very Broad

							Ste	o Numb	er <sup>†</sup> with	Impact	Score*						Total	Priority
Reach ID	4.1	4.2	4.3	5.1	5.2	5.3	5.4	5.5	6.1	6.2	6.3	6.4	6.5	6.6	7.2	7.3	Score	Ranking
R8.S1.01	2	2	0	0	1	0	2	0	0	0	1	0	2	2	0	1	13	High
R8.S1.02	2	2	1	0	0	0	1	0	2	1	2	2	0	0	0	2	15	High
R8.S1.03	2	2	0	0	0	0	2	0	1	0	1	0	1	1	0	0	10	High
R8.S1.04	2	2	0	0	0	0	0	0	1	0	0	0	2	1	0	0	8	Medium
R8.S1.04-S1.01	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	Low
R8.S1.04-S1.02	2	2	0	0	0	0	0	0	0	1	0	0	0	0	0	0	5	Low
R8.S1.05	2	2	1	0	0	0	1	0	1	0	2	1	2	2	1	2	17	High
R8.S1.06	2	2	0	0	0	0	1	0	0	1	0	0	0	0	0	0	6	Medium
R8.S1.07	2	1	0	0	0	0	0	0	0	0	0	0	1	1	0	0	5	Medium
R8.S1.08	2	2	0	0	0	0	0	0	0	1	0	0	0	0	0	0	5	Low
R8.S2.01	2	2	1	0	0	0	2	0	0	0	1	2	2	2	0	1	15	High
R8.S2.02	2	2	0	0	1	0	1	0	1	0	2	0	0	0	0	0	9	Medium
R8.S2.02-S1.01	2	2	0	0	1	0	0	0	0	0	0	0	0	0	0	0	5	Medium
R8.S2.03	1	2	0	0	0	0	0	0	2	0	0	0	0	0	0	0	5	Medium
R8.S2.03-S1.01	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	2	5	Low
R8.S2.04	1	2	0	0	0	0	1	0	2	0	1	0	0	0	0	0	7	Medium
R8.S2.05	0	1	0	0	0	0	2	0	0	0	1	0	2	2	0	1	9	Medium
R8.S2.05-S1.01	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Low
R8.S2.06	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	Low
R9.S2.01	2	2	2	0	1	0	2	0	0	0	2	2	2	2	0	0	17	High
R9.S2.02	2	2	0	0	2	0	2	0	0	2	0	2	0	0	0	1	13	High
R9.S2.03	2	2	1	0	1	0	2	0	0	0	1	1	2	2	0	0	14	High
R9.S2.04	1	2	0	0	1	0	0	0	0	1	0	0	0	0	0	0	5	Low
R9.S2.04-S1.01	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Low
R9.S2.05	2	2	0	0	0	0	0	0	0	1	0	0	0	0	0	0	5	Low
R9.S2.06	1	2	0	0	0	0	0	0	0	0	0	0	1	2	0	0	6	Low
R9.S2.07	1	2	1	0	0	0	0	0	1	0	0	0	0	0	0	0	5	Low

Table 3. Richmond Tributaries Impact Ratings (Step 8)

\* 0 = Not Significant or No Data; 1 = Low; 2 = High

† Step 4: Land Cover and Reach Hydrology

Step 5: Channel Modifications

Step 6: Floodplain Modifications and Planform Changes

Step 7: Bed and Bank Condition

	Reach ID         Degradation         Agg           R8.S1.01         7           R8.S1.02         5           R8.S1.03         5           R8.S1.04         4           R8.S1.04-S1.01         4           R8.S1.04-S1.02         4           R8.S1.04-S1.02         4           R8.S1.04-S1.02         4           R8.S1.05         5           R8.S1.06         5           R8.S1.07         4           R8.S1.08         4           R8.S2.01         6           R8.S2.02         6           R8.S2.03         4		tment Score	S	9.2 Reach	Condition	9.3 Reach
Reach ID	Degradation	Aggradation	Widening	Planform	Project*	Statewide*	Sensitivity
R8.S1.01	7	6	5	7	Fair	Good	High
R8.S1.02	5	9	7	7	Fair	Good	High
R8.S1.03	5	6	5	6	Fair	Good	High
R8.S1.04	4	4	2	0	Good	Reference	High
R8.S1.04-S1.01	4	3	2	0	Good	Reference	High
R8.S1.04-S1.02	4	4	2	0	Good	Reference	Moderate
R8.S1.05	5	9	7	5	Fair	Good	High
R8.S1.06	5	6	5	2	Fair	Good	Moderate
R8.S1.07	4	3	2	0	Good	Reference	High
R8.S1.08	4	4	2	0	Good	Reference	Moderate
R8.S2.01	6	7	5	8	Fair	Good	High
R8.S2.02	6	6	7	3	Fair	Good	Moderate
R8.S2.02-S1.01	5	6	5	0	Fair	Good	High
R8.S2.03	4	3	0	0	Good	Reference	Moderate
R8.S2.03-S1.01	2	5	2	0	Good	Reference	High
R8.S2.04	5	5	3	1	Good	Good	Moderate
R8.S2.05	4	1	0	2	Good	Reference	High
R8.S2.05-S1.01	2	0	0	0	Reference	Reference	High
R8.S2.06	2	2	0	0	Reference	Reference	High
R9.S2.01	7	8	9	11	Poor	Fair	High
R9.S2.02	10	8	5	0	Fair	Good	High
R9.S2.03	7	7	5	7	Fair	Good	Moderate
R9.S2.04	3	3	0	0	Reference	Reference	Very Low
R9.S2.04-S1.01	2	0	0	0	Reference	Reference	High
R9.S2.05	4	4	2	0	Good	Reference	High
R9.S2.06	4	3	0	0	Good	Reference	Moderate
R9.S2.07	2	4	0	0	Reference	Reference	Moderate

 Table 4. Richmond Tributaries Predicted Channel Adjustment Processes (Step 9)

\* Conditions relative to the Pond Brook watershed ("project") versus overall Vermont ("statewide")

Note: **Bold** values indicate the dominant adjustment processes (when moderate to severe; value > 5)

# **APPENDIX C**

# PHASE 1 REACH REPORTS

	••••								iidot						<b>J</b>	oper
Basin	:			W	inoos	ki										
Strear	m Nam	ne:		G	overn	or Peo	k Rd	Tribu	tary		Rea	ach	R8.S	51.01		
Topo	Maps:			E	SSEX	JUNC	TION		-							
•	Last E			т	hu. Se	ptem	oer 27	2007	7							
Water					/inoos	-		, _ • • • •								
	vatersh	ned:					-	untin	igton R	iver to	o mou	ıth				
			undma					unun	igton i							
15 1.60	ach an	impot	unume		0											
	1. Rea															
	Reach		iption:				ence v	vith tl	he Win	ooski	River	to rea	ch bre	eak w	here	
	owns:				Richmo	ond		~	4 m			Deed		I		
	Downst				44.42				tep 4. L			React	n Hyar	ology		
	Downst 2. Stre			uue	·7 J.UZ				4.1 Wa		-					
	Elevatio		<u>.</u>	r f	300				Historio					Crop	<b>C</b> 4	• • • •
	Elevatio				295				Curren Curren						-	.0 %
	s Grad				No				4.2 Col		Domin	iant La			IDall	
	alley L				1515 fe		<b>0.29</b> N	/liles	Historia			r٠	<i>,</i>	Crop		
	/alley \$				0.33	%									17	<b>.0</b> %
	hanne				1711 f 0.29	eet. %	0.32	/IIIes.	Currer Curren	t Sub-	Domir	anu C	ind Co	ver F	۰+ ield	.0 /0
	Channe Sinuosi		<i>ю</i> с.		0.29 1.13	70			4.3 Rip							ht Banl
	Vaters		rea:		3	Sc	uare I		Domina		Janoi			-100	51-	
	Channe						feet.		Sub-do		nt:		-	6-50	26-	
							feet.		-				-		0	
					-							•				
						Broad								ations	-	
2.10 Confinement Ratio:04.4 Ground Water Inputs:Abundant2.10 Confinement Type:Very BroadStep 5. Instream Channel Modifications2.11 Reference Stream Type:Dune-Ripple5.1 Flow Regulation - (old):Type:None																
2.10 Confinement Type: Very Broad 2.11 Reference Stream Type: E Step 5. Instream Channel Modifications 5.1 Flow Regulation - (old):																
	ed Mat				Sand				5.2 Brid	laes a	nd Cu	lverts:	3		16	%
Step 3			acteris	stics:	ound				5.3 Bar	0			Ŭ		0.0	/0
	Alluvial				Nor	ne			5.4 Cha		-		: <b>93</b>	8	54 %	6
	Grade (		ol:		Nor				5.5 Dre		-	-	No	ne		
3.3 E	Domina	ant Ge	ologic	Mat.:	Allu	vial	89	<b>0</b> %S	tep 6. F	Floodp	lain M	odifica	tions			
3.3 5	Sub-do	minan	t Geol	ogical	Mat.:	Ice-	Conta	ct	6.1 Ber	ms an	d Roa	ds	One S	Side	Both S	Sides
	.eft Va	,			01				Road:				0.0	ft.	0.0	ft.
	Right V	alley S	Side		Stee	-	. <u>Stoo</u>	-	Railroa	id:			0.0		0.0	ft.
3.5 5		~		_		-	/ Stee		Berm:		4 la .		0.0		0.0	ft.
-	drologi	c Grou	ıp:	E			7 <b>9.0</b> %	-	Improv Berms			(old)	0.0 0.0		0.0 0.0	ft.
	oding:						7 <b>0.0</b> %		6.2 Flo						0.0	
	ter Tal ter Tal		•		.0 .0		′9.0 % ′0.0 %	,	6.3 Cha					d-cha		
	dibility		allow.	4	.0		<b>0.0</b> %	•	6.4 Me			ion:				
	-						/	J	6.5 Me	ander	Width:			<b>19.9</b> F	Ratio:	1.0
7.4 (	Comme	ents:							6.6 Wa					19.9 F	Ratio:	1.0
								S	tep 7. \	Vindsh	nield S	urvey				
									7.2 Bar					0.00		
									7.2 Bar	•	0			0.00 ft		
									7.3 lce/	Debris	s Jam	Potent	ial: C	ulvert		
		• -						-								
4.1	4.2	4.3	5.1	5.2	5.3	5.4	5.5	6.1	6.2	6.3	6.4	6.5	6.6	7.2	7.3	Total
0	2	_	0	4	_	0	0	_	0	_	_	2	2	_	0	
2	2	0	0	1	0	2	0	0	0	0	0	2	2	0	0	11
High	High	N.S.	N.S.	Low	N.S.	High	N.S.	N.S.	N.S.	N.S.	N.S.	High	High	N.S.	N.S.	

									iiuot		1.00		Gam		<b>,</b>	cpoi
Basin				W	inoos	ki										
Stream	m Nam	ne:		G	overn	or Peo	k Rd	Tribu	tary		Re	ach	R8.5	\$1.02		
	Maps:	-			SSEX				,							
•	Last E						ber 27	2007	7							
Water		uncu.			inoos	-		, 2001								
		a di					-		aton D	iver 1		-4 6				
	vatersh						er H	untin	gton R	iver to	o mou	ith				
Is Rea	ach an	Ιmpoι	undme	ent? No	0											
Step	1. Rea	ch Loo	cation													
	Reach			Р	aralle	ls Gov	vernor	· Pecl	k Highv	way fo	r abo	ut 400	0 feet.			
	owns:				lichmo				5							
1.3 E	Downst	tream	Latitud	de: 4	44.43			S	tep 4. L	and C	over -	Reac	h Hydr	ology		
				ude: -	73.01				4.1 Wa	tershe	d					
	2. Stre		<u>.                                    </u>						Historia			r:	F	Field		
	Elevatio				318				Curren				over: F	orest	64	.0 %
	Elevatio				300				Curren	t Sub-	Domir	nant La	and Co	ver: U	rban	
	s Grad				No			A*1	4.2 Coi	rridor						
	/alley L	•			<b>3024</b> fe	eet. %	<b>0.57</b> N	/IIIes.	Historio	c Land	l Cove	r:	F	ield		
	/alley \$ Channe				<b>0.60</b> 4354 fe		0 83 1	liloc	Currer				-		38	<b>.0</b> %
	Channe				•334 n 0.41	εει. %	0.02	mes.	Curren	t Sub-	Domir	ant La	and Co	ver: F		
	Sinuosi				1.44	/0			4.3 Rip							ht Bank
	Vaters		rea:		2	Sc	uare I		Domina					00	>10	•
2.8 0	Channe	el Widt	th:				feet.		Sub-do	ominar	nt:			25	51-	-
	/alley \				350		feet.		Length					0	0	
	Confir				0	_			4.4 Gro			•		bunda		
	Confir				Very	Broad			tep 5. I					ations		
			stream	Type:		Deal			5.1 Flov	w Reg	ulatior					
	edform				Riffle	-P001			Type:			Nor	ne			
	ub-clas		be:		•				Use:				•			0/
	ed Mat				Grave	) )			5.2 Brid	0			2			%
Step 3			acteris	stics:					5.3 Bar		0			· <b>·</b> ·	0.0	,
	Alluvial				Nor				5.4 Cha		<u> </u>		,		15 %	0
	Grade (				Nor	-			5.5 Dre tep 6. F			•	No	ne		
	Domina				Allu									<b>2</b> :40	Dath	
				ogical	Mat.:	G	lacial		6.1 Ber	ms an	a Roa	us	One S		Both S	
	.eft Va Right V				Extr	emelv	/ Stee	0	Road: Railroa	d.			951 0.0		0.0	ft.
3.5 5	•	alley	Side			/ Stee		-	Berm:	iu.			0.0		0.0 0.0	ft. ft.
	drologi	Grou	ın.	С	-		30.0 %		Improv	ed Pa	th·		0.0		0.0	ft.
-	oding:		ιp.		reque	-	30.0 %	-	Berms			(old):		<b>3.8</b> ft.		11.
	ter Tal	hle De	en.		.5		<b>80.0</b> %		6.2 Flo						21 %	
	iter Tal		•		.0		<b>80.0</b> %	,	6.3 Cha	-		•		ultiple		
	dibility				ligh -		<b>3.0</b> %		6.4 Mea	ander	Migrat	ion:	Ne	ck Cu	Itoff	
	-			-		I		5	6.5 Mea	ander	Width:	:	1	20.0 F	Ratio:	6.2
7.4 (	Comme	ents:							6.6 Wa					<b>20.0</b> F	Ratio:	11.3
								S	tep 7. V	Vinds	nield S	urvey				
									7.2 Bar	nk Eros	sion:			54.42	ft.	
									7.2 Bar	nk Heig	ght:		4	3.00 ft	-	
									7.3 Ice/			Potent	tial: C	ulvert		
														1		
4.1	4.2	4.3	5.1	5.2	5.3	5.4	5.5	6.1	6.2	6.3	6.4	6.5	6.6	7.2	7.3	Total
				-					-							
2	2	0	0	0	0	2	0	1	0	0	0	0	0	0	0	7
High	High	N.S.	N.S.	N.S.	N.S.	High	N.S.	Low	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	
									1			1	1	1	1	

								iidov				Guili		<b>,</b>	oport
Basin:			W	linoos	ki										
Stream	Name <sup>.</sup>		G	overn	or Peo	ck Rd	Tribu	tarv		Re	ach	R8.5	\$1.03		
Торо М				SSEX				<b>J</b>			aon		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		
•	ast Edited	4.				oer 27	2007	,							
		J.			-		, 2007								
Watersh				linoos 		-									
	tershed:				ki Riv	er H	untin	gton F	liver to	o mou	ith				
ls Reac	h an Imp	oundm	ent? N	0											
Step 1.	Reach L	ocatior	า												
	each Des		-	Paralle	ls Gov	vernor	Pecl	k High	wav fo	r abo	ut 150	0 feet.			
1.2 To				Richmo					<b>,</b>				-		
	wnstrear	n Latitu	ide: 4	44.43			S	tep 4. l	_and C	over -	Reac	h Hydr	ology		
	wnstrear		itude: -	73.00				4.1 Wa	tershe	d		-			
	Stream							Histori			r:	F	ield		
	evation U			338				Curren				over: F	orest	63	.0 %
-	evation D			318				Curren	t Sub-	Domir	nant La	and Co	ver: U	rban	
	Gradient			No		0 20 4	/ilee	4.2 Co	rridor						
	Iley Leng Illey Slop			1452 fe 1.38		0.28	mes.	Histori	c Land	l Cove	r:	F	ield		
	annel Le			1.30 1556 f	eet	0.29	liles	Currer	nt Dom	inant	land C	over: L	Jrban	52	2.0 %
	annel Sl				%			Curren	t Sub-	Domir	nant La	and Co	ver: F	orest	
	nuosity:			1.07				4.3 Rip	arian E	Buffer		Le	ft Ban	k Rig	ht Bank
2.7 Wa	atershed			2	Sc	quare I	Miles	Domin	ant:				00	26-	
	annel W					feet.		Sub-do			a = 4		one	51-'	100
	lley Widt			282		feet.		Length				-		0	
	onfinem				Drood			4.4 Gro			•		bunda		
	confineme eference			Very C	broau			tep 5. I					ations	-	
	lform:	Silear	птуре.	Riffle	-Pool			5.1 Flo	w кед	ulatior					
	-class SI	one.		T T T T T	1 001			Type: Use:			Nor	ie			
	Material	•		Grave	2			5.2 Brid	haes a	nd Cu	lverts:	0		0	%
	Basin Ch		istics:	Glave	<i>•</i> I			5.3 Bar	0			U		0.0	70
	uvial Far		0000	Nor	0			5.4 Cha		•		a: <b>43</b>	7	28 %	6
	ade Cont			Nor				5.5 Dre				, No		_• /	•
	ominant (		c Mat ·	Allu		69.		tep 6. F	0 0			-			
	b-domina					lacial		6.1 Ber				One S	Side	Both S	Sides
	ft Valley		regioai	main				Road:	ine an	u rtou	u c	236		0.0	ft.
	ght Valle			-	/ Stee	-		Railroa	ad:			0.0		0.0	ft.
3.5 So				Very	/ Stee	р		Berm:				0.0		0.0	ft.
Hydro	ologic Gr	oup:	C	;	e	<b>59.0</b> %		Improv				0.0	ft.	0.0	ft.
Flood	•	-	F	reque	nt 6	<b>69.0</b> %		Berms				0.0		0.0	
Wate	r Table [	Deep:	1	.5	6	<b>69.0</b> %		6.2 Flo			elopme			15 %	
Wate	er Table S	Shallow		.0		<b>3.0</b> %	)	6.3 Cha			lione	Sic	ae		
Erodi	ibility:		F	ligh -	2	29.0 %	,	6.4 Me		-			00 0 5		A E
7.4 Co	omments	:						6.5 Me 6.6 Wa			•		80.0 F		4.5
-	-							o.o vva tep 7. \			Urvev	2	<b>50.0</b> F	vallo:	14.1
											ui vey		0.00	£1	
								7.2 Bar 7.2 Bar					0.00 <sup>-</sup> 0.00 ft		
								7.3 Ice/	•	0	Datant				
								1.5 168	אומשים	Jaili	FULCEI	uai. <b>IN</b>	UIR		
4.1 4	1.2 4.3	3 5.1	5.2	5.3	5.4	5.5	6.1	6.2	6.3	6.4	6.5	6.6	7.2	7.3	Total
4	T.Z 4.	J J.I	0.2	0.0	0.4	0.0	0.1	0.2	0.5	0.4	0.0	0.0	1.2	1.5	
2	2 0	0	0	0	2	0	1	0	0	0	1	1	0	0	9
							-	_							
High   F	High N.ទ	5. N.S	. N.S.	N.S.	High	N.S.	Low	N.S.	N.S.	N.S.	Low	Low	N.S.	N.S.	
								1							

									nast	· ·	I CC		Juin	mai	y i v	cpoi
Basin:				W	'inoos	ki										
Stream	n Nam	e:		G	overn	or Peo	ck Rd	Tribut	tary		Re	ach	R8.5	51.04		
				E	SSEX	JUNC	TION,	RICH	MOND	)						
Date L	•	dited:					ber 27									
Waters					inoos	•		,								
Sub-wa		ed:					-	untin	gton R	liver to	o mou	ıth				
Is Read			Indme				•	<b>G</b>	gronn		•					
				, III; IN,	•											
Step 1				_									<b>.</b>			
1.1 Re		Descri	ption:						k Highv	way to	or abo	ut 130	0 feet.	•		
1.2 To		room	Latituo		44.43	), RICI	hmono		tep 4. L	and C	over -	Read	h Hydr	voloav		
				ude: -	-				4.1 Wa			Ttouoi	i i iyui	ology		
Step 2									<i>+. i vva</i> Historio		••	r	F	Field		
2.1 EI	levatic	on Ups	stream	: 3	360				Curren				-		62	0 %
			wnstre		338				Curren						-	• 70
			entle?		No	t	0.00.		4.2 Col			•				
2.2 Va 2.3 Va					1071 fe 2.05		<b>0.20</b> N	/IIIes.	Historio	c Land	l Cove	r:	F	Field		
2.3 va 2.4.Cł					2.05 1304 f		0.25		Currer				over: <b>F</b>	orest	43	.0 %
2.4.01 2.5 Cl						%	0.20		Curren	t Sub-	Domir	nant La	and Co	over: U	rban	-
2.6 Si					1.22			4	4.3 Rip	arian I	Buffer		Le	ft Ban	k Rig	ht Ban
2.7 W					2				Domina					100	>10	-
2.8 Cl			:h:		200		feet.		Sub-do			05 ft		one	51-	00
2.9 Va			t Ratio		209 0		feet.		Length 4.4 Gro				-	one	0	
			t Type		Very	Broad			tep 5. I			•				
				Type:					5.1 Flo						-	
Bee	dform				Riffle	-Pool			Type:			Nor				
	b-clas	•	e:						Úse:							
	d Mate				Grave	el			5.2 Brid	•			0			%
Step 3.			acteris	stics:					5.3 Bar		-		•	-	0.0	
3.1 Al					Nor				5.4 Cha		•				0.0	
3.2 G				Mat .	Nor	-	oko 10		5.5 Dre tep 6. F	0 0			No	ne		
			ologic	ogical		Jai Lo	are iu		6.1 Ber				One S	Sido	Both S	Sidos
3.4 Le				ogical	iviat				Road:	1115 011	u Rua	us	119		<b>0.0</b>	ft.
3.4 Ri					Very	y Stee	p		Railroa	nd:			0.0		0.0	ft.
3.5 Sa	-	,			Very	/ Stee	p		Berm:				0.0		0.0	ft.
Hydr	rologic	: Grou	ıp:	D	)	9	98.0 %		Improv				0.0		0.0	ft.
	ding:			N	lone/F		100. %	, <i>(</i>	Berms				0.0		0.0	
	er Tab				.0		<b>73.0</b> %	, ,	6.2 Flo 6.3 Cha	•		elopme		ot Eval	9 % Juatod	ł
			allow:		.0 		<b>73.0</b> %	· ·	5.4 Me			tion:			lualeu	
	dibility			F	ligh -	į	99.0 %	J	6.5 Me		•			<b>50.0</b> F	Ratio <sup>.</sup>	2.9
7.4 C	omme	ents:							5.6 Wa			-		25.0 F		7.3
									tep 7. \			Survey		-		
									7.2 Bar	nk Ero	sion:			0.00	ft.	
								7	7.2 Bar	nk Heig	ght:		(	0.00 ft		
									7.3 Ice/	Debris	s Jam	Potent	ial: N	one		
4.1	4.2	4.3	5.1	5.2	5.3	5.4	5.5	6.1	6.2	6.3	6.4	6.5	6.6	7.2	7.3	Total
2	2	0	0	0	0	0	0	0	0	0	0	2	1	0	0	7
	۷	U										<b>∠</b>				'
High	High	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	High	Low	N.S.	N.S.	
	-															

Basin:	Winoos	ki										
Stream Name:	Sunset		Rd Ti	ibuta	arv		Re	ach	R8 9	\$1.04·	.S1 0	1
Topo Maps:	RICHM	•		ibutt	i y		IXC.		1.0.0		01.0	•
Date Last Edited:	Thu, Se		her 27	2007	7							
Watershed:	Winoos	•		2001								
Sub-watershed:	Winoos		-	untin	aton P	ivor t	0 mou	ith				
			ег п	unun		iver u	omou	i un				
Is Reach an Impoundme												
Step 1. Reach Location		_								_		
1.1 Reach Description:			ading	east	off the	left ba	ank of	<b>R8.S</b> 1	1.04 to	ward	Hidde	en
1.2 Towns: 1.3 Downstream Latitud	Jerich e: 44.43	0		S	tep 4. L	and C	`over -	Read	h Hydr	ology		
1.3 Downstream Longitu	<b>.</b>				4.1 Wa			Neac	ii i iyui	ology		
Step 2. Stream Type					4. / vva Historio			r.		ield		
2.1 Elevation Upstream:	580				Curren						44	.0 %
2.1 Elevation Downstrea					Curren				-			
2.1 Is Gradient Gentle?	No				4.2 Col							
2.2 Valley Length:	1712 f 12.85		0.32 \	mes.	Historie	c Land	Cove	r:	F	orest		
2.3 Valley Slope: 2.4.Channel Length:	1713		0.32	/iles	Currer	nt Dom	inant	land C	over: F	orest	49	.0 %
2.5 Channel Slope:	12.84			/1100.	Curren	t Sub-	Domir	ant La	and Co	ver: U	rban	
2.6 Sinuosity:	1.00				4.3 Rip		Buffer		Le	ft Ban	k Rig	ht Bank
2.7 Watershed Area:	0				Domina					00	>10	-
2.8 Channel Width:	4.4		feet.		Sub-do			25 ft		one	Nor	ne
2.9 Valley Width: 2.10 Confinement Ratio	14 : 0		feet.		Length 4.4 Gro				-	inima	0	
2.10 Confinement Type:		wlv C	onfine		tep 5. I			•				
2.11 Reference Stream		<b>,</b> -			5.1 Flo						-	
Bedform:	Step-	Pool			Type:			Nor				
Sub-class Slope:					Úse:							
Bed Material:	Cobb	le			5.2 Brid	•		lverts:	1			%
Step 3. Basin Characteris					5.3 Bar		-		•		0.0	
3.1 Alluvial Fan:	No				5.4 Cha		•		-		0.0	
3.2 Grade Control:	Not Cla		aka E2		5.5 Dre tep 6. F	0 0			No	ne		
<ul><li>3.3 Dominant Geologic</li><li>3.3 Sub-dominant Geologic</li></ul>			Conta		6.1 Ber				One S	Sido	Both S	Sidos
3.4 Left Valley Side	gical Mat	100	Conta		Road:	1115 011	u Rua	us	0.0		<b>0.0</b>	ft.
3.4 Right Valley Side	Ext	remely	y Steej		Railroa	ad:			0.0		0.0	ft.
3.5 Soils	Ext	remely	y Stee	o	Berm:				0.0		0.0	ft.
Hydrologic Group:	Α	4	46.0 %	D	Improv				0.0		0.0	ft.
Flooding:	None/I		1 <b>00.</b> %		Berms				0.0		0.0	
Water Table Deep:	6.0		78.0 %	,	6.2 Flo 6.3 Cha	•		siopme		ot Eval	0.0 Juated	
Water Table Shallow:	6.0 Lliab		78.0 %	)	6.4 Me			ion:			luaicu	
Erodibility:	High -	3	95.0 %	,	6.5 Me		•			F	Ratio:	0.0
7.4 Comments:					6.6 Wa	veleng	gth:				Ratio:	0.0
				S	tep 7. \	Nindsh	hield S	urvey				
					7.2 Bar	nk Ero	sion:			0.00	ft.	
					7.2 Bar		0			0.00 ft		
					7.3 lce/	/Debris	s Jam	Potent	tial: N	one		
				0.4	0.0	0.0	0.4	0.5	0.0	7.0	7.0	Tatal
4.1 4.2 4.3 5.1	5.2 5.3	5.4	5.5	6.1	6.2	6.3	6.4	6.5	6.6	7.2	7.3	Total
2 1 0 0	0 0	0	0	0	0	0	0	0	0	0	0	3
High Low N.S. N.S.	N.S. N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	

										<b>,</b>	oport			
Basin:	Winooski													
Stream Name:	Sunset Ridg	e Rd Ti	ributa	ry		Rea	ach	R8.S	51.04·	-S1.0	2			
Topo Maps:	RICHMOND			-										
Date Last Edited:	Thu, Septem	ber 27	, 2007											
Watershed:	Winooski Riv													
Sub-watershed:	Winooski Riv	/er H	untin	qton R	iver to	o mou	th							
Is Reach an Impoundment				J										
· ·														
Step 1. Reach Location														
1.1 Reach Description:	North of Hic Jericho	Iden Pi	nes C	sircle e	nding	east	of Jer	ICHO R	load.					
1.2 Towns: 1.3 Downstream Latitude:			St	tep 4. L	and C	over -	Read	h Hvdr	voloav					
1.3 Downstream Longitud				4.1 Wa			Ttouoi	i i i yui	ology					
Step 2. Stream Type				<i>+. i vva</i> Historio		-	r.	C	Crop					
2.1 Elevation Upstream:	740			Curren						57	.0 %			
2.1 Elevation Downstream				Curren				-						
2.1 Is Gradient Gentle?	No 2425 feet	0 50 1	2	4.2 Coi			•		-					
2.2 Valley Length:	<b>3125</b> feet. <b>5.12</b> %	<b>0.59</b> N	/illes.	Historio	c Land	Cove	r:	F	orest					
2.3 Valley Slope: 2.4.Channel Length:	<b>3204</b> feet.	0.61		Currer				over: <b>l</b>	Jrban	72	.0 %			
2.5 Channel Slope:	<b>4.99</b> %			Curren	t Sub-	Domin	ant La	and Co	ver: F	orest				
2.6 Sinuosity:	1.03			4.3 Rip		Buffer		Le	ft Ban	k Rig	ht Bank			
2.7 Watershed Area:	0 S	quare I							00	>10				
2.8 Channel Width:	<b>0</b> 5	feet.		Sub-do			05 ft		6-50	26-	50			
2.9 Valley Width: 2.10 Confinement Ratio:	25 0	feet.		Length 4.4 Gro				-	one	0				
	•	ined					•							
				•										
2.10 Confinement Type:Semi-confined2.11 Reference Stream Type:BBedform:Step-PoolStep-PoolType:None														
2.11 Reference Stream Type: B5.1 Flow Regulation - (old):Bedform:Step-PoolType:Sub-class Slope:a														
Bed Material:	Cobble						verts:	1			%			
Step 3. Basin Characteristic				5.3 Bar				•	_	0.0				
3.1 Alluvial Fan:	None			5.4 Cha		0		•		0.0				
3.2 Grade Control:	None at.: Ice-Conta	nat 00		5.5 Dre				No	ne					
3.3 Dominant Geologic M		Till		6.1 Ber				One S	Cido	Both S	Cidoc			
3.3 Sub-dominant Geolog 3.4 Left Valley Side				Road:	1115 di I	u Rua	us	0.0		<b>0.0</b>	sides ft.			
3.4 Right Valley Side	Very Stee	эр		Railroa	id:			0.0		0.0	ft.			
3.5 Soils	Very Stee	ep		Berm:				0.0		0.0	ft.			
Hydrologic Group:	Α	53.0 %	-	Improv				0.0		0.0	ft.			
Flooding:	None/Rare	100. %		Berms				56		17 %				
Water Table Deep:		<b>63.0</b> %	, ,	6.2 Flo			elopme			0.0				
Water Table Shallow:		<b>63.0</b> %	) (	5.3 Cha 5.4 Mea			ion	INC	one					
Erodibility:	High -	94.0 %	0	6.5 Me		•			F	Ratio:	0.0			
7.4 Comments:				5.6 Wa						Ratio:	0.0			
				tep 7. V			urvey							
				7.2 Bar					0.00	ft.				
				7.2 Bar				(	0.00 ft					
			7	7.3 lce/	Debris	s Jam	Potent	ial: <b>C</b>	ulvert					
4.1 4.2 4.3 5.1 5	5.2 5.3 5.4	5.5	6.1	6.2	6.3	6.4	6.5	6.6	7.2	7.3	Total			
2 2 0 0	0 0 0	0	0	1	0	0	0	0	0	0	5			
High High N.S. N.S. N	I.S. N.S. N.S.	N.S.	N.S.	Low	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.				

Stream Name:       Governor Peck Rd Tributary       Reach       R8.S1.05         Topo Maps:       RICHMOND         Date Last Edited:       Thu, September 27, 2007         Watershed:       Winooski River         Sub-watershed:       Winooski River - Huntington River to mouth         Is Reach an Impoundment?       No         Step 1. Reach Location       Parallels Governor Peck Highway for approximately 3000 feet         1.1 Reach Description:       Parallels Governor Peck Highway for approximately 3000 feet         1.2 Towns:       Jericho         1.3 Downstream Latitude:       44.43         Step 2. Stream Type       Historic Land Cover:         2.1 Elevation Dystream:       860         2.1 Elevation Dystream:       360         2.1 Is Gradient Gentle?       No         2.3 Valley Slope:       3.68 %         2.4 Channel Length:       3928 feet.         3.928 feet.       0.74 Miles.         2.7 Watershed Area:       1< Square Miles Dominant:         2.6 Sinuosity:       1.16         4.3 Riparian Buffer       Left Bank Right Bar         2.7 Watershed Area:       1< Square Miles Dominant:         2.6 Ordinement Ratio:       0         3.6 Gravel       5.2 Bridges and Culverts:	Desia								-							<b>,</b>	
Topo Maps:         RICHMOND           Date Last Edited:         Thu, September 27, 2007           Watershed:         Winooski River Huntington River to mouth           Is Reach an Impoundment?         No           Step 1. Reach Location         11.1 Reach Description:           1.1 Reach Description:         Parallels Governor Peck Highway for approximately 3000 feet           1.2 Towns:         Jericho           3.3 Downstream Latitude:         44.43           Step 2. Stream Type         44.43           2.1 Elevation Upstream:         46.5           2.1 Elevation Downstream:         360           2.1 Elevation Downstream:         360           2.1 Elevation Downstream:         360           2.2 Valley Length:         3928 feet.           3.8 B         %           2.4 Channel Length:         3928 feet.           2.5 Channel Stope:         3.8 %           2.6 Channel Nicht:         259 feet.           2.7 Watershed Area:         1           2.8 Sinuosity:         1.16           2.9 Valley Width:         259 feet.           2.9 Valley Width:         259 feet.           2.9 Valley Width:         259 feet.           2.9 Valley Width:         259 Singe Singes and Culverts:         3<	Basin:								Tu:L	tori		Π-	<b>.</b>		A 05		
Date Last Edited:       Thu, September 27, 2007         Watershed:       Winooski River         Sub-watershed:       Winooski River - Huntington River to mouth         Is Reach an Impoundment?       No         Step 1. Reach Location       Parallels Governor Peck Highway for approximately 3000 feet         1.1 Reach Description:       Parallels Governor Peck Highway for approximately 3000 feet         2.1 Stream Type       Parallels Governor Peck Highway for approximately 3000 feet         3.1 Downstream Longitude:       44.43       Step 4. Land Cover - Reach Hydrology         3.1 Downstream Longitude:       74.00       4.1 Watershed         2.1 Elevation Dupstream:       360       Current Dominant land Cover: Forest       68.0 %         2.1 Stradient Gentle?       3388 feet.       0.64 Miles.       Historic Land Cover: Crop       2.50 > 100         2.4 Channel Length:       3228 feet.       0.74 Miles.       Current Dominant Land Cover: Urban       35.0 %         2.6 Sinuceity:       1.16       Square Miles Dominant:       >100       >100         2.8 Channel Slope:       3.18 %       Current Sub-Cominant:       >26.0 > 100       >100         2.9 Orofinement Ratio:       0       4.4 Ground Water Inputs.       Abundant         2.10 Confinement Ratio:       4.4 Ground Water Inputs.       Abu			-					ж ка	Iribu	tary		Rea	acn	K8.3	51.05		
Watershed:         Winooski River           Sub-watershed:         Winooski River Huntington River to mouth           Is Reach an Impoundment?         No           Step 1. Reach Location         1.1 Reach Description:         Parallels Governor Peck Highway for approximately 3000 feet Jericho           1.1 Reach Description:         Parallels Governor Peck Highway for approximately 3000 feet Jericho         Step 1. Reach Location           1.3 Downstream Latitude:         44.43         Step 4. Land Cover - Reach Hydrology           2.1 Bievation Downstream:         865         Current Sub-Dominant Land Cover: Forest         68.0 %           2.1 Elevation Downstream:         308 feet.         0.64 Miles.         Current Sub-Dominant Land Cover: Forest         63.0 %           2.1 Stream Hength:         3298 feet.         0.64 Miles.         Current Sub-Dominant Land Cover: Forest         63.0 %           2.4 Channel Length:         3298 feet.         0.74 Miles         Current Sub-Dominant Land Cover: Forest         63.0 %           2.6 Sinuosity:         1.16         4.3 Riparina Buffer         100 5100         52.9           2.0 Confinement Type:         Very Broad         Step 5. Instream Channel Modifications         5.1 Flow Regulation - (old):           Bed Material:         Gravel         5.2 Bridges and Culverts:         3         3         % <td>•</td> <td>•</td> <td></td> <td></td> <td></td> <td>-</td> <td>_</td> <td></td> <td></td> <td>_</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>	•	•				-	_			_							
Sub-watershed:         Wincoski River - Huntington River to mouth           Is Reach an Impoundment?         No           Step 1. Reach Location         Parallels Governor Peck Highway for approximately 3000 feet           1.1 Reach Description:         Parallels Governor Peck Highway for approximately 3000 feet           1.3 Downstream Latitude:         44.3         Step 4. Land Cover - Reach Hydrology           1.3 Downstream Latitude:         44.43         Step 4. Land Cover:         Field           2.1 Elevation Upstream:         485         Current Sub-Dominant Land Cover: Urban         50.0 %           2.1 Stradient Gentle?         308 feet         0.64 Miles.         Current Sub-Dominant Land Cover:         Crop           2.3 Valley Stope:         3.18         %         Current Dominant Iand Cover:         Crop           2.4 Channel Length:         32928 feet.         0.74 Miles.         Current Dominant Iand Cover:         Crop           2.6 Shunosity:         1.16         4.3 Riparian Buffer         Left Bank Right Bar           2.9 Valley Width:         259         feet.         Sub-dominant         26-50         0.252           2.10 Confinement Type:         Gravel         5.2 Bridges and Culverts:         3         3 %         Step 5. Instream Channel Modifications           3.1 Allwvial Fan:         None <td></td> <td></td> <td>dited:</td> <td></td> <td></td> <td>-</td> <td>•</td> <td></td> <td>2007</td> <td>7</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>			dited:			-	•		2007	7							
Is Reach an Impoundment?         No           Step 1. Reach Location         Parallels Governor Peck Highway for approximately 3000 feet Jericho           1.1 Reach Description:         Jericho           1.3 Downstream Longitude:         44.43           Step 2. Stream Type         4.1 Watershed           2.1 Elevation Upstream:         465           2.1 Elevation Downstream:         360           2.1 Stream Type         0.64 Miles.           2.1 Stream Internation Upstream:         360           2.2 Valley Length:         339 feet.           2.3 Valley Length:         398 feet.           2.4 Channel Length:         392 feet.           2.5 Stream Type:         1.16           2.4 Channel Length:         392 feet.           2.6 Sinuosity:         1.16           2.7 Watershed Area:         1           2.9 Valley Width:         259 feet.           2.9 Valley Width:         259 feet.           2.10 Confinement Type:         Very Broad           Step 3. Basin Characteristics:         3.3 Basin Characteristics:           3.1 Alluvial Fan:         None           3.2 Grade Control:         None           3.3 Dominant Geologic Mat:         Alluvial           A1.4 Waters hed Material:         Steep <td>Water</td> <td>shed:</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>-</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>	Water	shed:						-									
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	Sub-w	atersh	ned:		W	inoos	ki Riv	er H	untin	gton R	liver to	o mou	ith				
1.1         Reach Description: 1.2 Towns:         Parallels Governor Peck Highway for approximately 3000 feet 1.2 Towns:           1.3         Downstream Latitude:         44.43         Step 4. Land Cover - Reach Hydrology           1.3         Downstream Longitude:         73.00         4.1 Watershed           Step 2. Stream Type         455         Current Dominant Land Cover: Forest         68.0 %           2.1         Elevation Downstream:         360         Current Dominant Land Cover: Forest         68.0 %           2.3         Valley Slope:         3.68 %         0.64 Miles.         Current Dominant Land Cover: Forest         68.0 %           2.4         Achannel Length:         3928 feet.         0.74 Miles.         Current Dominant Land Cover: Forest         63.0 %           2.6         Sinuosity:         1.16         4.3 Riparian Buffer         Left Bank Right Bar         7100         >100         >100           2.8         Channel Width:         1         Square Miles         Dominant:         2-100         >100         529         feet.         Sub-dominant:         2-100         Sub-dominant:         Sub-domi	Is Rea	ach an	Ιmpoι	undme	ent? No	0											
1.1         Reach Description: 1.2 Towns:         Parallels Governor Peck Highway for approximately 3000 feet 1.2 Towns:           1.3         Downstream Latitude:         44.43         Step 4. Land Cover - Reach Hydrology           1.3         Downstream Longitude:         73.00         4.1 Watershed           Step 2. Stream Type         455         Current Dominant Land Cover: Forest         68.0 %           2.1         Elevation Downstream:         360         Current Dominant Land Cover: Forest         68.0 %           2.3         Valley Slope:         3.68 %         0.64 Miles.         Current Dominant Land Cover: Forest         68.0 %           2.4         Achannel Length:         3928 feet.         0.74 Miles.         Current Dominant Land Cover: Forest         63.0 %           2.6         Sinuosity:         1.16         4.3 Riparian Buffer         Left Bank Right Bar         7100         >100         >100           2.8         Channel Width:         1         Square Miles         Dominant:         2-100         >100         529         feet.         Sub-dominant:         2-100         Sub-dominant:         Sub-domi	Step '	1. Rea	ch Loo	cation													
1.2 Towns:       Jericho       Step 4. Land Cover - Reach Hydrology         1.3 Downstream Latinguide:       -73.00       4.1 Watershed         Step 2. Stream Type       Historic Land Cover:       Field         2.1 Elevation Dusnstream:       465       Current Dominant Land Cover:       Field         2.1 Elevation Downstream:       360       Current Sub-Dominant Land Cover:       Orepst         2.2 Valley Length:       398 feet.       0.64 Miles.       Current Dominant Land Cover:       Oropst         2.3 Valley Slope:       3.68 %       -       Current Dominant Land Cover:       Oropst       Step 4. Land Cover:       Cropst         2.4 Channel Length:       3928 feet.       0.64 Miles.       Current Dominant Land Cover:       Oropst       -       100       >100       >100       >100       >100       >20       >100       >100       >20       >20       Current Sub-Dominant Land Cover:       Field       -       <	1.1 F	Reach	Descri	iption:	Р	aralle	ls Gov	vernor	Pecl	k Highv	way fo	r app	roxima	ately 3	8000 fe	eet	
1.3 Downstream Longitude:       -73.00       4.1 Watershed         Step 2. Stream Type       485       Field         2.1 Elevation Downstream:       360       Current Dominant Land Cover:       Field         2.1 stegration Upstream:       398 feet.       0.64 Miles.       Current Sub-Dominant Land Cover:       Crop         2.2 Valley Length:       3928 feet.       0.64 Miles.       Current Dominant Land Cover:       Crop         2.3 Valley Stope:       3.68 %       0.74 Miles.       Current Dominant Land Cover:       Crop         2.4 Channel Length:       32928 feet.       0.74 Miles.       Current Dominant Land Cover:       Crops         2.4 Channel Kate:       1       Square Miles       Dominant:       >100       >100         2.8 Channel Width:       259       feet.       Sub-dominant:       >100       >20       >100       52         2.10 Confinement Ratio:       0       4.4 Ground Water Inputs:       Abundant       Step 5. Instream Channel Modifications       5.1 Flow Regulation - (old):         Bedform:       Riffle-Pool       Type:       None       5.2 Bridges and Culverts:       3       3 %         3.1 Alluvial Fan:       None       5.4 Channel Straightening:       308.1       7 %         3.2 Grade Control:       None/				•	J	ericho				•	•	••		•			
Step 2. Stream Type         Historic Land Cover:         Field           2.1 Elevation Upstream:         485         Current Dominant Land Cover:         Forest         68.0 %           2.1 Is Gradient Gentle?         3398 feet.         0.64 Miles.         Current Sub-Dominant Land Cover:         Orops           2.3 Valley Slope:         3.68 %         0.74 Miles.         Current Sub-Dominant Land Cover:         Crops           2.4 Channel Length:         3928 feet.         0.74 Miles.         Current Dominant Land Cover:         Forest           2.6 Sinuosity:         1.16         4.3 Riparian Buffer         Left Bank Right Bar         26.50         0.25           2.9 Valley Width:         259 feet.         0.44 Miles.         Sub-dominant:         26.50         0.25           2.10 Confinement Type:         Very Broad         Step 5. Instream Channel Modifications         2.11 Reference Stream Type:         Very Broad         Step 5. Instream Channel Modifications           3.11 Reference Stream Type:         Kiffle-Pool         Type:         None         5.4 Channel Straightening:         3.0.0           3.2 Grade Control:         Step 5. Siles and Culverts:         3.3 Bank Armoring:         0.0         1.0.0         ft.0.0         ft.0.0           3.4 Left Valley Side         Step         Step 6. Floodplain Modifications <td></td> <td></td> <td></td> <td></td> <td></td> <td>-</td> <td></td> <td></td> <td>S</td> <td>tep 4. L</td> <td>_and C</td> <td>over -</td> <td>Reac</td> <td>h Hydr</td> <td>ology</td> <td></td> <td></td>						-			S	tep 4. L	_and C	over -	Reac	h Hydr	ology		
2.1 Elevation Upstream:       485       Current Dominant land Cover: Forest       68.0 %         2.1 Elevation Downstream:       360       Current Dominant land Cover: Urban       42.0 Corridor         2.2 Valley Length:       3398 feet.       0.64 Miles.       Current Sub-Dominant land Cover: Urban       35.0 %         2.3 Valley Slope:       3.18 %       Current Sub-Dominant land Cover: Urban       35.0 %         2.4 Channel Length:       3928 feet.       0.74 Miles.       Current Sub-Dominant Land Cover: Urban       35.0 %         2.6 Sinuosity:       1.16 d       4.3 Riparian Buffer       Left Bank Right Bar       7.00 > 100         2.8 Channel Width:       259       feet.       Sub-dominant:       26.50 0-25       9.210         2.9 Valley Width:       259       feet.       Length w/less than 25 ft.:       100 529       9.100       5.1 Flow Regulation - (old):         Bedform:       Riffle-Pool       Type:       None       5.1 Flow Regulation - (old):       5.1 Flow Regulation - (old):         Bed Material:       Gravel       5.2 Bridges and Culverts:       3 %       3 %         3.1 Alluvial Fan:       None       5.4 Channel Straightening:       30.0       7%         3.2 Grade Control:       None       5.4 Channel Straightening:       30.0       6.1 Berms and Road					ude: -	73.00				4.1 Wa	tershe	d					
2.1 Elevation Downstream:       360       Current Sub-Dominant Land Cover: Urban       300         2.1 Is Gradient Gentle?       3398 feet.       0.64 Miles.       4.2 Corridor         2.2 Valley Length:       3398 feet.       0.74 Miles.       Current Dominant Land Cover: Urban       35.0 %         2.4 Channel Length:       3298 feet.       0.74 Miles.       Current Dominant       Current Dominant       35.0 %         2.5 Channel Length:       3298 feet.       0.74 Miles.       Current Dominant       26.50       0-25         2.6 Valley Width:       1       Square Miles Dominant:       >100       >100       529         2.9 Valley Width:       259       feet.       Length Wiless than 25 ft.:       100       529         2.10 Confinement Type:       Very Broad       Step 5. Instream Channel Modifications       5.1 Flow Regulation - (old):       Type:       None         Sub-class Slope:       b       Use:       5.2 Bridges and Culverts:       3       3 %         3.11 Reference Stream Type:       None       5.4 Channel Straightening:       308.1       7 %         3.2 Grade Control:       None       5.4 Channel Straightening:       303.1       7 %         3.2 Grade Control:       None/Rare       58.0 %       6.1 Berms and Roads (old):       0.0 ft				<u>.                                    </u>													
2.1 Is Gradient Gentle?       No       Current Sub-Dominant Land Cover: Orbital         2.2 Valley Length:       3398 feet.       0.64 Miles.         2.3 Valley Slope:       3.68 %         2.4 Channel Length:       3928 feet.       0.74 Miles.         2.5 Channel Slope:       3.18 %       Current Sub-Dominant Land Cover: Urban       35.0 %         2.6 Sinuosity:       1.16       4.3 Riparian Buffer       Left Bank Right Bar         2.7 Watershed Area:       1       Square Miles Dominant:       >100       >100         2.8 Channel Width:       259       feet.       Length w/ less than 25 ft.:       100       >100         2.9 Valley Width:       259       feet.       Length w/ less than 25 ft.:       100       529         2.11 Reference Stream Type: C       Riffle-Pool       Type:       None       5.1 Flow Regulation - (old):         Bedform:       Gravel       5.2 Bridges and Culverts:       3       3       %         3.1 Alluvial Fan:       None       5.4 Channel Straightening:       308.1       7%         3.3 Sub-dominant Geological Mat:       Alluvial       6.1 Berms and Roads (old):       0.0       ft 0.0       ft 0.0         3.4 Left Valley Side       Steep       Steep       Steep       Stolds       35.1 </td <td></td> <td>-</td> <td></td> <td></td> <td>.0 %</td>														-			.0 %
2.2 Valley Length:       3398 feet.       0.64 Miles.       Historical and Cover:       Crop         2.3 Valley Slope:       3.68 %       Current Dominant Land Cover:       Crop         2.4. Channel Length:       3928 feet.       0.74 Miles.       Current Dominant Land Cover:       Forest         2.6 Sinuosity:       1.16       4.3 Riparian Buffer       Left Bank Right Bar         2.7 Watershed Area:       1       Square Miles       Dominant:       >100       >100         2.8 Valley Width:       259       feet.       Sub-dominant:       26-50       0-25         2.10 Confinement Ratio:       0       4.4 Ground Water Inputs:       Abundant         2.10 Confinement Type:       Very Broad       Step 5. Instream Channel Modifications         3.11 Reference Stream Type:       Very Broad       Step 5. Instream Channel Modifications         3.11 Reference Stream Type:       Very Broad       Step 5.1 Barteam Channel Straightening:       30.81       7 %         3.2 Grade Control:       None       5.4 Channel Straightening:       30.81       7 %         3.2 Grade Control:       None       5.4 Channel Straightening:       30.81       7 %         3.3 bu-dominant Geological Mat:       Alluvial       6.1 Berms and Roads       On ft. 0.0       ft. 0.0												Domir	nant La	and Co	over: U	rban	
2.3 Valley Slope:       3.68 %       Historic Land Cover:       Crop         2.4.Channel Length:       3928 feet.       0.74 Miles.       Current Dominant Land Cover:       Urban       35.0 %         2.5 Channel Slope:       31.8 %       Current Sub-Dominant Land Cover:       Forest       4.3 Riparian Buffer       Left Bank Right Bar         2.7 Watershed Area:       1       Square Miles       Dominant:       >100       >100         2.8 Channel Width:       26-50       0-25       0-25       0-25       0       26-50       0-25         2.9 Valley Width:       259       feet.       Length w/ less than 25 ft.:       100       529         2.10 Confinement Ratio:       0       4.4 Ground Water Inputs:       Abundant       26-50       0-25         2.11 Reference Stream Type:       Very Broad       Step 5. Instream Channel Modifications       Step 5.1 Flow Regulation - (old):       Type:       None         Step 3. Basin Characteristics:       5.1 Flow Regulation - (old):       Type:       None       5.4 Channel Straightening:       30.1       7%         3.3 Sub-dominant Geologica Mat:       Glacial Lake 55.0% Step 6. Floodplain Modifications       3.1       1.6       0.0       ft.       0.0       ft.       0.0       ft. 0.0       ft <t< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td>٥ct</td><td>0 64 1</td><td>lilos</td><td>4.2 Cor</td><td>rridor</td><td></td><td></td><td></td><td></td><td></td><td></td></t<>							٥ct	0 64 1	lilos	4.2 Cor	rridor						
2.4. Channel Length:       3928 feet.       0.74 Miles.       Current Dominant land Cover: Urban       35.0 %         2.5. Channel Stope:       3.18 %       Current Sub-Dominant Land Cover: Forest         2.6. Sinuosity:       1.16       4.3 Riparian Buffer       Left Bank Right Bar         2.7 Watershed Area:       1       Square Miles       Dominant:       >100       >100         2.8 Channel Width:       259       feet.       Sub-dominant:       26-50       0-25         2.9 Valley Width:       259       feet.       Sub-dominant:       >100       >100         2.10 Confinement Ratio:       0       4.4 Ground Water Inputs:       Abundant         2.11 Reference Stream Type:       Very Broad       Step 5. Instream Channel Modifications       5.1 Flow Regulation - (old):         3.1 Alluvial Fan:       None       5.2 Bridges and Culverts:       3       3 %         3.2 Grade Control:       None       5.5 Dredging History:       None       5.6 I Berms and Roads       One Side Both Sides         3.4 Left Valley Side       Steep       Steep       Road:       351       ft 0.0       ft         3.5 Solis       Du       45.0 %       Berms and Roads (old):       0.0       ft 0.0       ft 0.0         3.4 Right Valley Side       S							%										
2.5 Channel Slope:       3.18 %       Current Sub-Dominant Land Cover: Forest         2.6 Sinuosity:       1.16       4.3 Riparian Buffer       Left Bank Right Bar         2.7 Watershed Area:       1       Square Miles Dominant:       >100       >100         2.8 Channel Width:       259       feet.       Sub-dominant:       26-50       0-25         2.9 Valley Width:       259       feet.       Length W/ less than 25 ft.:       100       529         2.10 Confinement Ratio:       0       4.4 Ground Water Inputs:       Abundant       Abundant         2.11 Reference Stream Type:       C       Step 5. Instream Channel Modifications       5.1 Flow Regulation - (old):         Bedform:       Riffle-Pool       Type:       None       5.4 Channel Straightening:       308.1       7 %         3.2 Grade Control:       None       5.4 Channel Straightening:       308.1       7 %         3.3 Sub-dominant Geologic Mat:       Glacial Lake 55.0%       Step 6. Floodplain Modifications       351       ft. 0.0       ft         3.4 Right Valley Side       Steep       Steep       Road:       351       ft. 0.0       ft         3.5 Solis       D       Steep       Steep       Stool ft. 0.0       ft. 0.0       ft       0.0       ft. 0.0							eet.	<b>0.74</b> N	/iles	Curren	nt Dom	inant	land C	over: <b>l</b>	Jrban	35	<b>.0</b> %
2.6 Sinuosity:       1.16       4.3 Riparian Buffer       Left Bank Right Bar         2.7 Watershed Area:       1       Square Miles Dominant:       >100       >100         2.8 Channel Width:       259       feet.       Sub-dominant:       26-50       0-25         2.9 Valley Width:       259       feet.       Length w/ less than 25 ft.:       100       529         2.10 Confinement Ratio:       0       4.4 Ground Water Inputs:       Abundant         2.11 Reference Stream Type: C       Sitep 5. Instream Channel Modifications       5.1 Flow Regulation - (old):         Bedform:       Riffle-Pool       Type:       None         Sub-class Slope:       b       Use:       None         3.2 Grade Control:       None       5.5 Dredging History:       None         3.3 Sub-dominant Geological Mat.:       Glacial Lake 55.0% Step 6. Floodplain Modifications       3.1 ft. 0.0 ft         3.4 Left Valley Side       Steep       Radi:       3.1 ft. 0.0 ft       0.0 ft. 0.0 ft         3.4 Left Valley Side       Steep       Radi:       3.3 ft. 0.0 ft       0.0 ft. 0.0 ft         3.4 Left Valley Side       Steep       Steep       Berms and Roads (old):       0.0 ft. 0.0 ft         3.4 Left Valley Side       Steep       Steep       S.2 Grade Contro:<								φ.ι τ IV		Curren	t Sub-	Domir	ant La	and Co	over: F	orest	
2.7 Watershed Area:       1       Square Miles       Dominant:       >100       >100         2.8 Channel Width:       259       feet.       Sub-dominant:       >26-50       0-25         2.9 Valley Width:       259       feet.       Sub-dominant:       >44 Ground Water Inputs:       Abundant         2.10 Confinement Ratio:       0       4.4 Ground Water Inputs:       Abundant         2.11 Reference Stream Type: C       Riffle-Pool       Type:       None         Sub-class Slope:       b       Use:       Step 5. Instream Channel Modifications         3.1 Alluvial Fan:       None       5.2 Bridges and Culverts:       3       3         3.3 Dominant Geologic Mat.:       Glacial Lake 55.0% Step 6. Floodplain Modifications       3       38.1       7 %         3.3 Conditionation Geological Mat.:       Alluvial       6.1 Berms and Roads       One Side Both Sides         3.4 Left Valley Side       Steep       Step 6. Floodplain Modifications       351       ft.0.0       ft         3.4 Left Valley Side       Steep       Steep       Berms and Roads (old):       0.0       ft.0.0       ft         3.5 Sub-dominant Geological Mat.:       Alluvial       6.3 Channel Bars:       Multiple       6.4 Meander Migration:       6.5 Dediplain Development: 532       ft									4	4.3 Rip	arian E	Buffer		Le	ft Ban	k Rig	ht Bank
2.9 Valley Width:       259       feet.       Length w/ less than 25 ft.:       100       529         2.10 Confinement Ratio:       0       4.4 Ground Water Inputs:       Abundant         2.10 Confinement Type:       C       5.1 Flow Regulation - (old):       Type:       None         2.11 Reference Stream Type:       C       5.1 Flow Regulation - (old):       Type:       None         Sub-class Slope:       b       Use:       Step 3. Basin Characteristics:       0.0       5.4 Channel Straightening:       308.1       7 %         3.1 Alluvial Fan:       None       5.4 Channel Straightening:       308.1       7 %         3.2 Grade Control:       None       5.4 Channel Straightening:       308.1       7 %         3.3 Sub-dominant Geological Mat.:       Alluvial       Actionationationationationationationationa						1	Sc	quare N	Ailes	Domina	ant:			>1	100	>10	0
2.10 Confinement Ratio:       0       4.4 Ground Water Inputs:       Abundant         2.10 Confinement Type:       Very Broad       Step 7. Instream Channel Modifications         2.11 Reference Stream Type:       C       Step 5. Instream Channel Modifications         3.1 Alluvial Fan:       Gravel       5.2 Bridges and Culverts:       3       3         3.1 Alluvial Fan:       None       5.4 Channel Straightening:       30.0         3.2 Grade Control:       None       5.4 Channel Straightening:       308.1       7%         3.2 Grade Control:       None       5.4 Channel Straightening:       308.1       7%         3.3 Sub-dominant Geological Mat.:       Glacial Lake 55.0%       Step 6. Floodplain Modifications       6.1 Berms and Roads       One Side       Both Sides         3.4 Left Valley Side       Steep       Steep       Road:       351       ft. 0.0       ft.         3.5 Soils       Steep       D       45.0 %       Berms:       0.0       ft. 0.0       ft         Hydrologic Group:       D       45.0 %       Berms and Roads (old):       0.0 ft.       0.0       ft. 13%         Kaght Valley Side       Steep       Steep       Steep       Berms:       0.0 ft.       0.0       ft. 0.0         Hydrologic Group: </td <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>feet.</td> <td></td> <td>Sub-do</td> <td>ominar</td> <td></td> <td> <i>c</i></td> <td></td> <td></td> <td></td> <td></td>								feet.		Sub-do	ominar		<i>c</i>				
2.10 Confinement Type:       Very Broad       Step 5. Instream Channel Modifications         2.11 Reference Stream Type:       Riffle-Pool       5.1 Flow Regulation - (old):         Bedform:       Riffle-Pool       Type:       None         Sub-class Slope:       b       Use:       0.0         Bed Material:       Gravel       5.2 Bridges and Culverts:       3       3         3.1 Alluvial Fan:       None       5.4 Channel Straightening:       308.1       7%         3.2 Grade Control:       None       5.5 Dredging History:       None       5.4 Channel Straightening:       308.1       7%         3.3 Sub-dominant Geological Mat.:       Glacial Lake 55.0% Step 6. Floodplain Modifications       6.1 Berms and Roads       One Side       Both Sides         3.4 Left Valley Side       Steep       Steep       Raitroad:       0.0       ft. 0.0       ft         3.5 Soils       Steep       Steep       Berm:       0.0       ft. 0.0       ft         Hydrologic Group:       D       45.0 %       Improved Path:       0.0       ft. 0.0       ft         Hydrologic Group:       D       45.0 %       Berms and Roads (old):       0.0       ft. 0.0       ft         Flooding:       None/Rare       88.0 %       6.3 Cha								feet.		-				-			
2.11 Reference Stream Type: C       5.1 Flow Regulation - (old): Type:         Bedform:       Riffle-Pool         Sub-class Slope:       b         Bed Material:       Gravel         3.1 Alluvial Fan:       None         3.2 Grade Control:       None         3.3 Dominant Geologic Mat::       Glacial Lake 55.0%         3.4 Left Valley Side       Steep         3.4 Left Valley Side       Steep         3.5 Soils       Steep         Hydrologic Group:       D         Hydrologic Group:       D         Vater Table Deep:       2.0         2.0       28.0 %         Erodibility:       High -         7.4 Comments:       High -         4.1       4.2         4.1       4.2         2       1       0       0       2       0       0       0       2       0       01	2.7 Watershed Area:1Square Miles Dominant:2.8 Channel Width:feet.Sub-dominant:2.9 Valley Width:259feet.Length w/ less than 25 ft.:2.10 Confinement Ratio:04.4 Ground Water Inputs:2.10 Confinement Type:Very BroadStep 5. Instream Channel Moder2.11 Reference Stream Type: CDedformer5.1 Flow Regulation - (old):																
Bedform:         Riffle-Pool         Type:         None           Sub-class Slope:         b         Use:         None           Bed Material:         Gravel         5.2 Bridges and Culverts:         3         3           Step 3. Basin Characteristics:         5.3 Bank Armoring:         0.0           3.1 Alluvial Fan:         None         5.4 Channel Straightening:         308.1         7 %           3.2 Grade Control:         None         5.5 Dredging History:         None         5.5 Dredging History:         None           3.3 Sub-dominant Geological Mat.:         Glacial Lake 55.0% Step 6. Floodplain Modifications         6.1 Berms and Roads         One Side         Both Sides           3.4 Left Valley Side         Steep         Steep         Berm:         0.0         ft. 0.0         ft           3.5 Soils         Steep         Steep         Berm:         0.0         ft. 0.0         ft           Hydrologic Group:         D         45.0 %         Improved Path:         0.0         ft. 0.0         ft           Flooding:         None/Rare         58.0 %         Gananel Bars:         Multiple           Vater Table Shallow:         0.5         28.0 %         G.2 Floodplain Development: 532         ft. 13 %           7.4 Comments: <td colspan="15">2.8 Channel Width:feet.Sub-dominant:26-500-252.9 Valley Width:259feet.Length w/ less than 25 ft.:1005292.10 Confinement Ratio:04.4 Ground Water Inputs:Abundant2.10 Confinement Type:Very BroadStep 5. Instream Channel Modifications2.11 Reference Stream Type: C5.1 Flow Regulation - (old):</td> <td></td>	2.8 Channel Width:feet.Sub-dominant:26-500-252.9 Valley Width:259feet.Length w/ less than 25 ft.:1005292.10 Confinement Ratio:04.4 Ground Water Inputs:Abundant2.10 Confinement Type:Very BroadStep 5. Instream Channel Modifications2.11 Reference Stream Type: C5.1 Flow Regulation - (old):																
Sub-class Slope:         b         Use:           Bed Material:         Gravel         5.2 Bridges and Culverts:         3         3         %           Step 3. Basin Characteristics:         None         5.2 Bridges and Culverts:         3         3         %           3.1 Alluvial Fan:         None         5.4 Channel Straightening:         308.1         7 %           3.2 Grade Control:         None         5.4 Channel Straightening:         308.1         7 %           3.3 Sub-dominant Geological Mat.:         Alluvial         6.1 Berms and Roads         One Side         Both Sides           3.4 Left Valley Side         Steep         Steep         Railroad:         0.0         ft. 0.0         ft           3.5 Soils         Steep         Berms and Roads (old):         0.0         ft. 0.0         ft           Hydrologic Group:         D         45.0 %         Berms and Roads (old):         0.0         ft. 0.0         ft           Water Table Deep:         2.0         28.0 %         6.3 Channel Bars:         Multiple           Kander Width:         36.0 Ratio:         2.4         6.6 Wavelength:         80.0 Ratio:         5.2           7.4 Comments:         D.5         2.8.0 %         6.4 Meander Migration:         6.5 Meander Widt	2.9 Valley Width:259feet.Length w/ less than 25 ft.:1005292.10 Confinement Ratio:04.4 Ground Water Inputs:Abundant2.10 Confinement Type:Very BroadStep 5. Instream Channel Modifications2.11 Reference Stream Type:C5.1 Flow Regulation - (old):Bedform:Riffle-PoolType:NoneSub-class Slope:bUse:																
Bed Material:         Gravel         5.2 Bridges and Culverts:         3         3         %           Step 3. Basin Characteristics:         3.1 Alluvial Fan:         None         5.3 Bank Armoring:         0.0           3.1 Alluvial Fan:         None         5.4 Channel Straightening:         308.1         7 %           3.2 Grade Control:         None         5.5 Dredging History:         None           3.3 Dominant Geologic Mat.:         Glacial Lake 55.0%         Step 6. Floodplain Modifications         6.1 Berms and Roads         One Side         Both Sides           3.4 Left Valley Side         Steep         Steep         Steep         0.0         ft. 0.0         ft           3.5 Soils         Steep         Steep         Berm:         0.0         ft. 0.0         ft           Hydrologic Group:         D         45.0 %         Improved Path:         0.0         ft. 0.0         ft           Ywater Table Deep:         2.0         28.0 %         6.2 Floodplain Development: 532         ft. 13 %           Water Table Shallow:         0.5         28.0 %         6.4 Meander Migration:         6.6 Wavelength:         80.0 Ratio:         2.4           7.4 Comments:         High -         40.0 %         5.5         6.1         6.2         6.3	2.9 Valley Width:259feet.Length w/ less than 25 ft.:1005292.10 Confinement Ratio:04.4 Ground Water Inputs:Abundant2.10 Confinement Type:Very BroadStep 5. Instream Channel Modifications2.11 Reference Stream Type:C5.1 Flow Regulation - (old):Bedform:Riffle-PoolType:NoneSub-class Slope:bUse:Bed Material:Gravel5.2 Bridges and Culverts:3																
Step 3. Basin Characteristics:         None         5.3 Bank Armoring:         0.0           3.1 Alluvial Fan:         None         5.4 Channel Straightening:         308.1         7 %           3.2 Grade Control:         None         5.5 Dredging History:         None         Step 6.1 Berms and Roads         One Side         Both Sides           3.4 Left Valley Side         Steep         Steep         Steep         Galial Lake 55.0%         Step 6.1 Berms and Roads         One file         One file         Mone         file         Step 6.1 Berms and Roads         One file         One file         Mone         file         Step 6.1 Berms and Roads         One file         One file         Mone         file         file         Step 6.2 Floodplain Modifications         Step 6.1 Berms and Roads         One file         One file         file         file         file         Step 6.2 Floodplain Development: 532 file         Step 7. Windshield Survey         File	2.10 Confinement Ratio:04.4 Ground Water Inputs:Abundant2.10 Confinement Type:Very BroadStep 5. Instream Channel Modifications5.1 Flow Regulation - (old):2.11 Reference Stream Type:Riffle-PoolType:NoneBedform:Bedform:Bedform:Step 5. Instream Channel ModificationsSub-class Slope:BUse:Step 5. Instream Channel ModificationsBed Material:Gravel5.2 Bridges and Culverts:3															0/	
3.1 Alluvial Fan:       None       5.4 Channel Straightening:       308.1       7 %         3.2 Grade Control:       None       5.5 Dredging History:       None         3.3 Dominant Geologic Mat.:       Glacial Lake 55.0% Step 6. Floodplain Modifications       6.1 Berms and Roads       One Side       Both Sides         3.4 Left Valley Side       Steep       6.1 Berms and Roads       One ft. 0.0       ft. 0.0       ft.         3.5 Soils       Steep       Steep       Berm:       0.0       ft. 0.0       ft.         Hydrologic Group:       D       45.0 %       Improved Path:       0.0       ft. 0.0       ft.         Flooding:       None/Rare       58.0 %       Berms and Roads (old):       0.0       ft. 0.0       ft.         Water Table Deep:       2.0       28.0 %       6.3 Channel Bars:       Multiple       6.4 Meander Migration:         7.4 Comments:       0.5       28.0 %       6.4 Meander Migration:       6.5 Meander Width:       36.0 Ratio:       2.4         7.4 Comments:       High -       40.0 %       6.4 Meander Migration:       6.6 Wavelength:       80.0 Ratio:       5.2         Xep 7. Windshield Survey       7.2 Bank Erosion:       0.00 ft.       7.3 Total         2       2       1       0 </td <td colspan="15">2.10 Confinement Ratio:04.4 Ground Water Inputs:Abu2.10 Confinement Type:Very BroadStep 5. Instream Channel Modificat2.11 Reference Stream Type:C5.1 Flow Regulation - (old):Bedform:Riffle-PoolType:NoneSub-class Slope:bUse:Step 3. Basin Characteristics:Step 3. Basin Characteristics:5.3 Bank Armoring:</td> <td></td> <td>70</td>	2.10 Confinement Ratio:04.4 Ground Water Inputs:Abu2.10 Confinement Type:Very BroadStep 5. Instream Channel Modificat2.11 Reference Stream Type:C5.1 Flow Regulation - (old):Bedform:Riffle-PoolType:NoneSub-class Slope:bUse:Step 3. Basin Characteristics:Step 3. Basin Characteristics:5.3 Bank Armoring:																70
3.2 Grade Control:       None       5.5 Dredging History:       None         3.3 Dominant Geologic Mat.:       Glacial Lake 55.0% Step 6. Floodplain Modifications       0.0       Side Both Sides         3.3 Sub-dominant Geological Mat.:       Alluvial       6.1 Berms and Roads       One Side Both Sides         3.4 Left Valley Side       Steep       Road:       351       ft. 0.0       ft         3.4 Left Valley Side       Steep       Berms and Roads       0.0       ft. 0.0       ft         3.5 Soils       D       45.0 %       Improved Path:       0.0       ft. 0.0       ft         Hydrologic Group:       D       45.0 %       Berms and Roads (old):       0.0       ft. 0.0       ft         Ywater Table Deep:       2.0       28.0 %       Berms and Roads (old):       0.0       ft. 13 %         Water Table Shallow:       0.5       28.0 %       6.3 Channel Bars:       Multiple         6.4 Meander Migration:       6.4 Meander Migration:       6.4 Meander Migration:       5.2         7.4 Comments:       6.1 6.2       6.3       6.4       6.5       6.6       7.2       7.3       Total         4.1       4.2       4.3       5.1       5.2       5.3       5.4       5.5       6.1       6				acteris	siics.	New								. 20	0 1		
3.3 Dominant Geologic Mat.:       Glacial Lake 55.0% Step 6. Floodplain Modifications         3.3 Sub-dominant Geological Mat.:       Alluvial         3.4 Left Valley Side       Steep         3.4 Right Valley Side       Steep         3.5 Soils       Steep         Hydrologic Group:       D         Flooding:       None/Rare         Water Table Deep:       None/Rare         Water Table Shallow:       0.5         Erodibility:       0.5         7.4 Comments:       0.5         4.1       4.2         4.1       4.2         2       2         4.1       0         2       2         2       1         2       2         4.1       0         2       2         1       0         2       2         2       2         2       2         3       5.3         5.4       5.5         6.1       6.2         6.3       6.4         6.5       6.6         7.4       6.7         7.4       6.1         7.5       5.3 <td< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>0</td><td></td><td>·</td><td></td><td>1 /0</td><td></td></td<>												0		·		1 /0	
3.3 Sub-dominant Geological Mat.:       Alluvial       6.1 Berms and Roads       One Side       Both Sides         3.4 Left Valley Side       Steep       Steep       Steep       Steep       Steep       Steep         3.5 Soils       Steep       Steep       Steep       Steep       Steep       Steep         Hydrologic Group:       D       45.0 %       Berm:       0.0 ft. 0.0 ft. 0.0 ft         Flooding:       None/Rare       58.0 %       Steep       Steep       Steep         Water Table Deep:       None/Rare       28.0 %       Steep       Berms and Roads (old):       0.0 ft. 0.0 ft         Water Table Shallow:       0.5       28.0 %       6.3 Channel Bars:       Multiple         6.4 Meander Migration:       6.5 Meander Width:       36.0 Ratio:       2.4         6.6 Wavelength:       80.0 Ratio:       5.2         Step 7. Windshield Survey       7.2 Bank Erosion:       0.00 ft.         7.2 Bank Height:       0.00 ft.       7.3 Total         2       2       1       0       2       0       0       0       2       2       0       0       11					Mat .			ko 55					•	-	ne		
3.4 Left Valley Side 3.4 Right Valley Side 3.5 Soils       Steep Steep       Road:       351       ft. 0.0       ft         Hydrologic Group: Flooding: Water Table Deep: Water Table Shallow: Erodibility:       D       45.0 % 2.0       None/Rare 2.0       58.0 % 2.0       None/Rare 2.0       58.0 % 2.0       Improved Path:       0.0       ft. 0.0       ft         Yater Table Shallow: Erodibility:       0.5       28.0 % 0.5       80.0 % High -       80.0 % 40.0 %       Multiple       6.3 Channel Bars:       Multiple         6.4 Meander Migration: 6.5 Meander Width:       36.0 Ratio:       2.4 6.6 Wavelength:       80.0 Ratio:       5.2         Step       Yater Table Shallow:       Yater Table Shallow:       Yater Table Shallow:       Yater Table Shallow:       13 %         7.4 Comments:       0.5       28.0 %       Yater Table Shallow:       Yater Table Shallow:       36.0 Ratio:       2.4 6.6 Wavelength:       36.0 Ratio:       2.4 6.6 Wavelength:         7.4 Comments:       7.2 Bank Erosion:       0.00 ft.       7.2 Bank Height:       0.00 ft.       7.2 Bank Height:       0.00 ft.         7.2 Bank Height:       0.00 ft.       7.3 Total       2       2       1       0       0       2       0       0       0       2       0       0       11				•						-					Sido	Doth 9	Sidoc
3.4 Right Valley Side 3.5 Soils       Steep Steep       Railroad:       0.0       ft. 0.0 <td></td> <td></td> <td></td> <td></td> <td>ogical</td> <td>iviat</td> <td></td> <td>inu viai</td> <td></td> <td></td> <td>1115 al 1</td> <td>u Rua</td> <td>us</td> <td></td> <td></td> <td></td> <td></td>					ogical	iviat		inu viai			1115 al 1	u Rua	us				
3.5 Soils       Steep       Steep       Berm:       0.0       ft. 0.0       ft         Hydrologic Group:       D       45.0 %       Improved Path:       0.0       ft. 0.0       ft         Flooding:       None/Rare       58.0 %       Berms and Roads (old):       0.0       ft. 0.0       ft         Water Table Deep:       2.0       28.0 %       6.3 Channel Bars:       Multiple         6.4 Meander Migration:       6.5 Meander Width:       36.0 Ratio:       2.4         6.4 Meander Width:       36.0 Ratio:       2.4         6.6 Wavelength:       80.0 Ratio:       5.2         Step 7. Windshield Survey       7.2 Bank Erosion:       0.00 ft.         7.3 Ice/Debris Jam Potential:       Culvert         4.1       4.2       4.3       5.1       5.2       5.3       5.4       5.5       6.1       6.2       6.3       6.4       6.5       6.6       7.2       7.3       Total         2       2       1       0       0       2       0       0       0       2       2       0       0       11			,			Stee	ep				۰he						
Hydrologic Group: Flooding: Water Table Deep: Water Table Shallow: Erodibility:       D       45.0 % 58.0 % 2.0       Improved Path: 58.0 % 28.0 %       0.0       ft. 0.0       ft. 0.0       ft. 0.0         7.4 Comments:       0.5       28.0 %       40.0 %       6.3 Channel Bars: 40.0 %       Multiple       6.4 Meander Migration: 6.5 Meander Width: 6.6 Wavelength: Step 7. Windshield Survey       36.0 Ratio:       2.4         6.1       6.2 Floodplain Development:       532       6.4 Meander Migration: 6.5 Meander Width: 7.2 Bank Erosion: 7.2 Bank Height: 7.2 Bank Height: 7.3 Ice/Debris Jam Potential:       0.00 ft. 7.2       7.3       Total         4.1       4.2       4.3       5.1       5.2       5.3       5.4       5.5       6.1       6.2       6.3       6.4       6.5       6.6       7.2       7.3       Total         2       2       1       0       0       2       0       0       0       0       2       2       0       0       11		•	uney c	Jiuc			-				iu.						ft.
Flooding: Water Table Deep: Water Table Shallow: Erodibility:       None/Rare 2.0       58.0 % 28.0 %       Berms and Roads (old): 6.2 Floodplain Development: 532       0.0       ft. 0.0         7.4 Comments:       0.5       28.0 %       40.0 %       6.3 Channel Bars: High -       Multiple         7.4 Comments:       40.0 %       5.5 Meander Width: 6.6 Wavelength: Step 7. Windshield Survey       36.0 Ratio: 7.2 Bank Erosion: 7.2 Bank Height: 7.3 Ice/Debris Jam Potential:       0.00 ft. 0.00 ft. 7.2 Total         4.1       4.2       4.3       5.1       5.2       5.3       5.4       5.5       6.1       6.2       6.3       6.4       6.5       6.6       7.2       7.3       Total         2       2       1       0       0       2       0       0       0       0       0       0       1			c Grou	ın.	D	)		150%			ed Pa	th:					ft.
Water Table Deep: Water Table Shallow: Erodibility: 7.4 Comments:       2.0 0.5 High -       28.0 28.0 40.0 40.0 40.0 40.0 40.0 40.0 40.0 4	•	•		φ.					-				(old):				
Water Table Shallow: Erodibility:       0.5 High -       28.0 % 40.0 %       6.3 Channel Bars:       Multiple         7.4 Comments:       High -       40.0 %       6.4 Meander Migration: 6.5 Meander Width: 6.6 Wavelength: Step 7. Windshield Survey       36.0 Ratio:       2.4 80.0 Ratio:       5.2         7.4 Comments:       Yes and the second		•	ole De	en.					,					ent: <b>53</b>			
Erodibility:       High -       40.0 %       6.4 Meander Migration:       36.0 Ratio:       2.4         7.4 Comments:       High -       40.0 %       6.5 Meander Width:       36.0 Ratio:       2.4         7.4 Comments:       Step 7. Windshield Survey       7.2 Bank Erosion:       0.00 ft.       5.2         Yet P 7. Windshield Survey       7.2 Bank Erosion:       0.00 ft.       0.00 ft.         7.2 Bank Height:       0.00 ft.       7.3 Ice/Debris Jam Potential:       Culvert         4.1       4.2       4.3       5.1       5.2       5.3       5.4       5.5       6.1       6.2       6.3       6.4       6.5       6.6       7.2       7.3       Total         2       2       1       0       0       2       0       0       0       0       2       2       0       0       11										6.3 Cha	annel E	Bars:		Μι	ultiple		
7.4 Comments:       6.5 Meander Width:       36.0 Ratio: 2.4         80.0 Ratio:       5.2         Step 7. Windshield Survey       7.2 Bank Erosion:       0.00 ft.         7.2 Bank Height:       0.00 ft.         7.3 Ice/Debris Jam Potential:       Culvert         4.1       4.2       4.3       5.1       5.2       5.3       5.4       5.5       6.1       6.2       6.3       6.4       6.5       6.6       7.2       7.3       Total         2       2       1       0       0       2       0       0       0       0       2       2       0       0       11				anom						6.4 Mea	ander	Migrat	ion:				
Step 7. Windshield Survey         Step 7. Windshield Survey         7.2 Bank Erosion:       0.00 ft.         7.2 Bank Height:       0.00 ft.         7.3 Ice/Debris Jam Potential:       Culvert         4.1       4.2       4.3       5.1       5.2       5.3       5.4       5.5       6.1       6.2       6.3       6.4       6.5       6.6       7.2       7.3       Total         2       2       1       0       0       2       0       0       0       0       0       11		•				-3				6.5 Mea	ander	Width:			36.0 F	Ratio:	2.4
7.2 Bank Erosion:       0.00 ft.         7.2 Bank Height:       0.00 ft.         7.2 Bank Height:       0.00 ft.         7.3 Ice/Debris Jam Potential:       Culvert         4.1       4.2       4.3       5.1       5.2       5.3       5.4       5.5       6.1       6.2       6.3       6.4       6.5       6.6       7.2       7.3       Total         2       2       1       0       0       2       0       0       0       0       0       2       2       0       0       11	7.4 0	Johnne	ents.												80.0 F	Ratio:	5.2
7.2 Bank Height: 7.3 Ice/Debris Jam Potential: Culvert         4.1       4.2       4.3       5.1       5.2       5.3       5.4       5.5       6.1       6.2       6.3       6.4       6.5       6.6       7.2       7.3       Total         2       2       1       0       0       0       2       0       0       0       0       2       2       0       0       11									S	tep 7. V	Vindsł	nield S	urvey				
7.3 Ice/Debris Jam Potential: Culvert         4.1       4.2       4.3       5.1       5.2       5.3       5.4       5.5       6.1       6.2       6.3       6.4       6.5       6.6       7.2       7.3       Total         2       2       1       0       0       0       2       0       0       0       0       2       2       0       0       11									•	7.2 Bar	nk Eros	sion:					
4.1       4.2       4.3       5.1       5.2       5.3       5.4       5.5       6.1       6.2       6.3       6.4       6.5       6.6       7.2       7.3       Total         2       2       1       0       0       0       2       0       0       0       0       2       2       0       0       11										7.2 Bar	nk Heig	ght:		(	0.00 ft	-	
2       2       1       0       0       0       2       0       0       0       0       0       2       2       0       0       11										7.3 lce/	Debris	s Jam	Potent	ial: C	ulvert		
2       2       1       0       0       0       2       0       0       0       0       0       2       2       0       0       11	1 1	12	12	<b>E</b> 1	<b>E</b> 0	E 2	E A	<b>5 5</b>	61	6.0	6.2	61	6 F	66	70	70	Total
	4.1	4.2	4.3	່ <del>ວ</del> . ເ	J.Z	5.5	ວ.4	5.5	0.1	0.2	0.3	0.4	0.5	0.0	1.2	1.3	TOTAL
High High Low N.S. N.S. N.S. High N.S. N.S. N.S. N.S. N.S. N.S. High High N.S. N.S.	2	2	1	0	0	0	2	0	0	0	0	0	2	2	0	0	11
	High	High	Low	N.S.	N.S.	N.S.	High	N.S.	N.S.	N.S.	N.S.	N.S.	High	High	N.S.	N.S.	
							-										

															<b>,</b>			
Basin:					Winooski													
Stream Name:					Governor Peck Rd Tributary Reach R8.S1.06													
Topo Maps:					RICHMOND													
Date I	Last E	dited:			Thu, September 27, 2007													
Watershed:					inoos	ki Riv	er											
Sub-watershed:					inoos	ki Riv	er H	untin	gton R	iver to	o mou	th						
ls Rea	ach an	Impou	undme	nt? N	0													
Step	1. Rea	ch Loo	cation															
				F	rom G	ioverr	or Pe	ck Hi	ghway	chan	nel mo	oves e	east ar	nd rea	ch en	ds at		
1.1 Reach Description: 1.2 Towns:					ericho			UK I II;	giinay	Unan			uot ui	iu i u		aoat		
1.3 Downstream Latitude:				de: 4	44.44			St	Step 4. Land Cover - Reach Hydrology									
1.3 Downstream Longitude				ude: -	72.99				4.1 Watershed									
	Step 2. Stream Type								Historio	c Land	Cove	r:	F	Field				
2.1 Elevation Upstream:				720				Curren						67	.0 %			
2.1 Elevation Downstream:				485				Curren	t Sub-	Domin	ant La	and Co	over: U	rban				
2.1 Is Gradient Gentle?				No	1	0 07 1	1:1	4.2 Cor	ridor									
2.2 Valley Length:				8516 fe	eet. %	<b>0.67</b> N	mes.	Historio	c Land	Cove	r:	F	orest					
2.3 Valley Slope: 2.4.Channel Length:				<b>6.68</b> 3997 fe	70 ADt	0 76 1		Curren							.0 %			
2.5 Channel Slope:					θθι. %	0.70	/IIICS.	Curren	t Sub-	Domin	ant La	and Co	over: U	rban	- ,0			
2.6 Sinuosity:				1.14	/0			4.3 Rip							ht Bank			
2.7 Watershed Area:				1	Sc	auare I		Domina					100	>10				
2.8 Channel Width:						feet.		Sub-dominant: 26-50 51-100										
2.9 Valley Width:				30		feet.		Length				-		0				
2.10 Confinement Ratio:					0				4.4 Gro			•		one				
2.10	Confir	nemen	t lype	: 	Semi-confined Step 5. Instream Channel Modifications													
			stream	Type:	в Step-	Pool			5.1 Flov	w Reg	ulatior	•						
Bedform: Sub-class Slope:				-	-001			Type:			Nor	ne						
Sub-class Slope: Bed Material:				a Cabb				Use:			lvortor	4		4	0/			
Step 3. Basin Characteristics				tion.	Cobble				5.2 Bridges and Culverts: 1 1 % 5.3 Bank Armoring: 0.0									
3.1 Alluvial Fan:				siics.	New				5.3 Bank Armoring: 0.0 5.4 Channel Straightening: 164.1 4 %									
3.2 Grade Control:				None None				5.5 Dredging History: <b>None</b>										
	Domina			Mat ·			ct 85		tep 6. F			•	-					
			•				lluvial						One S	ahi2	Roth 9	Sidos		
3.3 Sub-dominant Geologic 3.4 Left Valley Side			Uyicai					6.1 Berms and Roads One Road: 0.0						Side Both Sides ft. <b>0.0</b> ft.				
3.4 Right Valley Side				Extremely Steep				Railroad: 0.0						0.0	ft.			
3.5 Soils				Extremely Steep				Berm: <b>0.0</b> ft. <b>0.0</b>							ft.			
Hydrologic Group:				A	<b>`</b>	5	<b>34.0</b> %		Improv	ed Pa	th:		0.0		0.0	ft.		
Flooding:					Ione/R		<b>92.0</b> %	-	Berms			(old):	31		7%			
	ter Tal	ole De	ep:		.0		<b>34.0</b> %	, 6	6.2 Floo			elopme			0.0			
	ter Tal				.0		<b>34.0</b> %	, 6	6.3 Cha				No	ot Eva	luatec	1		
	dibility				High - 91.0 % 6.4 Meander Migration:													
	Comme				0			(	6.5 Mea						Ratio:	0.0		
7.40		51115.							6.6 Wa					F	Ratio:	0.0		
									tep 7. V			urvey						
7.2 Bank Erosion: 0.00 ft.																		
									7.2 Bar	•		_		0.00 ft	•			
								-	7.3 Ice/	Debris	s Jam	Potent	ial: N	one				
	4.0	4.0	<b>_ _ _ _</b>	<b>F A</b>	<b>F A</b>	<b>F</b> 4		0.4	0.0	0.0	0.4	0.5	0.0	7.0	7.0	<b>T</b>		
4.1	4.2	4.3	5.1	5.2	5.3	5.4	5.5	6.1	6.2	6.3	6.4	6.5	6.6	7.2	7.3	Total		
2	2	0	0	0	0	2	0	0	0	0	0	0	0	0	0	6		
High	High	N.S.	N.S.	N.S.	N.S.	High	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.			
- iigii	i ngri	11.0.	14.0.	14.0.	11.0.	i ngil	14.0.	14.0.	11.0.	11.0.	14.0.	14.0.	14.0.	14.0.	14.0.			
																—		

					-		-					<b>J</b>	
Basin:	V	Ninoos	ki										
Stream Name:	C	Governe	or Peo	k Rd	Tribu	tary		Re	ach	R8.5	51.07		
Topo Maps:	F	RICHMO	OND			-							
Date Last Edited:	V	Ned, Se	ptem	ber 19	, <b>200</b>	7							
Watershed:		Vinoos	•										
Sub-watershed:	V	Ninoos	ki Riv	er H	untin	aton R	liver to	o mou	ıth				
Is Reach an Impour				••••••	••••••	.g							
·													
Step 1. Reach Loca				-	_								
1.1 Reach Descrip		From B		s Irac	e Roa	ad to N	lilo W	hite R	oad				
1.2 Towns: 1.3 Downstream L		Jerichc 44.44	)		S	tep 4. L	and C	over -	Read	h Hydr	voloav		
1.3 Downstream L						4.1 Wa			TCaci	i i i yui	ology		
Step 2. Stream Typ						<i>4.1 vva</i> Historio		-	r٠	C	Crop		
2.1 Elevation Upst		760				Curren						77	0 %
2.1 Elevation Down		720				Curren							0 /0
2.1 Is Gradient Ge	ntle?	No		o 46 -		4.2 Coi							
2.2 Valley Length:		2097 fe	et. %	<b>0.40</b> N	/IIIes.	Historio	c Land	l Cove	r:	F	ield		
2.3 Valley Slope: 2.4.Channel Lengt	h.	1.91 2555 fe	/u Pet	0 48 1		Currer						38	.0 %
2.5 Channel Slope			%	U. TU I		Curren	t Sub-	Domir	nant La	and Co	ver: F	ield	-
2.6 Sinuosity:		1.22				4.3 Rip	arian E	Buffer		Le	ft Ban	k Rig	ht Bank
2.7 Watershed Are		1				Domina					00	26-	
2.8 Channel Width	1:	050		feet.		Sub-do			OF 4		6-50	51-1	100
2.9 Valley Width: 2.10 Confinement	Patio:	358 0		feet.		Length					Inimal		
2.10 Confinement		Very I	Broad			4.4 Grc tep 5. I			•		inima ations		
2.11 Reference St			Jiouu			5.1 Flov					one	-	
Bedform:		Riffle	Pool			Type:	w ricg	alation		)			
Sub-class Slope	):					Use:							
Bed Material:		Grave	el		!	5.2 Bric	dges a	nd Cu	lverts:	0		0	%
Step 3. Basin Chara	cteristics:					5.3 Bar		•				0.0	
3.1 Alluvial Fan:		Non				5.4 Cha		•				0.0	
3.2 Grade Control:		Non				5.5 Dre			•	No	ne		
3.3 Dominant Geo						tep 6. F					<u></u>		
3.3 Sub-dominant	•	a Mat.:	ice-	Conta		6.1 Ber Road:	ms an	d Roa	as	One S		Both S	
3.4 Left Valley Side 3.4 Right Valley Si		Verv	Stee	p		Roau: Railroa	d.				ft. ft.		ft. ft.
3.5 Soils		Stee		•		Berm:	iu.				ft.		ft.
Hydrologic Group	):	Not Rat	ted 4	<b>15.0</b> %		Improv	ed Pa	th:			ft.		ft.
Flooding:		None/R			, , )	Berms	and R	oads	· /	0.0	) ft.	0.0	
Water Table Dee		3.0		23.0 %	) (	6.2 Flo	-		elopme			0.0	
Water Table Sha		1.5		<b>32.0</b> %	)	6.3 Cha				No	ot Eval	luated	
Erodibility:		High -	1	<b>17.0</b> %	,	6.4 Mea 6.5 Mea		•			1205	Datio	3.7
7.4 Comments:						6.6 Wa					43.0 F 72.0 F		5.7 6.3
						tep 7. V			urvev		. <b>-</b> .v r	<b>λαι</b> Ο.	0.0
						7.2 Bar			- <u> </u>	Ν	one		
						7.2 Bar					o Data	a	
						7.3 Ice/	•	0	Potent		ulvert		
				1							1	1	
4.1 4.2 4.3	5.1 5.2	5.3	5.4	5.5	6.1	6.2	6.3	6.4	6.5	6.6	7.2	7.3	Total
2 1 0	0 0	0	0	0	0	0	0	0	1	1	0	0	5
High Low N.S.	N.S. N.S	. N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	Low	Low	N.S.	N.S.	

Basin:	10/	inoos	L:		-							<b>J</b>	
Stream Name:				ck Rd	Tribu	tary		Do	ach		<b>S1.08</b>		
					mbu	tai y		Re.	acii	KO.C	00.10		
Topo Maps: Date Last Edited:				oor 97	2007	,							
			-	ber 27	, 2007								
Watershed:		inoos		-					.d.				
Sub-watershed:			KI RIV	er H	luntin	gton R	liver to	o mou	ith				
Is Reach an Impound	ment? No	0											
Step 1. Reach Location													
1.1 Reach Description				hite R	oad t	he Cha	annel I	heads	east f	toward	d the e	end of	
1.2 Towns:	-	ericho	)		~								
1.3 Downstream Lati		44.44				tep 4. L			Reac	n Hyar	rology		
1.3 Downstream Lon Step 2. Stream Type	gitude.	12.31				4.1 Wa				-			
2.1 Elevation Upstrea	am <sup>.</sup> 1	120				Historia					Field	70	• • • •
2.1 Elevation Downs		760				Curren Curren				=			.0 %
2.1 Is Gradient Gent	e?	No				4.2 Coi		Domin				IDall	
2.2 Valley Length:		<b>3967</b> fe		<b>0.75</b> N	/liles.	Historia			r٠		Forest		
2.3 Valley Slope:		9.07	%	o == ·	<b>A</b> -1	Currer							<b>.0</b> %
2.4.Channel Length:		<b>4061</b> f	eet. %	0.77	villes.	Curren	t Sub-	Domir	anu C	and Co		4J Arest	<b>.U</b> 70
2.5 Channel Slope: 2.6 Sinuosity:		8.86 1.02	/0			4.3 Rip							iht Bank
2.7 Watershed Area:		1	S	uare I		Domina		Junei			100	>10	
2.8 Channel Width:		-		feet.	mee	Sub-do	minar	nt:			1-100	51-	-
2.9 Valley Width:		30		feet.		Length				-		0	
2.10 Confinement Ra		0				4.4 Gro					one		
2.10 Confinement Ty		Semi-	confi	ned		tep 5. I					ations	-	
2.11 Reference Strea Bedform:	am Type:	в Step-	Dool			5.1 Flo	w Reg	ulatior					
Sub-class Slope:						Type:			Nor	ne			
Bed Material:		a Cobb				Use: 5.2 Bric	4000 0	nd Cu	lvorte:	3		3	%
Step 3. Basin Characte	eristics.	CODD				5.2 Brid 5.3 Bar	•			3		0.0	/0
3.1 Alluvial Fan:		Nor				5.4 Cha		0		a: <b>0.</b> 0	0	0.0	
3.2 Grade Control:		Nor				5.5 Dre		•		No		0.0	
3.3 Dominant Geolog	nic Mat.:	Till		96.		tep 6. F			•	-			
3.3 Sub-dominant Ge		Mat.:	Ice-	Conta		6.1 Ber				Ones	Side	Both S	Sides
3.4 Left Valley Side	Ū		_	_		Road:				0.0	ft.	0.0	ft.
3.4 Right Valley Side	;		-	/ Stee	-	Railroa	nd:			0.0	ft.	0.0	ft.
3.5 Soils			-	/ Stee	•	Berm:				0.0		0.0	ft.
Hydrologic Group:	C			96.0 %	-	Improv			(-1-1)	0.0		0.0	ft.
Flooding:		lone/R		100. %	-	Berms 6.2 Flo				26		6 % 0.0	
Water Table Deep:		.5		<b>54.0</b> %	,	6.3 Cha	-		siopine		ot Eval		1
Water Table Shallo		.5 Lioch		67.0 %	)	6.4 Mea			ion:			luatee	•
Erodibility:	F	ligh -	į	95.0 %	0	6.5 Mea		-			F	Ratio:	0.0
7.4 Comments:						6.6 Wa			-			Ratio:	0.0
						tep 7. V			urvey				-
						7.2 Bar					0.00	ft.	
						7.2 Bar					0.00 ft		
						7.3 lce/	•		Potent	ial: N	one		
4.1 4.2 4.3 5.	1 5.2	5.3	5.4	5.5	6.1	6.2	6.3	6.4	6.5	6.6	7.2	7.3	Total
2 2 0 0		0	0	0	0	0	0	0	0	0	0	0	4
	, 0		0										4
High High N.S. N.	S. N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	

									nast	<i>,</i> 1	1100		Jam	IIIai	<b>y</b>	cport
Basin:				W	inoos	ki										
Strear	n Nam	ne:		Je	ericho	Road	Tribu	tary			Rea	ach	R8.5	52.01		
Topo I	Maps:			E	SSEX	JUNC	TION,	RICH	HMOND	)						
•	Last Ed						ber 27									
Water					/inoos	•		,	-							
	/atersh	ned.					-	untir	ngton R	iver to	o mou	ıth				
	ach an		Indmo					until	igioni							
					0											
	1. Rea															
	Reach I		iption:				ence v	vith t	he Win	ooski	River	to rea	ch bre	eak or	n the v	vest
	owns:				Richmo	ond		~				Deed				
	)ownst )ownst				44.41				Step 4. L			Reaci	п пуаг	ology		
	2. Strea			uue	.1.2.01				4.1 Wa							
	levatio		<u>.                                    </u>		320				Historia Curren					Crop		• • • •
	levatio				296				Curren							.0 %
2.1 ls	s Grad	ient G	entle?		No				4.2 Col		Domin				IDall	
	alley L				<b>3340</b> fo		<b>0.63</b> N	/liles.	Historia			r·	c	Crop		
	alley S				0.72		• <b>•</b> • •	<b>a</b>	Currer						21	.0 %
	Channe Channe				<b>4030</b> f <b>0.60</b>	eet. %	0.76	villes.	Curren	t Sub-	Domir	anu C	and Co	ver C		.0 /0
	Sinuosi		с.		1.21	70			4.3 Rip						-	ht Bank
	Vaters		rea:		2	Se	uare I		Domina		Junor			6-50	<b>26</b> -	
	Channe						feet.		Sub-do		nt:		-	25	Nor	
	/alley \				434		feet.		Length				-	32	366	;
	Confin				0				4.4 Gro			•		inima		
	Confin				Very	Broad			Step 5. I					ations		
	Refere edform		stream	Type.		-Rippl	۵		5.1 Flo	w Reg	ulatior					
	ib-clas		<u>م</u> .		Dune	Trippi	C		Type: Use:			Non	e			
	ed Mat				Sand				5.2 Brid	lues a	nd Cu	lvorte:	2		3	%
Step 3.			acteris	stics.	Janu				5.3 Bar	0			L		0.0	70
	Iluvial				Yes				5.4 Cha		-		: <b>27</b>	57	68 %	6
	Grade (		<u>.</u>		Nor				5.5 Dre		-	-	No		,	•
	Domina			Mat.:	Allu		87.		Step 6. F	0 0			-			
	Sub-do		•				lacial		6.1 Ber	ms an	d Roa	ds	One S	Side	Both S	Sides
	.eft Val			0		-			Road:				0.0	ft.	0.0	ft.
3.4 R	Right V	alley S	Side			/ Stee	-		Railroa	ıd:			0.0	ft.	0.0	ft.
3.5 S	Soils				Extr	remely	/ Stee	р	Berm:				0.0		0.0	ft.
•	Irologia	c Grou	ıp:	C			<b>52.0</b> %		Improv			()	0.0		0.0	ft.
	oding:				reque		<b>30.0</b> %		Berms 6.2 Floo				0.0		0.0 0.0	
	ter Tab				.5		<b>52.0</b> %	)	6.3 Cha			siopine		oint	0.0	
	ter Tak		allow:		.0 Lioch		<b>4.0</b> %	)	6.4 Mea			ion:	10	,,,,,		
	dibility			F	ligh -		<b>2.0</b> %	0	6.5 Me		0			17.5 F	Ratio <sup>.</sup>	1.0
7.4 C	Comme	ents:							6.6 Wa					17.5 F		1.0
									Step 7. V			urvey				-
								_	7.2 Bar	nk Eros	sion:			0.00	ft.	
									7.2 Bar					0.00 ft		
									7.3 Ice/	•	0	Potent	ial: <b>C</b>	ulvert		
4.1	4.2	4.3	5.1	5.2	5.3	5.4	5.5	6.1	6.2	6.3	6.4	6.5	6.6	7.2	7.3	Total
																+
2	2	1	0	0	0	2	0	0	0	0	0	2	2	0	0	11
Linh	Hiah		N.S.	N.S.	N.S.	Liah	N.S.	N.S	. N.S.	N.S.	N.S.	High	Hiah	N.S.	N.S.	
High	High	Low	19.3.	19.3.	19.3.	High	19.3.	14.5	. 14.3.	19.3.	14.3.	High	High	14.3.	19.3.	
I								•				•	•		•	

	: m Narr Maps:	ie:		Je	'inoos ericho ICHM(	Road	Tribu	tary			Re	ach	R8.S	<b>52.02</b>	5	
Date I	Last E	dited:		Tł	nu, Se	ptemb	oer 27,	2007	7							
Water	shed:			W	inoos	ki Riv	er									
Sub-w	/atersh	ned:		W	inoos	ki Riv	er H	untin	gton F	liver to	o mou	Ith				
ls Rea	ach an	Impou	undme	nt? N	0											
Sten	1. Rea	chlo	cation													
	Reach			F	rom r	each l	oreak	hv I-8	9 to in	tersec	tion c	of Sout	thview	v Drive	e and	Old
	owns:		iption.		lichmo		Jican	Sy I C	,5 to m							
			Latituc	de: 4	44.42			S	tep 4. l	_and C	over -	Reac	h Hydr	ology		
			Longit	ude: -	73.00				4.1 Wa	tershe	d					
	2. Stre		<u>.</u>						Histori			r:	F	ield		
			stream		460				Curren	t Dom	inant l	and Co	over: F	orest	62.	.0 %
			wnstre		320				Curren	t Sub-	Domir	nant La	and Co	over: U	rban	
	s Grad ′alley L		entle?		No 2525 fe	tac	<b>0.48</b> N	lilee	4.2 Co	rridor						
	alley S	•			5.54	%			Histori					ield		
	Channe				2570 f	eet.	<b>0.49</b> N	/liles.	Currer	nt Dom	inant	land C	over: <b>l</b>	Jrban	51	.0 %
	Channe				5.45	%			Curren	t Sub-	Domir	nant La	and Co	ver: F	orest	
	Sinuosi				1.02				4.3 Rip		Buffer		Le	ft Ban	k Rig	ht Bank
	Vaters				2				Domin				-	-100	>10	-
					40		feet.		Sub-do Length			25 ft		-100	51-	100
	alley \ Confir		t Ratic	<b>)</b> .	40		feet.		4.4 Gro				-	one	0	
			t Type		Semi-	confi	ned		tep 5. I							
			Stream			•••••			5.1 Flo						-	
	edform			51	Step-	Pool			Type:	w rtog	alation	Nor				
Su	ub-clas	s Slop	be:		а				Use:			-	-			
Be	ed Mat	erial:			Cobb	le		;	5.2 Brid	dges a	nd Cu	lverts:	2		16	%
Step 3	. Basir	h Char	acteris	stics:					5.3 Bar		0				0.0	
3.1 A	lluvial	Fan:			Nor				5.4 Cha		0		•		18 %	, D
	Grade (				Nor				5.5 Dre				No	ne		
			ologic						tep 6. I	-						
			t Geol	ogical	Mat.:	Ice-	Conta		6.1 Ber	ms an	d Roa	ds	One S		Both S	
	eft Va	,			Verv	/ Stee	n		Road:	. d.			0.0		0.0	ft.
3.4 F 3.5 S	Right V	alley	Side		-	/ Stee	-		Railroa Berm:	10:			0.0 0.0		0.0 0.0	ft. ft.
	irologi	Grou	<b>.</b>	N	lot Ra		г 30.0 %		Improv	ed Pa	th∙		188		0.0	ft.
-	oding:		ιp.				94.0 %		Berms			(old):	0.0		0.0	π.
	ter Tal	ole De	en.		.0		<b>1.0</b> %		6.2 Flo				ent: <b>18</b>		7 %	
	ter Tal		•		.0		1.0 %	)	6.3 Cha				Μι	ultiple		
	dibility				ligh -		9.0 %	D	6.4 Me		•					
740	Comme	onts:			-				6.5 Me						Ratio:	0.0
7.40	2011111	5111.5.							6.6 Wa					F	Ratio:	0.0
									tep 7. \			urvey		0.00	• •	
									7.2 Bar					0.00		
									7.2 Bar	•		Dotort		0.00 ft		
									7.3 Ice/	Deptis	s Jam	rotent		uivert		
A A	4.2	4.3	5.1	5.2	5.3	E A	5.5	61	6.2	6.3	61	6.5	66	7.2	70	Total
4.1	4.2	4.3	J.1	J.2	5.5	5.4	5.5	6.1	0.2	0.3	6.4	0.5	6.6	1.2	7.3	Total
2	2	0	0	1	0	2	0	0	0	0	0	0	0	0	0	7
	<b>∠</b>	U				2		0								
High	High	N.S.	N.S.	Low	N.S.	High	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	
			1				1		1		I	I	I	I	I	

									nast				Jam	ina	<b>y</b> iv	cpoi
Basin:				W	'inoos	ki										
Strean	n Nam	ne:		Jo	ban Av	/e Tril	butary				Rea	ach	R8.S	52.02·	-S1.0	1
Topo N	Maps:	-					•				-			_		
Date L		dited <sup>.</sup>					ber 27	2007	7							
Waters		ancu.			inoos	-		2001	1							
		a du					-		aton D	ivor t		<b>4</b> 6				
Sub-w							er H	untin	gton R	iver to	o mou	ITN				
ls Rea	ch an	Impou	undme	ent? No	0											
Step 1	I. Rea	ch Lo	cation													
1.1 R	each	Descri	iption:	F	rom iı	nterse	ection	of So	uthvie	w Driv	ve and	Old J	ericho	o Road	d up te	D
1.2 T	owns:		•	R	lichmo	ond									-	
			Latitud		14.42			S	tep 4. L	and C	over -	Reac	h Hydr	ology		
				ude: -	72.99				4.1 Wa	tershe	d					
Step 2			-						Historio	c Land	Cove	r:	F	ield		
			stream		680				Curren	t Dom	inant l	and Co	over: <b>F</b>	ield	43	.0 %
			wnstre		460 No				Curren	t Sub-	Domir	nant La	and Co	ver: U	rban	
	s Grad alley L		entle?		<b>No</b> 2235 fe	aat	<b>0.42</b> N	lilee	4.2 Coi	ridor						
	alley S	•			2235 R 9.84		<b>U.4</b> 2  \	11105.	Historio	c Land	Cove	r:	F	orest		
	hanne				9.04 2317 f		<b>0.44</b> N	/iles	Currer	nt Dom	inant	land C	over: <b>l</b>	Jrban	30	.0 %
	hanne					%	<b>₩1 Γ</b> <sup>-</sup> <b>Γ</b>		Curren						ield	
	inuosi				1.04				4.3 Rip	arian E	Buffer		Le	ft Ban	k Rig	ht Banl
2.7 W	/aters	hed A	rea:		0	So	quare I	Miles	Domina	ant:			51	-100	51- <sup>*</sup>	100
	hanne						feet.		Sub-do			a = 4		6-50	26-	50
	alley \				12		feet.		Length				-		0	
			t Ratio		0				4.4 Gro					one		
			t Type	: Type:		wiy C	onfine		tep 5. I					ations		
	dform		bileam	rype.	A Step-	Pool			5.1 Flov	w Reg	ulatior	``	,			
-	b-clas		۰.		Otep				Type: Use:			Nor	ie			
	d Mat	•	ю.		Cobb	ما			5.2 Brid	taos o	nd Cu	lvorte	2		7	%
Step 3.			actoria	stics.	CODD				5.3 Bar	•			2		0.0	70
	lluvial		actoric	51105.	Nor				5.4 Cha				a: <b>0.</b> 0	ר	0.0	
	irade (				Nor				5.5 Dre				, U. No		0.0	
			ologic	Mat ·	-	-	oct 77		tep 6. F	0 0			-			
			•	ogical		oomu	Till		6.1 Ber				One S	ahiZ	Both S	Sidos
	eft Val			ogicai	mat		• • • •		Road:	ins an	untua	u3	0.0		0.0	ft.
	ight V				Extr	emely	y Steej	0	Railroa	id:			0.0		0.0	ft.
3.5 S	•				Extr	remely	y Stee	-	Berm:				0.0		0.0	ft.
	rologio	c Grou	in:	В	5	4	41.0 %		Improv	ed Pa	th:		0.0		0.0	ft.
	ding:		-1				100. %	, )	Berms				0.0		0.0	
	er Tat	ole De	ep:		.0		54.0 %		6.2 Flo			elopme			0.0	
			allow:	6	.0	5	54.0 %	)	6.3 Cha			_	No	one		
	dibility				ligh -		84.0 %	)	6.4 Mea		-				<u>.</u>	• •
	comme								6.5 Mea						Ratio:	0.0
7.40		51110.							6.6 Wa					F	Ratio:	0.0
									tep 7. V			urvey			_	
									7.2 Bar					0.00		
									7.2 Bar	•				0.00 ft		
									7.3 lce/	Debris	s Jam	Potent	iai: <b>C</b>	ulvert		
							_	- ·		<b>.</b> -						
4.1	4.2	4.3	5.1	5.2	5.3	5.4	5.5	6.1	6.2	6.3	6.4	6.5	6.6	7.2	7.3	Total
2	2	0	0	1	0	0	0	0	0	0	0	0	0	0	0	5
High	High	N.S.	N.S.	Low	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	
LL								1		1		1				

														<b>,</b>	opon
Basin:			W	inoos	ki										
Stream Nam	e:		Je	ericho	Road	Tribu	tary			Re	ach	R8.S	<b>52.03</b>		
Topo Maps:	•														
Date Last Ec	dited:					oer 27,	2007	7							
Watershed:	into di.			inoos	•	•	, 200.								
Sub-watersh	٥d٠					-	untin	gton F	livor t	0 mou	ith				
		un aluna a					unun	Igton r			lui				
Is Reach an	Impol	uname		0											
Step 1. Read	ch Loo	cation													
1.1 Reach [	Descri	iption:				icho R	load	for abc	out 150	00 fee	t.				
1.2 Towns:				lichmo	ond		~								
1.3 Downsti				14.42				tep 4. l			Reac	h Hydr	ology		
1.3 Downsti Step 2. Strea			uue	12.99				4.1 Wa				_	_		
2.1 Elevatio		<u> </u>	. <b>1</b>	560				Histori					Crop		• • • •
2.1 Elevatio				460				Curren						-	.0 %
2.1 Is Gradi				No				Curren 4.2 Col		יווויטט	iant La		wer: U	rban	
2.2 Valley L	ength	:		<b>1485</b> fe		0.28 N	liles			Care	<b>r</b> .	-	-		
2.3 Valley S				6.73				Histori					orest		<b>0</b> 0/
2.4.Channe				1540 f		<b>0.29</b> N	/iles.	Currer Curren	וו דעסע יו סטיף	nnant Domir		over: L	Jrban	( )	<b>'.0</b> %
2.5 Channe 2.6 Sinuosit		e:		6.49 1.04	%										ht Bank
2.6 Sindosin 2.7 Watersh	•	rea.		1.04	50			4.3 Rip Domin		Sullei			11 Dari	× rig >10	
2.8 Channe				•		feet.		Sub-do		nt:			one	Nor	-
2.9 Valley V				30		feet.		Length			n 25 ft.			0	
2.10 Confin			):	0				4.4 Ğrc				-	one	•	
2.10 Confin				Semi-	confi	ned	S	tep 5. I	nstrea	m Cha	annel N	Nodific	ations	_	
2.11 Refere		Stream	Туре:					5.1 Flo	w Reg	ulatior	``	,		-	
Bedform:				Step-	2001			Type:			Nor	ne			
Sub-class		be:		a Oshbi	1			Use:			l t	•		•	0/
Bed Mate		ootorio	tion	Cobb	le			5.2 Brid	•			0			%
Step 3. Basin		actens	sucs.	New				5.3 Bar 5.4 Cha		0		a: <b>0.</b> 0	n	0.0 0.0	
3.1 Alluvial 3.2 Grade C				Nor Nor				5.4 Cha 5.5 Dre		•		J. U.( No		0.0	
			Mot ·			ct 10		tep 6. F				-	ne		
3.3 Domina 3.3 Sub-dor		•			Soma			6.1 Ber				One S	Sido	Both S	Sidos
3.4 Left Val			ogical	iviat				Road:		u Rua	us	0.0		<b>0.0</b>	ft.
3.4 Right Va				Extr	emely	/ Stee	р	Railroa	ad:			0.0		0.0	ft.
3.5 Soils				Extr	emely	/ Stee	р	Berm:				0.0		0.0	ft.
Hydrologic	: Grou	ıp:	E	3	ç	99.0 %	, D	Improv	ed Pa	th:		1540	ft.	0.0	ft.
Flooding:			Ν	lone/R	are 1	100. %	, D	Berms				0.0		0.0	
Water Tab	le De	ep:	6	.0	g	<b>98.0</b> %		6.2 Flo			elopme			100 %	6
Water Tab	ole Sh	allow:	6	.0	ç	<b>98.0</b> %	)	6.3 Cha				NC	one		
Erodibility:			F	ligh -	ç	<b>99.0</b> %	,	6.4 Me 6.5 Me		•			г		0.0
7.4 Comme	ents:							6.6 Wa						Ratio:	0.0
								tep 7. \			urvev		Г	Ratio:	0.0
								7.2 Bar			<u></u>		0.00	f+	
								7.2 Баі 7.2 Ваі				(	0.00 ft		
								7.3 lce/	•		Potent			•	
4.1 4.2	4.3	5.1	5.2	5.3	5.4	5.5	6.1	6.2	6.3	6.4	6.5	6.6	7.2	7.3	Total
<b>T.IT.Z</b>	7.0	0.1	0.2	0.0	0.7	0.0	0.1		0.0	0.4	0.0	0.0		1.5	
1 2	0	0	0	0	0	0	2	0	0	0	0	0	0	0	5
	-				_										
Low High	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	High	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	

									iiuot		1.00		<b>G</b> ain		<b>,</b>	oper
Basin:				W	linoos	ki										
Stream	n Nam	ne:		U	nname	ed Tri	butary	,			Rea	ach	R8.5	<b>52.03</b>	-S1.0	1
Topo I	Maps:			R		OND										
Date L	•	dited:		ТІ	hu. Se	ptem	<b>ber 27</b>	2007	7							
Water					linoos	•										
Sub-w		ned:					-	untin	gton R	iver to	o mou	th				
Is Rea			Indmo				0	antin	gioni							
-					0											
	1. Rea															
	leach		iption:				ds sou	uthea	st for a	about	one-h	alf of a	a mile	past	Jerich	10
	owns:		1		Richmo 44.42	ond		C	100 1 I			Decel	المالية	ماممر		
			Latituo	ude: •					tep 4. L			Read	п пуш	ology		
Step 2				uue	12.30				4.1 Wa				-			
-			stream	n: <b>8</b>	810				Historio Curren					orest		.0 %
			wnstre		560				Curren						-	.0 %
2.1 ls	Grad	lient G	entle?		No				4.2 Coi		Domin				Dan	
	alley L				2 <b>895</b> f		<b>0.55</b> N	liles	Historia		Cove	r.	F	orest		
	alley S				8.64	%	0 50 1		Currer							.0 %
	hanne hanne				<b>2941</b> f 8.50	eet. %	0.56	/illes.	Curren	t Sub-	Domin	ant l a	and Co	ver U	rban	.0 /0
	Sinuosi		с.		1.02	70			4.3 Rip							ht Bank
	Vaters		rea:		0	Sc	ouare I		Domina		Janoi			00	>10	•
2.8 C	hanne	el Widt	:h:				feet.		Sub-do	ominar			51	-100		100
	alley \				13		feet.		Length				-		0	
			t Ratic		0		<b>f</b> !		4.4 Gro			•		one		
			t Type	: Type:		wiy C	onfine		tep 5. I					ations	-	
	dform		neam	туре.	Step-	Pool			5.1 Flov	w Reg	ulatior	n - (old <b>Nor</b>	,			
	b-clas		)e.		otop				Type: Use:			INOI	ie			
	ed Mat				Cobb	le			5.2 Brid	laes a	nd Cu	lverts:	1		1	%
Step 3.			acteris	stics:	0000				5.3 Bar	0		vonto.	•		0.0	/0
	lluvial				Nor	ne			5.4 Cha		-	nteninc	g: <b>0.</b> 0	)	0.0	
	Grade (		ol:		Nor				5.5 Dre		-	-	, No	ne		
3.3 D	omina	ant Ge	ologic	Mat.:	Till		76.	<b>0</b> %S	tep 6. F	Floodp	lain M	odifica	itions			
			<u> </u>	ogical	Mat.:	Ice-	Conta	ct	6.1 Ber	ms an	d Roa	ds	One S	Side	Both S	Sides
3.4 L	eft Va	lley Si	de	-			•		Road:				0.0	ft.	0.0	ft.
	light V	alley S	Side			-	/ Stee	_	Railroa	id:			0.0		0.0	ft.
3.5 S		-		_		-	/ Stee		Berm:		ul.		0.0		0.0	ft.
-	rologio	c Grou	ıp:	C			<b>39.0</b> %		Improv Berms			ر مام)،	0.0 0.0		0.0 0.0	ft.
	oding:						100. %	,	6.2 Flo						0.0	
	ter Tak				5.0 2.0		<b>52.0</b> %	,	6.3 Cha			, opine		ne	••	
	ter Tal dibility		allow.		ligh -		89.0 % 95.0 %	)	6.4 Me			ion:	-	-		
				•	iigii -	·	<b>JJ.U</b> /0	,	6.5 Mea		•			F	Ratio:	0.0
7.4 C	Comme	ents:							6.6 Wa					F	Ratio:	0.0
								<u>S</u>	tep 7. V	Vindsh	nield S	urvey				
								•	7.2 Bar	nk Eros	sion:			0.00		
									7.2 Bar	•				0.00 ft		
									7.3 lce/	Debris	s Jam	Potent	ial: C	ulvert		
			_			_		_		_						
4.1	4.2	4.3	5.1	5.2	5.3	5.4	5.5	6.1	6.2	6.3	6.4	6.5	6.6	7.2	7.3	Total
		~		<u> </u>	_	_	_	_		_	~	_	_	_	<u> </u>	
1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
Low	High	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	

								-							<b>,</b>	
Basin:				W	inoos	ki										
Stream	Name:			Je	ericho	Road	Tribu	tary			Rea	ach	R8.S	<b>52.04</b>		
Торо М	laps:			RI	CHMC	OND										
•	ast Edite	d:		Tł	nu, Se	ptemb	oer 27,	2007	7							
Waters					'inoos	-		,								
	atershed:						-	untin	igton F	Pivor ta	0 mou	ith				
								unun	igton r							
Is Read	ch an Imp	pou	namer		0											
	. Reach I															
	each Des	scrip	otion:				icho R	load	for abc	out 200	00 feet	t.				
1.2 To					lichmo	ond		~	4 m			D I				
	ownstrea			••	14.42				tep 4. I			Reac	n Hyar	ology		
	ownstrea Stream			ide: -	12.98				4.1 Wa				_	_		
	evation L			6	680				Histori					Crop		/
	evation E				560				Curren						-	.0 %
	Gradient				No				Curren		omin	iant La	ind Co	over: F	ield	
	lley Leng				1 <b>889</b> fe	eet.	0.36 N	/liles.	4.2 Co				_			
2.3 Va	alley Slop	be:			6.35	%			Histori					orest		
2.4.Ch	nannel Le	eng			2101 fe		<b>0.40</b> N	/liles.	Currer	nt Dom	inant l	land C	over: L	Jrban	73	<b>3.0</b> %
	nannel S	lope	e:		5.71	%			Curren							
	nuosity:	I A	<u></u>	1	1.11	~			4.3 Rip		Suffer				-	ht Bank
	atershed nannel W				1		quare I feet.	villes	Domin Sub-do		nt.			00  -100	>10 51-	
	alley Wid		1.		25		feet.		Length			25 ft.		-100	0	100
	Confinem		Ratio:		0		1001.		4.4 Gro				-	one	v	
	Confinem				Semi-	confi	ned		tep 5. I			•				
2.11 R	Reference				В				5.1 Flo						-	
	dform:				Step-	Pool			Type:	0		ÌNor				
	o-class S	•	e:		а				Use:							
	d Materia				Cobb	le			5.2 Brio	•		lverts:	1			%
Step 3.	Basin Ch	nara	acterist	tics:					5.3 Bai		•				0.0	
	luvial Fai				Nor				5.4 Ch		•				7 %	
	ade Con				Nor				5.5 Dre			•	No	ne		
	ominant		0			Conta			tep 6. I	-						
	ub-domin			ogical	Mat.:		Till		6.1 Ber	ms an	d Roa	ds	One S		Both S	
	ft Valley				Evtr	omoly	v Steej	•	Road:				0.0		0.0	ft.
	ght Valle	ey S	ae			-	/ Steel		Railroa	10:			0.0		0.0	ft.
3.5 Sc		r.c. · ·	<b>.</b> .	-		-	-		Berm: Improv	nad Dat	th∙		0.0 766		0.0	ft. ft
	ologic Gi	rou	h:	B			<b>37.0</b> %		Berms			′old)∙	766 0.0		0.0 0.0	ft.
Flood	0	Daa	201		lone/R		1 <b>00.</b> %		6.2 Flo						36 %	
	er Table I er Table		•		.0 .0		′6.0 % ′6.0 %	,	6.3 Ch	•			Sic			
	ibility:		anow.		.u ligh -		6.0 % 38.0 %	)	6.4 Me			ion:				
	•			•	ລ	Ľ	/0.0 /0	,	6.5 Me		•			F	Ratio:	0.0
7.4 Co	omments	5:							6.6 Wa					F	Ratio:	0.0
								<u>S</u>	tep 7. \	Nindsh	nield S	urvey				
									7.2 Bai	nk Eros	sion:			0.00	ft.	
									7.2 Baı	•				0.00 ft		
									7.3 Ice	/Debris	s Jam	Potent	ial: B	ridge		
											_					
4.1 4	4.2 4.	3	5.1	5.2	5.3	5.4	5.5	6.1	6.2	6.3	6.4	6.5	6.6	7.2	7.3	Total
1	2 0	c	0	0	0	2	0	1	0	0	0	0	0	0	0	6
Low	High N.	S.	N.S.	N.S.	N.S.	High	N.S.	Low	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	
																—

Basin:				W	'inoos	ki							_		<i>y</i>	
Stream	n Nam	ie:		Je	ericho	Road	Tribu	tary			Rea	ach	R8.S	<b>52.05</b>		
Торо М	Maps:			R		OND										
Date L	ast Eo	dited:		Tł	nu, Se	ptemb	oer 27,	, 2007	7							
Waters	shed:			W	inoos	ki Riv	er									
Sub-w	atersh	ed:		W	'inoos	ki Riv	er H	untin	gton R	iver to	o mou	ith				
ls Rea	ich an	Impou	undme	nt? No	0				_							
Step 1	I. Rea	ch Loo	cation													
<b>!</b>				т	he rea	ach ex	tends	<b>900</b> 1	feet eas	st fror	n Jeri	cho R	oad.			
				R	lichmo											
								S	tep 4. L	and C	over -	Reac	h Hydr	ology		
				ude: -	72.98				4.1 Wa	tershe	d					
			<u>.                                    </u>		205											
													-			.0 %
											Domin	iant La	and Co	ver: F	leid	
					<b>844</b> fe		<b>0.16</b> N	/liles.			0		_			
						%									4.0	• • • •
			,				<b>0.17</b> N	/liles.	Curren		Inant I	and C	over: F		01 הוה	.0 %
			e:			%										ht Bonk
			rea.		_	S	nuare M				Juliel					
					•			villes			nt:					-
2.9 V	alley V	Nidth:			244		feet.		Length	w/ les	s than	25 ft.:			0	
					0							•				
						Broad			•					ations		
			siream			.Pool				w Reg	ulatior					
			Δ.		I/IIIIC							NO	ie			
			<i>.</i> .		Grave	4				laes a	nd Cul	lverts:	0		0	%
			acteris	tics:	Clare					-			Ŭ			/0
<u> </u>					Nor	e					0	ntening	g: <b>36</b>	0		D
			ol:		-	-		;	5.5 Dre	dging	Histor	y:	No	ne		
3.3 D	omina	ant Ge	ologic	Mat.:	Ice-	Conta	ct 97.	<b>0</b> %S	tep 6. F	loodp	lain M	odifica	tions			
3.3 S	ub-do	minan	t Geol	ogical	Mat.:	G	lacial		6.1 Ber	ms an	d Roa	ds	One S	Side	Both S	Sides
					Von	. 6100	<b>1</b>		Road:				0.0			ft.
	•	alley S	Side		-		þ			id:						ft.
		0			-					od Dai	h.					ft.
	0	c Grou	ip:			-		-				old).				ft.
	0	م مام	on.													
			•					,		•		•				
			anom.					, D			•					
					U											1.0
7.40		5111.5.									,			11.1 F	Ratio:	1.0
									· ·			urvey			•.	
Stream Name:         Jericho Road Tributary         Reach         R8.52.05           Topo Maps:         RICHMOND         Date Last Edited:         Thu, September 27, 2007           Watershed:         Winooski River         Winooski River Huntington River to mouth         Is           Is Reach an Impoundment? No         Step 1. Reach Location         The reach extends 900 feet east from Jericho Road.           1.1 Reach Description:         The reach extends 900 feet east from Jericho Road.         Richmond           1.3 Downstream Latitude:         44.42         Step 1. Land Cover - Reach Hydrology           1.3 Downstream Latitude:         44.42         Step 4. Land Cover - Reach Hydrology           2.1 Elevation Downstream:         695         Current Dominant Land Cover: Forest         85.0 9           2.1 Elevation Downstream:         696         Current Dominant Land Cover: Forest         85.0 9           2.1 Istevation Downstream:         696         Current Sub-Dominant Land Cover: Forest         85.0 9           2.2 Valley Length:         912 feet.         0.16 Miles: Current Dominant Land Cover: Forest         16.0 9           2.4 Channel Length:         91         Sub-chass Stope:         18         Sub-chass Stope:         19           2.4 Valley Width:         244         feet.         Sub-chass Stope:         Sub-chass Stope:																
									1.3 ICH	DEDLIS	Jaill	ruen	.iai. <b>U</b>	uiveit		
4.1	4.2	4.3	5.1	5.2	5.3	5.4	5.5	6.1	6.2	6.3	6.4	6.5	6.6	7.2	7.3	Total
0	1	0	0	0	0	2	0	0	0	0	0	2	2	0	0	7
N.S.	Low	N.S.	N.S.	N.S.	N.S.	High	N.S.	N.S.	N.S.	N.S.	N.S.	High	High	N.S.	N.S.	
			I	1	1		1	1	I	I	1		1	1	1	<u> </u>

								nast	· ·	1100		Gam		<b>y</b> iv	cpon
Basin:			W	inoos	ki										
Stream Na	ame:		U	nname	ed Tri	butary	,			Rea	ach	R8.S	<b>52.05</b> -	-S1.0	1
Торо Мар	-														
Date Last						ber 19	. 200	7							
Watershed				inoos	•		, 200	•							
Sub-water						-	untin	gton R	ivor t	0 mou	th				
		undmo				CI II	unun	Igton R		o mou	i i i				
Is Reach a	an impo	uname	ent <i>e</i> ing	0											
Step 1. Re															
1.1 Reac		iption:				ieet ea	st of	Jerich	o Roa	d in a	mixed	d fores	st.		
1.2 Town				lichmo	ond		~	4 a m 1 1			Deed				
1.3 Dowr 1.3 Dowr				14.42 72 08				tep 4. L			Reac	n Hyar	ology		
Step 2. St			uue	12.30				4.1 Wa				-			
2.1 Eleva		<u> </u>	c g	900				Historio Curren					orest		• •/
2.1 Eleva				595				Curren						94	.0 %
2.1 Is Gra	adient G	entle?		No				4.2 Cor			ιαπτ		vei.		
2.2 Valley				2600 fe		<b>0.49</b> N	liles	Historia		Covo	r.		ield		
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2.5 Chan 2.6 Sinuc		<i>ю</i> .		1.02	70			4.3 Rip							iht Bank
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2.8 Chan	nel Wid	th:				feet.		Sub-do	minar			N	one	51-	-
2.9 Valley				15		feet.		Length							
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Bedfor		Jucan	турс.	Step-	Pool			5.1 Flov	м кед	ulation	i - (ola	): NC	one		
	ass Slop	be:		o top				Type: Use:							
	aterial:			Cobb	le			5.2 Bric	laes a	nd Cu	lverts:	0		0	%
Step 3. Bas		acteris	stics:					5.3 Bar	•					0.0	
3.1 Alluvi				Nor	ne			5.4 Cha			ntening	g:		0.0	
3.2 Grade	e Contro	ol:		Nor	ne		:	5.5 Dre	dging	Histor	y:	No	ne		
3.3 Domi	nant Ge	eologic	Mat.:	Till		94.	<b>0</b> %S	tep 6. F	loodp	lain M	odifica	tions			
3.3 Sub-c	dominan	t Geol	ogical	Mat.:	lce-	Conta	ct	6.1 Ber	ms an	d Roa	ds	One S	Side	Both S	Sides
3.4 Left V	,			Stor				Road:					ft.		ft.
3.4 Right	Valley \$	Side		Stee	∌ρ γ Stee	n		Railroa	id:				ft.		ft.
3.5 Soils			~	-	•	•		Berm: Improv	od Dai	łh:			ft.		ft.
Hydrolog	•	ıp:	C			73.0 % 100. %		Berms			′old)∙	0.0	ft. ft	0.0	ft.
Flooding Water T		on:		.5		<b>67.0</b> %	,	6.2 Flo						0.0	
Water T		•		.5		67.0 %	,	6.3 Cha	-		•		ot Eval	luated	I
Erodibili				ligh -		93.0 %		6.4 Mea	ander	Migrat	ion:				
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	m Nam			Je	/inoos ericho	Road	Tribu	tary			Re	ach	R8.5	62.06	5	
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ls Rea	ach an	Impou	undme	nt? N	0											
Step	1. Rea	ch Loo	cation													
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	owns:			F	Richmo	ond										
	Downst				44.42			S	tep 4. L	and C	over -	Reac	h Hydr	ology		
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	2. Stre		<u>.                                    </u>						Historio				-	Shrub		
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	/alley S				13.19				Historio				-	ield		
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•	oding:		ιp.		, None/R		100. %	•	Berms			(old):	0.0		0.0	
	ter Tal	ole De	ep:		2.5		<b>11.0</b> %	1	6.2 Flo	odplaiı	n Deve	èlopme			0.0	
	iter Tal		•		2.0		<b>52.0</b> %		6.3 Cha				No	ot Eva	luated	l
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4.1	4.2	4.3	5.1	5.2	5.3	5.4	5.5	6.1	6.2	6.3	6.4	6.5	6.6	7.2	7.3	Total
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Low	Low	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	
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Strear	m Nam	ne:		St	tage R	d Trib	outary				Rea	ach	R9.5	52.01		
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•	Last E			Tł	hu, Se	ptemb	<b>ber 27</b> ,	, 2007	7							
Water	shed:				inoos	-										
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		lient G			No		0451	Ailee	4.2 Coi	rridor						
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		el Leng	th:		<b>933</b> f		0.18	/iles	Currer	nt Dom	inant	land C			56	<b>.0</b> %
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2.11	Refere	ence S	Stream	Type:	C				5.1 Flov						_	
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	ed Mat				Grave	el			5.2 Bric	•			3		14	%
Step 3			acteris	stics:					5.3 Bar		-			_	0.0	
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	•	ble De	ep:		.0		<b>)5.0</b> %	)	6.2 Flo	-		elopme			0.0	
Wa	ter Ta	ble Sh	allow:	1	.5	g	<b>)5.0</b> %	)	6.3 Cha			•	Mu	ultiple		
Ero	dibility	:		H	ligh -		<b>4.0</b> %	,	6.4 Mea		-			4 - 0 -	<b>N</b> = 4 <sup>2</sup> = 1	10
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4.1	4.2	4.3	5.1	5.2	5.3	5.4	5.5	6.1	6.2	6.3	6.4	6.5	6.6	7.2	7.3	Total
2	2	2	0	1	0	2	0	0	0	0	0	2	2	0	0	13
High	High	High	N.S.	Low	N.S.	High	N.S.	N.S.	. N.S.	N.S.	N.S.	High	High	N.S.	N.S.	
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Basin				W	inoos	ki										
Strea	m Nam	ne:		St	age R	d Trib	outary				Rea	ach	R9.5	52.02		
Topo	Maps:			RI	СНМС	OND	•									
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	ach an		Indmo					untin	igton it							
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	ub-clas		) <del>0</del> .		orch-				Type: Use:			Nor	ie			
	ed Mat				Cobbl	e			5.2 Brid	laes a	nd Cul	verts:	2		66	%
	6. Basir		acteris			-			5.3 Bar	0			<u> </u>		0.0	
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-	Grade (		ol:		Non				5.5 Dre				No			
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	_eft Va				<b>F</b> 4~		044	_	Road:				0.0		0.0	ft.
	Right V	alley S	Side			-	V Steep		Railroa	ıd:			0.0		0.0	ft.
3.5 5		~		_		-	Steep		Berm:		łb.		0.0		0.0	ft.
	drologio	c Grou	ıp:	D			<b>57.0</b> %		Improv Berms			ر ماط ۲۰	0.0 0.0		0.0 0.0	ft.
	oding:						<b>60.0</b> %	,	6.2 Flo						0.0 32 %	
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Basin:WinooskiStream Name:Stage Rd TributaryReach R9.S2.03Topo Maps:RICHMONDDate Last Edited:Thu, September 27, 2007Watershed:Winooski RiverSub-watershed:Winooski River Huntington River to mouthIs Reach an Impoundment?NoStep 1. Reach LocationFrom reach break by I-89 to change in slope before a conifer1.1 Reach Description:From reach break by I-89 to change in slope before a conifer1.2 Towns:Richmond1.3 Downstream Latitude:44.391.3 Downstream Latitude:-72.942.1 Elevation Upstream:3802.1 Elevation Downstream:3552.1 Elevation Downstream:355Current Dominant Land Cover: Urb	
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1.1 Reach Description:From reach break by I-89 to change in slope before a conifer1.2 Towns:Richmond1.3 Downstream Latitude:44.391.3 Downstream Longitude:-72.94Step 2. Stream Type-72.942.1 Elevation Upstream:3802.1 Elevation Downstream:3552.1 Levation Downstream:3552.1 Levation Downstream:Ne	
1.2 Towns:Richmond1.3 Downstream Latitude:44.391.3 Downstream Longitude:-72.94Step 2. Stream Type-72.942.1 Elevation Upstream:3802.1 Elevation Downstream:3552.1 Levation Downstream:3553.1 Levation Downstream:3553.1 Levation Downstream:3553.1 Levation Downstream:3553.1 Levation Downstream:3553.1 Levation Downstream:3553.1 Levation Downstream:355<	_
1.3 Downstream Latitude:44.39Step 4. Land Cover - Reach Hydrology1.3 Downstream Longitude:-72.944.1 WatershedStep 2. Stream Type-72.94Historic Land Cover:Shrub2.1 Elevation Upstream:380Current Dominant land Cover:Forest2.1 Elevation Downstream:355Current Sub-Dominant Land Cover:Urb	stand
1.3 Downstream Longitude:-72.941.3 Downstream Longitude:-72.94Step 2. Stream Type4.1 Watershed2.1 Elevation Upstream:3802.1 Elevation Downstream:3552.1 Lo Cradient Contlo2No	
Step 2. Stream TypeHistoric Land Cover:Shrub2.1 Elevation Upstream:380Current Dominant land Cover:Forest2.1 Elevation Downstream:355Current Sub-Dominant Land Cover:Urb	
2.1 Elevation Upstream:380Current Dominant land Cover:Forest2.1 Elevation Downstream:355Current Sub-Dominant Land Cover:Urb	
2.1 Elevation Downstream: <b>355</b> 2.1 La Cradiant Contral: <b>Current Sub-Dominant Land Cover: Urb</b>	81.0 %
2.1 lo Cradient Contlo2 No	
2.1 Is Gradient Gentle? <b>No</b> 4.2 Corridor	
2.2 Valley Length: 800 feet. 0.15 Miles.	
2.3 Valley Slope: <b>3.13</b> % Fision Cland Cover. <b>Field</b> 2.4.Channel Length: <b>1046</b> feet. <b>0.20</b> Miles. Current Dominant land Cover: <b>Urban</b>	<b>68.0</b> %
2.5 Channel Slope: <b>2.39</b> % Current Sub-Dominant Land Cover:	/0
	Right Bank
2.7 Watershed Area: 1 Square Miles Dominant: 51-100	>100
	26-50
,	0
2.10 Confinement Ratio:04.4 Ground Water Inputs:Minimal2.10 Confinement Type:Very BroadStep 5. Instream Channel Modifications	
2.11 Reference Stream Type: <b>C</b> 5.1 Flow Regulation - (old):	
Bedform: Riffle-Pool Type: None	
Sub-class Slope: <b>b</b> Use:	
Bed Material: Cobble 5.2 Bridges and Culverts: 1	8 %
<u></u>	0.0
	40 %
3.2 Grade Control: None 5.5 Dredging History: None	
3.3 Dominant Geologic Mat.: Alluvial 62.0% Step 6. Floodplain Modifications	
0	oth Sides
3.4 Left Valley Side         Road:         0.0         ft. 0.           3.4 Right Valley Side         Steep         Railroad:         0.0         ft. 0.	
3.5 Soils Hilly Berm: 0.0 ft. 0.	
Hydrologic Group: Not Rated 62.0 % Improved Path: 0.0 ft. 0.	
Flooding: Frequent 62.0 % Berms and Roads (old): 0.0 ft. 0.	.0
Water Table Deep: 2.5 19.0 % 6.2 Floodplain Development: 0.0 ft. 0.	.0
Water Table Shallow:1.519.0 %6.3 Channel Bars:Multiple	
Erodibility: High - 36.0 % 6.4 Meander Migration: 6.5 Meander Width: 15.0 Rates	tio: <b>1.0</b>
7.4 Comments: 6.6 Wavelength: <b>15.0</b> Rat	
Step 7. Windshield Survey	
7.2 Bank Erosion: 0.00 ft.	
7.2 Bank Height: 0.00 ft.	
7.3 Ice/Debris Jam Potential: <b>Culvert</b>	
	7.3 Total
4.1     4.2     4.3     5.1     5.2     5.3     5.4     5.5     6.1     6.2     6.3     6.4     6.5     6.6     7.2     7	
4.1       4.2       4.3       5.1       5.2       5.3       5.4       5.5       6.1       6.2       6.3       6.4       6.5       6.6       7.2       7         1       2       0       0       1       0       2       0       0       0       0       2       2       0	0 10
1     2     0     1     0     2     0     0     0     0     2     0	0 10 N.S.

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Basin:				W	linoos	ki										
Strean		e:		St	tage R	d Trik	outary				Re	ach	R9.5	<b>52.04</b>		
		0.					J									
Date L	•	dited.					oer 27	2007	,							
Waters		incu.			linoos	-		, 2001								
Sub-w		٥d٠					-	untin	aton E	livor ta	- mou	14h				
							ег п	unun	gton F	liver u		ILN				
ls Rea	icn an	Impol	Iname	nt? N	0											
Step 1	1. Read	ch Loo	cation													
1.1 R	leach [	Descri	iption:	F	rom lo	ower r	each	break	the ch	nannel	para	llels S <sup>.</sup>	tage R	ld. up	to the	<b>}</b>
	owns:				Richmo	ond		_				_				
	ownst				44.39				tep 4. l			Reac	h Hydr	ology		
	ownst 2. Strea			uae: -	-72.93				4.1 Wa				_			
	levatic		<u>.                                    </u>		620				Histori				-	Shrub		• • • •
	levatic				380				Curren						-	.0 %
	Gradi				No				Curren		Domir	iant La	and Co	ver: U	rban	
	alley L				<b>3072</b> fe		0.58 N	/liles.	4.2 Col		Corre		_	here		
	alley S				7.81	%			Histori					Shrub	~ ~	<b>0</b> 0/
	hanne				3140 f		0.59	/iles.	Currer Curren	וו דעסע ד פייף	nnant Domir		over: L		-	.0 %
	hanne inuosit	•	e:		7.64 1.02	%			4.3 Rip							ht Bank
	Vatersh		rea.		1.02	Sc			Domin		Sullei			11 Dam 1 <b>00</b>	× riy >10	
	hanne				•		feet.		Sub-do		nt:			-100	51-	-
	alley V				20		feet.		Length			n 25 ft.			0	
	Confin				0				4.4 Gro					one		
	Confin					wly C	onfine		tep 5. I					ations		
	Refere		stream	Type:	A Casca	oho		:	5.1 Flo	w Reg	ulatior					
					Casca	aue			Type:			Nor	ne			
	b-clased Mate	-	ю.		Bedro				Use: 5.2 Brid	daos o	nd Cu	lvorte:	3		6	%
Step 3.			acteris	stics.	Deur				5.2 Brid 5.3 Bar	•			3		0.0	/0
-	Iluvial				Nor				5.4 Cha		0		a: <b>0.0</b>	)	0.0	
	Grade (		<u>.</u>			tiple			5.5 Dre		-	-	No		••••	
	Domina			Mat.:	Till		89.		tep 6. F			•				
	ub-dor					Α	lluvial		6.1 Ber				One S	Side	Both S	Sides
	eft Val			0		-			Road:				0.0	ft.	0.0	ft.
3.4 R	light Va	alley S	Side		-	/ Stee	-		Railroa	ad:			0.0	ft.	0.0	ft.
3.5 S	Soils				Very	/ Stee	р		Berm:				0.0		0.0	ft.
•	rologic	: Grou	ıp:	C			<b>57.0</b> %		Improv			(a.l.al).	0.0		0.0	ft.
	oding:						<b>91.0</b> %		Berms 6.2 Flo				324 2011 - 11		10 % 3 %	
	ter Tab		•		2.5		<b>57.0</b> %	,	6.3 Ch			Jopine	Sic		0 /0	
	ter Tab		allow:		.5 liah -		57.0 % 90.0 %	)	6.4 Me			ion:	•			
	dibility:			ſ	ligh -	:	JU.U 70	,	6.5 Me		•			F	Ratio:	0.0
7.4 C	Comme	ents:							6.6 Wa						Ratio:	0.0
								S	tep 7. \	Nindsk	nield S	urvey				
									7.2 Bar	nk Eros	sion:			<b>0.00</b> f	ft.	
									7.2 Bar					0.00 ft		
									7.3 Ice	/Debris	s Jam	Potent	ial: C	ulvert		
4.1	4.2	4.3	5.1	5.2	5.3	5.4	5.5	6.1	6.2	6.3	6.4	6.5	6.6	7.2	7.3	Total
1	2	0	0	1	0	0	0	0	1	0	0	0	0	0	0	5
Low	High	N.S.	N.S.	Low	N.S.	N.S.	N.S.	N.S.	Low	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	
				1			1		1			1		·		<u> </u>

Basin:         Winooski         Reach         R9.52.04-51.01           Stream Name:         Unnamed Tributary         Reach         R9.52.04-51.01           Topo Maps:         RICHMOND         Date Last Edited:         Weinoski River -           Watershed:         Winooski River -         Humington River to mouth           Is Reach an Impoundment?         No           7.1         Reach Description:         From just east of Stage Rd. where it intersects Blue Rock Rd. up to           1.3         Downstream Latitude:         72.33         4.1 Watershed           1.3         Downstream Latitude:         72.33         4.1 Watershed           2.1         Elevation Downstream:         620         Current Sub-Dominant Land Cover: Forest 80.0 %           2.1         Elevation Downstream:         724 feet, 1.44 Miles,										nast	· I	I CC		Juin	mai	<b>y</b> iv	cpon
Topo Maps:         RICHMOND           Date Last Edited:         Wed, September 19, 2007           Watershed:         Winooski River - Huntington River to mouth           Is Reach an Impoundment? No         Step 1. Reach Location           1.1 Reach Description:         From just east of Stage Rd. where it intersects Blue Rock Rd. up to Bioton, Richmond           1.3 Downstream Latitude:         44.40         Step 4. Land Cover - Reach Hydrology           1.3 Downstream Longitude:         72.93         4.1 Watershed           1.1 Reach Description:         From just east of Stage Rd. where it intersects Blue Rock Rd. up to Bioton, Richmond         Step 4. Land Cover - Reach Hydrology           1.3 Downstream Longitude:         72.93         4.1 Watershed           2.1 Elevation Downstream:         620         Current Duminant Land Cover: Intran           2.2 Valley Length:         1.46 Miles.         4.2 Corridor           2.3 Valley Length:         1.46 Miles.         Current Sub-Dominant Land Cover: Urban           2.4 Channel Stope:         10.01 %         Current Sub-Dominant Land Cover: Urban           2.6 Sinuosity:         1.04         5.2 Braina Buffer:         Left Bank Right Bani           2.7 Watershed Area:         0         Square Milles Dominant:         >100         >100           2.8 Sinuosity:         1.04         5.2 Bridges	Basin	:			W	linoos	ki										
Topo Maps:         RICHMOND           Date Last Edited:         Wed, September 19, 2007           Watershed:         Winooski River - Huntington River to mouth           Is Reach an Impoundment? No         Step 1. Reach Location           1.1 Reach Description:         From just east of Stage Rd. where it intersects Blue Rock Rd. up to           1.3 Downstream Latitude:         44.40         Step 4. Land Cover - Reach Hydrology           1.3 Downstream Longitude:         72.93         4.1 Watershed           2.1 Elevation Downstream:         620         Current Dominant Land Cover:         Strub           2.1 Elevation Downstream:         620         Current Sub-Dominant Land Cover:         Wruban           2.2 Valley Length:         722 feet.         1.46 Miles.         4.2 Corridor           2.3 Valley Length:         712 feet.         1.46 Miles.         Current Sub-Dominant Land Cover:         Gan > 100           2.6 Channel Slope:         10.44         4.3 Riparian Buffer         Left Bank Right Ban         2.100           2.7 Watershed Area:         0         Square Miles Dominant:         >100         >100           2.8 Origine:         1.04         5.2 Borind Armatics         None         5.1 Flow Regulation - (old):         None           2.9 Valley Widht:         18         feet. <t< td=""><td>Strear</td><td>m Nam</td><td>ne:</td><td></td><td>U</td><td>nname</td><td>ed Tri</td><td>butary</td><td></td><td></td><td></td><td>Rea</td><td>ach</td><td>R9.5</td><td>52.04-</td><td>-S1.0</td><td>1</td></t<>	Strear	m Nam	ne:		U	nname	ed Tri	butary				Rea	ach	R9.5	52.04-	-S1.0	1
Date Last Edited:         Wed, September 19, 2007           Watershed:         Winooski River           Sub-watershed:         Winooski River - Huntington River to mouth           Is Reach an Impoundment?         No           Step 1. Reach Location         From Just east of Stage Rd. where it Intersects Blue Rock Rd. up to Diton, Richmond           1.1 Reach Description:         From Just east of Stage Rd. where it Intersects Blue Rock Rd. up to Diton, Richmond           1.3 Downstream Laitude:         -72.93           2.1 Elevation Upstream:         44.40           2.1 Elevation Upstream:         1400           2.1 Elevation Upstream:         520           2.2 Valley Length:         74.44 feet.           2.3 Valley Slope:         10.48           2.4 Cornent Sub-Dominant Land Cover:         Shrub           2.6 Shuosity:         1.04           2.7 Watershed Area:         0           2.8 Channel Width:         18 <feet.< td="">           2.9 Valley Width:         18<feet.< td="">           2.10 Confinement Type:         None           3.2 Grade Control:         None           3.3 Ub-dominant Geologic Mat.:         TIII           3.4 Left Valley Side         5.5 Dredging History:         None           3.4 Left Valley Side         5.4 Channel Streigh History:</feet.<></feet.<>																	-
Watershed:         Winooski River           Sub-watershed:         Winooski River - Huntington River to mouth           Is Reach an Impoundment? No           Step 1. Reach Location           1.1 Reach Description:           1.2 Towns:           3.1 Downstream Longitude:           44.40           3.2 Ornstream Longitude:           74.4 Reach Location           1.1 Reach Description:           1.1 Beradion Upstream:           2.1 Elevation Downstream           2.1 Stream Type           1400           2.1 Elevation Downstream:           2.2 Valley Length:           2.2 Valley Length:           7.2.4 Valley Longth:           7.44 feet.           1.46 Miles           7.41 Keler           1.46 Miles           2.6 Sincosity:           1.0.47 Watershed Area:           0         Square Miles           2.10 Confinement Ruic:         0           2.11 Reference Stream Type: A           3.11 Reference Stream Type: None           3.2 Grade Control:           3.2 Grade Control:	•	•	dited:		W	ed. Se	eptem	ber 19	. 2007	7							
Sub-watershed:         Wincoski River Huntington River to mouth           Is Reach an Impoundment?         No           Step 1. Reach Location         From just east of Stage Rd. where it intersects Blue Rock Rd. up to           1.1 Reach Description:         From just east of Stage Rd. where it intersects Blue Rock Rd. up to           1.2 Towns:         Botton, Richmond           1.3 Downstream Laitude:         -72.93         Step 4. Land Cover - Reach Hydrology           1.3 Downstream Longitude:         -72.93         At Watershed           2.1 Elevation Upstream:         1400         Current Sub-Dominant Land Cover: Forest         89.0 %           2.1 Stegan Type         10.48 %         Current Sub-Dominant Land Cover: Urban         A: 2 Corridor           2.3 Valley Stope:         10.48 %         Current Sub-Dominant Land Cover: Urban         None           2.6 Shunosity:         1.04         4.3 Riparian Buffer         Left Bank Right Band           2.7 Watershed Area:         0         Square Miles         Dominant: None         None           2.10 Confinement Type:         Narrowy Confined         Step -Pool         Step -Pool         Step -S Instream Channel Modifications           3.1 Allwids Fam:         None         5.2 Bridges and Culverts:         0         0 %           3.2 Grade Control:         None							-		,								
Is Reach an Impoundment?         No           Step 1. Reach Location         1.1 Reach Location           1.2 Towns:         Bolton, Richmond           1.3 Downstream Latitude:         44.00           Step 2. Stream Type         72.93           2.1 Elevation Upstream:         1400           2.1 Elevation Upstream:         1400           2.1 Elevation Upstream:         1400           2.1 Elevation Upstream:         1400           2.3 Valley Slope:         1444 feet.           2.3 Valley Slope:         10.48 %           2.4 Channel Length:         7721 feet.           1.6 Grandel Width:         18 feet.           2.6 Sincosity:         1.04 %           2.6 Sincosity:         1.04 %           2.1 D Confinement Type:         Narrowly Confined           2.1 Reference Stream Type: A Bedform:         Step Pool           3.1 Altuvial Fan:         None           3.2 Grade Control:         None           3.3 Sub-class Slope:         D           3.4 Left Valley Side         Step Pool           3.1 Altuvial Fan:         None           3.5 Sub-class Slope:         D           3.5 Sub-class Slope:         D           3.5 Sub-clominant Caelogical Mat::         Step Pool<			ned:		W	linoos	ki Riv	er H	untin	aton R	iver to	o mou	ıth				
Step 1. Reach Location           From just east of Stage Rd. where it intersects Blue Rock Rd. up to Bolton, Richmond           1.2 Towns:           Bolton, Richmond           1.1 Reach Description:           Town site east of Stage Rd. where it intersects Blue Rock Rd. up to Bolton, Richmond           1.1 Reach Location           Step 1. Reach Location           Step 2. Land Cover - Reach Hydrology           A Water Shoto Current Dominant Land Cover: Forest         8.0 %           Current Sub-Dominant Land Cover: Forest         8.0 %           Current Sub-Dominant Land Cover: Forest         6.3.0 %           Colspan= Miles Domin				Indme				•	••••••	3							
1.1 Reach Description:         From just east of Stage Rd. where it intersects Blue Rock Rd. up to Botton, Richmond           1.2 Towns:         Botton, Richmond           1.3 Downstream Latitude:         44.40         Step 4. Land Cover - Reach Hydrology           1.3 Downstream Latitude:         44.40         Step 4. Land Cover - Reach Hydrology           1.1 B Gradien Centle?         72.93         4.1 Watershed           2.1 Elevation Downstream:         1400         Current Sub-Dominant Land Cover:         Shrub           2.1 Stardien Gentle?         No         1.44 Miles.         Current Sub-Dominant Land Cover:         Urban           2.3 Valley Slope:         10.48         *         1.46 Miles.         Current Dominant land Cover:         Shrub           2.4 Channel Length:         7721 feet.         1.46 Miles.         Current Sub-Dominant Land Cover:         Urban           2.6 Sinuosity:         1.04         Square Miles         Dominant:         >100         >100           2.7 Confinement Type:         Narrowly Confined         Sub-Class Slope:         Sub-Class Slope:         None         Step-Pool           3.1 Reference Stream Type:         Narrowly Confined         Step -Pool         Step -Pool         None         5.5 Dredging History:         None           3.2 Grade Control:         None <t< td=""><td></td><td></td><td></td><td></td><td></td><td>-</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></t<>						-											
1.2 Towns:       Bolton, Richmond         1.3 Downstream Lative:       44.4 lick         3.1 Jownstream Landiude:       4.72.93         3.1 Elevation Dystream:       1400         2.1 Elevation Downstream:       1400         2.1 Elevation Downstream:       620         2.1 Elevation Downstream:       620         2.2 Valley Length:       7721 feet.         2.3 Valley Slope:       10.48 %         2.4 Channel Length:       7721 feet.         2.6 Sinuosity:       10.48 %         2.6 Sinuosity:       10.40         2.7 Watershed Area:       0         2.9 Valley Width:       18 feet.         2.10 Confinement Ratio:       0         2.11 Reference Stream Type: A         Bedform:       Step-Pool         3.2 Busin Characteristics:       None         3.3 Dub-class Slope:       None         3.4 Right Valley Side       Extremely Steep         3.3 Sub-class Slope:       None         3.3 Cominant Geologic Mat::       Till         3.4 Right Valley Side       Extremely Steep         3.5 Solis       None         1.4 Right Valley Side       Step Armoly Confined         3.4 Edit Valley Side       Step Pool         3.5 D	<b>i</b>				F	-		at af C	1000	ابيد ام ۵		intore	a a ta l			متناه (	1
1.3 Downstream Latitude:       44.40       Step 4. Land Cover - Reach Hydrology         1.3 Downstream Longitude:       -72.93       4.1 Watershed         1.4 Elevation Dystream:       1400       Current Dominant Land Cover:       Shrub         2.1 Elevation Dystream:       1400       Current Dominant Land Cover:       Shrub         2.1 Elevation Dystream:       1446 fet.       1.41 Miles.       4.2 Corridor         2.1 Is Gradient Gentle?       7444 fet.       1.41 Miles.       Current Sub-Dominant Land Cover:       Shrub         2.3 Valley Slope:       10.48 %				iption:					otage	Ra. wr	iere it	Inters	Sects	Bine R		a. up	το
1.3 Downstream Longitude: -72.93       4.1 Watershed         Step 2. Stream Type       4.1 Watershed         1.1 Elevation Downstream:       620         2.1 Elevation Downstream:       620         2.2 Valley Length:       7444 feet.         2.3 Valley Stope:       10.48         2.4 Channel Length:       7721 feet.         1.45 Gradient Gentle?       No         2.4 Channel Length:       7721 feet.         1.46 Miles.       Current Sub-Dominant Land Cover:         2.4 Channel Stope:       10.10 %         2.5 Channel Stope:       10.10 %         2.6 Sinuosity:       10.44         2.8 Valley Width:       18 feet.         2.9 Valley Width:       18 feet.         2.10 Confinement Ratio:       0         2.11 Reference Stream Type:       Narrowly Confined         2.11 Reference Stream Type:       None         Step 3. Basin Characteristics:       Step-Pool         3.1 Alluvial Fan:       None         3.2 Grade Control:       None         3.3 Sub-dominant Geologic Mat.:       Till         3.4 Right Valley Side       Extremely Steep         3.4 Right Valley Side       Extremely Steep         3.4 Right Valley Side       Fatrenely Stape				l atitud				monu	St	tep 4. L	and C	over -	Reac	h Hvdr	oloav		
Step 2. Stream Type         Historic Land Cover:         Shrub           2.1 Elevation Upstream:         1400         Current Dominant Land Cover:         Forest         89.0 %           2.1 Is Gradient Gentle?         7444 feet.         1.41 Miles.         Current Dominant Land Cover:         Forest         89.0 %           2.2 Valley Length:         7444 feet.         1.41 Miles.         Current Dominant Land Cover:         Urban           2.4 Channel Length:         7721 feet.         1.46 Miles.         Current Dominant Land Cover:         Urban           2.6 Sinuosity:         10.04         4.3 Riparian Buffer         Left Bank Right Ban           7.7 Watershed Area:         0         Square Miles         Sub-dominant:         >100         >100           2.8 Channel Width:         18         feet.         Length w/ less than 25 ft:         -         -           2.10 Confinement Type:         Narrowly Confined         Step 5. Instream Channel Modifications         5.1 Flow Regulation - (old):         None           3.1 Allwaid Far:         None         5.2 Bridges and Culverts:         0         %           3.1 Allwaid Far:         None         5.4 Channel Straightening:         0.0           3.1 Allwaid Far:         None         5.5 Dredging History:         None <t< td=""><td></td><td></td><td></td><td></td><td>.0.</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td><u></u></td><td></td><td></td></t<>					.0.										<u></u>		
2.1 Elevation Upstream:       1400       Current Dominant land Cover: Forest       89.0 %         2.1 Elevation Downstream:       620       Current Sub-Dominant Land Cover: Urban         2.2 Valley Length:       744 feet.       1.41 Miles.         2.3 Valley Slope:       10.48 %         2.4 Channel Length:       7721 feet.       1.46 Miles.         2.5 Channel Slope:       10.10 %         2.6 Sinuosity:       1.04       4.3 Riparian Buffer         2.7 Watershed Area:       0       Square Miles         2.8 Channel Width:       18       feet.         2.9 Valley Width:       18       feet.         2.10 Confinement Ratio:       0       Square Miles         2.11 Reference Stream Type:       Narrowly Confined       Step 5. Instream Channel Modifications         3.1 Alluvial Fan:       None       5.2 Bridges and Culverts:       0       0         3.3 Deminant Geological Mat::       None       5.4 Channel Streight Modifications       0.0         3.3 Deminant Geological Mat::       79.0 %       Extremely Steep       5.1 Berds and Roads       One Side Both Sides         3.4 Left Valley Side       Steep       79.0 %       6.1 Berms and Roads (old):       0.0 ft.0.0         3.4 Left Valley Side       Steep       Steep <td< td=""><td>Step 2</td><td>2. Stre</td><td>am Ty</td><td>pe</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>r:</td><td>S</td><td>Shrub</td><td></td><td></td></td<>	Step 2	2. Stre	am Ty	pe									r:	S	Shrub		
2.1 Is Gradient Gentle?       No       Current Sub-Dominant Land Cover. Urban         2.2 Valley Length:       7444 feet.       1.41 Miles.         2.3 Valley Slope:       10.48 %         2.4 Channel Length:       7721 feet.         2.5 Channel Slope:       10.10 %         2.6 Sinuosity:       1.04         2.8 Channel Width:       Square Miles Dominant:         2.9 Valley Width:       18 feet.         2.10 Confinement Ratio:       0         2.11 Reference Stream Type:       Narrowly Confined         2.11 Reference Stream Type:       Narrowly Confined         Sub-class Slope:       Use:         Bedform:       Step-Pool         3.1 Alluvial Fan:       None         3.3 Sub-class Slope:       Use:         3.3 Sub-class Slope:       Use:         3.3 Sub-clogic Mat:       Till         3.4 Left Valley Side       Step         3.4 Left Valley Side       Step         3.4 Left Valley Side       Step         3.4 Right Valley Side       Step         3.4 Left Va														-		89	.0 %
2.2 Valley Length:       7444 feet.       1.41 Miles.       4.2 Combut         2.3 Valley Slope:       10.48 %       1.46 Miles.       Current Dominant land Cover: Forest       63.0 %         2.5 Channel Length:       7721 feet.       1.46 Miles.       Current Sub-Dominant Land Cover: Urban       63.0 %         2.6 Sinuosity:       1.04       4.3 Riparian Buffer       Left Bank Right Bank         2.7 Watershed Area:       0       Square Miles       Dominant:       >100       >100         2.8 Channel Width:       18       feet.       Eength w/less than 25 ft.:										Curren	t Sub-	Domir	nant La	and Co	ver: U	rban	
2.3 Valley Slope:       10.48 %       Historic Land Cover:       Shrub         2.4 Channel Length:       7721 feet.       1.46 Miles.       Current Dominant Land Cover:       Water Shed Area:       0       Square Miles       Current Sub-Dominant Land Cover:       Urban         2.6 Channel Width:       1.04       4.3 Riparian Buffer       Left Bank Right Bani         2.7 Watershed Area:       0       Square Miles       Sub-dominant:       None         2.8 Channel Width:       18       feet.       Sub-dominant:       None       None         2.10 Confinement Ratio:       0       4.4 Ground Water Inputs:       Minimal         2.10 Confinement Ratio:       0       4.4 Ground Water Inputs:       Minimal         2.11 Reference Stream Type: A       Step-Pool       5.1 Flow Regulation - (old):       None         3.1 Alluvial Fan:       Cobble       5.2 Bridges and Culverts:       0       0 %         3.3 Sub-dominant Geologic Mat::       Till       99.0% Step 6. Floodplain Modifications       0.0         3.4 Left Valley Side       Step       Step       Floadplain Modifications       6.1 Berms and Roads       One Side       Both Sides         3.4 Left Valley Side       Step       Step       Railroad:       ft.       ft.       ft.         <							act	1 / 1 1	/ilos <sup>1</sup>	4.2 Cor	ridor						
2.4. Channel Length:       7721 feet.       1.46 Miles.       Current Dominant Land Cover: Forest       63.0 %         2.5. Schannel Slope:       10.10 %       Current Sub-Dominant Land Cover: Urban       Current Sub-Dominant Land Cover: Urban         2.6. Sinuosity:       1.04       A: Riparian Buffer       Left Bank Right Banl         2.7. Watershed Area:       0       Square Miles       Dominant:       >100       >100         2.8 Channel Width:       18       feet.       Length w/less than 25 ft.:														-			
2.5 Channel Slope:       10.10 %       Current Sub-Dominant Land Cover: Urban         2.6 Sinuosity:       1.04       4.3 Riparian Buffer       Left Bank Right Bank         2.7 Watershed Area:       0       Square Miles Dominant:       >100 >100         2.8 Channel Width:       18       feet.       Sub-dominant:       None       None         2.10 Confinement Ratio:       0       Step-Pool       Step 5. Instream Channel Modifications       5.1 Flow Regulation - (old):       None         2.11 Reference Stream Type: A       Step-Pool       Step 5. Instream Channel Modifications       5.1 Flow Regulation - (old):       None         3.1 Alluvial Fan:       None       5.2 Bridges and Culverts:       0       0       %         3.3 Sub-dominant Geologic Mat.:       Till       99.0% Step 6. Floodplain Modifications       0.0       5.5 Dredging History:       None         3.4 Left Valley Side       Extremely Steep       Step 5       Floodplain Modifications       6.1 Berms and Roads       One Side       Both Sides         A.4 Right Valley Side       2.0       79.0 %       Improved Path:       ft.       ft.       ft.         3.4 Right Valley Side       2.0       79.0 %       Earline Areader Migration:       6.0       ft.       ft.       ft.         3.5.50i/s <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td><b>1.46</b> N</td> <td>/liles.</td> <td>Curren</td> <td>t Dom</td> <td>inant  </td> <td>land C</td> <td>over: F</td> <td>orest</td> <td>63</td> <td>.0 %</td>								<b>1.46</b> N	/liles.	Curren	t Dom	inant	land C	over: F	orest	63	.0 %
2.7 Watershed Area:       0       Square Miles       Dominant:       >100       >100       >100         2.8 Channel Width:       18       feet.       Sub-dominant:       None       None         2.9 Valley Width:       18       feet.       Length wiless than 25 ft.:				e:			%			Curren	t Sub-	Domir	ant La	and Co	ver: U	rban	
2.8 Channel Width:       18       feet.       Sub-dominant:       None       None         2.9 Valley Width:       18       feet.       Length w/ less than 25 ft.:							-	_				Buffer					
2.9 Valley Width:       18       feet.       Length w/ less than 25 ft.:           2.10 Confinement Ratio:       0       4.4 Ground Watter Inputs:       Minimal         2.10 Confinement Type:       A       Step 5. Instream Channel Modifications       5.1 Flow Regulation - (old):       None         3.1 Allevial Fan:       Sub-class Slope:       Use:       0       0       %         3.1 Alluvial Fan:       None       5.4 Channel Straightening:       0.0       %         3.2 Grade Control:       None       5.4 Channel Straightening:       0.0       %         3.3 Sub-dominant Geologic Mat.:       Till       99.0%       Step 6. Floodplain Modifications       0.0         3.4 Left Valley Side       Extremely Step       6.1 Berms and Roads       One Side Both Sides       Road:       ft.       ft.         3.4 Left Valley Side       Step       90.%       Step 6. Floodplain Modifications       6.1 Berms and Roads       One Side Both Sides         7.5 Soils       D       79.0 %       Improved Path:       ft.       ft.       ft.         Hydrologic Group:       D       79.0 %       Floodplain Development:       0.0 ft. 0.0       6.2 Floodplain Development:       ft.       ft.       ft.         7.4 Comments: <td< td=""><td></td><td></td><td></td><td></td><td></td><td>0</td><td></td><td></td><td></td><td></td><td></td><td>\<b>t</b>•</td><td></td><td></td><td></td><td></td><td>-</td></td<>						0						\ <b>t</b> •					-
2.10 Confinement Ratio: 2.10 Confinement Type: Marrowly Confined Bedform: Sub-class Slope: Bed Material: 3.1 Alluvial Fan: 3.3 Dominant Geological Mat.: 3.4 Left Valley Side 3.4 Left Valley Side 3.5 Soils       4.4 Ground Water Inputs: Step 5. Instream Channel Modifications 5.1 Flow Regulation - (old): Voe: Use: Bed Material: 3.2 Grade Control: 3.3 Dominant Geological Mat.: 3.4 Left Valley Side 3.5 Soils       0       0         3.4 Left Valley Side 3.5 Soils       None Step 7.9.0 %       Step 6. Floodplain Modifications 6.1 Berms and Roads       0.0         3.4 Left Valley Side 3.5 Soils       Extremely Step Step 0.       Extremely Step Step 0.       6.0       79.0 %         Hydrologic Group: Flooding: Water Table Deep: Crodibility: 7.4 Comments:       D       79.0 %       Berms and Roads (old): 0.0 ft. 0.0 6.0 79.0 %       0.0 ft. 0.0 6.3 Channel Bars: Mid-channel         4.1 4.2       4.3 5.1       5.2       5.3 5.4       5.5       6.1       6.2       6.3       6.4       6.5       6.6       7.2       7.3       Total 0         4.1 4.2       4.3       5.1       5.2       5.3       5.4       5.5       6.1       6.2       6.3       6.4       6.5       6.6       7.2       7.3       Total 0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       <						18							) 25 ft.		one		Ie
2.10 Confinement Type:       Narrowly Confined Bedform:       Step 5. Instream Channel Modifications 5.1 Flow Regulation - (old):       None         Bedform:       Step-Pool       Type:       Step 5.       Step 5.       Step 5.         Bed Material:       Cobble       5.2 Bridges and Culverts:       0       %         Step 3. Basin Characteristics:       Cobble       5.2 Bridges and Culverts:       0.0       %         3.1 Alluvial Fan:       None       5.5 Dredging History:       None       0.0         3.2 Grade Control:       None       5.5 Dredging History:       None       0.0         3.3 Sub-dominant Geological Mat.:       Till       99.0% Step 6. Floodplain Modifications       6.1 Berms and Roads       One Side       Both Sides         3.4 Left Valley Side       Extremely Steep       Steep       Thipoved Path:       ft.       ft.       ft.         Hydrologic Group:       D       79.0 %       Improved Path:       ft.       ft.       ft.         High -       99.0 %       Earnel Bars:       Mid-channel       6.3 Channel Bars:       Mid-channel         6.4 Meander Width:       Ratio:       0.0       6.4 Meander Width:       Ratio:       0.0         7.4 Comments:       5.2       5.3       5.4       5.5 <t< td=""><td></td><td></td><td></td><td></td><td>):</td><td></td><td></td><td>1001.</td><td></td><td>-</td><td></td><td></td><td></td><td></td><td>inimal</td><td></td><td></td></t<>					):			1001.		-					inimal		
Bedform:       Step-Pool       Type:         Sub-class Slope:       Use:         Bed Material:       Cobble         Step 3. Basin Characteristics:       5.2 Bridges and Culverts:       0       0         3.1 Alluvial Fan:       None       5.4 Channel Straightening:       0.0         3.2 Grade Control:       None       5.5 Dredging History:       None         3.3 Dominant Geologic Mat.:       Till       99.0% Step 6. Floodplain Modifications       6.1 Berms and Roads       One Side Both Sides         3.4 Left Valley Side       Extremely Steep       6.1 Berms and Roads       One Side Both Sides         3.4 Left Valley Side       Extremely Steep       6.0 79.0 %       Berms and Roads (old):       0.0 ft. 0.0         3.5 Soils       None/Rare       100. %       Berms and Roads (old):       0.0 ft. 0.0         Water Table Deep:       None/Rare       100. %       Berms and Roads (old):       0.0 ft. 0.0         Water Table Shallow:       2.0       79.0 %       Berns and Roads (old):       0.0 ft. 0.0         Frodibility:       High -       99.0 %       6.3 Channel Bars:       Mid-channel         7.4 Comments:       Foodplain Development:       0.0 ft. 0.0       6.0 7.2 7.3 Total         Value       5.1 5.2 5.3 5.4 5.5 6.1 6.2 6.3 6.4 6.5 6.6	2.10	Confir	nemen	t Type	:		wly C	onfine					•		-		
Sub-class Slope:       Use:         Bed Material:       Cobble         Step 3. Basin Characteristics:       5.2 Bridges and Culverts:       0       %         Step 3. Basin Characteristics:       5.3 Bank Armoring:       0.0         3.1 Alluvial Fan:       None       5.4 Channel Straightening:       0.0         3.2 Grade Control:       None       5.5 Dredging History:       None         3.3 Dominant Geological Mat.:       6.1 Berms and Roads       One Side       Both Sides         3.4 Left Valley Side       Extremely Steep       6.1 Berms and Roads       One Side       Both Sides         3.4 Right Valley Side       Steep       Hydrologic Group:       ft.       ft.       ft.         Hydrologic Group:       D       79.0 %       Improved Path:       ft.       ft.         Hydrologic Group:       None/Rare       100. %       Berms and Roads (old):       0.0 ft. 0.0         Water Table Deep:       6.0       79.0 %       Berms and Roads (old):       0.0 ft. 0.0         Water Table Shallow:       2.0       79.0 %       6.4 Meander Migration:       6.5 Meander Width:       Ratio:       0.0         7.4 Comments:       High -       99.0 %       6.4 Meander Migration:       7.3 lce/Debris Jam Potential:       None				Stream	Type:				Į	5.1 Flov	w Reg	ulatior	n - (old	): <b>N</b> o	one		
Bed Material:         Cobble         5.2 Bridges and Culverts:         0         %           Step 3. Basin Characteristics:         5.3 Bank Armoring:         0.0           3.1 Alluvial Fan:         None         5.4 Channel Straightening:         0.0           3.2 Grade Control:         None         5.4 Channel Straightening:         0.0           3.3 Dominant Geologic Mat.:         Till         99.0% Step 6. Floodplain Modifications         5.3 Bank Armoring:         0.0           3.3 Sub-dominant Geological Mat.:         Till         99.0% Step 6. Floodplain Modifications         6.1 Berms and Roads         One Side         Both Sides           3.4 Left Valley Side         Extremely Steep         Steep         ft.         ft.         ft.           3.5 Soils         Steep         D         79.0 %         Improved Path:         ft.         ft.           Hydrologic Group:         D         79.0 %         Berms and Roads (old):         0.0 ft. 0.0         ft. 0.0           Water Table Deep:         6.0         79.0 %         Berms and Roads (old):         0.0 ft. 0.0         ft. 0.0           Year Table Shallow:         2.0         79.0 %         Ftodplain Development: 0.0 ft. 0.0         ft. 0.0           Year Table Shallow:         2.0         79.0 %         Ftodplain Develop						Step-	Pool										
Step 3. Basin Characteristics:         None         5.3 Bank Armoring:         0.0           3.1 Alluvial Fan:         None         5.4 Channel Straightening:         0.0           3.2 Grade Control:         None         5.5 Dredging History:         None           3.3 Dominant Geologic Mat.:         Till         99.0% Step 6. Floodplain Modifications         0.0           3.4 Left Valley Side         Extremely Steep         6.1 Berms and Roads         One Side         Both Sides           3.4 Left Valley Side         Extremely Steep         Road:         ft.         ft.         ft.           3.4 Left Valley Side         Steep         Tt.         ft.         ft.         ft.           3.5 Soils         D         79.0 %         Improved Path:         ft.         ft.           Hydrologic Group:         D         79.0 %         Improved Path:         ft.         ft.           Water Table Deep:         0.0         79.0 %         G.3 Channel Bars:         Mid-channel           Kight Valley         High -         99.0 %         G.4 Meander Migration:         G.5 Meander Width:         Ratio:         0.0           7.4 Comments:         7.2         5.3         5.4         5.5         6.1         6.2         G.3         6.4			•	be:		0.44	1							•		•	0/
3.1 Alluvial Fan:       None       5.4 Channel Straightening:       0.0         3.2 Grade Control:       None       5.5 Dredging History:       None         3.3 Dominant Geologic Mat.:       Till       99.0% Step 6. Floodplain Modifications       None         3.3 Sub-dominant Geological Mat.:       Till       99.0% Step 6. Floodplain Modifications       Step         3.4 Left Valley Side       Extremely Steep       6.1 Berms and Roads       One Side       Both Sides         3.4 Right Valley Side       Extremely Steep       Steep       Berm:       ft.       ft.         Hydrologic Group:       D       79.0 %       Improved Path:       ft.       ft.       ft.         Flooding:       None/Rare       100. %       6.0       79.0 %       Berms and Roads (old):       0.0 ft.       0.0         Water Table Deep:       6.0       79.0 %       High -       99.0 %       6.3 Channel Bars:       Mid-channel         7.4 Comments:       High -       99.0 %       6.4 Meander Migration:       6.5 Meander Width:       Ratio:       0.0         7.4 Comments:       5.1       5.2       5.3       5.4       5.5       6.1       6.2       6.3       6.4       6.5       6.6       7.2       7.3       Total <tr< td=""><td></td><td></td><td></td><td>ootoric</td><td>tion.</td><td>Copp</td><td>le</td><td></td><td></td><td></td><td>0</td><td></td><td></td><td>U</td><td></td><td></td><td>%</td></tr<>				ootoric	tion.	Copp	le				0			U			%
3.2 Grade Control:       None       5.5 Dredging History:       None         3.3 Dominant Geologic Mat.:       Till       99.0% Step 6. Floodplain Modifications         3.3 Sub-dominant Geological Mat.:       6.1 Berms and Roads       One Side       Both Sides         3.4 Left Valley Side       Extremely Steep       6.1 Berms and Roads       One Side       Both Sides         3.4 Right Valley Side       Extremely Steep       Steep       ft.       ft.       ft.         Hydrologic Group:       D       79.0 %       Mone/Rare       100. %       6.0       79.0 %         Flooding:       None/Rare       100. %       6.0       79.0 %       Berms and Roads (old):       0.0 ft.       0.0         Water Table Deep:       None/Rare       100. %       6.0       79.0 %       Berms and Roads (old):       0.0 ft.       0.0         7.4 Comments:       2.0       79.0 %       File Annel       6.4 Meander Migration:       6.5 Meander Width:       Ratio:       0.0         7.4 Comments:       High -       99.0 %       Step 7. Windshield Survey       7.2 Bank Erosion:       None         7.2 Bank Height:       No Data       7.3 Total       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0	i			acteris	sucs.	Nor						-		ı.		•••	
3.3 Dominant Geologic Mat.:       Till       99.0% Step 6. Floodplain Modifications         3.3 Sub-dominant Geological Mat.:       6.1 Berms and Roads       One Side       Both Sides         3.4 Left Valley Side       Extremely Steep       Road:       ft.       ft.         3.4 Left Valley Side       Extremely Steep       Steep       Steep       Road:       ft.       ft.         3.5 Soils       D       79.0 %       None/Rare       100. %       6.0       79.0 %       Berms and Roads (old):       0.0 ft.       0.0         Water Table Deep:       None/Rare       100. %       6.0       79.0 %       Berms and Roads (old):       0.0 ft.       0.0         Water Table Shallow:       2.0       79.0 %       High -       99.0 %       6.4 Meander Migration:       6.5 Meander Width:       Ratio:       0.0         7.4 Comments:       High -       99.0 %       Step 7. Windshield Survey       7.2 Bank Erosion:       None         7.2 Bank Height:       No Data       7.3 Total         0       0       0       0       0       0       0       0       0       0       0				<u>.</u>								•			ne	0.0	
3.3 Sub-dominant Geological Mat.:       6.1 Berms and Roads       One Side       Both Sides         3.4 Left Valley Side       Extremely Steep       Railroad:       ft.       ft.         3.4 Left Valley Side       Extremely Steep       Steep       ft.       ft.         3.5 Soils       D       79.0 %       Berm:       ft.       ft.         Hydrologic Group:       D       79.0 %       Improved Path:       ft.       ft.         Vater Table Deep:       0.0       79.0 %       Berms and Roads (old):       0.0 ft.       0.0         Water Table Shallow:       2.0       79.0 %       Berms and Roads (old):       0.0 ft.       0.0         7.4 Comments:       6.0       79.0 %       Algent Migration:       6.5 Meander Migration:       6.6 Wavelength:       Ratio:       0.0         7.4 Comments:       Fight -       99.0 %       7.2 Bank Erosion:       None       None         7.2 Bank Height:       No Data       7.3 Ice/Debris Jam Potential:       None         7.3 Ice/Debris Jam Potential:       None       7.3 Total         0       0       0       0       0       0       0       0       0       0					Mat ·	-		99.			0 0		5				
3.4 Left Valley Side       Extremely Steep       Road:       ft.       ft.       ft.         3.5 Soils       Hydrologic Group:       D       79.0 %       Berm:       ft.       ft.       ft.         Flooding:       None/Rare       100. %       6.0       79.0 %       Improved Path:       ft.       ft.       ft.         Water Table Deep:       None/Rare       100. %       6.0       79.0 %       Berms and Roads (old):       0.0       ft.       0.0         Water Table Shallow:       2.0       79.0 %       A. Meander Migration:       6.3 Channel Bars:       Mid-channel         6.4 Meander Width:       Ratio:       0.0       6.6 Wavelength:       Ratio:       0.0         7.4 Comments:       Ft.       5.3       5.4       5.5       6.1       6.2       6.3       6.4       6.5       6.6       7.2       7.3       Total         0 </td <td></td> <td></td> <td></td> <td>•</td> <td></td> <td>Side</td> <td>Both S</td> <td>Sides</td>				•											Side	Both S	Sides
3.5 Soils       Steep       5       Flooding:       10. %         Hydrologic Group:       D       79.0 %       Improved Path:       ft.       ft.         Flooding:       None/Rare       100. %       Berm:       ft.       ft.       ft.         Water Table Deep:       0.0       79.0 %       6.0       79.0 %       6.2 Floodplain Development: 0.0 ft. 0.0         Water Table Shallow:       2.0       79.0 %       6.4 Meander Migration:       6.5 Meander Migration:         Frodibility:       7.4 Comments:       99.0 %       6.6 Wavelength:       Ratio:       0.0         7.4 Comments:       Steep       99.0 %       6.6 Wavelength:       None         7.2 Bank Erosion:       None       7.2 Bank Height:       No Data         7.3 Ice/Debris Jam Potential:       None         4.1       4.2       4.3       5.1       5.2       5.3       5.4       5.5       6.1       6.2       6.3       6.4       6.5       6.6       7.2       7.3       Total         0       0       0       0       0       0       0       0       0       0       0       0       0       0					0		_	•		Road:							
Hydrologic Group:       D       79.0 %       Improved Path:       ft.       ft.       ft.       ft.         Flooding:       None/Rare       100. %       Berms and Roads (old):       0.0 ft.       0.0       ft.		•	alley S	Side			-	/ Stee	o	Railroa	d:						
Flooding:       None/Rare       100. %       Berms and Roads (old):       0.0       ft. 0.0         Water Table Deep:       6.0       79.0 %       6.0       79.0 %       6.0       79.0 %         Water Table Shallow:       2.0       79.0 %       2.0       79.0 %       Mid-channel         7.4 Comments:       High -       99.0 %       6.4 Meander Migration:       6.5 Meander Width:       Ratio:       0.0         7.4 Comments:       Yes       Yes       7.2 Bank Erosion:       None       Ratio:       0.0         4.1       4.2       4.3       5.1       5.2       5.3       5.4       5.5       6.1       6.2       6.3       6.4       6.5       6.6       7.2       7.3       Total         0							•										
Water Table Deep:       6.0       79.0 %       6.2 Floodplain Development: 0.0 ft. 0.0         Water Table Shallow:       2.0       79.0 %       6.4 Meander Migration:         Frodibility:       99.0 %       6.5 Meander Width:       Ratio: 0.0         7.4 Comments:       8       99.0 %       6.6 Wavelength:       Ratio: 0.0         7.4 Comments:       99.0 %       6.6 Wavelength:       Ratio: 0.0         7.4 Comments:       8       99.0 %       6.6 Wavelength:       Ratio: 0.0         Step 7. Windshield Survey       7.2 Bank Erosion:       None         7.2 Bank Height:       No Data         7.3 Ice/Debris Jam Potential:       None         4.1       4.2       4.3       5.1       5.2       5.3       5.4       5.5       6.1       6.2       6.3       6.4       6.5       6.6       7.2       7.3       Total         0	•	•	c Grou	ıp:									(ald)	0.0		0 0	ft.
Water Table Shallow: Erodibility:       2.0 High -       79.0 % 99.0 %       6.3 Channel Bars:       Mid-channel         7.4 Comments:       High -       99.0 %       6.4 Meander Migration: 6.5 Meander Width:       Ratio: 0.0 Ratio: 0.0         7.4 Comments:       Yester Table Shallow: Table Shallow:       79.0 %       99.0 %         7.4 Comments:       Yester Table Shallow: Table Shallow:       Yester Table Shallow: High -       99.0 %         7.4 Comments:       Yester Table Shallow: Table Shallow:       Yester Table Shallow: Step 7. Windshield Survey       None None 7.2 Bank Height:       Ratio: 0.0 None No Data 7.3 Ice/Debris Jam Potential:         4.1       4.2       4.3       5.1       5.2       5.3       5.4       5.5       6.1       6.2       6.3       6.4       6.5       6.6       7.2       7.3       Total         0       0       0       0       0       0       0       0       0       0       0       0		0							, <i>(</i>								
Erodibility:       High -       99.0 %       6.4 Meander Migration:       8.5 Meander Width:       Ratio:       0.0         7.4 Comments:       Yes       Yes       8.6 Wavelength:       Ratio:       0.0         Step 7. Windshield Survey       7.2 Bank Erosion:       None       None         7.2 Bank Height:       No Data       7.3 Ice/Debris Jam Potential:       None         4.1       4.2       4.3       5.1       5.2       5.3       5.4       5.5       6.1       6.2       6.3       6.4       6.5       6.6       7.2       7.3       Total         0       0       0       0       0       0       0       0       0       0       0       0									, <i>(</i>		-						
7.4 Comments:       6.5 Meander Width:       Ratio: 0.0         6.6 Wavelength:       Ratio: 0.0         Step 7. Windshield Survey       7.2 Bank Erosion:       None         7.2 Bank Height:       No Data         7.3 Ice/Debris Jam Potential:       None         4.1       4.2       4.3       5.1       5.2       5.3       5.4       5.5       6.1       6.2       6.3       6.4       6.5       6.6       7.2       7.3       Total         0       0       0       0       0       0       0       0       0       0       0				allow.						6.4 Mea	ander	Migrat	ion:				
Step 7. Windshield Survey         Step 7. Windshield Survey       None         7.2 Bank Erosion:       None         7.2 Bank Height:       No Data         7.3 Ice/Debris Jam Potential:       None         4.1       4.2       4.3       5.1       5.2       5.3       5.4       5.5       6.1       6.2       6.3       6.4       6.5       6.6       7.2       7.3       Total         0       <		-			•				6						R	Ratio:	0.0
7.2 Bank Erosion:       None         7.2 Bank Height:       No Data         7.3 Ice/Debris Jam Potential:       None         4.1       4.2       4.3       5.1       5.2       5.3       5.4       5.5       6.1       6.2       6.3       6.4       6.5       6.6       7.2       7.3       Total         0       0       0       0       0       0       0       0       0       0       0	7.40	Jonne	enis.												R	Ratio:	0.0
7.2 Bank Height: No Data 7.3 Ice/Debris Jam Potential: None         4.1       4.2       4.3       5.1       5.2       5.3       5.4       5.5       6.1       6.2       6.3       6.4       6.5       6.6       7.2       7.3       Total         0													urvey				
4.1       4.2       4.3       5.1       5.2       5.3       5.4       5.5       6.1       6.2       6.3       6.4       6.5       6.6       7.2       7.3       Total         0 <td></td> <td>_</td> <td></td>																_	
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Is Read	ch an In	npou	iname	nt? N	0											
Step 1	. Reach	n Loc	ation													
1.1 Re	each De	escri	ption:	F	rom tl	he eas	st side	of St	tage Ro	d. whe	ere it i	nterse	cts Bl	ue Ro	ck Rd	l. up
1.2 To					Richmo	ond		_								
	ownstre				44.40				tep 4. L			Reac	h Hydr	ology		
	ownstre . Strean			uae: •	12.93				4.1 Wa							
	levation			. ,	360				Historio				-	Shrub		• • • •
	levation				500 520				Curren						-	.0 %
	Gradie				No				Curren 4.2 Coi		Domir	iant La	ina Co	ver: U	rban	
2.2 Va	alley Le	ngth:		2	2 <b>353</b> fe		<b>0.45</b> N	liles			Cours	<b>r</b> .	-	ore of		
	alley Slo				10.20				Historia					orest		<b>0</b> 0/
	hannel l				<b>2366</b> f		<b>0.45</b> N	/liles.	Currer Curren	וו דעסע ד פייף	nnant I Domin		over: F		60 rhan	<b>.0</b> %
	hannel : inuosity		e:		10.14 1.01	70			4.3 Rip							ht Bank
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	hannel				•		feet.		Sub-do		nt:			-100	51-	-
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		Clan	<u></u>		Step-	F001			Type:			Nor	e			
	b-class d Mater		e.		Cobb	0			Use: 5.2 Bric	1000 0	nd Cu	lvorte:	1		4	%
Step 3.			actoria	tice	CODD	ie			5.2 Brid 5.3 Bar	•			I		4 0 %	70
- ·	Iluvial F		acterio	103.	Nor				5.4 Cha		•		1: <b>0.0</b>	)	0.0	
	rade Co		ŀ		Nor				5.5 Dre		0		No		0.0	
	ominan			Mat ·	Till		99.		tep 6. F			•	-			
	ub-domi		•						6.1 Ber	· · ·			One S	Side	Both S	Sides
	eft Valle			- 3					Road:				0.0		0.0	ft.
	ight Val				Stee	-			Railroa	nd:			0.0		0.0	ft.
3.5 Sc	oils				Hilly	/			Berm:				0.0	ft.	0.0	ft.
•	rologic (	Grou	p:	C			<b>53.0</b> %		Improv			()	0.0		0.0	ft.
Floo	0	_			lone/R		<b>100.</b> %	,	Berms 6.2 Flo				276		11 % 0.0	
	er Table		•		.0		<b>50.0</b> %		6.3 Cha	•		siopine		d-cha		
	er Table	e Sna	allow:		.0 liab		50.0 % 99.0 %		6.4 Me			ion:				
	dibility:			ſ	ligh -		<b>33.U</b> 70	,	6.5 Me		-			R	Ratio:	0.0
7.4 Co	ommen	its:							6.6 Wa	veleng	th:				Ratio:	0.0
									tep 7. V			urvey				
									7.2 Bar	nk Eros	sion:			<b>0.00</b> f	ft.	
									7.2 Bar	•				<b>0.00</b> ft		
									7.3 lce/	Debris	s Jam	Potent	ial: C	ulvert		
4.1	4.2	4.3	5.1	5.2	5.3	5.4	5.5	6.1	6.2	6.3	6.4	6.5	6.6	7.2	7.3	Total
2	2	0	0	0	0	0	0	0	1	0	0	0	0	0	0	5
High	High N	۱.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	Low	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	
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Basin:			W	inoos	ki										
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Topo Maps:	:			СНМС		-						_			
Date Last E			Th	nu, Se	ptemk	oer 27,	2007	7							
Watershed:				inoos	•										
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Step 1. Rea															
1.1 Reach		otion:				ed stre	tch o	on west	side	of Sta	ge roa	d.			
1.2 Towns 1.3 Downs		otitud	-	ichmo 4.40	ona		S	tep 4. L	and C	ovor -	Reach	h Hydr	ology		
1.3 Downs			0.	-							Neaci	TTYU	ology		
Step 2. Stre				1 2100				4.1 Wa Historio			<b>.</b> .		orest		
2.1 Elevati			9	00				Curren				-		87	0 %
2.1 Elevati				60				Curren				-			<b>U</b> 70
2.1 Is Grad				No		• •		4.2 Cor							
2.2 Valley	•	1		138 fe		<b>0.22</b> N	/liles.	Historia		Cove	r:	9	Shrub		
2.3 Valley		th		3.51  300 fe	%	0.25 1	liloc	Curren				-		63	0 %
2.4.Channe 2.5 Channe					θeι. %	U.ZJ  \	/1162.	Curren	t Sub-	Domin	ant La	nd Co	ver: U	rban	- ,0
2.6 Sinuos				.14			,	4.3 Rip					ft Banl		ht Ban
2.7 Waters	shed Ar			0	Sc	quare N		Domina	ant:				00	>10	
2.8 Chann		h:				feet.		Sub-do			o= 4		-100	Nor	e
2.9 Valley		Detia		120		feet.		Length				-		0	
2.10 Confii 2.10 Confii				0 Very I	Broad			4.4 Gro tep 5. I			•		one		
2.10 Com					Ji Uau			5.1 Flov					alions		
Bedform		lioann		Riffle-	Pool			Type:	wrey	ulation	Non				
Sub-clas	ss Slop	e:		b				Use:							
Bed Mat	•			Cobb	le			5.2 Bric	lges a	nd Cul	verts:	1		4	%
Step 3. Basii	n Chara	acteris	tics:					5.3 Bar	nk Arm	oring:				0.0	
3.1 Alluvia	l Fan:			Nor	e			5.4 Cha						0.0	
3.2 Grade				Nor	e			5.5 Dre	0 0		,	No	ne		
3.3 Domin		•		Till		99.		tep 6. F						_	
3.3 Sub-do			ogical	Mat.:				6.1 Ber	ms an	d Roa	ds	One S		Both S	
3.4 Left Va				Vorv	/ Stee	n		Road:	d			0.0		0.0	ft.
3.4 Right V 3.5 Soils	alley S	aue		Stee		۲		Railroa Berm:	iu:			0.0 0.0		0.0 0.0	ft. ft.
5.0 5005				2.00	· •			Denni				<b>U.U</b>	11.	0.0	
	c Grou	n.	П		4	0/	_	Improv	ed Pat	'n.		00	ft	0 0	
Hydrologi	•	p:	D			00. %	-	Improv Berms			old):	0.0 0.0		0.0 0.0	ft.
Hydrologi Flooding:			Ν	one/R	are 1	<b>00.</b> %	D	Improv Berms 6.2 Floo	and R	oads (		0.0	ft.	0.0 0.0 0.0	
Hydrologi Flooding: Water Ta	ble Dee	ep:	N 6.	one/R .0	are 1 7	00. %	)	Berms	and R odplair	oads ( n <b>Deve</b>		0.0 nt: 0.0	ft.	0.0 0.0	
Hydrologi Flooding: Water Ta Water Ta	ble Dee ble Sha	ep:	N 6. 2.	one/R .0 .0	are 1 7 7	<b>00.</b> %		Berms 6.2 Floo 6.3 Cha 6.4 Mea	and R odplair annel E ander	oads ( n Deve 3ars: Migrat	elopme ion:	0.0 nt: 0.0	ft. ft.	0.0 0.0	ft.
Hydrologi Flooding: Water Ta Water Ta Erodibility	ble Dee Ible Sha /:	ep:	N 6. 2.	one/R .0	are 1 7 7	00. % 0.0 %		Berms 6.2 Floo 6.3 Cha 6.4 Mea 6.5 Mea	and R odplair annel E ander ander	oads ( n Deve 3ars: Migrat Width:	elopme ion:	0.0 ent: 0.0 No	ft. ft. ft Eval 30.0 R	<b>0.0</b> <b>0.0</b> <b>uated</b> atio:	ft. <b>3.7</b>
Hydrologi Flooding: Water Ta Water Ta	ble Dee Ible Sha /:	ep:	N 6. 2.	one/R .0 .0	are 1 7 7	00. % 0.0 %		Berms 6.2 Floo 6.3 Cha 6.4 Mea 6.5 Mea 6.6 Wa	and R odplair annel E ander ander veleng	oads ( n Deve Bars: Migrat Width: th:	lopme	0.0 ent: 0.0 No	ft. ) ft. • <b>t Eval</b>	<b>0.0</b> <b>0.0</b> <b>uated</b> atio:	ft. <b>3.7</b>
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	ib-class \$	Slon	٥.		a				Type: Use:			Nor	ne			
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## **APPENDIX D**

# QA/QC SUMMARY

To: Evan Fitzgerald, Fitzgerald Environmental Associates From: Sacha Pealer, VT DEC River Management Date: 8/31/07

### **Richmond Tributaries Phase 1 QA, check 2**

#### **Preliminary Reference Stream Type**

As you noted previously, there appear to be several reaches in the project area that are either reference stream type A or B, with slope indicating one type and confinement another. In this case, it might be helpful to use subclass slopes or to evaluate the confidence you have in confinement ratios/types. Also, if you observed specific characteristics of a reach in the field that influence your choice of stream type, please describe these in your response. Consider how much of the reach you were able to see. Comments from Evan Fitzgerald in red.

• R8S1.04S1.01. Stream type A with semi-confined (SC) valley is atypical (see Table 2.2, phase 1 protocols, May 2007). Type A streams tend to be narrowly confined (NC). Slope of 12.84% and sinuousity <1.2 (in an area that on topomaps and orthos does not appear straightened) support the type A classification. However, the confinement "trumps" these other factors, suggesting stream type B. This hinges on the accuracy of the valley width. If the slope was not greater than 9.9%, I might suggest Ba. Please comment on your confidence in the confinement ratio.

I observed the valley width in the field in lower reach to be no less than 20 ft, which would make it SC. However, the steeper sections I did not see are likely more confined. Changed valley width to 14 ft. to make it NC.

• R8S1.04S1.02. As with R8S1.04S1.01, the SC confinement type does not match stream type A. This reach has a lower slope (4.99) although it's still in the A range. It also has a greater chance of having been straightened, so sinuosity may be less helpful. If you are confident in the confinement data, and wish to keep SC, I suggest changing stream type to Ba.

As with above, upper reach appeared to be less confined in the field (SC type). I am more confident with original confinement on this reach and have changed stream type to Ba.

- R8S1.06. With 5.88% slope, I suggest adding subclass slope to make this stream type Ba. Also, should metadata for 2.11 indicate field observation? Changed to Ba per field observation. Metadata updated to indicate it was observed in field.
- R8S1.08. If you are confident in your confinement of SC (and that this is type B and not type A), then I suggest stream type Ba due to slope.
   I could not take any photos of this reach due to property access, but observations suggest that much of reach is B-type. Added subslope a for slope.
- R8.S2.02. Same comment as R8S1.08. Many field observations along this reach (and photos). B-type kept with subslope a.
- R8S2.02S1.01. Another A stream with SC confinement type. If you go with this confinement, I suggest Ba.

Valley observed in field was narrower than measure on topo. Have changed confinement to match field observations.

- R8S2.03. Same comment as R8S1.08. Many field observations along this reach (and photos). B-type kept with subslope a.
- R8S2.03S1.01. Same comment as R8S1.08. Valley observed in field was narrower than measure on topo. Have changed confinement to match field observations.
- R8S2.04. Same comment as R8S1.08. Many field observations along this reach (and photos). B-type kept with subslope a.
- R8S2.05S1.01. As I'm sure you know, it's very tough to measure valley width from topos on a stream of this size without overestimating. Stream type A with NW confinement is atypical. Do you think confinement should actually be NC, since slope, sinuousity, and position in the watershed all support an A stream type? Agree. Valley width updated to 15ft for NC.
- R8S2.06. Another A stream with SC confinement type. The slope (12.36) certainly indicates an A stream. Since this reach's valley width had to be measured from topos, do think it's possible confinement is actually NC? Agree. Valley width updated to 15ft for NC.
- R9S2.02. Revisit metadata. Step 2.9 valley width indicates you measured valley width in the field. Your step 2.11 metadata suggest you were not in the field. I wonder, how confident are you in your confinement ratio, that this is a B stream and not an A stream, even though slope is 6.29%?

Metadata revised – I did not see this reach in the field. Valley width revised to 30ft for narrow confinement on A type.

- R9S2.04. Should metadata for 2.11 indicate field observation? Yes! Revised metadata.
- R9S2.04S1.01. With a slope of 10.10%, stream type A seems more likely than B. What characteristics lead you to choose type B? Are you confident in the confinement type? Do you think what you saw/measured is representative of the whole reach? Only the lower portion of the reach observed, where B-type geometry was seen. However, middle/upper reach is likely A-type, and channel/confinement data have been revised to reflect entire reach slope, etc.
- R9S2.06. Why do you think reference bedform is planebed? Often an unconfined C-type stream with a slope >3% does not exhibit pool-riffle morphology (see Fig. 6 in Montgomery and Buffington, 1997). I did not see this reach in the field, but its sinuosity is low despite the VB confinement. I am fine with calling it pool-riffle until bedform is observed in field. Changed in DMS.
- R9S2.07. If you are confident in your confinement of NW (and that this is type B and not type A), then I suggest stream type Ba due to slope. Valley width remeasured and confinement changed to SC with Ba.

To: Evan Fitzgerald, Fitzgerald Environmental Associates From: Sacha Pealer, VT DEC River Management Date: 9/17/07

### **Richmond Tributaries Phase 1 QA, check 3**

This document includes quality assurance notes for phase 1 steps 3 through 7. The notes are in order by step, then reach. Comments from Evan Fitzgerald in red.

#### 3.1 Alluvial Fans

- Do you think an alluvial fan is possible in R8S2.01? Note broad terracing of alluvial material on both sides of reach as valley widens. Upstream reach is much more steep and confined. Yes, there is a possibility of an (inactive) alluvial fan here. It is worth noting in the DMS.
- R9S2.01. Possible alluvial fan. With this reach located in the more recent (Holocene) alluvial zone of the Winooski, it is not likely an alluvial fan created by this trib.
- R9S2.03. Possible alluvial fan. Yes, there is a possibility of an active alluvial fan here, given the setting and channel planform. It is worth noting in the DMS.

#### 3.4 Valley Side Slope

• R8S1.01. Not sure how the right slope is "extremely steep." I measure it at hilly or steep at most. VT YDRODEM data was used to create contours which reflect current valley characteristics due to I-89 side slope.

#### 4.3 Riparian Buffer

- R8S1.03. On the right buffer, you might go lower than 51-100 for dominant due to road and development on lower portion of reach. Even if you decide to stick with 51-100 for dominant, I suggest changing subdominant; I do not think it is >100 ft. Changed to 26-50 dominant and 51-100 subdominant.
- R8S2.01. Do you think there might be more "buffer less than 25ft" on this reach? And did you mean to index only for the left side? Hard for me to tell from the orthos whether there are fallow fields in this location; maybe you have a better sense from field visits. Additional areas for buffer < 25' added for right banks in lower reach.
- R8S2.02S1.01. It appears on orthos that there is less than 25 ft of buffer on the uppermost portion of this reach. Were you able to see if a channel was present here? Was it buffered? If not, you would need to index. This area is buffered more than 25' with unmanaged vegetation.
- R9S2.07. You've indexed 303 ft of this reach as having <25 ft buffers on the right side. Did you mean to say it's on the left side? Yes, corrected in FIT.

#### 4.4 Groundwater inputs

- R8S1.04. Consider "minimum" rather than "none" due to wetlands inventory data. There are no NWI wetlands mapped in the vicinity of this reach.
- R8S1.04S1.01. Consider "minimum" rather than "none" due adjacent minor trib. Changed to minimum.

- R8S2.05S1.01. Consider "minimum" rather than "none" due adjacent minor trib. Changed to minimum.
- R8S2.06. Consider "minimum" rather than "none" due adjacent minor tribs. Changed to minimum.

### 5.1 Flow Regulation

• Have you checked with Water Supply or Facilities Engineering about flow regulation types? All of the reaches currently say "none" for flow type. Are you confident in these types? Checked with Steve Bushman and Jeff Cueto in Dam Safety and Hydrology and there are no data on flow regulations for these tributaries

### 5.2 Bridges-Culverts

- R8S1.01. You've got 3 crossings indexed on this reach. Counting the two interstate bridges, I see 5 crossings. Why did you index only three? The I-89 crossings are elevated well above ground no bridges/culverts present.
- R8S1.02. I think there might be two road crossings at the gravel pit, possibly bridges or culverts. Did you forget to index these? **Updated in FIT.**
- R8S1.04S1.01. The e911 data and orthos indicate a possible road crossing ~ 420 ft upstream of the downstream reach break (unnamed road?). Did you mean to index this bridge/culvert? No. Will update and enter unknown.
- R8S1.05. Appears to be a driveway crossing roughly 50 ft above the lower reach break. Please index. **Yes, this should be indexed. Updated in FIT.**
- R8S1.07. Why did you select "No Data"? With orthos and topos for metadata, I think you can say "None". **Updated.**
- R8S1.08. Orthos suggest three driveway crossings on upper portion of the reach (for the houses situated just south of the stream line). Suggest indexing. **Updated in FIT.**
- R8S2.02. Please index both the interstate bridges as separate points. There is a single culvert under both I-89 lanes, not two.
- R8S2.02S1.01. I think you missed a driveway crossing about 140 ft downstream from the crossing you already indexed. Yes, updated in FIT.
- R9S2.01. Another missed driveway about 160ft below the upper reach break. Yes, updated in FIT.
- R9S2.02. Please index both the interstate bridges as separate points. There is a single culvert under both I-89 lanes, not two.
- I suspect another driveway crossing about 1150ft below the upper reach break. Indexed.

### 5.3 Bank Armoring

• Can you confirm that you found no bank armoring in the project area? After reviewing photos, I observed only one small bank armoring area on R9.S2.05. Added to FIT.

5.4 Channel Straightening

• R8S1.01. I wonder if there should be more straightening associated with the interstate bridges, roadroad, etc. I suspect the stream was straightened to accommodate those multiple crossings in a short area. What do you think? Agree. Small area of straightening added to FIT.

- R8S2.05. I suspect this reach was partially straightened to create the pond. USGS topos indicate the pond is an added feature. Consider indexing straightening on this reach. Agree. Area of straightening added to FIT.
- R9S2.01. This reach could use more straightening also, especially near the confluence with the Winooski, where Main Street and the railroad cross the stream. It seems likely that more than 50 % of this reach has been straightened. Agree. Large area of straightening added to FIT.

### 5.5 Dredging

• Please confirm that interviews with DEC stream alt engineers did not yield new information on dredging history (ie, all available information indicates the history is "None" for all reaches). No information available for these small tributaries according to Chris Brunelle.

### 6.3 Depositional Features

• Data indicate that depositional features were not evaluated for the following reaches: R8S1.04, R8S1.04S1.01, R8S1.06, R8S1.07, R8S1.08, R8S2.05S1.01, R8S2.06, R9S2.02, R9S2.06, and R9S2.07. Please select "Not Evaluated" for the 6.3 metadata on these reaches. **Updated in DMS.** 

### 6.5/ 6.6 Meander Geometry

- R8S1.03. Your average meander wavelength of 350 ft seems high to me. I couldn't get more than 250 ft average. Please revisit this reach. **Updated to 250'.**
- R8S1.07. I took measurements on this reach, including meanders in the upper portion of the reach (where you didn't) and ended up with an average belt width of 43 ft (ratio 3.7, impact Low) and an average wavelength of 71.8 ft (ratio 6.2, impact Low). Please have a look at this reach again and see what you think. **OK. Updated to 43' and 72' in DMS.**
- R8S2.05. It's possible this reach was straightened to create the pond. The meanders are only at the lower portion of the reach. Consider entering the step 2.8 channel width for both average belt width and average wavelength. **OK. Updated in DMS.**
- R9S2.01. Suggest entering channel width for both average belt width and average wavelength. The reach is likely >50% straightened. Agree. Updated in DMS.
- R9S2.02. Meander geometry should be Not Applicable for this reach because it is stream type A. OK. Updated in DMS.