TRIECA CONFERENCE

Great Lakes Chapter

Toronto and Region Conservation for The Living City

3rd Annual TRIECA Conference – March 25 & 26, 2014
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Construction Site Effluent Management

Too Thick to Drink … Too Thin to Plow

Presentation for TRIECA
March 25, 2014

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Ecologist and General Manager

Dave Green, C.Tech
Aquatic Biologist – Team Leader

Presentation Overview

- Types of projects
- Approach to construction
- Erosion protection & sediment controls
- Risk management
- Construction effluent & discharge options
- Discharge criteria
- Effluent treatment
- Agency expectations
- Oversight & sampling

Construction at a Glance

- Land developments
- Road & highways
- Infrastructure
- Renewable energy projects
- Linear transmission
- Bridges & culverts
- Emergency works
- Dredging & offshore

Best Laid Plans: The Strategy

- Understand the sequence of construction
- Communication plan
- Be aware of the contract $$
- Schedule
- Identify potential conflicts
- There is an EM in Team

The Front Line: Erosion Protection

- Know your site & surroundings
- Don`t clear it unless you really, really have to … seriously!
- Phase construction
- Topography & slope protection
- Changing flow pathways & diversion strategies
- Stabilize the site

Site Containment: Sediment Controls

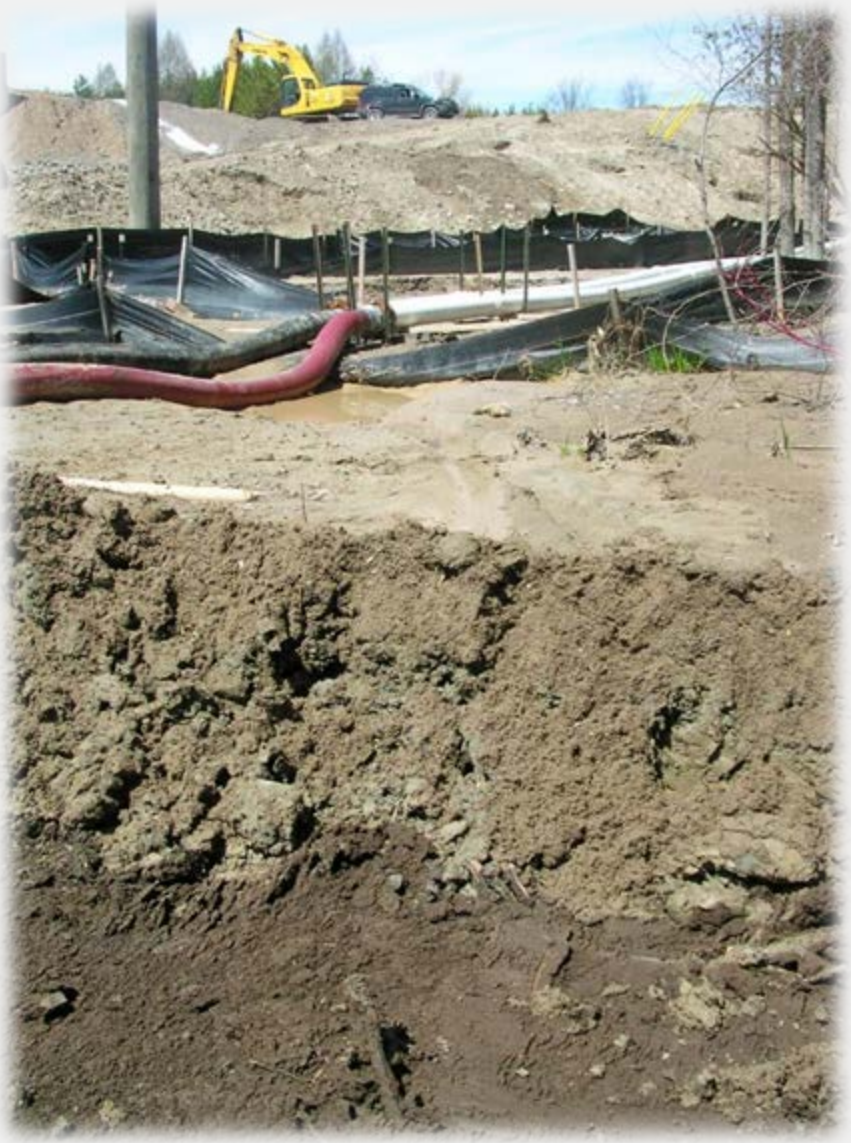
- Hold the Line! (perimeter treatment)
- Slow it down (velocity management)
- Control release (discharge points)
- Limit your access (track pads)
- Multi-layer treatments (tanks, bags, ponds)

Risky Business ….

- When pumps are involved
- When you are close to environmental features
- Do you have time? Schedule vs. Restrictions
- Has it been included? Show me the money!
- Do you have the right people? Who is responsible?
- Forward thinking & avoid tunnel vision

What is Effluent ?

- The simple definition: *"liquid that is released as waste"*
- Broader definition: "*waste material (smoke, industrial refuse, sewage) discharged into the environment especially as a pollutant or "Deleterious Substance"*
- Primarily focus on sediment & construction fluids



Types of Effluent

- Sediment laden water
- Hydrocarbons
- Lubricants & fluids
- Concrete wastewater
- Drilling muds & slurries (Bentonite)
- Site servicing wastewater
- Sterilizing waters (Chlorine)
- “Stained water”
- Know your site!

Sediment

- Total Suspended Solids (TSS)
- Turbidity
- Slurries

Other Construction Site Effluent

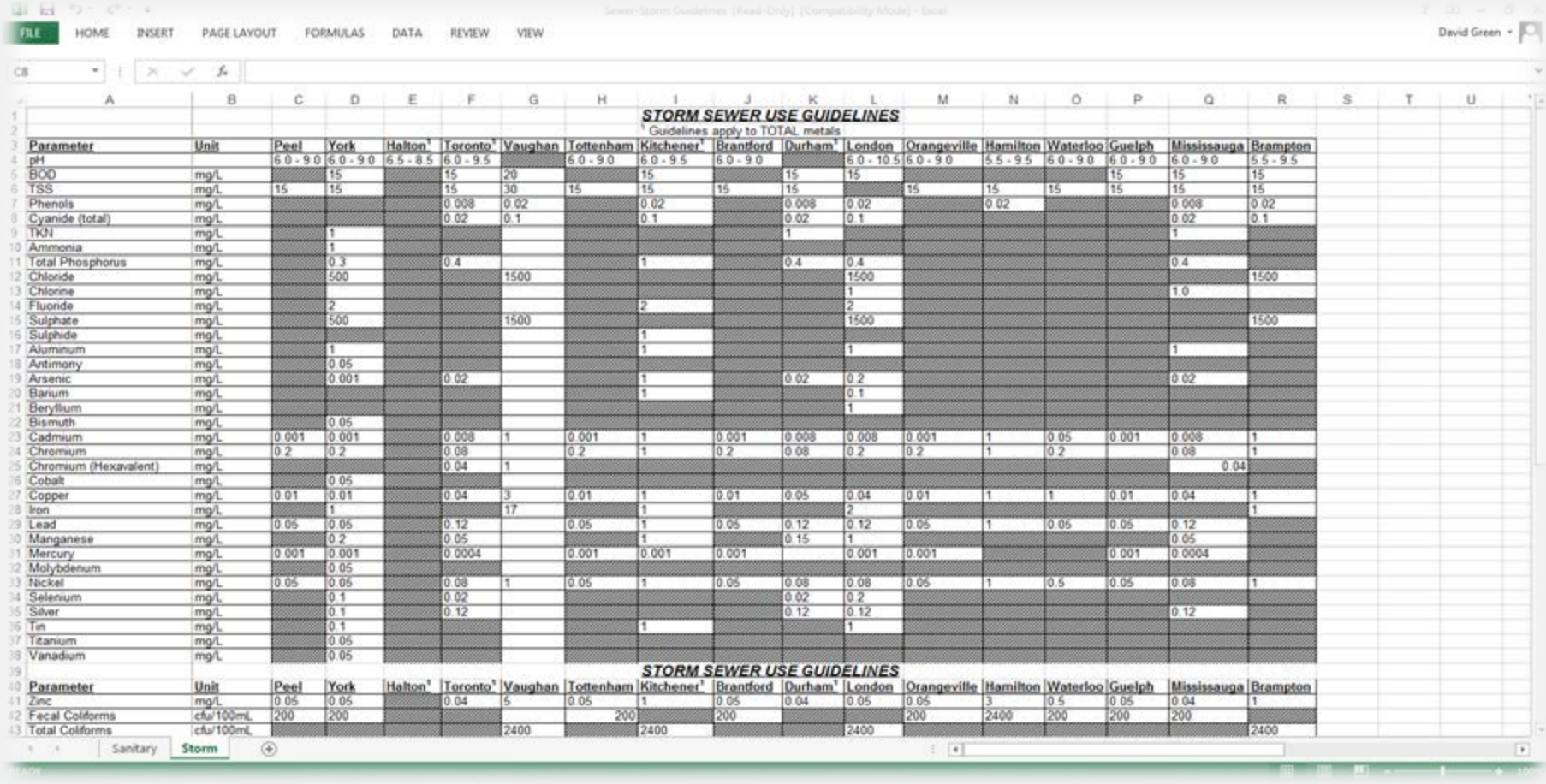
- Fuels
- Hydraulic fluids, lubricants, antifreeze
- Concrete wash
- Solvents
- Site Servicing wastewater

Discharge Options

- Discharge to infrastructure
- Discharge to environment
- Transport offsite to approved facility

Range of Target Criteria for Infrastructure

Depending on where you are … Storm Sewer



STORM SEWER USE GUIDELINES

[1] Guidelines apply to TOTAL metals

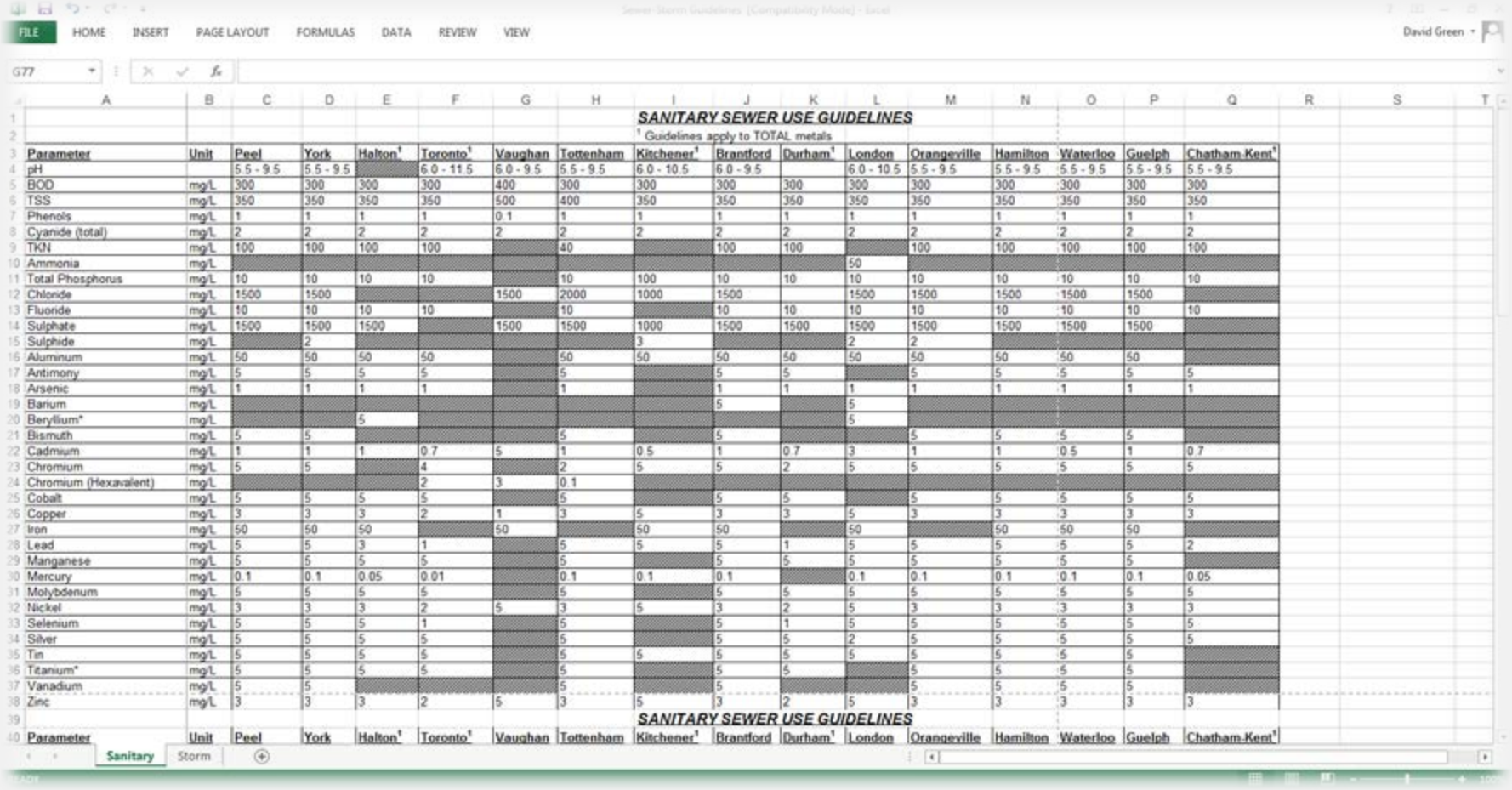
Parameter	Unit	Peel	York	Halton[1]	Toronto[1]	Vaughan	Tottenham	Kitchener[1]	Brantford	Durham[1]	London	Orangeville	Hamilton	Waterloo	Guelph	Mississauga	Brampton
pH		6.0 - 9.0	6.0 - 9.0	6.5 - 8.5	6.0 - 9.5		6.0 - 9.0	6.0 - 9.5	6.0 - 9.0		6.0 - 10.5	6.0 - 9.0	5.5 - 9.5	6.0 - 9.0	6.0 - 9.0	6.0 - 9.0	5.5 - 9.5
BOD	mg/L		15		15	20		15		15	15				15	15	15
TSS	mg/L	15	15		15	30	15	15	15	15		15	15	15	15	15	15
Phenols	mg/L				0.008	0.02		0.02		0.008	0.02		0.02			0.008	0.02
Cyanide (total)	mg/L				0.02	0.1		0.1		0.02	0.1					0.02	0.1
TKN	mg/L		1							1						1	
Ammonia	mg/L		1														
Total Phosphorus	mg/L		0.3		0.4			1		0.4	0.4					0.4	
Chloride	mg/L		500			1500					1500						1500
Chlorine	mg/L										1					1.0	
Fluoride	mg/L		2					2			2						
Sulphate	mg/L		500			1500					1500						1500
Sulphide	mg/L							1									
Aluminum	mg/L		1					1			1					1	
Antimony	mg/L		0.05														
Arsenic	mg/L		0.001		0.02			1		0.02	0.2					0.02	
Barium	mg/L							1			0.1						
Beryllium	mg/L										1						
Bismuth	mg/L		0.05														
Cadmium	mg/L	0.001	0.001		0.008	1	0.001	1	0.001	0.008	0.008	0.001	1	0.05	0.001	0.008	1
Chromium	mg/L	0.2	0.2		0.08		0.2	1	0.2	0.08	0.2	0.2	1	0.2		0.08	1
Chromium (Hexavalent)	mg/L				0.04	1										0.04	
Cobalt	mg/L		0.05														
Copper	mg/L	0.01	0.01		0.04	3	0.01	1	0.01	0.05	0.04	0.01	1	1	0.01	0.04	1
Iron	mg/L		1			17		1			2						1
Lead	mg/L	0.05	0.05		0.12		0.05	1	0.05	0.12	0.12	0.05	1	0.05	0.05	0.12	
Manganese	mg/L		0.2		0.05			1		0.15	1					0.05	
Mercury	mg/L	0.001	0.001		0.0004		0.001	0.001	0.001		0.001	0.001			0.001	0.0004	
Molybdenum	mg/L		0.05														
Nickel	mg/L	0.05	0.05		0.08	1	0.05	1	0.05	0.08	0.08	0.05	1	0.5	0.05	0.08	1
Selenium	mg/L		0.1		0.02					0.02	0.2						
Silver	mg/L		0.1		0.12					0.12	0.12					0.12	
Tin	mg/L		0.1					1			1						
Titanium	mg/L		0.05														
Vanadium	mg/L		0.05														

STORM SEWER USE GUIDELINES

Parameter	Unit	Peel	York	Halton[1]	Toronto[1]	Vaughan	Tottenham	Kitchener[1]	Brantford	Durham[1]	London	Orangeville	Hamilton	Waterloo	Guelph	Mississauga	Brampton
Zinc	mg/L	0.05	0.05		0.04	5	0.05	1	0.05	0.04	0.05	0.05	3	0.5	0.05	0.04	1
Fecal Coliforms	cfu/100mL	200	200				200		200			200	2400	200	200	200	
Total Coliforms	cfu/100mL					2400		2400			2400						2400

Range of Target Criteria for Infrastructure

Depending on where you are … Sanitary Sewer



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SANITARY SEWER USE GUIDELINES

[1] Guidelines apply to TOTAL metals

Parameter	Unit	Peel	York	Halton[1]	Toronto[1]	Vaughan	Tottenham	Kitchener[1]	Brantford	Durham[1]	London	Orangeville	Hamilton	Waterloo	Guelph	Chatham-Kent[1]
pH		5.5 - 9.5	5.5 - 9.5		6.0 - 11.5	6.0 - 9.5	5.5 - 9.5	6.0 - 10.5	6.0 - 9.5		6.0 - 10.5	5.5 - 9.5	5.5 - 9.5	5.5 - 9.5	5.5 - 9.5	5.5 - 9.5
BOD	mg/L	300	300	300	300	400	300	300	300	300	300	300	300	300	300	300
TSS	mg/L	350	350	350	350	500	400	350	350	350	350	350	350	350	350	350
Phenols	mg/L	1	1	1	1	0.1	1	1	1	1	1	1	1	1	1	1
Cyanide (total)	mg/L	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
TKN	mg/L	100	100	100	100		40		100	100		100	100	100	100	100
Ammonia	mg/L										50					
Total Phosphorus	mg/L	10	10	10	10		10	100	10	10	10	10	10	10	10	10
Chloride	mg/L	1500	1500			1500	2000	1000	1500		1500	1500	1500	1500	1500	
Fluoride	mg/L	10	10	10	10		10		10	10	10	10	10	10	10	10
Sulphate	mg/L	1500	1500	1500		1500	1500	1000	1500	1500	1500	1500	1500	1500	1500	
Sulphide	mg/L		2					3			2	2				
Aluminum	mg/L	50	50	50	50		50	50	50	50	50	50	50	50	50	
Antimony	mg/L	5	5	5	5		5		5	5		5	5	5	5	5
Arsenic	mg/L	1	1	1	1		1		1	1	1	1	1	1	1	1
Barium	mg/L								5		5					
Beryllium*	mg/L			5							5					
Bismuth	mg/L	5	5				5		5			5	5	5	5	
Cadmium	mg/L	1	1	1	0.7	5	1	0.5	1	0.7	3	1	1	0.5	1	0.7
Chromium	mg/L	5	5		4		2	5	5	2	5	5	5	5	5	5
Chromium (Hexavalent)	mg/L				2	3	0.1									
Cobalt	mg/L	5	5	5	5		5		5	5		5	5	5	5	5
Copper	mg/L	3	3	3	2	1	3	5	3	3	5	3	3	3	3	3
Iron	mg/L	50	50	50		50		50	50		50		50	50	50	
Lead	mg/L	5	5	3	1		5	5	5	1	5	5	5	5	5	2
Manganese	mg/L	5	5	5	5		5		5	5	5	5	5	5	5	
Mercury	mg/L	0.1	0.1	0.05	0.01		0.1	0.1	0.1		0.1	0.1	0.1	0.1	0.1	0.05
Molybdenum	mg/L	5	5	5	5		5		5	5	5	5	5	5	5	5
Nickel	mg/L	3	3	3	2	5	3	5	3	2	5	3	3	3	3	3
Selenium	mg/L	5	5	5	1		5		5	1	5	5	5	5	5	5
Silver	mg/L	5	5	5	5		5		5	5	2	5	5	5	5	5
Tin	mg/L	5	5	5	5		5	5	5	5	5	5	5	5	5	
Titanium*	mg/L	5	5	5	5		5		5	5		5	5	5	5	
Vanadium	mg/L	5	5				5		5			5	5	5	5	
Zinc	mg/L	3	3	3	2	5	3	5	3	2	5	3	3	3	3	3

SANITARY SEWER USE GUIDELINES

Parameter	Unit	Peel	York	Halton[1]	Toronto[1]	Vaughan	Tottenham	Kitchener[1]	Brantford	Durham[1]	London	Orangeville	Hamilton	Waterloo	Guelph	Chatham-Kent[1]

Sanitary | Storm

Discharge to Environment

Federal Jurisdiction

- Fisheries Act
- CEPA
- SARA
- NWPA

Provincial Jurisdiction

- OWRA
- EPA
- CAA
- ESA
- LRIA

Municipal Jurisdiction

- Planning Act and Municipal Act

When typical treatments are not enough … Think inside the box!

- Steel micron filtration
- Sand media
- Bag pod treatment
- Fractionation tanks
- Carbon
- Clay
- Vortex
- Additives (pH, phosphorous…)

And as a last “ditch” effort…Polymers

- Old technology in a relatively new application
- Only use anionic polyacrylamides with MSDS
- Erosion control
- Sediment control
- Stormwater pond demucking

Common Agency Expectations

- Demonstrated due diligence
- Adherence to timing restrictions
- 30m from watercourse
- Routine and event inspections
- Communication & documentation
- Field fit and design adjustments
- Meet discharge criteria
- Spills reporting
- Containment and remediation

Environmental Monitoring

- Strong contribution to due diligence
- Solutions come with experience
- A focus on environmental issues
- Environmental risk management
- Construction team & agency liaison
- Ensure compliance
- Keep things moving

Sampling

- Unbiased
- Routine & event based sampling
- Appropriate parameters
- Data management
- Result reporting
- Enhancement of treatment

Questions?