

Council Status Update

Date: November 8, 2016



URBAN CENTRE WASTEWATER SERVICING



Class Environmental Assessment Phase 3 & 4



Hutchinson
Environmental Sciences Ltd

Purpose of Presentation

- To provide Council with an Update on the Status of the Class Environmental Assessment (Class EA) before engaging the Public, regarding the background documents, through the Nov. 24, 2016 Public Liaison Committee (PLC) and Public Information Centre (PIC) in early 2017;
- No direction is being sought from Council, until after input is received from the public, via the Public Liaison Committee, approval Agencies and the Public Information Centre in early 2017,

Background

- The project was started in March 2016 and called for the update/ completion of Phase 2 of the Class EA this year;
- Phase 3 is scheduled to be completed in 2017 with Phase 4, including the Environmental Study Report (ESR)m being completed in spring of 2018;
- As a reminder:
 - The 2014 Servicing and Settlement Master Plan (SSMP) prepared by BM Ross was based on servicing 6,000 population based on a wastewater flow of 2,610 m³/d and a phosphorus limit of 0.15 mg/l in the treated effluent. This equated to a new population growth of approximately 1,500 persons;
- During this presentation you will see that it is “possible” to service a higher population while still protecting water quality in the West Credit River;

Work Completed to Date

The following tasks have been completed to date :

- Establishment of a Core Management Team (CMT) and Public Liaison committee (PLC) for project consultation;
- Topographical Surveys to support detailed analysis of the proposed collection system;
- Document existing septic system data collection and analysis;
- Evaluating potential wastewater flows from the existing areas to be serviced;
- Evaluating potential wastewater flows from new growth areas defined in the Town Official Plan;
- Review of the low flow conditions in the West Credit River (7Q20);
- Field work and analysis associated with assimilating treated sewage effluent into the West Credit River;
- Determining limits to wastewater servicing based on what can be assimilated into the West Credit River;
- Developing and defining alternatives for Wastewater Collection System Alternatives ;
- Reviewing all results with the CMT including the MOECC and CVC.

Deliverables Proposed for release for Next PLC Meeting

- 1. Septic System Survey Technical Memorandum**
 - Defining which existing properties are proposed to be serviced;
- 2. 7Q20 Flow Technical memorandum for Flows in the West Credit River**
- 3. Technical Memorandum providing a summary of the results of the Assimilative Capacity Study (ACS);**
 - Defining what discharge limits are to be met by the proposed Wastewater Treatment Plant for servicing alternatives;
- 4. Technical Memorandum On Proposed Wastewater System Capacity**
 - Defining flows from existing areas and new growth areas;
 - Defining discharge flows and effluent requirements to protect the river;

Water Quality in the West Credit River

- West Credit River Field Studies were completed throughout the summer;
- Water quality sampling was carried out at 10th Line and Winston Churchill;
- CVC participated in the work alongside our team;

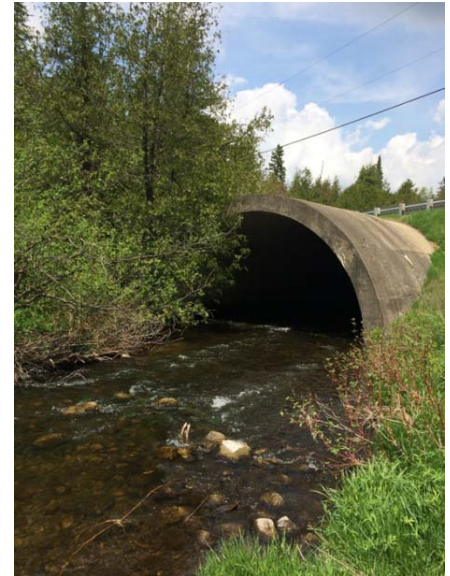
Results:

- Very good water quality
- Low concentrations of nutrients
- Excellent dissolved oxygen conditions

Water Quality Sampling Events	10 th Line	Winston Churchill
May 27	WQ, flow	N/M
June 29	WQ, flow	flow
Jul 27	WQ, flow	flow
Aug 25	WQ, flow	flow
Sept 28	WQ, flow	flow

Water Quality in the West Credit River

- Existing Total phosphorus (TP) concentrations in West Credit River are low (0.016 mg/L) and well below the Provincial Water Quality Objective of 0.03 mg/L;
- MOECC/CVC suggested development of a Site Specific Water Quality Objective (SSWQO) for TP downstream of the wastewater outfall:
 - To protect the cold water habitat and trophic (nutrient) status of the river;
 - To protect brook trout and aquatic community;
- A SSWQO of 0.024 mg/L TP is recommended based on guidance by Environment Canada and CCME;
- This provides a higher level of protection for the river over the 0.03 mg/L recommended in the SSMP.



7Q20 Value for West Credit River at 10th Line

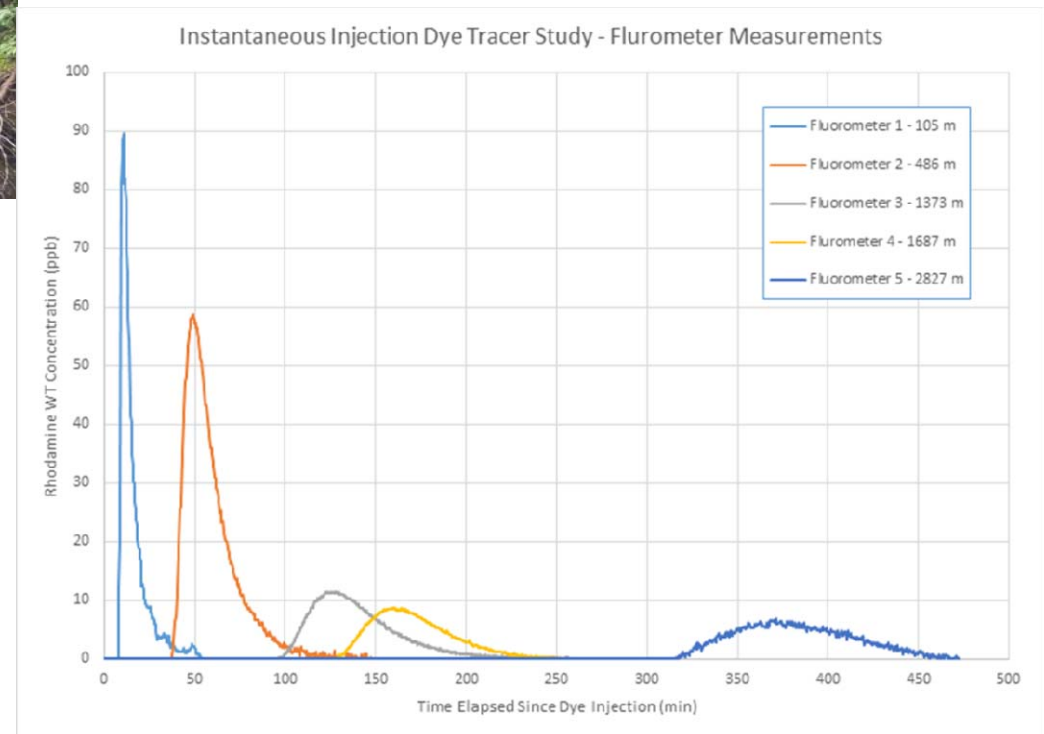
The Lowest 7-day average flow in a 20 year period is used in the assimilative capacity study to assess the effect of any discharge on the river under low flow conditions:

- Credit Valley Conservation (CVC) developed the 7Q20 in conjunction with the completion of the 2014 SSMP, prepared by BM Ross and then updated the value this past summer;
- Our team peer reviewed and confirmed the 7Q20 flow at 225 Litres/second (0.225 m³/s). Note: 2014 SSMP identified 202 L/s;
 - This includes a 10% reduction factor for future climate change.

Water Quality in the West Credit River



- Dye tracer study was conducted on August 25, 2016;
- Dye was injected 75 m downstream of 10th Line (outside influence of beaver dam);
- Results used as input into water quality model for Assimilative Capacity Study.



Assimilative Capacity Water Quality Modeling

- Mass Balance modelling of key limiting parameter – Total Phosphorus
- Detailed Assimilation Modeling Using Final Effluent Flow and Water Quality Targets
 - **CORMIX**
 - Size and shape of plume
 - Water quality in mixing zone
 - Total ammonia (unionized ammonia)
 - **QUAL2K**
 - Water quality beyond point of complete mixing
 - Dissolved oxygen, temperature, ammonia, nitrate



Recommended Effluent Limits for WWTP to meet Provincial Water Quality Guidelines in West Credit River

Parameter	Stage 1 (Effluent flow of 3,380 m ³ /d)	Full Build Out (Effluent flow of 7,172 m ³ /d)
pH	Within range of 7 – 8.6	
Total suspended solids	5 mg/L	
Total phosphorus	0.07 mg/L	0.045 mg/L
Total ammonia nitrogen	1.3 mg/L summer; 2 mg/L winter	0.7 mg/L summer; 2 mg/L winter
Nitrate nitrogen	5 mg/L	
E.coli	100 cfu/100 mL	
Dissolved oxygen	4 mg/L	
5-day carbonaceous biochemical oxygen demand (CBOD5)	5 mg/L	

Objective of Septic System Survey

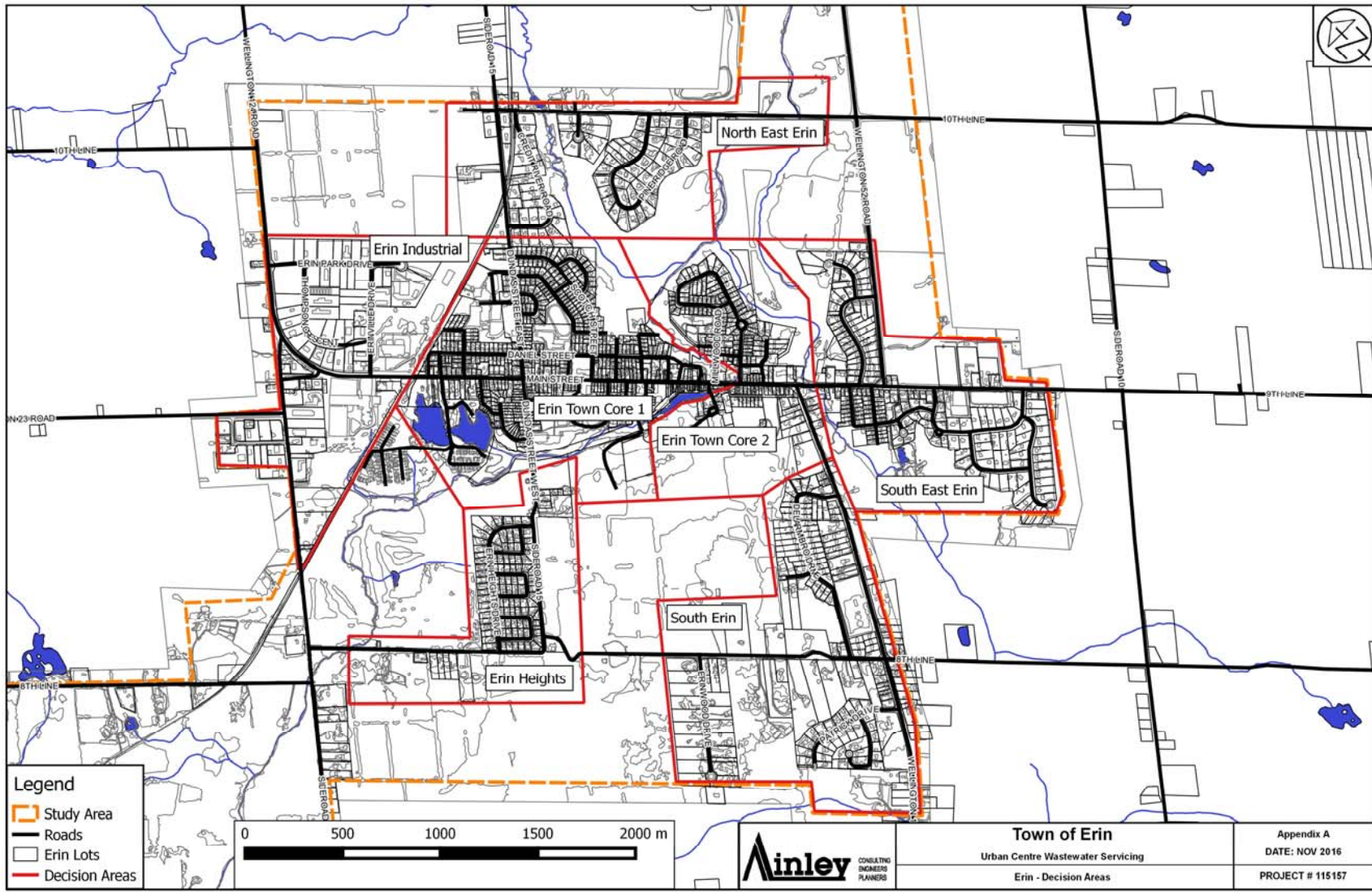
To access existing private/septic systems in more detail in order to define the extent of the area to be serviced by the proposed Municipal Wastewater Treatment Plant (WWTP).

- The Servicing and Settlement Master Plan (SSMP) prepared by BM Ross in 2014 recommended most of the core areas of Erin and Hillsburgh be serviced by a wastewater collection and treatment system;
- We obtained and Reviewed Building Department Records:
 - Addresses, legal descriptions, owner information, well type and available septic information including: type, tank size, and filter bed size;
 - Individual septic records that included lot property location surveys, septic installation/alteration permits, inspection records, for approximately 1,200 properties in Erin and Hillsburgh;
- Prepared Detailed Drawings from Town GIS Property Fabric;
- Established a database of all existing septic systems.

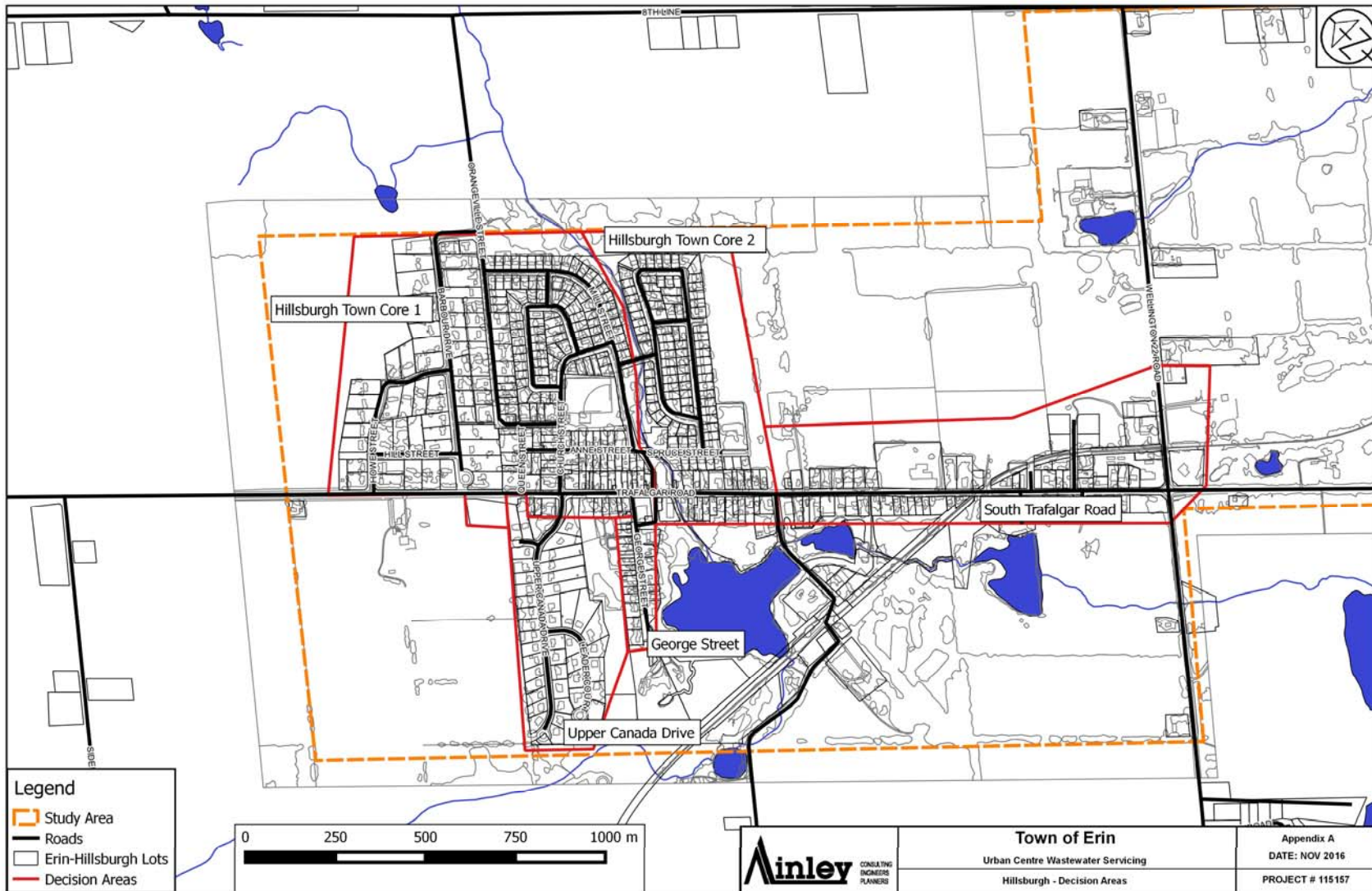
Decision Areas

- A wastewater collection system typically services a defined area and generally all properties within that defined area are serviced;
- The decision to define the various wastewater service areas in Erin and Hillsburgh is made on an area by area basis;
- Therefore; Erin and Hillsburgh were divided into decision areas;
- Preliminary recommendations on whether to connect to a communal wastewater system were made for each decision area;
- Erin was divided into 7 decision areas and Hillsburgh was divided into 5 areas
- Refer to following Drawings for Erin and Hillsburgh

Map of Erin – Septic System Survey



Map of Hillsburgh – Septic System Survey



Septic System Analysis

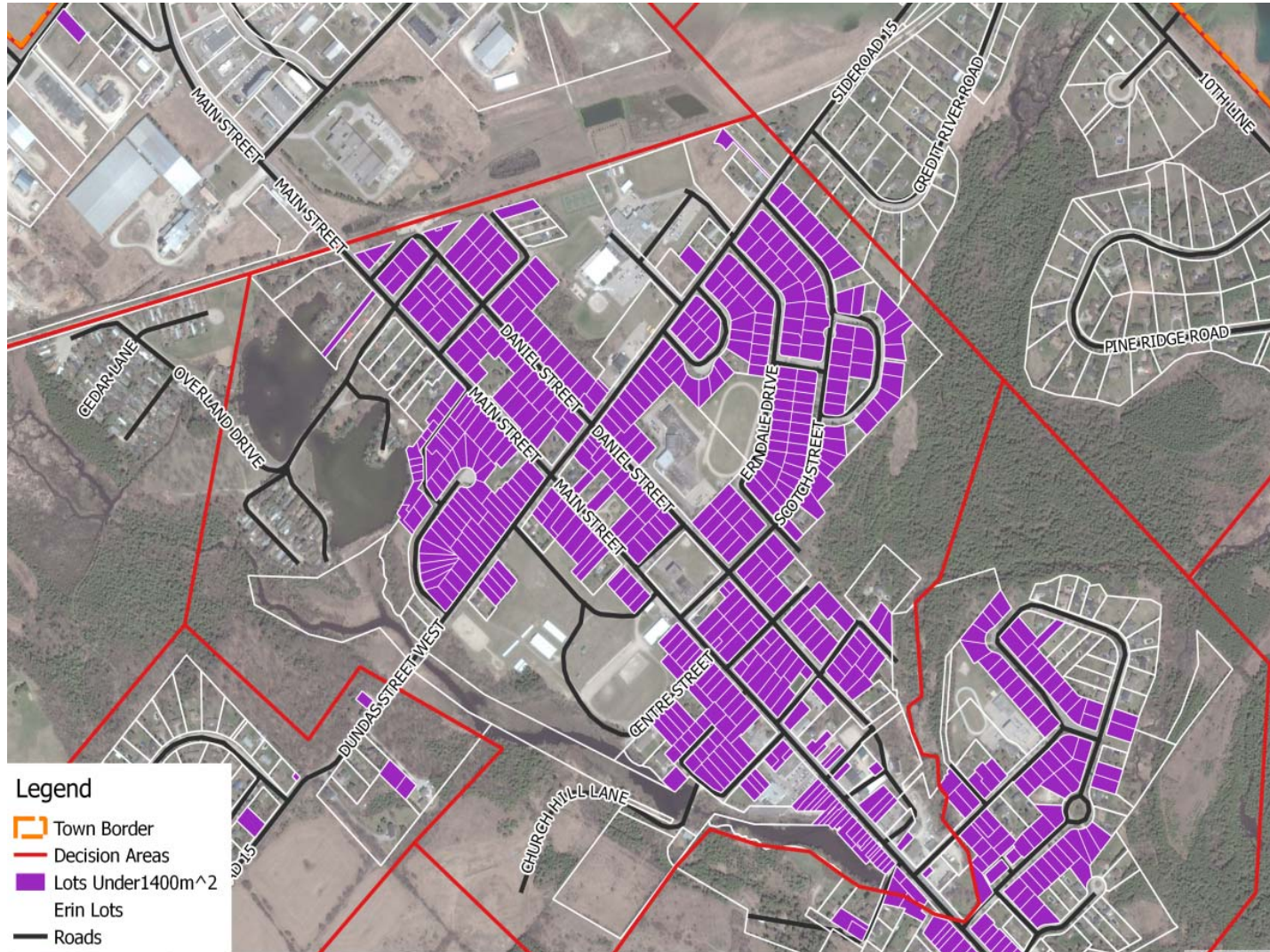
Decision Area	Location
Erin Industrial Area	North Industrial/Commercial area
Erin Town Core 1	North area either side of Main Street
Erin Town Core 2	South area either side of Main Street
South East Erin	South East Study area boundary
Erin Heights	Erin Heights Subdivision
South Erin	Wellington 124/ 8 th Line area
North East Erin	10 th Line/Ridge Road
Hillsburgh Town Core 1	North of Mill Street/East of Trafalgar
Hillsburgh Town Core 2	South of Mill Street/North of Station St
South Trafalgar Road	Trafalgar South of Station Street
George Street	George Street
Upper Canada Drive	Upper Canada Drive Subdivision

Decision Criteria

- Whether the private systems in an area can continue to perform and meet applicable regulations as they are replaced/repaired
 - Criteria used is lot size (less than 1,400 m²)
- Whether they presently comply with applicable regulations
 - Criteria used is tank size (less than 3,600 litres)
- The risk of failure and contamination of surface water
 - Criteria used is age of system
- Whether the system is within a wellhead protection area
 - 2015 Annual Report by WSP Consulting

Erin Town Core 1

Example:
Erin Town
Core Area 1



Erin Town Core 1

- Of the 521 properties, 449 (86%) are below the minimum 1,400m² lot area for septic replacement;
- The septic tank size data is available for 228 lots. Of those lots, 22% have septic systems with a tank that is below 3,600L in working capacity, which would not comply with section 8.2.2.3 of the Ontario Building Code;
- A portion of properties on the Main St of Erin are still using holding tanks as their current septic system. This type of septic system would also not comply with section 8.2.2.3 of the Ontario Building Code;
- The average age of the septic systems in this area is 39 years.

Based on this it is recommended that Erin Town Core 1 be connected to the Municipal wastewater collection system

Recommendation Summary

Decision Area	Connection Recommendation
Erin Industrial Area	Connect to Wastewater Collection System
Erin Town Core 1	Connect to Wastewater Collection System
Erin Town Core 2	Connect to Wastewater Collection System
South East Erin	Connect to Wastewater Collection System
Erin Heights	Connect to Wastewater Collection System
South Erin	Do not connect to Wastewater Collection System
North East Erin	Do not connect to Wastewater Collection System
Hillsburgh Town Core 1	Connect to Wastewater Collection System
Hillsburgh Town Core 2	Connect to Wastewater Collection System
South Trafalgar Road	Connect to Wastewater Collection System
George Street	Connect to Wastewater Collection System
Upper Canada Drive	Do not connect to Wastewater Collection System

Effects of Different Effluent Phosphorus Concentrations

- Using Assimilative Capacity Study (ACS), discharge scenarios were developed on the basis of reaching specified downstream phosphorus concentrations in the West Credit River:

Effluent Phosphorus Concentration (mg/L)	Discharge Potential (m ³ /d)
0.15 mg/L	1,234
0.1 mg/L	2,050
0.07 mg/L	3,380
0.05 mg/L	5,982
0.046 mg/L	7,172

Developing Projected Wastewater Flows

Existing Service Areas

- Flow estimates developed for each “decision area”;
- Flow criteria applied at the individual lot level to determine the flow estimate including residential, institutional, commercial and industrial flows;
- Includes estimates for servicing from undeveloped lots and intensification within the existing areas;
- To service the existing areas, that are recommended for servicing, generates a service population of 4,270. Adding infill and intensification will result in a serviced population of 4,616.

New Growth Areas

- Growth areas were established from the Town Official Plan and verified with County of Wellington Planning Department;
- The same flow criteria used for existing areas was used at the density recommended by County of Wellington Planning Department.

Residential Potential Populations and Wastewater Flows

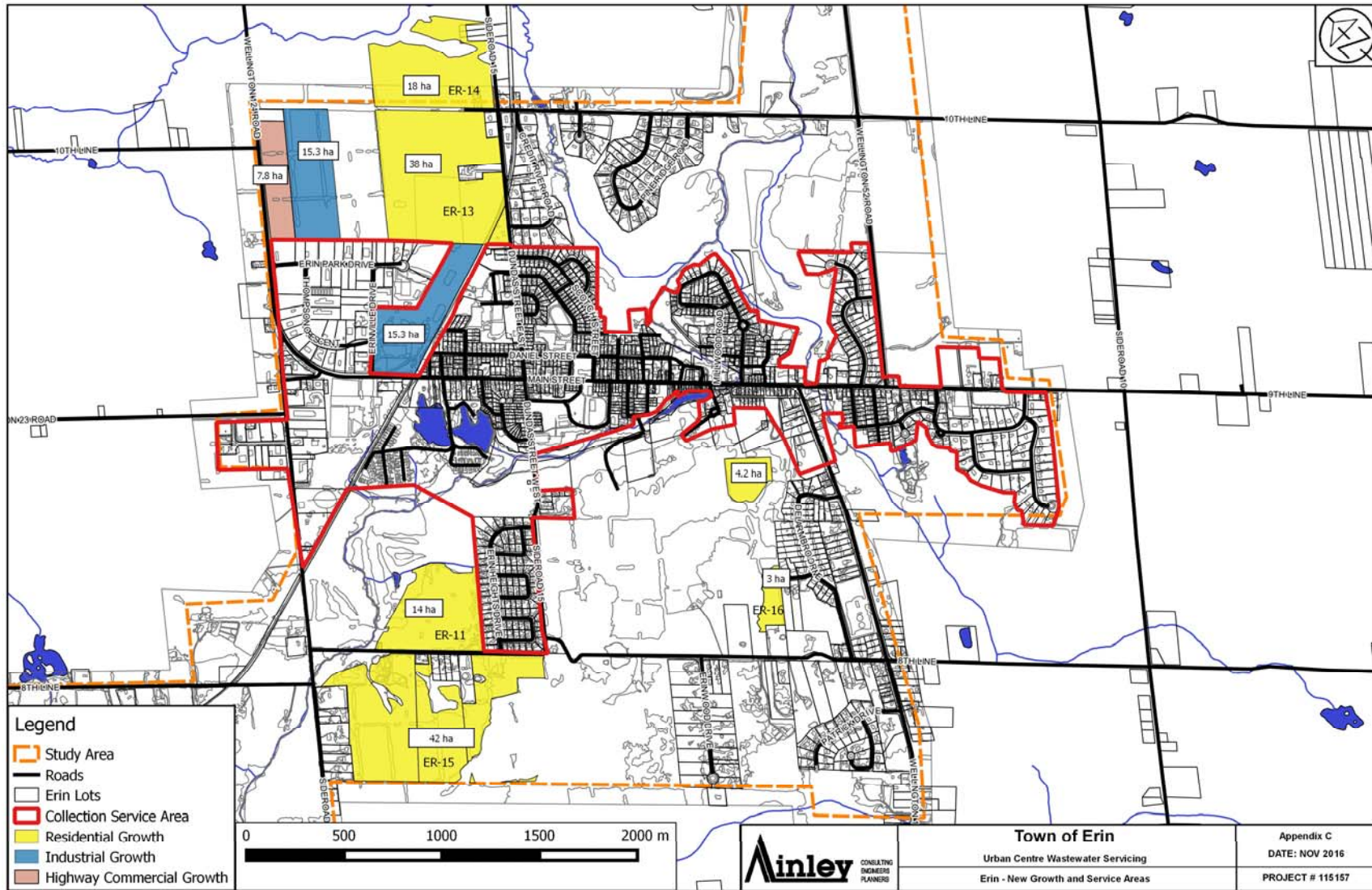
- Residential Populations from Existing Areas & new Growth Areas were calculated to determine Total Population associated with Full Build Out of the Town’s Official Plan;
- Wastewater Flows from Existing Areas and new Growth Areas were calculated to identify total Wastewater Flows from Full Build Out of the Town’s Official Plan.

	Erin		Hillsburgh		Total	
	Population	Flows (m ³ /day)	Population	Flows (m ³ /day)	Population	Flows (m ³ /day)
Existing Community	3,225	2,244	1,391	599	4,616	2,844
Growth Areas	5,340	2,523	4,603	1,806	9,943	4,329
Total	8,565	4,767	5,994	2,405	14,559	7,172

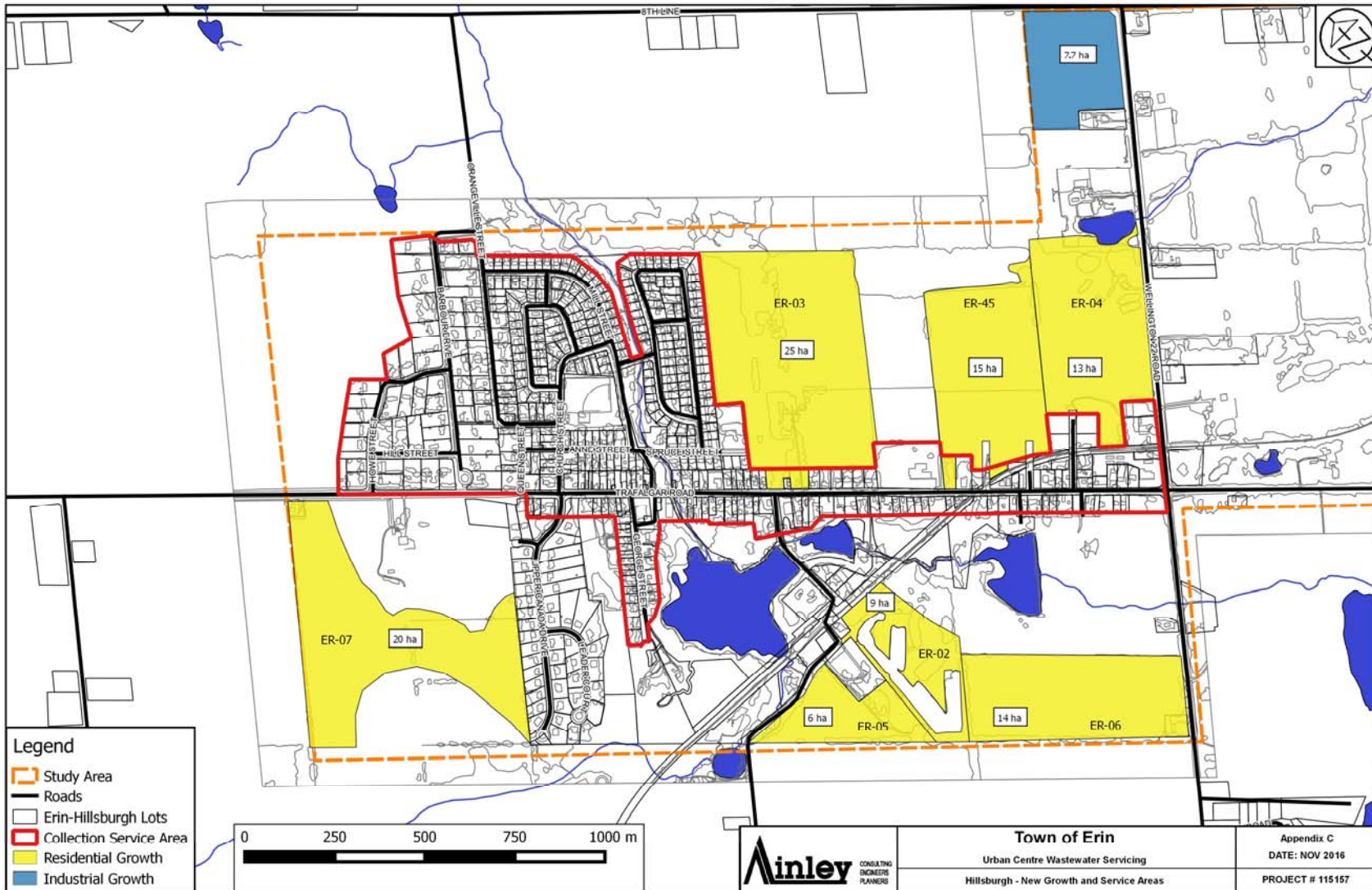
Residential Potential Populations and Wastewater Flows

	Residential Population	Equivalent Population for Non Residential (Inst/Comm/Ind)	Proposed Wastewater Flows ADF (m ³ /d)	TP Effluent Discharge Concentration (mg/L)
Fully Service Existing Community	4,616	2,866	2,844	0.079
Potential Stage 1 Servicing	6,029	2,866	3,380	0.07
Potential Stage 2 Servicing	12,876	2,866	5,982	0.05
Full Build Out of Town's Official Plan	14,559	4,314	7,172	0.046

Map of Erin - New Growth Areas



Map of Hillsburgh - New Growth Areas



Observations and Preliminary Recommendations

The 2014 Servicing and Settlement Master Plan (SSMP) does not represent a realistic wastewater system capacity scenario based on either downstream phosphorus limits in the West Credit River or based on available wastewater treatment technologies;

The SSMP recommended a downstream TP of 0.03 mg/l in the West Credit River whereas we have determined a Site Specific Water Quality Objective of 0.024 mg/l;

The SSMP identified a wastewater flow to service a population of 6,000, our work establishes the wastewater flows necessary to service existing communities and growth areas defined in the Town's Official Plan

Based on the results of the Assimilative Capacity Study, the following TP effluent Limits would need to be met from a Wastewater Treatment Plant to service the existing communities and new growth:

- To fully service Existing Communities with infill growth 0.079 mg/l
- To service Full Build Out of the Town Official Plan 0.046 mg/l

Treatment Technologies are available to achieve these effluent limits.

Observations and Preliminary Recommendations

Stage 1 – Effluent Phosphorus Limit 0.07 mg/L

A phosphorus effluent compliance limit of 0.07 mg/L with an operational objective of 0.05 mg/l which would:

- Accommodate a residential population of 6,029, plus 2,866 non-residential (Inst/Comm/Ind) equivalent made up of a combination of:
 - Existing lots, existing infill and intensification;
 - New growth;
- Allow the Wastewater Treatment Plant to be operated to demonstrate reliable performance under 0.05 mg/l sufficient to apply for rating to meet Stage 2 limits.

Observations and Preliminary Recommendations

Stage 2 – Effluent Phosphorus Limit 0.05 mg/L

A phosphorus effluent compliance limit of 0.05 mg/L with an operational objective of 0.04 mg/l which would :

- Accommodate a residential population of 12,876, plus 2,866 non-residential (Inst/Comm/Ind) equivalent made up of a combination of:
 - Existing lots, existing infill and intensification;
 - New growth;
- Allow the Wastewater Treatment Plant to be operated to demonstrate reliable performance under 0.04 mg/l sufficient to apply for rating to meet full build out limits.

Observations and Preliminary Recommendations

Stage 3 – Effluent Phosphorus Limit 0.045 mg/L

A phosphorus effluent compliance limit of 0.045 mg/L with an operational objective of 0.04 mg/l which would:

- Accommodate full build out of the Town's Official Plan which equates to a population of 14,559, plus 4,314 non-residential (Inst/Comm/Ind) equivalent.

Observations and Preliminary Recommendations

Based on the results of our studies to date, it is concluded that the Town of Erin can implement a Municipal Wastewater Collection and Treatment system for the Village of Erin and for Hillsburgh that meets the wastewater servicing requirements of the existing communities including infill and intensification of these areas and can also service all new growth areas identified in the Town Official Plan while protecting water quality in the West Credit River and utilizing “Best Available Technology” for phosphorus removal.

Next Steps

The next steps the Class EA process are as follows:

- Host the Public Liaison Committee (PLC) meeting on Nov 24, 2016 and obtain comments on background documents;
- Host Public Information Centre (PIC) in Jan 2017 to obtain comments on background documents;
- Continuing following up approval Agencies (particularly MOECC, CVC & Wellington County) to obtain comments on background documents;
- In Winter/Spring of 2017 proceed with Phase 3 analysis including:
 - Prepare report regarding Wastewater Treatment alternatives;
 - Prepare report regarding Wastewater Collection system alternatives;
 - Prepare report regarding Wastewater discharge location alternatives;
- Complete Phase 3 Report end Sept 2017;
- Hold Second Public Information Centre late October 2017;
- Submit Final Report after 30 day public review period Winter/Spring 2018.

QUESTIONS?