

CAP MEETING #2 - WATER

Dufferin Aggregates Paris Pit



Brant County

May 8, 2012

AGENDA

- A. INTRODUCTIONS
- B. DUFFERIN COMMITMENTS TO THE COMMUNITY AND ENVIRONMENT
- C. TECHNICAL DISCUSSION ON WATER
 - 1. OUR UNDERSTANDING OF SOME OF THE KEY CONCERNS
 - 2. WATER AND AGGREGATES
 - 3. DRINKING WATER SOURCE PROTECTION
 - 4. PARIS PIT WATER MANAGEMENT
 - 5. QUESTIONS
- D. NEXT STEPS

B. DUFFERIN OVERVIEW/UPDATE

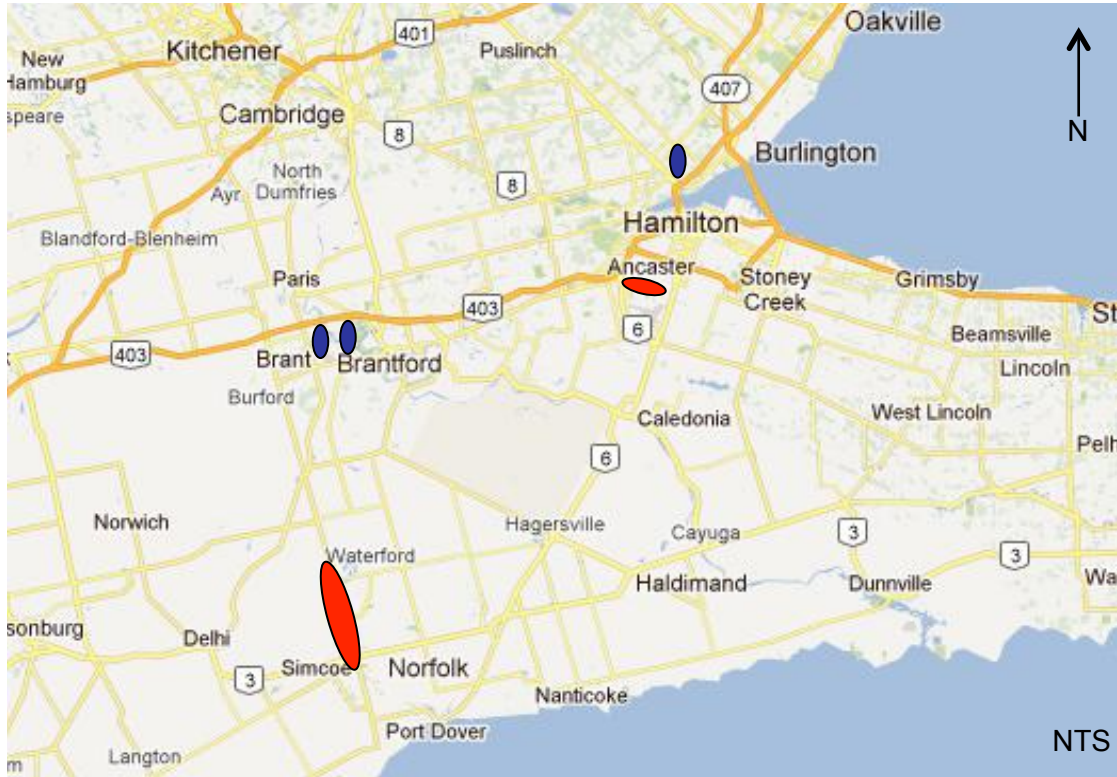
Andrea Bourrie (Dufferin/Holcim)

- Respect and acknowledge concerns of the Paris community.
- Dufferin is committed and responsible corporate citizen.
- The 1974 license simply grants us the right to extract the resource. Our operation must and will operate based on today's standards. **It is the law.**
- We are absolutely committed to working with you, the local community, and to proceed in a fully transparent and open manner in starting our operations.
- We'll continue to share information and work cooperatively to address all concerns.

Dufferin Aggregates is one of the largest suppliers of construction quality stone, sand and gravel in southern Ontario. We are committed to being responsible neighbours and keeping our communities and stakeholders advised of our activities.

- Although the *Aggregate Resources Act* license for the Pit was granted in 1974 it simply gives us the right to extract the resource. The site must be operated in conformity with current requirements to continuously respect, preserve and protect the environment, and quality of life of the community.
- Active engagement and transparent communications is the way we do business. The company has been engaged for 8 months with the County. We are confident the outstanding technical considerations **are resolvable**.
- Dufferin has been providing information and commenting on the Assessment Report and draft Source Protection Plans since 2008.
- We are confident that the proposed extraction plan, monitoring regime, progressive rehabilitation plan and approach to community engagement will ensure that we balance community, environmental and economic goals.
- We welcome questions and are prepared to continue discussions to ensure that concerns are addressed.

Material from the Paris Pit will meet the needs of construction jobs in the County of Brant, Brantford, Hamilton and Kitchener Waterloo areas.



-  Location of 2012 Private Construction Work
-  Location of 2012 Public Construction Project

- Projected demand for aggregate in this area is driven by a combination of public infrastructure renewal projects and new development of residential and industrial / commercial projects.
- **Supplying these projects locally is both environmentally and economically responsible.**
- In addition to these direct benefits, Dufferin is a responsible and active corporate citizen prepared to make long term community investment.
- The environment and community will be protected.

We think we understand many of the concerns related to water and have summarized questions that have been raised so far. We will address these through our discussion. Additional questions are expected and welcome.

QUESTIONS ...

1. Is there extraction below the groundwater table? Will it lower the groundwater levels?
2. What happens to the water Dufferin pumps? Will it be consumed or lost?
3. Will private well or municipal well supplies be reduced?
4. Will surface water (wetland/pond, Grand River, Gilbert Creek) be impacted?
5. Will water quality be impacted? What chemicals will be used on site? What if there is a spill?
6. Who is responsible and what happens if a private well is impacted - water quantity or water quality?
7. Who is responsible and what happens if a municipal well is impacted - water quantity or water quality?
8. Who is responsible and what happens if a surface water feature is impacted - water quantity or water quality?
9. Where has this been done before?
10. Other questions...??

C. TECHNICAL DISCUSSION ON WATER

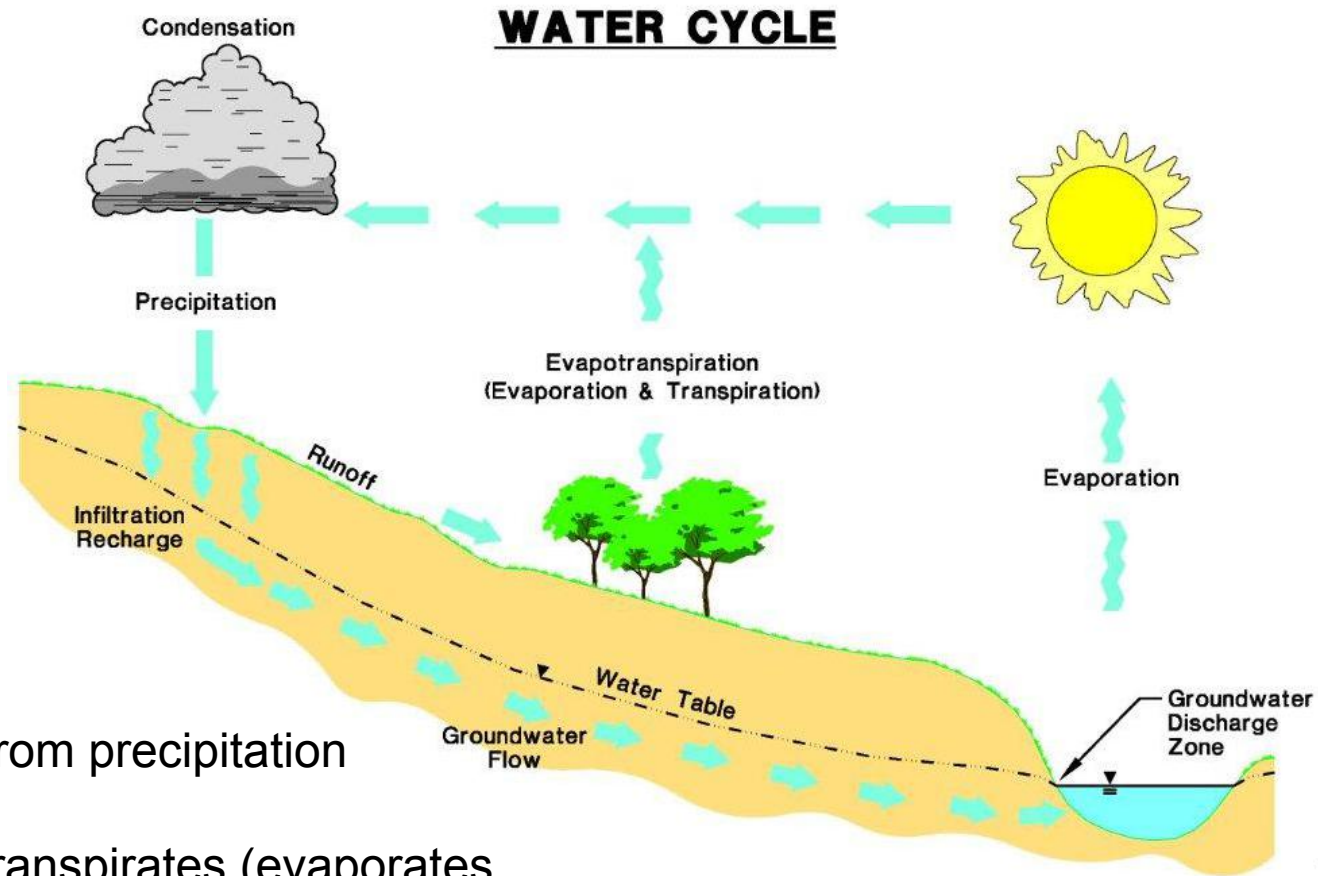
Richard Murphy – Conestoga-Rovers & Associates (CRA)

1. ... KEY CONCERNS ...
2. BACKGROUND ON WATER AND AGGREGATES
3. DRINKING WATER SOURCE PROTECTION
 - Purpose and Scope
 - Status
 - Findings in Local Area
5. PARIS PIT AND WATER MANAGEMENT
 - Paris Site Development Plans
 - Water Use and Handling
 - Implications and Responsibilities for Municipal and Private Water Supplies
 - Water-related Approvals
7. QUESTIONS

2. BACKGROUND ON WATER AND AGGREGATES

- What is groundwater and where does it come from?
- What is the difference between a sand or gravel pit and a quarry?
- What is the difference between “above water” and “below water” extraction?
- What happens in an aggregate (gravel) pit that relates to water?
- What water quality threats exist in an aggregate operation?

Water in Paris area originates from local precipitation and upstream flow in Grand River



- Water originates from precipitation
- Over 50% evapotranspirates (evaporates or transpired by plants)
- Remainder runs off or infiltrates to groundwater

Infiltrating water forms a flowing groundwater system that can support water wells and creeks and wetlands

GROUNDWATER

Aquifer →

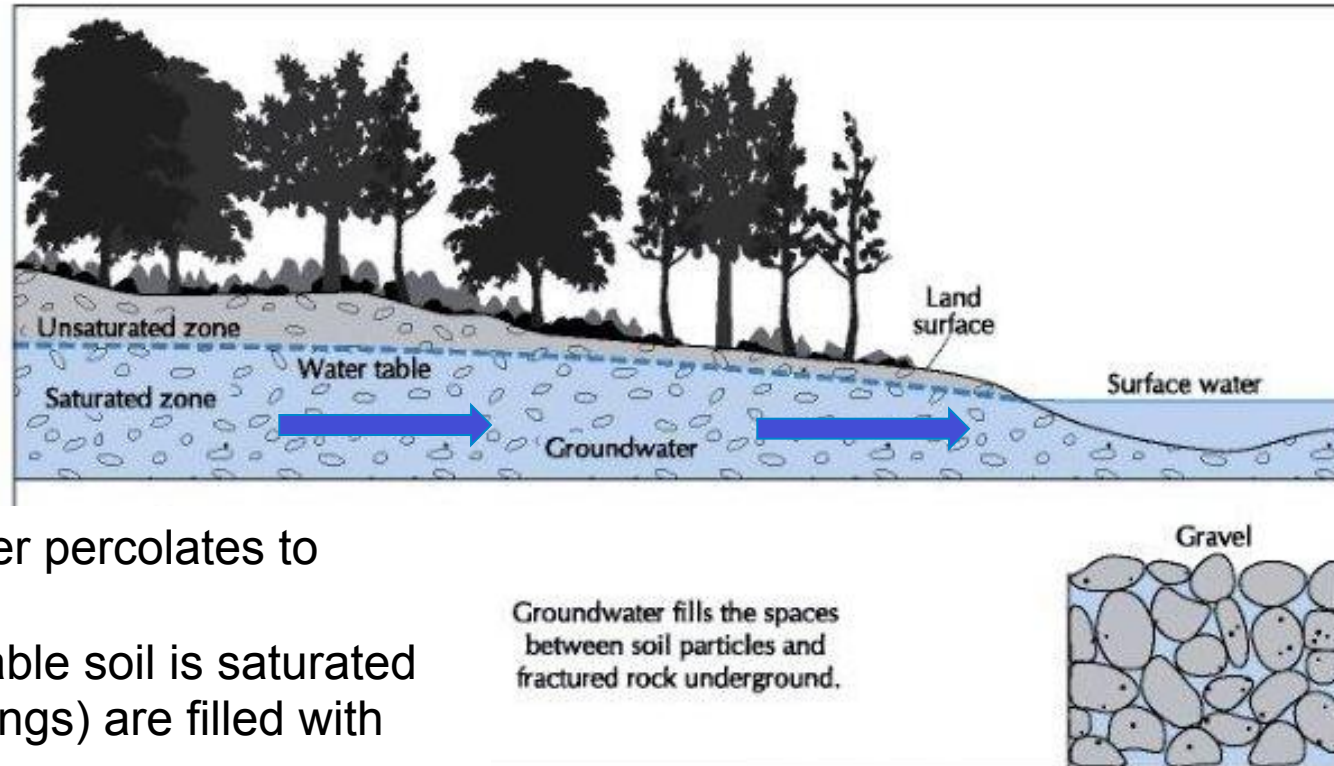


Image adapted from the United States Geological Survey

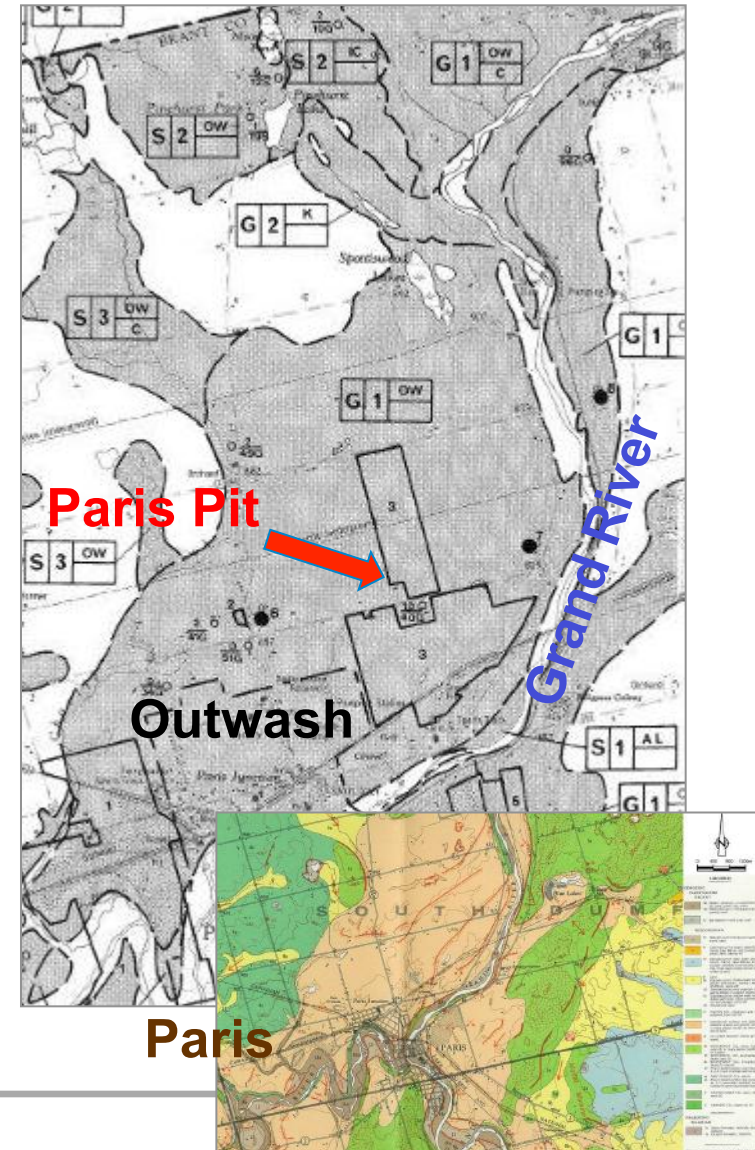
- Infiltrating water percolates to water table
- Below water table soil is saturated – pores (openings) are filled with water
- Aquifers are formed by groundwater in permeable material (e.g. sand/gravel)
- Water flow in aquifers is primarily horizontal
- Water withdrawals are replaced by infiltration and upgradient flow

Area north of Paris is underlain by outwash deposits that are an important source of aggregates and municipal water supply

- Outwash deposits are coarse-grained material deposited from melting glacier rivers
- Preferred source of construction aggregates
 - High gravel and cobble fraction
 - Relatively clean – low fine-grained (silt and clay) content
 - Therefore it is very important for use in public infrastructure projects that require large amounts of quality construction materials
- Outwash deposits below the water table also make good aquifers and sources of large supplies of groundwater (municipal wells)
- That's one of the reasons why you'll find co-location of municipal water supply and aggregate operations in some communities

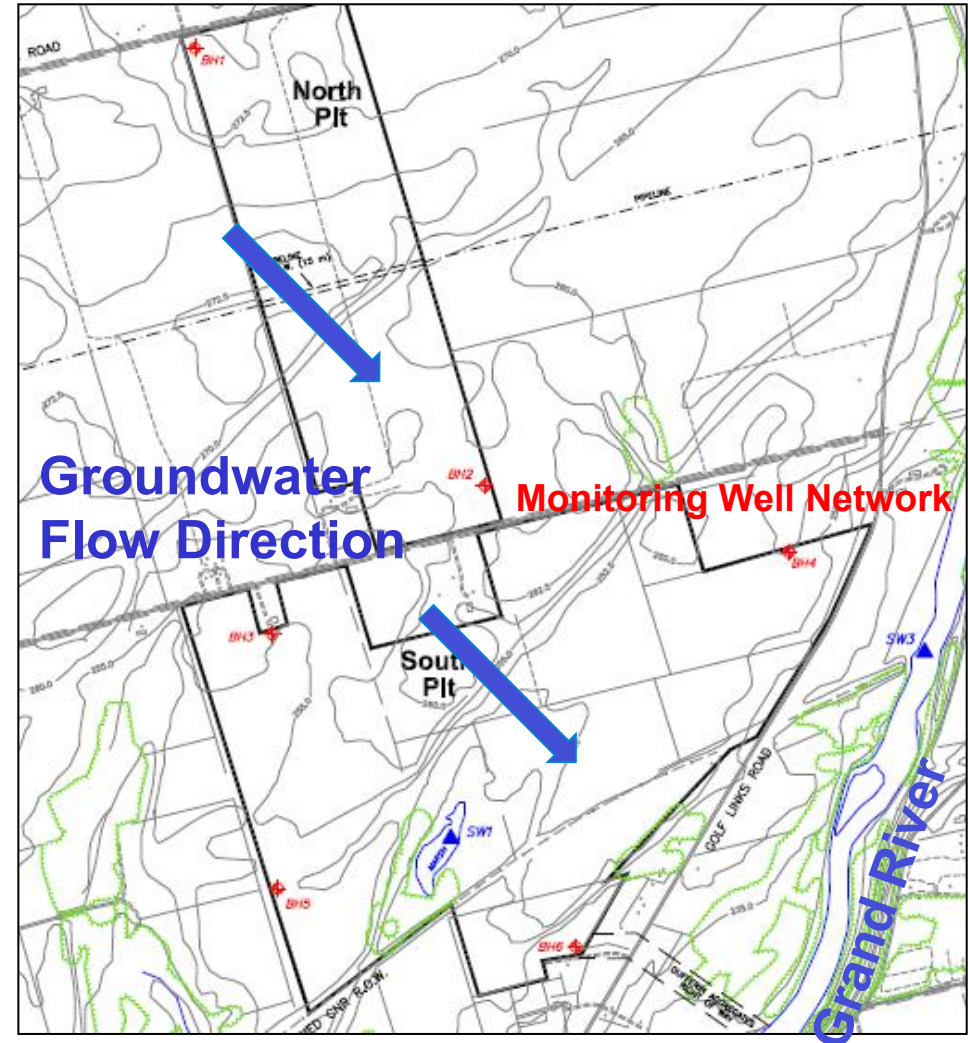
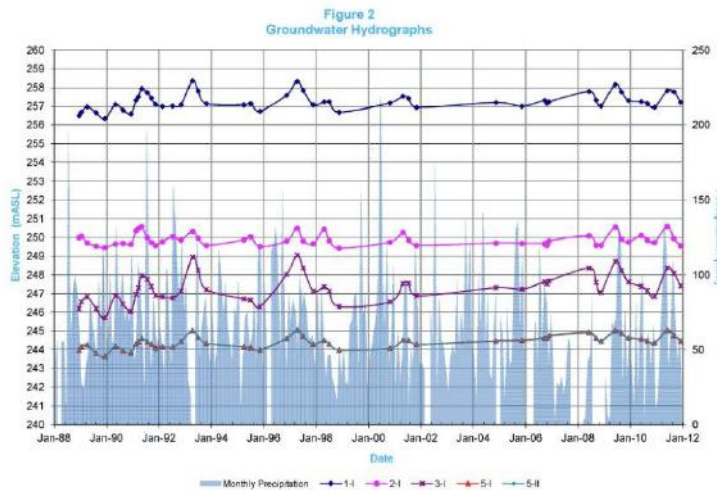
Note: Pits refer to extraction of unconsolidated material (e.g. sand and gravel) by digging. Quarries refer to rock extraction that typically includes blasting.

OGS AGGREGATES MAPPING



HYDROGEOLOGY: Dufferin Aggregates has been monitoring the groundwater around the pit property since the 1980's - Good baseline data exists and this allows for effective design and implementation

- Groundwater flow is towards the Grand River – from northwest to southeast
- Groundwater levels fluctuate seasonally now with the existing agricultural land uses
- Water is replenished on an ongoing basis. Availability varies with climatic conditions.



Aggregates and Water:

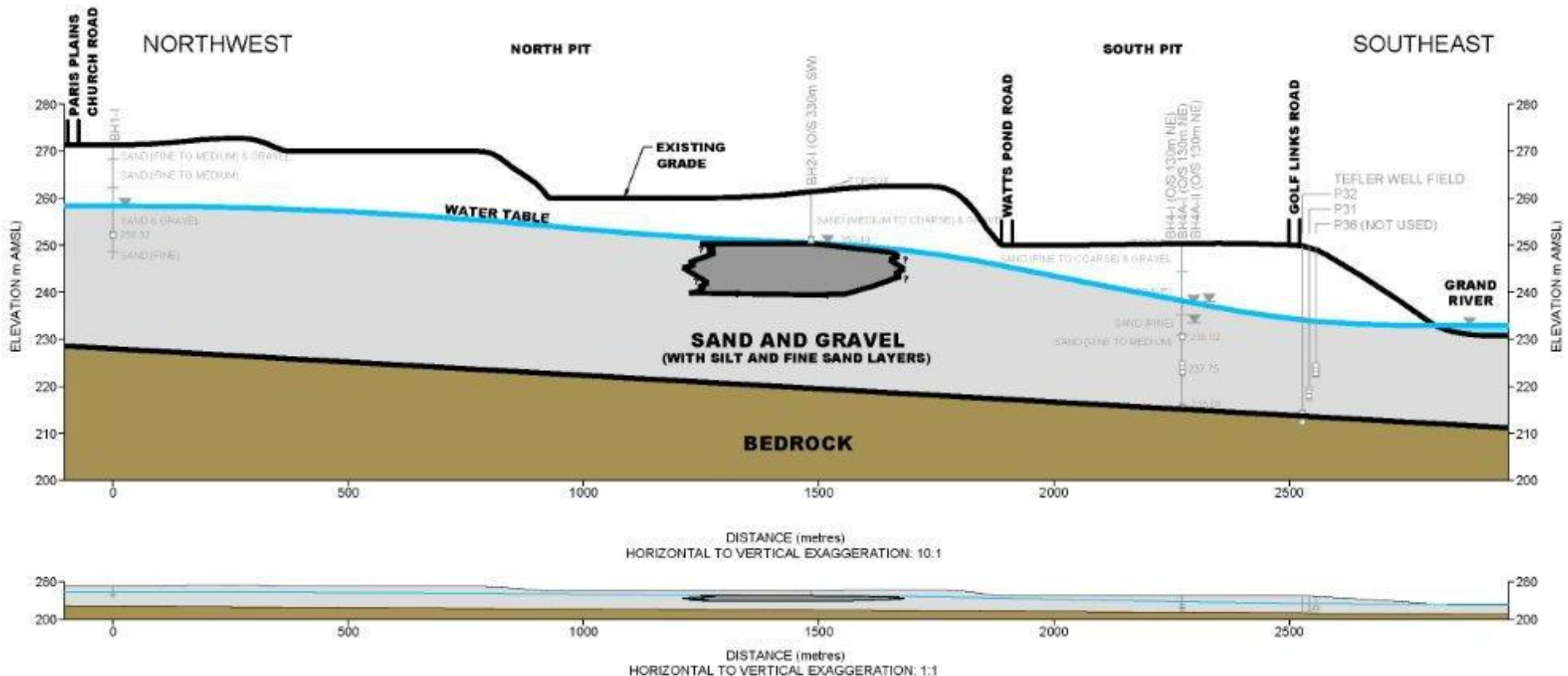
Actual consumption of water is very limited.

- Potential water quantity influences from aggregates operations:
 - **Above water extraction** (from above the water table) has little/no influence as no pumping is required for extraction. There will be no lowering of groundwater levels.
 - Groundwater may actually increase as runoff is captured and evapotranspiration is reduced.
 - **Below water extraction** induces a “pumping” effect as aggregate volume is replaced by water (analogous to someone getting out of the bathtub).
 - Can result in “drawdown” (lowering) of groundwater levels if the rate of withdrawal exceed the rate of replenishment from groundwater inflow and precipitation. This is managed by limiting the rate and timing of extraction.
 - **Operational use** of water includes aggregate washing and dust control. Actual consumption (taking of water) of water is small:
 - Creating and naturally filling the source pond (one time)
 - Re-circulating of water through closed-loop system (to wash product)
 - Natural replenishment of source pond water (ground water flow, precipitation)



The glacial outwash naturally occurs above and below the groundwater table and aggregate can be extracted from both areas

- Dufferin's Paris Pit extraction will be **above** the groundwater table, with 2 exceptions:
 1. Source water pond (reservoir for washing operations)
 2. Final stage of operation anticipates below water extraction in two limited areas (20 ha) in 20 to 40 years. Dufferin has committed to further evaluation and ongoing review of this extraction and **it will not occur if it can not be done safely.**



Aggregates and Water: Operations do not use chemicals.

- Potential water quality influences from aggregates operations:
 - **No chemicals or contaminants are used in operations or processing of aggregates.** This means that the risk of contamination of water sources is very low.
 - Fuel handling on site does occur. It is **heavily regulated** and spill response measures must be in place. Equipment is on hand and personnel are trained to respond quickly and effectively in the event of any spill.
 - Combined, these facts ensure a **very high level of protection for water sources.** This is demonstrated by decades of industry operating experience throughout Ontario and elsewhere.
 - **There is no known example of an aggregate operation resulting in groundwater contamination.**



3. DRINKING WATER SOURCE PROTECTION

- What is it and what is its status?
- What are the findings in the local area?
- How does Dufferin's Paris Pit relate to Drinking Water Source Protection?



The goal of Source Protection Plans is to manage or eliminate activities that are, or could become, threats to drinking water

LAKE ERIE SOURCE PROTECTION REGION

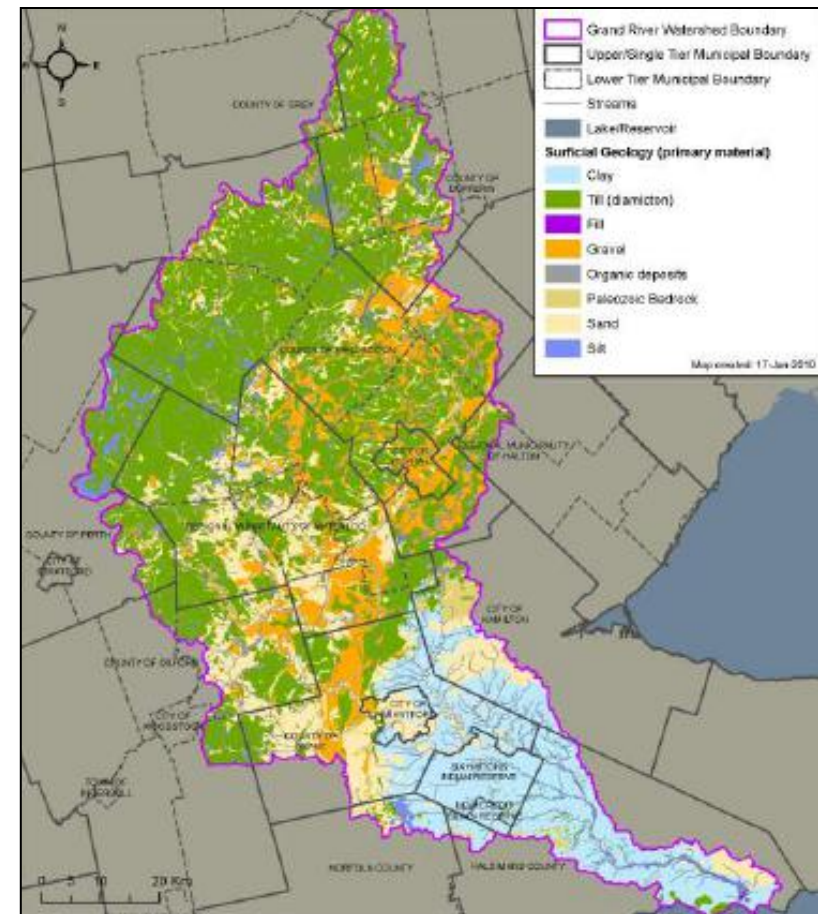
- The Clean Water Act was passed by the Ontario government in 2006 to protect the sources of municipal drinking water from contamination (water quality) and overuse (water quantity).
- Source water protection work is completed to extensive mandated Provincial requirements and is specific to local areas and individual sources of drinking water.
- Paris, County of Brant is within the Grand River Source Protection Area (GRSPA) of the Lake Erie Source Protection Region.
- Studies are completed and Policies have been prepared and submitted to MOE for review. Further public consultation will occur.



Source Protection includes extensive technical studies and assessment of existing and future conditions.

- Geology, groundwater, and surface water conditions were studied
- Water supply systems and water use were determined
- Water budget was analyzed
- Aquifer vulnerability was assessed
- Land Use and potential Provincially Significant Threats were inventoried
- Wellhead Protection Areas (WHPAs) were delineated
- Documented in the Watershed Characterization Report and the Assessment Report.

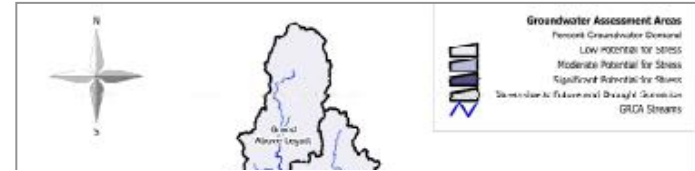
SURFICIAL GEOLOGY GRAND RIVER WATERSHED



The Paris water system is within an area assigned a low level potential for water quantity stress by SP Assessment.

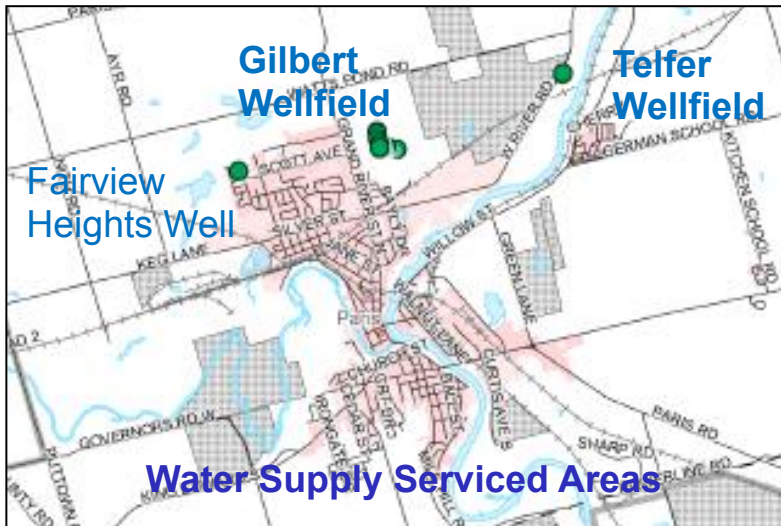
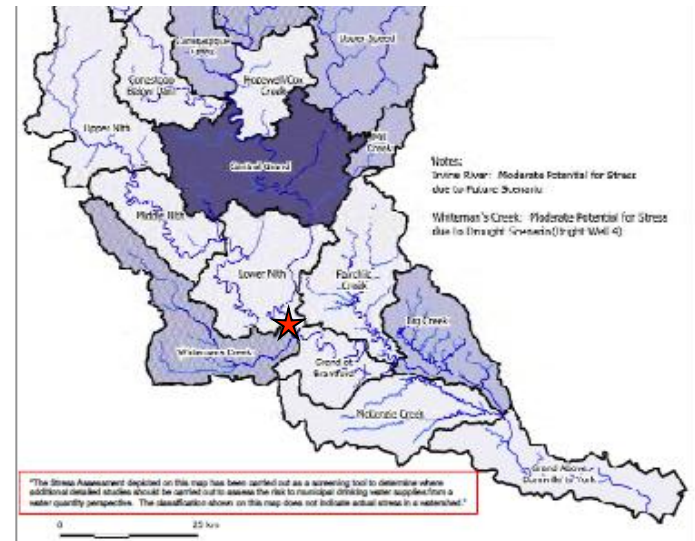
- There is sufficient amount of water available in the source area for Paris drinking water supply under all scenarios (existing, future, drought). **Aggregate extraction will not impact the availability of water.**
- The **Gilbert Wellfield** is the primary source of water. It consists of 8 wells – 2 into bedrock; 6 draw water from the overburden
- The **Telfer Wellfield** has two wells which are used primarily during high demand periods or system maintenance. One well is in the overburden and one well is in bedrock
- The Fairview Heights Well on Schuyler Street is a bedrock well. It is not currently in use
- Two overburden wells have been developed on Bethel Road for future use

Groundwater Assessment Areas Potential Stress Classifications



– Groundwater Potential Stress Thresholds

Groundwater Potential Stress Level Assignment	Average Annual	Monthly Maximum
Significant	> 25%	> 50%
Moderate	> 10%	> 25%
Low	0 – 10%	0 – 25%

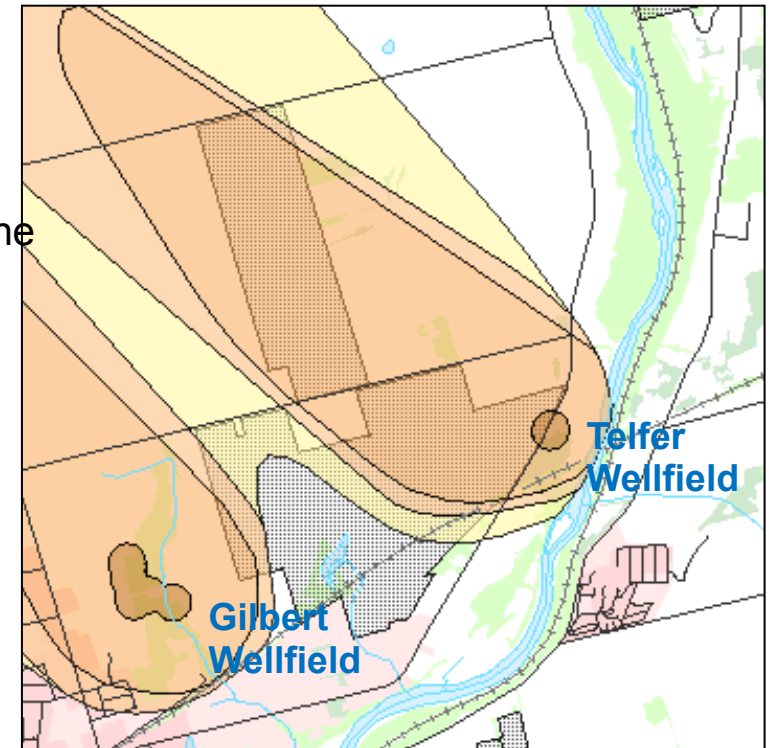


★ Lower Nith River Subwatershed Percent Water Demand: average annual 5%; monthly maximum 7%. PERCENT WATER DEMAND IS BELOW THRESHOLDS

The Wellhead Protection Areas and Vulnerability have been established for the Gilbert and Telfer Wellfields. Water quantity at these wells has been confirmed to be adequate however, availability to use that water capacity is limited by the quality of the existing groundwater source water.

- There are 2 identified issues at the Gilbert and Telfer Wellfields related to existing water quality concerns:
 - Nitrates: fertilizer, livestock, sewage/septic
 - Sulphates: naturally occurring from bedrock
- **Aggregate operations will not contribute to these issues as neither are used**
 - In fact, nitrate loading may be reduced with the best management practices being implemented
- Aggregate operations will also:
 - NOT result in any Provincially Significant Threats to source water
 - NOT threaten water quantity due to low existing water stress and low influence of operations
- Any increase in stress due to regular seasonal/ climatic conditions (drought) can be addressed with best management practices on site.

Municipal Wells and Associated Wellhead Protection Areas (WHPAs)



Dec 2010 (per GRCA Feb 2012)

The extensive and detailed SPA work demonstrates that Gilbert and Telfer drinking water sources are adequately protected



SUMMARY:

- No change in vulnerability as a result of aggregate extraction
- No drinking water quality threats
- No water quantity issues
- Opportunity to reduce the local contribution to the nitrate issue
- These conclusions will be reviewed in the context of approved Source Protection Plans

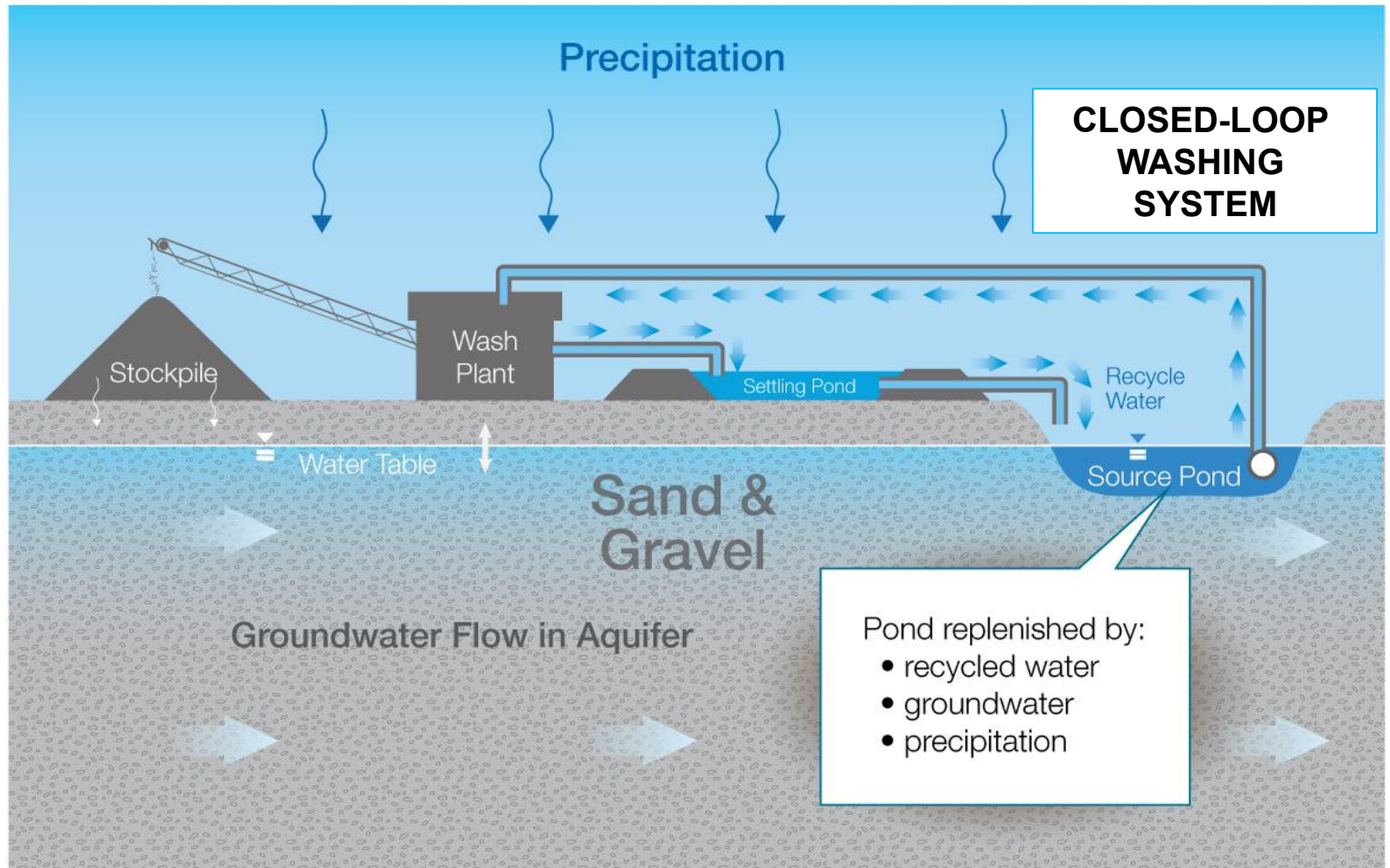
4. PARIS PIT AND WATER MANAGMENT

- What measures will be used to prevent water quantity impacts?
- What measures will be used to prevent water quality impacts?
- What are the risks to water quality?

Closed-loop washing system recycles the wash water so only a small amount of makeup water is needed.

Source water pond (reservoir for washing operations)

- Extraction to create source water pond will occur gradually (months)
- Wash water is re-circulated to source water pond after passing through settling pond
- Only water loss is through evaporation and residual moisture on material



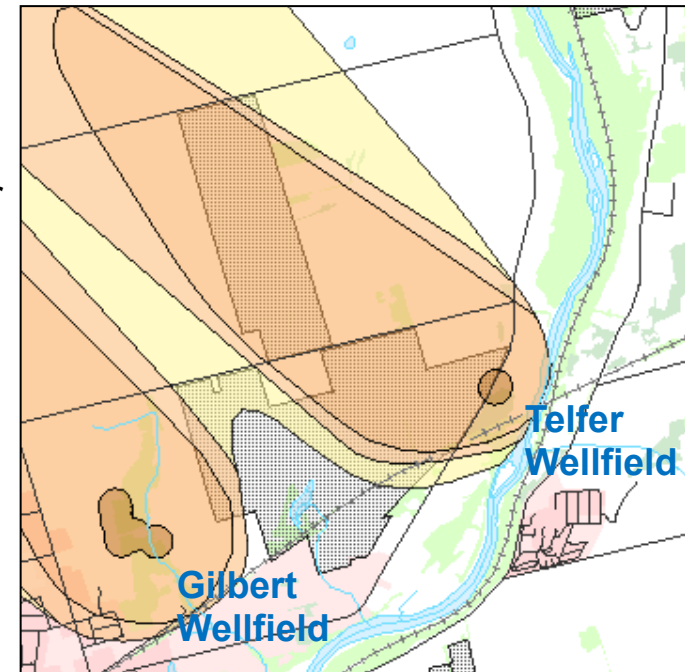
Dufferin has already made changes to further protect WHPAs. We have repositioned the processing plant area and source/settling ponds outside of the WHPAs.



Operational best practices and regulatory requirements to protect WHPAs

- **Aggregate operations do not use chemicals in their processing and the Paris Pit will not have any of the other potentially significant threats within identified vulnerable areas.**
- Fuel will be stored outside the WHPAs; above ground on an impervious pad with containment for more than 100% of tank capacity; subject to strict TSSA regulation and ARA site plan requirements.
- Dufferin will implement Best Management Practices (BMPs) and an Environmental Management System (EMS) as done with all their aggregate operations, to ensure that fuel storage is done properly.

Wellhead Protection Areas (WHPAs)



Aggregate extraction and water supply are compatible: Dec 2010 (per GRCA Feb 2012)

- Other jurisdictions specifically request to locate large wellfields in gravel operations because they find the source to be the most sustainable.
- Dufferin has had successful experience in operating pits in close proximity to municipal water supply wells.

MOE oversight via OWRA permit and monitoring will be in place to ensure aggregate extraction does not have an impact.

- No water taking can occur prior to MOE issuance of PTTW
 - Technical studies and reports are required to be submitted to MOE to address all potential water quantity and water quality concerns
- Regular monitoring is required and will be submitted to the MOE, MNR, and County, as well as being made available to the public
 - Groundwater and surface water levels – to ensure there is no unacceptable drawdown
 - Groundwater and surface water quality – to ensure there is no impact to water quality
 - Groundwater monitoring occurs at monitoring wells.
 - Surface water monitoring in the on-site ponds and Gilbert Creek.

MOE oversight via OWRA permit and monitoring will be in place to ensure aggregate extraction does not have an impact.

- Monitoring provides a forewarning system allowing the operator, MOE, and other agencies to track and respond to conditions as they evolve.
- If necessary contingency measures can be introduced to protect water resources. Available contingency measures include:
 - Temporary (immediate) supply of potable water to neighbours
 - Reduce or cease water taking
 - Augment private water supplies (e.g. lower pump, deepen well)
 - Water treatment (on-site or at supply wellhead)
- **Dufferin is responsible to not impact other water resources and to address any unanticipated impacts should they occur.**

We've tried to answer the questions and concerns as we understood them. Additional questions are welcome.

ADDITIONAL QUESTIONS ...?

D. Next Steps

- Continued dialogue with the County, Conservation Authority, Source Protection, MOE, MNR and community to ensure accurate information and fulsome understanding
- Dufferin finishes technical work and applies for Permit to Take Water
- Dufferin continues to liaise with Public - next CAP meeting: June 19, 2012
- Dufferin continues to work to address concerns and issues with County and Community
- Review of SPP policies once approved