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Proud of Our Past... Building the Future

INFRASTRUCTURE AUDIT

Village of Bittern Lake

Project Objective

- Assess the current condition of key infrastructure
- Recommend infrastructure upgrades considering:
  - Existing condition
  - Current standards and guidelines
- Develop cost estimates and priority for completion
- Allocation of funds to infrastructure with the most need
- Grant funding

Study Scope

- Introductory meeting with Village staff
- Review available information
- Inspect key infrastructure
- Identify required upgrades and maintenance
- Develop a Class D Cost Estimate
- Develop a 20 – Year Capital Plan

Key Infrastructure

- Potable Water Supply and Distribution
- Sanitary Collection and Treatment
- Stormwater
- Transportation
- Village owned buildings
- Waste Transfer Site
- Vehicles and Equipment

Historical Water Consumption

- ADD = Average Day Demand
- MDD = Max Day Demand
- PHD = Peak Hour Demand
- Lpcd = Litres per capita per day

	Historical Consumption (Lpcd)	Audit Values (Lpcd)
ADD	228	250
MDD	552	500
PHD	1,104	1,000

Water Supply and Storage

- City of Camrose
- Reservoir and Pump Station
- Reservoir Capacity = 550 m^3
- Required Storage for Typical Consumption = 163 m^3
- Storage recommended for Fire Demand = 540m^3

Pump Station

- Adequate Condition Overall
- Continue Maintenance
- Implement SCADA

Water Distribution System

- Record Drawings
- GPS Survey
  - Valves
  - Hydrants
- Hydrant Flow Testing
- History of breaks or leaks

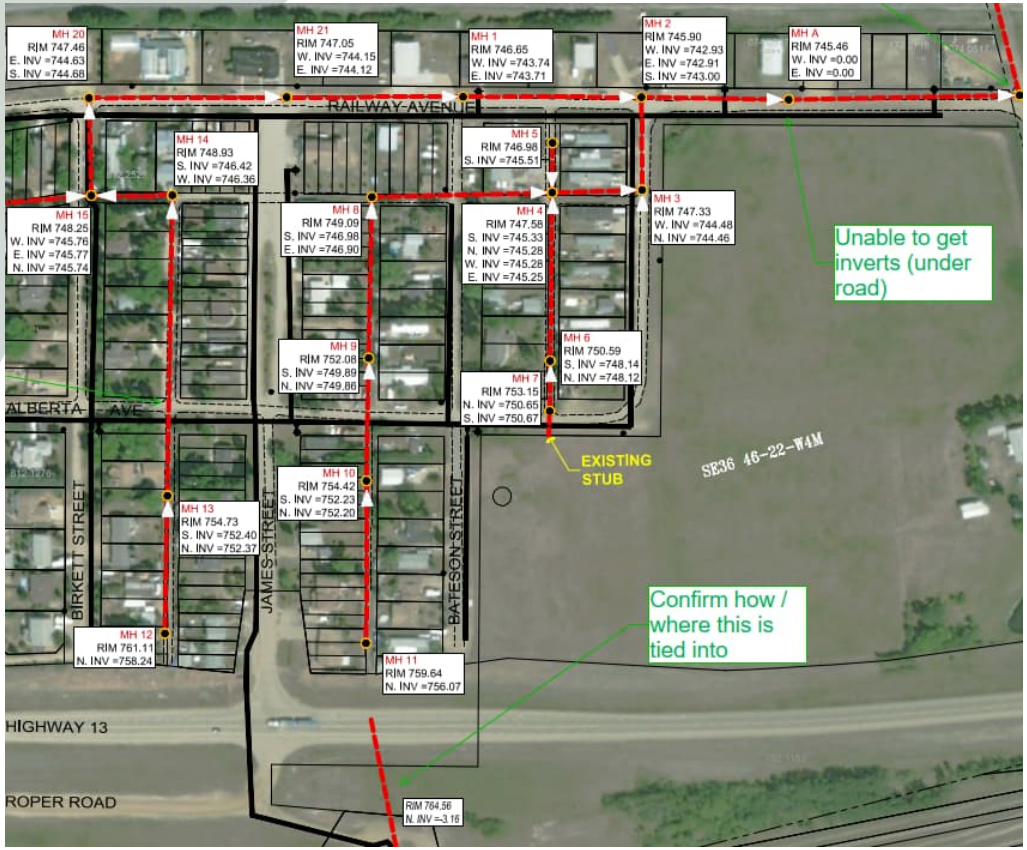
Water System Modeling

- System Layout
- Historical Water Demands
- Fire Flows
- Hydrant Testing
- Results
  - Adequate Pressure
  - Limited Fire Flow

Water System Improvements

- Looping
- Increasing Watermain Diameters
- Additional Hydrants
- Fire Demand Review

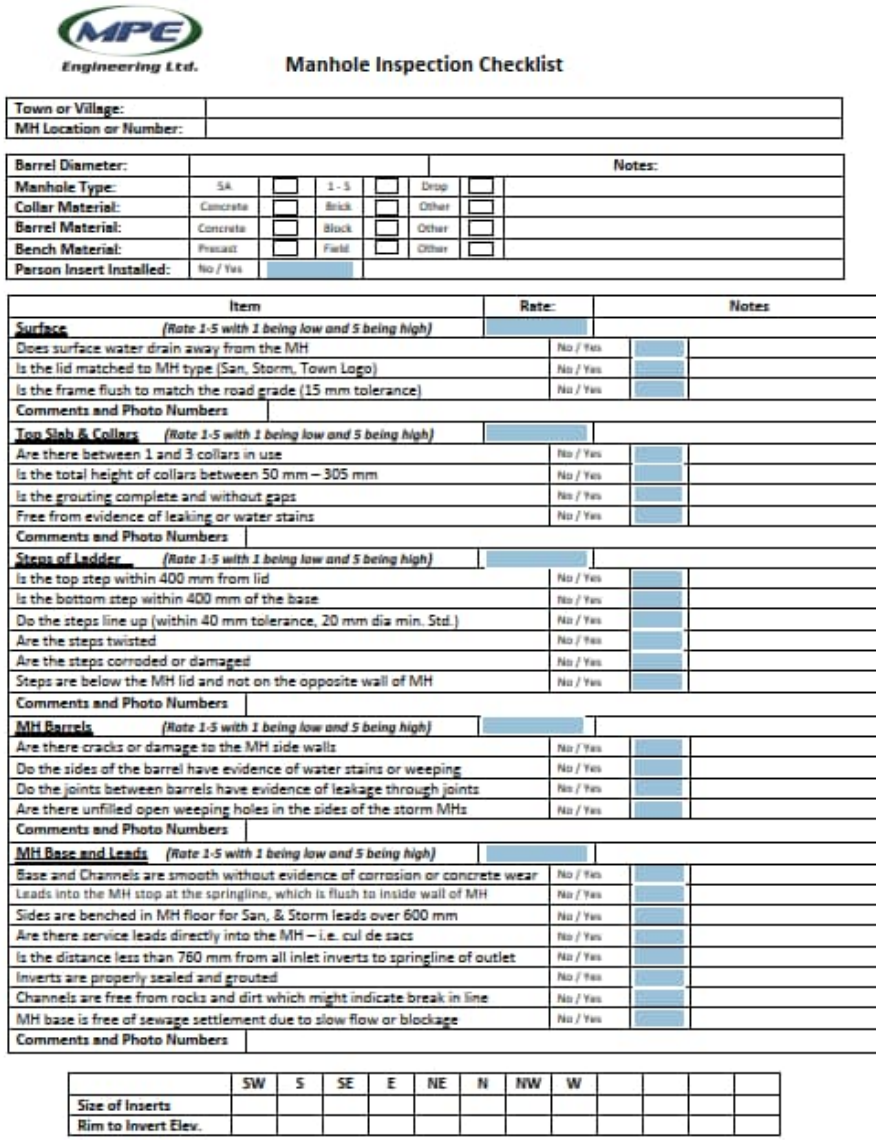
Sanitary Collection



- 2015 Drawings
- GPS Survey
  - Manholes
- Manhole inspections
- Sanitary main camera inspection footage

Manhole Inspections

- Material
  - Concrete
  - Brick
- Surface
  - Inflow
- Top Slab and Collars
- Ladder rungs
- Barrels
- Base and pipe leads
- Measure pipe inverts



MPE Engineering Ltd.

Manhole Inspection Checklist

Town or Village:	
MH Location or Number:	

							Notes:
Barrel Diameter:							
Manhole Type:	SA	☐	1 - 5	☐	Drop	☐	
Collar Material:	Concrete	☐	Brick	☐	Other	☐	
Barrel Material:	Concrete	☐	Block	☐	Other	☐	
Bench Material:	Precast	☐	Field	☐	Other	☐	
Person Insert Installed:	No / Yes						

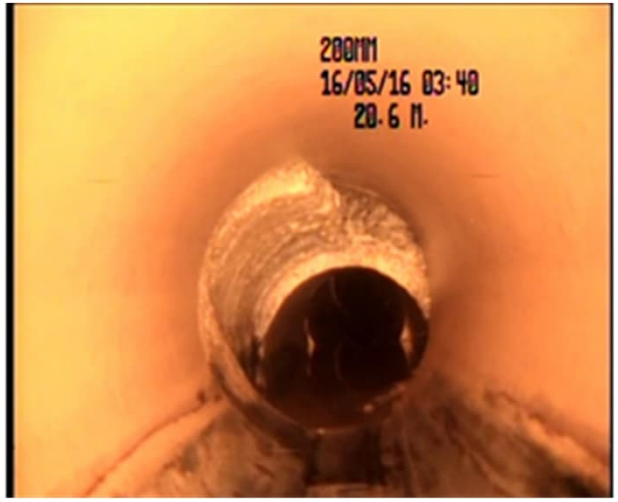
Item		Rate:	Notes
Surface *(Rate 1-5 with 1 being low and 5 being high)*			
Does surface water drain away from the MH	No / Yes		
Is the lid matched to MH type (San, Storm, Town Logo)	No / Yes		
Is the frame flush to match the road grade (15 mm tolerance)	No / Yes		
Comments and Photo Numbers			
Top Slab & Collars *(Rate 1-5 with 1 being low and 5 being high)*			
Are there between 1 and 3 collars in use	No / Yes		
Is the total height of collars between 50 mm – 305 mm	No / Yes		
Is the grouting complete and without gaps	No / Yes		
Free from evidence of leaking or water stains	No / Yes		
Comments and Photo Numbers			
Steps of Ladder *(Rate 1-5 with 1 being low and 5 being high)*			
Is the top step within 400 mm from lid	No / Yes		
Is the bottom step within 400 mm of the base	No / Yes		
Do the steps line up (within 40 mm tolerance, 20 mm dia min. Std.)	No / Yes		
Are the steps twisted	No / Yes		
Are the steps corroded or damaged	No / Yes		
Steps are below the MH lid and not on the opposite wall of MH	No / Yes		
Comments and Photo Numbers			
MH Barrels *(Rate 1-5 with 1 being low and 5 being high)*			
Are there cracks or damage to the MH side walls	No / Yes		
Do the sides of the barrel have evidence of water stains or weeping	No / Yes		
Do the joints between barrels have evidence of leakage through joints	No / Yes		
Are there unfilled open weeping holes in the sides of the storm MHs	No / Yes		
Comments and Photo Numbers			
MH Base and Leads *(Rate 1-5 with 1 being low and 5 being high)*			
Base and Channels are smooth without evidence of corrosion or concrete wear	No / Yes		
Leads into the MH stop at the springline, which is flush to inside wall of MH	No / Yes		
Sides are benched in MH floor for San, & Storm leads over 600 mm	No / Yes		
Are there service leads directly into the MH – i.e. cul de sacs	No / Yes		
Is the distance less than 760 mm from all inlet inverts to springline of outlet	No / Yes		
Inverts are properly sealed and grouted	No / Yes		
Channels are free from rocks and dirt which might indicate break in line	No / Yes		
MH base is free of sewage settlement due to slow flow or blockage	No / Yes		
Comments and Photo Numbers			

	SW	S	SE	E	NE	N	NW	W				
Size of Inserts												
Rim to Invert Elev.												

Manhole Condition Assessment

- 21% Good Condition
- 45% Fair Condition
- 24% Poor Condition
- 10% couldn’t be inspected
- 3 manholes for replacement
- 13 manholes for repairs

Sanitary Main Camera Inspection



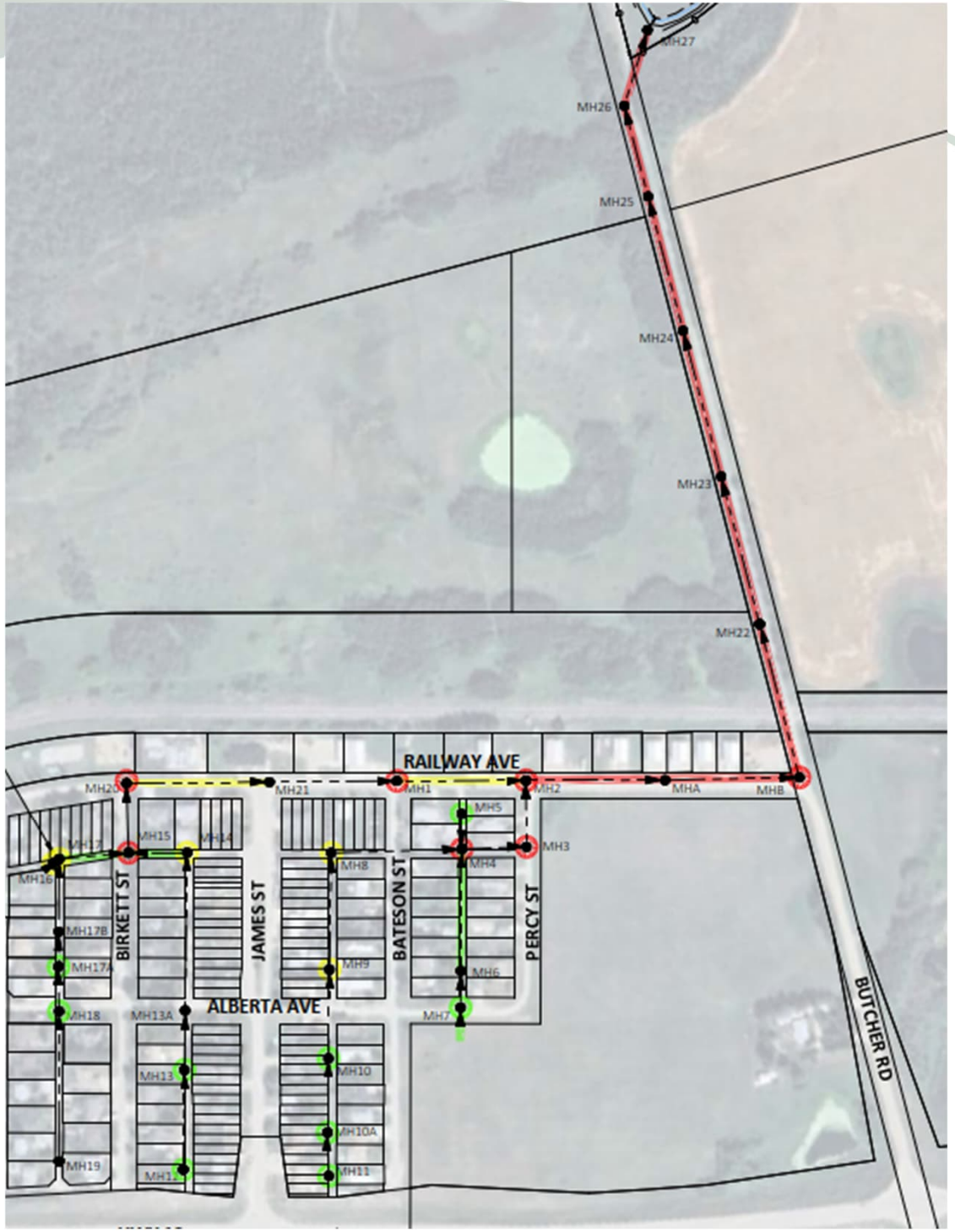
- Cracks
- Exposed Gaskets
- Breaks
- Joint offsets/ gaps
- Sags
- Intrusions
  - Services
  - Roots
  - Mineral deposits

Sanitary Main Condition Assessment

Rating	Percentage (%)
Good	22
Fair	37
Poor	34
Not Rated	7

- Replacement
- Relining
- Spot Repairs
- Modeling

Sanitary Collection System Priority Level



Sanitary Treatment

- Single Cell
- Capacity
- Configuration

Lagoon Condition

- Significant Vegetation Growth
- No Erosion
- Inlet Structure
- Fence Requires Repair

Stormwater Assessment

- Contour Data
- System layout
  - Drainage paths
  - Catch basins
  - Culverts
- GPS Survey
- Collect rainfall data
  - Intensity – Duration – Frequency Curves
  - Various Events

Stormwater Model

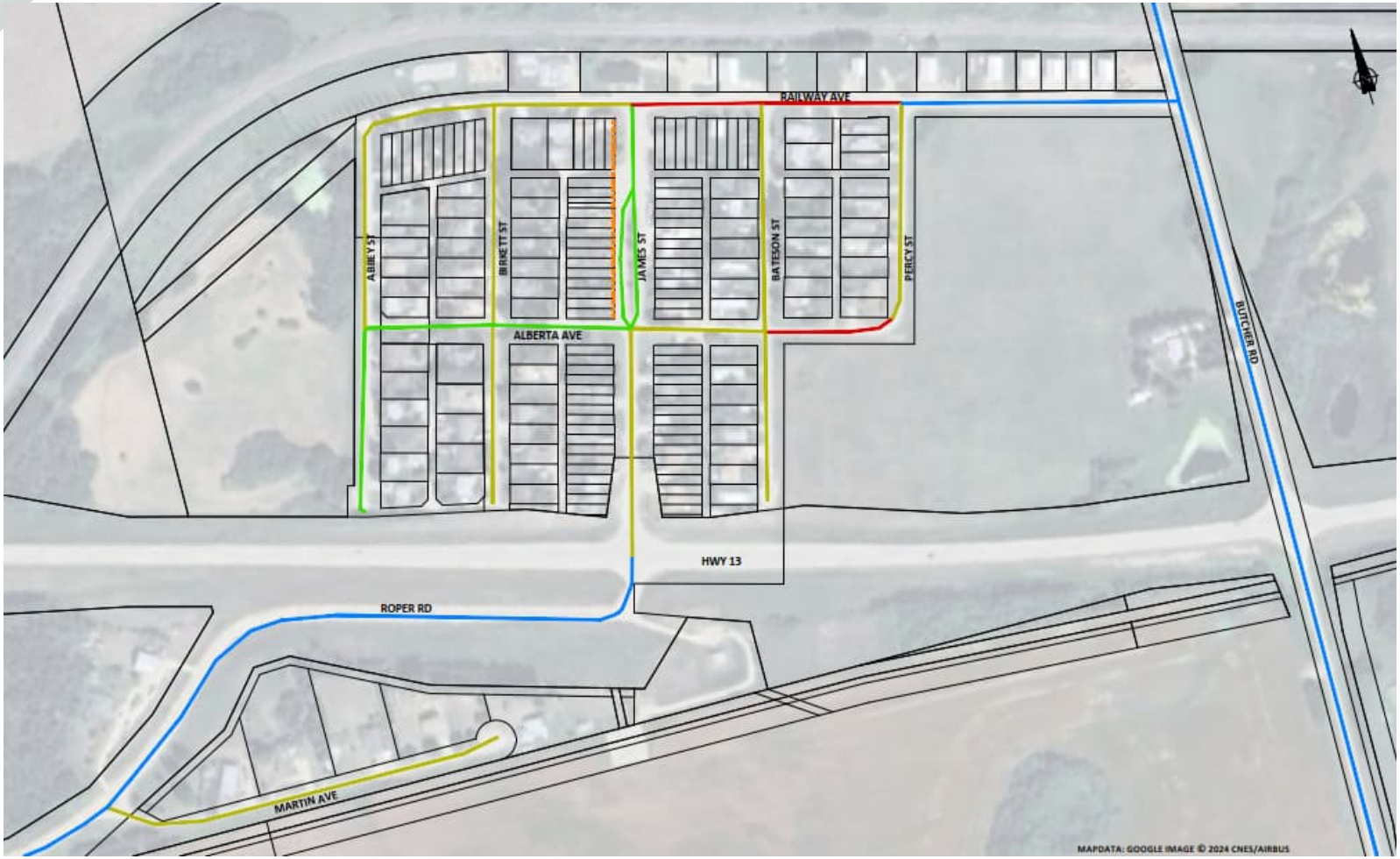
- Model
- Results
  - Flow rates and volumes
  - Areas and extents of ponding
- Model improvements

Transportation Infrastructure

- Field survey
- Record surface deformations
- Summarize pavement condition
- Create maps of Village roads and sidewalks

Roadway Condition

- Recommend rehabilitation
  - Full Mill and Overlay



Building Inspections

- Village owned buildings:
  - Village Office
  - Public Works Shop
  - Community Hall
  - Skate Park/ Skating Rink
  - Cemetery Site
- Assessment:
  - Civil
  - Structural
  - Mechanical
  - Electrical

Village Office

- Deficiencies:
  - Exterior Siding
  - Crack in the Foundation
  - Doors and Overhead Doors
  - Carpet
  - Furnace
  - Washroom Exhaust Fan
  - Condenser
  - Exit Sign Lighting
  - Light Fixtures

Public Works Shop

- Deficiencies:
  - Mezzanine Column
  - Exhaust Switch

Community Hall

- Deficiencies:
  - Railing Fasteners
  - Exterior Siding
  - Painted Surfaces
  - Possible Hazardous Materials
  - Furnace
  - Washroom Exhausts
  - Light Fixtures

Skate Park and Skating Rink

- Deficiencies:
  - Exterior Siding

Cemetery

- Deficiencies:
  - None

Other Infrastructure

- Other Assessments
  - Waste Transfer Site
  - Inventory of Village Owned Equipment

Phase I ESA

- Completed for Village Owned Sites:
  - Skate Park
  - Village Office
  - Public Works Compound
  - Public Works Shop
  - Community Hall
  - Waste Transfer Site
  - Cemetery

- Low Environmental Risk:
  - Skate Park
  - Public Works Shop
  - Waste Transfer Site
  - Cemetery
- Village Office
  - Possible soil contamination
  - Possible hazardous materials
- Public Works Compound
  - Possible soil contamination
- Community Hall
  - Possible soil contamination
  - Possible hazardous materials

Deliverables

- Report
  - Summary of findings
  - Figures for each system
  - Cost Estimates for each system
  - 20-Year Capital Plan
- Inspection Reports
  - Hydrant flow test reports
  - Manhole inspections
- Models
  - Water System
  - Sanitary System
  - Stormwater