TOWN OF CALEDON
PLANNING
RECEIVED

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GEI Consultants

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Project No. 2100463

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Re: Watercourse and Drainage Feature Assessment
Official Plan Amendment Application
Wildfield Village Secondary Plan, Local Subwatershed Study
Caledon, Ontario

Dear Mr. Cascone and Mr. Elliott,

GEI has been retained by the Wildfield Village Landowner Group to develop a Local Subwatershed Study (LSS) in support of an Official Plan Amendment Application for the Secondary Plan for Wildfield Village.

This letter provides a detailed assessment of the mapped regulated hydrologic features located within the Wildfield Village Secondary Plan Area, herein referred to as the Study Area. The purpose of this letter is to:

1. Document existing conditions for these features and determine whether these features meet the definition of a watercourse, from a regulatory perspective. Currently, Ontario Regulation 41/24 of the *Conservation Authorities Act* defines a watercourse as "a defined channel, having bed and banks or sides, in which a flow of water regularly or continuously occurs". The assessment considered this definition, as well as the overall form and function of each feature from a geomorphic and ecological perspective. The Evaluation, Classification and Management of Headwater Drainage Features Guideline (CVC and TRCA 2014) was also considered in this assessment.
2. Provide supporting materials (additional photographs in **Appendix C**; HDF Management Recommendation Table in **Appendix E**) requested during the technical meeting on May 2, 2025.
3. Address the Town's comments on the LSS dated March 21, 2025, related to the Headwater Drainage Feature assessment and associated Management Recommendations (refer to Comment Response Matrix found in **Appendix F**).

1. Background

The Toronto and Region Conservation Authority (TRCA) regulates natural hazards and natural features including rivers, streams, floodplains, wetlands and valleylands in accordance with the *Conservation Authorities Act* and Ontario Regulation 41/24. The current regulated area includes several hydrologic features within the Study Area, as shown on **Figure 1** (**Appendix A**). Comments received from the TRCA and the Town of Caledon on the Phase 1 and 2 Local Subwatershed Study (LSS) have indicated that these hydrologic features are watercourses which are regulated by TRCA.

GEI understands that the regulation mapping is derived as a desktop exercise, with potential supporting information from application review and that the hydrologic features in the Study Area have not been confirmed by TRCA through on-site observations. As such, this memo has been prepared to provide documented field observations and assessment of these hydrologic features.

As part of the review of the Region of Peel's Official Plan review (Peel 2051+) the Region conducted the Settlement Area Boundary Expansion (SABE) Scoped Subwatershed Study (Wood, 2022). The SABE Study identified all of the hydrologic features in the Study Area as headwater drainage features (HDFs), with the exception of three features identified as watercourses (WHT3(7)1-1, WHT2(1)2-1, and WHT2(1)1-1) (**Figure 2**, **Appendix A**; **Appendix B**). The SABE mapping was derived primarily as a desktop exercise and supplemented with roadside 'windshield' surveys where possible. Hydrologic feature mapping was not confirmed by the SABE Study authors through on-site observations.

TRCA policies require HDFs to be identified and managed in accordance with their Evaluation, Classification and Management of Headwater Drainage Features Guideline (HDF Guidelines; CVC and TRCA 2014). Accordingly, the HDF Assessment has been completed as part of the Wildfield Village Local Subwatershed Study (LSS) for these HDFs and summarized herein.

2. Reach Delineation

Reaches are defined as "sections of river along which boundary conditions are sufficiently uniform such that the river maintains a near consistent structure" (Brierley & Fryirs 2005). Reaches are typically delineated based on changes in channel planform, gradient, valley form, physiography, land cover, flow inputs, channel disturbances, and past channel modifications. Due to spatial variability in the modifying and controlling influences of channel form, two reaches situated immediately upstream or downstream of each other could show a marked difference in planform (TRCA 2004).

Reach segments were delineated as part of the Peel Region's SABE Study. These reaches were generally maintained and modified as needed based on the findings of the assessments being conducted as part of the ongoing LSS for the Wildfield Village Secondary Plan Area. A reach map showing the features identified as HDFs and watercourses in the SABE Study is provided in **Figure 2** (**Appendix A**). This figure includes both the SABE reach name, as well as the updated LSS reach name.

3. Methods

As a first step, the existing SABE Study was reviewed, to provide a preliminary characterization of each mapped reach. Due to the scale of the site and scope of the SABE Study, many of the reaches were assessed through the SABE using "windshield assessment" techniques, whereby the features were assessed from the road. It was noted in the SABE Study that as the field assessments were limited to roadside observations, feature types and reach delineation could be refined through subsequent planning stages through collection of detailed field data.

GEI reviewed historical imagery (2002, 2013, and 2022), obtained from First Base Solutions to determine changes to the channel and surrounding land use and cover. Historic analyses can provide insight into how past channel adjustments and modifications have contributed to current channel form and processes. The historical imagery is presented in **Figure 3** (**Appendix A**).

Multi-year field assessments were conducted for the reaches on the following dates as part of the Headwater Drainage Feature Assessments (HDFAs), as well as during the rapid geomorphic field assessments:

- HDFA Round 1 Surveys on March 24, 2021, and April 10, 2024;
- HDFA Round 2 Surveys on May 18, 2022, and May 31, 2024;
- HDFA Round 3 Surveys on August 3, 2022, and August 14, 2024; and
- Rapid geomorphic field assessments on May 24, 2023.

The field assessments documented existing conditions, documenting presence or absence of defined bed and banks, determining observed indicators of channel form, stability and ecological health.

The rapid geomorphic assessments consisted of a Rapid Geomorphic Assessment (RGA; MOE 2003), a modified Rapid Stream Assessment Technique (RSAT; Galli 1996) and classification of the reach using the Downs Method (Thorne et al., 1997). Additionally, in situ measurements of bankfull width and depth (where present), and substrate were taken. Active geomorphic processes were also documented in these assessments.

The HDF Guidelines (CVC and TRCA 2014) define HDFs as non-permanently flowing drainage features that contribute to the overall health of the watershed and include numerous Feature Types as per the Ontario Stream Assessment Protocol (OSAP), including 'Defined Natural Channel (Visible Banks)', 'Swale', and 'No Defined Feature (Overland Flow Only)'.

The HDF Guidelines recommend that the first survey is carried out during the spring freshet in early spring (late March - mid-April), the second survey in late spring (late April – May), and the third survey in the summer (July – August). The HDF Guidelines do not define 'regular' flow (as per the Ontario Regulation 41/24 of the *Conservation Authorities Act* definition of a watercourse) however they distinguish between ephemeral and intermittent features as follows:

> *Contributing Functions – **Ephemeral:** Provides ephemeral flow or water storage functions during and (for a short time) after spring freshet and following large rain events only. These features are typically dry or surface-damp by mid-May.*
>
> *Valued Functions – **Intermittent:** Water is present in the spring as a result of seasonally high groundwater discharge or seasonally extended contributions from wetlands or other areas that support intermittent flow or water storage conditions. These features are typically still flowing in late spring but dry or surface-damp by July.*

This suggests that features only flowing in Round 1 are considered Ephemeral, having temporary, or short-lived flow during, or immediately following, the spring freshet. Features flowing into Round 2 (but dry in Round 3) would be considered Intermittent or having more 'regular' flow.

As per the HDF guidelines, GEI completed three rounds of HDF surveys across 2021, 2022 and 2024, and identified seven HDFs in the Study Area (Figure 1, Appendix A). A photographic record for all reaches is provided in **Appendix C**. As requested during the May 2, 2025, meeting with TRCA and the Town, supplementary photographs have been included, where available. These include reaches H1S1-1, H1S1-2, H1S3, H3S1, H3S1A, H9S1, H9S2, H9S3, H10S1, H11S1, H13S1, H13S1A and H12A1-1.

4.0 Results

WHT3(7)1-1 (GEI Reaches H1S1-1, H1S1-2, and H1S1-3)

This reach is located in the north-west portion of the Secondary Plan Area (**Figure 2, Appendix A**). The reach was identified as an unconfined watercourse in the SABE Study Figure DA6f (**Appendix B**). The SABE Study observed the reach as being a poorly defined grass-lined channel on the north side of Centreville Creek Road, running as a ditch along the road on the south side. This reach was designated as a low-constraint stream in the SABE Study.

GEI's geomorphic assessment noted that channel geometry was generally lacking over the length of the reach within the participating properties in the Secondary Plan Area. This reach was regularly ploughed through and planted with row crops. Channel definition was limited to the area adjacent to a farm crossing within the reach. Distinct riffles and pools were not noted, and substrates consisted predominantly of organic material, silt, and clay. A review of historical imagery indicated negligible channel migration. Given the limited definition, this reach provides very limited geomorphic function. Therefore, this reach is not considered a watercourse.

GEI's HDFA noted that reach H1S1-2 was a ploughed-through swale, planted in row crops. Small wetlands occur at the downstream (H1S1-1; MAM2-2/DIST) and upstream (H1S1-3; MAM2-2). The early spring Round 1 survey in 2021 indicated that the reaches contained standing water. Similarly, the late spring Round 2 survey in 2022 also observed standing water within the features, while the summer Round 3 survey in 2022 reported that the features had dried out. HDFA surveys completed in 2024 reported that the reaches were dry during early spring Round 1. Due to the presence of wetland habitat, these reaches are best characterized as ephemeral. As detailed in the HDF table (Table 2.13), these reaches have a strict HDF Guideline interpretation of Conservation. These features are provided an Interpreted management recommendation of Mitigation, considering the expected ability to replicate and enhance HDF features and functions by:

1. Continuing to convey flows from the downstream portion of H1S3 to the appropriate downstream habitat west of Centreville Creek Road via a pipe that outlets to the created compensation wetland which in turn outlets to the culvert under Centreville Creek Road; and
2. Creation of the Relocation and Wetland Compensation Area on the Solmar lands which is designed to achieve the following:
    a. Provide an increase in total wetland habitat area, as well as contiguous wetland area;
    b. Help mitigate hydrology (slower release from the wetland);
    c. Support indirect fish habitat functions (provision of insects, organic materials, as well as coarse sediment through alluvium deposits in the wetland outlet reach); and
    d. Provide an increase in wetland plant species diversity.

GEI Reach H2S1

This reach is located off-site along the northern boundary of the Secondary Plan Area. The reach is identified as part of a regulated watercourse under TRCA (**Figure 1**, **Appendix A**).

GEI's geomorphic assessment noted that this reach lacked defined bed and banks within the assessed portion of the reach. Standing water was noted and the feature was heavily vegetated. From a geomorphic perspective, this reach is not a watercourse but may be providing additional functions as a wetland.

GEI's HDFA identified this reach as a wetland (SWD3-3). The early spring Round 1 survey in 2021 indicated that the reach was flowing. The late spring Round 2 survey in 2022 observed standing water within the feature, while the summer Round 3 survey in 2022 reported that the feature was dry. HDFA surveys completed in 2024 reported that the reach has standing water during early and late spring Round 1 and 2 and was dry by summer Round 3. The reach was characterized as intermittent and was identified with a management recommendation of Protection, as detailed in the HDF Table 2.13.

WHT2(1)1-1c (GEI Reach H14S1)

This reach is located in the eastern portion of the Secondary Plan Area (**Figure 2, Appendix A**). The reach was identified as an HDF within the SABE Study Figure DA6f (**Appendix B**), where it was described as a swale. TRCA's mapping identifies a Regional Floodplain over a short portion of the downstream end of the feature just upstream of The Gore Road.

GEI's geomorphic assessment found this reach lacked defined bed and banks. Additionally, bed substrate was poorly sorted, consisting mainly of finer materials. Given the limited definition, this reach provides very limited geomorphic function. Therefore, this reach is not considered a watercourse.

GEI's HDFA also identified this reach was a ploughed-through swale, planted in row crops. The early spring Round 1 survey in 2021 indicated that the reach was dry. Similarly, the early spring Round 1 survey in 2024 also observed that the reach was dry. The reach does not provide a groundwater recharge function and is characterized as having a limited hydrological function and was provided a Management Recommendation of No Management Required as detailed in the HDF Table (Table 2.13)

WHT2(1)1-1b (GEI Reach H8S1)

This reach is located in the eastern portion of the Secondary Plan Area (**Figure 2, Appendix A**). The reach was identified as an HDF within the SABE Study Figure DA6f (**Appendix B**). The study described the reach as a swale.

GEI's HDFA confirmed the findings of the SABE Study, noting that this reach was generally a ploughed-through swale, planted in row crops. The reach lacked bed and banks and was found to have no substrate sorting. Given the lack of form and geomorphic function, this reach is not a watercourse. The early spring Round 1 survey in 2021 indicated that the reach was dry. The early and late spring Round 1 and 2 surveys in 2024 observed standing water within the feature, while the summer Round 3 survey in 2024 reported that the feature had dried out. The reach does not provide a groundwater recharge function and is characterized as having limited hydrological function and was provided with a Management Recommendation of No Management Required (HDF Table 2.13).

WHT2(1)2-1 (GEI Reaches H4S1, H4S2 and H4S3)

This feature is located in the eastern portion of the Secondary Plan Area (**Figure 2, Appendix A**). The reach was identified as an unconfined watercourse in the SABE Study Figure DA6f (**Appendix B**).

The geomorphic rapid assessment noted that channel definition was associated with a farm crossing within the reach but otherwise was generally lacking over the length of the reach within the participating lands of the Secondary Plan Area. Distinct riffles and pools were not noted, and substrates consisted predominantly of silt, and clay. A review of historical imagery indicated negligible channel migration. Given the limited definition, this reach provides very limited geomorphic function. Therefore, this reach is not considered a watercourse.

GEI's HDFA noted that these reaches are swales. The downstream extent is described as a ploughed-through swale, planted in row crops while the upstream extent contains a riparian meadow. The early spring Round 1 survey in 2021 indicated that H4S1 and H4S2 were flowing but were dry by the late spring Round 2 survey in 2022. The early and late spring Round 1 and Round 2 surveys completed in 2024 observed standing water within H4S1 and H4S2, while the summer Round 3 survey in 2024 reported that these features were dry. H4S1 and H4S2 are therefore characterized as ephemeral and were provided a Management Recommendation of Mitigation, as detailed in HDF Table 2.13.

The early spring Round 1 survey in 2024 indicated that H4S3 was dry. The reach does not provide a groundwater recharge function and is characterized as having a limited hydrological function and was provided a Management Recommendation of No Management Required, as detailed in HDF Table 2.13.

WHT2(1)2-1a (GEI Reach NRO4)

This reach is located in the eastern portion of the Secondary Plan Area (**Figure 2, Appendix A**). The reach was identified as an HDF within the SABE Study Figure DA6f (**Appendix B**). The study described the reach as a swale.

GEI's early spring Round 1 surveys completed in 2021 and 2024 did not identify a feature at this location (No Reach Observed - NRO4). The area was observed to be a flat-ploughed agricultural field with no signs of flow. It lacked bed and banks and was found to have no substrate sorting. Given the lack of form and geomorphic function, this reach is not a watercourse, nor is it an HDF.

WHT2(1)2-1b (GEI Reach NRO3)

This reach is located in the eastern portion of the Secondary Plan Area (**Figure 2, Appendix A**). The reach was identified as an HDF within the SABE Study Figure DA6f (**Appendix B**). The study described the reach as a swale.

GEI's early spring Round 1 surveys completed in 2021 and 2024 did not identify a feature at this location (No Reach Observed - NRO3). The area was observed to be a flat-ploughed agricultural field with no signs of flow. It lacked bed and banks and was found to have no substrate sorting. Given the lack of form and geomorphic function, this reach is not a watercourse, nor is it an HDF.

WHT2-4 (GEI Reach H5S1-H5S3)

This feature is located in the southeastern portion of the Secondary Plan Area (**Figure 2, Appendix A**). This reach was identified as an HDF within the SABE Study Figure DA6f (**Appendix B**) and described as a defined channel.

The geomorphic rapid assessment noted that the channel was defined in the downstream portion but was not defined upstream of H5S3. Therefore, this reach was split into two sub-reaches, maintaining WHT2-4 (H5S1/S2/S3) downstream, and WHT2-4a (H5S4) upstream. WHT2-4 was found to be flowing during the geomorphic assessment, crossing through a culvert under The Gore Road. Bankfull width ranged between 1-2 m, while bankfull depth ranged between 0.3-0.75 m. Distinct riffles and pools, a high degree of sinuosity, and a suspended armour layer were observed in this feature. Substrate types were diverse, with silt, sand, and clay in the pools, and gravel in the riffles. Due to the channel definition, reach WHT2-4 is considered a watercourse.

WHT2-4a (GEI Reaches H5S4, H3S1A and H3S1)

This feature is located in the southeast portion of the Secondary Plan Area (**Figure 2, Appendix A**). This reach was identified as a HDF within the SABE Study Figure DA6f (**Appendix B**) and described as a defined channel.

The geomorphic rapid assessment found that the reach was defined within a hedgerow but otherwise was not well defined. The majority of the reach is ploughed-through and planted with row crops. Review of historical air photography (**Figure 3, Appendix A**) indicates these agricultural practices have been ongoing since at least 2002. Flow was imperceptible during the field assessment. Little to no variability in substrate was observed, with bed material consisting of silt, clay, and organic material. The review of historical imagery (**Figure 3, Appendix A**) indicated negligible channel migration. This reach provides limited geomorphic function. Therefore, this reach is not considered a watercourse.

GEI's HDFA noted that these reaches were a swale fed by a tile drain at H3S1. The early spring Round 1 survey in 2021 indicated that H5S4 was flowing. The late spring Round 2 survey in 2022 observed standing water within the reach, while the summer Round 3 survey in 2022 reported that the reach was dry. Both the early and late spring Round 1 and 2 surveys in 2024 also indicated that H5S4 was flowing while the summer Round 3 survey in 2024 reported that the reach was dry. H5S4 is therefore best characterized as intermittent and was provided a Management Recommendation of Mitigation, as detailed in the HDF Table 2.13.

The early spring Round 1 survey in 2021 and the late spring Round 2 survey in 2022 indicated that the H3S1 was flowing while the summer Round 3 survey in 2022 reported that the feature was dry. The early and late spring Round 1 and Round 2 surveys completed in 2024 observed standing water within H3S1, while the summer Round 3 survey in 2024 reported that the feature had dried out. H3S1 is therefore characterized as ephemeral and was provided a Management Recommendation of Mitigation, as detailed in the HDF Table 2.13.

The early spring Round 1 survey in 2021 and the late spring Round 2 survey in 2022 indicated that the H3S1A was flowing and then had standing water while the summer Round 3 survey in 2022 reported that the feature was dry. Early and late spring Round 1 and Round 2 surveys completed in 2024 indicated that H3S1A had standing water and was dry by summer Round 3 surveys. H3S1A is therefore characterized as ephemeral and was provided a Management Recommendation of Mitigation, as detailed in the HDF Table 2.13.

WHT2-5 (GEI Reach H5S4A)

This reach is located in the southeastern portion of the Secondary Plan Area (**Figure 2, Appendix A**). This reach was identified as an HDF within the SABE Study Figure DA6f (**Appendix B**). The study described it as a swale.

The geomorphic field assessment noted that channel geometry was generally lacking over the length of this reach. Channel definition was localized to short portions within the reach. Distinct riffles and pools were not noted, and substrates consisted predominantly of organic material, silt, and clay. A review of historical imagery indicated negligible channel migration. Given the limited definition, this reach provides very limited geomorphic function. Therefore, this reach is not considered a watercourse.

GEI's HDFA results confirmed the SABE designation of this reach as a swale. The early spring Round 1 surveys in 2021 and 2024 indicated that the reach was flowing. The late spring Round 2 surveys in 2022 and 2024 observed standing water within the feature, while the summer Round 3 surveys in 2022 and 2024 reported that the feature was dry. GEI's monitoring results indicated high groundwater in this general area may explain the observation of standing water in Round 2. This reach is therefore characterized as ephemeral and was provided a Management Recommendation of Mitigation, as detailed in the HDF Table 2.13.

WHT2-5b (GEI Reach NRO5)

This reach is located in the eastern portion of the Secondary Plan Area. The reach was identified as an HDF within the SABE Scoped Subwatershed Study Figure DA6f (**Appendix B**). The study described the reach as a swale.

GEI's early spring Round 1 survey completed in 2024 did not identify a feature at this location (No Reach Observed - NRO5). The area was observed to be a flat-ploughed agricultural field with no signs of flow. It lacked bed and banks and was found to have no substrate sorting. Given the lack of form and geomorphic function, this reach is not a watercourse nor is it an HDF.

GEI Reach NRO6

This reach is located in the southwestern portion of the Secondary Plan Area (**Figure 2, Appendix A**). The reach is identified as part of a regulated watercourse under TRCA (**Figure 1**, **Appendix A**), but was not mapped as part of the SABE (**Figure 2, Appendix A**).

GEI's early spring Round 1 surveys completed in 2021 and 2024 did not identify a feature at this location (No Reach Observed (NRO6). The area was observed to be a flat ploughed agricultural field and lawn area with no signs of flow. It lacked bed and banks and was found to have no substrate sorting. Given the lack of form and geomorphic function, this reach is not a watercourse nor is it an HDF.

GEI Reach NRO8

This reach is located in the south-central portion of the Secondary Plan Area (**Figure 2, Appendix A)**. The reach was identified as an HDF within the SABE study Figure DA6f (**Figure 2, Appendix A**).

GEI's early spring Round 1 survey completed in 2021 and 2024 did not identify a feature at this location (No Reach Observed - NRO8). The area was observed to be a flat ploughed agricultural field extending into a wooded feature comprised of shrub thicket, deciduous swamp, and shallow aquatic. No discharge from the wetland into the agricultural field was observed at this location. The feature lacked bed and banks and was found to have no substrate sorting. Given the lack of form and geomorphic function, this reach is not a watercourse, nor a HDF.

WHT2-2 (GEI Reach H15S1)

This reach is located in the southeastern portion of the Secondary Plan Area (**Figure 2, Appendix A**). This reach was identified as an HDF within the SABE Study Figure DA6f (**Appendix B**). The study described it as a swale.

GEI's HDFA confirmed the findings of the SABE Study, noting that this reach occurred as a ploughed-through swale, planted in row crops. It lacked bed and banks and was found to have no substrate sorting. Given the lack of form and geomorphic function, this reach is not a watercourse. The early spring Round 1 survey in 2021 and 2024 indicated that the reach was dry, and ended at reach H12A1 (**Figure 2, Appendix A**). This reach does not have a groundwater recharge function and is characterized as having a limited hydrological function and provided a Management Recommendation of No Management Required, as detailed in the HDF Table 2.13.

WHT2-2a (GEI Reach H15S2)

This reach is located in the southeastern portion of the Secondary Plan Area (**Figure 2, Appendix A**). This reach was identified as an HDF within the SABE Study Figure DA6f (**Appendix B**). The study described it as a swale.

GEI's HDFA confirmed the findings of the SABE Study, noting that this reach occurred as a ploughed-through swale, planted in row crops. It lacked bed and banks and was found to have no substrate sorting. Given the lack of form and geomorphic function, this reach is not a watercourse. The early spring Round 1 survey in 2021 and 2024 indicated that the reach was dry. This reach does not have a groundwater recharge function and provides limited hydrological function and was given a Management Recommendation of No Management Required, as detailed in the HDF Table (Table 2.13).

WHT2-1a (GEI Reach H12S1, H12S2, NRO7)

This feature is located in the southern portion of the Secondary Plan Area (**Figure 2, Appendix A**). This reach was identified as an HDF within the SABE Study Figure DA6f (**Appendix B**). The study described it as a swale.

GEI's geomorphic assessment found this reach generally lacked defined bed and banks, with some intermittent definition near the downstream extent of this reach. Additionally, bed substrate was poorly sorted, consisting mainly of finer materials. Given the limited definition, this reach provides very limited geomorphic function. Therefore, this reach is not considered a watercourse.

GEI's HDFA results confirmed the SABE designation of this feature as a ploughed-through swale, planted in row crops. The early spring Round 1 survey in 2021 indicated that the reach was dry. The early spring Round 1 survey in 2024 indicated that the feature contained standing water. However, it is noted that no reach was observed at the upstream extent of the feature (NRO7). The late spring Round 2 survey in 2024 reported that the feature had dried out. As detailed in the HDF Table (Table 2.13), this reach does not provide a groundwater recharge function and is characterized as having a limited hydrology and provided a Management Recommendation of No Management Required.

WHT2-1b and WHT2-2 (GEI Reach H12A1)

This reach is located in the south-central portion of the Secondary Plan Area (**Figure 2, Appendix A**). This reach was identified as an HDF within the SABE Study Figure DA6f (**Appendix B**). The study described it as a swale.

GEI's geomorphic assessment found this reach lacked defined bed and banks. Additionally, bed substrate was poorly sorted, consisting mainly of finer materials. Given the limited definition, this reach provides very limited geomorphic function. Therefore, this reach is not considered a watercourse.

GEI's HDFA results confirmed the SABE designation of this reach as a ploughed-through swale, planted in row crops. The early spring Round 1 survey in 2021 indicated that the reach was dry. The early spring Round 1 survey in 2024 indicated that the feature contained pools of standing water isolated throughout the feature. The late spring Round 2 survey in 2024 reported that the feature had dried out. One Brook Stickleback was observed during the April survey in a small and isolated pool, approximately 130 m upstream of Mayfield Road. The pool was in an agricultural field and H12A1 had been ploughed through and planted with wheat, representing very low-quality fish habitat. Due to the presence of a wetland (SWD3-2) upstream, this reach is characterized as ephemeral and was provided a Management Recommendation of Mitigation, as detailed in the HDF Table (Table 2.13) with clean roof water proposed to be piped to the downstream culvert at Mayfield Road.

As detailed in the HDF table (Table 2.13), H12A1 has a strict HDF Guideline interpretation of Conservation. The reach is provided an Interpreted management recommendation of Mitigation, considering the expected ability to mitigate HDF and direct fish habitat functions by:

a) Continuing to convey flows to the appropriate downstream habitat at Culvert #9 at Mayfield Road;

b) Creating Fish Habitat Compensation wetland area to provide direct fish habitat for Tributary H5S1/S2/S3 that is connected to the same branch (i.e. within approximately 400m of the fish observation at H12A1); and that is known to support fish at nearby Mayfield Road Culvert; and,

c) Help mitigate hydrology (slower release from the wetland); and d) improve direct fish habitat functions (insects, organic materials, as well as coarse sediment through alluvium deposits in the wetland outlet reach) compared to existing conditions of H12A1 which is ploughed-through and planted with row crops.

WHT2-2 (GEI Reach H12A1-1)

This reach is located in the south-central portion of the Secondary Plan Area (**Figure 2, Appendix A**). This reach was identified as an HDF within the SABE Study Figure DA6f (**Appendix B**). The study described it as a swale.

GEI identified this feature as Cattail Shallow Marsh Wetland (MAS2-1), occurring immediately upstream of reach H12A1. The early spring Round 1 survey in 2021 did not observe any wetland discharge into H12A1. The early spring Round 1 survey in 2024 observed wetland discharge into H12A1. The wetland held water throughout the summer months and was provided with a Management Recommendation of Protection, as detailed in the HDF Table (Table 2.13).

6.0 Closing

GEI conducted Rapid Geomorphic Assessments and Headwater Drainage Feature Assessments (HDFAs) for the hydrologic features located within the Wildfield Village Secondary Plan Area. TRCA's regulatory mapping classifies these features as watercourses. The geomorphic assessments and HDFAs reviewed these features in 2021, 2022, 2023, and 2024, to document existing conditions for these features and determine whether these features meet the definition of a watercourse, from a regulatory perspective.

We have provided a summary of the results of these surveys, as well as detailed rationale as to which features meet the definition of watercourse as per Ontario Regulation 41/24 of the *Conservation Authorities Act*, which defines a watercourse as "a defined channel, having bed and banks or sides, in which a flow of water regularly or continuously occurs". **Figure 2 (Appendix A)** illustrates the results of the assessment. It is concluded that **only Reach H5S1/S2/S3 is considered a watercourse, and the remaining hydrologic features are HDFs** with varying management recommendations as shown on **Figure 4** (**Appendix A**) and summarized in **Table 1** (**Appendix D**).

Sincerely,

GEI Consultants Canada Ltd.





Ahmed Siddiqui, M.Sc., P.Geo. (Limited)
Senior Fluvial Geomorphologist

George Buckton
Senior Ecologist

Appendices

Appendix A	GEI Figures
Appendix B	SABE SWS Study Appendix A – DA6f: Watercourses, HDFs and Aquatic Species at Risk Components of the Preliminary Natural Heritage System
Appendix C	Photographic Record
Appendix D	Table 1 Reach Classification Summary (GEI)
Appendix E	HDF Management Recommendation Table (Table 2.13)
Appendix F	HDF- Specific Comment Response Matrix

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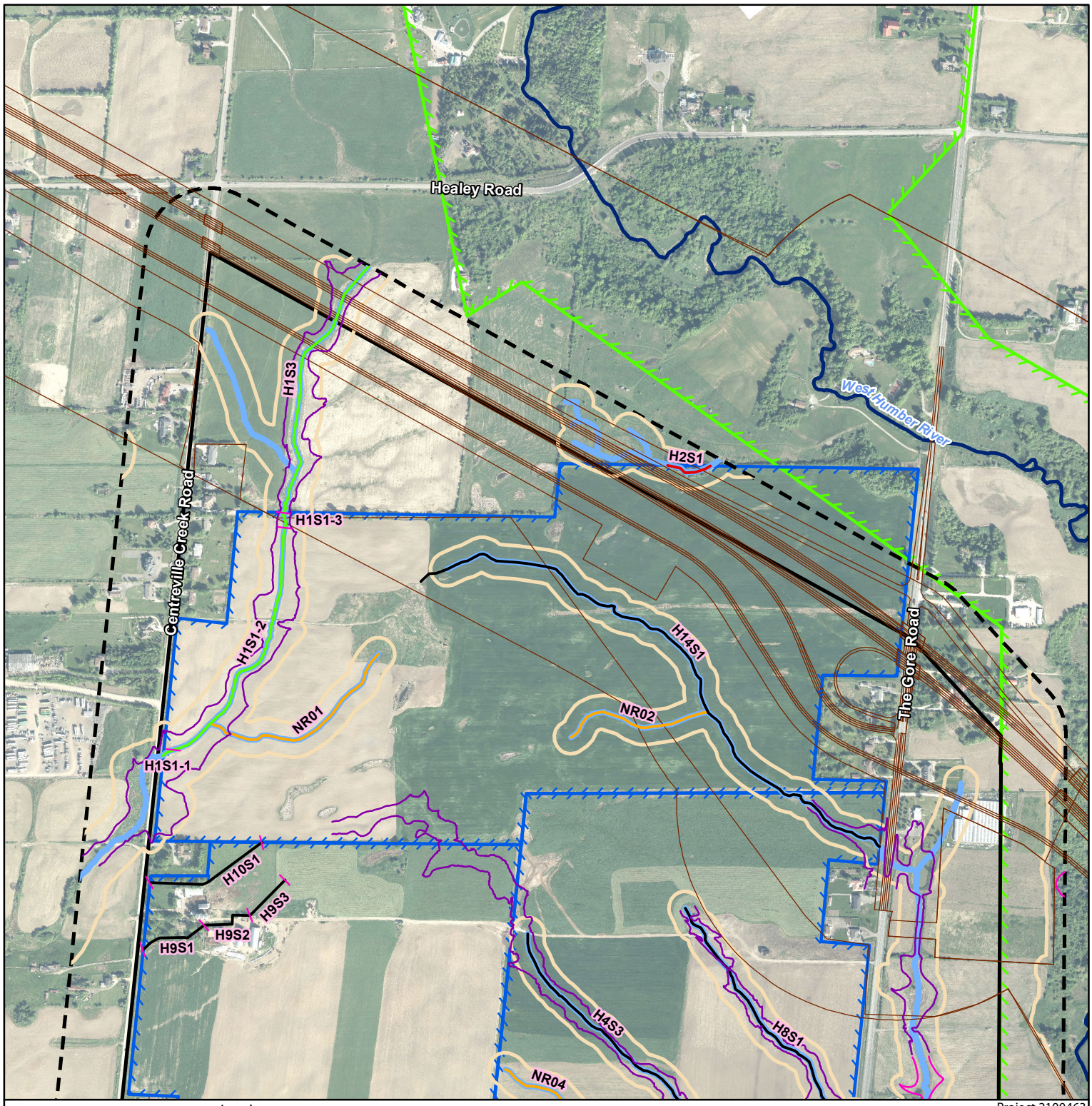
Appendix A GEI Figures

Figure 1: Watercourse Characterization (Toronto and Region Conservation Authority)

Figure 2: Watercourse Characterization (Region of Peel Settlement Area Boundary Expansion (SABE) Scoped Subwatershed Study)

Figure 3: Historical Aerial (2002, 2013, and 2022)

Figure 4: Watercourse and Headwater Drainage Features (GEI)



NOTES:

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3. Orthoimagery © First Base Solutions, 2021. Imagery taken in 2020.

*HDF Management Recommendation shown is the Interpreted Management Recommendation – Wildfield Village Consultant Team (refer to Table 2).

Legend

- Wildfield Secondary Plan Area
- Adjacent 120m
- Participating Landowner
- Greenbelt Natural Heritage System
- Regulation Limit (TRCA 2024)
- Approximate Highway 413 Alignment
- Watercourse (TRCA 2022)
- West Humber River
- Regional Storm Event Estimated Floodline (TRCA 2024)
- W.Humber River Regulatory Floodline (TRCA 2018)

Watercourse/HDF (source and class)*

- GEI, HDF - Mitigation
- GEI, HDF - No Management Required
- GEI, HDF - Protection
- GEI, No Reach Observed

Reach Breaks

- GEI

Project 2100463

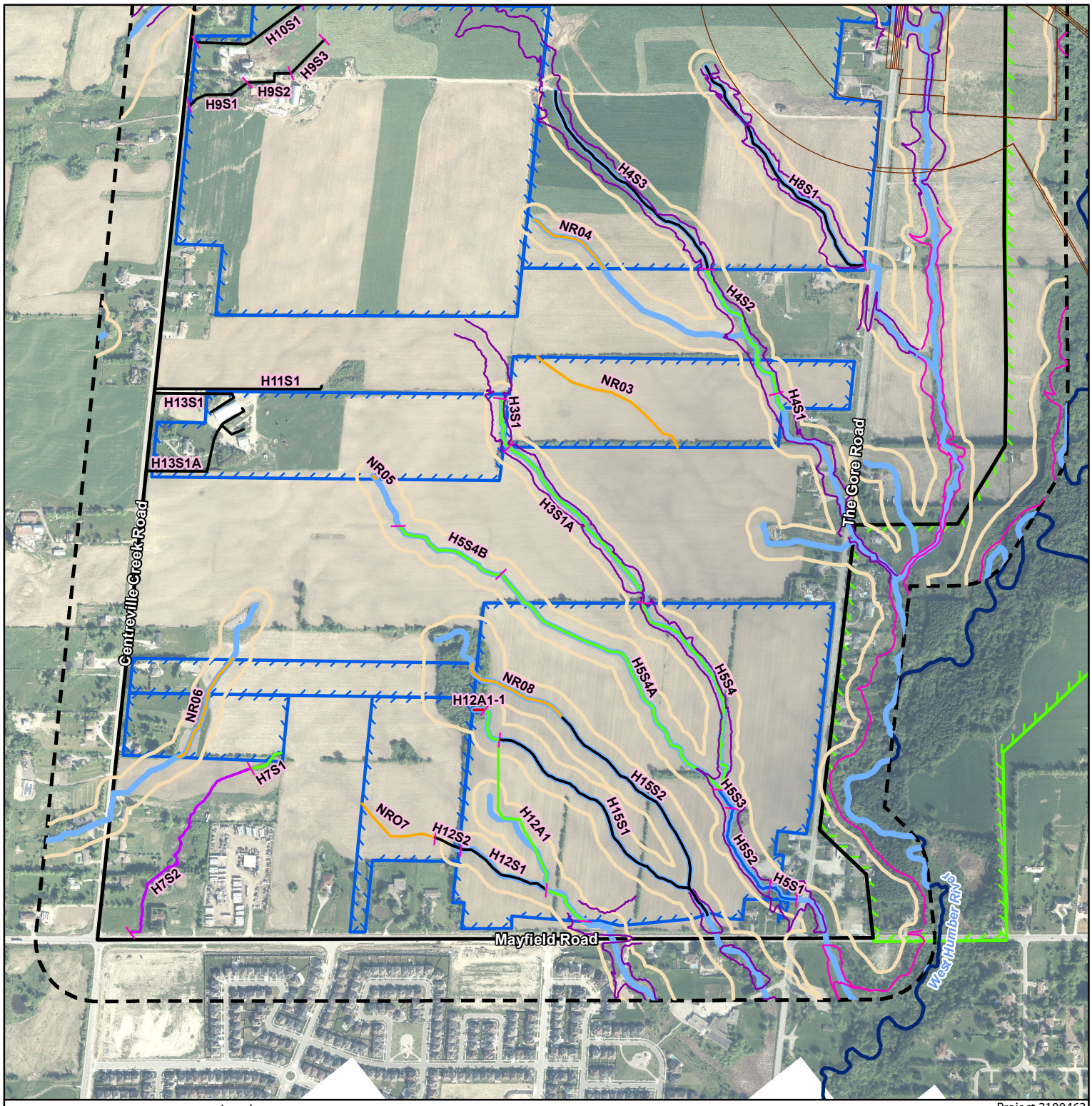
Wildfield Local Subwatershed Study
Wildfield Village Landowners Group Inc.

Figure 1
Watercourse and Drainage Feature Assessment (with Toronto and Region Conservation Authority Regulation Mapping)

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1:10,000

GEI Consultants

Path: \\bos-pzcs-1\data_storage\Working\WILDFIELD VILLAGE LANDOWNER GROUP\2100463 Town of Caledon\05_GIS\figures\report_figures\2025-04-11_watercourse_characterization\2100463_rpt_fig01_watercourse_characterization_TRCA.mxd Date Saved: Friday, May 23, 2025



Project 2100463

NOTES:

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Legend

- Wildfield Secondary Plan Area
- Adjacent 120m
- Participating Landowner
- Greenbelt Natural Heritage System
- Regulation Limit (TRCA 2024)
- Approximate Highway 413 Alignment
- Watercourse (TRCA 2022)
- West Humber River
- Regional Storm Event Estimated Floodline (TRCA 2024)
- W.Humber River Regulatory Floodline (TRCA 2018)

Watercourse/HDF (source and class)*

- GEI, HDF - Mitigation
- GEI, HDF - No Management Required
- GEI, HDF - Protection
- GEI, Further Study - Non-Participant
- GEI, No Reach Observed
- GEI, Watercourse

Reach Breaks

- GEI

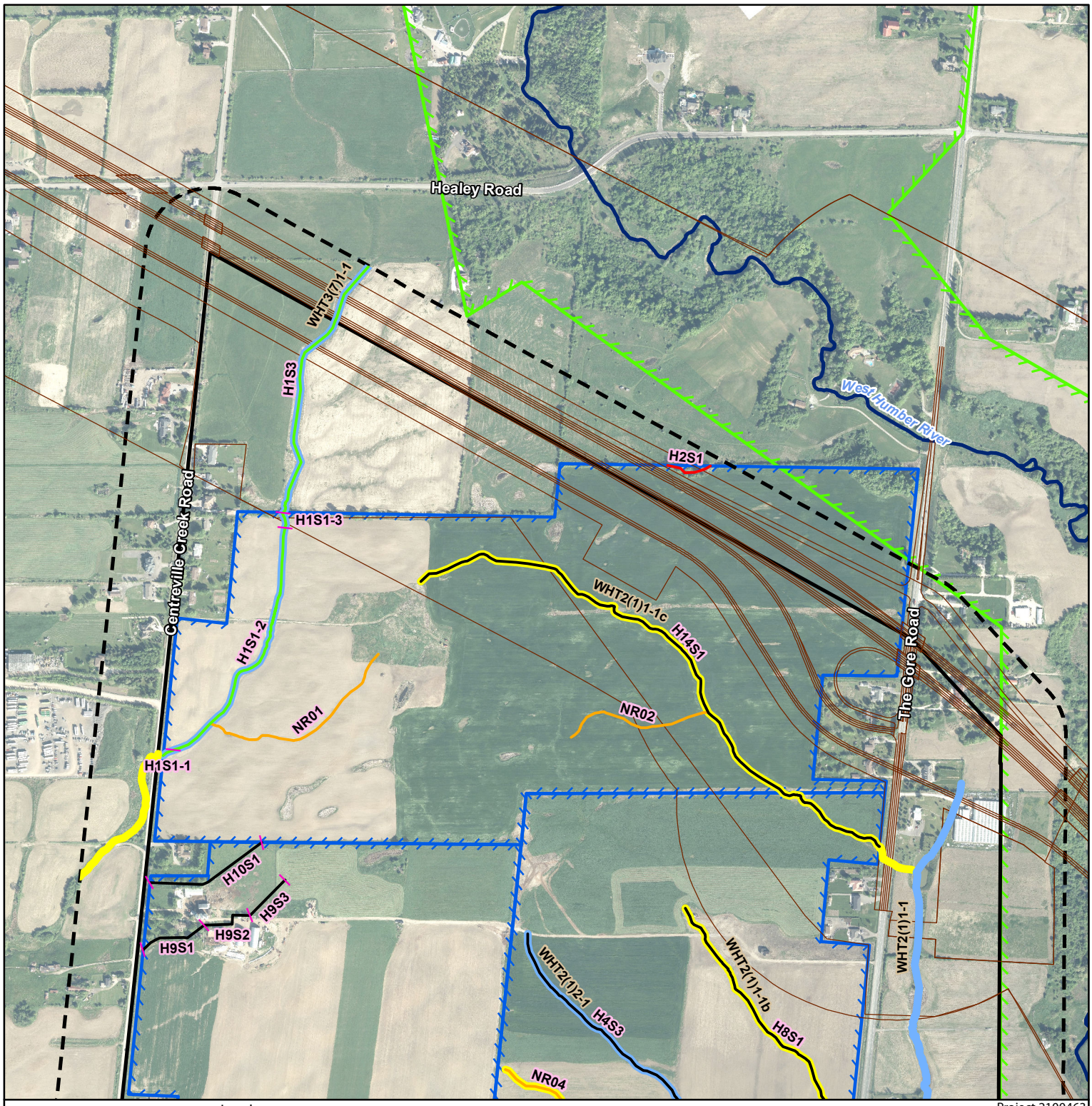
Wildfield Local Subwatershed Study
Wildfield Village Landowners Group Inc.

Figure 1
Watercourse and Drainage Feature Assessment (with Toronto and Region Conservation Authority Regulation Mapping)

0 100 m
1:10,500

GEI Consultants

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Legend

- Wildfield Secondary Plan Area
- Adjacent 120m
- Participating Landowner
- Greenbelt Natural Heritage System
- Approximate Highway 413 Alignment
- West Humber River

Watercourse/HDF (source and class)*

- GEI, HDF - Mitigation
- GEI, HDF - No Management Required
- GEI, HDF - Protection
- GEI, For Further Study - Non-Participant
- GEI, No Reach Observed
- GEI, Watercourse
- SABE, HDF
- SABE, Watercourse

Reach Breaks

- GEI
- SABE

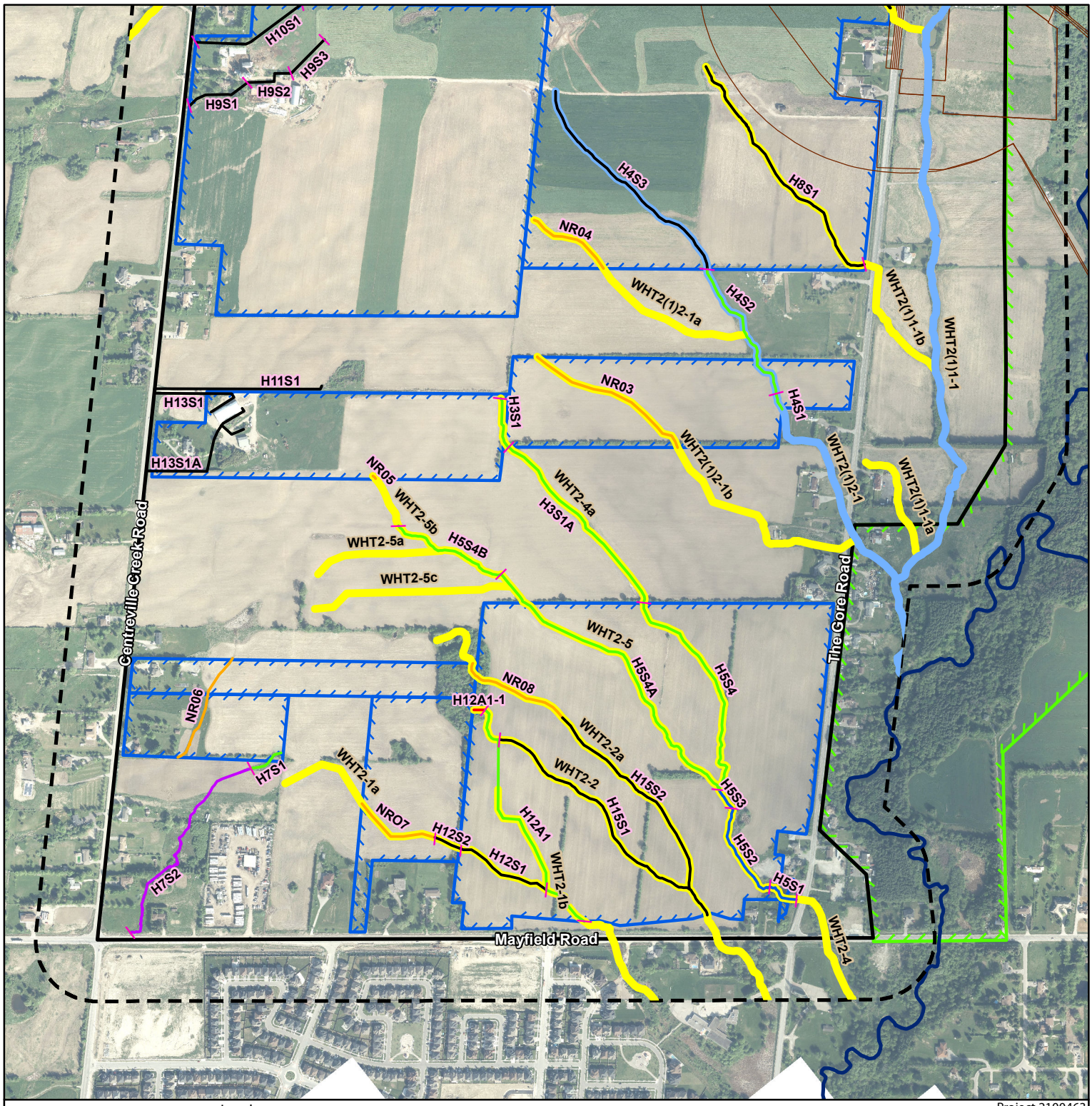
Project 2100463

Wildfield Local Subwatershed Study
Wildfield Village Landowners Group Inc.

Figure 2
Watercourse and Drainage Feature Assessment (with Region of Peel Settlement Area Boundary Expansion (SABE) Scoped Watershed Study Mapping)

0 100 m
1:10,000

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NOTES:

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Legend

- Wildfield Secondary Plan Area
- Adjacent 120m
- Participating Landowner
- Greenbelt Natural Heritage System
- Approximate Highway 413 Alignment
- West Humber River

Watercourse/HDF (source and class)*

- GEI, HDF - Mitigation
- GEI, HDF - No Management Required
- GEI, HDF - Protection
- GEI, For Further Study - Non-Participant
- GEI, No Reach Observed
- GEI, Watercourse
- SABE, HDF
- SABE, Watercourse

Reach Breaks

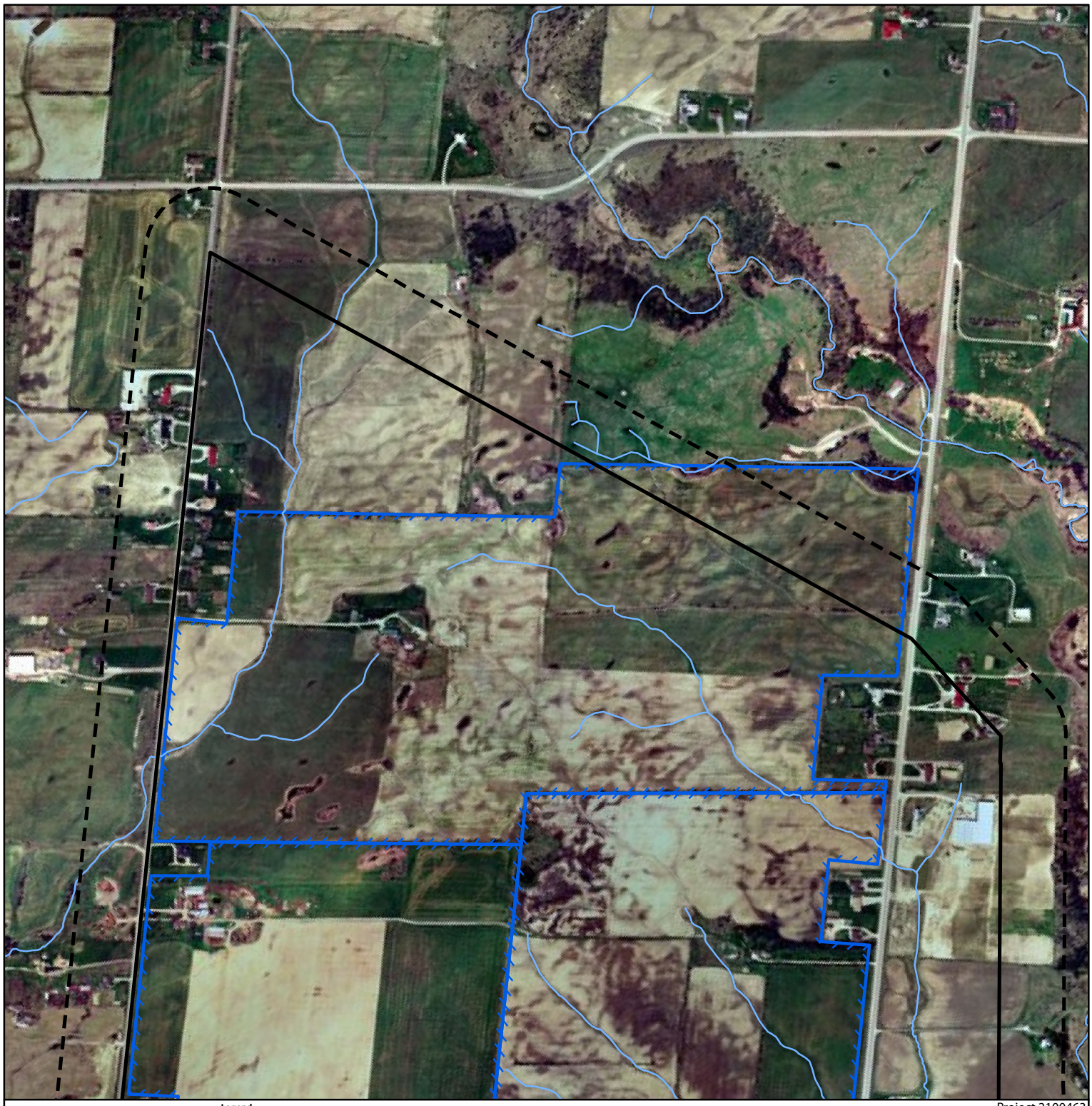
- GEI
- SABE

Wildfield Local Subwatershed Study
Wildfield Village Landowners Group Inc.

Figure 2
Watercourse and Drainage Feature Assessment (with Region of Peel Settlement Area Boundary Expansion (SABE) Scoped Watershed Study Mapping)

0 100 m
1:10,500

GEI Consultants



NOTES:
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3. Airphoto source: First Base Solutions

Legend
- Wildfield Secondary Plan Area
- Adjacent 120m
- Participating Landowner
- Watercourse (TRCA)

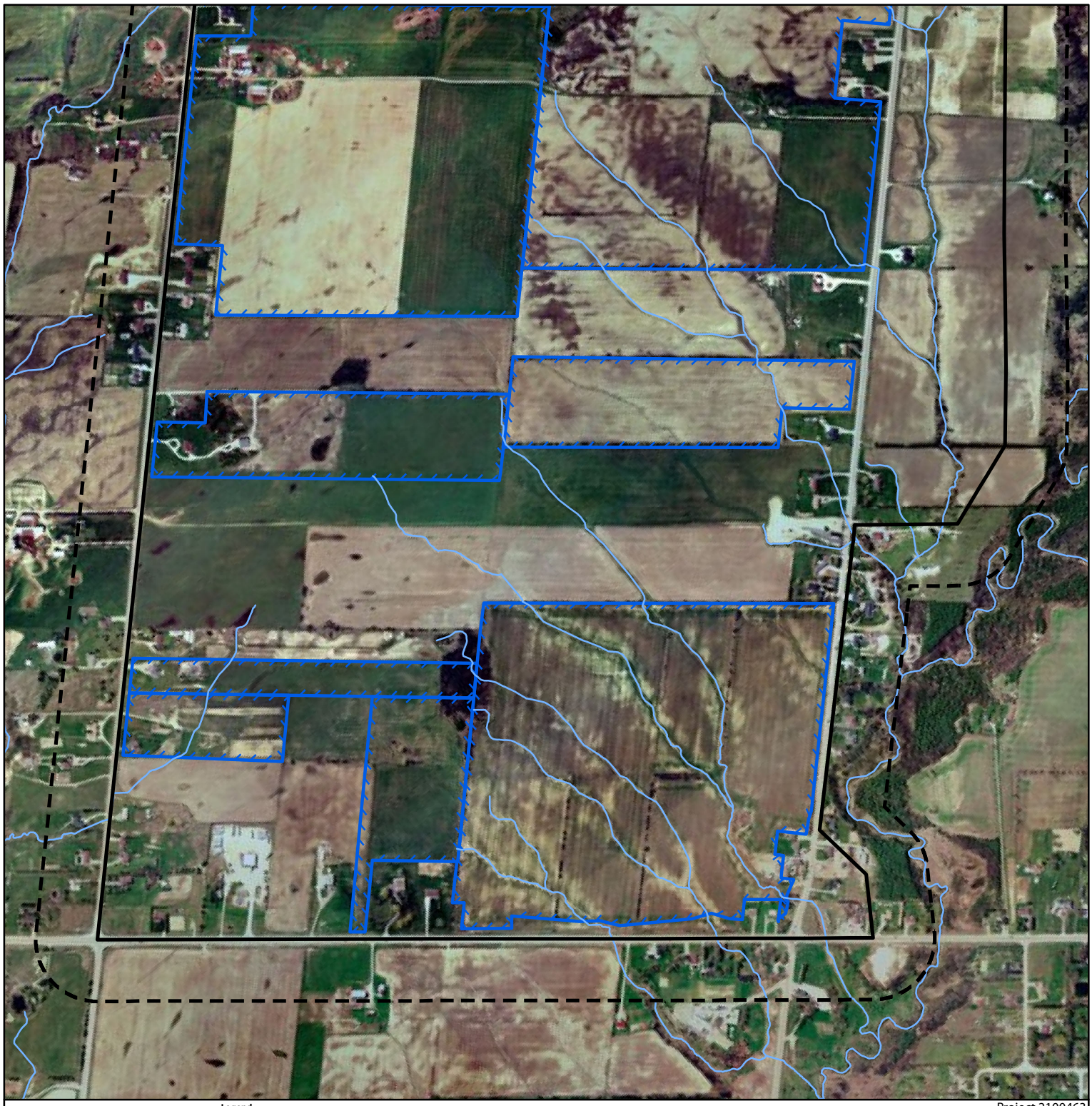
Project 2100463

Wildfield Local Subwatershed Study
Wildfield Village Landowners Group Inc.

Fig. 3A
2002
Aerial Photograph

0 100 m
1:10,000

GEI Consultants



NOTES:
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3. Airphoto source: First Base Solutions

Legend
- Wildfield Secondary Plan Area
- Adjacent 120m
- Participating Landowner
- Watercourse (TRCA)

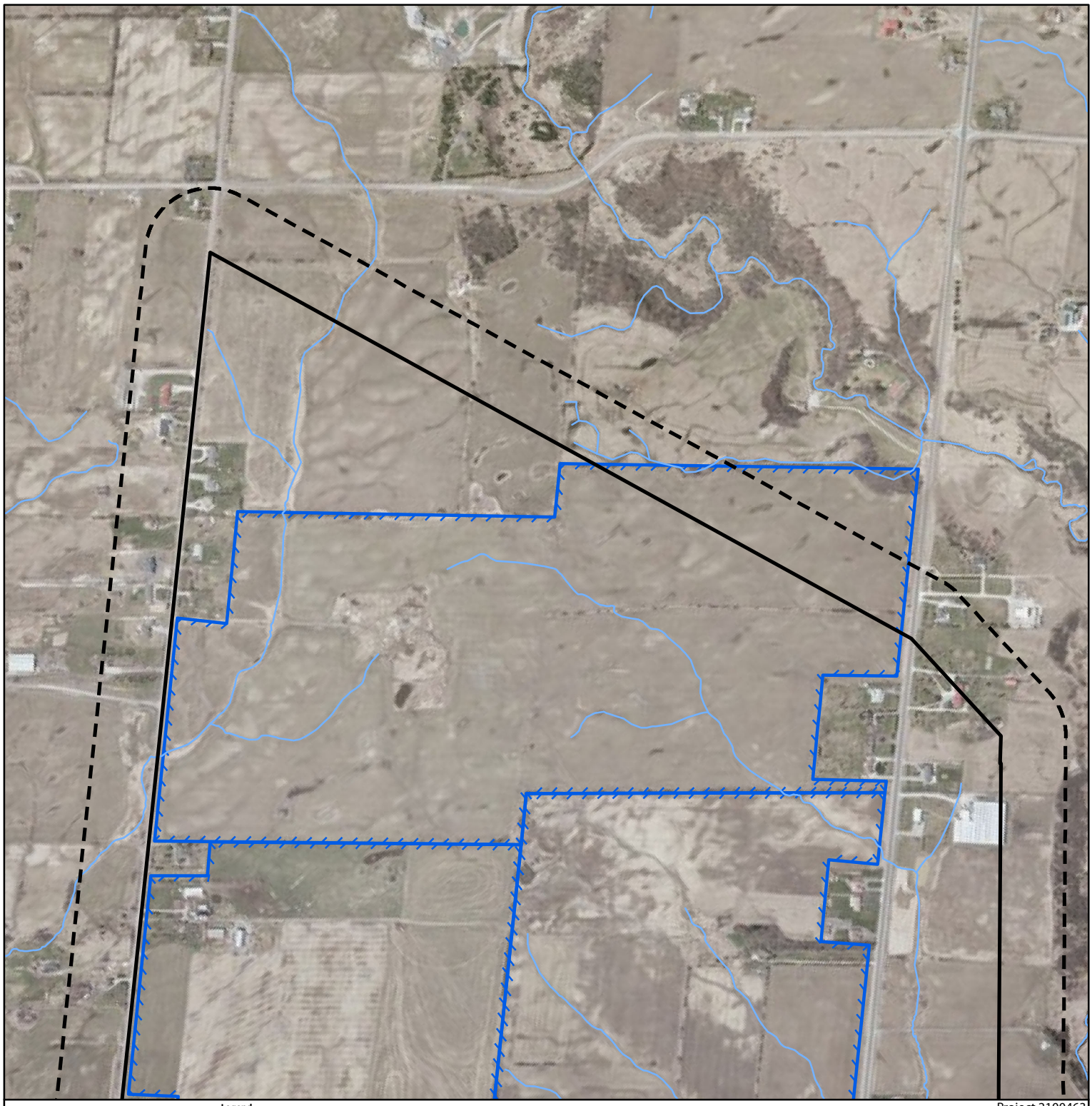
Project 2100463

Wildfield Local Subwatershed Study
Wildfield Village Landowners Group Inc.

Fig. 3B
2002
Aerial Photograph

0 100 m
1:10,500

GEI Consultants



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3. Airphoto source: First Base Solutions

Legend
- Wildfield Secondary Plan Area
- Adjacent 120m
- Participating Landowner
- Watercourse (TRCA)

Project 2100463

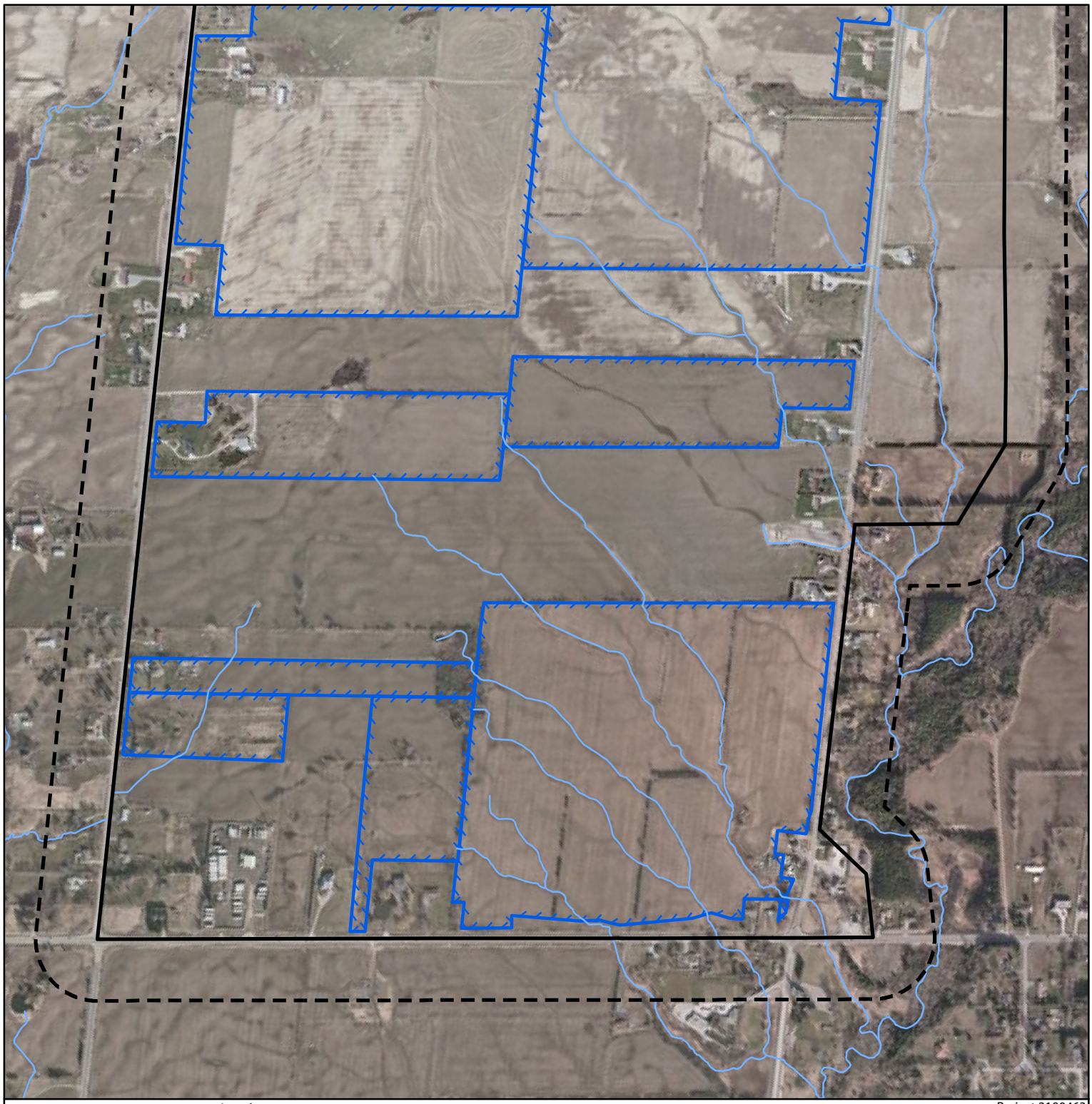
Wildfield Local Subwatershed Study
Wildfield Village Landowners Group Inc.

Fig. 3C
2013
Aerial Photograph

0 100 m
1:10,000

GEI Consultants

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Legend
- Wildfield Secondary Plan Area
- Adjacent 120m
- Participating Landowner
- Watercourse (TRCA)

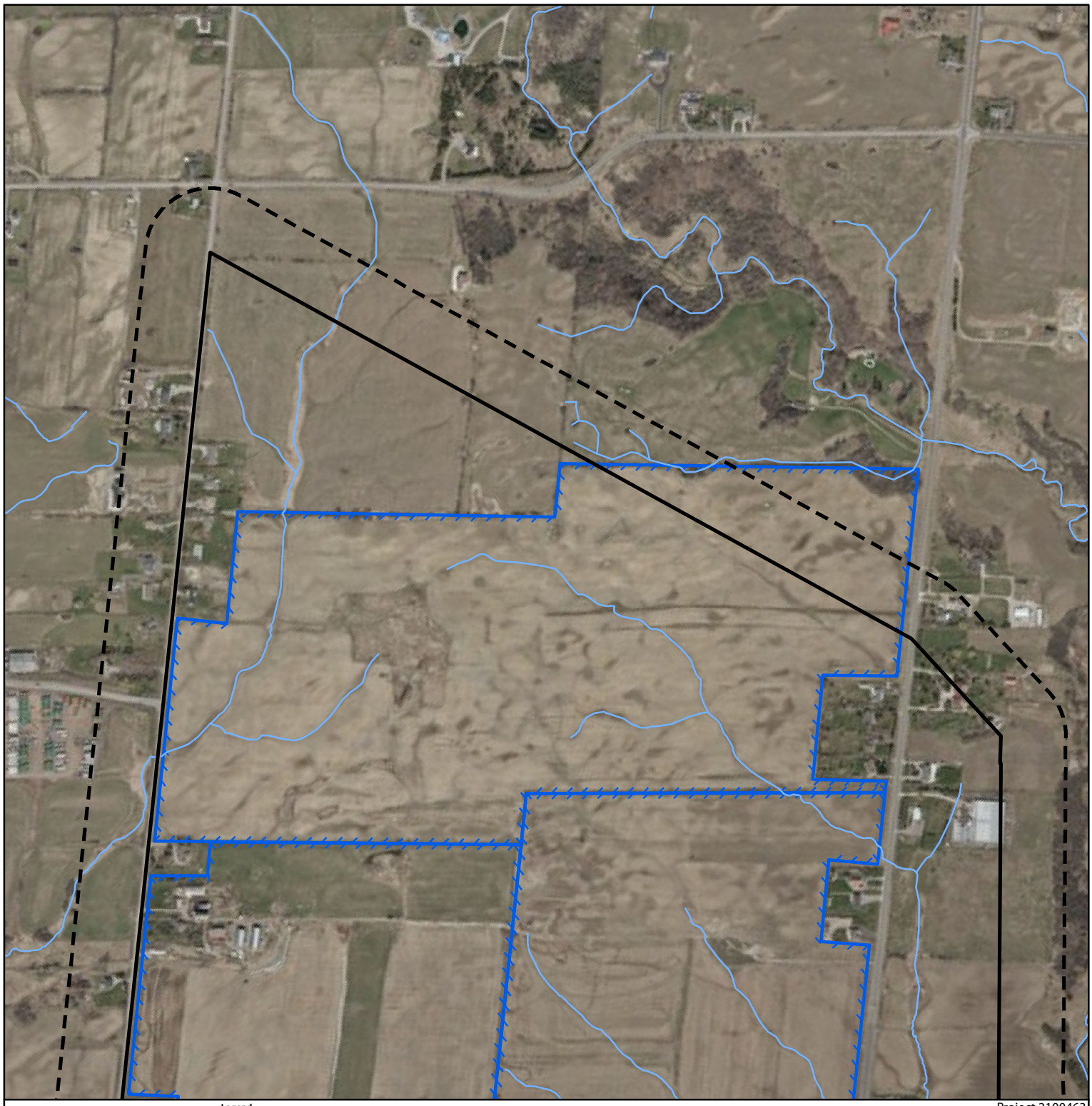
Project 2100463

Wildfield Local Subwatershed Study
Wildfield Village Landowners Group Inc.

Fig. 3D
2013
Aerial Photograph

0 100 m
1:10,500

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Legend
- Wildfield Secondary Plan Area
- Adjacent 120m
- Participating Landowner
- Watercourse (TRCA)

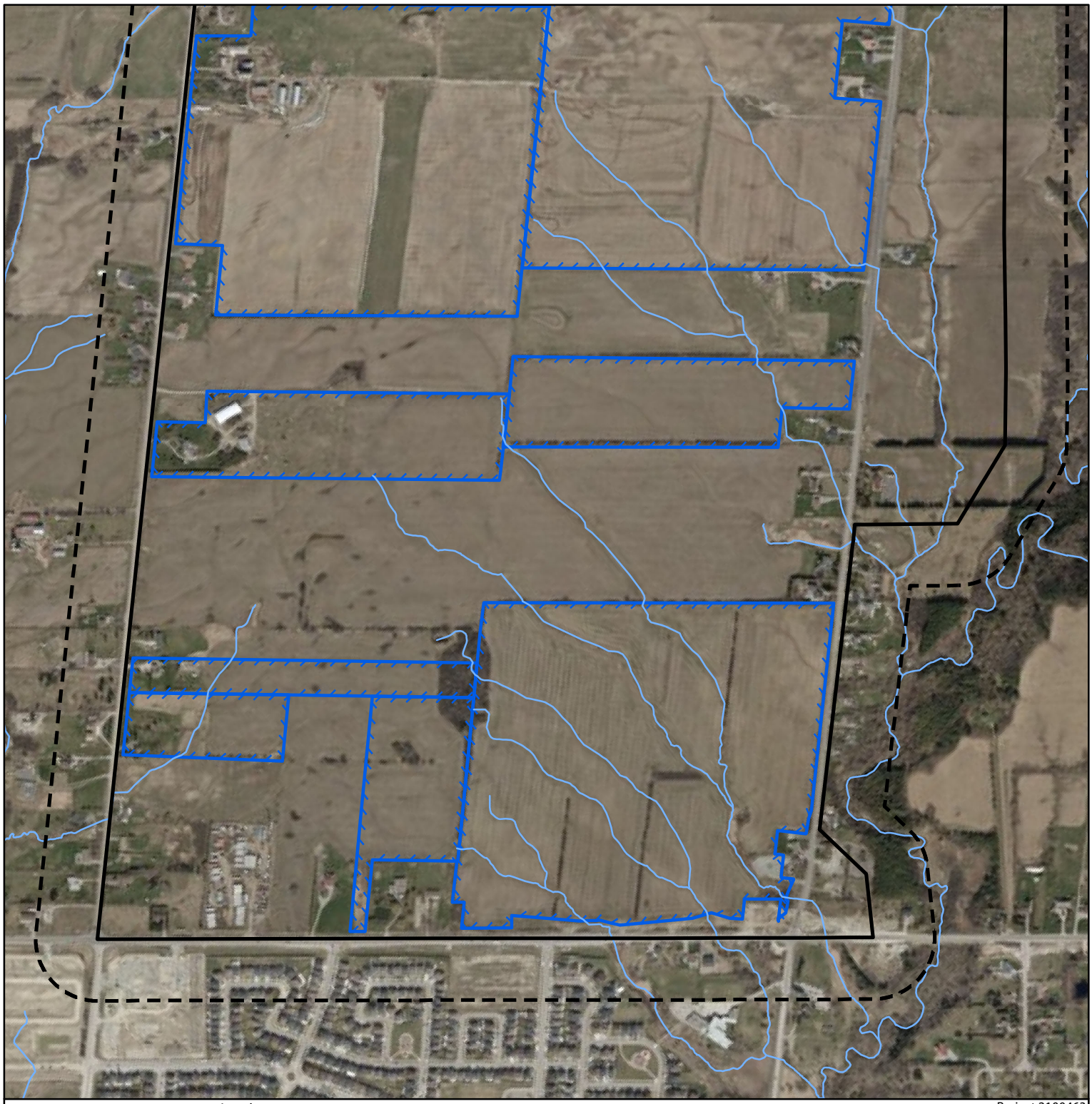
Project 2100463

Wildfield Local Subwatershed Study
Wildfield Village Landowners Group Inc.

Fig. 3E
2022
Aerial Photograph

0 100 m
1:10,000

GEI Consultants



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3. Airphoto source: First Base Solutions

Legend
- Wildfield Secondary Plan Area
- Adjacent 120m
- Participating Landowner
- Watercourse (TRCA)

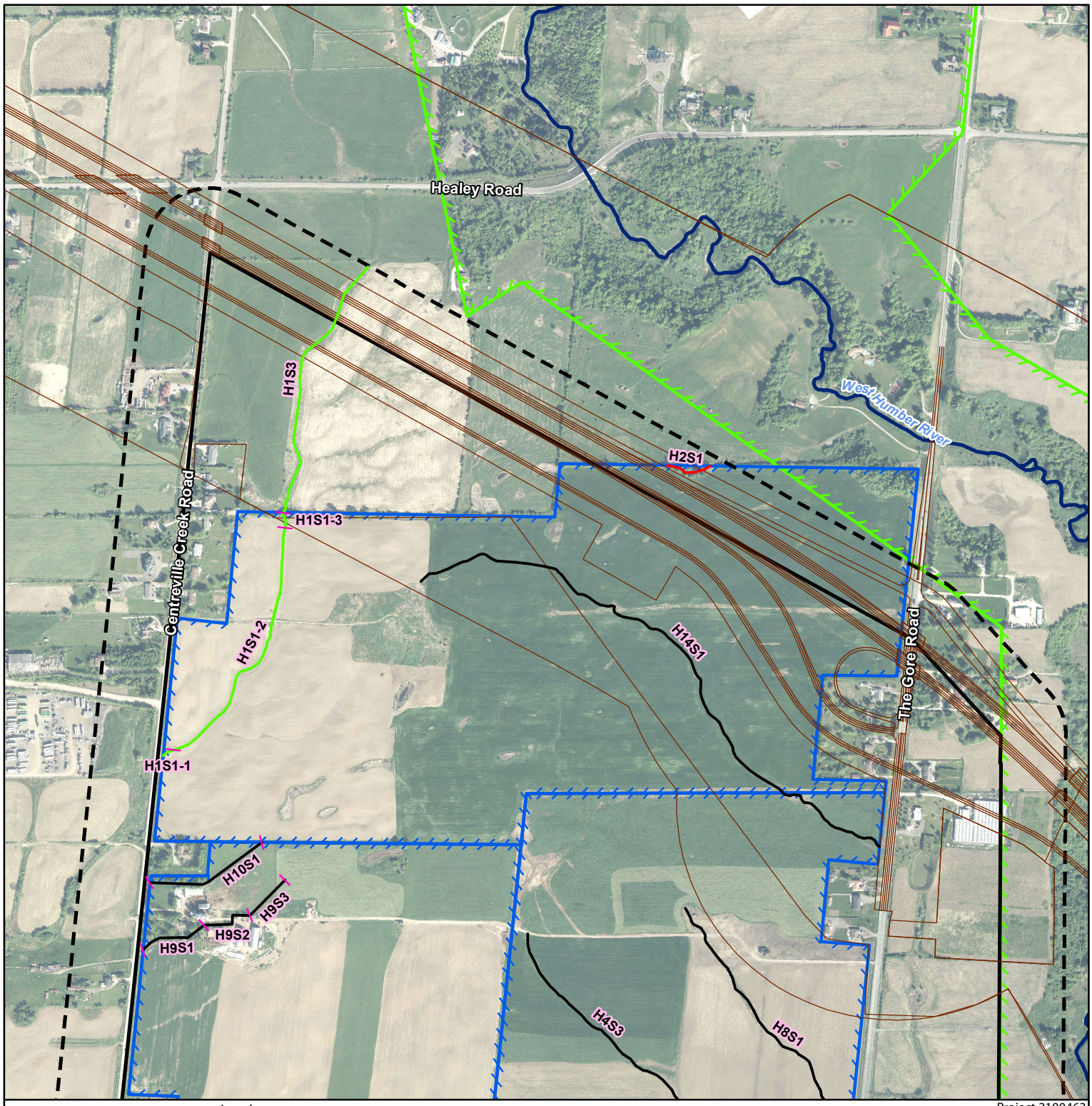
Project 2100463

Wildfield Local Subwatershed Study
Wildfield Village Landowners Group Inc.

Fig. 3F
2022
Aerial Photograph

0 100 m
1:10,500

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Legend

- Wildfield Secondary Plan Area
- Adjacent 120m
- Participating Landowner
- Greenbelt Natural Heritage System
- Approximate Highway 413 Alignment
- West Humber River

Watercourse/HDF (source and class)*

- GEI, HDF - Mitigation
- GEI, HDF - No Management Required
- GEI, HDF - Protection
- GEI, For Further Study - Non-Participant
- GEI, Watercourse

Reach Breaks

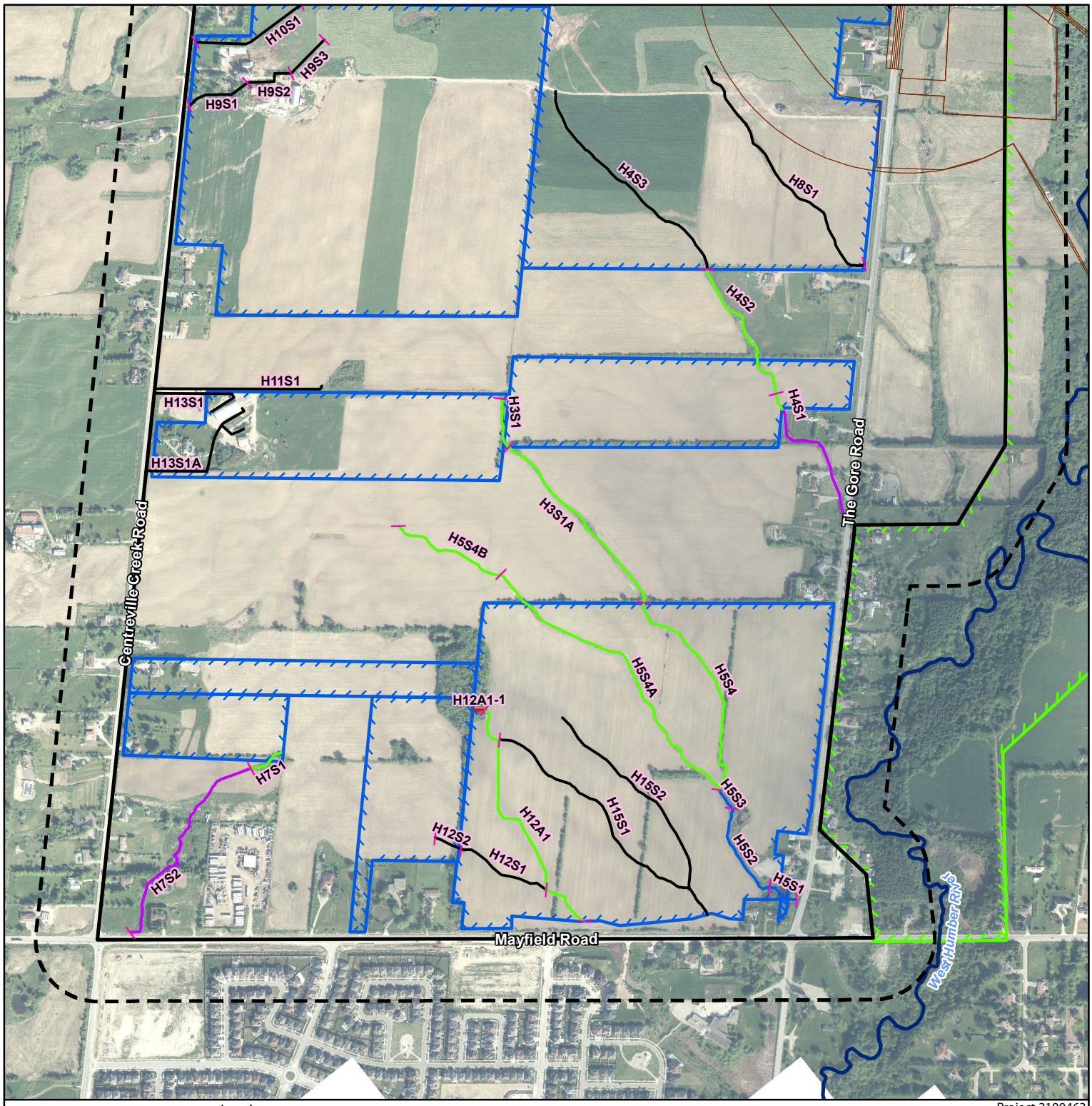
- GEI

Wildfield Local Subwatershed Study
Wildfield Village Landowners Group Inc.

Figure 4
Watercourse and Headwater Drainage Features (GEI)

0 100 m
1:10,000

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Project 2100463

NOTES:

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- Participating Landowner
- Greenbelt Natural Heritage System
- Approximate Highway 413 Alignment
- West Humber River

Watercourse/HDF (source and class)*

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- GEI, HDF - Protection
- GEI, For Further Study - Non-Participant
- GEI, Watercourse

Reach Breaks

- GEI

Wildfield Local Subwatershed Study
Wildfield Village Landowners Group Inc.

Figure 4
Watercourse and Headwater Drainage Features (GEI)

0 100 m
1:10,500

GEI Consultants

Appendix B SABE SWS Study Appendix A – DA6f: Watercourses, HDFs and Aquatic Species at Risk Components of the Preliminary Natural Heritage System

PROJECT: DA19-052-01

CLIENT: Region of Peel

DATE: 21, June 2021

DRAWN BY: J.Sauder

DA6f: Watercourses, HDFs and Aquatic Species at Risk Components of the Preliminary Natural Heritage System

Region of Peel Settlement Area Boundary Expansion Scoped Subwatershed Study

Part A: Existing Conditions and Characterization

- Focused Study Area
- Focused Study Area 120m Buffer
- Subwatersheds [1]
- Key Feature - HDFs [2]
- Key Feautre - Watercourses [2]
- Key Features - Redside Dace Habitat [3]

Base Province of Ontario, Esri Canada, Esri, HERE, Garmin, METI/NASA, USGS, EPA, NPS, USDA, NRCan, Parks Canada

1) Data used with permission of The Region of Peel (2020)
2) Matrix Solutions (2020)
3) C. Portt (2020)

0 500 1,000 2,000
Metres

SCALE: 1:75,000

NAD 1983 UTM Zone 17N

Disclaimer:
The information displayed on this map has been compiled from various sources. While every effort has been made to accurately depict the information, this map should not be relied on as being a precise indicator of locations, features, or roads, nor as a guide to navigation. MNRF data provided by Queen's Printer of Ontario. Use of the data in any derivative product does not constitute an endorsement by the MNRF or the Ontario Government of such products.

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72 Wyndham Street South • Guelph ON N1E 5R3
T 519.822.1609 • F 519.822.5389 • www.dougan.ca

north-south ENVIRONMENTAL

Appendix C Photographic Record



Photo 1 – H1S1-1 [WHT3(7)1-1] at Centreville Creek Road during HDFA Round 1 (March 24, 2021).



Photo 2 – H1S1-1 [WHT3(7)1-1] at Centreville Creek Road during HDFA Round 1 (March 24, 2021).



Photo 3 – H1S1-1 [WHT3(7)1-1] at Centreville Creek Road during HDFA Round 1 (April 10, 2024).



Photo 4 – H1S1-1 [WHT3(7)1-1] at Centreville Creek Road during HDFA Round 1 (April 10, 2024).

Headwater Drainage Feature Assessment

HDF Reach H1S1-1 [WHT3(7)1-1]

Round 1 (March 2021 and April 2024)

PHOTOGRAPHIC RECORD

GEI Consultants



Photo 5 – H1S1-1 [WHT3(7)1-1] at Centreville Creek Road during HDFA Round 2 (May 18, 2022).





Photos 6a and 6b – H1S1-1 [WHT3(7)1-1] at Centreville Creek Road during HDFA Round 2 (May 31, 2024).

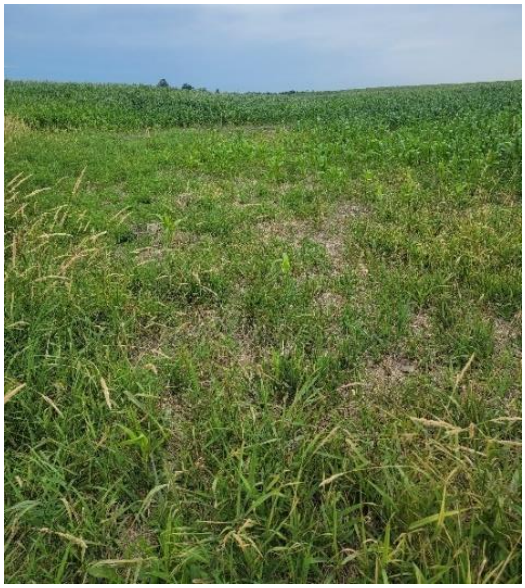


Photo 7- H1S1-1 [WHT3(7)1-1] downstream extent at Centreville Creek Road during HDFA Round 3 (August 3, 2022).



Photo 8 – H1S1-1 [WHT3(7)1-1] at Centreville Creek Road during HDFA Round 3 (August 14, 2024).

Headwater Drainage Feature Assessment

HDF Reach H1S1-1 [WHT3(7)1-1]

Round 2 (May 2022 and May 2024)

Round 3 (August 20222 and August 2024)

PHOTOGRAPHIC RECORD

GEI Consultants



Photo 9 – H1S1-1 [WHT3(7)1-1] at Centreville Creek Road during RGA on May 24, 2023. Minor definition was noted immediately upstream of the culvert.



Photo 10 – H1S1-1 [WHT3(7)1-1] at Centreville Creek Road during RGA on May 24, 2023. Minor definition was noted immediately upstream of the culvert.

Rapid Geomorphic Assessment

HDF Reach H1S1-1 [WHT3(7)1-1]

May 2023

PHOTOGRAPHIC RECORD

GEI Consultants



Photo 11 – H1S1-2 [WHT3(7)1-1] during HDFA Round 1 (March 24, 2021).



Photo 12 – H1S1-2 [WHT3(7)1-1] during HDFA Round 1 (March 24, 2021).



Photo 13 – H1S1-2 [WHT3(7)1-1] during HDFA Round 1 (April 10, 2024).



Photo 14 – H1S1-2 [WHT3(7)1-1] during HDFA Round 1 (April 10, 2024).

Headwater Drainage Feature Assessment

HDF Reach H1S1-2 [WHT3(7)1-1]

Round 1 (March 2021 and April 2024)

PHOTOGRAPHIC RECORD

GEI Consultants



Photo 15 – H1S1-2 [WHT3(7)1-1] at farm lane crossing during HDFA Round 2 (May 18, 2022).



Photo 16 – H1S1-2 [WHT3(7)1-1] during HDFA Round 3 (August 3, 2022).

Headwater Drainage Feature Assessment

HDF Reach H1S1-2 [WHT3(7)1-1]

Round 2 (May 2022 and May 2024)

Round 3 (August 20222 and August 2024)

PHOTOGRAPHIC RECORD

GEI Consultants



Photo 17 – H1S1-2 [WHT3(7)1-1] upstream extent during RGA on May 24, 2023. Note the lack of channel definition.



Photo 18 – H1S1-2 [WHT3(7)1-1] upstream extent during RGA on May 24, 2023. Note the lack of channel definition.



Photo 19 – H1S1-3 [WHT3(7)1-1] during RGA on May 24, 2023. Note the lack of channel definition.

Rapid Geomorphic Assessment

HDF Reach H1S1-2 [WHT3(7)1-1]

May 2023

PHOTOGRAPHIC RECORD

GEI Consultants

NO PHOTO AVAILABLE

Photo 20 – H1S1-3 [WHT3(7)1-1] during HDFA Round 1 (March 24, 2021).

NO PHOTO AVAILABLE

Photo 21 – H1S1-3 [WHT3(7)1-1] during HDFA Round 1 (April 10, 2024).

NO PHOTO AVAILABLE

Photo 22 – H1S1-3 [WHT3(7)1-1] during HDFA Round 2 (May 18, 2022).

NO PHOTO AVAILABLE

Photo 23 – H1S1-3 [WHT3(7)1-1] during HDFA Round 2 (May 31, 2024).

NO PHOTO AVAILABLE

Photo 24 – H1S1-3 [WHT3(7)1-1] during HDFA Round 3 (August 3, 2022).

NO PHOTO AVAILABLE

Photo 25 – H1S1 [WHT3(7)1-1] during HDFA Round 3 (August 3, 2022).

Headwater Drainage Feature Assessment

HDF Reach H1S1-3 [WHT3(7)1-1]

Round 1 (March 2021 and April 2024)

Round 2 (May 2022 and May 2024)

Round 3 (August 20222 and August 2024)

PHOTOGRAPHIC RECORD

GEI Consultants



Photo 26 –H1S3 [WHT3(7)1-1] at Healey Rd facing downstream during RGA on May 24, 2023.



Photo 27 – H1S3 [WHT3(7)1-1] at Healey Rd facing downstream during HDFA Round 1 on April 24, 2024.



Photo 28- H1S3 at Healy Rd facing downstream from Google Earth Street View (May 2024)

Rapid Geomorphic Assessment

HDF Reach H1S3 [WHT3(7)1-1]

May 2023, April 2024, May 2024

PHOTOGRAPHIC RECORD

GEI Consultants



Photo 29 – H2S1 during HDFA Round 1 (March 24, 2021).



Photo 30 – H2S1 during HDFA Round 1 (April 10, 2024).



Photo 31 – H2S1 during HDFA Round 2 (May 18, 2022).

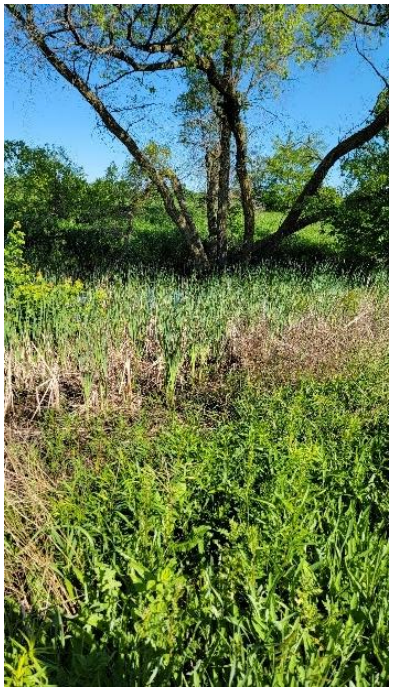


Photo 32 – H2S1 during HDFA Round 2 (May 21, 2024).

Headwater Drainage Feature Assessment

HDF Reach H2S1

Round 1 (March 2021 and April 2024)

Round 2 (May 2022 and May 2024)

PHOTOGRAPHIC RECORD

GEI Consultants



Photo 33 – H2S1 during HDFA Round 3 (August 3, 2022).



Photo 34 – H2S1 during HDFA Round 3 (August 14, 2024).

Headwater Drainage Feature Assessment

HDF Reach H2S1

Round 3 (August 2022 and August 2024)

PHOTOGRAPHIC RECORD

GEI Consultants



Photo 35 – H2S1 during RGA on May 24, 2023.



Photo 36 – H2S1 during RGA on May 24, 2023.

Rapid Geomorphic Assessment

HDF Reach H2S1

May 24, 2023

PHOTOGRAPHIC RECORD

GEI Consultants



Photo 37 – H14S1 [WHT2(1)1-1c] downstream extent during HDFA Round 1 (March 24, 2021).





Photos 38a and 38b – H14S1 [WHT2(1)1-1c] downstream extent during HDFA Round 1 (April 10, 2024).

Headwater Drainage Feature Assessment

HDF Reach H14S1 [WHT2(1)1-1c]

Round 1 (March 2021 and April 2024)

PHOTOGRAPHIC RECORD

GEI Consultants







Photos 39a, 39b and 39c – H8S1 [WHT2(1)1-1b] downstream during HDFA Round 1 (April 10, 2024).





Photo 40a and 40b – H8S1 [WHT2(1)1-1b] upstream during HDFA Round 1 (April 10, 2024). Tile drain was identified.

Headwater Drainage Feature Assessment

HDF Reach H8S1 [WHT2(1)1-1b]

Round 1 (April 2024)

PHOTOGRAPHIC RECORD

GEI Consultants



Photo 41 – H4S1 [WHT2(1)2-1] downstream extent during HDFA Round 1 (March 24, 2021).



Photo 42 – H4S1 [WHT2(1)2-1] upstream extent during HDFA Round 1 (March 24, 2021).



Photo 43 – H4S1 [WHT2(1)2-1] downstream extent at the Gore Road during HDFA Round 1 (April 10, 2024).



Photo 44 – H4S1 [WHT2(1)2-1] upstream extent during HDFA Round 1 (April 10, 2024).

Headwater Drainage Feature Assessment

HDF Reach H4S1 [WHT2(1)2-1]

Round 1 (March 2021 and April 2024)

PHOTOGRAPHIC RECORD

GEI Consultants



Photo 45 – H4S1 [WHT2(1)2-1] downstream extent during HDFA Round 2 (May 18, 2022).



Photo 46 – H4S1 [WHT2(1)2-1] upstream extent during HDFA Round 2 (May 18, 2022).



Photo 47 – H4S1 [WHT2(1)2-1] downstream extent during HDFA Round 2 (May 31, 2024).



Photo 48 – H4S1 [WHT2(1)2-1] upstream extent during HDFA Round 2 (May 31, 2024).

Headwater Drainage Feature Assessment

HDF Reach H4S1 [WHT2(1)2-1]

Round 2 (May 2022 and May 2024)

PHOTOGRAPHIC RECORD

GEI Consultants



Photo 49 – H4S1 [WHT2(1)2-1] downstream extent during HDFA Round 3 (August 3, 2022).



Photo 50 – H4S1 [WHT2(1)2-1] upstream extent during HDFA Round 3 (August 14, 2024).

Headwater Drainage Feature Assessment

HDF Reach H4S1 [WHT2(1)2-1]

Round 3 (August 2022 and August 2024)

PHOTOGRAPHIC RECORD

GEI Consultants



Photo 51 – H4S2 [WHT2(1)2-1] downstream extent during HDFA Round 1 (March 24, 2021).



Photo 52 – H4S2 [WHT2(1)2-1] upstream extent during HDFA Round 1 (March 24, 2021).



Photo 53 – H4S2 [WHT2(1)2-1] downstream extent during HDFA Round 1 (April 10, 2024).



Photo 54 – H4S2 [WHT2(1)2-1] upstream extent during HDFA Round 1 (April 10, 2024).

Headwater Drainage Feature Assessment

HDF Reach H4S2 [WHT2(1)2-1]

Round 1 (March 2021 and April 2024)

PHOTOGRAPHIC RECORD

GEI Consultants



Photo 55 – H4S2 [WHT2(1)2-1] downstream extent during HDFA Round 2 (May 18, 2022).



Photo 56 – H4S2 [WHT2(1)2-1] upstream extent during HDFA Round 2 (May 18, 2022).



Photo 57 – H4S2 [WHT2(1)2-1] downstream extent during HDFA Round 2 (May 31, 2024).



Photo 58 – H4S2 [WHT2(1)2-1] downstream extent during HDFA Round 2 (May 31, 2024).

Headwater Drainage Feature Assessment

HDF Reach H4S2 [WHT2(1)2-1]

Round 2 (May 2022 and May 2024)

PHOTOGRAPHIC RECORD

GEI Consultants



Photo 59 – H4S2 [WHT2(1)2-1] downstream extent during HDFA Round 3 (August 3, 2022).



Photo 60 – H4S2 [WHT2(1)2-1] upstream extent during HDFA Round 3 (August 3, 2022).



Photo 61 – H4S2 [WHT2(1)2-1] downstream extent during HDFA Round 3 (August 14, 2024).

.

Headwater Drainage Feature Assessment

HDF Reach H4S2 [WHT2(1)2-1]

Round 3 (August 2022 and August 2024)

PHOTOGRAPHIC RECORD

GEI Consultants



Photo 62– H4S3 [WHT2(1)2-1] mid-reach during HDFA Round 1 (April 10, 2024).



Photo 63 – H4S3 [WHT2(1)2-1] mid-reach during HDFA Round 1 (April 10, 2024).

Headwater Drainage Feature Assessment

HDF Reach H4S3 [WHT2(1)2-1]

Round 1 (April 2024)

PHOTOGRAPHIC RECORD

GEI Consultants



Photo 64 – NRO4 [WHT2(1)2-1a] mid-reach during HDFA Round 1 (April 10, 2024).

Headwater Drainage Feature Assessment

HDF Reach NRO4 [WHT2(1)2-1a]

Round 1 (April 2024)

PHOTOGRAPHIC RECORD

GEI Consultants



Photo 65 – NRO3 [WHT2(1)2-1b] downstream extent during HDFA Round 1 (April 10, 2024).

Headwater Drainage Feature Assessment

HDF Reach NRO3 [WHT2(1)2-1b]

Round 1 (April 2024)

PHOTOGRAPHIC RECORD

GEI Consultants



Photo 66 – H5S1 [WHT2-4] downstream extent at the Gore Road during HDFA Round 1 (March 24, 2021).



Photo 67 – H5S1 [WHT2-4] upstream extent at the edge of the Buckthorn Thicket (THDM2-6) during HDFA Round 1 (March 24, 2021).



Photo 68 – H5S1 [WHT2-4] downstream extent at the Gore Road during HDFA Round 1 (April 10, 2024).



Photo 69 – H5S1 [WHT2-4] upstream extent at the edge of the Buckthorn Thicket (THDM2-6) during HDFA Round 1 (April 10, 2024).

Hydrologic Feature Assessment

Watercourse (Reach H5S1) [WHT2-4]

Round 1 (March 2021 and April 2024)

PHOTOGRAPHIC RECORD

GEI Consultants



Photo 70 – H5S1 [WHT2-4] downstream extent at The Gore Road during HDFA Round 2 (May 18, 2022).



Photo 71 – H5S1 [WHT2-4] upstream extent at the edge of the Buckthorn Thicket (THDM2-6) during HDFA Round 2 (May 18, 2022).



Photo 72 – H5S1 [WHT2-4] mid-reach within the Buckthorn Thicket (THDM2-6) during HDFA Round 2 (May 31, 2024).

Hydrological Feature Assessment

Watercourse (Reach H5S1) [WHT2-4]

Round 2 (May 2022 and May 2024)

PHOTOGRAPHIC RECORD

GEI Consultants



Photo 73 – H5S1 [WHT2-4] downstream extent at the Gore Road during HDFA Round 3 (August 3, 2022).



Photo 74 – H5S1 [WHT2-4] upstream extent at the edge of the Buckthorn Thicket (THDM2-6) during HDFA Round 3 (August 3, 2022).



Photo 75 – H5S1 [WHT2-4] downstream extent at The Gore Road during HDFA Round 3 (August 14, 2024).

Hydrological Feature Assessment

Watercourse (Reach H5S1) [WHT2-4]

Round 3 (August 2022 and August 2024)

PHOTOGRAPHIC RECORD

GEI Consultants



Photo 76 – H5S1 [WHT2-4] mid-reach during RGA on May 24, 2023.



Photo 77 – H5S1 [WHT2-4] downstream extent at The Gore Road during RGA on May 24, 2023. The channel was defined upstream of the culvert.

Rapid Geomorphic Assessment

HDF Reach H5S1 [WHT2-4]

May 2023

PHOTOGRAPHIC RECORD

GEI Consultants



Photo 78 – H5S2 [WHT2-4] downstream extent within the forb meadow marsh (MAM2-10) during HDFA Round 1 (March 24, 2021).



Photo 79– H5S2 [WHT2-4] upstream extent within the Reed-canary Grass meadow marsh (MAM2-2) during HDFA Round 1 (March 24, 2021).



Photo 80 – H5S2 [WHT2-4] downstream extent within the forb meadow marsh (MAM2-10) during HDFA Round 1 (April 10, 2024).



Photo 81 – H5S2 [WHT2-4] upstream extent within the Reed-canary Grass meadow marsh (MAM2-2) during HDFA Round 1 (April 10, 2024).

Hydrological Feature Assessment

Watercourse (Reach H5S2) [WHT2-4]

Round 1 (March 2021 and April 2024)

PHOTOGRAPHIC RECORD

GEI Consultants



Photo 82 – H5S2 [WHT2-4] downstream extent within the forb meadow marsh (MAM2-10) during HDFA Round 2 (May 18, 2022).



Photo 83 – H5S2 [WHT2-4] upstream extent within the Reed-canary Grass meadow marsh (MAM2-2) during HDFA Round 2 (May 18, 2022).

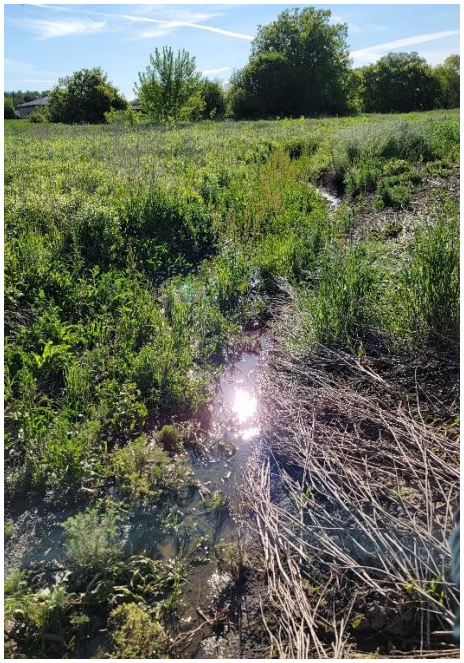


Photo 84 – H5S2 [WHT2-4] downstream extent within the forb meadow marsh (MAM2-10) during HDFA Round 2 (May 31, 2024).

Hydrological Feature Assessment

Watercourse (Reach H5S2) [WHT2-4]

Round 2 (May 2022 and May 2024)

PHOTOGRAPHIC RECORD

GEI Consultants



Photo 85– H5S2 [WHT2-4] downstream extent within the forb meadow marsh (MAM2-10) during HDFA Round 3 (August 3, 2022).



Photo 86 – H5S2 [WHT2-4] mid-reach during HDFA Round 3 (August 3, 2022).



Photo 87 – H5S2 [WHT2-4] downstream extent within the forb meadow marsh (MAM2-10) during HDFA Round 3 (August 14, 2024).

Hydrological Feature Assessment

Watercourse (Reach H5S2) [WHT2-4]

Round 3 (August 2022 and August 2024)

PHOTOGRAPHIC RECORD

GEI Consultants



Photo 88 – H5S2 [WHT2-4] downstream extent during RGA on May 24, 2023. Defined bed and banks were present.



Photo 89 – H5S2 [WHT2-4] mid-reach during RGA on May 24, 2023. Defined bed and banks were present.

Rapid Geomorphic Assessment

Watercourse (Reach H5S2) [WHT2-4]

May 24, 2023

PHOTOGRAPHIC RECORD

GEI Consultants



Photo 90 – H5S3 [WHT2-4] downstream extent within the cultural meadow (CUM1) during HDFA Round 1 (March 24, 2021).



Photo 91 – H5S3 [WHT2-4] upstream extent within the cultural meadow (CUM1) during HDFA Round 1 (March 24, 2021).



Photo 92 – H5S3 [WHT2-4] downstream extent within the cultural meadow (CUM1) during HDFA Round 1 (April 10, 2024).

Hydrological Feature Assessment

Watercourse (Reach H5S3) [WHT2-4]

Round 1 (March 2021 and April 2024)

PHOTOGRAPHIC RECORD

GEI Consultants



Photo 93 – H5S3 [WHT2-4] downstream extent within the cultural meadow (CUM1) during HDFA Round 2 (May 18, 2022).



Photo 94 – H5S3 [WHT2-4] upstream extent within the cultural meadow (CUM1) during HDFA Round 2 (May 18, 2022).



Photo 95 – H5S3 [WHT2-4] upstream extent within the cultural meadow (CUM1) during HDFA Round 2 (May 31, 2024).

Hydrological Feature Assessment

Watercourse (Reach H5S3) [WHT2-4]

Round 2 (May 2022 and May 2024)

PHOTOGRAPHIC RECORD

GEI Consultants



Photo 96 – H5S3 [WHT2-4] downstream extent within the cultural meadow (CUM1) during HDFA Round 3 (August 3, 2022).



Photo 97 – H5S3 [WHT2-4] upstream extent within the cultural meadow (CUM1) during HDFA Round 3 (August 3, 2022).



Photo 98 – H5S3 [WHT2-4] mid-reach within the cultural meadow (CUM1) during HDFA Round 3 (August 14, 2024).

Hydrological Feature Assessment

Watercourse (Reach H5S3) [WHT2-4]

Round 3 (August 2022 and August 2024)

PHOTOGRAPHIC RECORD

GEI Consultants



Photo 99 – H5S3 [WHT2-4] upstream extent during RGA on May 24, 2023. Defined bed and banks were present.



Photo 100 – H5S3 [WHT2-4] upstream extent during RGA on May 24, 2023. Defined bed and banks were present.

Rapid Geomorphic Assessment

Watercourse (Reach H5S3) [WHT2-4]

May 24, 2023

PHOTOGRAPHIC RECORD

GEI Consultants



Photo 101 – H5S4 [WHT2-4a] downstream extent at the H5S3 reach break during HDFA Round 1 (March 24, 2021).



Photo 102– H5S4 [WHT2-4a] downstream extent at the H5S3 reach break during HDFA Round 1 (April 10, 2024).



Photo 103 – H5S4 [WHT2-4a] upstream extent during HDFA Round 1 (April 10, 2024).

Headwater Drainage Feature Assessment

HDF Reach H5S4 [WHT2-4a]

Round 1 (March 2021 and April 2024)

PHOTOGRAPHIC RECORD

GEI Consultants



Photo 104 – H5S4 [WHT2-4a] downstream extent at the H5S3 reach break during HDFA Round 2 (May 18, 2022).



Photo 105 – H5S4 [WHT2-4a] upstream extent within the agricultural field during HDFA Round 2 (May 18, 2022).



Photo 106 – H5S4 [WHT2-4a] downstream extent at the H5S3 reach break during HDFA Round 2 (May 31, 2024).

Headwater Drainage Feature Assessment

HDF Reach H5S4 [WHT2-4a]

Round 2 (May 2022 and May 2024)

PHOTOGRAPHIC RECORD

GEI Consultants



Photo 107 – H5S4 [WHT2-4a] downstream extent at the H5S3 reach break during HDFA Round 3 (August 3, 2022).



Photo 108 – H5S4 [WHT2-4a] downstream extent at the beginning of the hedgerow (HR) during HDFA Round 3 (August 14, 2024).

Headwater Drainage Feature Assessment

HDF Reach H5S4 [WHT2-4a]

Round 3 (August 2022 and August 2024)

PHOTOGRAPHIC RECORD

GEI Consultants



Photo 109 – H5S4 [WHT2-4a] downstream extent during RGA on May 24, 2023. The channel was defined near the confluence with WHT2-4, but was noted to lose definition upstream.



Photo 110 – H5S4 [WHT2-4] mid-reach during RGA on May 24, 2023. The channel was defined associated with the hedgerow.



Photo 111 – H5S4 [WHT2-4a] upstream extent during RGA on May 24, 2023. Note the lack of definition.

Rapid Geomorphic Assessment

HDF Reach H5S4 [WHT2-4a]

May 24, 2023

PHOTOGRAPHIC RECORD

GEI Consultants



Photo 112 – H3S1 [WHT2-4a] upstream extent during HDFA Round 1 (March 24, 2021).



Photo 113 – H3S1 [WHT2-4a] upstream extent during HDFA Round 1 (April 10, 2024).



Photo 114 – H3S1 [WHT2-4a] upstream extent during HDFA Round 1 (April 10, 2024).

Headwater Drainage Feature Assessment

HDF Reach H3S1 [WHT2-4a]

Round 1 (March 2021 and April 2024)

PHOTOGRAPHIC RECORD

GEI Consultants



Photo 115 – H3S1 [WHT2-4a] downstream extent during HDFA Round 2 (May 18, 2022).



Photo 116 – H3S1 [WHT2-4a] downstream extent during HDFA Round 2 (May 18, 2022).

Headwater Drainage Feature Assessment

HDF Reach H3S1 [WHT2-4a]

Round 2 (May 2022)

PHOTOGRAPHIC RECORD

GEI Consultants



Photo 117 – H3S1 [WHT2-4a] upstream extent at tile drain during site visit (May 3, 2024).



Photo 118 – H3S1 [WHT2-4a] upstream extent during site visit (May 3, 2024).



Photo 119 – H3S1 [WHT2-4a] downstream extent during HDFA Round 2 (May 31, 2024).

Headwater Drainage Feature Assessment

HDF Reach H3S1 [WHT2-4a]

Round 2 (May 2024)

PHOTOGRAPHIC RECORD

GEI Consultants



Photo 120 – H3S1 [WHT2-4a] downstream extent during HDFA Round 3 (August 3, 2022).



Photo 121 – H3S1 [WHT2-4a] upstream extent during HDFA Round 3 (August 14, 2024).

Headwater Drainage Feature Assessment

HDF Reach H3S1 [WHT2-4a]

Round 3 (August 2022 and August 2024)

PHOTOGRAPHIC RECORD

GEI Consultants



Photo 122- H3S1A [WHT2-4a] upstream extent during fish community sampling on June 9, 2022.



Photo 123 – H3S1A [WHT2-4a] upstream extent during HDFA Round 1 (April 10, 2024).



Photo 124 – H3S1A [WHT2-4a] upstream extent during HDFA Round 2 (May 31, 2024).



Photo 125 – H3S1A [WHT2-4a] upstream extent during HDFA Round 3 (August 14, 2024).

Headwater Drainage Feature Assessment

HDF Reach H3S1A [WHT2-4a]

Round 1 (April 2024), Round 2 (May 2024), Round 3 (August 2024)

PHOTOGRAPHIC RECORD

GEI Consultants



Photo 126 – H5S4A [WHT2-5] downstream extent at the H5S3 reach break during HDFA Round 1 (March 24, 2021).



Photo 127 – H5S4A [WHT2-5] downstream extent within the agricultural field during HDFA Round 1 (April 10, 2024).





Photo 128a and 128b – H5S4A [WHT2-5] upstream within the agricultural field extent during HDFA Round 1 (April 10, 2024).

Headwater Drainage Feature Assessment

HDF Reach H5S4A [WHT2-5]

Round 1 (March 2021 and April 2024)

PHOTOGRAPHIC RECORD

GEI Consultants



Photo 129 – H5S4A [WHT2-5] downstream extent at the H5S3 reach break during HDFA Round 2 (May 18, 2022).



Photo 130 – H5S4A [WHT2-5] upstream extent within the agricultural field during HDFA Round 2 (May 18, 2022).



Photo 131 – H5S4A [WHT2-5] downstream extent within the agricultural field during HDFA Round 2 (May 31, 2024).

Headwater Drainage Feature Assessment

HDF Reach H5S4A [WHT2-5]

Round 2 (May 2022 and May 2024)

PHOTOGRAPHIC RECORD

GEI Consultants



Photo 132 – H5S4A [WHT2-5] downstream extent at the H5S3 reach break during HDFA Round 3 (August 3, 2022).



Photo 133 – H5S4A [WHT2-5] downstream extent within the agricultural field during HDFA Round 3 (August 14, 2024).

Headwater Drainage Feature Assessment

HDF Reach H5S4A [WHT2-5]

Round 3 (August 2022 and August 2024)

PHOTOGRAPHIC RECORD

GEI Consultants



Photo 134 – H5S4A [WHT2-5] downstream extent during RGA on May 24, 2023.



Photo 135– H5S4A [WHT2-5] mid-reach during RGA on May 24, 2023.



Photo 136 – H5S4A [WHT2-5] upstream extent during RGA on May 24, 2023. Some channel definition was noted within the hedgerow

Rapid Geomorphic Assessment

HDF Reach H5S4A [WHT2-5]

May 24, 2023

PHOTOGRAPHIC RECORD

GEI Consultants



Photo 137 – H15S1 [WHT2-2] mid-reach during HDFA Round 1 (April 10, 2024).



Photo 138 – H15S1 [WHT2-2] mid-reach during HDFA Round 1 (April 10, 2024).

Headwater Drainage Feature Assessment

HDF Reach H15S1 [WHT2-2]

Round 1 (April 2024)

PHOTOGRAPHIC RECORD

GEI Consultants



Photo 139 – H15S2 [WHT2-2a] mid-reach during HDFA Round 1 (April 10, 2024).



Photo 140 – H15S [WHT2-2a] mid-reach during HDFA Round 1 (April 10, 2024).

Headwater Drainage Feature Assessment

HDF Reach H15S2 [WHT2-2a]

Round 1 (April 2024)

PHOTOGRAPHIC RECORD

GEI Consultants



Photo 141 – H12S1/S2 [WHT2-1a] downstream extent at H12A1 reach break during HDFA Round 1 (March 24, 2021).



Photo 142 – H12S1 [WHT2-1a] downstream extent during HDFA Round 1 (April 10, 2024).



Photo 143 – H12S2/S1 [WHT2-1a] downstream extent at H12A1 reach break during HDFA Round 1 (March 24, 2021).





Photo 144a and 144b – H12S2 [WHT2-1a] downstream extent (H12S1 upstream extent) during HDFA Round 1 (April 10, 2024).

Headwater Drainage Feature Assessment

HDF Reach H12S1/S2 [WHT2-1a]

Round 1 (March 2021 and April 2024)

PHOTOGRAPHIC RECORD

GEI Consultants

NO PHOTO AVAILABLE



Photo 145 – H12S1/S2 [WHT2-1a] during HDFA Round 2 (May 18, 2022). Feature was identified as dry during Round 1.

Photo 146 – H12S1/S2 [WHT2-1a] downstream extent at H12A1 reach during HDFA Round 2 (May 31, 2024).

NO PHOTO AVAILABLE

NO PHOTO AVAILABLE

Photo 147 – H12S1/S2 [WHT2-1a] during HDFA Round 3 (August 3, 2022). Feature was identified as dry during Round 1.

Photo 148 – H12S1/S2 [WHT2-1a] during HDFA Round 3 (August 14, 2024). Feature was identified as dry during Round 2.

Headwater Drainage Feature Assessment

HDF Reach H12S1/S2 [WHT2-1a]

Round 2 (May 2022 and May 2024)

Round 3 (August 2022 and August 2024)

PHOTOGRAPHIC RECORD

GEI Consultants





Photo 149 – NRO7 [WHT2-1a] downstream extent during HDFA Round 1 (April 10, 2024).

Headwater Drainage Feature Assessment

HDF Reach NRO7 [WHT2-1a]

Round 1 (April 2024)

PHOTOGRAPHIC RECORD

GEI Consultants



Photo 150 – H12A1 [WHT2-1b] mid-reach during HDFA Round 1 (March 24, 2021).



Photo 151 – H12A1 [WHT2-1b] downstream extent at Mayfield Road during HDFA Round 1 (March 24, 2021).





Photo 152a and 152b – H12A1 [WHT2-1b] downstream extent at Mayfield Road during HDFA Round 1 (April 10, 2024).





Photo 153a and 153b – H12A1 [WHT2-1b] upstream extent during HDFA Round 1 (April 10, 2024). Sheet flow was present draining into the HDF from the SWD3-2.

Headwater Drainage Feature Assessment

HDF Reach H12A1 [WHT2-1b]

Round 1 (March 2021 and April 2024)

PHOTOGRAPHIC RECORD

GEI Consultants

NO PHOTO AVAILABLE





Photo 154 – H12A1 [WHT2-1b] during HDFA Round 2 (May 18, 2022). Feature was identified as dry during Round 1.

Photo 155a and 155b – H12A1 [WHT2-1b] during HDFA Round 2 (May 31, 2024).

NO PHOTO AVAILABLE

NO PHOTO AVAILABLE

Photo 156 – H12A1 [WHT2-1b] during HDFA Round 3 (August 3, 2022). Feature was identified as dry during Round 1.

Photo 157 – H12A1 [WHT2-1b] during HDFA Round 3 (August 14, 2024). Feature was identified as dry during Round 2.

Headwater Drainage Feature Assessment

HDF Reach H12A1 [WHT2-1b]

Round 2 (May 2022 and May 2024)

Round 3 (August 2022 and August 2024)

PHOTOGRAPHIC RECORD

GEI Consultants



Photo 158 – H12A1-1 [WHT2-1b] during botanical surveys (July 14, 2022).



Photo 159 – H12A1-1 [WHT2-1b] during HDFA Round 1 (April 10, 2024).

Headwater Drainage Feature Assessment

HDF Reach H12A1-1 [WHT2-1b]

PHOTOGRAPHIC RECORD

GEI Consultants



Photo 160 – H7S1 upstream extent during HDFA Round 1 (March 24, 2021).



Photo 161 – H7S1 upstream extent during HDFA Round 1 (March 24, 2021).

Headwater Drainage Feature Assessment

HDF Reach H7S1

Round 1 (March 2021 and April 2024)

PHOTOGRAPHIC RECORD

GEI Consultants



Photo 162 – H7S1 upstream extent during HDFA Round 2 (May 18, 2022).

NO PHOTO AVAILABLE

Photo 163 – H7S1 during HDFA Round 2 (May 31, 2024). Feature was identified as dry during Round 2.



Photo 164 – H7S1 during HDFA Round 3 (August 3, 2022).



Photo 165- H7S1 during HDFA Round 3 (August 14, 2024).

Headwater Drainage Feature Assessment

HDF Reach H7S1

Round 2 (May 2022 and May 2024)

Round 3 (August 2022 and August 2024)

PHOTOGRAPHIC RECORD

GEI Consultants



Photo 166 – H7S1 upstream extent during RGA on May 24, 2023.

Rapid Geomorphic Assessment

HDF Reach H7S1

May 24, 2023

PHOTOGRAPHIC RECORD

GEI Consultants



Photo 167 – NRO6 upper mid-reach during HDFA Round 1 (March 24, 2021).



Photo 168 – NRO6 upper mid-reach during HDFA Round 2 (May 18, 2022).



Photo 169 – NRO6 mid-reach during HDFA Round 3 (August 3, 2022).



Photo 170 – NRO6 upper mid-reach during HDFA Round 3 (August 14, 2024).

Headwater Drainage Feature Assessment

HDF Reach NRO6

Round 1 (March 2021)

Round 2 (May 2022)

Round 3 (August 2022 and August 2024)

PHOTOGRAPHIC RECORD

GEI Consultants

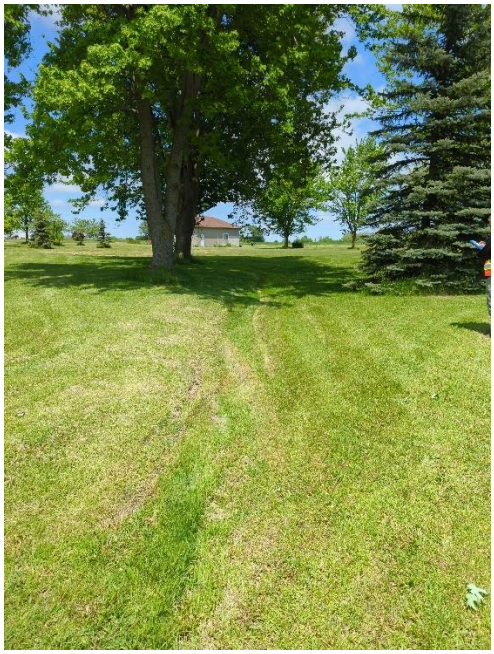


Photo 171 – NRO6 mid-reach during RGA on May 24, 2023

Rapid Geomorphic Assessment

HDF Reach NRO6

May 24, 2023

PHOTOGRAPHIC RECORD

GEI Consultants



Photo 172 – H9S1 downstream extent during HDFA Round 1 (April 10, 2024).



Photo 173 – H9S1 upstream extent during site visit (May 3, 2024).

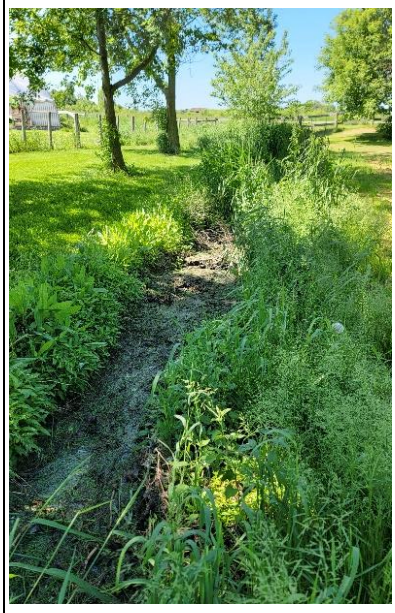




Photo 174a and 174b – H9S1 mid-reach during HDFA Round 2 (May 31, 2024).





Photo 175a and 175b – H9S1 downstream extent during HDFA Round 3 (August 14, 2024).

Headwater Drainage Feature Assessment

HDF Reach H9S1

Round 1 (April 2024), Round 2 (May 2024) and Round 3 (August 2024)

PHOTOGRAPHIC RECORD

GEI Consultants

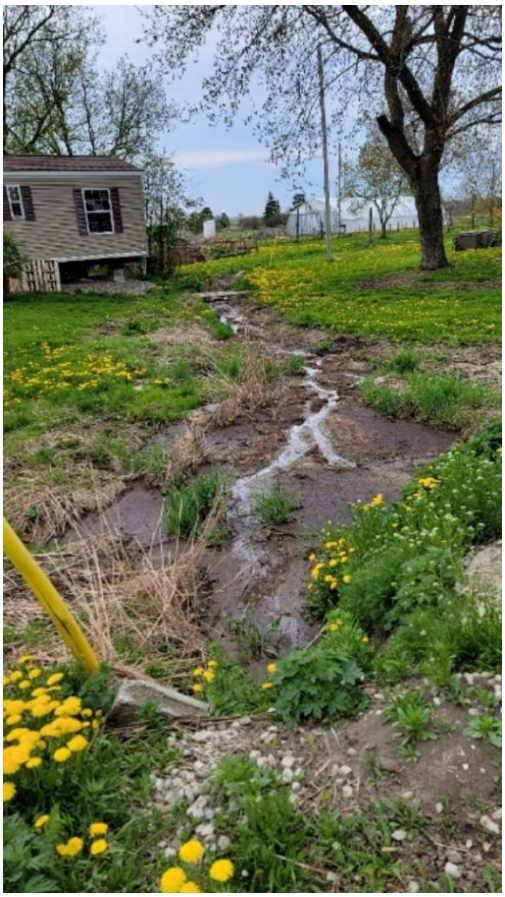


Photo 176 – H9S2 downstream extent at H9S1 during site visit (May 3, 2024). Feature is piped at the culvert.



Photo 177 – H9S2 mid-reach as a piped underground feature along a farm road during site visit (May 31, 2024).

Headwater Drainage Feature Assessment

HDF Reach H9S2

PHOTOGRAPHIC RECORD

GEI Consultants



Photo 178 – H9S3 downstream extent at pipe outlet of H9S2 during site visit (May 3, 2024).



Photo 179 – H9S3 downstream extent during site visit (May 3, 2024).

Headwater Drainage Feature Assessment

HDF Reach H9S3

PHOTOGRAPHIC RECORD

GEI Consultants



Photo 180 – H10S1 downstream extent during HDFA Round 1 (April 10, 2024).



Photo 181 – H10S1 downstream extent during HDFA Round 2 (May 31, 2024).



Photo 182 – H10S1 downstream extent during HDFA Round 3 (August 14, 2024).

Headwater Drainage Feature Assessment

HDF Reach H10S1

Round 1 (April 2024), Round 2 (May 2024) and Round 3 (August 2024)

PHOTOGRAPHIC RECORD

GEI Consultants



Photo 183 – H11S1 mid-reach during HDFA Round 1 (April 10, 2024).



Photo 184 – H11S1 upstream extent at a disturbed area during HDFA Round 1 (April 10, 2024).



Photo 185 – H11S1 mid-reach during HDFA Round 2 (May 31, 2024).



Photo 186 – H11S1 mid-reach during HDFA Round 3 (August 14, 2024).

Headwater Drainage Feature Assessment

HDF Reach H11S1

Round 1 (April 2024), Round 2 (May 2024) and Round 3 (August 2024)

PHOTOGRAPHIC RECORD

GEI Consultants



Photo 187 – H13S1 mid-reach during HDFA Round 1 (April 10, 2024).



Photo 188 – H13S1 upstream extent during HDFA Round 1 (April 10, 2024).



Photo 189 – H13S1 mid-reach during HDFA Round 2 (May 31, 2024).



Photo 190 – H13S1 mid-reach during HDFA Round 3 (August 14, 2024).

Headwater Drainage Feature Assessment

HDF Reach H13S1

Round 1 (April 2024), Round 2 (May 2024) and Round 3 (August 2024)

PHOTOGRAPHIC RECORD

GEI Consultants



Photo 191 – H13S1A downstream extent during HDFA Round 1 (April 10, 2024).



Photo 192 – H13S1A downstream extent during HDFA Round 2 (May 31, 2024).



Photo 193 – H13S1A downstream extent during HDFA Round 3 (August 14, 2024).

Headwater Drainage Feature Assessment

HDF Reach H13S1A

Round 1 (April 2024), Round 2 (May 2024) and Round 3 (August 2024)

PHOTOGRAPHIC RECORD

GEI Consultants

Appendix D Table 1 Reach Classification Summary (GEI)

Table 1: Headwater Drainage Feature and Watercourses at Wildfield Village

REACH	FEATURE TYPE	MANAGEMENT RECOMMENDATION
H1S1	Headwater Drainage Feature	Mitigation
H2S1	Headwater Drainage Feature	Protection
H14S1	Headwater Drainage Feature	No Management Required
H8S1	Headwater Drainage Feature	No Management Required
H4S1	Headwater Drainage Feature	Mitigation
H4S2	Headwater Drainage Feature	Mitigation
H4S3	Headwater Drainage Feature	No Management Required
H3S1	Headwater Drainage Feature	Mitigation
H3S1A	Headwater Drainage Feature	Mitigation
H5S4	Headwater Drainage Feature	Mitigation
H5S3	Watercourse	-
H5S2	Watercourse	-
H5S1	Watercourse	-
H5S4A	Headwater Drainage Feature	Mitigation
H15S1	Headwater Drainage Feature	No Management Required
H15S2	Headwater Drainage Feature	No Management Required
H12A1	Headwater Drainage Feature	Mitigation
H12A1-1	Headwater Drainage Feature	Protection
H12S1	Headwater Drainage Feature	No Management Required
H12S2	Headwater Drainage Feature	No Management Required

Appendix E HDF Management Recommendation Table (Table 2.13)

Table 2.13: Headwater Drainage Feature Classification and Management Recommendations

DRAINAGE FEATURE SEGMENT	STEP 1. HYDROLOGY		STEP 2. RIPARIAN	STEP 3. FISH HABITAT	STEP 4. TERRESTRIAL HABITAT	MANAGEMENT RECOMMENDATION PER HDFA GUIDELINES	INTERPRETED MANAGEMENT RECOMMENDATION – WILDFIELD VILLAGE CONSULTANT TEAM
	FUNCTION	MODIFIERS					
H1S1-1 (WT3(7)1-1)	FT – 6 (wetland) FC – 2 (Round 1; 2021) FC– 2 (Round 2; 2022) FC – 1 (Round 2; 2024) FC– 1 (Round 3; 2022) **Contributing** – Feature was holding standing water during spring assessments and was dry by early summer. Wetland habitat upstream.	Hydrology may be modified by adjacent and upstream agricultural activities.	**Important** – The feature type is a wetland	**Contributing** – No direct fish habitat present. This feature provides allochthonous material transport to downstream habitat	**Valued –** The wetland provides general amphibian habitat. No breeding amphibians were recorded during Amphibian Call Count surveys.	**Conservation**	**Mitigation*** (see footnotes)
H1S1-2 (WT3(7)1-1)	FT – 7 (swale) FC – 2 (Round 1; 2021) FC– 2 (Round 2; 2022)	Hydrology may be modified by adjacent	**Limited –** Cropped Cropped (agricultural) vegetation is located on either side of the reach.	**Contributing** – No direct fish habitat present. This feature provides	**Limited –** As per Table 7 of the HDFA Guidelines, swales provide	**Conservation** (based on presence of upstream wetland)	**Mitigation*** (see footnotes)

Table 2.13: Headwater Drainage Feature Classification and Management Recommendations

DRAINAGE FEATURE SEGMENT	STEP 1. HYDROLOGY		STEP 2. RIPARIAN	STEP 3. FISH HABITAT	STEP 4. TERRESTRIAL HABITAT	MANAGEMENT RECOMMENDATION PER HDFA GUIDELINES	INTERPRETED MANAGEMENT RECOMMENDATION – WILDFIELD VILLAGE CONSULTANT TEAM
	FUNCTION	MODIFIERS					
	FC – 1 (Round 2; 2024) FC– 1 (Round 3; 2022) **Contributing** – Reach was holding standing water during spring assessments and was dry by early summer. Wetland habitat upstream.	and upstream agricultural activities.		allochthonous material transport to downstream habitat	limited terrestrial function.		
H1S1-3 (WT3(7)1-1)	FT – 6 (wetland) FC – 2 (Round 1; 2021) FC– 2 (Round 2; 2022) FC – 1 (Round 2; 2024) FC– 1 (Round 3; 2022) **Limited** – Reach	Hydrology may be modified by adjacent and upstream agricultural activities.	**Important** – The feature type is a wetland	**Contributing** – No direct fish habitat is present. This feature provides allochthonous material transport to downstream habitat	**Valued –** The wetland provides general amphibian habitat. No breeding amphibians were recorded during Amphibian	**Conservation**	**Mitigation*** (see footnotes)

Table 2.13: Headwater Drainage Feature Classification and Management Recommendations

DRAINAGE FEATURE SEGMENT	STEP 1. HYDROLOGY		STEP 2. RIPARIAN	STEP 3. FISH HABITAT	STEP 4. TERRESTRIAL HABITAT	MANAGEMENT RECOMMENDATION PER HDFA GUIDELINES	INTERPRETED MANAGEMENT RECOMMENDATION – WILDFIELD VILLAGE CONSULTANT TEAM
	FUNCTION	MODIFIERS					
	was holding standing water during spring assessments and was dry by early summer.				Call Count surveys.		
H1S3 (Non-participating ownership)	FT – 7 (Swale; observed at the downstream extent from property line at H1S1-3 and at upstream extent at Healy Road). It is acknowledged the feature is more defined during the spring freshet due to erosion of the barren farm field. **Contributing** – (Assumed) Immediate downstream	Hydrology may be modified by adjacent and upstream agricultural activities.	**Limited** – Riparian area consists of disturbed land and agricultural crops.	**Contributing** – No direct fish habitat is present. This feature provides allochthonous material transport to downstream habitat	**Limited –** As per Table 7 of the HDFA Guidelines, swales provide limited terrestrial function.	**Mitigation**	**Mitigation**

Table 2.13: Headwater Drainage Feature Classification and Management Recommendations

DRAINAGE FEATURE SEGMENT	STEP 1. HYDROLOGY		STEP 2. RIPARIAN	STEP 3. FISH HABITAT	STEP 4. TERRESTRIAL HABITAT	MANAGEMENT RECOMMENDATION PER HDFA GUIDELINES	INTERPRETED MANAGEMENT RECOMMENDATION – WILDFIELD VILLAGE CONSULTANT TEAM
	FUNCTION	MODIFIERS					
	reach was classified as Limited.						
H2S1	FT – 6 (wetland) FC – 4 (Round 1; 2021) FC – 2 (Round 1; 2024) FC – 2 (Round 2; 2022 and 2024) FC – 1 (Round 3; 2022 and 2024) **Valued** – Reach was flowing or holding standing water during spring assessments and was dry by summer. Feature displays intermittent flow.	Hydrology may be modified by adjacent and upstream agricultural activities.	**Important** – The feature type is a wetland	**Contributing** – No direct fish habitat is present. This feature provides allochthonous material transport to downstream habitat	**Important –** The wetland provides breeding amphibian habitat. Calling amphibians were recorded during Amphibian Call Count Surveys.	**Protection**	Not applicable as HDF is located outside the Secondary Plan Area.
H4S1	FT – 7 (swale)	Hydrology may be	**Limited –** Cropped	**Contributing** – No direct	**Limited –** As per Table 7 of	**Mitigation**	**Mitigation**

Table 2.13: Headwater Drainage Feature Classification and Management Recommendations

DRAINAGE FEATURE SEGMENT	STEP 1. HYDROLOGY		STEP 2. RIPARIAN	STEP 3. FISH HABITAT	STEP 4. TERRESTRIAL HABITAT	MANAGEMENT RECOMMENDATION PER HDFA GUIDELINES	INTERPRETED MANAGEMENT RECOMMENDATION – WILDFIELD VILLAGE CONSULTANT TEAM
	FUNCTION	MODIFIERS					
(WHT2(1)2-1)	FC – 4 (Round 1; 2021) FC – 2 (Round 1; 2024) FC– 1 (Round 2; 2022) FC – 2 (Round 2; 2024) FC – 1 (Round 3; 2024) **Valued/Contributing** – Reach was flowing or holding standing water during spring assessments and was dry by summer	modified by adjacent and upstream agricultural activities.	Cropped (agricultural) vegetation is located on either side of the reach.	fish habitat is present. This feature provides allochthonous material transport to downstream habitat	the HDFA Guidelines, swales provide limited terrestrial function.		
H4S2 (WHT2(1)2-1)	FT – 7 (swale) FC – 4 (Round 1; 2021) FC – 2 (Round 1; 2024)	Hydrology may be modified by adjacent	**Valued-** Meadow Meadow vegetation is located on either side of the reach surrounded by active agricultural fields.	**Contributing** – No direct fish habitat is present. This feature provides	**Limited –** As per Table 7 of the HDFA Guidelines, swales provide	**Mitigation**	**Mitigation**

Table 2.13: Headwater Drainage Feature Classification and Management Recommendations

DRAINAGE FEATURE SEGMENT	STEP 1. HYDROLOGY		STEP 2. RIPARIAN	STEP 3. FISH HABITAT	STEP 4. TERRESTRIAL HABITAT	MANAGEMENT RECOMMENDATION PER HDFA GUIDELINES	INTERPRETED MANAGEMENT RECOMMENDATION – WILDFIELD VILLAGE CONSULTANT TEAM
	FUNCTION	MODIFIERS					
	FC– 1 (Round 2; 2022) FC – 2 (Round 2; 2024) FC – 1 (Round 3; 2024) **Valued/Contributing** Reach was flowing or holding standing water during spring assessments and was dry by summer.	and upstream agricultural activities.		allochthonous material transport to downstream habitat	limited terrestrial function.		
H4S3 (WHT2(1)2-1)	FT-7 (swale) FC-1 (Round 1; 2024) **Limited**- Reach was observed to be dry during early spring assessment. No recharge	Actively managed agricultural field (row-crop)	**Limited –** Cropped Cropped (agricultural) vegetation is located on either side of the reach.	**Contributing** – No direct fish habitat is present. This feature provides allochthonous material transport to downstream habitat	**Limited –** As per Table 7 of the HDFA Guidelines, swales provide limited terrestrial function.	**No Management Required**	**No Management Required**

Table 2.13: Headwater Drainage Feature Classification and Management Recommendations

DRAINAGE FEATURE SEGMENT	STEP 1. HYDROLOGY		STEP 2. RIPARIAN	STEP 3. FISH HABITAT	STEP 4. TERRESTRIAL HABITAT	MANAGEMENT RECOMMENDATION PER HDFA GUIDELINES	INTERPRETED MANAGEMENT RECOMMENDATION – WILDFIELD VILLAGE CONSULTANT TEAM
	FUNCTION	MODIFIERS					
	function - the soil conditions are fine textured with low hydraulic conductivity, generally favouring runoff over recharge.						
H5S4 (WHT2-4)	FT – 7 (swale) While majority of the feature is a swale, it is acknowledged that the downstream section of H5S4 within the hedgerow is observed to have more definition FC – 4 (Round 1; 2021 and 2024)	Hydrology may be modified by adjacent and upstream agricultural activities.	**Limited –** Cropped Cropped (agricultural) vegetation is located on either side of the reach. It is acknowledged that the downstream section of H5S4 passes through a hedgerow composed of scattered small shrubs and cultural meadow vegetation (Hawthorn (*Crataegus spp*.), *Malus spp*. and Manitoba Maple (*Acer negundo*) with Reed-canary grass (*Phalaris arundinacea)* and Perennial Rye (*Lolium perenne*)	**Contributing** – No direct fish habitat is present. This feature provides allochthonous material transport to downstream habitat	**Limited –** As per Table 7 of the HDFA Guidelines, swales provide limited terrestrial function.	**Mitigation**	**Mitigation**

Table 2.13: Headwater Drainage Feature Classification and Management Recommendations

DRAINAGE FEATURE SEGMENT	STEP 1. HYDROLOGY		STEP 2. RIPARIAN	STEP 3. FISH HABITAT	STEP 4. TERRESTRIAL HABITAT	MANAGEMENT RECOMMENDATION PER HDFA GUIDELINES	INTERPRETED MANAGEMENT RECOMMENDATION – WILDFIELD VILLAGE CONSULTANT TEAM
	FUNCTION	MODIFIERS					
	FC– 2 (Round 2; 2022) FC – 4 (Round 2; 2024) FC- 1 (Round 3; 2022 and 2024) **Valued** – Reach was flowing or holding standing water during spring assessments and was dry by summer. This feature displays intermittent flow.						

Table 2.13: Headwater Drainage Feature Classification and Management Recommendations

DRAINAGE FEATURE SEGMENT	STEP 1. HYDROLOGY		STEP 2. RIPARIAN	STEP 3. FISH HABITAT	STEP 4. TERRESTRIAL HABITAT	MANAGEMENT RECOMMENDATION PER HDFA GUIDELINES	INTERPRETED MANAGEMENT RECOMMENDATION – WILDFIELD VILLAGE CONSULTANT TEAM
	FUNCTION	MODIFIERS					
H3S1A	FT – 7 (swale) FC – 4 (Round 1; 2021) FC – 2 (Round 1; 2024); FC– 2/3 (Round 2; 2022) FC- 2 (Round 2; 2024) FC– 1 (Round 3; 2022 and 2024) **Valued** – (Non-participating property) Reach was flowing or had standing water identified at the upstream and downstream extents during spring assessments and was dry by summer. This feature displays	Tile drain upstream. Hydrology may be modified by adjacent and upstream agricultural activities.	**Valued –** Meadow (Fallow)	**Contributing** – No direct fish habitat is present. This feature provides allochthonous material transport to downstream habitat	**Limited –** As per Table 7 of the HDFA Guidelines, swales provide limited terrestrial function.	**Mitigation**	**Mitigation**

Table 2.13: Headwater Drainage Feature Classification and Management Recommendations

DRAINAGE FEATURE SEGMENT	STEP 1. HYDROLOGY		STEP 2. RIPARIAN	STEP 3. FISH HABITAT	STEP 4. TERRESTRIAL HABITAT	MANAGEMENT RECOMMENDATION PER HDFA GUIDELINES	INTERPRETED MANAGEMENT RECOMMENDATION – WILDFIELD VILLAGE CONSULTANT TEAM
	FUNCTION	MODIFIERS					
	intermittent flow.						
H3S1	FC– 3 (Round 2; 2022) FC – 2 (Round 2; 2024) FC– 1 (Round 3; 2022 and 2024) **Valued** – Reach was flowing or holding standing water during spring assessments and was dry by summer. This feature displays intermittent flow.	Tile drain outlets to this feature. Hydrology may be modified by adjacent and upstream agricultural Activities.	**Limited**-Cropped Cropped (agricultural) vegetation is located on either side of the reach. GEI acknowledges the presence of a small hedgerow along H3S1 made up of Hawthorn, Malus, Manitoba Maple and Reed-canary grass. Although the HDFA Guidelines do not include a specific category for "hedgerow," GEI is of the opinion that a narrow hedgerow should not be considered a contributing factor in determining riparian classification.	**Contributing** – No direct fish habitat is present. This feature provides allochthonous material transport to downstream habitat	**Limited –** As per Table 7 of the HDFA Guidelines, swales provide limited terrestrial function.	**Mitigation**	**Mitigation**

Table 2.13: Headwater Drainage Feature Classification and Management Recommendations

DRAINAGE FEATURE SEGMENT	STEP 1. HYDROLOGY		STEP 2. RIPARIAN	STEP 3. FISH HABITAT	STEP 4. TERRESTRIAL HABITAT	MANAGEMENT RECOMMENDATION PER HDFA GUIDELINES	INTERPRETED MANAGEMENT RECOMMENDATION – WILDFIELD VILLAGE CONSULTANT TEAM
	FUNCTION	MODIFIERS					
H5S4A (WHT2-5)	FT – 7 (swale) FC – 4 (Round 1; 2021 and 2024) FC– 2 (Round 2; 2022 and 2024) FC- 1 (Round 3; 2022 and 2024) **Valued** – Reach was flowing or holding standing water during spring assessments and was dry by summer. This feature displays intermittent flow.	Hydrology may be modified by adjacent and upstream agricultural activities.	**Valued –** Meadow (Fallow) Riparian vegetation occurs as a mosaic of vegetation associated with varying degrees of past disturbance including cultural meadow-type species (e.g., Goldenrods), though more commonly it consists of fallow-type species, such as Lamb's Quarters (*Chenopodium album*) and Scentless Chamomile (*Tripleurospermum inodorum).* These weedy species are more typically associated with agricultural fields than with true cultural meadows	**Contributing** – No direct fish habitat is present. This feature provides allochthonous material transport to downstream habitat	**Limited –** As per Table 7 of the HDFA Guidelines, swales provide limited terrestrial function.	**Mitigation**	**Mitigation**
H5S4B	FT – 7 (swale) FC – 4 (Round 1; 2021) FC– Unknown (Round 2; 2022)	Hydrology may be modified by adjacent and upstream agricultural	**Limited –** Cropped Cropped (agricultural) vegetation is located on either side of the reach.	**Contributing** – No direct fish habitat is present. This feature provides allochthonou	**Limited –** As per Table 7 of the HDFA Guidelines, swales provide limited	**Mitigation**	**Mitigation**

Table 2.13: Headwater Drainage Feature Classification and Management Recommendations

DRAINAGE FEATURE SEGMENT	STEP 1. HYDROLOGY		STEP 2. RIPARIAN	STEP 3. FISH HABITAT	STEP 4. TERRESTRIAL HABITAT	MANAGEMENT RECOMMENDATION PER HDFA GUIDELINES	INTERPRETED MANAGEMENT RECOMMENDATION – WILDFIELD VILLAGE CONSULTANT TEAM
	FUNCTION	MODIFIERS					
	FC- 1 (Round 3; 2022) **Valued** – (Non-participating property) Downstream end of reach was flowing during early spring assessment, and was dry by summer. This feature displays intermittent flow.	activities.		s material transport to downstream habitat	terrestrial function.		
H7S1	FT-6 (wetland) FC-2 (Round 1; 2022) FC – 1 (Round 1; 2024) FC-1 (Round 2; 2022) **Contributing** – Feature was not	Hydrology may be modified by adjacent and upstream agricultural activities.	**Important** – Feature type is a wetland	**Contributing** – No direct fish habitat is present. This feature provides allochthonous material transport to downstream habitat	**Valued –** The wetland provides general amphibian habitat. No breeding amphibians were recorded during	**Conservation**	**Mitigation*** (see footnotes)

Table 2.13: Headwater Drainage Feature Classification and Management Recommendations

DRAINAGE FEATURE SEGMENT	STEP 1. HYDROLOGY		STEP 2. RIPARIAN	STEP 3. FISH HABITAT	STEP 4. TERRESTRIAL HABITAT	MANAGEMENT RECOMMENDATION PER HDFA GUIDELINES	INTERPRETED MANAGEMENT RECOMMENDATION – WILDFIELD VILLAGE CONSULTANT TEAM
	FUNCTION	MODIFIERS					
	present due to agricultural management during 2021 early spring assessments; however, this feature was present during 2022 assessments. Feature had standing water during early spring assessment but was dry by late spring. Feature was dry upon spring assessment in 2024. This feature displays ephemeral flow.				Amphibian Call Count surveys.		
H8S1 (WHT2(1)1-1b)	FT-7 (swale)	Actively managed agricultural	**Limited –** Cropped	**Contributing** – No direct fish habitat is	**Limited –** As per Table 7 of the HDFA	**No Management Required**	**No Management Required**

Table 2.13: Headwater Drainage Feature Classification and Management Recommendations

DRAINAGE FEATURE SEGMENT	STEP 1. HYDROLOGY		STEP 2. RIPARIAN	STEP 3. FISH HABITAT	STEP 4. TERRESTRIAL HABITAT	MANAGEMENT RECOMMENDATION PER HDFA GUIDELINES	INTERPRETED MANAGEMENT RECOMMENDATION – WILDFIELD VILLAGE CONSULTANT TEAM
	FUNCTION	MODIFIERS					
	FC – 1 (Round 1; 2021) FC-2 (Round 1; 2024) FC-2 (Round 2; 2024) FC- 1 (Round 3; 2024) **Limited** – Reach was holding standing water during early and late spring assessments and was dry by summer. No recharge function - the soil conditions are fine textured with low hydraulic conductivity, generally favouring runoff over recharge.	field (row-crop)	Cropped (agricultural) vegetation is located on either side of the reach.	present. This feature provides allochthonous material transport to downstream habitat	Guidelines, swales provide limited terrestrial function.		

Table 2.13: Headwater Drainage Feature Classification and Management Recommendations

DRAINAGE FEATURE SEGMENT	STEP 1. HYDROLOGY		STEP 2. RIPARIAN	STEP 3. FISH HABITAT	STEP 4. TERRESTRIAL HABITAT	MANAGEMENT RECOMMENDATION PER HDFA GUIDELINES	INTERPRETED MANAGEMENT RECOMMENDATION – WILDFIELD VILLAGE CONSULTANT TEAM
	FUNCTION	MODIFIERS					
H9S1	FT-7 (swale) FC-2 (Round 1; 2024) FC-2 (Round 2; 2024 FC- 1 (Round 3; 2024) **Limited** – Reach was holding standing water during early and late spring assessments and was dry by summer. No recharge function - the soil conditions are fine textured with low hydraulic conductivity, generally favouring runoff over recharge.	Actively managed cattle farm	**Contributing-** Lawn Lawn vegetation is present on both sides of the reach**.**	**Contributing** – No direct fish habitat is present. This feature provides allochthonous material transport to downstream habitat	**Limited –** As per Table 7 of the HDFA Guidelines, swales provide limited terrestrial function.	**No Management Required**	**No Management Required**

Table 2.13: Headwater Drainage Feature Classification and Management Recommendations

DRAINAGE FEATURE SEGMENT	STEP 1. HYDROLOGY		STEP 2. RIPARIAN	STEP 3. FISH HABITAT	STEP 4. TERRESTRIAL HABITAT	MANAGEMENT RECOMMENDATION PER HDFA GUIDELINES	INTERPRETED MANAGEMENT RECOMMENDATION – WILDFIELD VILLAGE CONSULTANT TEAM
	FUNCTION	MODIFIERS					
H9S2	FT-5 (buried pipe) FC-2 (Round 1; 2024) FC-2 (Round 2; 2024 FC- 1 (Round 3; 2024) **Limited** – Immediate upstream and downstream reach was holding standing water during early and late spring assessments and was dry by summer. No recharge function - the soil conditions are fine textured with low	Actively managed cattle farm	**Limited-** No riparian corridor is present due to the feature being buried.	**Contributing** – No direct fish habitat is present. This feature provides allochthonous material transport to downstream habitat	**Limited –** As per Table 7 of the HDFA Guidelines, buried drainages provide limited terrestrial function.	**No Management Required**	**No Management Required**

Table 2.13: Headwater Drainage Feature Classification and Management Recommendations

DRAINAGE FEATURE SEGMENT	STEP 1. HYDROLOGY		STEP 2. RIPARIAN	STEP 3. FISH HABITAT	STEP 4. TERRESTRIAL HABITAT	MANAGEMENT RECOMMENDATION PER HDFA GUIDELINES	INTERPRETED MANAGEMENT RECOMMENDATION – WILDFIELD VILLAGE CONSULTANT TEAM
	FUNCTION	**MODIFIERS**					
	hydraulic conductivity, generally favouring runoff over recharge.						
H9S3	FT-7 (swale) FC-2 (Round 1; 2024) FC-2 (Round 2; 2024 FC- 1 (Round 3; 2024) **Limited** – Reach was holding standing water during early and late spring assessments and was dry by summer. No recharge function - the soil conditions are fine textured with low	Actively managed cattle farm	**Contributing-** Lawn Lawn vegetation is present on both sides of the reach**.**	**Contributing** – No direct fish habitat is present. This feature provides allochthonous material transport to downstream habitat	**Limited –** As per Table 7 of the HDFA Guidelines, swales provide limited terrestrial function.	**No Management Required**	**No Management Required**

Table 2.13: Headwater Drainage Feature Classification and Management Recommendations

DRAINAGE FEATURE SEGMENT	STEP 1. HYDROLOGY		STEP 2. RIPARIAN	STEP 3. FISH HABITAT	STEP 4. TERRESTRIAL HABITAT	MANAGEMENT RECOMMENDATION PER HDFA GUIDELINES	INTERPRETED MANAGEMENT RECOMMENDATION – WILDFIELD VILLAGE CONSULTANT TEAM
	FUNCTION	MODIFIERS					
	hydraulic conductivity, generally favouring runoff over recharge.						
H10S1	FT-7 (swale) FC-2 (Round 1; 2024) FC-2 (Round 2; 2024) FC- 1 (Round 3; 2024) **Limited** – Reach was holding standing water during early and late spring assessments and was dry by summer. No recharge function - the soil conditions are fine textured with low	Actively managed cattle farm	**Valued-** Meadow Meadow vegetation is present on both sides of the reach.	**Contributing** – No direct fish habitat is present. This feature provides allochthonous material transport to downstream habitat	**Limited –** As per Table 7 of the HDFA Guidelines, swales provide limited terrestrial function.	**No Management Required**	**No Management Required**

Table 2.13: Headwater Drainage Feature Classification and Management Recommendations

DRAINAGE FEATURE SEGMENT	STEP 1. HYDROLOGY		STEP 2. RIPARIAN	STEP 3. FISH HABITAT	STEP 4. TERRESTRIAL HABITAT	MANAGEMENT RECOMMENDATION PER HDFA GUIDELINES	INTERPRETED MANAGEMENT RECOMMENDATION – WILDFIELD VILLAGE CONSULTANT TEAM
	FUNCTION	MODIFIERS					
	hydraulic conductivity, generally favouring runoff over recharge.						
H11S1 (Non-participating property)	FT-7 (swale; reach was observed from the participating property boundary) FC-2 (Round 1; 2024) FC-2 (Round 2; 2024) FC- 1 (Round 3; 2024) **Limited** – (Non-participating property) Reach was holding standing water during early and late spring assessments and	Actively managed agricultural field (row-crop)	**Limited –** Cropped Cropped (agricultural) vegetation is located on left (north) side of the reach. A farm road is present on the right (south) side of the reach.	**Contributing** – No direct fish habitat is present. This feature provides allochthonous material transport to downstream habitat	**Limited –** As per Table 7 of the HDFA Guidelines, swales provide limited terrestrial function.	**No Management Required**	**No Management Required**

Table 2.13: Headwater Drainage Feature Classification and Management Recommendations

DRAINAGE FEATURE SEGMENT	STEP 1. HYDROLOGY		STEP 2. RIPARIAN	STEP 3. FISH HABITAT	STEP 4. TERRESTRIAL HABITAT	MANAGEMENT RECOMMENDATION PER HDFA GUIDELINES	INTERPRETED MANAGEMENT RECOMMENDATION – WILDFIELD VILLAGE CONSULTANT TEAM
	FUNCTION	MODIFIERS					
	was dry by summer. No recharge function - the soil conditions are fine textured with low hydraulic conductivity, generally favouring runoff over recharge.						
H13S1	FT-7 (swale) FC-2 (Round 1; 2024) FC-2 (Round 2; 2024) FC- 1 (Round 3; 2024) **Limited** – Reach was holding standing water during early and late spring assessments and		**Valued-** Meadow Meadow vegetation is present on the right side of the reach. A farm roadway is present on the left side of the reach.	**Contributing** – No direct fish habitat is present. This feature provides allochthonous material transport to downstream habitat	**Limited –** As per Table 7 of the HDFA Guidelines, swales provide limited terrestrial function.	**No Management Required**	**No Management Required**

Table 2.13: Headwater Drainage Feature Classification and Management Recommendations

DRAINAGE FEATURE SEGMENT	STEP 1. HYDROLOGY		STEP 2. RIPARIAN	STEP 3. FISH HABITAT	STEP 4. TERRESTRIAL HABITAT	MANAGEMENT RECOMMENDATION PER HDFA GUIDELINES	INTERPRETED MANAGEMENT RECOMMENDATION – WILDFIELD VILLAGE CONSULTANT TEAM
	FUNCTION	MODIFIERS					
	was dry by summer. No recharge function - the soil conditions are fine textured with low hydraulic conductivity, generally favouring runoff over recharge.						
H13S1A	FT-7 (swale) FC-2 (Round 1; 2024) FC-2 (Round 2 2024) FC- 1 (Round 3; 2024) **Limited** – Reach was holding standing water during early and late spring assessments and		**Contributing-** Lawn Lawn vegetation is present on both sides of the reach**.**	**Contributing** – No direct fish habitat is present. This feature provides allochthonous material transport to downstream habitat	**Limited –** As per Table 7 of the HDFA Guidelines, swales provide limited terrestrial function.	**No Management Required**	**No Management Required**

Table 2.13: Headwater Drainage Feature Classification and Management Recommendations

DRAINAGE FEATURE SEGMENT	STEP 1. HYDROLOGY		STEP 2. RIPARIAN	STEP 3. FISH HABITAT	STEP 4. TERRESTRIAL HABITAT	MANAGEMENT RECOMMENDATION PER HDFA GUIDELINES	INTERPRETED MANAGEMENT RECOMMENDATION – WILDFIELD VILLAGE CONSULTANT TEAM
	FUNCTION	MODIFIERS					
	was dry by summer. No recharge function - the soil conditions are fine textured with low hydraulic conductivity, generally favouring runoff over recharge.						
H12S1 (WHT2-1a)	FT-7 (swale) FC – 1 (Round 1; 2022) FC-2 (Round 1; 2024) FC-1 (Round 2; 2024) **Limited** – Reach was holding standing water during early spring and was dry by late	Actively managed agricultural field (row-crop)	**Limited –** Cropped Cropped (agricultural) vegetation is located on either side of the reach.	**Contributing** – No direct fish habitat is present. This feature provides allochthonous material transport to downstream habitat	**Limited –** As per Table 7 of the HDFA Guidelines, swales provide limited terrestrial function.	**No Management Required**	**No Management Required**

Table 2.13: Headwater Drainage Feature Classification and Management Recommendations

DRAINAGE FEATURE SEGMENT	STEP 1. HYDROLOGY		STEP 2. RIPARIAN	STEP 3. FISH HABITAT	STEP 4. TERRESTRIAL HABITAT	MANAGEMENT RECOMMENDATION PER HDFA GUIDELINES	INTERPRETED MANAGEMENT RECOMMENDATION – WILDFIELD VILLAGE CONSULTANT TEAM
	FUNCTION	MODIFIERS					
	spring. No recharge function - the soil conditions are fine textured with low hydraulic conductivity, generally favouring runoff over recharge.						
H12S2 (WHT2-1a)	FT-7 (swale) FC – 1 (Round 1; 2022) FC-2 (Round 1; 2024) FC-1 (Round 2; 2024) **Limited** – Reach was holding standing water during early spring and was dry by late spring. No	Actively managed agricultural field (row-crop)	**Limited –** Cropped Cropped (agricultural) vegetation is located on either side of the reach. It is acknowledged that the upstream extent crosses a hedgerow.	**Contributing** – No direct fish habitat is present. This feature provides allochthonous material transport to downstream habitat	**Limited –** As per Table 7 of the HDFA Guidelines, swales provide limited terrestrial function.	**No Management Required**	**No Management Required**

Table 2.13: Headwater Drainage Feature Classification and Management Recommendations

DRAINAGE FEATURE SEGMENT	STEP 1. HYDROLOGY		STEP 2. RIPARIAN	STEP 3. FISH HABITAT	STEP 4. TERRESTRIAL HABITAT	MANAGEMENT RECOMMENDATION PER HDFA GUIDELINES	INTERPRETED MANAGEMENT RECOMMENDATION – WILDFIELD VILLAGE CONSULTANT TEAM
	FUNCTION	MODIFIERS					
	recharge function - the soil conditions are fine textured with low hydraulic conductivity, generally favouring runoff over recharge.						
H12A1 (WHT2-1b)	FT-7 (swale) FC – 1 (Round 1; 2022) FC-2 (Round 1; 2024) FC-1 (Round 2; 2024) **Contributing** – Reach was holding standing water during early spring and was dry by late spring. Wetland	Actively managed agricultural field (row-crop)	**Limited –** Cropped Cropped (agricultural) vegetation is located on either side of the reach.	**Valued** – This feature provides seasonal fish habitat. One Brook Stickleback was incidentally observed within the feature during April 2024 HDFA surveys.	**Limited –** As per Table 7 of the HDFA Guidelines, swales provide limited terrestrial function.	**Protection** (Based on presence of upstream wetland)	**Mitigation*** (see footnotes)

Table 2.13: Headwater Drainage Feature Classification and Management Recommendations

DRAINAGE FEATURE SEGMENT	STEP 1. HYDROLOGY		STEP 2. RIPARIAN	STEP 3. FISH HABITAT	STEP 4. TERRESTRIAL HABITAT	MANAGEMENT RECOMMENDATION PER HDFA GUIDELINES	INTERPRETED MANAGEMENT RECOMMENDATION – WILDFIELD VILLAGE CONSULTANT TEAM
	FUNCTION	MODIFIERS					
	occurs upstream.						
H12A1-1 (WHT2-b)	FT: 6 (wetland) FC – 2 (Round 1; 2024) FC – 2 (Round 2; 2024) FC – 2 (Round 3; 2024) **Important**- Reach is holding standing water throughout the year.		**Important** – Feature type is a wetland	**Contributing** – No direct fish habitat is present. This feature provides allochthonous material transport to downstream habitat	**Important –** The wetland provides breeding amphibian habitat. Calling amphibians were recorded during Amphibian Call Count Surveys.	**Protection**	**Protection**
H14S1 (WHT2(1)1-1c)	FT-7 (swale) FC – 1 (Round 1; 2022) FC-1 (Round 1; 2024) **Limited**- Reach was observed to be dry during early spring	Actively managed agricultural field (row-crop)	**Limited –** Cropped Cropped (agricultural) vegetation is located on either side of the reach.	**Contributing** – No direct fish habitat is present. This feature provides allochthonous material transport to downstream habitat	**Limited –** As per Table 7 of the HDFA Guidelines, swales provide limited terrestrial function.	**No Management Required**	**No Management Required**

Table 2.13: Headwater Drainage Feature Classification and Management Recommendations

DRAINAGE FEATURE SEGMENT	STEP 1. HYDROLOGY		STEP 2. RIPARIAN	STEP 3. FISH HABITAT	STEP 4. TERRESTRIAL HABITAT	MANAGEMENT RECOMMENDATION PER HDFA GUIDELINES	INTERPRETED MANAGEMENT RECOMMENDATION – WILDFIELD VILLAGE CONSULTANT TEAM
	FUNCTION	MODIFIERS					
	assessments. No recharge function - the soil conditions are fine textured with low hydraulic conductivity, generally favouring runoff over recharge.						
H15S1 (WHT2-2)	FT-7 (swale) FC-1 (Round 1; 2024) **Limited**- Reach was observed to be dry during early spring assessment. No recharge function - the soil conditions are fine textured with low hydraulic	Actively managed agricultural field (row-crop)	**Limited –** Cropped Cropped (agricultural) vegetation is located on either side of the reach.	**Contributing** – No direct fish habitat is present. This feature provides allochthonous material transport to downstream habitat	**Limited –** As per Table 7 of the HDFA Guidelines, swales provide limited terrestrial function.	**No Management Required**	**No Management Required**

Table 2.13: Headwater Drainage Feature Classification and Management Recommendations

DRAINAGE FEATURE SEGMENT	STEP 1. HYDROLOGY		STEP 2. RIPARIAN	STEP 3. FISH HABITAT	STEP 4. TERRESTRIAL HABITAT	MANAGEMENT RECOMMENDATION PER HDFA GUIDELINES	INTERPRETED MANAGEMENT RECOMMENDATION – WILDFIELD VILLAGE CONSULTANT TEAM
	FUNCTION	MODIFIERS					
	conductivity, generally favouring runoff over recharge.						
H15S2 (WHT2-2a)	FT-7 (swale) FC-1 (Round 1; 2024) **Limited**- Reach was observed to be dry during early spring assessment. No recharge function - the soil conditions are fine textured with low hydraulic conductivity, generally favouring runoff over recharge.	Actively managed agricultural field (row-crop)	**Limited –** Cropped Cropped (agricultural) vegetation is located on either side of the reach.	**Contributing** – No direct fish habitat is present. This feature provides allochthonous material transport to downstream habitat	**Limited –** As per Table 7 of the HDFA Guidelines, swales provide limited terrestrial function.	**No Management Required**	**No Management Required**

LEGEND:

Table 2.13: Headwater Drainage Feature Classification and Management Recommendations

FT	Feature Types (1-defined natural channel, 2-channelized, 3-multi-thread, 4-no defined feature, 5-tiled drainage, 6-wetland, 7-swale, 8-roadside ditch, 9-online pond outlet)
FC	Flow Conditions (1-no surface water, 2-standing water, 3-interstitial flow, 4-surface flow minimal, 5-surface flow substantial)

Note: Codes correspond with Ontario Stream Assessment Protocol (OSAP) guidelines.

*The management recommendation per HDF Guidelines differs from the interpreted management recommendation from the Wildfield Village consultant team based on the following:

1. **H1S1 –** Expected ability to mitigate HDF wetland functions by: a) continuing to convey flows to the appropriate downstream habitat via pipe that outlets to the created compensation wetland which in turn outlets to the culvert under Centreville Creek Road; b) creating compensation wetland (Relocation and Wetland Compensation Area on Solmar lands) to help mitigate hydrology (slower release from the wetland) and support indirect fish habitat functions (provision of insects, organic materials, as well as coarse sediment through alluvium deposits in the wetland outlet reach).
2. **H12A1 –** Expected ability to mitigate HDF and direct fish habitat functions by: a) continuing to convey flows to the appropriate downstream habitat; b) creating compensation wetland to provide direct fish habitat for a tributary associated with the same main branch that is known to support fish (i.e. within approximately 400m of the fish observation at H12A1); c) help mitigate hydrology (slower release from the wetland); and d) improve direct fish habitat functions (insects, organic materials, as well as coarse sediment through alluvium deposits in the wetland outlet reach) compared to existing conditions of H12A1 which is ploughed-through and planted with row crops.
3. **H7S1 –** Expected ability to mitigate HDF wetland functions by: a) continuing to direct flows to the appropriate downstream habitat; b) creating compensation wetland (Relocation and Wetland Compensation Area on Solmar lands) to help mitigate hydrology (slower release from the wetland) and support indirect fish habitat functions (provision of insects, organic materials, as well as coarse sediment through alluvium deposits in the wetland outlet reach).

Appendix F HDF – Specific Comment Response Matrix

Table 1. Town of Caledon Comment Regarding Wildfield Village Secondary Plan – POPA 2024-0010, Local Subwatershed Study – Phase 1 and 2

Comment #	Comments Specific to Headwater Drainage Features (Phase 1)		GEI Response
	The HDFA was not completed correctly. Address the following general and feature specific comments:		
18	It is not clear when the Round 1 assessment were completed for each feature. Provide clarity.		HDFA Round 1 surveys were completed on March 24, 2021 and April 10, 2024. The HDFA table (Table 2.13 in Appendix B2) lists the dates for each feature for each round surveyed.
19	Further to the preceding comment, it appears that all the Round 1 assessments were not completed at the appropriate time. Historical weather data from closest station (Pearson) indicates that the freshets occurred weeks before them and it doesn't appear that there was any pption in the days preceding. The guidelines indicate that the Round 1 assessment must capture the spring freshet but this doesn't appear to have been done. This could affect all features not recommended as mitigation, conservation or protection and could have resulted in features being omitted from the assessment. For instance, Drainage Area 38.04.10 is indicated to be >20ha in size and draining through a culvert under Mayfield Road to natural area but Figure 2.2 does not identify the same drainage features and assessed a HDF that drains to an outlet for a different catchment.The HDF assessment and stormwater catchments do not align and it appears that the Round 1 timing may have contributed to this.		This comment has been addressed through GEI's *Spring Survey Timing Windows* techncial memorandum submitted on April 8, 2025. GEI maintains that the HDF Round 1 assessments were conducted during appropriate conditions and within the re quired seasonal window. The Town confirmed they were satisfied that no additional field surveys for the LSS were required, as per the email from Michael Hoy dated April 14, 2025.
20	Many of the HDFs identified in the SABE SWS (or their entire identified length) were not assessed. Similarly, several Potential Watercourse or Headwater Drainage Features identified on Figure 2.2 were not assessed. All of these must be assessed or an explanation why it isn't necessary provided. It is noted that Figure 2.11 identified road culverts along these unassessed features and Figures 4.1 and 4.2 identify many drainage features with road culverts that weren't assessed; some of which have substantial drainage area. This suggests that the unassessed features convey drainage. Clarify the rationale for omitting these, including whether the Round 1 survey timing affected the decision.		As documented in this technical memorandum, all of the HDFs identified in the SABE were assessed during Round 1 for participating lands in the Wildfield Village Study Area. Features with no definition that were dry were noted internally as 'not present', which is why they were originally excluded from the HDF mapping and Management Recommendation Table. The HDF mapping has been updated accordinlgy to include these features (labelled as 'No Reach Observed'). Available photographs are also included in the Photographic Record (**Appendix C**).
21	It is posited that there is flexibility to reflect additional considerations when determining appropriate management of HDFs and the notion of 'modifiers' in the guidelines is referenced. The modifiers are to be used when considering classification of features to understand their original function, not management of the features. Further, some of the considerations outlined such as compatibility with adjacent land uses, removing the features to eliminate the current agricultural impacts, and the use of stormwater infrastructure (pipes) are not supported. One purpose of a secondary plan is to protect and restore natural heritage functions in the context of changing land use. The secondary plan must be arranged to place compatible land uses next to protected features. Further, those factors are not consistent with conservation best practices or the HDFA guidelines (i.e., practitioners are supposed to assess based on the changes expected to occur when the modifier (agricultural impacts) is removed). The notion that HDFs are proposed for removal because "it would be difficult to maintain in an urban setting" is not supported. The guidelines explicitly indicate that "management options provided should be considered where efforts to relocate or redesign the proposal have been considered..." and speak to respecting and mimicking natural patterns of transition from seemingly "insignificant" HDFs to more intermittent channels. The guidelines provide flexibility within the management recommendations and outlines when the various practices are appropriate. Once a final classification is determined, the management outlined in the guidelines is required through policy that requires the SABE SWS to be implemented.		**Modifiers** It is our understanding that the HDF Guidelines discuss modifiers specificially in the hydrology classification section, and are to be considered from a hydologic perspective. We have considered the modifying effects of agriculture on the hydological classificaiton of the HDFs. GEI is of the opinion that the agricultural activity in the Study Area does not substantially change the hydrology of any HDFs to warrant an upgrade in the hydrological classification. The HDF Guidelines treat ephemeral (Contributing Hydrology) and intermittent (Valued Hydrology) as the same in 'Figure 2: Flow chart providing direction on management options', named 'Contributing or Valued Hydrology'. The agricultural modifier is not reasonably expected to change the hydrology to 'Important Hydrology' (i.e., perennial), and as such the management recommendation would not be altered. GEI is of the opinion that it is reasonable to acknowledge that existing site-specific conditons of HDFs that are ploughed through and fertilized have a current negative impact on downstream fish habitat due to siltation and pollution. However, any Interpreted Management Recommendations resulting in a downgrade from Conservation to Mitigation are also based on compensation designed to replicate HDF features and functions, including wetland compensation, fish habitat compenation, and conveyance of appropriate flows to these features. **Compatibility with adjacent land uses** The Phase 1 LSS has been updated to remove the mention of propsed surrounding Residential Land Use/ diffuculty to maintain in an Urban setting. **Use of Stormwater Infrastructure (Pipes)** It is our understanding that HDF reaches with a managmeent recommndation of Mitigation are permitted to be piped, provided that appropriate water is conveyed to the appropriate downstream feature (HDF or watercourse), as determined through the feature-based water balance assessment.

Comment #	Comments Specific to Headwater Drainage Features (Phase 1)		GEI Response
22	When proposing removal of many features, the guidelines indicate that this should be assessed cumulatively; however, this was not done.		The LSS Phase 1 report has been updated to assess the cumulative impacts of the proposed HDF removal and replication of the features and their functions on the local subwatershed. The report notes that in general, the HDFs in the Study Area are ephemeral and intermittent features that have limited riparian vegetation due to active, ongoing agriculture. A feature-based water balance analysis has been conducted and the proposed stormwater management system and piping of two reaches (H1S1 and H12A1) will convey appropriate flows to the appropriate downstream habitats. HDF wetlands proposed for removal (H1S1-1 and H1S1-3) will be compensated through a wetland creation area that will include a 10m vegetated buffer and will be part of the NHS. Direct seasonal fish habitat observed for H12A1 was limited (ploughed through swale planted in row crops) however this habitat will be compensated for with a Fish Habitat Compensation Area that will include a created wetland that will provide direct seasonal fish habitat for a nearby reach within 400m that was observed to have fish at the culvert at Mayfield Road. Considering the proposed mitigation for removal of HDFs, cumulative impacts are not anticipated to be an issue for the local subwatershed.
23	The notion that it is reasonable to assume that wetlands located along HDFs on non-participating properties won't be protected so it is reasonable to assume that the HDFs won't be protected is unsupported circular logic. HDFs and wetlands must be studied individually and integrated as appropriate. This must be outlined for the non-participating lands with no assumptions made.		The LSS Phase 1 report has been updated to note that wetlands along HDFs on non-particpating lands will require further study before a HDF management recommendation is provided.
24	Removal and wetland compensation for Mitigation features is acceptable; however, this is not being proposed for all features. The wetlands must be connected to the downstream reaches. It is not acceptable to replicate functions through stormwater management pipes. As per Table 9 of the guidelines, the BMP must be open		The majority of HDFs with a management recommendation of Mitigation are propoposed to have their functions (provision of water to downstream habitat) replicated through the SWM Ponds that will outlet to the appropriate downstream habitat. None of these HDFs have upstream, or online, wetlands. Three exceptions include: 1) H12A1 is proposed to be removed and will have its flows maintained through a pipe that will collect clean water discharging from wetland #34 and convey flow to the downstream H12A1 culvert (Culvert #9) at Mayfield Road. Flows contributing to wetland #34 will be maintained through augmentation of clean water from roofs and/or rear yards upgradient of the feature via LID measures. As noted, the discharge from the wetland will be picked up at the upstream end of the clean water pipe for H12A1. 2) H1S1 and its two small riparian wetlands are proposed to be removed and will have its flows maintained through a pipe that will collect clean water from upstream external drainage areas at the downstream end of H1S3 and outlet to the Wetland Relocation and Compensation Area that will in turn outlet to the culvert (Culvert #3) under Centreville Creek Road. Wetland habitat removal will be compensated for with the Wetland Relocation and Compensation Area. 3) H7S1 wetland on participating lands is proposed to be removed. Appropriate flow will continue to be directed to the off-site (downstream) portion of H7S1. The Wetland Relocation and Compensation Area on the Solmar Lands will include wetland compensation for the area of H7S1 on participating landsd, and will in turn outlet to the culvert (Culvert #3) under Centreville Creek Road, which feeds the tributary on the west side of the Study Area, as does H7S1 (only further downstream).
25	All of the HDFs ultimately flow into occupied habitat for Redside Dace. It is not acceptable to assume that they won't be considered contributing habitat in the assessment. They must be considered as such in the assessment until MECP confirms that they are not contributing habitat.		MECP provided written confirmation that Redside Dace contributing habitat is absent from the Wildfield Village Secondary Plan area on April 25, 2025. This has been provided in the updated LSS Phase 1 report.
26	Figure 1 of the guidelines indicate that distinct HDFs occur when a new feature type (i.e., pond or wetland) is encountered. The assessment was not conducted this way which could change downstream classifications. Note that wetland size does not matter in this regard.		H1S1 has been divided into three reaches—H1S1-1, H1S1-2, and H1S1-3—to account for the presence of wetlands. This has also been updated in the HDF Management Recommendation Table.
27	Clarify why HDFs on non-participating properties were included west of Gore Rd but not east of Gore Rd and note the preceding comments indicating that no assumptions should be made and requirements for future study should be outlined		Watercourses and/or HDFs on the east side of The Gore Road have been added to the figures. The LSS Phase 1 report has been updated to include these features and note that field surveys (wetland evaluations, watercourse and headwater drainage feature assessments) will need to be conducted as part of future studies when these lands are participating.

Comment #	Comments Specific to Headwater Drainage Features (Phase 1)		GEI Response
28	Ensure that downstream reaches consider upstream classifications as per the guidelines		The HDF Management Recommendations table (Table 2.13) has been updated to ensure that all downstream reaches consider upstream classifications.
29	H1S1 – historical imagery reveals that the feature had a riparian corridor from 2001 up until 2019. The guidelines indicate that historic aerial imagery is helpful in determining the appropriate, original function of the affected reach when a modifier is present (i.e., recent riparian vegetation removal). 2024 aerial imagery and the May 2024 picture in Appendix B5 also show some riparian vegetation along its length suggesting it is returning to its original function.		The current conditions are a result of agricultural practices that have been ongoing for over 70 years. GEI understands that maximizing crop production is a reasonable objective for farmers, and historical aerial photographs show that this drainage feature has been actively ploughed from 2020 to the present. The HDF surveys of H1S1-2 have documented it as a ploughed-through feature planted with row crops (Photographic Record, Appendix C). The May 2024 photo included in the LSS Appendix B5 corresponds to the downstream extent at Centreville Creek Road, within reach H1S1-1 (MAM2-2/DIST), and is not representative of the main portion of the reach (H1S1-2) which is actively ploughed and planted. It is acknowledged that the HDF Guidelines recommend the review of historical imagery, which indicates that riparian vegetation was previously present. As noted above, GEI is of the opinion that the agrciulutral modifier would not substantially change the hydrology to warrant an upgrade in the hydrological classification, and would not impact the management recommendation.
30	H2S1 – As it is not in the primary study area and management of the feature won't be in the secondary plan, remove interpreted management recommendation (i.e., there is no reason for it).		Table 2.13 has been updated to remove the interpreted management recommendation
31	H3S1 - a first round hydrology classification from 2022 is provided but Table 2.1 indicates that Round 1 surveys were not done that year; riparian classification is incorrect as natural vegetation (woody and meadow) is clearly present along the length of the feature on aerial imagery in all of the survey years.		HDFA Round 1 surveys were completed on March 24, 2021 and April 10, 2024. No Round 1 surveys were carried out in 2022. This has been corrected in Table 2.1 (Appendix B2). The HDFA table (Table 2.13 in Appendix B2) lists the dates for each feature for each round surveyed. H3S1 has predominantly narrow, fallow riparian vegetation that has been treated as an inclusion within the surrounding agricultural fields. GEI acknowledges the presence of a small patch of woody shrubs along H3S1, occupying an area of approximately 6 m by 30 m. While nearby woody vegetation has been delineated and mapped as hedgerows, these features are located no closer than 40 m to the unmapped shrub cluster. Due to this separation, and given the small size of the shrub patch, it was excluded from hedgerow delineations and considered part of the fallow inclusion. While GEI recognizes that the corridor does contain vegetation, the dominant community is fallow species. As the ELC manual does not provide classification codes for fallow vegetation, these features have been treated as inclusions within the agricultural landscape. The HDF table (Table 2.13) has also been updated to note this distinction in the riparian classification section.
32	H3S1A - there is no basis for the mitigation recommendation. Wetland along its length means a minimum of valued terrestrial function which leads to a minimum of conservation.		H3S1A is predominantly a narrow, fallow vegetative feature that has been treated as an inclusion within the surrounding agricultural fields. The riparian classification of wetland was a typo, which has been corrected in the HDF table (Table 2.13). GEI reviewed aerial imagery associated with H3S1A, which was not accessible during field surveys as it is located on a non-participating property. A review of multiple imagery sources supports our previous interpretation that this corridor primarily consists of fallow vegetation, with an assemblage of cultural meadow-type species. Small pockets of water-tolerant species, such as Reed-canary Grass (*Phalaris arundinacea*), are also present but are limited in extent (approximately 0.02 to 0.04 ha) and are typically below the mapping threshold for ELC surveys. While GEI recognizes that the corridor does contain vegetation, the dominant community is anticipated to be fallow species. As the ELC manual does not provide classification codes for fallow vegetation, these features have been treated as inclusions within the agricultural landscape. The HDF table (Table 2.13) has also been updated to include Meadow (fallow) in the riparian classification section and has a management recommendation of Mitigation.
33	H5S4 - should have been assessed as two separate reaches due to the change in vegetation along the downstream portion; must be a minimum of conservation due to the classification of H3S1A		It is acknowledged that the downstream portion of H5S4 passes through a hedgerow composed of scattered small shrubs and cultural meadow vegetation. The hedgerow is mainly comprised of Hawthorn (*Crataegus spp* .), *Malus spp* . and Manitoba Maple (*Acer negundo*) with Reed-canary grass and Perennial Rye (*Lolium perenne*). Given its narrow, linear form, and lack of structural complexity, GEI does not consider this hedgerow to provide the ecological functions typically associated with shrubland or forest communities, and is instead considered part of the agricultural landscape. Therefore, H5S4 was not assessed as two separate reaches. However, the characteristics of the riparian area have been updated accordingly in the HDF table (Table 2.13). As noted above, H3S1A is identified as having agricultural riparian vegetation and a management recommendation of Mitigation.

Comment #	Comments Specific to Headwater Drainage Features (Phase 1)		GEI Response
34	H4S2 – riparian classification incorrect as clearly natural vegetation along it length on aerial imagery in all survey years. This is reflected in the CUM1-1 ELC polygon on Figure 2.4.		Table 2.13 has been updated to note meadow riparian vegetation for H4S2.
35	H4S1 - riparian classification not supported as natural vegetation is clearly present along more than half of its length during all survey years; should be assessing what the remainder would be like when the agricultural tilling and cropping is removed from its downstream third; terrestrial classification not clear as it is connecting two wetlands on Figure 2.4.		It is acknowledged that based on air photo review, riparian cultural meadow vegetation extends further south along H4S2, and the northern extent of H4S1 has been adjusted accoringly (i.e. moved south) as shown on Figure 1. As noted above, GEI is of the opinion that the agrciulutral modifier is related to hydrology, and would not substantially change the hydrology to warrant an upgrade in the hydrological classification, and would not impact the management recommendation. H4S1 does not connect two wetland features. There is one wetland feature downstream at H4S1B. The terrestrial habitat classification for H4S1 therefore remains as Limited.
36	H4S1A - riparian classification not supported as natural vegetation is clearly present along more than half of its length during all survey years; should be assessing what the remainder would be like when the manicured lawn is removed from its upstream third; terrestrial classification not clear as it is connecting two wetlands on Figure 2.4.		This HDF is downstream on non-particpating lands and is now shown as "For Future Study - Non-participant".
37	H4S1B – it is not understood how arrived at protection based on subcategories; based on Figure 2.4 it is known that it is a least valued terrestrial so not clear why unknown was indicated.		This HDF is downstream on non-particpating lands and is now shown as "For Future Study - Non-participant".
38	H4S1C - while it may be a different HDF reach, the portion that is comprised of a roadside ditch must be assessed.		This HDF is downstream on non-particpating lands and is now shown as "For Future Study - Non-participant".
39	H5S4A - riparian classification not supported as natural vegetation is present along almost its entire length in all survey years		The riparian vegetation observed along H5S4A generally does not align well with ELC. It occurs as a mosaic of vegetation associated with varying degrees of past disturbance including cultural meadow-type species (e.g., Goldenrods), though more commonly it consists of fallow-type species, such as Lamb's Quarters (*Chenopodium album*) and Scentless Chamomile (*Tripleurospermum inodorum*). These weedy species are more typically associated with agricultural fields than with true cultural meadows. Water-tolerant plants (e.g., Reed-canary Grass are generally sparse; where they are abundant, they occupy small pockets within the overall fallow corridor. These wetland pockets are sporadic and infrequent—such small features are generally not mapped as part of ELC surveys. Overall, recognizing that this corridor is a narrow linear feature dominated by fallow species commonly associated with agricultural fields, and acknowledging that the ELC manual lacks classification codes for fallow, GEI treated this feature as an inclusion within the agricultural field. The HDF table (Table 2.13) has been updated to note a riparian classificaiotn of Meadow (Fallow).
40	H7S2 - none of the assessments were completed so no management supported at this time unless based on upstream a minimum of upstream classifications and identified for further study.		This HDF is downstream on non-particpating lands and is now shown as "For Future Study - Non-participant".
41	H8S1 - it is unclear why steps 2-4 were not completed; the terrestrial step is needed to arrive at no management and nothing was assessed in relation to recharge hydrology		The HDF table (Table 2.13) has been updated to provide more information on H8S1 and how the management recommendation was determined.
42	H9S1 and H10S1- it appears that the reach should have been split into two for assessment at the point where the feature becomes visible on aerial imagery; it is unclear why steps 2-4 were not completed; the terrestrial step is needed to arrive at no management and nothing was assessed in relation to recharge hydrology		H9S1 was divided into more appropriate reaches (H9S1, H9S2, H9S3) to account for the middle buried drainage portion. The HDF table (Table 2.13) was updated to reflect this change. H10S1 will remain as one reach as it is fully visible on aerial imagery. The HDF Table 2.13 addresses the recharge function.

Comment #	Comments Specific to Headwater Drainage Features (Phase 1)		GEI Response
43	H11S1 - the area labelled as disturbed on Figure 2.4 upstream of the HDF appears on aerial imagery to possibly be a wetland that was impacted in 2023/2024. This area was not participating during the TRCA wetland staking in 2023. Consultation with TRCA is required to confirm the wetland status of that area and the HDF assessment updated accordingly. It is unclear why steps 2-4 were not completed; the terrestrial step is needed to arrive at no management and nothing was assessed in relation to recharge hydrology.		This disturbed feature was labelled as such in Aug 2024 based on observations from the adjacent lands. All vegetation had been stripped and the exposed soil was smooth and level; a shallow drainage feature was present between the non-participating and participating property (parcel 9). Based on those observations, the feature could only be classified as "disturbed". The HDF Table 2.13 addresses the recharge function.
44	H12S2 and H12S1 - it is unclear why steps 2-4 were not completed; the terrestrial step is needed to arrive at no management and nothing was assessed in relation to recharge hydrology.		The HDFA table (Table 2.13) has been updated to provide more information on H12S1 and H12S2 and how the management recommendations were determined.
45	H12A1: the downgrade from conservation to mitigation may be supported (subject to addressing other comments); however, no mitigation is displayed on Figure 2.5 despite it being displayed for other HDFs and a wetland and watercourse corridor being present immediately downstream of the feature south of Mayfield Road.		Figure 2.5 shows H12A1 as Mitigation.
46	The text and Table 2.14 omit the brook stickleback observation that Table 2.13 indicates from HDF H12A1. Further, Table 2.14 indicates that the fish sampling station FS5 at the downstream end of H12A1 was dry during the sampling. This should be acknowledged/clarified in this section.		HDFA Round 1 surveys in 2024 were completed on April 10, which identified the Brook Stickleback incidentially in H12A1. Fish community sampling for HDFs in 2024 was completed on May 17. At the time H12A1 was already dry. Text was updated in Section 2.2.16 and 2.4.5 to include the incidential fish observation. Table 2.14 shows the fish community sampling results and do not include incidential observations.