# **Headwater Drainage Feature Assessment** 6150 Thunder Road, Ottawa

**Updated Report** 

July 15, 2021

#### Submitted To:

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## **TABLE OF CONTENTS**

1.0	INTRODUCTION	1
2.0	HEADWATER DRAINAGE FEATURES	1
2.1	OVERVIEW	1
2.2	ASSESSMENT METHODOLOGY	
	2.2.1 Channel Form and Fish	
	2.2.2 Vegetation	
	2.2.3 Anurans	
	GENERAL REACH DESCRIPTIONSERROR! BOOKMARK NOT DEFINED	
	COMPONENT CLASSIFICATIONS	
2.5	REACH SUMMARY	
3.0	MANAGEMENT RECOMMENDATIONS1	
3.1	MANAGEMENT RECOMMENDATIONS FOR REACHES1	-
4.0	CLOSURE1	
5.0	REFERENCES1	3
	t of Tables	
Tab	ole 1 Summary of frog survey times and weather conditions	4
Tab	le 1. Hydrology Classification, 2018	5
	ble 2. Riparian Classification (Updated 2020)	
	ble 3. Fish and Fish Habitat Classification, June 21, 2018	
	ble 4. Terrestrial Habitat Classification (Updated 2020)	
ıak	ne 3. heach Dimensions Duning Spring Freshet (April 12, 2016)	J
	t of Figures	_
	ure 1. HDF reachesure 2. Headwater Drainage Feature Assessment (HDFA) flow chart providing direction on	<u>კ</u>
_	management options	n

**List of Appendices**Appendix A: Reach Photos
Appendix B: Field Notes



#### 1.0 INTRODUCTION

This report is an updated Headwater Drainage Feature Assessment written by Kilgour & Associates Ltd. (KAL) on behalf of Avenue 31 in support of potential future development at 6150 Thunder Road in Ottawa, Ontario (the "Site").

#### 2.0 HEADWATER DRAINAGE FEATURES

#### 2.1 Overview

Seven headwater drainage features (HDFs) on the Site were initially reviewed in 2018 using field methodologies identified with the *Evaluation, Classification and Management of Headwater Drainage Features Guidelines* (CVC & TCRA, 2013) (the "HDF Guidelines"). Six HDFs (R1 through R6) all drain to a permanent watercourse identified within this report as channel R7. The features were studied during the spring and summer of 2018 as part of a due-diligence review of the site prior to the commencement of planning for the site, though the formal HDFA report was not completed at the time.

Much of the southern half of the Site was cleared of vegetation in 2019. The site was briefly revisited on October 8, 2020, to note where portions of the Site landcover had been cleared. As vegetation clearing was permissible on the site at the time under City bylaws, the descriptions and management recommendations provided in this report reflect current site conditions.

Two additional existing channels have been noted since that time along the western boundary of the Site (R8 and R9), which was not part of the initial review in 2018. Two further temporary drainage channels (R10 and R11) were added to the Site in 2021.

This updated report describes current site conditions.

#### 2.2 Assessment Methodology

#### 2.2.1 Channel Form and Fish

Headwater channels R1 through R7 on the Site were investigated three times in 2018 following *Evaluation*, *Classification and Management of Headwater Drainage Features Guidelines* (Toronto and Region Conservation Authority and Credit Valley Conservation, 2014) to document their hydrological and riparian and terrestrial habitat. On April 12, 2018 (i.e. during the spring freshet), KAL biologists Liza Hamilton and Tyler Peat identified and described seven channelized features on the Site (reaches R1 through R7; Figure 2), noting the channel dimensions, substrate, form, and riparian vegetation.

Channel R1 is the roadside ditch along Thunder Road. This feature is unlikely to be altered (realigned) in any meaningful way under future development plans. All other channels on site had been (i.e. in 2018) located within young, early successional wooded areas and coniferous plantation covering former agricultural fields. A single small wetland pocket was observed at the upstream end of Channel R4. Natural landcover along Channels R6, R5 and most of R2 was completely removed in 2019.



Channel R7, the permanent watercourse crossing the north end of the Site is highly linearized, U-shaped drainage channel, though it does not have status as a municipal or ward drain. All other channels are small, shallow, linear, U-shaped agricultural ditches or swales that ultimately connect to Channel R7.

Channels R3 and R4, and the north half of Channel R2 were all wet until mid-summer in 2017, but only so because of the presence of beaver dams along Channel R7, which prevented the site from draining normally. With the dams having been removed, Channels other than R7, can be expected to run dry shortly after the spring freshet. Channels R5, R6 and the upper half of Channel R2 are ephemeral and ran dry very quickly after the freshet, even when beaver dams were present. Small numbers of fish were observed in all areas below Channel R 7 is considered as a potential fish habitat.

On June 21, 2018, KAL biologists Rob Hallett and Tyler Peat conducted an electrofishing survey of R1, R3, R4, and a portion of R2 north of R4. These channels were deemed at the time to be sufficiently wet to potentially support fish, whereas R2, R5, and R6 were dry at the time of electrofishing surveys and therefore not able to support fish. R7, a permanent stream, was not fished as the project does not propose to alter or build within 30 m of that feature. As a permanently flowing channel connected to larger creeks downstream, R7 is considered to directly support fish regardless.

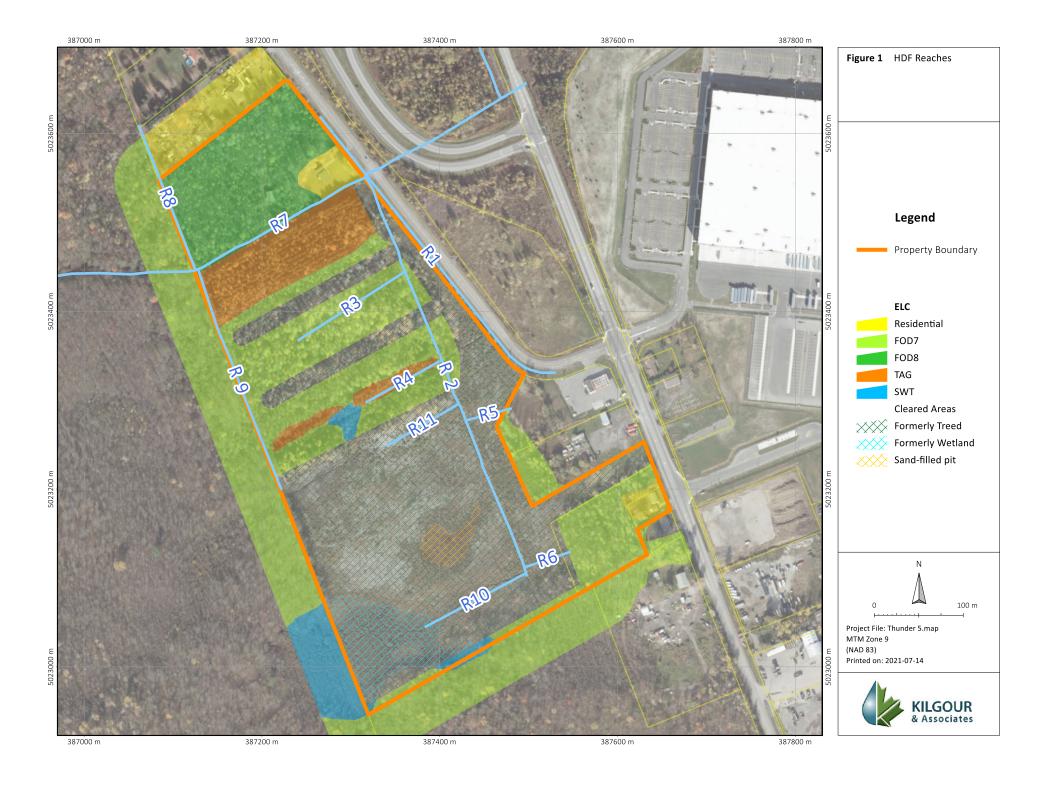
Several beaver dams were removed from R7 just west of the Site in late June 2018. The effect on Site water levels was observed on July 5, 2018, by KAL biologist Terry Hams while completing bird surveys, with flows R7 noted as being greatly reduced and all other channels having dried. On June 8, 2021, KAL biologist Anthony Francis noted channel R7 was hydrated but had no perceptible flow. Channels R1 through R6 were fully dry, except for the bottom ~25 m of R2, which held shallow (<10 cm) of backwater from R7.

Channel R8 was initially noted during the field visit of October 8, 2020, by KAL biologist Ed Malindzak. The channel was observed to wet at the time. Given its direct connection to R7, it is presumed to provide fish habitat. Given its location at the rear of the Site, however, the feature will not be subject to alteration and no development is proposed within 30 m of its top-of-bank. No further study is deemed to be required at this time.

Channel R9 was first noted on June 8, 2021, as a dry shallow ditch along the western property line leading northward to R7. KAL biologist Nick Moore returned the feature on June 22, 2021, to take measurements and photos. The feature is a shallow, linear, dirt swale, 1 - 1.5 m in width, with no obvious bank substructure. It was fully dry along its entire length. It likely conveys some runoff during the spring freshet but is unlikely to provide aquatic habitat beyond that.

Channel R10 was dug as an eastward-running, linear drainage channel sometime in either late fall 2020 or spring 2020. The 2 m wide swale was excavated in the bare sandy soil of the cleared portion at the south end of the site. City of Ottawa air photos from 2019 (Ottawa, 2021) suggest some natural surface drainage may have previously occurred along that route, though no headwater features were evident there during site surveys through the 2018 field season. Channel R11 is a similarly sized and formed feature at the north end of the cleared area, dug within the same time frame. City of Ottawa air photos (Ottawa, 2021) do not suggest any channel had existed there previously. Both R10 and R11 were fully dry on June 8, 2021.





#### 2.2.2 Vegetation

KAL Biologist, Terry Hams, completed an initial tree inventory and an ecological land classification (ELC) of the Site on June 20, 2018. Vegetation cover on the Site was described following standard ELC methods, including the collection of soil samples (Lee *et al.*, 1998).

As the south half of the Site was cleared and partially regraded in 2019, the ELC for the Site and the tree information for the remaining stands were updated by Ed Malindzak (October 15, 2020) and Anthony Francis (on October 18, 2020). The updated tree survey identified the size and species distributions of trees within forested areas of the Site.

#### 2.2.3 Anurans

Site amphibian (anuran) surveys were conducted and lead by KAL biologists, Rob Hallett and Liza Hamilton, following protocols set forth by the Marsh Monitoring Program (Bird Studies Canada *et al.*, 2008). Three surveys are completed to identify early, mid, and, late-season breeding amphibian species generally in April, May, and June, respectfully, though survey dates are temperature dependent. Surveys are completed on nights of calm weather with temperatures above 5 degrees Celsius (°C), 10°C, and 17°C for each of the three respective survey periods. Surveys begin a half-hour after sunset and are finished by midnight with a five-minute recording period at each survey station. Amphibian species are recorded at each point along with the estimated distance from observers, calling code, an estimate of the number of individuals, and estimated directions of calling anurans.

Amphibian surveys were performed on April 23, May 30, and June 21, 2018 (Table 2). Three stations were surveyed in wetland and aquatic habitats (F1 through F3; Figure 2). Station F3 was located at the north end of the Site with the observers facing south. Stations F1 and F2 were the same point located near the southwestern corner of the Site, but with one observer facing south (F1) and one facing north (F2).

Table 1 Summary of frog survey times and weather conditions

Survey Date	Temperature (°C)	Weather conditions	Wind speed (km/hour)
23-Apr-18	10*	Clear	4
30-May-18	21*	Mostly Cloudy	11-14
21-Jun-18	17**	Clear	7 - 10

<sup>\*</sup> Temperatures on these nights were warmer than the preceding nights, with evening temperatures just above 5°C and 10°C, respectively, within a few days of the surveys. Frogs for the period would still be expected to be calling regardless.

#### 2.3 Component Classifications

The following tables summarize the functions provided by the Site channels.



<sup>\*\*</sup> Temperatures on this night just reached the minimum required temperature but had been were warmer the preceding nights, with evening temperatures above 17°C. Frogs for the period would still be expected to be calling regardless.

## **Table 2. Hydrology Classification**

	Hydrology Classification					
Drainage Feature	Assessment	Flow Conditi	ons	Flow	AA JUGA A	Hydrological
	Period	Description	(OSAP Code)	Classification	Modifiers	Function
	April 12, 2018	Standing water			Road sided ditch. Water	
R1	June 21, 2018	Standing water	4	Ephemeral	remained in this reach for a longer period of time than usual	Contributing
	July 5, 2018	Dry			due to beaver dams in R7.	
	April 12, 2018	Standing water		lata anithant		Val. ad /la half
R2	June 21, 2018	Upper channel: Dry Lower channel: standing water	3	Intermittent (lower half) Ephemeral (upper half)	Water remained in lower portion of this reach for a longer period of time than usual due to beaver dams in R7.	Valued (lower half Contributing (upper half)
	July 5, 2018	Dry		(apper rian)		(apper nan)
	April 12, 2018	Standing water			Water remained in this reach for	
R3	June 21, 2018	Standing water	4	Water remained in this reach for a longer period of time than usual due to beaver dams in R7.	Valued	
	July 5, 2018	Dry				
	April 12, 2018	Standing water			Water remained in this reach for	
R4	June 21, 2018	Standing water	4	Intermittent	a longer period of time than usual due to beaver dams in R7.	Valued
	July 5, 2018	Dry			usual due to beaver dams in N7.	
	April 12, 2018	Standing water				
R5	June 21, 2018	Dry	1	Ephemeral		Contributing
	July 5, 2018	Dry				
	April 12, 2018	Standing water				
R6	June 21, 2018	Dry	3	Ephemeral		Contributing
	July 5, 2018	Dry				
	April 12, 2018	Surface flow			Conducts flows from the east across the Site and on to	
R7	June 21, 2018	Surface flow	1	Perennial	neighbouring properties to the west. As a permanent perennial	Important
	July 5, 2018	Surface flow			feature, this channel is not considered an HDF.	
	October 8, 2020	Standing Water				
R8	June 22, 2021	Standing Water, bottom end, otherwise dry	1	Potentailly perennial	May contain water late into the season.	Important
R9	June 22, 2021	Dry	3	Ephemeral		Contributing
R10	June 8, 2021	Dry	3	Ephemeral		Contributing
R11	June 8, 2021	Dry	3	Ephemeral		Contributing



Table 3. Riparian Classification (Updated 2020)

		Riparian Class	ification	
Drainage Feature	OSAP Descriptions	OSAP Riparian Codes	ELC Codes	Riparian Conditions
R1	RUB – Cleared LUB – Road shoulder	RUB – 1 LUB – 1	-	Limited Functions
R2	RUB – Cleared/Forest LUB – Cleared	RUB – 2 LUB – 4	-	Limited Functions (Upper half) Important Functions (Lower half)
R3	RUB – Forest LUB – Forest	RUB – 6/2 LUB – 6/2	CUF CUF	Important Functions
R4	RUB – Forest LUB – Forest	RUB – 6/2 LUB – 6/2	CUW CUW	Important Functions
R5	RUB – Cleared LUB – Cleared	RUB – 6 LUB – 6	-	Limited Functions
R6	RUB - Cleared LUB - Cleared	RUB – 2 LUB – 6	-	Limited Functions
R7	RUB - Forest LUB – Meadow	RUB – 6 LUB – 4/6	CUW FOD	Important Functions*
R8	RUB – Forest LUB – Forest	RUB – 6/2 LUB – 6/2	CUF CUF	Important Functions
R9	RUB – Forest LUB – Forest	RUB – 6/2 LUB – 6/2	CUF CUF	Important Functions
R10	RUB – Cleared LUB – Cleared	RUB – 6 LUB – 6	-	Limited Functions
R11	RUB – Cleared LUB – Cleared	RUB – 6 LUB – 6	-	Limited Functions

RUB – right upstream bank

LUB – left upstream bank



<sup>\* &</sup>quot;Important Function" level is discussed further in Section 3.1

Table 4. Fish and Fish Habitat Classification, June 21, 2018

		Rip	arian Classification
Drainage Feature	Fish Observation • Fishing effort	Fish & Fish Habitat Designation*	Modifiers/Notes
R1	Incidental fish present, no SAR present.  • 630 SS = ~5.3s/m²	Contributing Functions	20 fish (13 Central Mudminnows, 3 Brassy Minnows, 1 Brook Stickleback, and 3 Northern Redbelly Dace. These species are very common and highly tolerant. Only present as beaver dam backed up water into to this feature. Feature dried as soon as the dam was removed. Shallow feature is considered unlikely to support fish without the dams being present.
R2	Fish present lower half only, no SAR present.  • 721 SS = 2.7 s/m2	Valued Functions (lower half)  Contributing Functions (upper half)	155 fish (60 Central Mudminnows, 52 Brook Stickleback, 15 Northern Redbelly Dace, 8 Pumpkinseeds, 1 Fathead Minnow, and 1 Creek Chub). These species are very common and highly tolerant. Only present as beaver dam backed up water into to this feature. Feature dried as soon as the dam was removed. Bottom most end may provide some habitat in wet years regardless.
R3	Incidental fish, no SAR present.  • 339 SS = 4.8 s/m2	Contributing Functions	130 fish (73 Central Mudminnows, 52 Brook Stickleback, and 3 Fathead Minnows, and 2 Pumpkinseeds). These species are very common and highly tolerant. Only present as beaver dam backed up water into to this feature. Feature dried as soon as the dam was removed. Shallow feature is considered unlikely to support fish without the dams being present.
R4	Incidental fish, no SAR present. • 327 SS = 2.7 s/m <sup>2</sup>	Contributing Functions	32 Brook Stickleback were observed. This species is very common and highly tolerant. Only present as beaver dam backed up water into to this feature. Feature dried as soon as the dam was removed. Shallow feature is considered unlikely to support fish without the dams being present.
R5	No fish present, no SAR present.  • Dry	Contributing Functions	
R6	No fish present, no SAR present.  • Dry	Contributing Functions	
R7	Fish assumed present.	Valued Functions	Permanent channel assumed to have fish at all times of the year.
R8	Fish assumed present.	Valued Functions	Permanent channel assumed to have fish at all times of the year.
R9	No fish present, no SAR present.  • Dry	Contributing Functions	
R10	No fish present, no SAR present.  • Dry	Contributing Functions	
R11	No fish present, no SAR present.  • Dry	Contributing Functions	

<sup>\*</sup>Fish and Fish Habitat Designation is constrained by the HDF Guidelines definitions. "Modifiers" provides significant caveats to those designations.

SS = shocking seconds



## **Table 5. Terrestrial Habitat Classification (Updated 2020)**

Drainage Feature	Description	Amphibians	Terrestrial Classification
R1	Roadside ditch.	No frogs were observed in the feature.	Limited Functions
R2	Lower half includes some portions within plantation forest. Upper half was located within moist forest/plantation (no adjacent wetland evident during surveys), but surrounding area has now been fully cleared.	No frogs were observed in the feature.	Contributing Functions (lower half)  Limited Functions (upper half)
R3	Flows through plantation forest.	No frogs were observed in the feature.	Contributing Functions
R4	Upstream end is a small wetland pocket. Flows through plantation forest very near the clearing edge.	No frogs were observed in the feature.	Valued Functions
R5	All surrounding vegetation has been cleared.	No frogs were observed in the feature.	Limited Functions
R6	All surrounding vegetation has been cleared.	No frogs were observed in the feature.	Limited Functions
R7	Permanent stream within a forested area.	No frogs were observed in the feature.	Valued Functions
R8	Permanent stream within a forested area.	As no frogs were observed in R7, frog presence here is considered unlikely.	Valued Functions
R9	Ephemeral channel within a forested area with no adjacent wetlands features.	Frog presence here is considered unlikely.	Contributing Functions
R10	Newly dug ephemeral channel within a cleared area.	Frog presence here is considered unlikely.	Limited Functions
R11	Newly dug ephemeral channel within a cleared area.	Frog presence here is considered unlikely.	Limited Functions



## 2.4 Reach Summary

Dimensions of the HDF reaches are summarized in Table 5.

Table 6. Reach Dimensions During Spring Freshet (April 12, 2018)

Drainage Feature	Length (m)	Mean Bankfull Width (m)	Mean Wetted Width (m)	Mean Depth (m)
R1	401 (along the Site edge)	4.0	1.6	0.19
R2	485	3.0	90	0.90
R3	144	2.0	2.0	0.18
R4	145	3.0	3.0	-
R5	54	2.0	1.4	0.26
R6	55	2.5	1.2	0.32
R7	218 (on the Site)	5.1	3.2	-
R8	175	2		
R9	265	1.5		
R10	242	2.5		
R11	95	2.5		-



#### 3.0 MANAGEMENT RECOMMENDATIONS

The classification categories identified in Section 2 provide the basis of the management recommendations provided here. The following flow chart (Figure 2) combines and translates the classification results to management recommendations.

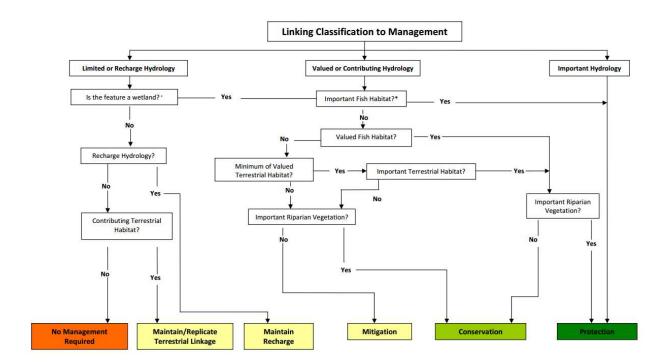


Figure 2. Headwater Drainage Feature Assessment (HDFA) flow chart providing direction on management options

#### 3.1 Management Recommendations for Reaches

#### Channels R1, R5, R6, R10, R11 and the upper half of R2

These features are fully within the cleared area. They are ephemeral channels that do not provide fish habitat. Following the HDFA Guide flow chart linking component classification to management directives (Figure 2), these reaches:

- 1. Provide Contributing Hydrology.
- 2. Do not provide Important Fish Habitat;
- 3. Do not provide Valued Fish Habitat;
- 4. Do not provide Valued Terrestrial Habitat;
- 5. Do not provide Important Riparian Vegetation.



This chain of classification descriptors leads to a management directive of **Mitigation**. These features are not required to be maintained per se, but their functionality must be replicated or enhanced through lot level conveyance measures as part of the site stormwater management system. As the features convey runoff to more ecologically important reaches, replacement features/systems, should be vegetated to mimic online wet vegetation pockets to the extent possible, and should convey water to the same final receiver (i.e. R7). Lot level conveyance features would form part of the Site's future stormwater management system. As such, the replacement features would not require either setbacks or a natural channel design, nor would they need to be comparable dimensions so long as they function to provide the required conveyance and opportunity for allochthonous input.

#### Channels R3, R4 and R9

These reaches are small, ephemeral to intermittent drainage features located entirely within a treed area. While some fish were observed when beaver dams backed up water into them (R2 and R4), they are not considered valued fish habitat as the features now dry too quickly in the spring to support fish. The HDFA Guide flow chart linking component classification to management directives (Figure 2) progresses as follows:

- 1. Provides Contributing/Valued Hydrology;
- 2. Does not provide Important Fish Habitat;
- 3. Does provide Valued Fish Habitat;
- 4. Does not provide Valued Terrestrial Habitat; and
- 4. Provides Important Riparian Vegetation.

This chain of classification descriptors leads to a management directive of **Conservation** for this reach. The feature may be maintained or be realigned using natural channel design techniques to enhance their overall productivity. If realigned, the features may be relocated on or off the Site. In either case, the riparian corridors must be maintained or enhanced. If catchment drainage will be removed due to diversion of stormwater flows, lost functions should be restored through enhanced lot level controls (e.g. restore original catchment using clean roof drainage).

#### **Channels R2 (lower half)**

This reach, with its direct connection to R7 likely retains some water well into summer providing some potential fish habitat for tolerant forage fish. The HDFA Guide flow chart linking component classification to management directives (Figure 2) progresses as follows:

- 1. Provides Contributing/Valued Hydrology;
- 2. Does not provide Important Fish Habitat;
- 3. Provides Valued Fish Habitat;
- 4. Provides Important Riparian Vegetation.

This chain of classification descriptors would typically lead to a management directive of **Protection** for this reach, based in part on the assessment of "Important Riparian Vegetation". Under a management directive of **Protection**, the feature should not generally be relocated. For this feature, however, the



assessment of "Important Riparian Vegetation" comes from only the west side. The east side of the channel has limited vegetation and is generally located within <30 m of the Thunder Road (it connects with R7 within 3 m of the roadway), thus preventing options for an undisturbed, naturalized buffer on that side. The management recommendation for this feature is thus **Conservation** to allow its relocation. The feature should be realigned westward to allow for an improved, naturalized setback with an enhancement of the riparian corridors. Drainage must still be conveyed to R7 and stormwater management systems on the site must be designed to avoid impacts (i.e. sediment, temperature) to this headwater channel.

#### **Channel R7 and R8**

This perennial channel conveys off-site flows across the property. As a permanent stream, it does not qualify as headwater feature. As feature with important hydrology, it automatically receives a management directive of **Protection**. As such, this reach may be maintained and/or enhanced, but should not generally be relocated. Improvements, however, could be possible to its overall channel form and thus some minor realignment may be considered within that context. The riparian zone should be protected and enhanced where feasible. The hydro-period must be maintained. Use natural channel design techniques or wetland design to restore and enhance existing habitat features if and where needed. Stormwater management systems must be designed to avoid impacts (i.e. sediment, temperature) to this headwater channel.

#### 4.0 CLOSURE

This report provides detailed descriptions of the HDFs on the Thunder Road site, as well as management recommendations to direct future development near those features. Points of clarification can be addressed to the undersigned.

Anthony Francis, PhD

KILGOUR & ASSOCIATES LTD.



#### 5.0 REFERENCES

- Bird Studies Canada, United States Environmental Protection Agency, and Environment Canada. 2008.

  Marsh Monitoring Program Participant's Handbook for Surveying Amphibians (Revised).

  Available online at: https://www.birdscanada.org/bird-science/marsh-monitoring-program/
- Credit Valley Conservation and Toronto Region Conservation Authority. 20147. Evaluation, Classification and Management of Headwater Drainage Features.
- Lee, H.R., W. Bakowsky, J. Riley, J. Bowles, M. Puddister, P. Uhlig, and S. McMurray. 1998. Ecological Land Classification for Southern Ontario: First Approximation and its Application. Ontario Ministry of Natural Resources, North Bay.



## **Appendix A: Site Photos**

Note: Reach numbers located within the comment lines directly on photos indicate the order in which they were originally photographed and do not necessarily reflect the final assigned reach numbers used throughout this report.



**Upstream view** 



**Downstream view** 







Upstream view Downstream view







Downstream view







Upstream view

Downstream view







Upstream view Downstream view







**Upstream view** 

Downstream view







Upstream view Downstream view



**Appendix B: Field Notes** 





## Daily Work Plan for Field Work

Client/Project #: SIMP 773

Date: 2018/04 / 12

Personnel Data: CHTP

Anticipated Worst Outcome/ Catastrophic Failure (describe):

Date of Birth YYYY/MM/DD	Emergency contact and number	Staff hazard review initials@
1983/05/08	M. Vegiard 613-993-5683	Det.
1988/07/19	Mirable Miller 613-138-6611	TP
Tell Control of the C		
	\983/05/09	1983/05/00 M. Vegiard 613-993-5683

If there are more than four crew, use a second sheet; \*indicates person responsible for check in / check out; \*e initial if staff has had the opportunity to review the hazard assessment and mitigations for this project, is aware of risks, and agrees the work can be done safely.

Vehicle (circle those that apply)	Owner	Licence
KAL Truck (Chev Silverado), Grey	Bruce Kilgour	685 7JZ (Ontario)
QUAD	Bruce Kilgour	2CK47 (Ontario)
QUAD Trailer	2317833 Ontario	M7807M (Ontario)
Tracker	2317833 Ontario	C23182ON (Transport Canada)
Tracker Trailer	2317833 Ontario	J3161S (Ontario)
Red Inflatable	2317833 Ontario	C23183ON (Transport Canada)
Inflatable Trailer	Bruce Kilgour	J7553K (Ontario)
White inflatable	Kilgour & Associates Ltd.	unmarked
LIZA'S HONDA FIT	L. HAMILTON.	NEd HSM

der Rd, CHEUR CN.
~
J
7
7

He CH hasn't heard from us in over 4 his he Emergency Response Procedure (describe):
Calls born. If no one answers he calls all

Home Base:	Field Location:	
Time leaving 8:30	Time arriving 8-80	
Time returning 11:15.	Time Leaving 1/200	

Person	Pre-Field Condition	Post-Field Condition
LIZA	GCCP.	6000
TYLER	GOOD.	GOED
Vehicle	Pre-Field Condition	Post-Field Condition
LIZA'S HENDA FIT	60CP.	GOP.
The second	Start km: 80 105	End km: 82155

				(dealla	Calil	oration				
Unit	Serial No.	Pre		рН		Cond.		Turbidity		DO
Offic	Serial IVO.	/ Post	4	7	10	1413	0			100% Sat.
pH pen		Pre								
pri peri		Post								
YSI Pro Plus	der aue sta	Pre	S DIFFS	Marin			SUE ME		HeU bent	
TSI PIO PIUS		Post		/			37.19	1950 5		
HI Turb. Meter		Pre								
ni Turb. Meter		Post								
Lamotte Turb.		Pre							and the first	
Meter		Post								
/		Pre								
		Post						934	Daniel Su	ashrenia Arnea

Rules of thumb (when to flag your result):

- DO (mg/L): < 5 mg/L, check that YSI is calibrated to 100% saturation, if yes, then use HACH kit to confirm low DO
- pH: If < 6.5 or > 9, check pH meter vs buffer solutions
- If unit cannot calibrate, it <u>must be serviced</u>, so notify Bruce Kilgour

#### Issues with field equipment

Do not forget to mention all equipment issues to Rob Hallett as soon as possible

**Datasheet Log** 



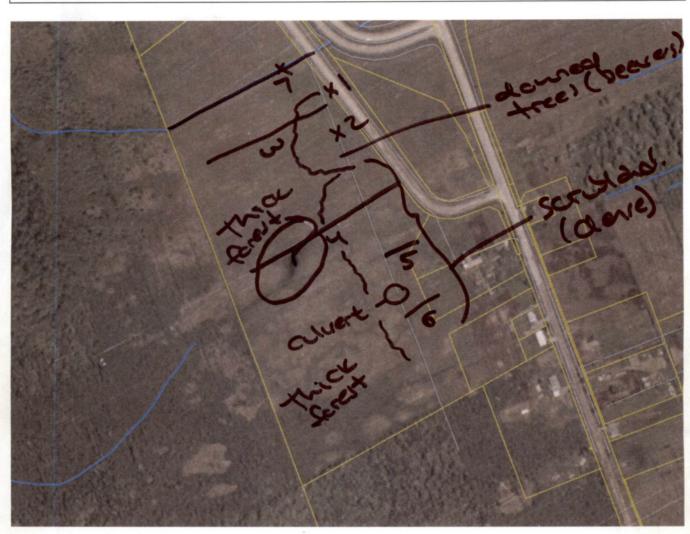
## Field Map

Client/Project #: SIMP773 Crew: LH TP

Date: 2018/64/12

Location: 6150 Thursda Rd.

HDFA Visit #1



Notes



## **General Notes Sheet**

Client/Project #: S 149773 Crew: CH TD

Date: 2012/04/12

Location: 1550 Theoder Rd.

Time (hh:mm)	Map Pin	Easting	Northing	Description/Note
9.30	3			defined channel
	Stat	465023	5001492	freza quer
	ed	464908	5021419	- depth 18cm
				- susstrate frezen.
				~ g.o. M. appex, wetter
				La expressed since cent
				masure.
				- Serest on eigher side
				of chanel
				- Hoderede buch derent
				m B) undereste to
				derse hixen birch 201
				chideras al
II SELL				- 2°C Water Jemp.
				- 2°C 215 temp
9:50	9			C C C C C C C C C C C C C C C C C C C
	Start	465056	5021398	defined chanel
	ed	484980	5401348	- frezer aver
				- hetted ~ 3h (Sext press)
				- conserous forest on
				eigner side (dere)
				- 1.5 day - 200
				- Seaver dan on channel 20 Confliere a dienel
				2 D Conflere a of enel
				4.
				-deep
				- Mas clarse ferest a com
				side of land of chancel
				- scruby truen then slaved
				confered ferent
				- ens is letting one set
				105 (day of 400) 50
				Scrubby brush
				-anthut to see
				Denhater.

**CREW INITIALS:** 

FINAL FIELD PACKAGE: P \_\_\_\_ OF \_\_\_

ream Code	Site Code	ISN ISN	Easting	-007	Northing	150	Date (YYYY)	(MM)	(DD)	Time (24h	
ream Name		151	1 465	001	502		201 R	) - 6 9	- 12	CHI	Ca
Roadsice	D:40-				Dian		roximates Base		1 1	stream Site L	ength (n
ccess Route	10.46				Site Description		V O Freshet	О Зра	te		
	der Rd.						-h 1		0.	1- 01	,
1.00	ser no,				Read	side Vi	6 01	cy	Inco	Ler Rol	
					-			<u> </u>			
					-						
					J [	Un	stream Photo#	Photo Na	ame	-	-
Optional Features Vater Temp (C) Air Temp (C)	pH Conduct	ivity (Ns) Turbidity (	NTV) Dissolved	O <sub>2</sub> (ppm)	Number of upstre		ghness	7	anne		
2 2					1 5 5			===			
					J	8 8 6					
ostream Feature(s)	Sedimen		hetted	uets	ed Baxf	- 1		Unama	am t anninud	inal Cradians	37
eature Distance (m) Bearing umber	Type Flow Transpo		th Feeture Wid	th (m) gr Depti	h (mm) Entrenehme	ent. Feat	ian Vegetation - 1.5-10 m 10-3	Mathov	am Longitudi d Distance (m		
		ature Deposition INT	,			Veg Left Right	Left Right Left	Right Used		Rise (d9i)	
			1	1 1 0/ /				W.		11 1	
1	<b>3</b> 2		1.5	190	9 9.0		2 1 1				
2			1.51	197	9 9.0		3 6 6	٣u			
2					9 9.0						
					9.0						
2					9 9.0						
3					9 9.0						
3					HER Hydraulic Head OR	R Volume OR Distance					
2 3 3 Stream Flow Measure(s) sture Wetted	Depth (mm)		lydraulic Head (m	Record EIT)			Oistance (in			-Time (sec)	
2 3 3 Stream Flow Measure(s)			lydraulic Head (m	Record EIT)	HER Hydraulic Head OR		- Distance (m		1	-Time (sec)2	3
3			lydraulic Head (m	Record EIT)	HER Hydraulic Head OR		Distance (m		1	-Time (sec)2	3
3			hydraulic Head (m	Record EIT)	HER Hydraulic Head OR		Distance (m		1	-Time (sec)	3
2 3 3 Stream Flow Measure(s)			hydraulic Head (m	Record EIT)	HER Hydraulic Head OR		Distance (m		1	-Time (sec)	3
3 Stream Flow Measure(s)			lydraulic Head (m	Record EIT)	HER Hydraulic Head OR		- Oistance (m			Time (sec)	3
3 Stream Flow Measure(s) ature Wetted			hydraulic Head (m	Record EIT)	HER Hydraulic Head OR		-Distance (m		1	Time (sec)	
3 Stream Flow Measure(s) alure Wetled moor Width (m) 1			hydraufic Head (m	-Record EITI	HER Hydraulic Head OR		- Distance (m			-Time (sec) — 2	
3 Stream Flow Measure(s) sture Wetted other Width (m)	Depth (mm)		2	Record EITh	HER Hydraulic Head OR		- Distance (m			Time (sec)	
3 Stream Flow Measure(s) ture Wetted Width (m) 1	Depth (mm)—2	1	2 2 2 2 2 7. C	Record EITH	HER Hydraulic Head OR Volume (it) 1 2	3 1	Distance (m			Time (sec)	

			P	roject #:			Rec	order	Crew:				
Date: Stream Name:				tream Cod				Code					
Site Limits:	Upstream	,	WP#	aroum out					essment:	□ Sa	ample 1	Unconn	ected HDF:
	Downstre		WP#				- 100	. , ,,,,,	oodinoni.		ample 2		ot connected
Direction of Assessment	:		□ U	pstream	□ Da	ownstre	eam			☐ Sa	ample 3	to dow	nstream netv
Flow Influence		Freshe	t (1)				Spate (2)				☐ Baseflo	ow (3)	7 6 1
Flow Condition		Dry (1) Standin	ng Water (2	)			Interstitial Flow		)		☐ Substa	ntial Flov	v (5)
Feature Type			d Natural Co elized or Co pread (3)			00	No Defined F Tiled Feature Wetland (6)	Featu	re (4)		☐ Swale ☐ Roadsi☐ Pond (9	ide Ditch	(8)
Feature Vegetation			Lawn (2	()	Cropped (3)		Meadow (4)		Scrubland (	5) 🗆	Wetland(6)		rest (7)
Di-seles Vegetation													
Riparian Vegetation  0 - 1.5 m Left Bank	□ None	o (1) [	Lawn (2	, п	Cropped (3)	П	Meadow (4)	П	Carubland (	Б П	Wetland (6	, п	Farest (7)
Right Bank	□ None		Lawn (2		Cropped (3)		Meadow (4)		THE REAL PROPERTY OF THE PARTY	State of Sta	Wetland (6) Wetland (6)	The same of the same of	Forest (7)
1.5 - 10 m Left Bank	□ None		☐ Lawn (2		Cropped (3)		Meadow (4)						Forest (7)
Right Bank	□ None	Continue Continue	Lawn (2		Cropped (3)		Meadow (4)		Charles Aller and Artist and Arti	A STATE OF THE PARTY OF	Wetland (6) Wetland (6)	A STATE OF THE PARTY OF THE PAR	Forest (7)
10 - 30 m Left Bank Right Bank	□ None		☐ Lawn (2☐ Lawn (2☐ ☐ Lawn (2☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐	A STATE OF THE PARTY OF	Cropped (3)		Meadow (4) Meadow (4)		III CHA CONTRACTOR CON	and the same of the same of	Wetland (6)	The state of the s	Forest (7)
Channel Gradient (S4.I			(1) C				vel (3)				Wetland (6)  Other (5)		Forest (7) LiDAR (6)
					Elevation (cm)	-							D. Hills
Dominant Substrate (S			lard Pan)	Silt	Sand (0.06		Gravel (2	22-66	mm) Cobb	ole (67-2	49 mm) Bo	ulder (25	0 mm) Bedr
Sub-Dominant Substra					Sand (0.06	6-2 mm					49 mm) Bo	ulder (25	0 mm) Bedr
	te (S2.M3)	C C	10% Minim	nal (1)		6-2 mm  0% Moo	derate (2)	00	40 - 60% H	igh (3)	□ > 6	60% Extre	Eme (4)
Sub-Dominant Substra Feature Roughness Width Measurement Channel Dimensions	Can'	t Measur	10% Minim	nal (1)	Sand (0.06 E E 10 - 40 kfull (2)	6-2 mm	derate (2) an Width (3) Bankfull	Depti	40 - 60% H Estimated (	igh (3) 4)	GIS (5)	60% Extre	Eme (4)
Sub-Dominant Substra Feature Roughness Width Measurement Channel Dimensions Entrenchment To	Can'	t Measur Vidth (m)	10% Minim re (1)	nal (1) Bank	Sand (0.06	6-2 mm	derate (2) an Width (3) Bankfull m Righ	Depti	40 - 60% H Estimated ( h (mm) _	igh (3) 4)	GIS (5)	60% Extre	eme (4) e/GIS (6)
Sub-Dominant Substra Feature Roughness Width Measurement Channel Dimensions Entrenchment To Surface Flow Method	Can' Feature Votal:	't Measur Vidth (m) > 40 m	10% Minim re (1)	nal (1) Bank	Sand (0.06	6-2 mm  0% Moo	derate (2) an Width (3) Bankfull m Righ	Depth nt Ban Dista	40 - 60% H Estimated ( h (mm) _ k _ ance by Tim	igh (3) 4) — m	GIS (5)	60% Extre	eme (4) e/GIS (6) m
Sub-Dominant Substra Feature Roughness Width Measurement Channel Dimensions Entrenchment To	Can' Feature Votal:	Vidth (m) > 40 m	10% Minim re (1)	nal (1) Bank 40 m	Sand (0.06	6-2 mm  0% Moo	derate (2) an Width (3) Bankfull m Righ 2) Volume	Depth nt Ban Dista	40 - 60% H Estimated ( h (mm) _ k _ ance by Tim	igh (3) 4) — m	GIS (5) Total w	60% Extre	eme (4) e/GIS (6)
Sub-Dominant Substra Feature Roughness Width Measurement Channel Dimensions Entrenchment To Surface Flow Method	Feature Votal:  Percovert	Vidth (m) > 40 m ched Culveted Dept	10% Minimizer (1)	anal (1) Bank 40 m Hydi 1	Sand (0.06	6-2 mm  0% Moo  Mea  Head (2m)  3	derate (2) an Width (3) Bankfull m Righ 2) Volume	Depth at Ban District	40 - 60% H Estimated ( h (mm)  k  ance by Tim	igh (3) 4)	Total w	50% Extre Measur  Measur  J Estimat	eme (4) e/GIS (6)  m ed (4) Time (s)

	Headwater Drainage Feature	
Stream Code Site Code	Zone Easting   Y64 999	Northing Date (YYYY) (MM) (DD) Time (24hr)  5027573 2018 - 04 - 12 69:15
Stream Name		Discharge Approximates Baseflow? Upstream Site Length (m.
Ditor #1		O Baseflow @ Freshet O Spate
Access Route		Site Description
Thuder Rd.		Diton Time down length of
		Droparty Derelai No Thines
L Talk		Rd. O
Optional Features Water Temp (C) Air Temp (C) pH	Conductivity (Ns.) Turbidity (NTV) Dissolved O <sub>2</sub> (ppm)	Number of upstream features   Upstream Photo # Photo Name   Roughness
2 2 7		
Upstream Feature(s)	Sediment Transport Wetted Wette	
Feature Distance (m) Bearing Type Flow Number	Adjacent Feature Deposition MT	(mm) Entrenchment Feat 0.1.5 m 1.5-10 m 10.30 m Method Distance (m) Elevation Rise (co)
	7 7 0.90 90	3011444474
3		
4		
Ipstream Flow Measure(s)	Record EITHE	ER Hydraulic Head OR Volume OR Distance
Feature Wetted Depth (m Number Width (m) 1 2	m) Hydraulic Head (mm)	Volume (it) — Distance (m) — Time (sec) — 1 2 3 1 2 3
Comments		
Substrate -	ruddy sitt	
SUSSTRETE - SIMP773		
2		
- U - U - U - U - U - U - U - U - U - U		
		170"

	4		, u	nconst	trained l	Headwater	r Dra	Inage Fea	ature Asses	sme	nt		
Date:					Project #:			Reco	order/Crew:				
Stream Name:					Stream Co	de:		Site	Code:				
Site Limits:			tream Instream	WP#	_			Field	Assessment:		ample 1	Unconnect	
Direction of Asses	ssment:				Upstream		ownstr	eam		□ s	ample 3	to downst	ream network
Flow Influence			☐ Fres	het (1)				Spate (2)			☐ Basef	flow (3)	
Flow Condition			☐ Dry	(1) Iding Water	(2)		00	Interstitial Flow			☐ Subst	antial Flow (5	)
Feature Type			☐ Cha		Constrained			No Defined F Tiled Feature Wetland (6)			☐ Swale ☐ Road	side Ditch (8)	
Feature Vegetati	ion		None (1)	☐ Lawr	(2)	Cropped (3)		Meadow (4)	☐ Scrubland	(5)	] Wetland(6	6) D Fores	t (7)
Riparian Vegeta	tion												
0 - 1.5 m Left E			None (1)	☐ Lawr	(2)	Cropped (3)		Meadow (4)	☐ Scrubland	(5) E	Wetland (	6) 🗆 F	prest (7)
Committee of the Commit	t Bank		None (1)	☐ Lawr	THE REAL PROPERTY.	Cropped (3)		Meadow (4)	☐ Scrubland		Wetland (	-	prest (7)
1.5 - 10 m Left F	Bank		None (1)	☐ Lawr	(2)	Cropped (3)		Meadow (4)	☐ Scrubland	(5)	Wetland (	6) 🗆 F	prest (7)
Right	t Bank		None (1)	☐ Lawr		Cropped (3)		Meadow (4)	☐ Scrubland	(5)	Wetland (	6)	prest (7)
10 - 30 m Left 8	Bank		None (1)	☐ Lawr	1(2)	Cropped (3)		Meadow (4)	☐ Scrubland	(5)	Wetland (	6) 🗆 F	orest (7)
Right	t Bank		None (1)	☐ Lawr		Cropped (3)		Meadow (4)	☐ Scrubland	(5)	Wetland (	6) 🗆 F	orest (7)
Distance (m):  Dominant Subst Sub-Dominant S		.,		(Hard Pan	silt	Sand (0.0		n) Gravel (2	22-66 mm) Cobb	ole (67-	Gradient (249 mm) B		m) Bedrock
Feature Roughn Width Measuren Channel Dimens	nent					the second contract of	Train .		40 - 60% H Estimated Depth (mm)			60% Extreme	
Entrenchment	Tot	al:	□ > 40	m 🗆	< 40 m	Left Bank		m Righ	it Bank	n	n Total	width	m
Surface Flow Me	ath a d	П	Darahad (	Culvert (1)					Distance by Tim	- (2)		Estimated	
		_											
Wetted Widt	in (m)			<b>epth (mm)</b> 2 3		raulic nead (m	3	1 2	e (L) 2 3	1	2	3 1	7 ime (s)
Sediment Trai	nsport	Adja	acent	□ None		☐ Rill (2)		Rill and Gull		Gully (4		Outlet Scour (5	5)
		Fea	ture	□ None	et Erosion (6 e (1) et Erosion (6	☐ Rill (2)		Rill and Gull	nk Erosion (7) y (3)	Gully (4	4) 🗆 0	Other (8) Outlet Scour (5 Other (8)	5)
Sediment Depos	sition		Measures	s (mm):									
□ None (1)		Min	imal: < 5 m	ım (2)	☐ Mod	derate: 5-30 mn	n (3)	☐ Substan	tial: 31-80 mm (4	) [	Extensive	e: > 80 mm (5)	

	Site Code	Zone	Easting	eatures - U	op- and Do	own- Stre		te (YYYY)	(MM)	(DD)	Time (24h	ur)
ream Code	5	18	1465103		50213	327	7		1-6H	-12	10	15
ream Name			9 3 1			Discharge	e Approxim	nates Basefi	ow?	Up	stream Site L	ength (n
di, ton			E PT	12	400	O Bas	eflow 😡	Freshet	O Spat			
ccess Route				Si	ite Description	,						
Star	t- 4650	74 5	021327,	-	-Derne	Lordon	a	to 1	non	Old	ach	
Star	- 46510	ca 50	521327	-	- Sec	ind	Dotr	0- (6				
			n l	9			1	SIDE		1011		
ptional Features —				- Num	ber of upstrea	ım features —		n Photo#	Photo Na	ame		
Vater Temp (C) Air Temp (C) p	H Conductivi	ty (Ns) Turbidity (	NTV) Dissolved O <sub>2</sub> (p	pm)			Roughne	ss				
0 2											Į.	Ř.
			= 1		20.						77. 6	
eature Distance (m) Bearing	Sediment Transport	Sediment Wid	th Feature Width (m)	heted	B-8-11	Foot	Riparian V	egetation			inal Gradiem	t
umber	Adjacent Featur	re Deposition MT	Tomas maning	-BF Depth (mm)	Entrenchment Width (m)	Veg Left	5 m 1.5- Right Left	10 m 10-30 Right Left F	Right Used	Distance (m	Rise (cO)	
1	1 2	3	1.4	260	2.0H	115	55	55	5			
							Second Bearing	Supposed Supposed for			_	
2												
3												
3												
3				ecord EITHER Hydr	raulic Head OR V	Olume OR Dist	tance—			12.		
3	Depth (mm)			secord EITHER Hydr	raulic Head OR V	folume OR Dist	tance—	-Distance (m)			Time (sec)	
3 stream Flow Measure(s)	— Cepth (mm)———————————————————————————————————		hydraulic Head (mm) 2	secord EITHER Hydr		/olume OR Dist	tance—	-Distance (m)	3	1	-Time (sec) —	3
3 Stream Flow Measure(s)	— Depth (mm)———————————————————————————————————			lecord EITHER Hydr			fance 1	-Distance (m)		1	-Time (sec) —	3
3 Stream Flow Measure(s)	Depth (mm)—			secord EITHER Hydr			tance—	-Distance (m)		1	-Time (sec) ——	3
3 stream Flow Measure(s)	— Depth (mm)———————————————————————————————————			secord EITHER Hydr			tance—	-Distance (m)		1	-Time (sec) — 2	3
3 stream Flow Measure(s)	— Depth (mm) — 3			secord EITHER Hydr			tance—	-Distance (m)			-Time (sec)	3
3 stream Flow Measure(s)	- Cepth (mm) - 2 3			Secord EITHER Hydr			tarice 1	-Distance (m)			-Time (sec) — 2	3
3 Stream Flow Measure(s) atture Wettled miber Width (m)	Depth (mm)—2 3			secord EITHER Hydr			tance—	-Distance (m)			-Time (sec) — 2	3
3 Stream Flow Measure(s) ature Wetted miber Width (m)	2 3	1	tydraulic Head (mm)—2	1			tance—	-Distance (m)			-Time (sec) — 2	3
ature Wetted miber Width (m)	Oepth (mm)—  2  3  SUSSET  SIMP 773	1	tydraulic Head (mm)—2	1			tance 1	-Distance (m)			-Time (sec)—2	3

				Project #:			Reco	order	/Crew:				
Stream Name:				Stream Coo			Site	Code	):				
Site Limits:	Upstream		WP# WP#				Field	Ass		San	nple 1		cted HDF:
Direction of Assessment:				Jpstream		Downstr	eam			Sam	nple 3	to down	stream net
Flow Influence		Fresh	et (1)				Spate (2)				☐ Basefl	ow (3)	
Flow Condition		Dry (1)	) ing Water (	2)			Interstitial Flow		)		☐ Substa	antial Flow	(5)
Feature Type		Define Chann	ed Natural ( nelized or C	Channel (1) Constrained			No Defined F Tiled Feature	eatu	re (4)		☐ Swale ☐ Roads	(7) side Ditch (8	3)
			hread (3)				Wetland (6)	_			☐ Pond	1	
Feature Vegetation  Riparian Vegetation	□ Nor	ie (1)	☐ Lawn (	(2)	Cropped (3)		Meadow (4)		Scrubland (5)		Wetland(6	) 🗆 Fore	est (7)
0 - 1.5 m Left Bank	□ Nor	ne (1)	☐ Lawn	(2)	Cropped (3)		Meadow (4)		Scrubland (5)		Wetland (6	6) 🗆	Forest (7)
Right Bank	□ Nor	ie (1)	☐ Lawn	(2)	Cropped (3)		Meadow (4)		Scrubland (5)		Wetland (6	6) 🗆	Forest (7)
1.5 - 10 m Left Bank	□ Nor	ne (1)	☐ Lawn	(2)	Cropped (3)		Meadow (4)		Scrubland (5)		Wetland (6	6) 🗆	Forest (7)
Right Bank	□ Nor	ie (1)	☐ Lawn	(2)	Cropped (3)		Meadow (4)		Scrubland (5)		Wetland (6	6) 🗆	Forest (7)
10 - 30 m Left Bank	□ Nor	ne (1)	☐ Lawn	(2)	Cropped (3)		Meadow (4)		Scrubland (5)		Wetland (6	6) 🗆	Forest (7)
Right Bank	☐ Nor	ie (1)	☐ Lawn	(2)	Cropped (3)		Meadow (4)		Scrubland (5)		Wetland (6	6) 🗆	Forest (7)
Dominant Substrate (S2 Sub-Dominant Substrate			Hard Pan)	Silt	Sand (0.	.06-2 mr	n) Gravel (2	22-66	mm) Cobble	(67-24	9 mm) Bo	oulder (250	mm) Bedr
Feature Roughness			< 10% Mini	mal (1)	☐ 10 -	40% Mo	oderate (2)		40 - 60% High	(3)	>	60% Extre	ne (4)
	☐ Car				cfull (2)	☐ Me	an Width (3)		Estimated (4)				
Width Measurement													
Width Measurement													
Channel Dimensions		1	n —	< 40 m	Left Bank		m Righ	t Bar	nk	_m	Total	width	m
Channel Dimensions		> 40 n										7	
Channel Dimensions  Entrenchment Tot	tal:				☐ Hydrauli		(2)	Dist	ance by Time (	3)	L	Estimate	d (4)
Channel Dimensions	al:	ched Cu				ic Head							
Channel Dimensions  Entrenchment Tot  Surface Flow Method	al: Per	ched Cu	ulvert (1)		raulic head (	ic Head	Volume				nce (m)		
Channel Dimensions  Entrenchment Tot  Surface Flow Method	al: Per	tted Dep	oth (mm)	Hyd	raulic head (	mm) 3	Volume	e (L)	3	Dista 1	nce (m) 2		Time (s)

Headwater Drainage Features - Up- and Down- Stream Site Code Date (YYYY) Stream Code Stream Name Discharge Approximates Baseflow? Upstream Site Length (m) O Baseflow Freshet Spate Access Route Site Description Desperdicular to Proper Photo Name Upstream Photo # Optional Features -Number of upstream features -Roughness Water Temp (C) Air Temp (C) Conductivity (Ns) Turbidity (NTV) Dissolved O2 (ppm) Sediment Upstream Feature(s) hetted hetted Feat 0.1,5 m 1.5-10 m 10-30 m
Veg Left Right Left Right Left Right Upstream Longitudinal Gradient Transport Feature Width (m) BE Depth (mm) Feature Distance (m) Bearing Type Flow Sediment Width Entrenchment Feat. \_ Method Distance (m) Elevation Adjacent Feature Deposition MT Width (m) Number Rise (dO) Used 1 2 3 4 -Record EITHER Hydraulic Head OR Volume OR Distance -Upstream Flow Measure(s) -Hydraulic Head (mm) -Distance (m) -Time (sec)-Volume (It)-Wetted Depth (mm) Number Width (m) faczen Substrate - had silt SIMP773

Date:			Proje	ct #:		Reco	order/Crew:			
Stream Name:			Strea	m Code:		Site	Code:			
Site Limits:		stream wnstream	WP#				Assessment:		mple 1 mple 2	Unconnected HDF:
Direction of Asses	sment:		☐ Upstr	eam	☐ Downstr	ream		☐ Sa	mple 3	to downstream ne
Flow Influence		☐ Fres	het (1)			Spate (2)			☐ Baseflo	ow (3)
Flow Condition		☐ Dry (☐ Stan	(1) ding Water (2)			Interstitial Flow			☐ Substa	ntial Flow (5)
Feature Type		☐ Char	ned Natural Char nnelized or Consi i-thread (3)	the state of the s		No Defined F Tiled Feature Wetland (6)			☐ Swale ☐ Roadsi ☐ Pond (	de Ditch (8)
Feature Vegetation		None (1)	☐ Lawn (2)	☐ Croppe	ed (3)	Meadow (4)	☐ Scrubland	(5)	Wetland(6)	☐ Forest (7)
Riparian Vegetat										
0 - 1.5 m Left B Right	STATES OF THE PARTY OF THE PART	None (1)	☐ Lawn (2) ☐ Lawn (2)	☐ Croppe		Meadow (4) Meadow (4)	☐ Scrubland ☐ Scrubland		Wetland (6 Wetland (6	Commission of the Commission o
1.5 - 10 m Left B	lank 🗆	None (1)	☐ Lawn (2)	☐ Croppe	ed (3)	Meadow (4)	☐ Scrubland	(5)	Wetland (6	)
Right		None (1)	☐ Lawn (2)	☐ Croppe		AND DESCRIPTION OF THE PARTY OF			Wetland (6	The state of the s
10 - 30 m Left B		None (1)	☐ Lawn (2) ☐ Lawn (2)	☐ Croppe		Meadow (4)	□ Scrubland □ Scrubland		Wetland (6 Wetland (6	A CLASSIC PROPERTY OF A PARTY OF
Channel Gradien			al (1) Clino		Laser Le		Survey Level (4		Other (5)	LiDAR (6)
Distance (m):		-			on (cm) :			_	Gradient (	
Dominant Substr	rate (S2.M3		(Hard Pan)	Silt Sar	nd (0.06-2 mr	n) Gravel (	22-66 mm) Cob	Die (67-2	49 mm) Bo	ulder (250 mm) Bed
	ubstrate (S	2.M3)						П		_
Sub-Dominant Substitution  Feature Roughne  Width Measurem  Channel Dimens	ess ent	Can't Mea	< 10% Minimal asure (1)	(1) Lankfull (2)	10 - 40% Mo	ean Width (3)	40 - 60% F Estimated Depth (mm)	-	The second second	60% Extreme (4)  Measure/GIS (6)
Sub-Dominant S Feature Roughno Width Measurem Channel Dimens	ess ent	Can't Mea	< 10% Minimal asure (1)	(1) Bankfull (2)	10 - 40% Mc	ean Width (3)  Bankfull	☐ Estimated	(4)	GIS (5)	
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Feature Roughne Width Measurem Channel Dimens Entrenchment	ess ions Fea Total:	Can't Mea  ature Width  > 40  Perched C	< 10% Minimal asure (1)	(1) Bankfull (2)  m Left Ba  Hydraulic he	I 10 - 40% Mo	ean Width (3) Bankfull m Righ	Depth (mm)  It Bank  Distance by Time (L)	m ne (3)	Total v	Measure/GIS (6)  width
Sub-Dominant Si Feature Roughno Width Measurem Channel Dimens Entrenchment Surface Flow Me	rotal: thod C n (m) Adj	Can't Mea  ature Width  > 40  Perched C	< 10% Minimal asure (1)	m Left Ba Hydraulic he 1 2 Rill sion (6)	10 - 40% Mc   Me   Me   Me   Me   Me   Me   Me	Bankfull Bankfull Righ (2) Volum 1 2 Rill and Gull Instream Ba	Depth (mm)  It Bank Distance by Time (c)  It Same the second seco	m ne (3)	Total v  ance (m) 2  Ot	Measure/GIS (6)  vidth  Estimated (4)  Time (s)  3

tream Code	Site Code		Zone	Easting		Northing		Da	te (YYYY)	(MM)	(DD)	Time (24h)	1)
	1 7	W - 1 / 1 / 1 / 1 / 1	16	462 981		502	1600	2	018	- 04	- 115	701	40
eam Name							7	ASSESSMENT OF THE PARTY OF THE	ates Basefic	ow?	Ups	stream Site Le	ength (
							O Bas	seflow 🛇	Freshet	O Spat	e		
ccess Route						Site Description							
						Me.	ch	annel	Rd.	m 2	erper	se love	
E UUL	J L					to '	There	ser !	Pa.	0,		7	
		9 8 1											
ptional Features					T Nu	imber of upstrea	am features –		n Photo#	Photo Na	ime		
fater Temp (C) Air Temp (	(C) pH	Conductivity (No	i) Turbidity (NT	(V) Dissolved O <sub>2</sub> (pp	pm)			Roughne	55				
			1	1-		- 6	_					1	
						5 - (							
esture Distance (m) Bear		Sediment Transport	diment Width	Feature Width (m)	wested	B-FU	Foot -		egetation —			inal Gradient	
umber		djacent Feature		1 datara Triality	BF Depth (mm)	Width (m)	0-1-	5 m 1.5- Right Left	10 m 10-30 Right Left F		Distance (m	Rise (d0)	
1	7114		3	3.20	150	51	165	25	27	$Q \square$			
		<b>4</b> 2 i	fΗ					$\sqcap \sqcap$		_	7.3		
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				1 1	1	11	11 11 1						
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4			ΗH					65					
			56										
4	SJ.		56	Re	ecord EITHER Hy	rdraulic Head OR	Volume OR Dis	tance		<u> </u>			
4 stream Flow Measure(s	s) Depth (mm)			Retraulic Head (mm)	acord EITHER Hy	vdraulic Head OR	Volume OR Dis	tance	-Distance (m)		3	Time (sec)	
stream Flow Measure(struck Wetted		3	Hyd		acord EITHER Hy		Volume OR Dis	tarice	-Distance (m)	3		Time (sec)——	
stream Flow Measure(struck Wetled	Depth (mm)		Hyd		necord EITHER Hy		Volume OR Dis		-Distance (m)	3	,		
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stream Flow Measure(stature Wetted onber Width (m)	Depth (mm)		Hyd 1		accord EITHER Hy		Volume OR Dis		-Distance (m)	3			
stream Flow Measure(stature Wetted mber Width (m)	Depth (mm)	3	1	draulic Head (mm)—2 3	1	Volume (it)—2	3	1	2	3			
stream Flow Measure(stature Wetted inher Width (m)	Depth (mm)  1 2	3 13 M	1	draulic Head (mm)—2 3	1	Volume (it)—2	3	1	2	3			
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stream Flow Measure(sture Wetted width (m)	Depth (mm)  1 2	13 M	S. Cole	packa	els a	Volume (it)—2	3 Nest >	1 	2				

Date:					Project #:			Reco	order/C	Crew:				
Stream Na					Stream Co	AND THE RESERVE OF THE PARTY OF			Code:					
Site Limits:			tream Instream	WP#				Field	Asse	ssment:		Sample 1 Sample 2		nected HDF: ot connected
Direction of	Assessment:				Upstream		Downstr	ream				Sample 3	to dov	vnstream net
Flow Influe	ence		☐ Fres	het (1)				Spate (2)				☐ Base	eflow (3)	
Flow Cond	lition		☐ Dry ☐ Stan	(1) ding Water	(2)			Interstitial Flow				☐ Subs	tantial Flor	w (5)
Feature Ty	ре		☐ Defi	ned Natura	Channel (1	) d (2)		No Defined F	eature	e (4)		☐ Swal	e (7) dside Ditch	(8)
				i-thread (3)		- (-)		Wetland (6)	(0)			☐ Pond		(0)
Feature Ve			None (1)			Cropped (3)		Meadow (4)		Scrubland (	5)	☐ Wetland(		prest (7)
Riparian V	PARTY CONTRACTOR STATES AND ADDRESS OF	_		-	-				_					
U - 1.5 m	Left Bank		None (1)			Cropped (3)		Meadow (4)				☐ Wetland	A CONTRACTOR OF THE PARTY OF TH	Forest (7)
	Right Bank		None (1)			Cropped (3)		Meadow (4)				☐ Wetland		Forest (7)
1.5 - 10 m	Left Bank		None (1)			Cropped (3)	And in case of the last of the	Meadow (4)		The state of the s		☐ Wetland		Forest (7)
	Right Bank		None (1)	☐ Lawr	1(2)	Cropped (3)	) 🗆	Meadow (4)		Scrubland (	5)	☐ Wetland	(6)	Forest (7)
10 - 30 m	Left Bank		None (1)	☐ Lawr	(2)	Cropped (3)		Meadow (4)		Scrubland (	5)	☐ Wetland	(6)	Forest (7)
	Right Bank		None (1)	☐ Lawr	(2)	Cropped (3)		Meadow (4)		Scrubland (	5)	☐ Wetland	(6)	Forest (7)
	Substrate (S2			(Hard Pan	Silt		0.06-2 mr	n) Gravel (2	22-66 r	mm) Cobb	[	7-249 mm) E	Soulder (25	0 mm) Bed
Feature Ro		_		< 10% Mi			-	oderate (2)		40 - 60% Hi	-		> 60% Extr	
Width Mea	surement	П	Can't Mea	sure (1)	☐ Ban	kfull (2)	☐ Me	ean Width (3)	П	Estimated (	4)	☐ GIS (5)	Measu	re/GIS (6)
Channel D	imensions	Fea	ture Width	(m):				Bankfull	Depth	(mm) _				
Entrenchn	nent To	tal:	□ > 40	m 🗆	< 40 m	Left Bank		m Righ	nt Bank	·		m Tota	width _	r
Surface FI	ow Method		Perched (	Culvert (1)		☐ Hydrau	lic Head	(2)	Dista	ance by Time	e (3)		☐ Estima	ted (4)
Wetter	d Width (m)		Wetted D	epth (mm)	Hyd	draulic head	(mm)	Volume	e (L)			Distance (m)		Time (s)
			1	2 3		1 2	3			3				1 2
		Adia	acent	□ None	e (1)	☐ Rill (2)		Rill and Gull	y (3)		Gully	(4)	Outlet Scor	ur (5)
Sedimer	nt Transport				et Erosion (6			Instream Ba			,		Other (8)	
		Fea	ture	☐ None	e (1)	☐ Rill (2)		Rill and Gull	y (3)		Gully	(4)	Outlet Sco	
				☐ Shee	et Erosion (6	6)		Instream Ba	nk Fro	sion (7)			Other (8)	



### **Daily Work Plan for Field Work**

Client/Project #: 773

Date: 2018/06 /Z (

FINAL FIELD PACKAGE: P \_\_\_\_ OF \_\_\_

#### Personnel Data:

Staff Name	Date of Birth YYYY/MM/DD	Emergency contact and number	Staff hazard review initials®
R. 14 Deven	2990 /1/25	KATIE 613 851 5951	SR5
T. POAT	1988/07/19	MIRALDA 613 4366611	TP
	1 1 4 1 1	arran sarnasible for shook in fahask and @ initial if shaft	21 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1

If there are more than four crew, use a second sheet; \*indicates person responsible for check in / check out; \* initial if staff has had the opportunity to review the hazard assessment and mitigations for this project, is aware of risks, and agrees the work can be done safely.

Vehicle (circle those that apply)	Owner	Licence
KAL Truck (Chey Silverado), Grey	Bruce Kilgour	685 7JZ (Ontario)
and the same of th	Bruce Kilgour	2CK47 (Ontario)
QUAD Trailer	2317833 Ontario	M7807M (Ontario)
Tracker	2317833 Ontario	C23182ON (Transport Canada)
Tracker Trailer	2317833 Ontario	J3161S (Ontario)
Red Inflatable	2317833 Ontario	C23183ON (Transport Canada)
Inflatable Trailer	Bruce Kilgour	J7553K (Ontario)
White inflatable	Kilgour & Associates Ltd.	unmarked

•	ncluding Location(s), Route(s) and Access Points and approx. schedule
complete HDFB	Ferry & Thurch Fould
Map is attached? Y⊠ N□	
Check in / Check out Procedure	
KAL Contact Person and cell number:	A Frences
Hotel Details	
Client Contact Person and cell number:	
Check in method and frequency:	
	. Ala c
Traffic enca	
nticipated Worst Outcome/ Catastrophic Failure (desci	ribe):
t	

Home Base:	Field Location: Thy Cut POACE
Time leaving 1206	Time arriving 1245
Time returning (130)	Time Leaving 1700

Person	Pre-Field Condition	Post-Field Condition
PA	good	good
Vehicle	Pre-Field Condition	Post-Field Condition
	The second secon	A section of the second section of the section of th
	Control of the Contro	The state of the s
and the second second second second second	Start km:	End km:

					Cal	ibration					
	Carial Na	Pre		рН		Cond.		Turbidity		DO	
Unit	Serial No.	/ Post	4	7	10	1413	0			100% Sat.	
-11		Pre									
pH pen		Post									
YSI Pro Plus	mx2	Pre	4.00	7.03	-	1410					
		Post	4.63	7.00	-	1396		998			
III Turk Mater		Pre							75 5		
HI Turb. Meter		Post									
Lamotte Turb. Meter		Pre							76-2	and a minimum	
		Post				1					
		Pre								well all y	
		Post					124	9:04	P L	THE PERSON	

Rules of thumb (when to flag your result):

- DO (mg/L): < 5 mg/L, check that YSI is calibrated to 100% saturation, if yes, then use HACH kit to confirm low DO
- pH: If < 6.5 or > 9, check pH meter vs buffer solutions
- If unit cannot calibrate, it <u>must be serviced</u>, so notify Bruce Kilgour

#### Issues with field equipment

Do not forget to mention all equipment issues to Rob Hallett as soon as possible

none.

**Datasheet Log** 

DWP, map, Fish x 4, notes



### Field Map

Client/Project #: SIMP773



HDFA Visit #1

Date: 20/8/06/201-Location: 6150 Thindler Rd.

etere, cheeren agertanel a

new notes are in red,



Date: 2018/06/21 Start Time:

Stream type: Ct	Crew: RH TP
Reach Classification: WK	Task: 1-1 OFA
Temperature: 26.0°C	Gear type: E
Conductivity: 365 2-45/cm	Seconds/ Set + Pull Time: 630
pH: 6.49	Length fished: ~ 60m
DO: 1.65 mg/4 / 20.8%	
7	
Fish were harely being	shorted a no men of issues
	Temperature: 26.0°C  Conductivity: 365 2 45/cm  pH: 6.49

Species	Number	Total	Notes/Stage + Health Observations
CNMD	⊠:	13	
BROWN	<b>6</b> ©	3	
BRST	*	1	
HRDC	4	3	



Date: 2018/66 /21 Start Time:

Location: Therefor Roal	Stream type: DOM	Crew: RF
(UTM NAD 83): 14	Reach Classification: Unk	Task: TD
Watercourse: W	Temperature: 27.5°C	Gear type:
Reach/Station: ZA	Conductivity: 436	Seconds/ Set + Pull Time: 72
W-Depth: 3 0.40m	pH: 7.61.	Length fished:
W-Width: 35m	DO: 51.9% 4-4 me/L	
Fishing Details/Other Comments: Start: 465 001 507 End: 465 028 501	1494 vary ha	gh speand, not much fet response.

Notes/Stage + Health Observations **Species** Number Total D'BB'BB'B 60 Chimn 52 BRST 15 NRDC 8 PIMSD FTMN CRCH



Date: 20 6 / Start Time:

Location: Thunk (Roan)	Stream type: perm.	Crew:
(UTM NAD 83): 12	Reach Classification:	Task: HOFF
Watercourse: W	Temperature: Z5°C	Gear type:
Reach/Station: Reach 3	Conductivity: 3083	Seconds/ Set + Pull Time: 338.7
W-Depth: 30cm	pH: 7.67_	Length fished: $70_{\text{cm}}$
W-Width:	DO: <8% 4.75mg/L	
Fishing Details/Other Comments:  510RT 465028 5021496  END 464977 502147	J, –	

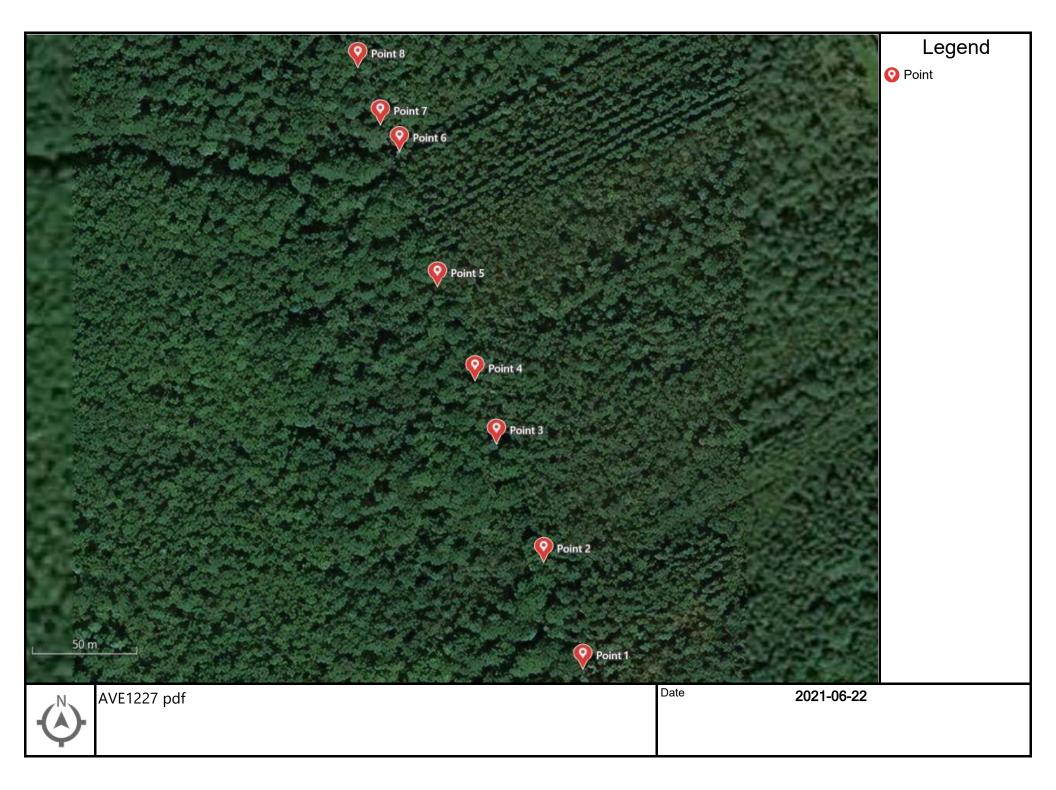
Number	Total	Notes/Stage + Health Observations
MADDED	73	
	52	
• •	3	
	2	
		<del>-</del>
<u> </u>		
	·: ABBBBB	*; 73   M M M M M M M M M M M M M M M M M M M



Date: 20 8/06 /2 \ Start Time:

Location: Thursday Road	Stream type: Pesw	Crew: RH -O		
	Reach Classification:	Task: HOEA		
Watercourse: On K	Temperature: 178	Gear type: Back Pack		
Reach/Station: Reach 4	Conductivity: 123,9	Seconds/ Set + Pull Time: 37 7		
	pH: 6.98	Length fished: 66 m		
W-Width: 3cc	DO: 13,69 1.78 mg//			
Fishing Details/Other Comments: 51APT9-465065 502 END 465039 502	1389 -1373			

Species	Number	Total	Notes/Stage + Health Observations				
BRST							



### **Point**

Name	Description	Attachment	Latitude	Longitude	Altitude (m)	Date/Time
Point 8	North point	WIN_20210622_12_57_33_Pr WIN_20210622_12_57_39_Pr	45.34647400	-75.44961367	77.40	2021-06-22 12:57
Point 7	norh end	WIN_20210622_12_56_17_Pr WIN_20210622_12_56_22_Pr	45.34622833	-75.44947617	79.90	2021-06-22 12:56
Point 6	water starts at confluence	WIN_20210622_12_51_55_Pr WIN_20210622_12_52_12_Pr	45.34611350	-75.44935950	83.50	2021-06-22 12:51
Point 5	North of confluence		45.34553250	-75.44912767	86.90	2021-06-22 12:48
Point 4	cross of swLE going east	WIN_20210622_12_46_38_Pr WIN_20210622_12_46_45_Pr WIN_20210622_12_46_51_Pr	45.34513000	-75.44889800	84.30	2021-06-22 12:46
Point 3	North mid point	WIN_20210622_12_44_18_Pr WIN_20210622_12_44_24_Pr	45.34485850	-75.44876683	76.90	2021-06-22 12:43
Point 2	South mid swale	WIN_20210622_12_41_50_Pr WIN_20210622_12_41_56_Pr	45.34435100	-75.44847867	78.80	2021-06-22 12:41
Point 1	Start of swale	WIN_20210622_12_39_18_Pr WIN_20210622_12_39_37_Pr	45.34389283	-75.44823917	79.10	2021-06-22 12:38

# Point 8 images (2)



WIN\_20210622\_12\_57\_39\_Pro.jpg



WIN\_20210622\_12\_57\_33\_Pro.jpg

# Point 7 images (2)



WIN\_20210622\_12\_56\_22\_Pro.jpg



WIN\_20210622\_12\_56\_17\_Pro.jpg

# Point 6 images (2)



WIN\_20210622\_12\_52\_12\_Pro.jpg

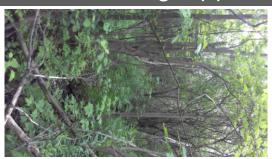


WIN\_20210622\_12\_51\_55\_Pro.jpg

## Point 4 images (3)



WIN\_20210622\_12\_46\_51\_Pro.jpg



WIN\_20210622\_12\_46\_45\_Pro.jpg



 $WIN\_20210622\_12\_46\_38\_Pro.jpg$ 

# Point 3 images (2)



WIN\_20210622\_12\_44\_24\_Pro.jpg



 $WIN\_20210622\_12\_44\_18\_Pro.jpg$ 

# Point 2 images (2)



WIN\_20210622\_12\_41\_56\_Pro.jpg



WIN\_20210622\_12\_41\_50\_Pro.jpg

# Point 1 images (2)



WIN\_20210622\_12\_39\_37\_Pro.jpg



WIN\_20210622\_12\_39\_18\_Pro.jpg