



Technical Memorandum

Project:	King Township Water and Wastewater Masterplan Update	
Client Project No.:		TYLin Project No.: 0100477
Date / Time	February 14, 2025 Revised February 14, 2025	
To	Daniel Wilkinson	
From	Steve Hollingworth	
Cc		
Subject	Wastewater Flow Monitoring Analysis Summary	

1 INTRODUCTION

The Township of King retained TYLin International Canada (TYLin) to undertake King’s Water and Wastewater Masterplan Update considering growth forecasts to year 2051. The hydraulic modeling tasks included updating the existing operational models completed in 2022 and converting them into ‘design criteria’ models before applying any growth.

Based on the results of the previous masterplan and subsequent assessments of the systems based on actual water billing and flow monitoring data, it was expected that there would be differences between the operational model and the design criteria model, which may result in some sewers being flagged as having insufficient capacity whereas flow monitoring may show the sewer as having adequate capacity.

In order to assess the degree of conservatism for each system, flow monitoring data has been compared against the output from the existing conditions ‘design criteria’ model. The Township provided flow monitoring data (supplied by York Region) for 14 locations: 4 in King City, 2 in Schomberg and 8 in Nobleton. The monitoring data covered the period from April to November 2024.

The existing conditions model outputs are attached to this memo.

2 FLOW MONITORING ANALYSIS

The flow monitoring data was analyzed to yield the maximum flow rates observed during both dry and wet weather flow conditions. These are compared against the design criteria model flows in the following tables.

Dry Weather Flow Comparison

Location	Monitor ID	Maximum Recorded Flow (L/s)	Model Result (L/s)	Difference
King City	KI001a_10	41.41	17.54 / 393.04*	-58% / 849%
King City	KI001a_20	4.95	3.07	-38%
King City	KI001c_11	3.23	1.54	-52%
King City	KI001c_20	5.12	5.32	4%
Schomberg	KI002_20	4.59	19.67	329%
Schomberg	KI003	3.89	19.29	396%
Nobleton	KI004a_11	29.7	31.86 / 68.54*	7% / 131%
Nobleton	KI004a_20	7.82	7.93	1%
Nobleton	KI004b	16.27	9.37 / 46.05*	-42% / 183%
Nobleton	KI-005-PB	19.07	5.13 / 41.81*	-73% / 119%
Nobleton	KI-006	5.81	1.9	-67%
Nobleton	KI-008	2.08	7.35	253%
Nobleton	KI-009_ml01	9.45	2.26	-76%
Nobleton	KI-010	7.21	2.46	-66%

* Based on upstream sanitary pump stations operating at minimum and maximum capacities

Wet Weather Flow Comparison

Location	Monitor ID	Maximum Recorded Flow (L/s)	Model Result (L/s)	Difference
King City	KI001a_10	114.8	77.7 / 453.21	-32% / 295%
King City	KI001a_20	7.67	6.02	-22%
King City	KI001c_11	10.85	7.35	-32%
King City	KI001c_20	43.76	16.03	-63%
Schomberg	KI002_20	6.09	31.94	424%
Schomberg	KI003	7.56	34.37	355%
Nobleton	KI004a_11	72.82	80.68 / 117.37	11% / 61%
Nobleton	KI004a_20	35.82	18.51	-48%
Nobleton	KI004b	35.08	20.4 / 57.08	-42% / 63%
Nobleton	KI-005-PB	38.48	10.607 / 47.29	-72% / 23%
Nobleton	KI-006	12.46	7.47	-40%
Nobleton	KI-008	10.05	20.93	108%
Nobleton	KI-009_ml01	26.46	9.94	-62%
Nobleton	KI-010	18.22	4.95	-73%

* Based on upstream sanitary pump stations operating at minimum / maximum capacities

3 DISCUSSION OF RESULTS

3.1 King City

The results from the first row in the table (KI001a_10) should not be considered, as there are 6 pumping stations located upstream of this flow monitor and the steady-state design criteria model can only represent these at their maximum or minimum pumping rates. The remaining three gauges suggest that the design criteria model is underpredicting flow rates under both dry weather and wet weather flow conditions.

Given this unexpected result, the flow monitoring data was reviewed by comparing the depth and velocity values in the data. The analysis suggests that there may be issues with the quality of the data (i.e. depth remains relatively static across all recorded velocities).

In addition, the flow comparison was made using the existing conditions model, which excludes recently approved and constructed developments. It is possible that some developments not included in our baseline existing conditions model have been occupied and are generating sanitary flows.

3.2 Schomberg

The design criteria model is significantly over-predicting maximum flow rates relative to the monitoring data recorded at the two gauges in Schomberg. This is consistent with past observations of monitoring data, billing rates and other data which show lower than typical water use in Schomberg. Flow monitoring data was also screened for the two Schomberg gauges, and did not reveal any significant concerns with the quality of the data.

3.3 Nobleton

Three of the 8 flow gauges in Nobleton are located downstream of a single pumping station. As noted in the discussion of data for King City, it is difficult to make meaningful comparisons against data recorded downstream of pumping stations, but it is noted that the observed flows generally fall between the modelled rates under minimum and maximum pumping capacities.

A screening of the data suggests that there may be issues with some of the gauges (KI004a_11, KI-009_ml01, and KI-010). Of the remaining gauges that have apparently valid data and are independent of pumping stations, two are significantly under-predicting maximum flow rates, and one is significantly over-predicting peak flow rates. It is possible that the existing conditions model did not capture some recent developments which were contributing flows during the monitoring period, or that different areas of Nobleton generate sanitary flows at rates that differ from design criteria. Note finally that at all locations with valid data, the pipes were less than half full at maximum flow rates.

4 IMPLICATIONS AND RECOMMENDATIONS

4.1 King City

For King City, there are few conclusions that can be drawn from the flow monitoring analysis, given the potential issues with data quality and relatively poor comparison with observed flows. **It is therefore recommended to maintain the Township's current level of service criteria for King City.**

4.2 Schomberg

For Schomberg, the model results appear to be very conservative relative to the observed flow monitoring data.

Given the degree of conservatism, it is recommended that the level of service criteria for Schomberg be relaxed. **It is recommended that pipes be allowed to surcharge under wet weather flow conditions, and upgrades not be triggered as long as the hydraulic grade line in surcharging sewers remains below basement levels.** In other words, there would be no criteria related to the ratio of flow to capacity, and any decisions for replacement would be based

exclusively on the elevation of the hydraulic grade line relative to basement elevations. With this approach, the degree of conservatism in the models effectively achieves a freeboard to basement elevations in wet weather flow events.

4.3 Nobleton

For Nobleton, it is difficult to draw conclusions from the monitoring data. There may be issues with the quality of the data at some locations, other locations are influenced by upstream pumping stations, and the comparison at remaining stations does not show a consistent pattern. The model is overpredicting flow rates at one location, and underpredicting flow rates at two locations.

Given the above, **it is recommended to maintain the Township's current level of service criteria for Nobleton.**

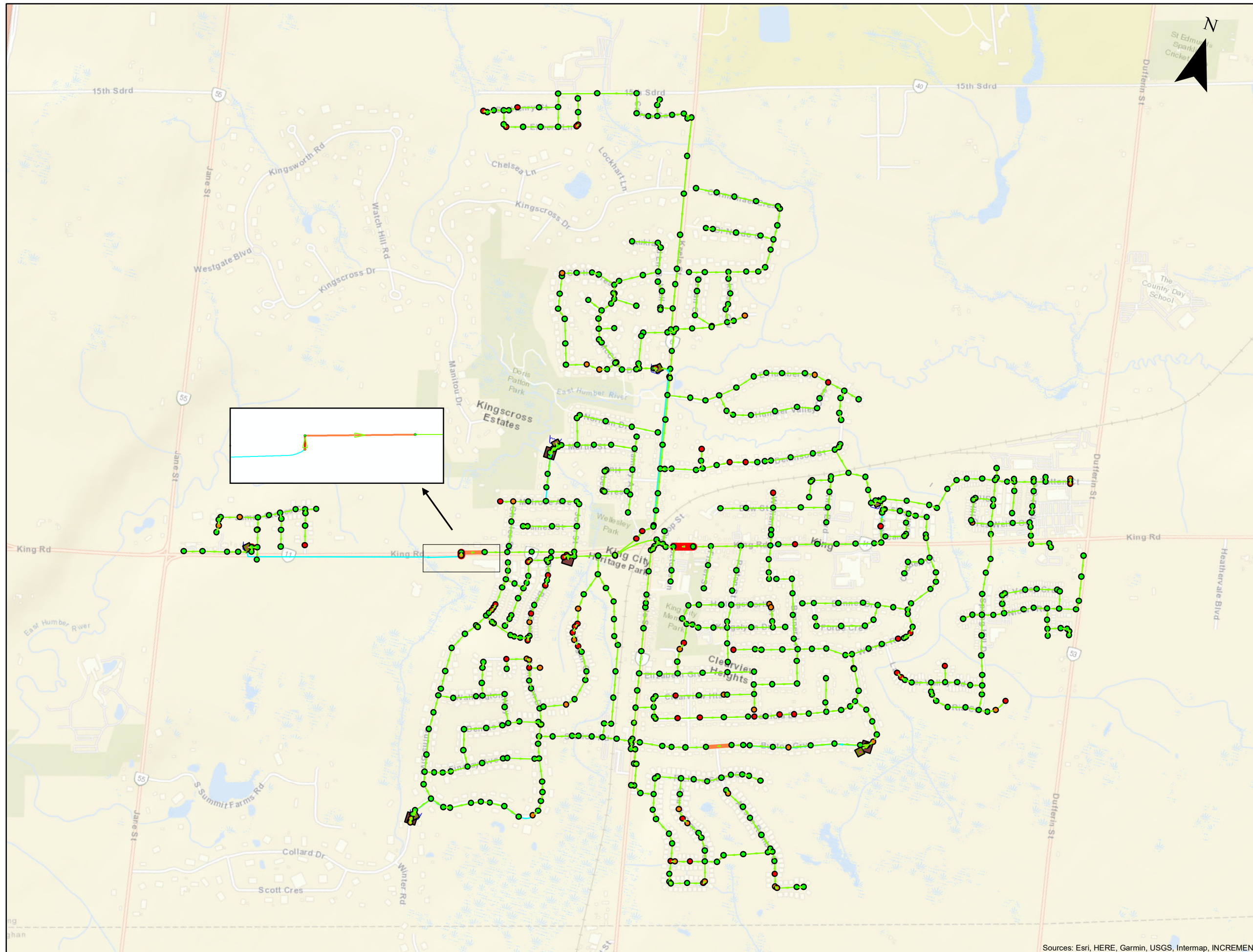
Should you have any questions or concerns regarding the information noted, please do not hesitate to contact the undersigned.

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APPENDIX A

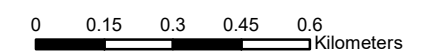


- Legend**
- Manhole**
- UNFILDEPTH**
- Less than 1.5 m
 - 1.5 ~ 2.0 m
 - Greater than 2.0 m
- Gravity Main**
- Q_OVER_Q**
- Less than 85%
 - 85% - 100%
 - Greater than 100%
- Outlet**
- <all other values>
- TYPE**
- Active
 - Domain
 - Inactive
- Forcemain**
- <all other values>
- TYPE**
- Active
 - Domain
 - Inactive
- Pump**
- <all other values>
- TYPE**
- Active
 - Domain
 - Inactive

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King Wastewater Master Plan Update

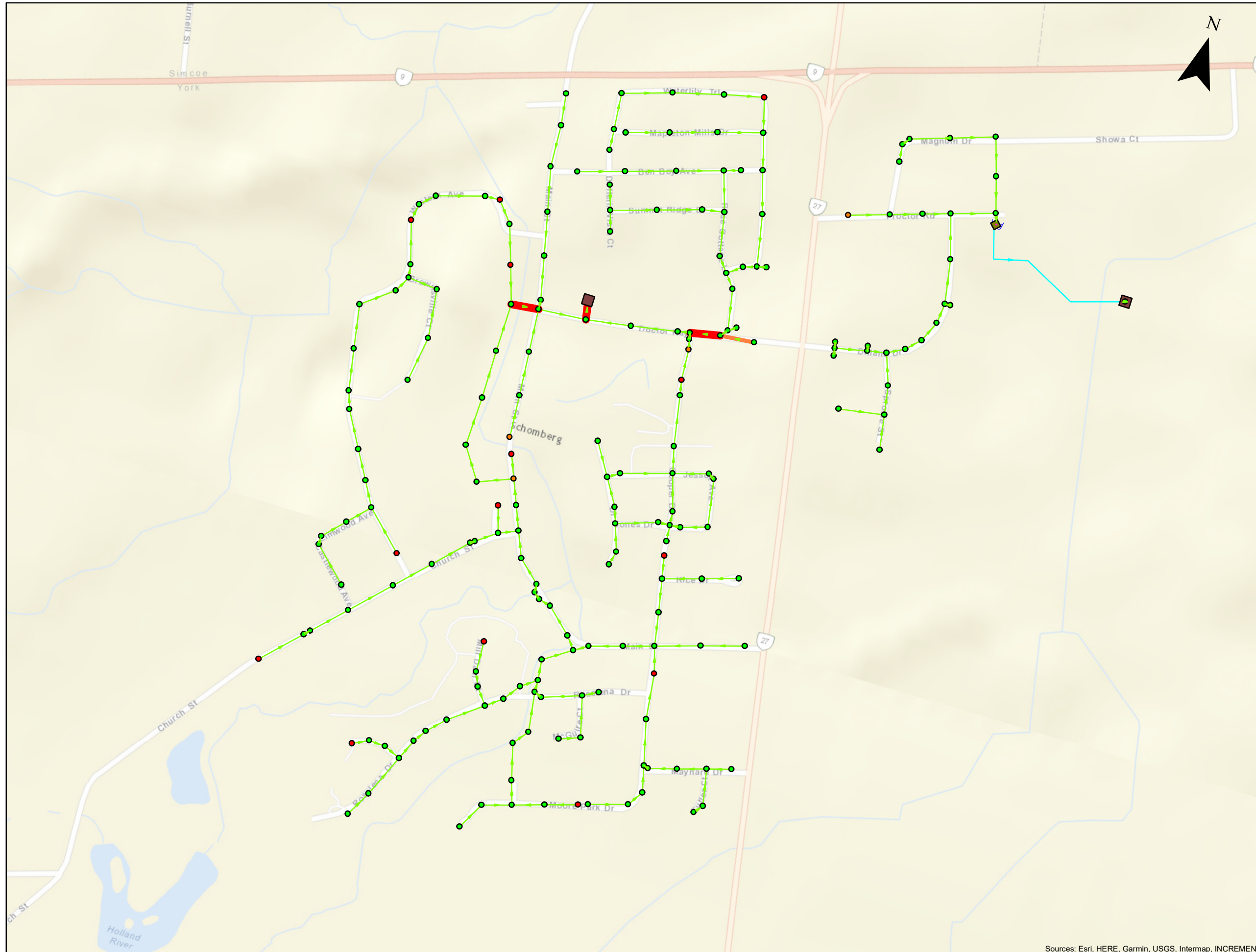
Existing without Developments
Wet Weather Condition-King City



Project No:
100447

December 2024

Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT



Legend

Manhole

UNFILDEPTH

- Less than 1.5 m
- 1.5 ~ 2.0 m
- Greater than 2.0 m

Gravity Main

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- 85% - 100%
- Greater than 100%

Outlet

- <all other values>

TYPE

- Active
- Domain
- Inactive

Forcemain

- <all other values>

TYPE

- Active
- Domain
- Inactive

Pump

- <all other values>

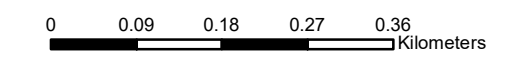
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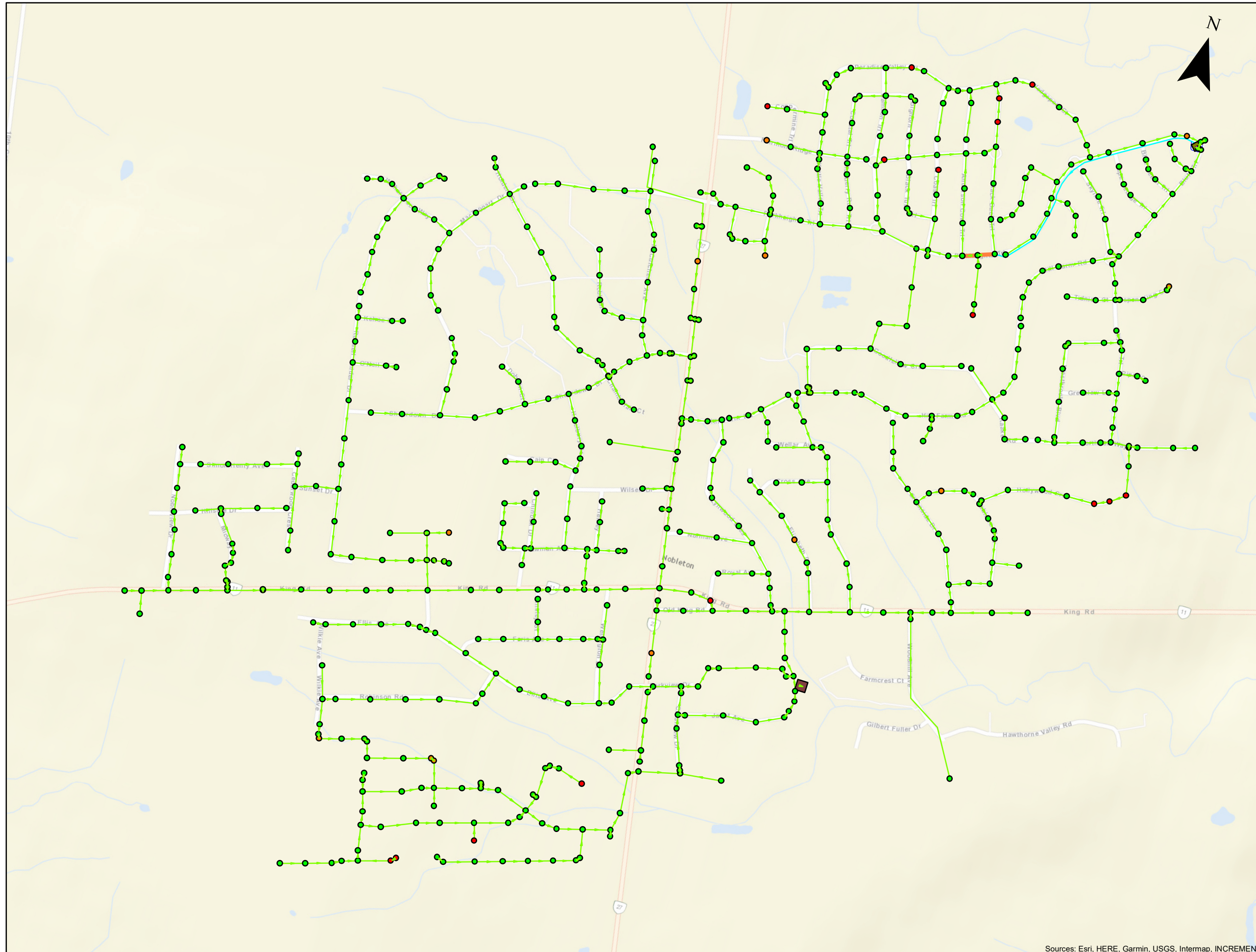
King Wastewater Master Plan Update

Existing without Developments
Wet Weather Condition-Schomberg



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Legend

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TYPE

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- Domain
- Inactive

Forcemain

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TYPE

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- Domain
- Inactive

Pump

- <all other values>

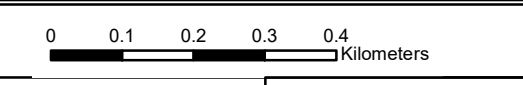
TYPE

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- Domain
- Inactive



King Wastewater Master Plan Update

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Wet Weather Condition-Nobleton



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