Williston, VT **DRAFT GIS Needs Assessment**

Department of Public Works July 2023

TECHNICAL MEMORANDUM FOR REVIEW ONLY



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DRAFT GIS Needs Assessment

Williston, VT

Department of Public Works

TECHNICAL MEMORANDUM

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Prepared for: Town of Williston

July 2023



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PRELIMINARY DRAFT TECHNICAL MEMORANDUM

INTRODUCTION

PURPOSE

Williston, a town located in Chittenden County, Vermont, is a thriving suburban area adjacent to Burlington, boasting a population of approximately 10,100 residents. The Town has demonstrated commendable efforts in managing their assets, and now they are actively exploring opportunities for further improvement. To achieve this goal, the Town is seeking to implement advanced Asset Management Software to facilitate, oversee, and monitor work orders for each of these utilities and assets. The primary objective is to deploy a comprehensive, versatile, and integrated platform that enhances efficiency, enabling stakeholders to make well-informed decisions regarding asset improvement projects and effectively manage work orders.

To ensure the success of this initiative, the town has engaged the services of BETA Group Inc. BETA will play a crucial role in guiding and supporting the town's asset management requirements. The ultimate aim is to implement a software package that utilizes ArcGIS Online, providing an intuitive platform that maximizes staff efficiency and allows for offline usage as well.

The achievement of this project hinges heavily on the integration of existing asset data into the online mapping platform and work order management system. Therefore, it is imperative to comprehensively document, inventory, and gather as much information as possible about the current state of the town's water, wastewater, and stormwater utility network datasets. Additionally, it is essential to understand how these datasets are currently utilized within the Department of Public Works (DPW). BETA Group will conduct a Needs Assessment to create an inventory of utility asset datasets, identify any anomalies that may impede the successful management of infrastructure by the DPW department, and uncover gaps, inconsistencies, and erroneous entries in the utility information. The end result will be the provision of an Action Plan to the town, outlining improvements that can be implemented to strengthen their utility datasets and enable the selection of a pathway towards enhanced productivity.

CURRENT STATE

EXISTING DATA SETS

Below is a summary of data sets compiled by BETA as provided by the Town. For a full list of features and attributes, see appendix A – Data Dictionary

STORMWATER DATA:

Name	File Type	Number of Items
BMP_Subwatersheds	Shapefile - Polygon	92 Features
Surveyed_Outfalls	Shapefile - Point	61 Features
UnSurveyed_Private_Outfalls	Shapefile - Point	18 Features
Williston_Catch_Basins	Shapefile - Point	1,760 Features
Williston_Open_System_Points	Shapefile - Point	104 Features
Williston_Stormlines	Shapefile - Line	1,985 Features
Williston_Swales	Shapefile - Line	512 Features
Williston_Stormwater_Assets_Summary	Word Doc	2 Pages



WATER DATA:

Name	File Type	Number of Items
water_valves_updated_2012	Shapefile - Point	447 Features
W_METERVAULT	Shapefile - Point	2 Features
GATE_VALVE	Shapefile - Point	686 Features
HYDRANTS	Shapefile - Point	657 Features
Water_Pipe (2,6,8,10,12,16,20,24)	Shapefile - Line	8 Features
Water Valve Tie Cards	PDF	11 PDF's, each PDF contains multiple pages
High_Side_Valves_from_GIS_Utilities _with_notes_from_Water_Dept_03152023	PDF	1 PDF with 12 pages
Water Dept. Forms most used	PDF	PDF with 8 pages containing forms
curb_stop_updated_2011	Shapefile - Point	18

SEWER DATA:

Name	File Type	Number of Items
sewer_pumpstation_1	Shapefile - Point	30
sewer_manhole	Shapefile - Point	937
sewer_pipe	Shapefile - Line	8
(6,8,10,12,15,18,20,24)		
Sewer_forcemain	Shapefile - Line	40

PLANIMETRIC DATA:

Name	File Type	Number of Items
facilities	Shapefile - Point	10
EastGPSpts	Shapefile - Point	45
DeerviewPointData	Shapefile - Point	15
Fence_Line	Shapefile - Line	6
DeerViewLineData	Shapefile - Line	6
Municipal_Parcels	Shapefile - Polygon	61

SIDEWALK/ROADWAY/SIGNS DATA:

Name	File Type	Number of Items
WillistonSignInventory	Shapefile - Point	1278
T2022_Sidewalks_Paths	Shapefile - Line	351
PCI FY23	Excel Spreadsheet	1 workbook



OUTDOOR/OPEN SPACE DATA:

Name	File Type	Number of Items
Trees_2017	Shapefile - Point	167
VT_Data_E911_Trails	Shapefile - Line	1662

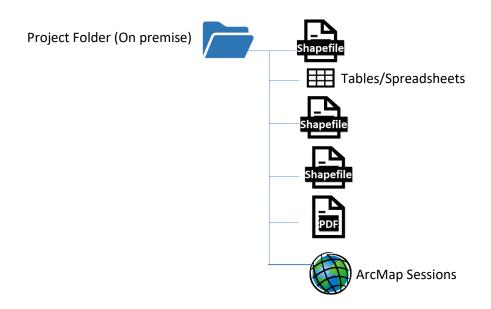
See Appendix A: GIS Data Dictionary for a complete list of feature classes and associated attribute structure.

EXISTING GIS SOFTWARE/ARCHITECTURE

We understand that the Town currently has an ArcGIS Online account, which will be crucial as it serves as the primary repository for the Town's GIS datasets during the project. Additionally, the Town utilizes ArcMap at the desktop level for mapping development.

The current architecture of the system relies on shapefiles and does not have support for ArcGIS Online. ArcMap is used to map specific assets, utilizing the existing datasets for mapping purposes. Tables, pdf's and spreadsheets are also integrated into the Town's current Architecture.

TOWN OF WILLISTON EXISTING GIS ARCHITECTURE:





GAP ANALYSIS

EXISTING GIS DATASET EVALUATION & DATA GAPS

An important practice is to review all native GIS layers, GIS-enabled spatial databases, associated location-based databases, and other databases. This is essential to learn the true status of the data and to inquire about any data redundancies that can be eliminated or integrated through GIS. As part of this process, BETA was tasked with evaluating the Town's existing GIS datasets.

The following features and associated data gaps were identified

WATER DATASETS:

Feature Class	Data Gap
Gate Valves	No attribute information. Areas where there is a lack of connectivity
Water Pipe 24	No attribute Information. Geospatial accuracy needs to be verified
Water Pipe 20	No attribute Information. Geospatial accuracy needs to be verified
Water Pipe 16	No attribute Information. Geospatial accuracy needs to be verified
Water Pipe 12	No attribute Information. Geospatial accuracy needs to be verified
Water Pipe 10	No attribute Information. Geospatial accuracy needs to be verified
Water Pipe 8	No attribute Information. Geospatial accuracy needs to be verified
Water Pipe 6	No attribute Information. Geospatial accuracy needs to be verified
Water Pipe 2	No attribute Information. Geospatial accuracy needs to be verified
Hydrants	No attribute Information. Geospatial accuracy needs to be verified. No
	laterals present leading to Hydrants
Water_valves_updated_2012	Limited attribute Information. Dataset needs to be updated

SEWER DATASETS:

Feature Class	Data Gap
Sewer Manholes	No attribute information. Areas where there is a lack of connectivity
Sewer Pipe 24	No attribute Information. Geospatial accuracy needs to be verified
Sewer Pipe 20	No attribute Information. Geospatial accuracy needs to be verified
Sewer Pipe 18	No attribute Information. Geospatial accuracy needs to be verified
Sewer Pipe 15	No attribute Information. Geospatial accuracy needs to be verified
Sewer Pipe 12	No attribute Information. Geospatial accuracy needs to be verified
Sewer Pipe 10	No attribute Information. Geospatial accuracy needs to be verified
Sewer Pipe 8	No attribute Information. Geospatial accuracy needs to be verified
Sewer Pipe 6	No attribute Information. Geospatial accuracy needs to be verified
Sewer Pump Station	Limited attribute Information.
Sewer Force Main	No attribute Information. Geospatial accuracy needs to be verified



STORMWATER DATASETS:

Feature Class	Data Gap
BMP_Subwatersheds	Additional attribute information to be verified
Surveyed_Outfalls	Additional attribute information to be verified. Potential Outfalls missing
UnSurveyed_Private_Outfalls	Additional attribute information to be verified. Areas of potential
	outfalls not included (need verification).
Williston_Catch_Basins	Limited attribute Information
Williston_Open_System_Points	Additional attribute information and geospatial location to be verified.
Williston_Stormlines	Areas without connectivity and attributes need to be verified.
Williston_Swales	Areas without connectivity and attributes need to be verified.

SIDEWALK DATASETS:

Feature Class	Data Gap
Sidewalks	Limited attribute information. Attribute information to be verified

SIGNS DATASETS:

Feature Class	Data Gap
Street Signs	Attribute information to be verified. Some attributes missing

GAP ANALYSIS MAPPING

See appendix B: Gap Analysis Mapping

SBETA

DRAFT TECHNICAL MEMORANDUM

ACTION PLAN

RECOMMENDATIONS

WATER DATASETS:

Pipes - The Town currently possesses 10 distinct feature classes representing water network datasets. Upon examination, it was determined that the Water Pipe datasets lack attribute information and may exhibit geospatial inaccuracies. To address these concerns, it is advisable to populate the attribute information by leveraging existing record plans or conducting field verification. Furthermore, a geospatial analysis should be performed to ensure an accurate depiction of pipe locations in the ground and enhance overall geospatial accuracy. Additionally, there are sections lacking pipe connectivity, and it is recommended that these areas be connected using existing record plans or field verification methods.

Gate Valves - The gate valve datasets are lacking essential attribute information. Furthermore, there are currently two water valves that require either consolidation or meticulous scrutiny to ascertain which file takes precedence over the other in terms of accuracy. For the attribute information, following a similar methodology employed for the Pipes datasets, this valuable information can potentially be sourced from tie cards and manually entered into the attribute fields. It is highly recommended that the Town undertake the process of utilizing tie cards to input attribute information and perform a comprehensive verification of the location of each gate valve. Additionally, a field investigation can greatly contribute to identifying accurate gate valve locations.

Hydrants - The Town's hydrants dataset lacks essential attribute information. Moreover, it is essential to assess each hydrant individually to determine their geospatial location and accuracy. Therefore, it is highly recommended to conduct a comprehensive field hydrant inventory to verify the precise location of each hydrant and complete the missing attribute information. Additionally, collaborating with the fire department can greatly assist in identifying the accurate location of each hydrant.

Furthermore, the laterals from the mainline are currently not depicted in the mapping. Incorporating this information would be highly advantageous and greatly facilitate the identification of each hydrant's location.

Other datasets to consider:

- Water manholes
- Water Fittings (by Type)
- Other Water Structures (Wells, Well Pumps, etc.)

Please take into account the following additional information to be included in the water gate datasets:

Gate ID Grid Inspector

Inspection Date

Gate Gate Type

Owner Street Name

Street Segment Name



Gate Cover ConditionGate StatusNumber Of TurnsCountGate SizeCommentsGate ModelRotationGate ManufacturerGateCardLink1Gate Open DirectionGateCardLink2

Gate Install Date

Please take into account the following additional information to be included in the water gate datasets:

Pipe Install Decade
PIPE_ID Pipe Age
Inspector Pipe Status
Inspection Date Pipe Pressure Zone

Owner Pipe Pressure Zone

Pipe Service Type

Street Name Rotation
Street Segment Name From Node
Pipe Size To Node
Pipe Material Comments
Pipe Install Date

Please take into account the following additional information to be included in the water hydrant datasets:

Hydrant ID Hydrant Size

Inspector Hydrant Outlet Number Inspection Date Hydrant Open Direction

Owner Hydrant Flow
Street Name Flow Range
Street Segment Name Comments
Hydrant Make Count

Hydrant Model HydrantCardLink1

Hydrant Year

STORMWATER DATASETS:

Surveyed Outfalls – The Town of Williston engaged Fitzgerald Environmental to assist with the management of their outfall dataset, which contains crucial attribute information essential for the Town's MS4 and SWPPP planning. However, certain datasets suffer from incomplete attribute information due to restricted access to physical structures or obstructions caused by debris, particularly in privately owned areas throughout the Town. For instance, outfall WILL051 lacks culvert diameter information (listed as 9999), and important details such as Pipe Material and Pipe Condition are missing. Moreover, Pipe Condition is absent in 4 out of the 61 outfalls, also due to



inaccessibility. It is recommended to conduct inspections on these structures (if possible) or, utilize existing record plans to fill the gaps. In some cases, the Town may need to authorize field crews to access previously restricted areas, such as fenced backyards or Town-owned properties. To address structures obstructed by debris, the Department of Public Works (DPW) should develop a cleaning schedule for these locations before proceeding with future inspections.

Additionally, it is worth noting the existence of potential outfall areas. Certain sections have stormwater pipes leading to wetlands or water bodies without a corresponding outfall. This occurrence is likely due to insufficient information about the stormwater infrastructure system in those specific locations.

Private Outfalls – Just like the Surveyed outfalls, the Private Outfalls dataset also holds significant outfall information. However, certain attributes remain incomplete due to accessibility challenges. Additionally, there are areas where the connectivity between the outfall and pipe is lacking. To gain a clearer understanding of this connectivity issue, it is advisable to thoroughly review and complete plans or conduct further field investigations. This will contribute to enhancing our understanding of the overall system connectivity.

Catch Basins & Pipes – The overall condition of the Pipe/Catchbasin system across the Town appears to be in satisfactory condition. However, we have identified instances where there are gaps in connectivity, requiring further clarification. To address this, it is recommended to utilize record plans whenever available to determine the precise locations of pipes and catch basins. In cases where necessary, conducting a field investigation is advisable to verify the existence of any missing assets. This approach will help ensure a comprehensive understanding of the system's infrastructure.

Below are some instances where the stormwater data appears to be incomplete:





Sunrise Drive: Connectivity issues

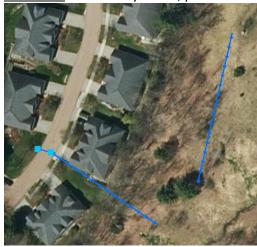


Knight Lane: Connectivity issues, no Outfalls/Outlets





<u>Ian Place:</u> Connectivity issues, potential Outfall



Please take into account the following additional information to be included in the Outfall datasets:

Street Name Depth Of Fill Over Culvert

Street Segment Name Wingwall Present
Temperature Wingwall Condition
Weather Condition Wingwall Material
Pavement Cracks Wingwall Length
Roadway Sags Side Slopes

Number Of Lanes Inlet Outlet
Pavement Condition Up Down Stream Condition

Weight Posting Scour
Closest Pole Screened In

Guardrail Condition Signs Of Recent Highwater

Dig Safe Markings Present Visible Sediment

Culvert Shape Underground Utilities Present
Culvert Bottom Type Waterway Name
Culvert Discharge Type Culvert Photo

Condition

Pipe Issues

Please take into account the following additional information to be included in the Stormwater Pipe datasets:

Street Name
Unknown Pipe
Street Segment
Interconnection
Owner
Field From Depth
Pipe Shape
Field To Depth
Pipe Size
Watershed
Pipe Material
Basin

Private Impaired Water Class

Sub Basin



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It is recommended that the following features be incorporated into the dataset:

Junctions (Fittings)
Inlets
Interconnections
Manholes
Water Quality Structure (detention ponds, dry wells, etc.)
Culverts

SEWER DATASETS:

Sewer Pipes & Manholes: The overall connectivity of the sewer Pipe and Manhole network is commendable. However, there are certain sections throughout the Town where pipes are missing, possibly due to these areas being privately owned parcels. Another noteworthy observation is the presence of manholes without accompanying pipes in various areas of the Town. To accurately depict the placement of manholes on the sewer lines, it is advisable to thoroughly review the record plans.

One area of improvement for the sewer dataset pertains to attribute information. Currently, there are no attributes associated with pipes, manholes, or pump stations. It is recommended to populate this information by leveraging the existing record plans and/or through field investigations. Furthermore, implementing tie cards would prove beneficial to the Town as they can aid in digitizing and locating sewer service lines, where applicable.

<u>Chamberlin Lane & Hanon Drive</u>: Pipe not connected to Manholes





Industrial Avenue: Pipe not connected to Manholes



Please take into account the following additional information to be included in the Sewer Pipe datasets:

Inspector Abandoned
Inspection Date Owner
Pipe Type Station Start
Pipe Size Station End
Pipe Shape Installed Date
Pipe Material Installed By
Pipe Issue Grid

Drop Inlet Street Name
Drop Inlet Type Pipe ID
Private Notes

Please take into account the following additional information to be included in the Sewer Pipe datasets:

SMH_ID **Outlet Diameter** Street Name Drop Inlet Station Rim Elevation **Nearest House Number Invert Elevation Cover Diameter** Cover Height **Cover Condition** Collar Type **Cover Number of Holes Install Date** Structure Material Installed By **Structure Condition** Inspector

Structure Issues Structure Diameter

Issues Depth

Rim To Invert Inside Diameter

Inlet1 Inlet2 Inlet3



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SIDEWALK & CURB RAMP DATASETS:

Sidewalks – The Town has provided a comprehensive shapefile containing approximately 47 miles of sidewalks, categorized by material, width, length, and location. After conducting a visual inspection utilizing aerial imagery, it has been determined that the accuracy of the sidewalks polyline layer is commendable, with only minimal adjustments required to establish a fully connected network. It is recommended that the Town conduct a field assessment to inventory its sidewalks and evaluate their condition.

Please take into account the following additional information to be included in the Sidewalk datasets:

Street Name Miles
Street Segment Name Notes
Sidewalk Segment Ward
Location Zoning
Ownership School
Sidewalk Grass Strip Priority Zone

Sidewalk Grass Strip Width ADA Compliance Width

Sidewalk Width

Sidewalk Material

Sidewalk Condition

Curb Type

Curb Condition

ADA Compliance Vertical

ADA Compliance Cross Slope

ADA Compliance Gratings

ADA Compliance Overall

Feet

SIGNS DATASETS:

Signs – The Town presently possesses a thorough inventory of signs along with their corresponding attribute information. Upon the preliminary inspection utilizing aerial imagery, the sign datasets demonstrate a commendable quality. However, it is recommended to conduct a field investigation to update the data and ensure comprehensive capture of all signs.

Please take into account the following additional information to be included in the Sign datasets:

Sign IDWarning Sign TypeSign LabelWarning Sign Sub TypeNumber of Signs On PostSchool Sign TypeNumber of SignsSchool Sign Sub Type

Sign Order Trail Blazer
Street Name Trail Blazer Type
Street Segment Name Trail Blazer Size
Sign Type Route Sign Type
Sign Sub Type Route Sign Sub Type

Regulatory Sign Type Speed Limit
Regulatory Sign Sub Type Sign Color



Sign Size Unlisted Sign
Sign Materials Unlisted Sign Code
Sign Condition Retro reflectivity

Sign Height Retro reflectivity Reading

Sign Graffiti Notes

Obstructed MUTCD Compliant Size Condition Mounting
Obstruction Type MUTCD Compliant Size Condition Retro

Post Type Street Sign Compliance
Postcondition Nearest House Number

Stop Line

ROADWAY INFORMATION:

The Town has provided an Excel spreadsheet containing roadway assessments. The spreadsheet includes information such as the road name, number of sections, length in feet, roadway width in feet, area in square feet, usage, average Pavement Condition Index (PCI), and the weighted average PCI. Currently, the Town lacks a digitized version of its roadway inventory.

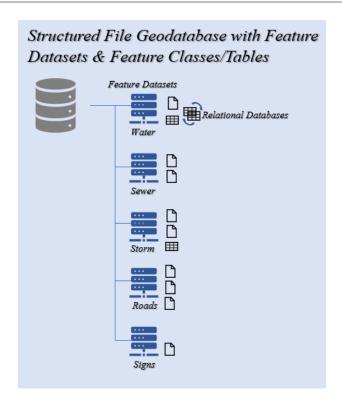
To address this, it is recommended that a roadway inventory and assessment be conducted using an automated approach that calculates the PCI on a segment-by-segment basis. This will enable the Town to develop a comprehensive roadway improvement plan and prioritize its projects accordingly. By implementing this automated approach, the Town will have access to accurate and detailed information, facilitating informed decision-making and efficient management of its roadway infrastructure.

GIS DATABASE STRUCTURE AND ARCHITECTURE:

GIS DATABASE

The Town is interested in implementing a GIS system that aligns with its requirements. BETA will develop a geospatial database to house the datasets and collaborate with the Town to design a data model encompassing the information needed for field data collection and assessment. Once the database is created and the datasets are migrated from the Town's legacy software, the information will be published to an environment driven by AGOL (ArcGIS Online) using ESRI's cloud hosting services.





The on-premises database will serve as the primary system of record for the Town's water, wastewater, and stormwater datasets. It will be stored on the Town's servers and will act as a backup for the cloud-hosted service. BETA will collaborate with the Town to establish a backup scheme that can be performed upon request (weekly, bi-weekly, etc.) to ensure the safety of the datasets hosted in the cloud. This process will involve downloading the asset information from the cloud and reconciling any differences with the on-premises database. Furthermore, BETA plans to leverage ESRI's comprehensive suite of pre-built ArcGIS Solutions for integration with the Town's overarching GIS Architecture. The implementation of ArcGIS Solutions for Sewer, Stormwater, and Water utilities will assist the Town in managing these assets.

ARCHITECTURE

The Town has placed significant emphasis on implementing a robust work order system to effectively monitor field operations, manage assets, and seamlessly track the progress of incoming work orders. As a key objective within the overarching project, the Town aims to utilize the Trimble Unity platform to accomplish this goal. By leveraging this web-based solution, the Town will have the capacity to promptly track work orders and receive real-time updates on asset management, thus streamlining their operations and enhancing efficiency.

PLATFORM DEVELOPMENT

BETA will develop an AGOL driven platform which will house the aforementioned asset related datasets in a cloud-based environment. This scalable solution will provide the Town with an easy to use, ESRI driven solution for viewing its water, wastewater, and stormwater related assets. Additionally, through our partnership with EJP, BETA will leverage Trimble Unity's software package which extends ArcGIS online's functionality to include customizable forms and easy to use field data collection tools. These out of the box solutions provide the functionality that the Town seeks to effectively and efficiently conduct asset related assessments, inventories, and updates.



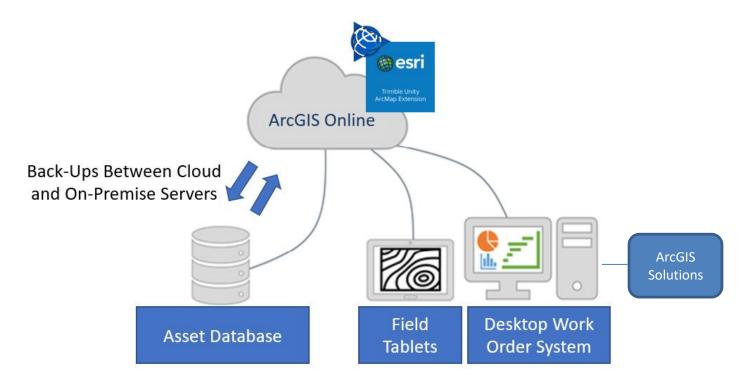
Field Staff will have the ability to view the online web map utilizing Trimble Unity's mobile app on a tablet. This will allow field staff to view work orders and update asset attribute information as described in the next paragraph.

WORKORDER SYSTEM

Included in this task is the development of Trimble Unity's workorder system. The system will allow DPW staff to assign, open, and close work orders at the desktop level. The platform will alert field staff with a list of required work for the day and will also allow them to close work orders as they are completed. This is all driven by AGOL, which provides the DPW department with a map view of work that has been assigned, work that needs to be completed, and work that has been closed out.

DASHBOARD INTEGRATION

Because the datasets are all housed within the AGOL platform, BETA will develop dashboards to show additional information such as asset condition, location, and other valuable data through content rich widgets. This allows DPW staff to view trends in the data and make well informed decisions about their assets. Additionally, plans based on data driven content can be developed to prioritize which assets need replacement and repairs.



CUSTOMIZABLE FORMS

BETA and EJP will work with the Town to develop the required forms for field data collection. The forms are highly customizable, and with input from the Town, they can be formatted to make field data collection as efficient as possible. The forms will be created within Trimble Unity's suite of software and, as previously mentioned, will be available through the tablet app for field staff to utilize.



REPORTS AND FIGURES

Online Reporting capabilities will be made possible by BETA's Portal. The portal will house the Town's reports and maps pertaining to its assets. This online platform also displays critical information about the health of the Town's utility network system. As the datasets are downloaded and backed up from the cloud, new reports will be generated and will become available to the Town for viewing. Maps, reports, and other graphical/spreadsheet-based data will also be presented in PDF format on the Town's portal.

ARCGIS ONLINE ACCOUNTS

BETA has worked with many municipalities throughout New England by providing AGOL based solutions to manage their assets. BETA will work with the Town to establish an ArcGIS Organizational account by purchasing a Creator License on behalf of the town. This will allow to Town to access AGOL's mapping capabilities and will act as the base for the Trimble Unity software. If the Town already utilizes AGOL, BETA can establish a "Group" for the Town within its AGOL environment and can continue to use this service on future projects. This will also eliminate the need for creating a Creator account for the Town as previously mentioned.

FIELD WORK (OPTIONS)

BETA has allocated 40 hours for field work as part of the gap analysis and data restoration efforts for this project. Following the completion of the Gap Analysis review with the Town, BETA will assist the Town in inventorying and assessing assets in the field. To provide the Town with an optimal solution, BETA recommends the following options for field data collection, allowing the Town to choose the option that best suits their needs.

Option 1: GPS-based Inventory of Sewer, Water, and/or Stormwater Assets

Based on the findings of the Gap Analysis, BETA will conduct an inventory and field assessment of the aforementioned assets, or a combination thereof, depending on the quantity of assets requiring inventorying within the allocated 40 hours. This may involve collecting additional Outfall information, locating extra gate valves, as well as other assets associated with stormwater, water, or sewer utilities. BETA will collaborate with the Town to determine which assets will be included in the inventory, considering the time allotted. The asset's location and assessment will be carried out using a GPS unit and a field tablet.

Option 2: Sign Inventory and Assessment Update

Utilizing the existing sign information, BETA will perform an update to assess the condition of each sign, as well as add or remove any new or existing signs. This information will be integrated into the Town's ArcGIS Online mapping system and will be configured for use with the Trimble Unity software, facilitating work order management. This way, the Town can assign tasks to field workers, who can then proceed with sign repairs as needed. BETA will assess the signs in the Town within the designated 40-hour timeframe. Based on field investigations in similarly sized towns, it is estimated that approximately 500 signs can be assessed within the allocated time. BETA will collaborate with the Town to determine a specific area of interest, enabling focused sign assessments based on traffic counts and other relevant characteristics. A BETA inspector will use a tablet pre-loaded with the Town's sign inventory to perform the assessments, assigning a condition rating of good,



fair, or poor to each sign. The field technician will also note the placement of new signs and the removal of existing signs.

A comprehensive set of existing conditions reports and GIS maps will be submitted, providing detailed information about the general condition of each sign, as mentioned above.

Option 3: LiDAR-based Pavement Inspection and Assessment

In the third option, BETA proposes conducting a pavement inspection and assessment using advanced LiDAR technology. Leveraging its partnership with Cyvl.ai (Cyvl), BETA brings the latest in field data capture technology to collect pavement condition information. Autonomous field inspections will be performed using a LiDAR sensor mounted on a vehicle.

During the inspection, the vehicle will travel along each roadway segment in both directions, capturing data through LiDAR technology to create a point cloud. As the vehicle progresses, a 3D digital map will be developed, scanning and recording all roadway assets within a 50-foot radius of the LiDAR sensor. Additionally, images will be captured, georeferenced, and timestamped at regular 20-foot intervals.

Once the data collection for all roads included in the project is complete, Cyvl's proprietary algorithms and AI machine learning technology will be applied to identify various pavement surface distresses, including cracks, potholes, seals, patches, and pavement oxidation. After the data has undergone post-processing, each roadway segment will receive a condition rating of Good, Fair, or Poor. These datasets will be seamlessly integrated into BETA's Pavement Management Dashboard, complemented by the ArcGIS Roadway Management Solution.

By adopting this cutting-edge approach, BETA aims to provide the Town with a comprehensive assessment of pavement conditions, enabling informed decision-making and effective pavement management strategies.



APPENDIX A: GIS DATA DICTIONARY

Town of Williston, VT GIS Data Dictionary

Geodatabase Documentation

Date: Monday, July 17, 2023

Time: 12:27:19 PM

Summary Information and Links

<u>0 Feature Datasets and 47 Feature Classes</u>

No Topology Datasets

No Geometric Networks

No Rasters

No Tables (Object Classes)

No Relationship Classes

4 Domains

Feature Datasets and Child Classes

Rasters

Workspace-Level Tables and Feature Classes

BETA stormwater review - Feature Class

BMP Subwatersheds - Feature Class

curb stop updated 2011 - Feature Class

<u>DeerViewCemetery - Feature Class</u>

DeerViewLineData - Feature Class

<u>DeerviewPointData - Feature Class</u>

East - Feature Class

<u>EastGPSpts - Feature Class</u>

facilities - Feature Class

Fence Line - Feature Class

Index Grid - Feature Class

Municipal Parcels - Feature Class

sewer_forcemain - Feature Class

sewer manhole - Feature Class

sewer_pipe_10 - Feature Class

sewer pipe 12 - Feature Class

sewer pipe 15 - Feature Class

sewer pipe 18 - Feature Class

sewer pipe 20 - Feature Class

sewer pipe 24 - Feature Class

sewer pipe 6 - Feature Class

sewer pipe 8 - Feature Class

sewer pumpstation 1 - Feature Class

SewerServiceArea - Feature Class

<u>Surveyed Outfalls - Feature Class</u>

T2022 Sidewalks Paths - Feature Class

<u>Town_Boundary - Feature Class</u>

Trees 2017 - Feature Class

<u>UnSurveyed Private Outfalls - Feature Class</u>

VT Data E911 Trails - Feature Class

W GATEVALVE - Feature Class

W HYDRANT - Feature Class

W_METERVAULT - Feature Class

W PIPE 10 - Feature Class

W PIPE 12 - Feature Class

W PIPE 16 - Feature Class

W PIPE 2 - Feature Class

W PIPE 20 - Feature Class

W PIPE 24 - Feature Class

W PIPE 6 - Feature Class

W PIPE 8 - Feature Class

water_valves_updated_2012 - Feature Class

Williston Catch Basins - Feature Class

Williston Open System Points - Feature Class

Williston Stormlines - Feature Class

Williston Swales - Feature Class

WillistonSignInventory - Feature Class

Domains

AnnotationStatus
BooleanSymbolValue
HorizontalAlignment
VerticalAlignment

BETA_stormwater_review - FeatureClass

Name BETA_stormwater_review

ShapeType Point **FeatureType** Simple

AliasName BETA_stormwater_review

HasM falseHasZ falseHasAttachments false

Description BETA_stormwater_review

Field	DataType	Length	AliasName	Description	Domain	DefaultValue	IsNullable	Precision	Scale
StreetName	String	50	StreetName	StreetName		0	true		
Comments	String	150	Comments	Comments			true		
Item_No	SmallInteger	2	Item_No	Item_No			true		

BMP_Subwatersheds - FeatureClass

Name BMP_Subwatersheds

ShapeType Polygon **FeatureType** Simple

AliasName BMP Subwatersheds

HasM falseHasZ false

HasAttachments false

Description BMP_Subwatersheds

Field	DataType	Length	AliasName	Description	Domain	DefaultValue	IsNullable	Precision	Scale
Id	Integer	4	Id	Id			true		
Permit	String	10	Permit	Permit			true		
Area	Double	8	Area	Area			true		
Area_acres	Double	8	Area_acres	Area_acres			true		
Permit_num	String	25	Permit_num	Permit_num			true		
Pre_exist	String	25	Pre_exist	Pre_exist			true		
Pond_ID	String	25	Pond_ID	Pond_ID			true		
Descriptio	String	50	Descriptio	Descriptio			true		
Notes	String	50	Notes	Notes			true		
Permit_BMP	String	25	Permit_BMP	Permit_BMP			true		
Act250	String	25	Act250	Act250			true		
Imp_acres	Double	8	Original Impervious Acres	Imp_acres			true		
perv_acres	Single	4	Original Pervious Acres	perv_acres			true		
MS4_Contr	String	50	MS4_Contr	MS4_Contr			true		
MS4_Status	String	69	MS4_Status	MS4_Status			true		
Pond	String	50	Pond	Pond			true		
FEA_Notes	String	512	FEA_Notes	FEA_Notes			true		
GlobalID	GlobalID	38	GlobalID	GlobalID			false		
FEA_Imperv	Double	8	FEA_Imperv	FEA_Imperv			true		
FEA_Pervious	Double	8	FEA_Pervious	FEA_Pervious			true		

curb_stop_updated_2011 - FeatureClass

Name curb_stop_updated_2011

ShapeType Point **FeatureType** Simple

AliasName curb_stop_updated_2011

HasM falseHasZ falseHasAttachments false

Description REQUIRED: A brief narrative summary of the data set.

Tags REQUIRED: Common-use word or phrase used to describe the subject of the data set.

Field	DataType	Length	AliasName	Description	Domain	DefaultValue	IsNullable	Precision	Scale
Name	String	254	Name	Name			true		
Descriptio	String	254	Descriptio	Descriptio			true		
Latitude	Double	8	Latitude	Latitude			true		
Longitude	Double	8	Longitude	Longitude			true		
Elevation	Integer	4	Elevation	Elevation			true		
Altitude	Integer	4	Al titude	Altitude			true		
Structure	String	10	Structure	Structure			true		

DeerViewCemetery - FeatureClass

Name DeerViewCemetery

ShapeType Polygon **FeatureType** Simple

AliasName DeerViewCemetery

HasM false
HasZ false
HasAttachments false

Description DeerViewCemetery

Field	DataType	Length	AliasName	Description	Domain	DefaultValue	IsNullable	Precision	Scale
Name	String	50	Name	Name			true		
ID	String	10	ID	ID			true		

DeerViewLineData - FeatureClass

Name DeerViewLineData

ShapeType Polyline **FeatureType** Simple

AliasName DeerViewLineData

HasM falseHasZ falseHasAttachments false

Description DeerViewLineData

Field	DataType	Length	AliasName	Description	Domain	DefaultValue	IsNullable	Precision	Scale
Cemetery	String	50	Cemetery	Cemetery			true		
Туре	String	25	Туре	Туре			true		
Descrption	String	50	Descrption	Descrption			true		
SHAPE_Leng	Double	8	SHAPE_Leng	SHAPE_Leng			true		

DeerviewPointData - FeatureClass

Name DeerviewPointData

ShapeType Point **FeatureType** Simple

AliasName DeerviewPointData

HasM false
HasZ false
HasAttachments false

Description DeerviewPointData

Field	DataType	Length	AliasName	Description	Domain	DefaultValue	IsNullable	Precision	Scale
Туре	String	50	Туре	Туре			true		

East - FeatureClass

NameShapeTypeFeatureTypeSimple

AliasNameEastHasMfalseHasZfalseHasAttachmentsfalseDescriptionEast

Field	DataType	Length	AliasName	Description	Domain	DefaultValue	IsNullable	Precision	Scale
Section_	String	5	Section_	Section_			true		
Lot	String	10	Lot	Lot			true		
SqFt	Integer	4	SqFt	SqFt			true		
Row	String	5	Row	Row			true		
Column_	String	5	Column_	Column_			true		
Туре	String	20	Туре	Туре			true		
SHAPE_Leng	Double	8	SHAPE_Leng	SHAPE_Leng			true		

EastGPSpts - FeatureClass

Name EastGPSpts

ShapeType Point **FeatureType** Simple

AliasName EastGPSpts

HasM falseHasZ falseHasAttachments false

Description EastGPSpts

Field	DataType	Length	AliasName	Description	Domain	DefaultValue	IsNullable	Precision	Scale
objectID	Double	8	objectID	objectID			true		
Header	String	254	Header	Header			true		
Name	String	254	Name	Name			true		
Descriptio	String	254	Descriptio	Descriptio			true		
Туре	String	254	Туре	Туре			true		
Position_	String	254	Position_	Position_			true		

Altitude	String	254	Al titude	Al titude		true	
Symbol	String	254	Symbol	Symbol		true	
Xo l d	String	254	Xold	Xo l d		true	
Yold	String	254	Yold	Yold		true	
X	Double	8	X	Х		true	
Υ	Double	8	Υ	Υ		true	

facilities - FeatureClass

Name facilities
 ShapeType Point
 FeatureType Simple
 AliasName facilities
 HasM false
 HasZ false
 HasAttachments false

Description Community Facilities of Chittenden County. These include fire, police, library, town offices, museums, etc.

Tags facilities

Field	DataType	Length	AliasName	Description	Domain	DefaultValue	IsNullable	Precision	Scale
AREA	Single	4	AREA	AREA			true		
PERIMETER	Single	4	PERIMETER	Feature geometry.			true		
COMPTS_00_	Integer	4	COMPTS_00_	COMPTS_00_			true		
COMPTS_001	Integer	4	COMPTS_001	COMPTS_001			true		
SITENO	Integer	4	SITENO	SITENO			true		
NAME	String	60	NAME	Local Name of site			true		
TYPE	String	12	TYPE	TYPE			true		
ASYMBOL	Sma ll Integer	2	ASYMBOL	ASYMBOL			true		
ATEXT	String	1	ATEXT	ATEXT			true		
TOWN	SmallInteger	2	TOWN	Town point is located in			true		
POLYGONID	Integer	4	POLYGONID	POLYGONID			true		

SCALE	Single	4	SCALE	SCALE		true	
ANGLE	Single	4		Internal feature number.		true	

Fence_Line - FeatureClass

Name Fence_Line
ShapeType Polyline
FeatureType Simple
AliasName Fence_Line

HasMfalseHasZfalseHasAttachmentsfalse

Description Fence_Line

Field	DataType	Length	AliasName	Description	Domain	DefaultValue	IsNullable	Precision	Scale
Туре	String	10	Туре	Туре			true		
SHAPE_Leng	Double	8	SHAPE_Leng	SHAPE_Leng			true		

Index_Grid - FeatureClass

Name Index_Grid
ShapeType Polygon
FeatureType Simple
AliasName Index_Grid

HasM falseHasZ falseHasAttachments falseDescription Index_Grid

Field DataType Length AliasName Description Domain DefaultValue IsNullable Precision Scale

Municipal_Parcels - FeatureClass

Name Municipal_Parcels

ShapeTypePolygonFeatureTypeSimple

AliasName Municipal_Parcels

HasM falseHasZ falseHasAttachments false

Description Municipal_Parcels

Field	DataType	Length	AliasName	Description	Domain	DefaultValue	IsNullable	Precision	Scale
SPAN	String	13	SPAN	SPAN			true		
GLIST_SPAN	String	13	GLIST_SPAN	GLIST_SPAN			true		
MAPID	String	41	MAPID	MAPID			true		
PARCID	String	23	PARCID	PARCID			true		
PROPTYPE	String	9	PROPTYPE	PROPTYPE			true		
YEAR	SmallInteger	2	YEAR	YEAR			true		
GLYEAR	SmallInteger	2	GLYEAR	GLYEAR			true		
TOWN	String	18	TOWN	TOWN			true		
TNAME	String	18	TNAME	TNAME			true		
SOURCENAME	String	80	SOURCENAME	SOURCENAME			true		
SOURCETYPE	String	19	SOURCETYPE	SOURCETYPE			true		
SOURCEDATE	String	8	SOURCEDATE	SOURCEDATE			true		
EDITMETHOD	String	20	EDITMETHOD	EDITMETHOD			true		
EDITOR	String	32	EDITOR	EDITOR			true		
EDITDATE	String	8	EDITDATE	EDITDATE			true		
MATCHSTAT	String	9	MATCHSTAT	MATCHSTAT			true		
EDITNOTE	String	187	EDITNOTE	EDITNOTE			true		
OWNER1	String	40	OWNER1	OWNER1			true		
OWNER2	String	40	OWNER2	OWNER2			true		
ADDRGL1	String	40	ADDRGL1	ADDRGL1			true		
ADDRGL2	String	40	ADDRGL2	ADDRGL2			true		
CITYGL	String	25	CITYGL	CITYGL			true		
STGL	String	10	STGL	STGL			true		

ZIPGL	String	11	ZIPGL	ZIPGL	true	
DESCPROP	String	40	DESCPROP	DESCPROP	true	
LOCAPROP	String	40	LOCAPROP	LOCAPROP	true	
CAT	String	15	CAT	CAT	true	
RESCODE	String	2	RESCODE	RESCODE	true	
ACRESGL	Double	8	ACRESGL	ACRESGL	true	
REAL_FLV	Integer	4	REAL_FLV	REAL_FLV	true	
HSTED_FLV	Integer	4	HSTED_FLV	HSTED_FLV	true	
NRES_FLV	Integer	4	NRES_FLV	NRES_FLV	true	
LAND_LV	Integer	4	LAND_LV	LAND_LV	true	
IMPRV_LV	Integer	4	IMPRV_LV	IMPRV_LV	true	
EQUIPVAL	Integer	4	EQUIPVAL	EQUIPVAL	true	
EQUIPCODE	String	1	EQUIPCODE	EQUIPCODE	true	
INVENVAL	Integer	4	INVENVAL	INVENVAL	true	
HSDECL	String	1	HSDECL	HSDECL	true	
HSITEVAL	Integer	4	HSITEVAL	HSITEVAL	true	
VETEXAMT	Integer	4	VETEXAMT	VETEXAMT	true	
EXPDESC	String	31	EXPDESC	EXPDESC	true	
ENDDATE	String	8	ENDDATE	ENDDATE	true	
STATUTE	String	16	STATUTE	STATUTE	true	
EXAMT_HS	Integer	4	EXAMT_HS	EXAMT_HS	true	
EXAMT_NR	Integer	4	EXAMT_NR	EXAMT_NR	true	
UVREDUC_HS	Integer	4	UVREDUC_HS	UVREDUC_HS	true	
UVREDUC_NR	Integer	4	UVREDUC_NR	UVREDUC_NR	true	
GLVAL_HS	Double	8	GLVAL_HS	GLVAL_HS	true	
GLVAL_NR	Double	8	GLVAL_NR	GLVAL_NR	true	
CRHOUSPCT	Double	8	CRHOUSPCT	CRHOUSPCT	true	
MUNGL1PCT	Double	8	MUNGL1PCT	MUNGL1PCT	true	
AOEGL_HS	Double	8	AOEGL_HS	AOEGL_HS	true	
AOEGL_NR	Double	8	AOEGL_NR	AOEGL_NR	true	
E911ADDR	String	43	E911ADDR	E911ADDR	true	
SHAPE_Leng	Double	8	SHAPE_Leng	SHAPE_Leng	true	
Town_Ownership	String	255	Town_Ownership	Town_Ownership	true	

Surveyed	String	255	Surveyed	Surveyed		true	
GlobalID	GlobalID	38	GlobalID	GlobalID		false	

sewer_forcemain - FeatureClass

Name sewer_forcemain

ShapeType Polyline **FeatureType** Simple

AliasName sewer_forcemain

HasM false
HasZ false
HasAttachments false

Description sewer_forcemain

Field DataType Length AliasName Description Domain DefaultValue IsNullable Precision Scale

sewer_manhole - FeatureClass

Name sewer_manhole

ShapeType Point **FeatureType** Simple

AliasName sewer_manhole

HasM falseHasZ falseHasAttachments false

Description sewer_manhole

Field DataType Length AliasName Description Domain DefaultValue IsNullable Precision Scale

sewer_pipe_10 - FeatureClass

Name sewer_pipe_10

ShapeType Polyline

FeatureType Simple

AliasName sewer_pipe_10

HasM false
HasZ false
HasAttachments false

Description sewer_pipe_10

Field DataType Length AliasName Description Domain DefaultValue IsNullable Precision Scale

sewer_pipe_12 - FeatureClass

Name sewer_pipe_12

ShapeType Polyline **FeatureType** Simple

AliasName sewer_pipe_12

HasM false
HasZ false
HasAttachments false

Description sewer_pipe_12

Field DataType Length AliasName Description Domain DefaultValue IsNullable Precision Scale

sewer_pipe_15 - FeatureClass

Name sewer_pipe_15

ShapeType Polyline **FeatureType** Simple

AliasName sewer_pipe_15

HasM falseHasZ falseHasAttachments false

Description sewer_pipe_15

	Length	AliasName	Description	Domain	DefaultValue	IsNullable	Precision	Scal
18 - Featu	reClass							
sewer_pip	pe_18							
Polyline								
Simple								
sewer_pip	oe_18							
false								
false								
ı ts false								
sewer_pipe	e_18							
DataType	Length	AliasName	Description	Domain	DefaultValue	IsNullable	Precision	Scal
20 - Featu	reClass							
sewer_pip	pe_20							
Polyline								
Simple								
sewer_pip	oe_20							
false								
false								
ı ts false								
sewer_pipe	e_20							
DataType	Length	AliasName	Description	Domain	DefaultValue	IsNullable	Precision	Scal
	sewer_piper Polyline Simple sewer_piper false false sewer_piper Polyline Simple sewer_piper false false sewer_piper sewer_piper sewer_piper false false sewer_piper false sewer_piper	Simple sewer_pipe_18 false false sts false sewer_pipe_18 DataType Length 20 - FeatureClass sewer_pipe_20 Polyline Simple sewer_pipe_20 false false sts false sewer_pipe_20	sewer_pipe_18 Polyline Simple sewer_pipe_18 false false sewer_pipe_18 PataType Length AliasName 20 - FeatureClass sewer_pipe_20 Polyline Simple sewer_pipe_20 false false false sts false	sewer_pipe_18 Polyline Simple sewer_pipe_18 false false false sewer_pipe_18 PataType Length AliasName Description 20 - FeatureClass sewer_pipe_20 Polyline Simple sewer_pipe_20 false false sts false sewer_pipe_20	sewer_pipe_18 Polyline Simple sewer_pipe_18 false false false sewer_pipe_18 PotatType Length AliasName Description Domain 20 - FeatureClass sewer_pipe_20 Polyline Simple sewer_pipe_20 false false false sewer_pipe_20	sewer_pipe_18 Polyline Simple sewer_pipe_18 false false false sewer_pipe_18 Polyline Description Domain DefaultValue 20 - FeatureClass sewer_pipe_20 Polyline Simple sewer_pipe_20 false false false sewer_pipe_20 false false sewer_pipe_20 sewer_pipe_20 false false sewer_pipe_20 sewer_pipe_20 false false sewer_pipe_20	sewer_pipe_18 Polyline Simple sewer_pipe_18 false false false sewer_pipe_18 PolataType Length AliasName Description Domain DefaultValue IsNullable 20 - FeatureClass sewer_pipe_20 Polyline Simple sewer_pipe_20 false false false sewer_pipe_20	sewer_pipe_18 Polyline Simple sewer_pipe_18 false false sewer_pipe_18 DataType Length AliasName Description Domain DefaultValue IsNullable Precision 20 - FeatureClass sewer_pipe_20 Polyline Simple sewer_pipe_20 false false false sewer_pipe_20 false false sewer_pipe_20 sewer_pipe_20 false false sewer_pipe_20

AliasName sewer_pipe_24

HasM false
HasZ false
HasAttachments false

Description sewer_pipe_24

Field DataType Length AliasName Description Domain DefaultValue IsNullable Precision Scale

sewer_pipe_6 - FeatureClass

Name sewer_pipe_6

ShapeType Polyline **FeatureType** Simple

AliasName sewer_pipe_6

HasMfalseHasZfalseHasAttachmentsfalse

Description sewer_pipe_6

Field DataType Length AliasName Description Domain DefaultValue IsNullable Precision Scale

sewer_pipe_8 - FeatureClass

Name sewer_pipe_8

ShapeType Polyline **FeatureType** Simple

AliasName sewer_pipe_8

HasM falseHasZ falseHasAttachments false

Description sewer_pipe_8

Field DataType Length AliasName Description Domain DefaultValue IsNullable Precision Scale

sewer_pumpstation__1_ - FeatureClass

Name sewer_pumpstation__1_

ShapeType Point **FeatureType** Simple

AliasName sewer_pumpstation__1_

HasM false
HasZ false
HasAttachments false

Description sewer_pumpstation__1_

Field	DataType	Length	AliasName	Description	Domain	DefaultValue	IsNullable	Precision	Scale
Pump_Sta	String	50	Pump_Sta	Pump_Sta			true		
STA_NUM	Integer	4	STA_NUM	STA_NUM			true		
Town_Priva	String	50	Town_Priva	Town_Priva			true		

SewerServiceArea - FeatureClass

Name SewerServiceArea

ShapeType Polygon **FeatureType** Simple

AliasName SewerServiceArea

HasM falseHasZ falseHasAttachments false

Description REQUIRED: A brief narrative summary of the data set.

Tags REQUIRED: Common-use word or phrase used to describe the subject of the data set.

Field	DataType	Length	AliasName	Description	Domain	DefaultValue	IsNullable	Precision	Scale
Id	Integer	4	Id	Id			true		

Surveyed_Outfalls - FeatureClass

Name Surveyed_Outfalls

ShapeType Point **FeatureType** Simple

AliasName Surveyed_Outfalls

HasM falseHasZ falseHasAttachments false

Description Surveyed_Outfalls

Field	DataType	Length	AliasName	Description	Domain	DefaultValue	IsNullable	Precision	Scale
globalid	GlobalID	38	GlobalID	globalid			false		
Outfall_ID	String	255	Outfa ll ID	Outfall_ID			true		
Survey_Type	String	255	Initial vs. Resurvey	Survey_Type			true		
GIS_Notes	String	255	Existing Notes:	GIS_Notes			true		
Diameter	Double	8	Culvert Diameter (inches)	Diameter			true		
Access_Physical	String	255	Ease of Accesss:	Access_Physical			true		
Pipe_Material	String	255	Pipe Material	Pipe_Material			true		
Pipe_Condition	String	255	Pipe Condition	Pipe_Condition			true		
Condition_Notes	String	255	Pipe Condition Notes (Representative?)	Condition_Notes			true		
Structural_Failure_Risk	String	255	Risk of Structural (Outlet/Storm Drain and Headwall) Failure	Structural_Failure_Risk			true		
Sediment_Level	String	255	Depth of Sediment Fill Relative to Pipe Diameter:	Sediment_Level			true		
Headwall_Material	String	255	Headwall Material	Headwall_Material			true		
Headwall_Condition	String	255	Headwa ll Condition	Headwall_Condition			true		
Banks_Condition	String	255	Bank Condition (Conveyance	Banks_Condition			true		

		1	Channel)			
Outlet_Erosion	String	255	Outlet Erosion Severity	Outlet_Erosion	true	
Erosion_Risk	String	255	Risk of Erosion (Downstream Conveyance or Emankment at Outlet)	Erosion_Risk	true	
Erosion_Presence	String	255	Is there measureable erosion related to this outfall?	Erosion_Presence	true	
Length_eros	Double	8	Total Erosion Length (ft)	Length_eros	true	
Width_erosion	Double	8	Avg Width Erosion (ft)	Width_erosion	true	
Depth_eros	Double	8	Avg Depth Erosion (ft)	Depth_eros	true	
US_eros	String	255	Notes on Upstream Erosion	US_eros	true	
DS_eros	String	255	Notes on Downstream Erosion	DS_eros	true	
Pool_Condition	String	255	Plunge Pool Condition	Pool_Condition	true	
Treatment	String	255	Treatment Needed	Treatment	true	
ВМР	String	255	BMP to Reduce Upslope Volume	ВМР	true	
Notes	String	255	Other Notes:	Notes	true	
CreationDate	Date	8	CreationDate	CreationDate	true	
Creator	String	128	Creator	Creator	true	
EditDate	Date	8	EditDate	EditDate	true	
Editor	String	128	Editor	Editor	true	

Name T2022_Sidewalks_Paths

ShapeType Polyline **FeatureType** Simple

AliasName T2022_Sidewalks_Paths

HasM falseHasZ falseHasAttachments false

Description T2022_Sidewalks_Paths

Field	DataType	Length	AliasName	Description	Domain	DefaultValue	IsNullable	Precision	Scale
ID	Integer	4	ID	ID			true		
MATERIAL	String	12	MATERIAL	MATERIAL			true		
WIDTH	Integer	4	WIDTH	WIDTH			true		
LOCATION_A	String	20	LOCATION_A	LOCATION_A			true		
LOCATION_B	String	30	LOCATION_B	LOCATION_B			true		
TYPE	String	14	TYPE	TYPE			true		
LENGTH	Integer	4	LENGTH	LENGTH			true		
YEAR	String	20	YEAR	YEAR			true		

Town_Boundary - FeatureClass

Name Town_Boundary

ShapeType Polygon **FeatureType** Simple

AliasName Town_Boundary

HasMfalseHasZfalseHasAttachmentsfalse

Description Town Boundary

Field	DataType	Length	AliasName	Description	Domain	DefaultValue	IsNullable	Precision	Scale
FIPS6	Integer	4	FIPS6	FIPS6			true		
TOWNNAME	String	18	TOWNNAME	TOWNNAME			true		

TOWNNAMEMC	String	18	TOWNNAMEMC	TOWNNAMEMC		true	
CNTY	Sma ll Integer	2	CNTY	CNTY		true	
TOWNGEOID	String	10	TOWNGEOID	TOWNGEOID		true	
SHAPE_Leng	Double	8	SHAPE_Leng	SHAPE_Leng		true	

Trees_2017 - FeatureClass

Name Trees_2017

ShapeTypePointFeatureTypeSimple

AliasName Trees_2017

HasM trueHasZ trueHasAttachments false

Description Trees_2017

Field	DataType	Length	AliasName	Description	Domain	DefaultValue	IsNullable	Precision	Scale
FACILITYID	String	50	FACILITYID	FACILITYID			true		
NAME	String	254	NAME	NAME			true		
GENUS	String	50	GENUS	GENUS			true		
SPECIES	String	50	SPECIES	SPECIES			true		
TREEAGE	Integer	4	TREEAGE	TREEAGE			true		
DIAMETER	Double	8	DIAMETER	DIAMETER			true		
HEIGHT	Double	8	HEIGHT	HEIGHT			true		
TRUNKHEIGH	Double	8	TRUNKHEIGH	TRUNKHEIGH			true		
TRUNKDIAM	Double	8	TRUNKDIAM	TRUNKDIAM			true		
CANOPYSHP	String	20	CANOPYSHP	CANOPYSHP			true		
WIRES	String	5	WIRES	WIRES			true		
INSTALLDAT	Date	8	INSTALLDAT	INSTALLDAT			true		
CONDITION	String	50	CONDITION	CONDITION			true		
OWNEDBY	Integer	4	OWNEDBY	OWNEDBY			true		
MAINTBY	Integer	4	MAINTBY	MAINTBY			true		
GlobalID	String	38	GlobalID	GlobalID			true		

CreationDa	Date	8	CreationDa	CreationDa		true	
Creator	String	50	Creator	Creator		true	
EditDate	Date	8	EditDate	EditDate		true	
Editor	String	50	Editor	Editor		true	

UnSurveyed_Private_Outfalls - FeatureClass

Name UnSurveyed_Private_Outfalls

ShapeType Point **FeatureType** Simple

AliasName UnSurveyed_Private_Outfalls

HasM falseHasZ falseHasAttachments false

Description UnSurveyed_Private_Outfalls

Field	DataType	Length	AliasName	Description	Domain	DefaultValue	IsNullable	Precision	Scale
Municipali	String	50	Municipali	Municipali			true		
OutfallID	Integer	4	OutfallID	OutfallID			true		
OutfallNam	String	20	Outfa ll Nam	Outfa ll Nam			true		
HydroConne	String	50	HydroConne	HydroConne			true		
Latitude	Single	4	Latitude	Latitude			true		
Longitude	Single	4	Longitude	Longitude			true		
AssessDate	Date	8	AssessDate	AssessDate			true		
Assessor	String	50	Assessor	Assessor			true		
Organizati	String	100	Organizati	Organizati			true		
ErosionVol	Sing l e	4	ErosionVol	ErosionVol			true		
ErosionLen	Sing l e	4	ErosionLen	ErosionLen			true		
ErosionWid	Single	4	ErosionWid	ErosionWid			true		
ErosionDep	Sing l e	4	ErosionDep	ErosionDep			true		
Slope	Single	4	Slope	Slope			true		
DirectToWa	String	50	DirectToWa	DirectToWa			true		
AssessNote	String	200	AssessNote	AssessNote			true		

CulvertDia	Single	4	CulvertDia	CulvertDia		true	
OutletID	String	10	OutletID	OutletID		true	
DrainErosi	String	254	DrainErosi	DrainErosi		true	
AssessReas	String	254	AssessReas	AssessReas		true	
RecTreatme	String	254	RecTreatme	RecTreatme		true	
Standards	String	254	Standards	Standards		true	
GlobalID	String	38	GlobalID	GlobalID		true	
GlobalID_2	GlobalID	38	GlobalID_2	GlobalID_2		false	

VT_Data__E911_Trails - FeatureClass

Name VT_Data__E911_Trails

ShapeType Polyline **FeatureType** Simple

AliasName VT_Data__E911_Trails

HasM falseHasZ falseHasAttachments false

Description VT_Data__E911_Trails

Field	DataType	Length	AliasName	Description	Domain	DefaultValue	IsNullable	Precision	Scale
TRAILNAME	String	80	TRAILNAME	TRAILNAME			true		
TRAILTYPE	String	80	TRAILTYPE	TRAILTYPE			true		
ARCMILES	String	80	ARCMILES	ARCMILES			true		
SOURCE	String	80	SOURCE	SOURCE			true		
TOWNNAME	String	80	TOWNNAME	TOWNNAME			true		
FIPS6	Integer	4	FIPS6	FIPS6			true		
UPDATESOUR	String	80	UPDATESOUR	UPDATESOUR			true		
UPDATEDATE	String	80	UPDATEDATE	UPDATEDATE			true		
ACTUALMILE	String	80	ACTUALMILE	ACTUALMILE			true		
GlobalID	String	80	GlobalID	GlobalID			true		
COUNTY	String	80	COUNTY	COUNTY			true		
STATE	String	80	STATE	STATE			true		

TRAILMANAG	String	80	TRAILMANAG	TRAILMANAG		true	
ShapeSTLen	Double	8	ShapeSTLen	ShapeSTLen		true	
TRAILRATIN	String	80	TRAILRATIN	TRAILRATIN		true	
SURFACE	String	80	SURFACE	SURFACE		true	
TRAILSYSTE	String	80	TRAILSYSTE	TRAILSYSTE		true	
VISIBLE	String	80	VISIBLE	VISIBLE		true	

W_GATEVALVE - FeatureClass

Name W_GATEVALVE

ShapeType Point **FeatureType** Simple

AliasName W_GATEVALVE

HasM trueHasZ trueHasAttachments false

Description W_GATEVALVE

Field	DataType	Length	AliasName	Description	Domain	DefaultValue	IsNullable	Precision	Scale
FID_1	Double	8	FID_1	FID_1			true		

W_HYDRANT - FeatureClass

Name W_HYDRANT

ShapeType Point **FeatureType** Simple

AliasName W_HYDRANT

HasM false
HasZ false
HasAttachments false

Description W_HYDRANT

Field DataType Length AliasName Description Domain DefaultValue IsNullable Precision Scale

W_METERVAULT - FeatureClass

Name W_METERVAULT

ShapeType Point **FeatureType** Simple

AliasName W_METERVAULT

HasM false
HasZ false
HasAttachments false

Description W METERVAULT

Field DataType Length AliasName Description Domain DefaultValue IsNullable Precision Scale

W_PIPE_10 - FeatureClass

Name W_PIPE_10
ShapeType Polyline
FeatureType Simple

AliasName W_PIPE_10

HasM trueHasZ trueHasAttachments false

Description W_PIPE_10

Field	DataType	Length	AliasName	Description	Domain	DefaultValue	IsNullable	Precision	Scale
FID_1	Double	8	FID_1	FID_1			true		

W_PIPE_12 - FeatureClass

Name W_PIPE_12
ShapeType Polyline
FeatureType Simple
AliasName W_PIPE_12

HasM trueHasZ trueHasAttachments falseDescription W_PIPE_12

Field	DataType	Length	AliasName	Description	Domain	DefaultValue	IsNullable	Precision	Scale
FID_1	Doub l e	8	FID_1	FID_1			true		

W_PIPE_16 - FeatureClass

Name W_PIPE_16
ShapeType Polyline
FeatureType Simple
AliasName W_PIPE_16

HasM trueHasZ trueHasAttachments falseDescription W_PIPE_16

Field	DataType	Length	AliasName	Description	Domain	DefaultValue	IsNullable	Precision	Scale
FID_1	Double	8	FID_1	FID_1			true		

W_PIPE_2 - FeatureClass

Name W_PIPE_2
ShapeType Polyline
FeatureType Simple
AliasName W_PIPE_2

HasM trueHasZ trueHasAttachments falseDescription W_PIPE_2

DefaultValue IsNullable **Precision Scale** Field **DataType** Length **AliasName** Description **Domain**

W_PIPE_20 - FeatureClass

Name W_PIPE_20 Polyline ShapeType **FeatureType** Simple

AliasName W_PIPE_20

HasM true HasZ true **HasAttachments** false

Description W_PIPE_20

Field	DataType	Length	AliasName	Description	Domain	DefaultValue	IsNullable	Precision	Scale
FID_1	Doub l e	8	FID_1	FID_1			true		

W_PIPE_24 - FeatureClass

Name W_PIPE_24 ShapeType Polyline **FeatureType** Simple

AliasName W_PIPE_24

HasM true HasZ true **HasAttachments** false

Description W_PIPE_24

Field	DataType	Length	AliasName	Description	Domain	DefaultValue	IsNullable	Precision	Scale
FID_1	Doub l e	8	FID_1	FID_1			true		

W_PIPE_6 - FeatureClass

Name W_PIPE_6 ShapeTypePolylineFeatureTypeSimpleAliasNameW_PIPE_6

HasM trueHasZ trueHasAttachments falseDescription W_PIPE_6

Field	DataType	Length	AliasName	Description	Domain	DefaultValue	IsNullable	Precision	Scale
FID_1	Double	8	FID_1	FID_1			true		

W_PIPE_8 - FeatureClass

Name W_PIPE_8
ShapeType Polyline
FeatureType Simple
AliasName W_PIPE_8

HasM trueHasZ trueHasAttachments falseDescription W_PIPE_8

Field	DataType	Length	AliasName	Description	Domain	DefaultValue	IsNullable	Precision	Scale
FID_1	Double	8	FID_1	FID_1			true		

water_valves_updated_2012 - FeatureClass

Name water_valves_updated_2012

ShapeType Point **FeatureType** Simple

AliasName water valves updated 2012

HasM falseHasZ false

HasAttachments false

Description REQUIRED: A brief narrative summary of the data set.

Tags REQUIRED: Common-use word or phrase used to describe the subject of the data set.

Field	DataType	Length	AliasName	Description	Domain	DefaultValue	IsNullable	Precision	Scale
Name	String	254	Name	Name			true		
Descriptio	String	254	Descriptio	Descriptio			true		
Latitude	Double	8	Latitude	Latitude			true		
Longitude	Double	8	Longitude	Longitude			true		
Elevation	Integer	4	Elevation	Elevation			true		
Structure	String	10	Structure	Structure			true		

Williston_Catch_Basins - FeatureClass

Name Williston_Catch_Basins

ShapeType Point **FeatureType** Simple

AliasName Williston_Catch_Basins

HasM falseHasZ falseHasAttachments false

nasattaciiiieiits iaise

Description Williston_Catch_Basins

Field	DataType	Length	AliasName	Description	Domain	DefaultValue	IsNullable	Precision	Scale
GlobalID	GlobalID	38	GlobalID	GlobalID			false		
CB_ID	SmallInteger	2	CB_ID	CB_ID			true		
Owner	String	15	Owner	Owner			true		
CB_ID_CHAR	String	30	CB_ID_CHAR	CB_ID_CHAR			true		
COMMENT	String	50	COMMENT	COMMENT			true		
Updated	String	1	Updated	Updated			true		
Field_Check	String	1	Field_Check	Field_Check			true		
Outfall_ID	String	255	Outfa ll_ ID	Outfa ll_ ID			true		

Williston_Open_System_Points - FeatureClass

Name Williston_Open_System_Points

ShapeType Point **FeatureType** Simple

AliasName Williston_Open_System_Points

HasM falseHasZ falseHasAttachments false

Description Williston_Open_System_Points

Field	DataType	Length	AliasName	Description	Domain	DefaultValue	IsNullable	Precision	Scale
Туре	String	255	Туре	Туре			true		
Notes	String	511	Notes	Notes			true		

Williston_Stormlines - FeatureClass

Name Williston_Stormlines

ShapeType Polyline **FeatureType** Simple

AliasName Williston_Stormlines

HasM falseHasZ falseHasAttachments false

Description Williston_Stormlines

Field	DataType	Length	AliasName	Description	Domain	DefaultValue	IsNullable	Precision	Scale
DIR_OF_FLO	String	15	DIR_OF_FLO	DIR_OF_FLO			true		
Туре	String	5	Туре	Туре			true		
Diameter	SmallInteger	2	Diameter	Diameter			true		
COMMENT	String	50	COMMENT	COMMENT			true		
Updated	String	1	Updated	Updated			true		
Field_Check	String	1	Field_Check	Field_Check			true		
GlobalID	GlobalID	38	GlobalID	GlobalID			false		

	1					
Outfall_ID	255	Outfa ll_ ID	Outfa ll_ ID		true	

Williston_Swales - FeatureClass

Name Williston_Swales

ShapeType Polyline **FeatureType** Simple

AliasName Williston_Swales

HasM false
HasZ false
HasAttachments false

Description Williston_Swales

Field	DataType	Length	AliasName	Description	Domain	DefaultValue	IsNullable	Precision	Scale
Material	String	255	Material	Material			true		
Notes	String	512	Notes	Notes			true		
Direction	String	10	Direction	Direction			true		
GlobalID	GlobalID	38	GlobalID	GlobalID			false		

WillistonSignInventory - FeatureClass

Name WillistonSignInventory

ShapeType Point **FeatureType** Simple

AliasName WillistonSignInventory

HasM falseHasZ falseHasAttachments false

Description Sign location (via GPS), condition, MUTCD compliance, and sign need were attributed to every sign on public road network of

Williston. Each sign was given a sign id that included road name and sequential numbering on that road.

sign condition attributes - excellent, good, fair, poor, bad, or missing

Field DataType Length AliasName Description Domain DefaultValue IsNullable Precision Scale

Road_Name	String	60	Road_Name	Road_Name	true	
Sign_ID	String	30	Sign_ID	Sign_ID	true	
Mu l ti_Sign	String	20	Mu l ti_Sign	Multi_Sign	true	
Sign_Type	String	20	Sign_Type	Sign_Type	true	
Descriptio	String	200	Descriptio	Descriptio	true	
Reflective	String	20	Reflective	Reflective	true	
Condition	String	20	Condition	Condition	true	
Comment	String	200	Comment	Comment	true	
Post_Type	String	20	Post_Type	Post_Type	true	
Post_Condi	String	20	Post_Condi	Post_Condi	true	
Tagged	String	20	Tagged	Tagged	true	
Tag_Info	String	100	Tag_Info	Tag_Info	true	
MUTCD_	String	20	MUTCD_	MUTCD_	true	
MUTCD_Comm	String	100	MUTCD_Comm	MUTCD_Comm	true	
Sign_Neede	String	20	Sign_Neede	Sign_Neede	true	
Sign_Need_	String	100	Sign_Need_	Sign_Need_	true	
Inspector	String	30	Inspector	Inspector	true	
Town_Hwy_N	Sma ll Integer	2	Town_Hwy_N	Town_Hwy_N	true	

AnnotationStatus - Domain

DomainName AnnotationStatus

Description Valid annotation state values.

FieldTypeSmallIntegerDomain TypeCodedValue

Code	Name
0	Placed
1	Unplaced

BooleanSymbolValue - Domain

DomainName BooleanSymbolValue

Description Valid values are Yes and No.

FieldTypeSmallIntegerDomain TypeCodedValue

Code	Name
1	Yes
0	No

Horizontal Alignment - Domain

DomainName HorizontalAlignment

Description Valid horizontal symbol alignment values.

FieldTypeSmallIntegerDomain TypeCodedValue

Code	Name
0	Left
1	Center
2	Right
3	Full

VerticalAlignment - Domain

DomainName VerticalAlignment

Description Valid symbol vertical alignment values.

FieldTypeSmallIntegerDomain TypeCodedValue

Code	Name
0	Тор
1	Center
2	Baseline
3	Bottom



DRAFT TECHNICAL MEMORANDUM

APPENDIX B: GAP ANALYSIS MAPPING





