



EA1415-01
December 21st, 2015

REASONS FOR DECISION ON THE ADEQUACY OF THE DEVELOPER'S ASSESSMENT REPORT

Prairie Creek All Season Road Project – EA1415-01

1 SUMMARY

These reasons outline the Review Board's decision regarding the outstanding information requirements described within the Review Board's *Adequacy Review*¹ that was issued on May 22nd, 2015 for Canadian Zinc Corporation (CanZinc)'s *Developer's Assessment Report* for the Prairie Creek All-Season Road Project. The Review Board met to consider the adequacy of the *Developer's Assessment Report* (DAR) and supporting adequacy materials on December 17th, 2015. After reviewing all the information submitted by CanZinc, the Review Board concludes that the environmental assessment can proceed because there is sufficient information for the Review Board and parties to prepare meaningful and relevant information requests. However, the Review Board has also concluded that five items require additional information and these must be addressed at least four weeks prior to the technical sessions.

2 ENVIRONMENTAL ASSESSMENT PROCESS

The goal of the environmental assessment is for the Review Board to determine if a development is likely to cause significant adverse impacts. The Review Board determines this by developing a firm understanding of the risks associated with the development and its components. It is only once the Review Board understands the risks (considering their likelihood and severity) that it can assess the potential for likely significant adverse impacts.

The Review Board considers evidence from all parties and the developer when making its final determination. The environmental assessment process is designed to give parties and the developer the opportunity to describe their predictions of potential effects from the project, and whether the effects will be significant. During the environmental assessment, "the onus is on the developer to convince the Review Board that the proposed development [will not] be likely to cause significant adverse impacts."²

3 BACKGROUND

On April 23rd, 2015, Canadian Zinc Corporation (CanZinc) submitted its DAR for its proposed all-season road and airstrip to access the approved Prairie Creek Mine. The proposed road extends approximately 184 km northwest from the Liard Highway across from Nahanni Butte to the Prairie Creek Mine. Approximately half of the proposed road is within the Nahanni National Park Reserve. The airstrip was proposed within the Nahanni National Park Reserve. Parks Canada stated that an airstrip is not

¹ http://www.reviewboard.ca/upload/project_document/EA1415-01_EA1415-01_CanZinc_DAR_Adequacy_Review_Final.PDF

² EA Guidelines: http://www.reviewboard.ca/upload/ref_library/MVE%20EIA%20Guidelines_1195078754.pdf



permitted within the park³. Given Parks Canada's decision, in June 2015, the Review Board determined that it will not be assessing the proposed airstrip⁴.

The Review Board issued its adequacy review document for the Prairie Creek All-Season Road Project DAR on May 22nd, 2015. The adequacy review found the DAR to be inadequate with respect the requirements outlined in the *Terms of Reference*⁵ and required CanZinc to submit additional information. The adequacy review identified 24 topics that were considered to be inadequate with respect to what was required in the Terms of Reference. The deficiencies of particular importance were: the quality of information presented describing the road, the absence of a full effects assessment for the key lines of inquiry, and the poor quality of the risk assessment. CanZinc responded by submitting a DAR Addendum on September 11th and a terrain mapping report on December 4th, 2015.

4 DISCUSSION – RATIONALE

The Review Board reviewed the supplemental material submitted by CanZinc and assessed it against what was required by the Terms of Reference and the adequacy review. The Review Board finds that majority of CanZinc's responses are satisfactory to allow parties to ask meaningful information requests; however, the Review Board finds that the five items below remain inadequate:

1. effects assessment and description for the Sundog Creek re-alignment (see section 5.1)
2. detailed characterization of permafrost and karst hazards from km48-59 (see section 5.2)
3. frequency of landslides and avalanches (see section 5.3)
4. description of terrain from km 160-184 (see section 5.4)
5. effects of potential accidents and malfunctions (Risk Assessment) (see section 5.5)

A summary of the final adequacy determination for each of the above items is described in more detail in Section 5 below. The items that require additional information from CanZinc must be provided to the Review Board at least four weeks prior to the technical session, to give parties enough time to analyze them before the session. If the materials are not provided and are not considered adequate by the Review Board, the technical session will be postponed.

The Review Board still has a number of remaining concerns related to the other sections in the DAR. The Review Board has questions related to what the impacts of the projects may be, the significance of the potential impacts, and the possible mitigations. In the Review Board's view, the best approach to begin to address the concerns is through information requests because it will enable the Board to understand parties' views on the project. As described above in section 2, the environmental assessment process is based on the Review Board hearing from all parties.

³ http://reviewboard.ca/upload/project_document/EA1415-01_Parks_Canada_response_to_MVEIRB_re_Airstrip.PDF and http://reviewboard.ca/upload/project_document/EA1415-01_Parks_Canada_letter_regarding_the_airstrip.PDF

⁴ http://reviewboard.ca/upload/project_document/EA1415-01_Note_to_File_Consideration_of_Airstrip_19June2015.PDF

⁵ http://www.reviewboard.ca/upload/project_document/EA1415-01_Terms_of_Reference.PDF



Since the majority of required adequacy items have been provided by CanZinc, with the exceptions noted above and described in more detail below, the Review Board determines that this environmental assessment can now proceed to the information request phase.

5 INADEQUATE ITEMS

5.1 Effects assessment and description for the Sundog Creek re-alignment

The developer has not provided adequate information for the Sundog Creek realignment and associated crossings. To be considered adequate the developer must meet the requirements in the Terms of Reference and adequacy review. The Terms of Reference required the developer to:

- describe the hydraulic characteristics of surface watercourses adjacent to or intersecting the road (section 5.1.3, item 7) and
- describe the road design considerations (section 6.2), including:
 6. channel bank reinforcement
 7. water course crossings and realignments
 11. sediment and erosion control especially where immediately adjacent to a waterbody

For the proposed Sundog Creek realignment from km 35 to 38, this information was considered inadequate in the DAR. In the adequacy review, the Review Board required the information (see adequacy item 7.6). The Board's requirements included details about the physical dimensions of the channel as a result of the realignment and a channel stability assessment. The Review Board finds that details on the Sundog Creek realignment are still needed to ensure that likelihood, risks, consequences and associated mitigations can be understood.

The Review Board requires that the developer address the information gaps associated with the Sundog Creek portion of the all-season road. Details of what is required can be categorized under the topics of:

- 1) the environmental setting,
- 2) preliminary designs for the realignment,
- 3) environmental risks to the project components, and
- 4) environmental effects of the project components.

A detailed list of requirements for each category is below.

Environmental setting – the developer will provide a thorough description of the geomorphic setting, include:

- completing desktop estimates of channel hydrology (mean flow, low flow, peak flow regimes) and hydraulics (width, depth, velocity under various flow conditions).
- providing a description of channel and floodplain including dimensions and longitudinal slope.



- providing a description of channel stability, bed material grain size, bed material transport/deposition processes, long-term trends in vertical stability (aggradation).
- providing air photo mapping showing the historical extent of the floodplain and active channel zone, and the position of channel thalweg(s) within the active channel zone.
- supporting the descriptions using site photographs.
- defining of the terminology used, supported by photograph annotations.

Preliminary design for the channel realignment – the developer will provide a thorough description of the realignment, including the:

- rationale and purpose of the channel realignment – is it intended as a temporary measure to provide an alternative low-flow pathway during road segment construction, or is it intended as a long-term measure to reduce erosion risk to the road?
- design criteria: flow capacity, functionality during floods, intended degree of stability and longevity
- general arrangement plan and typical sections (sketches are sufficient, a detailed ground survey is not required)
- estimated dimensions and quantities of excavation and materials, based on the above (rough estimates for general understanding will be sufficient, rounded to one significant figure)
- basic hydraulic calculations for channel flow capacity (e.g. Mannings equation) and bed material stability/transport (e.g. Shields equation)

Environmental risks to the project components and associated mitigation measures – the developer will provide a thorough, qualitative characterization of the:

- risks to the road segment in the absence of the channel realignment
- road segment mitigation measures such as channel realignment, riprap, etc.
- risks to the channel realignment such as from the thalweg shifting, bedload infill, etc.
- channel realignment mitigation measures such as scour enhancements, maintenance dredging, etc.
- risk to the road segment if the channel realignment is not successful in the long-term over the life of project (i.e. will the riprap be designed to accommodate thalweg impingement and associated scour if the realignment fails? Would more or larger riprap and a wider road prism then be required?)

Environmental effects of the project components – The developer will provide a thorough characterization of the following:

- spatial footprint area of the road segment on the floodplain, active braided channel, and channel thalweg(s)
- spatial footprint area of the channel realignment on the active braided channel and thalweg(s)



- effects of the road segment on channel hydraulics due to floodplain/channel constriction, and the associated effects on bed material transport, channel morphology and channel stability
- effects of the channel realignment on channel hydraulics, bed material transport, channel morphology and channel stability

5.2 Detailed characterization of permafrost and karst hazards from km 48-59

The developer has not provided enough information on permafrost and karst topography, in particular from km 48 to 59 and at the noted locations of karst features identified on the terrain mapping (e.g. km 25.5, km 42, and km 55 to 59). The globally unique karst features are one of the reasons the area is recognized as a World Heritage Site by the UN. Details about karst topography are necessary to understand the viability of the proposed road alignment, the potential effects of karst features on the stability of the road, and the potential effects of the project to karst.

In the Terms of Reference, section 5.1.1 item 1 required that karst features and important processes be defined; and section 6.2 item 10 required that the developer describe how geotechnical stability was accounted for in the road design. In the adequacy review and the Review Board's response to CanZinc's June 16, 2015 letter⁶, the Review Board required CanZinc to complete a detailed characterization of the permafrost and karst features that were identified between km 48 to 59. In the Board's view, the information provided in the DAR Addendum and DAR Addendum Appendix F does not satisfy this requirement.

The developer must address the information gaps related to karst and permafrost between km 48 to 59 and other noted locations of karst features. Specifically, the developer will define:

- the presence or absence of dissolution features, in particular between km 48 to 59 and at other locations identified on the terrain mapping
- if dissolution features are present,
 - the lateral extents of the features
 - whether the features are partially infilled
 - how much bedrock cover exists over the karst features.
- the presence and extent of permafrost between km 48 to 59.

The above will be defined by completing a detailed characterization using geophysics surveys (i.e. gravity surveys). In the Board's view, these need to be done in the winter if technically feasible.

5.3 Frequency of landslides and avalanches

Section 7.2.2.4 of the Terms of Reference required the developer to describe and evaluate the potential impacts of accidents and malfunctions along the all season road preferred and alternate routes. Items iii and v of part 7 required that this assessment must include a consideration of how landslides, ground movement and avalanche activity may contribute to these accidents. Additionally, section 6.2 item 10

⁶ http://www.reviewboard.ca/upload/project_document/EA1415-01_MVEIRB_response_to_CanZinc_Adequacy_letter.PDF



of the Terms of Reference required CanZinc to describe road design considerations for geotechnical stability. The adequacy review identified that the assessment provided in the DAR was inadequate, and required, in section 7.2, that the developer provide “an assessment of the frequency and magnitude of the various natural terrain landslide and snow avalanche hazards along the alignment”.

Upon review of the materials provided in the DAR addendum and supplementary materials, the Review Board determines that this required item has not been completed adequately. For example, no estimates for landslide frequency was completed for rock falls from km 8-11, km 15-16 and km 32.2-36. It is anticipated that established ranges with corresponding hazard terms can be used in this regard. For example, a “high” hazard means an anticipated return frequency of 1/100 to 1/20 years. This information forms the hazard component of the risk analysis in the effects assessment and therefore needs to be clearly described.

With respect to avalanches, while the DAR and DAR addendum provide avalanche mapping for km 0-35 of the road alignment, no mapping was undertaken for any other part of the road that may be affected by avalanches. For example, p283 of the DAR specifically stated that “KP0 to KP40 will be subject to rockfall and avalanche influence”. Both the DAR and the EBA Geotechnical Evaluation reference a 2012 Alpine Solutions Avalanche Services Report from 2012 that indicated that both kms 0-40 and areas near the Grainger Gap are at highest risk of avalanches. However, this report, justifying these conclusions, was not provided and only the maps from km 0-35 are provided. Moreover, the maps provided offer no indication of frequency of avalanches along the proposed route, and do not provided definitions for “avalanche path” versus “potential avalanche path”.

These items were required in both the Terms of Reference and the adequacy review document and remain outstanding. The information they contain (that is, frequency and geographic distribution of landslide and avalanche hazards) is essential for the risk assessment. For these reasons, the Review Board determines that the information provided on the frequency and magnitude of landslide and avalanche hazards along the road alignment is not yet adequate, and requires CanZinc to provide the following information:

- an assessment of the frequency and magnitude of the various natural terrain landslide and snow avalanche hazards along the alignment.
- the 2012 avalanche mapping report conducted by Alpine Solutions Avalanche Services. Or, failing that, a justification as to why only maps for km 0-35 were provided in the DAR and supplementary materials and a detailed explanation of how the maps provided related to avalanche frequency.

5.4 Description of km 160 – 184

The developer has not provided adequate information on the section of the road east of the Liard River and has not provided detailed terrain mapping for the entire alignment. In the Terms of Reference, the developer was required to describe the existing topography (section 5.1.1), hydraulic characteristics (section 5.1.3) and how the road design accounts for the environmental conditions (section 6.2). In the



adequacy review, the Review Board required the developer to characterize the road alignment using terrain mapping.

In the terrain mapping provided on December 4th, 2015, there was no information presented for the Liard River Crossing, or for the section of road on the Liard River floodplain between KP 160 and KP 184. The Liard River has an active meandering channel and there are multiple back channels and meander scroll bars in this area, indicating historic river channel alignments. The historic air photo interpretation and terrain mapping must be completed for this section of the road. In addition, the mapping assessment was less extensive between km 64 to 96 and km 126 to 160 where the surficial geology maps were relied on.

CanZinc will update the mapping for the remaining section of the proposed road so that the risks to the road and from the proposed road to the environment can be understood.

5.5 Effects of potential accidents and malfunctions

The Terms of Reference required the developer to complete a risk assessment for the key line of inquiry of the effects of potential accidents and malfunctions. The Terms of Reference recommended using best practice, including an assessment of components, systems, hazards, and failure modes. The risk assessment in the DAR was inadequate and was therefore included as a required item in the adequacy review.

The risk assessment presented in the DAR Addendum did not address the adequacy review requirement. Specifically, it lacked considerations for the effects of weather, human error, contamination of soil, aerial dispersal associated with spills, and spills at transfer facilities. In addition, it did not account for components or systems failures. The developer accounted for geohazards by transferring the likelihood of its occurrence to the assessment of risk of a spill. However, it is unclear how the likelihood of the geohazard related to the likelihood of an accident leading to a spill. In addition, the likelihood or frequency of certain geohazards was not adequately quantified (see 5.3). Finally, in the event of the spill, the risk assessment did not describe what the effect to the environment would be from a spilled material.

The Review Board finds that the risk assessment completed by CanZinc is inadequate. The methodology used for completing the risk assessment is unclear and is not sufficient for the Review Board to develop a firm understanding of the risks associated with the development and its components. It is only once the Review Board understands the risks (considering their likelihood and severity) that it can fully assess the potential for likely significant adverse impacts. Due to the importance of assessing risk associated with this project, the Review Board has decided that the best approach for an adequate risk assessment is for the Review Board to hire an independent risk assessor for this environmental assessment.

At the conclusion of the environmental assessment, the Review Board will make a final determination on whether potential significant adverse impacts are likely as a result of the potential accidents and malfunctions. To make its determination, the Review Board will rely on the risk assessment. It is



therefore important that the Review Board clearly understand the assumptions, methodology and results of the risk assessment.

6 CONCLUSION

The Review Board determines that, based on the DAR, DAR Addendum and supplementary materials, sufficient information is now available to parties to proceed to the next step in the environmental assessment for the Prairie Creek All-Season Road Project. However, the continuation of the environmental assessment process will depend on the Review Board receiving additional information about four of the items described in section 5 above that remain inadequate and require additional information from CanZinc. These items are necessary for parties and the Review Board to understand the potential impacts of the proposed project. As such, this information must be provided at least four weeks prior to the technical session. If the materials are not provided, the technical session will be postponed. The information on the four items is also necessary to complete the risk assessment.

The Review Board still has a number of remaining concerns related to the other sections in the DAR. The Review Board has questions related to what the impacts of the projects may be, the significance of the potential impacts, and the possible mitigations. In the Review Board's view, the best approach to begin to address the concerns is through information requests because it will enable the Board to understand parties' views on the project.

The Review Board also concludes that the risk assessment completed by CanZinc in the DAR and DAR addendum is inadequate and does not allow for a meaningful review by parties or the Review Board. The risk assessment is the key component for assessing the key line of inquiry on the effects of potential accidents and malfunctions. The Review Board requires a firm understanding of the methodology and approach used for the risk assessment. As a result, the Review Board will engage a third party risk assessor. The risk assessor would use the information provided by CanZinc and other parties to complete a risk assessment of the proposed Prairie Creek all-season road. The results from the risk assessment will be made public to all parties and open for review by all parties. This approach would be similar to what was done for the recent Snap Lake environmental assessment.⁷

Please contact Sachi De Souza at 867-766-7054 or sdesouza@reviewboard.ca with any questions regarding these reasons, or to set a time for the above discussion.

Regards,

JoAnne Deneron
Chairperson

⁷ http://www.reviewboard.ca/upload/project_document/EA1314-02_Note_to_file_independent_consulting_firm.PDF