



Mackenzie Valley Land and Water Board
7th Floor - 4922 48th Street
P.O. Box 2130
YELLOWKNIFE NT X1A 2P6
Phone (867) 669-0506
FAX (867) 873-6610

Staff Report

Applicant: De Beers Canada Inc. -Gahcho Kué Project	
Location: Kennady Lake, NT	Application: MV2005L2-0015
Date Prepared: July 11, 2016	Meeting Date: July 21, 2016
Subject: Dyke Construction and Management Plan for Water Collection Ponds (Version 1)	

1. Purpose/Report Summary

The purpose of this Report is to present to the Mackenzie Valley Land and Water Board (MVLWB/the Board) the Dyke Construction and Management Plan for Water Collection Ponds (Version 1) (Plan) for the Gahcho Kué Project as submitted by De Beers Canada Inc. (De Beers) under Water Licence (Licence) MV2005L2-0015 for decision.

2. Background

- May 26, 2016 – De Beers submitted the Plan;
- May 27, 2016 – Plan distributed for review;
- June 22, 2016 – Review comment deadline;
- June 29, 2016 – De Beers’ responses due;
- July 8, 2016 – Board staff seeks additional clarification from De Beers;
- July 13, 2016 – De Beers submits additional information; and
- **July 21, 2016 – Plan presented to the Board.**

3. Discussion

A Dyke Construction and Management Plan is required under Part G, item 16 of the Licence MV2005L2-0015, as follows:

All other dykes shall be addressed under the Dyke Construction and Management Plan, which shall be submitted to the Board for approval sixty (60) days prior to commencement of Construction of any dykes other than Dyke A. This Plan shall meet the objectives listed in Part G, item 1, and satisfy the requirements of Schedule 5, item 8. This Plan shall address the Construction and Operation phases of the Project. The Licensee shall not commence Construction of these remaining dykes until the Board has approved the Plan.

De Beers requires the construction of eight water collection ponds in order to manage the runoff water and dyke seepage inside the Project’s controlled area.

On May 26, 2016, De Beers submitted the Plan (attached). Included with this was the Final Detailed Construction Plan as per Part E, item 11, which is not for Board approval.

Separate from the collection ponds, a total of 14 dykes are required to manage the site water during the life of mine and achieve the controlled area boundary at the project site. The Dyke Construction and Management Plan for:

- Dyke A (version 3) was approved October 16, 2014,
- Dykes A1, F, G, H, I, J, K, and L (version 2) was approved May 27, 2015,
- Dykes B, D, E, and A1 Perimeter Berm (Version 1) was approved December 3, 2015; and
- Plans for the two remaining dykes (M and N) will be submitted under separate cover as the detailed design process is developed.

4. Comments

Not applicable.

5. Reviewer Comments

By June 22, 2016, comments and recommendations on the Plan were received from 2 reviewers:

- Government of the Northwest Territories (GNWT) – Environment and Natural Resources; and
- Board staff.

De Beers responded on June 29, 2016. Board staff requested additional clarification for some of De Beers' responses on July 8, 2016. De Beers submitted the additional information (attached) on July 13, 2016. The reviewer comment summary table (attached) presents the concerns identified through the review of the Plan.

6. Security

The GNWT currently holds \$23,776,270.00 in reclamation security for the Gahcho Kué Project for this Licence. De Beers' next deposit of security (in the amount of \$40,713,234) is due prior to year 4 of Operations (the end of mining of the Hearn Pit).

7. Conclusion

Board staff concludes that the Dyke Construction and Management Plan for Water Collection Ponds (Version 1) has addressed the requirements of the Licence, however, it does not address all the concerns that were raised during the review.

8. Recommendation

Board staff recommends the Board approve the Dyke Construction and Management Plan for Water Collection Ponds (Version 1) as an interim plan, and require the submission of a revised version. This revised Plan shall include the updates identified by reviewers and identified in the attached draft decision letter. The revised Plan would be reviewed by Board staff to ensure conformance with the decision letter.

9. Attachments

- [Dyke Construction and Management Plan for Water Collection Ponds;](#)
- [Additional Information Submitted by De Beers;](#)
- Reviewer Comment Summary Table;
- Draft Reasons for Decision; and
- Draft Decision Letter from the Board.

Respectfully submitted,




Angela Love
Regulatory Officer

Review Comment Table

Board:	MVLWB
Review Item:	De Beers Gahcho Kue - Water Collection Ponds Dyke Construction and Management Plan (Version 1) (MV2005L2-0015)
File(s):	MV2005L2-0015
Proponent:	De Beers Canada Inc - Gahcho Kue
Document(s):	Dyke Construction and Management Plan - Water Collection Ponds (11 MB)
Item For Review Distributed On:	May 27 at 13:34 Distribution List
Reviewer Comments Due By:	June 22, 2016
Proponent Responses Due By:	June 29, 2016
Item Description:	<p>De Beers Gahcho Kue has submitted a Dyke Construction and Management Plan (Version 1) for Water Collection Ponds, for Board approval, to satisfy the requirements of Part G, item 16 and Schedule 5, item 8 of their Water Licence MV2005L2-0015. Attached to this is the Final Detailed Construction Plans, for the Water Collection Ponds, to satisfy the requirements of Part E, item 11 and Schedule 4, item 2 which is not for Board approval.</p> <p>Please submit comments using the Online Review System by downloading the excel comment table or using the "add comment" button.</p> <p>If you have any questions or comments regarding this Plan or using the Online Review System, please contact Angela Love at 867-766-7456 or angela.love@mvlwb.com.</p>
General Reviewer Information:	<p>This information has also been distributed by fax to:</p> <p>Fort Resolution Métis Council Trudy King fax: (867)394-3322; Fieldworker.frmc53@northwestel.net</p> <p>Hay River Metis Council Karen Lafferty President fax: (867)874-4472; hrcm@northwestel.net</p> <p>NWT Metis Nation Tim Heron NWTMN IMA Coordinator fax: (867)872-3586; rcc.nwtmn@northwestel.net</p>
Contact Information:	<p>Angela Love 867-766-7456 Jen Potten 867-766-7468 Kierney Leach 867-766-7470</p>

Comment Summary

GNWT - ENR: Central Email GNWT				
ID	Topic	Reviewer Comment/Recommendation	Proponent Response	Board Response
1	General File	Comment (doc) ENR Comments Recommendation		N/A
2	Collection Ponds 7 and 8	Comment Collection Ponds 7 and 8 do not require the construction of dikes as they will be formed in the depression the lake bed. It is unclear from the figure if this is still within the bed of Kennady Lake or if these are individual depressions that are located south of the South Mine Rock Pile (SMRP). As they are south of the SMRP, these areas will be isolated from the Water Management Pond so it is unclear where the overflow from these areas will go. Recommendation ENR requests additional information on the locations of Collection Ponds 7 and 8. The information should describe their condition prior to development as well as their current condition. ENR requests clarification on the flow pathway from overflow originating from Collection Ponds 7 and 8.	June 30:  As shown in Figure 2, general site layout plan in the Management plan report and attached zoomed-in Figure 1, CP7 is located at southeast corner of the SMRP and CP8 is located at west corner of the SMRP. CP7 and CP8 will be formed after the construction of the SMRP. CP7 is located within a marsh area. CP8 is just out of boundary of the lakebed, it is in an isolated depression with a local hill. The geological unit in this area is till veneer. As described in Section 3.7, the water collected in CP7 will be pumped to Area 7 (CP1) or other designated storage area. The water collected in CP8 will be pumped to CP5 or other designated storage area.	Additional clarification sought from De Beers on July 8, 2016. The additional information submitted on July 13, 2016 should be added to the plan.
3	Containment	Comment The Plan notes that low permeability till will be used to contain water within the collection ponds. ENR notes that all till is permeable by its nature. It is not clear why another type of material or a liner is not being proposed if the intent is to contain water. Recommendation ENR recommends that De Beers clarify how the till will contain water as proposed for the collection ponds. ENR requests that De Beers describe other material types and liners that could be used to contain water and provide rationale for the option selected, including how it	June 30: The CP berms are short-term structures with low water head. The collection ponds will store spring freshet water prior to pumping to the water management pond. They do not need to be 100% impermeable to water, like a fuel containment area would be for example. They are temporary water storage areas located within the Controlled Area. When we evaluated options for the water containment element of the CP berms, we considered two options, low permeability till, and a liner. We selected	Acceptable response.

		<p>may or may not meet design specifications.</p>	<p>the low permeability till for several reasons. 1) The seepage rate associated with the till core is low (0.7 to 2.2 m³/day/m), as indicated in Section 5.2 (Seepage analysis). This seepage range is well within our operations requirements for water storage in the ponds. 2) Till is available at site 3) A liner must be keyed into the dyke foundation. The seepage flow path would be underneath the keyed liner. Because the liner key is much shorter than a wide till core, a higher seepage rate is expected using liner option as compared to the current design. 4) The low permeability till design has been successfully used at Dyke J which is completed and has been operational for some time. The A1 Perimeter berms have the similar design feature.</p>	
4	PAG	<p>Comment Section 7.5 states that "The run of mine will be non-acid generating (Non-PAG) with the exception of run of mine that will be used in dykes where it will remain submerged throughout the mine life and closure." As per ENR's comments on the 2015 Annual Report, the Water Licence is clear that PAG rock is not to be used during construction. ENR remains concerned with the use of PAG rock in construction particularly items that will be exposed and periodically subject to flushing which will likely lead to acid generation over time.</p> <p>Recommendation ENR recommends that PAG material not be used in the new construction activities as outlined in the water licence</p>	<p>June 30: The use of PAG rock in dykes is approved by the Board (see letter from the Board to De Beers October 16th, 2014; Construction Water Management Plan V.6 Table 2a, Page 12, and the Processed Kimberlite and Mine Rock Management Plan V.4, Pg. 15 and Section 2.1.2.3). Consistent with those approvals, PAG has been used in the construction of some interior dykes, which will be submerged under water at closure. We do not plan on using PAG in the Collection Pond berms.</p>	<p>Section 7.5 of this plan should be revised as necessary to remove any references to the use of PAG rock in the construction of the Collection Pond berms.</p>

5	Mitigation Plan	<p>Comment Section 7.7 outlines a list of key mitigation measures to ensure that works will have a minimum effect on water quality. Of note, one of these measures includes avoiding working in lake beds. ENR understands that a significant portion of the work will occur in the lake bed of Kennady Lake. As such, it is not clear what this measure is referring to and it should be clarified as it may not be possible to implement as stated.</p> <p>Recommendation ENR requests that De Beers clarify the mitigation measure related to the avoidance of work within lake beds.</p>	<p>June 30: This mitigation measure is related to working with heavy equipment. During construction of CP berms, heavy equipment will work on the working platform, avoid working on the lakebed (minimize the disturbance of the lakebed).</p>	Acceptable response.
6	Water Management	<p>Comment Section 7.7 outlines a list of key mitigation measures to ensure that works will have a minimum effect on water quality. One of these measures notes that water encountered within the construction footprint will be treated, as required, to remove TSS prior to pumping to the water management pond or other storage area (e.g. temporary pit sump). This procedure is mentioned again in Section 8. It is unclear how treatment will be performed and why treatment is necessary prior to being pumped to the Water Management Pond. ENR understands that the Water Management Pond will be a closed system that will be monitored prior to discharge. The Pond has the capacity to allow for settling of TSS.</p> <p>Recommendation ENR requests clarification on the proposal to treat water prior to pumping into the Water Management Pond. How will its need be determined and how will the treatment occur?</p>	<p>June 30: Water may be treated by flocculation in order to assist with the settling of TSS prior to or during periods of discharge from the Water Management Pond. When discharge from the Water Management Pond is no longer anticipated, treatment will not be required.</p>	Acceptable response.

7	Reporting	<p>Comment Section 7.10 outlines items that will be included in the Construction Report Record including "all testing records". It is unclear if this relates to water quality records or geochemical results related to the construction material.</p> <p>Recommendation ENR requests De Beers clarify the specifics of the testing records that will be included in the Construction Report Record.</p>	<p>June 30: The testing records referred to are the quality assurance tests for materials including particle size, moisture content, proctor test, and the field compaction test as outlined in the specifications.</p>	<p>Acceptable response. The explanation of what the testing records are should be added to section 7.10 of the plan.</p>
8	Reporting	<p>Comment Section 8.3 states that reporting will include any exceedence of "target levels". ENR is not clear if this refers to all target levels and warning levels. Section 1.2 references that an objective of the plan is to include "Action levels or cut-off limits for total suspended solid and turbidity measurements during construction to ensure the EQC under Part G, Item 9 of the Water Licence will not be exceeded"; however, Section 8.1 states that "the action levels for the water quality within the WMP are established to be 80% of the EQCs. The action levels will only apply when discharging from the WMP to the receiving environment (Lake N11 and Area 8). The action levels would only apply to open water not grounded ice conditions when there is no flow."</p> <p>Recommendation ENR requests that De Beers clarify the reference to "target levels" and "action levels" as it relates to the collection ponds. This clarification should include when reporting/notification would be triggered.</p>	<p>June 30: The "target level" and "action level" are not applicable to the collection pond, and they are related to the WMP. Any water encountered during construction of CPs will be pumped to the WMP. The water will be treated using in-line treatment system with flocculation for TSS, as required. When the discharge from the WMP to Lake N11 is occurring during construction of CPs, TSS in the WMP will be monitored to verify that the TSS will not exceed the EQC under Part G, Item 9 of Water Licence. If the TSS exceed the EQC during discharge from the WMP period, reporting requirements will be triggered.</p>	<p>Additional clarification sought from De Beers on July 8, 2016.</p> <p>The additional information submitted on July 13, 2016 should be added to Section 8.3 of the plan.</p>

ID	Topic	Reviewer Comment/Recommendation	Proponent Response	Board Response
1	Section 7.5, Construction Materials Specifications	<p>Comment In this section it states that "The run of mine will be non-acid generating (NonPAG) with the exception run of mine that will be used in dykes where it will remain submerged throughout the mine life and closure." This statement implies that PAG rock may be used at least in the construction of the dykes, which seems to contradict Part E, item 10 of the water licence which does not allow the use of PAG rock in construction. As well, the Geochemical Characterization Plan states in section 5.1 that "PAG rock must be sequestered in designated areas of the mine rock piles or placed within mined out pits"; there is no indication that PAG rock would be used for construction.</p> <p>Recommendation De Beers should clarify if it is proposing to use PAG rock in the construction of the Collection Pond berms. If so, can De Beers please comment on the inconsistency between this proposal and the requirement in Part E, item 10 as well as the statements made in the approved Geochemical Characterization Plan?</p>	<p>June 30: See response to GNWT 4. PAG rock will not be used for the construction of collection pond berms</p>	<p>Section 7.5 of this plan should be revised as necessary to remove any references to the use of PAG rock in the construction of the Collection Pond berms.</p>
2	Schedule 4, item 2 (i) of the Water Licence	<p>Comment The schedule indicates that the 'Quality Control Plan stamped by a professional Engineer, including a component of which includes a plan for a professional engineer to supervise and field check construction activities.' Attached in Appendix D is a Quality Assurance Plan which is not stamped by a professional Engineer.</p>	<p>June 30: The quality assurance plan will be stamped.</p>	<p>The Quality Assurance Plan shall be stamped by the Professional Engineer prior to construction. Please add this to the next revision of the plan.</p>

		Recommendation De Beers should clarify that this is the same Plan and should ensure that this is stamped by a professional Engineer as per Scheule 4, item 2 (i).		
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June 22, 2016

Angela Love
Regulatory Officer
Mackenzie Valley Land and Water Board
7th Floor – 4910 50th Avenue
P.O. Box 2130
Yellowknife, NT X1A 2P6

Dear Ms. Love,

Re: De Beers Gahcho Kue
MV2005L2-0015
Water Collection Ponds Dyke Construction and Management Plan (Version 1)
Request for Comment

The Department of Environment and Natural Resources (ENR), Government of the Northwest Territories, has reviewed the plan based on its mandated responsibilities under the *Environmental Protection Act*, the *Forest Management Act*, the *Waters Act*, the *Forest Protection Act* and the *Wildlife Act* and provides the following comments and recommendations for the consideration of the Board.

Topic 1: Collection Ponds 7 and 8

Comment:

Collection Ponds 7 and 8 do not require the construction of dikes as they will be formed in the depression the lake bed. It is unclear from the figure if this is still within the bed of Kennady Lake or if these are individual depressions that are located south of the South Mine Rock Pile (SMRP). As they are south of the SMRP, these areas will be isolated from the Water Management Pond so it is unclear where the overflow from these areas will go.

Recommendations:

ENR requests additional information on the locations of Collection Ponds 7 and 8. The information should describe their condition prior to development as well as their current condition.

ENR requests clarification on the flow pathway from overflow originating from Collection Ponds 7 and 8.

Topic 2: Containment

Comment:

The Plan notes that low permeability till will be used to contain water within the collection ponds. ENR notes that all till is permeable by its nature. It is not clear why another type of material or a liner is not being proposed if the intent is to contain water.

Recommendations:

ENR recommends that De Beers clarify how the till will contain water as proposed for the collection ponds.

ENR requests that De Beers describe other material types and liners that could be used to contain water and provide rationale for the option selected, including how it may or may not meet design specifications.

Topic 3: PAG

Comment:

Section 7.5 states that “The run of mine will be non-acid generating (Non-PAG) with the exception of run of mine that will be used in dykes where it will remain submerged throughout the mine life and closure.”

As per ENR’s comments on the 2015 Annual Report, the Water Licence is clear that PAG rock is not to be used during construction.

ENR remains concerned with the use of PAG rock in construction particularly items that will be exposed and periodically subject to flushing which will likely lead to acid generation over time.

Recommendation:

ENR recommends that PAG material not be used in the new construction activities as outlined in the water licence.

Topic 4: Mitigation Plan

Comment:

Section 7.7 outlines a list of key mitigation measures to ensure that works will have a minimum effect on water quality. Of note, one of these measures includes avoiding working in lake beds. ENR understands that a significant portion of the work will occur in the lake bed of Kennady Lake. As such, it is not clear what this measure is referring to and it should be clarified as it may not be possible to implement as stated.

Recommendation:

ENR requests that De Beers clarify the mitigation measure related to the avoidance of work within lake beds.

Topic 5: Water Management**Comment:**

Section 7.7 outlines a list of key mitigation measures to ensure that works will have a minimum effect on water quality. One of these measures notes that water encountered within the construction footprint will be treated, as required, to remove TSS prior to pumping to the water management pond or other storage area (e.g. temporary pit sump). This procedure is mentioned again in Section 8.

It is unclear how treatment will be performed and why treatment is necessary prior to being pumped to the Water Management Pond. ENR understands that the Water Management Pond will be a closed system that will be monitored prior to discharge. The Pond has the capacity to allow for settling of TSS.

Recommendation:

ENR requests clarification on the proposal to treat water prior to pumping into the Water Management Pond. How will its need be determined and how will the treatment occur?

Topic 6: Reporting**Comment:**

Section 7.10 outlines items that will be included in the Construction Report Record including “all testing records”. It is unclear if this relates to water quality records or geochemical results related to the construction material.

Recommendation:

ENR requests De Beers clarify the specifics of the testing records that will be included in the Construction Report Record.

Topic 7: Reporting**Comment:**

Section 8.3 states that reporting will include any exceedence of “target levels”. ENR is not clear if this refers to all target levels and warning levels. Section 1.2 references that an objective of the plan is to include “*Action levels or cut-off limits for total suspended solid and turbidity measurements during construction to ensure the EQC under Part G, Item 9 of the Water Licence will not be exceeded*”; however, Section 8.1 states that “*the action levels for the water quality within the WMP are established to be 80% of the EQCs. The action levels will only apply*”

when discharging from the WMP to the receiving environment (Lake N11 and Area 8). The action levels would only apply to open water not grounded ice conditions when there is no flow."

Recommendation:

ENR requests that De Beers clarify the reference to "target levels" and "action levels" as it relates to the collection ponds. This clarification should include when reporting/notification would be triggered.

Comments and recommendations were provided by ENR technical experts in the Water Resources Division and were coordinated and collated by the Environmental Impact Assessment Section, Conservation, Assessment and Monitoring Division (CAM).

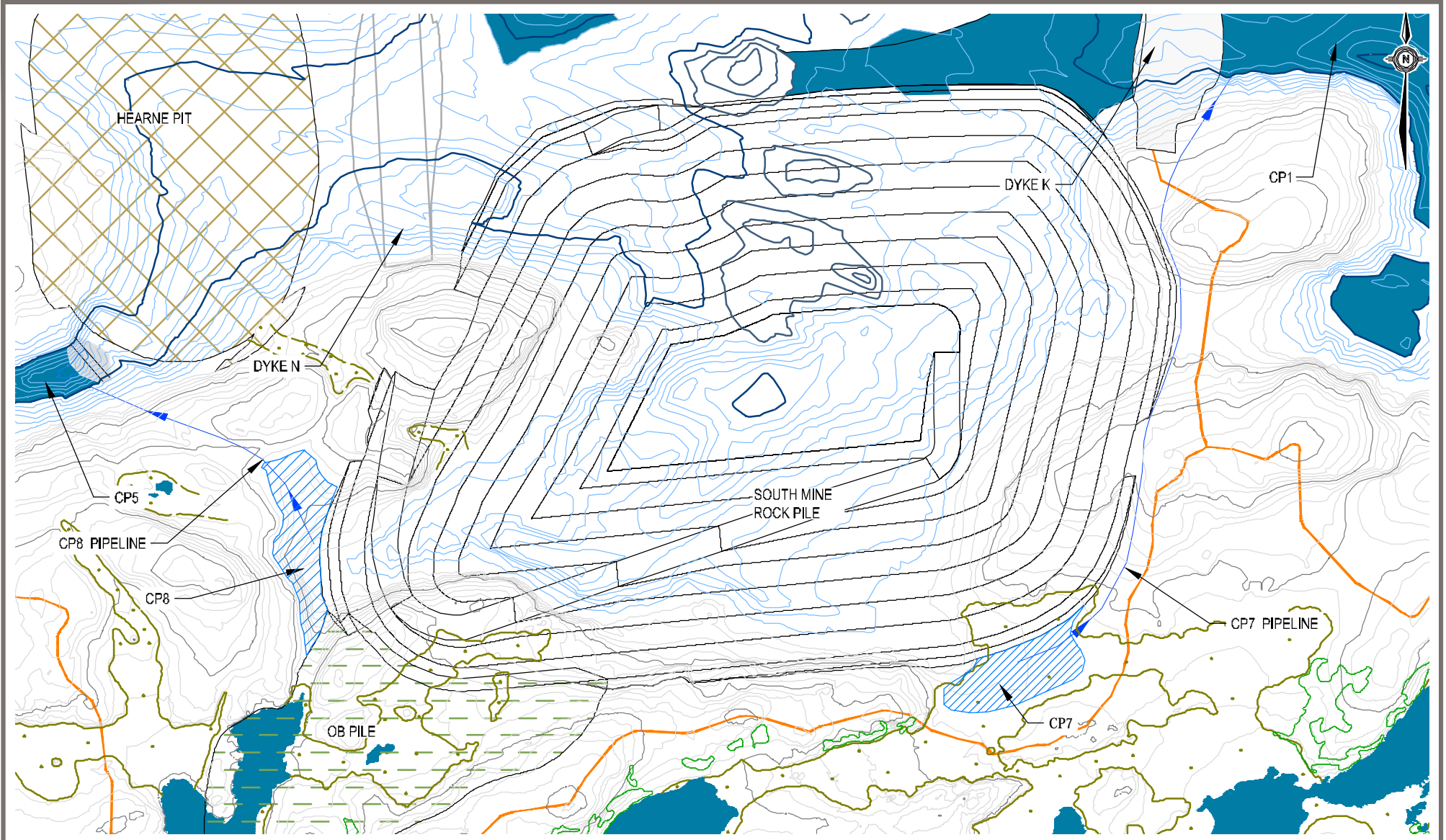
Should you have any questions or concerns, please do not hesitate to contact Marcy MacDougall at (867) 767-9233 Ext: 53099 or email Marcy_MacDougall@gov.nt.ca.

Sincerely,







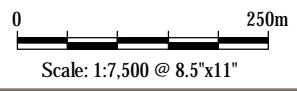
For

Patrick Clancy
Environmental Regulatory Analyst
Environmental Assessment and Monitoring Section
Conservation, Assessment and Monitoring Division
Department of Environment and Natural Resources
Government of the Northwest Territories



LEGEND

	MARSH AREA
	SCRUB
	CATCHMENT BOUNDARY
	PIPELINE



CLIENT




GAHCHO KUE PROJECT NT, CANADA			
CP7 AND CP8 LOCATIONS			
PROJ. FC# NO. E14103040-11-005	DWN HX	CKD WTH	REV 0
OFFICE EDM	DATE June 2016		Figure 1