

Proposed Installation of Sanitary
Sewers and Wastewater
Treatment for the
Community of Bothwell
Class Environmental Assessment
Study

Public Open House #1
June 30th, 2004

**The Old Fire Hall, 320 Main Street
Bothwell, Ontario**

4:30 pm – 8:30 pm



*Proposed Installation of Sanitary Sewers and Wastewater Treatment
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Welcome to Public Information Centre #1 for the
Proposed Installation of Sanitary Sewers and Wastewater
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- ❖ Please sign in on the sheet provided, then feel free to walk around & view the displays.
- ❖ If you have any questions, our representatives will be pleased to discuss the project with you.
- ❖ Comment sheets are provided for those who wish to provide comments in writing. Completed sheets can be deposited in the comment box.
- ❖ Comments may also be mailed or delivered to the Chatham-Kent PUC or Earth Tech (see below)
- ❖ Please contact either of the following people for additional information on the project:

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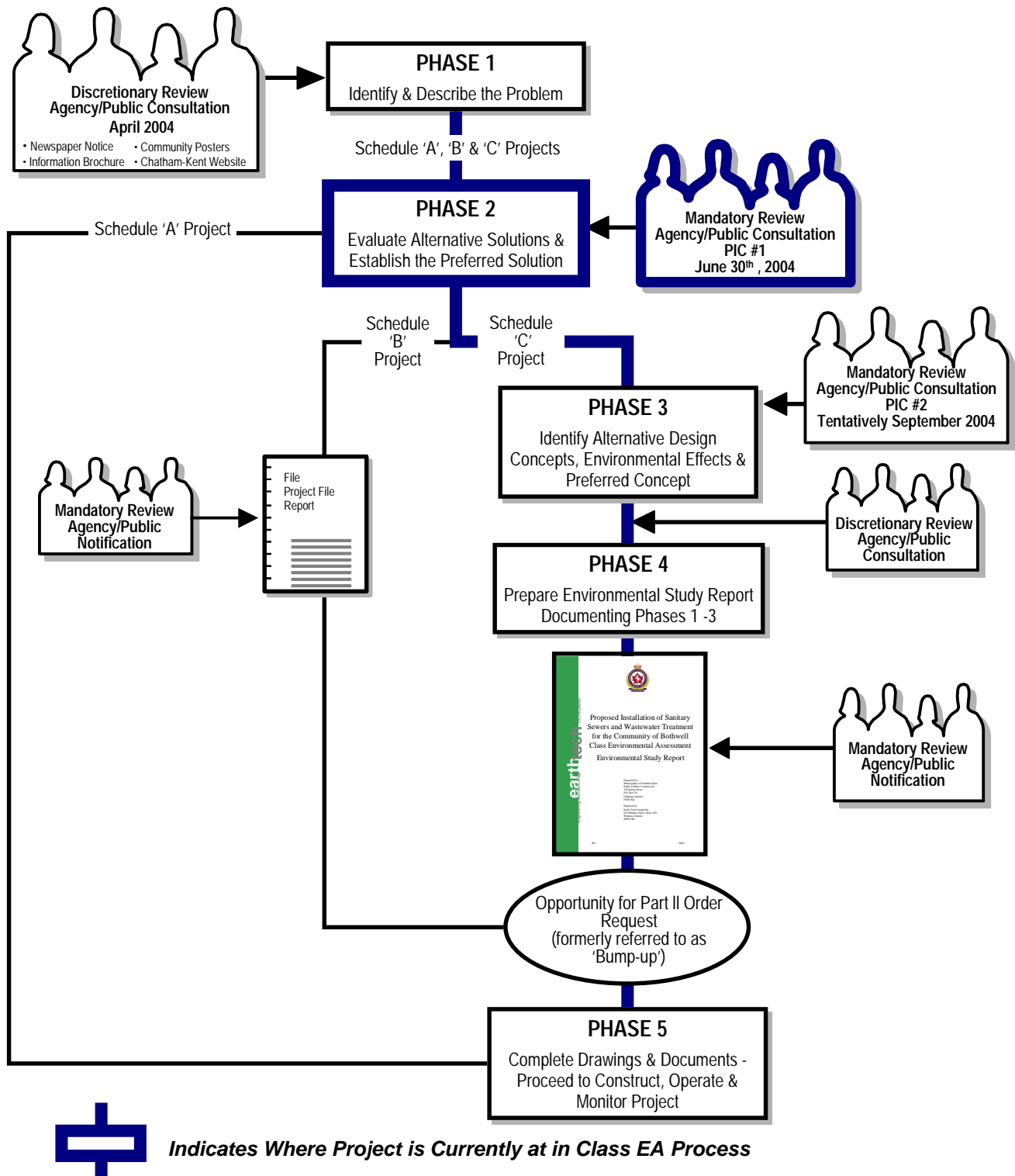


Purpose

- ❖ To identify and receive feedback on the evaluation of alternative solutions with respect to providing municipal wastewater infrastructure and services to the community of Bothwell.
- ❖ To determine specific requirements for implementing projects including mitigation of identified impacts and consider all reasonable and proven treatment methods.
- ❖ To undertake an Environmental Assessment (EA) process by following all the steps as outlined in the Municipal Engineers Association Municipal Class EA document (June 2000) including required public and review agency input.
- ❖ Study process and selection of preferred servicing solution will be guided by a consultation program.



Overview of the Class Environmental Assessment Process



Study Background

- ❖ The Chatham-Kent PUC is responsible for both the supply and distribution of water, and the collection and treatment of wastewater in the Municipality of Chatham-Kent.
- ❖ Over the past years, a number of studies have been undertaken to review and plan for wastewater servicing in Chatham-Kent.
- ❖ In May 2000, a Water and Wastewater Master Plans Study was completed for the municipality of Chatham-Kent in accordance with the Municipal Engineers Association Class Environmental Assessment for Municipal Water and Wastewater Projects.
- ❖ The Master Plans Study identified infrastructure requirements to meet existing needs and future growth in Chatham-Kent.
- ❖ One of the projects identified in the Master Plans Study was the provision of sanitary sewer collection and treatment to the community of Bothwell.
- ❖ The existing community of Bothwell does not have communal sewerage works (collection and treatment).
- ❖ Sewage disposal continues to be provided by individual on-site septic systems.
- ❖ Over the past few decades, problems with aging and failing septic systems have been identified throughout the community of Bothwell.



Study Background cont'd

- ❖ Previously completed studies had concluded that Bothwell residents utilizing raw groundwater resources (private wells) may be at risk due to high nitrates and possible contamination from waterborne bacteria if frequent testing and/or proper utilization of water treatment devices were not employed.
- ❖ In addition, many of the existing developed lots are too small to provide for today's area requirements for septic tanks.
- ❖ Samples taken from catchbasins and ditches indicated the presence of sewage in storm drains. This program was further updated in 2004, and is ongoing.
- ❖ In some instances, fecal coliform counts were very high, indicating direct connections from disposal beds or septic tanks as a probability.
- ❖ In response to this, in 1995 a municipal water supply system was extended to Bothwell with the intent that wastewater collection and treatment would be implemented in the future.
- ❖ The need for sanitary sewers and treatment was further confirmed by the Chatham-Kent Water and Wastewater Master Plan.



Problem Statement

- ❖ Numerous studies dating back to the 1960s indicated that the groundwater and local surface water streams were contaminated.
- ❖ Recent sampling has demonstrated that the microbial contamination of the local surface water streams is still a problem.
- ❖ The surface water contamination presents a health risk.
- ❖ Previous studies reviewed the alternatives and recommended a communal sewage treatment system as the preferred alternative due to address groundwater conditions and septic system site restrictions.
- ❖ The groundwater and surface water contamination, in Bothwell will not only impact the residents of Bothwell but the contaminants can and will migrate off-site impacting the surrounding area, including the Thames River as well as those who rely on groundwater.



Bothwell 2004: Sampling Results

(Based on 29 Sample Sites)

<u>Parameter Analyzed</u>	<u>Recreational Guidelines (CFU/ml)</u>	<u>Percentage of Samples which exceeded guidelines</u>
Total Coliform (TC)	1000	55% ^b
Fecal Coliform (FC)	100	59% ^a
Fecal Streptococci (FS)	100	46% ^a
E.Coli	100	30% ^b
<u>Parameter Analyzed</u>	<u>Predicted STP Effluent Criteria</u>	<u>Percentage of Samples which Exceeded the STP Effluent Criteria</u>
BOD ₅ (mg/L)	10	14% ^a
Suspended Solids (mg/L)	10	52% ^a
Phosphorus (mg/L)	0.5	17% ^a
E.Coli (CFU/ml)	100	30% ^b

a - 29 samples tested b - 20 samples tested



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Class Environmental Assessment
for the Installation of Sanitary Sewers
and Wastewater Treatment
in the Community of Bothwell

PROBLEM AREAS

LEGEND

-  BOTHWELL SETTLEMENT BOUNDARY
-  GENERAL LOCATION OF SEWAGE SYSTEM PROBLEM AREAS BASED ON SAMPLING RESULTS



Identification of Alternative Wastewater Treatment Solutions

Alternative	Description
1. Install New Collection system to Service Bothwell and Pump Sewage to an Existing Municipal Sewage Treatment Plant (i.e. Thamesville) for Treatment	<ul style="list-style-type: none"> ▪ Consists of gravity sewers and sewage pumping stations to collect sewage and transfer it to the existing Thamesville WWTP.
2. Site New Bothwell Wastewater Treatment Plant (WWTP) and Construct Local Bothwell Sewage Collection System for Treatment Within the Community	<ul style="list-style-type: none"> ▪ A collection system similar to Alternative No. 1 with the exception that a new WWTP would be constructed in the community of Bothwell with treated effluent disposal via a tributary of the Thames River.
3. Enter into a Joint Venture for Common Collection and Treatment with Adjacent Municipalities	<ul style="list-style-type: none"> ▪ Consists of gravity sewers and sewage pumping stations to collect sewage and transfer it to an existing WWTP (e.g. Newburg) in an adjacent municipality.
4. Improve Private On-Site Disposal Systems	<ul style="list-style-type: none"> ▪ Continue with septic beds located on private property servicing one home only.
5. Limit Community Growth	<ul style="list-style-type: none"> ▪ Restrict growth of community by changing planning documents.
6. Do Nothing	<ul style="list-style-type: none"> ▪ Continue use of current individual septic systems.






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Class Environmental Assessment for the Installation of Sanitary Sewers and Wastewater Treatment in the Community of Bothwell

ALTERNATIVE SOLUTIONS

LEGEND

-  POSSIBLE MAIN PUMPING STATION AND WWTP SITING AREA
-  POSSIBLE LOCATION FOR BOTHWELL WASTEWATER TREATMENT PLANT (MOE 1974)
-  ALTERNATIVE FORCEMAIN ALIGNMENTS



**Class Environmental Assessment for the Proposed Installation of Sanitary Sewers and Wastewater Treatment for the Community of Bothwell
Evaluation of Alternative Wastewater Treatment Solutions**

Preamble: The following criteria were used to evaluate the positive and negative impacts associated with the implementation of alternative solutions
EVALUATION CRITERIA

Alternative Solution	Public Health and Safety	Natural Environmental	Social/Cultural		Economic/Financial	Technical	Evaluation Summary
	Ability of Alternative to address potential risk that sewage will contaminate surface water (ditches, drains, watercourses) and drinking water wells (groundwater supplies).	Potential effects to the natural environment: effect on air, land water and biota siting/routing consideration or constraints (where applicable).	Conformity with local, regional and provincial planning policies	Potential land use impacts including compatibility with surrounding land uses as well as cultural/heritage /agricultural resources.	Estimated capital, operating and maintenance costs including life cycle costs.	Ability to utilize existing infrastructure, utilities and facilities.	Approval Requirements
<p>Alternative No. 1 Install New Collection System to Service Bothwell and Pump Sewage to an Existing Municipal Sewage Treatment Plant (i.e. Thamesville) for Treatment</p>	<ul style="list-style-type: none"> Sewage problems corrected-groundwater and surface water quality improved No mitigation required, beyond normal construction practices. Typical construction impacts can be minimized using appropriate mitigation measures. 	<ul style="list-style-type: none"> Groundwater and surface water quality improved. Potential impacts dependent on location of forcemain alignment and pumping station siting (to be determined as part of evaluation of design concepts and technologies). Typical construction impacts can be minimized using appropriate mitigation measures. Improved effluent quality in Thamesville net positive impact on receiving stream Hydrogen sulfide (an odourous gas) may be produced in the forcemain and impact air quality. 	<ul style="list-style-type: none"> Conforms with local policies-promotes Community Strategic Objectives. Conforms with Regional Water and Wastewater Master Plan Policies. Avoids any impact of discharges on downstream Moravian community, reduced time for approval of project – can be implemented sooner 	<ul style="list-style-type: none"> Potential impacts dependent on location of forcemain alignment and pumping station siting (to be determined as part of evaluation of design concepts and technologies). Construction will impact both the residents of Bothwell and Thamesville. Odours may be a problem due to the long retention time in the forcemain. Strong odours will impact land use in Thamesville especially lands used for recreational purposes. Local residents may object to new source of loading 	<ul style="list-style-type: none"> \$5 to \$7 million in capital cost. New odour control facilities may be required. Able to share the costs associated with O&M and capital upgrades of the plant Potential opportunity for government funding 	<ul style="list-style-type: none"> Utilizes existing Thamesville WWTP Avoids need to operate and maintain two sewage treatment plants Makes better use of existing treatment capacity Opportunity to improve some existing plant processes (eliminate discharge of chlorine to environment) 	<ul style="list-style-type: none"> Reopens existing C of A. Significant WWTP upgrades required, minimal land requirements. Due to expected long retention times in the forcemain there may be hydrogen sulfide generation. Precautions will need to be taken by staff when working in the pumping station, treatment plant, and around the forcemain. <p align="center">●</p>
<p>Alternative No. 2 Site New Bothwell Wastewater Treatment Plant (WWTP) and Construct Local Bothwell Sewage Collection System for Treatment Within the Community</p>	<ul style="list-style-type: none"> Sewage problems corrected-groundwater and surface water quality improved No mitigation required beyond normal construction practices 	<ul style="list-style-type: none"> Groundwater and surface water quality improved. Potential impacts dependent on location of wastewater treatment plant/system (to be determined as part of evaluation of design concepts and technologies) Typical construction impacts can be minimized using appropriate mitigation measures. 	<ul style="list-style-type: none"> Conforms with local policies-promotes Community Strategic Objectives. Conforms with Regional Water and Wastewater Master Plan Policies. Discharge is upstream of first nations community, additional project coordination, approvals processes required. 	<ul style="list-style-type: none"> Potential impacts dependent on location of wastewater treatment plant/system (to be determined as part of evaluation of design concepts and technologies). Typical construction impacts can be minimized using appropriate mitigation measures. 	<ul style="list-style-type: none"> \$5 to \$7 million in capital cost. Trade-off cost of new WPCP with cost of long forcemain. Long-term cost of operating and maintaining two plants Potential cost to purchase land for plant Potential cost to purchase easement for effluent pipe/outfall 	<ul style="list-style-type: none"> Possible coordination with publicly owned lands. To be determined as part of evaluation of design concepts and technologies. 	<p>Difficult Approvals:</p> <ul style="list-style-type: none"> Additional supporting studies <ul style="list-style-type: none"> Assimilative Capacity Bathymetric Study Complex C of A process Additional study time. Follow current Schedule C planning process. <p align="center">●</p>
<p>Alternative No. 3 Enter into a Joint Venture for Common Collection and Treatment with Adjacent Municipalities</p>	<ul style="list-style-type: none"> Sewage problems corrected-groundwater and surface water quality improved No mitigation required Delay of project by 1-2 years. 	<ul style="list-style-type: none"> Groundwater and surface water quality improved. Potential impacts dependent on location of wastewater treatment plant/system (to be determined as part of evaluation of design concepts and technologies). Typical construction impacts can be minimized using appropriate mitigation measures. 	<ul style="list-style-type: none"> Conforms with local policies-promotes Community Strategic Objectives. Conforms with Regional Water and Wastewater Master Plan Policies. 	<ul style="list-style-type: none"> Potential impacts dependent on location of wastewater treatment plant/system (to be determined as part of evaluation of design concepts and technologies). Typical construction impacts can be minimized using appropriate mitigation measures. High possibility the project may be delayed to secure funding. 	<ul style="list-style-type: none"> Opportunity for Federal funding Total project cost increases 	<ul style="list-style-type: none"> Possible to share both the capital and operating costs of the facility May be able to secure federal or provincial government funding. 	<p>If a new plant is suggested more studies would be needed:</p> <ul style="list-style-type: none"> Assimilative Capacity Bathymetric Study There would be a Complex C of A process Additional study time. Follow current Schedule C planning process. Follows federal EA process <p align="center">●</p>

**Class Environmental Assessment for the Proposed Installation of Sanitary Sewers and Wastewater Treatment for the Community of Bothwell
Evaluation of Alternative Wastewater Treatment Solutions**

Alternative Solution	Preamble: The following criteria were used to evaluate the positive and negative impacts associated with the implementation of alternative solutions							
	EVALUATION CRITERIA							
	Public Health and Safety	Natural Environmental	Social/Cultural		Economic/Financial	Technical		
	Ability of Alternative to address potential risk that sewage will contaminate surface water (ditches, drains, watercourses) and drinking water wells (groundwater supplies).	Potential effects to the natural environment: effect on air, land water and biota siting/routing consideration or constraints (where applicable).	Conformity with local, regional and provincial planning policies.	Potential land use impacts including compatibility with surrounding land uses as well as cultural/heritage /agricultural resources.	Estimated capital, operating and maintenance costs including life cycle costs.	Ability to utilize existing infrastructure, utilities and facilities.	Approval Requirements	<p align="center">Least Preferred</p> <p align="center">Most Preferred</p>
Alternative No. 4 Improve Private On-Site Disposal Systems	<ul style="list-style-type: none"> Difficult to address risk (enforcement and compliance issues due to existing lot sizes and water table). 	<ul style="list-style-type: none"> Potential impacts to natural environment still exist. Homeowner's responsible will be difficult to assess if the septic system is working as designed. 	<ul style="list-style-type: none"> Conforms, however cannot be effectively implemented (small lot sizes). 	<ul style="list-style-type: none"> Cannot conform due to small lot sizes. 	<ul style="list-style-type: none"> All the costs for the system will be the responsibility of the homeowner. There will be little or no funding from the municipality to help in the O&M of the on-site system. May deter new development (residential, industrial and commercial) in the area 	<ul style="list-style-type: none"> Cannot conform due to small lot sizes. Need for raised beds due to high groundwater elevation. Must address septage disposal 	<ul style="list-style-type: none"> Not approvable in many cases (i.e. insufficient lot size, water table). 	<ul style="list-style-type: none"> The costs of improving septic systems and tile beds will be the onus of the homeowner. With no funding from the Municipality Not approvable in many cases (i.e. insufficient lot size, water table). Difficult to address risk (enforcement and compliance issues due to existing lot sizes and water table).
Alternative No. 5 Limit Growth	<ul style="list-style-type: none"> Does not address problem statement. MOE has indicated existing conditions will not be permitted to continue indefinitely 	<ul style="list-style-type: none"> Potential impacts to natural environment still exist.. 	<ul style="list-style-type: none"> Incompatible with Chatham-Kent Official Plan goals and future, long-term development policies. 	<ul style="list-style-type: none"> Groundwater and surface water would become increasing contaminated and may effect recreational land use 	<ul style="list-style-type: none"> All the costs for the system will be the responsibility of the homeowner. There will be little or no funding from the municipality to help in the O&M of the on-site system. May deter new development (residential, industrial and commercial) in the area 	<ul style="list-style-type: none"> Not applicable. 	<ul style="list-style-type: none"> Not applicable. 	<ul style="list-style-type: none"> Does not address problem statement. Incompatible with Chatham-Kent Official Plan goals and future, long-term development policies. MOE has indicated existing conditions will not be permitted to continue indefinitely.
Alternative No. 6 Do Nothing	<ul style="list-style-type: none"> Does not address problem statement. MOE has indicated existing conditions will not be permitted to continue indefinitely 	<ul style="list-style-type: none"> Potential impacts to natural environment still exist. 	<ul style="list-style-type: none"> Conforms, however cannot be effectively implemented (small lot sizes). 	<ul style="list-style-type: none"> Groundwater and surface water would become increasing contaminated and may effect recreational land use. 	<ul style="list-style-type: none"> All the costs for the system will be the responsibility of the homeowner. There will be little or no funding from the municipality to help in the O&M of the on-site system. May deter new development (residential, industrial and commercial) in the area. 	<ul style="list-style-type: none"> Not applicable. 	<ul style="list-style-type: none"> Not applicable 	<ul style="list-style-type: none"> Does not address problem statement. MOE has indicated existing conditions will not be permitted to continue indefinitely.

Alternatives for the Bothwell WWTP

Wastewater Treatment Technology Alternatives

- ❖ Conventional Activated Sludge or Extended Aeration process
- ❖ Oxidation ditches
- ❖ Rotating biological contactors
- ❖ Sequencing batch reactors
- ❖ Biological nutrient removal
- ❖ Integrated fixed film activated sludge
- ❖ Membrane bioreactors

Effluent Polishing and Disposal Alternatives

- ❖ Slow sand filters
- ❖ Continuous sand filters
- ❖ Actifo
- ❖ Disc filters
- ❖ Batch storage and polishing – seasonal discharge
- ❖ Spray irrigation
- ❖ Re-use for recreational or agriculture
- ❖ Receiving stream



Next Steps

Pumping Wastewater to Thamesville

- ❖ Confirm the pipe routing including identifying the number of railway, stream, and road crossings, and size of easements.
- ❖ Evaluate the necessary upgrades required at Thamesville
- ❖ Confirm the new effluent criteria
- ❖ Develop a detailed capital and operating cost estimate

Constructing a new WWTP in Bothwell

- ❖ Evaluate effluent disposal options (dry ditch or Thames River)
- ❖ Confirm the new effluent criteria
- ❖ Identify potential locations for the new WWTP
- ❖ Review the possible on-site treatment alternatives available
- ❖ Develop a detailed capital and operating cost estimate



Overview of Possible Collection Systems

Conventional Gravity Sewers and Pump Stations:

A conventional gravity sewer system would include private drain connections, mainline sanitary sewers with manholes and, due to the flat terrain, a number of sanitary pumping stations. This system would be designed using previously recommended design flow criteria and following guidelines set out by the Ministry of the Environment.

Small Diameter Gravity (SDG) Sewers:

Through the installation or rehabilitation of existing septic tanks, grit, grease and other deleterious, blockage-causing materials can be removed from the waste stream allowing the installation of smaller diameter sanitary mainline pipes. SDG Sewers usually follow along the existing topography reducing or eliminating the need for pumping stations and providing a more favourable installation procedure when faced with poor ground conditions and high water tables. This system can be used in tandem with a conventional sewer system.

Low Pressure Sewers:

Each home or business would discharge, by gravity, through conventional plumbing and bypass the existing septic tank to a new independent pump station fitted with a small grinder pump. The pump will discharge to a small diameter forcemain, which is connected downstream to either a larger forcemain or conventional sewer system. This system again reduces or eliminates the need for large sanitary pumping stations.

A Vacuum System:

A vacuum system would not likely be a viable option for the community of Bothwell.



How Would Potential Project Costs Be Determined?

- ❖ All possible funding opportunities are being pursued.
- ❖ Implementation would need to consider different approaches to funding the necessary improvements to make the system as affordable as possible to the property owners.
- ❖ The actual cost to property owners would be finalized once final design is completed and actual collection system.
- ❖ Wastewater Costs will be presented at the Second PIC.

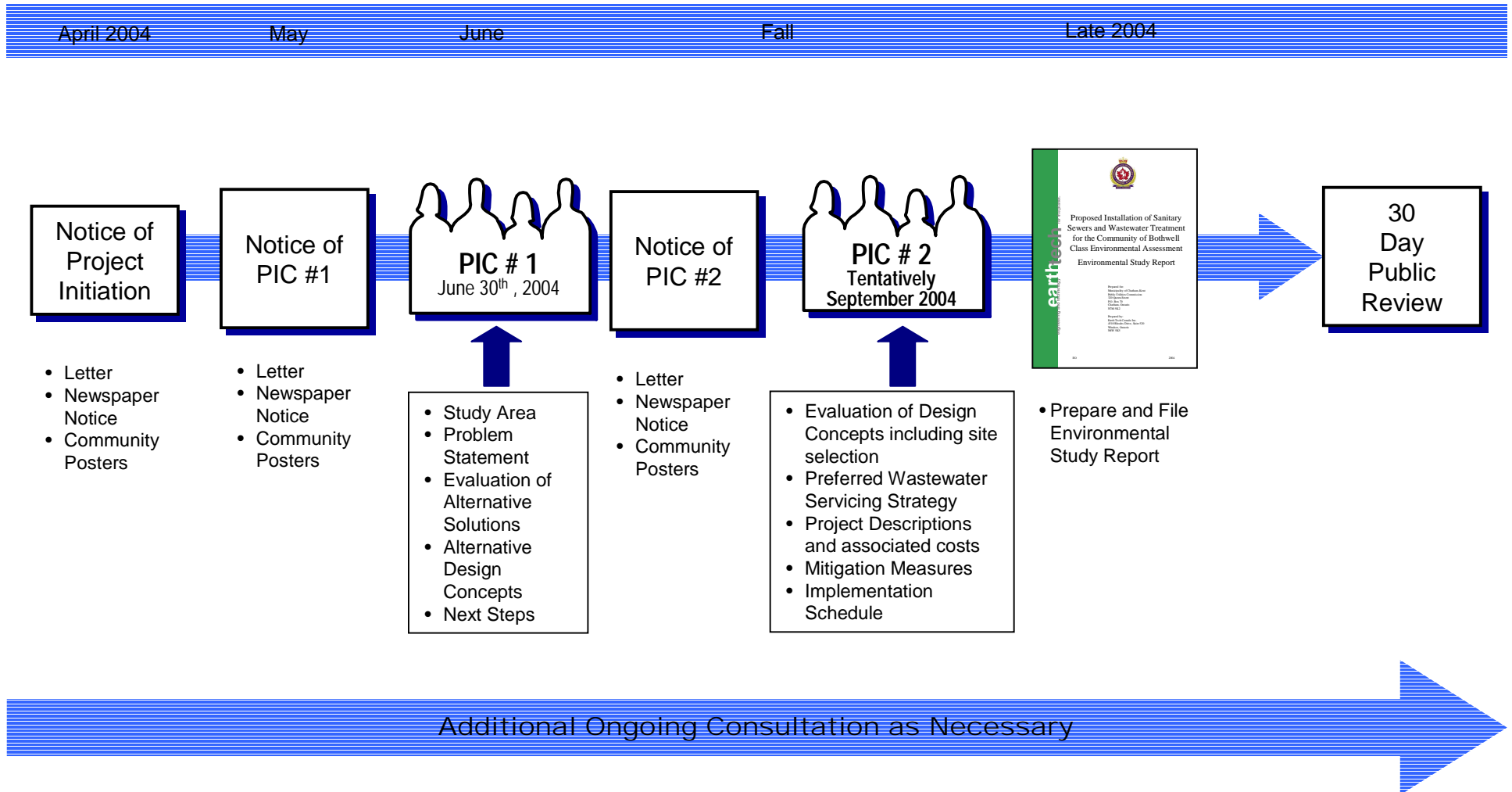


Considerations for Private Hook-Ups

- ❖ Many of the private septic systems within the study area are experiencing some sort of failure or operational limitation (e.g. limitation due to lot size, high water table).
- ❖ Although, in a few instances, some septic systems are functioning properly (i.e. sufficient lot size), local groundwater quality is still being negatively affected.
- ❖ In addition, as many systems are old, the potential for eventual failure is highly likely.
- ❖ To address environmental and public health issues, it is important that all property owners participate and connect to the new system.

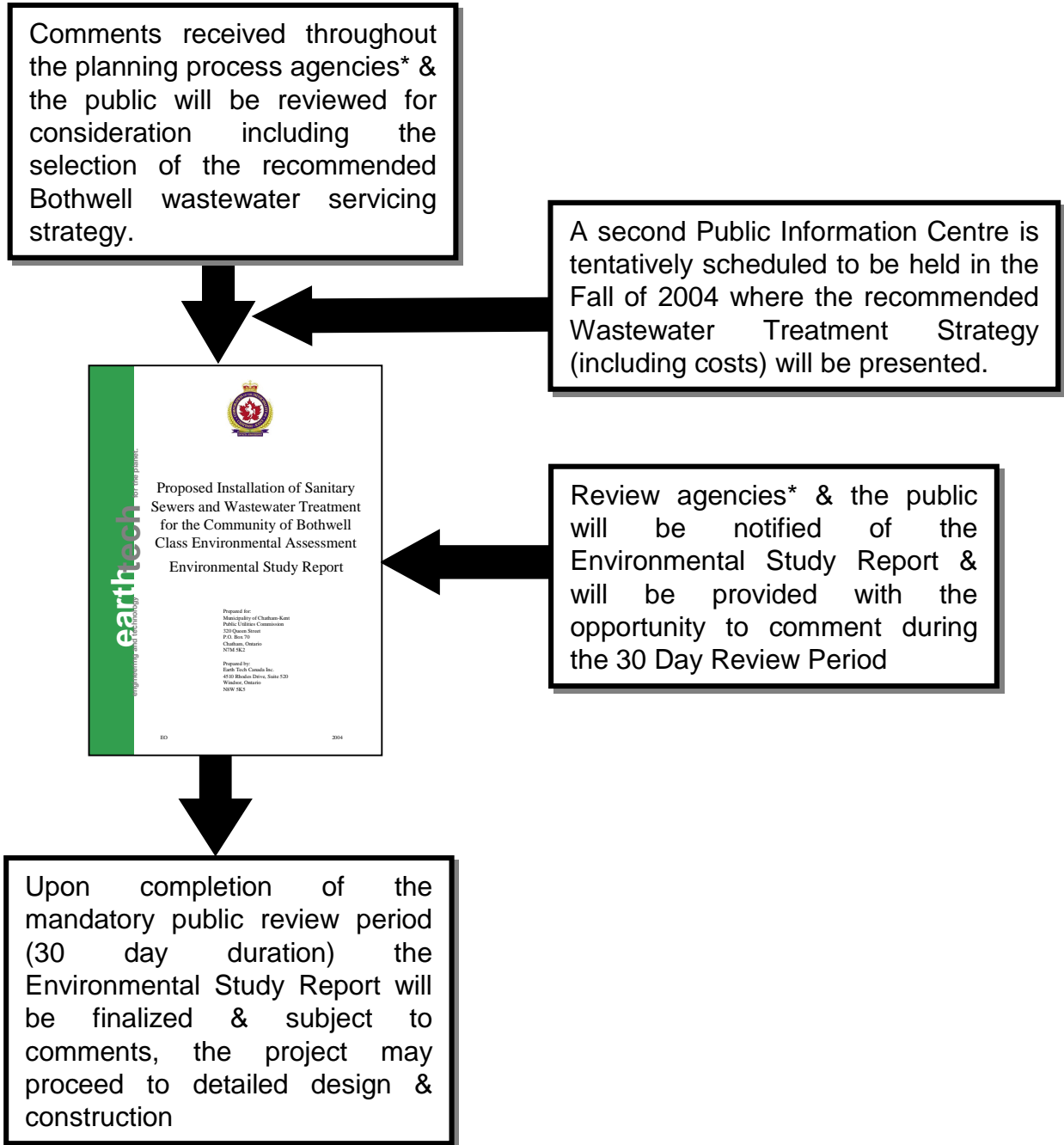


Class EA Consultation Program



**Proposed Installation of Sanitary Sewers and Wastewater Treatment
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The Next Steps . . .



* Review agencies include Provincial Ministries (e.g. Environment, Natural Resources, Culture), Lower Thames Valley Conservation Authority, municipal departments & utilities (e.g. hydro, gas, Bell etc.)

