

# **IRREVERSIBLE HARM AT AN INDUSTRIAL SCALE: THE IMPOVERISHED PROJECT ASSESSMENT OF SIO SILICA**

Joint Closing Argument of the Manitoba Eco-Network and Our Line in the Sand



Prepared by: The Public Interest Law Centre  
March 15, 2023

Clean Environment Commission (CEC) review of the proposed Sio Silica Silica Sand  
Extraction Project

# ROADMAP

1. Community Voices (Steinbach, Anola, Beausejour) – Community Priorities (SRGMP)
2. Legislative and Policy Guidance on Water, Sustainability and Impact Assessment
3. Key Considerations in Fulfilling the Terms of Reference (TOR)
  - a. The importance of water
  - b. Legal prohibitions on the mixing of aquifers
  - c. The importance of the Aquitard
  - d. Precaution and the unproven industrial application of the technology for mining
  - e. CEC Guidance on Assessing Impacts to the Aquifers
  - f. Credibility – is this an Impact Assessment you can rely on?

## ROADMAP (CONT'D)

4. The Project will cause Irreversible Harm at an Industrial Scale to the Shale Aquitard and the Limestone Carbonate
  - a. Sandstone
  - b. Collapse of the Shale Aquitard
  - c. The Intermixing of Aquifers
  - d. The Shale Aquitard as a Valued Ecological Component
  - e. Preferential Pathways in the Limestone
5. Critical questions regarding the reliability of the hydrogeological assessment
6. Concerns regarding the reliability of the geotechnical analysis
7. Unanswered questions relating to Geochemistry
8. Project uncertainty cannot be “managed” away
9. The Impoverished Assessment is not reliable
10. Recommendations and Conclusion

## COMMUNITY VOICES: QUALITY OF LIFE IS A PRIMARY CONCERN

“The quality of life, the environment that people . . . now enjoy, is a very primary concern that's expressed to me constantly, and there's not one public hearing that we get where that doesn't come up. We're living here because of quality of life, because we hear the birds, we can enjoy the Seine River, we can go cycling on our roads, . . . So, that, to the people that I represent, is extremely important. And I'm not expressing my personal views here, I'm expressing the views of the people that I'm representing.”<sup>1</sup>

“People have the right to clean and safe water and air” (G. Romaniuk, March 11\*)

“I have clean water now; I'd like to keep clean water forever, as would everybody else.” (R. Gawluk, March 13\*)

“If there is any risk regarding our most precious commodity, being water, it is no risk that should ever be taken. We lived in a beautiful forest; now the forest behind us is gone. We didn't choose to live in an industrial park.” (G. Mustard, March 11\*)

“Why should we risk the quality of our drinking water on untried/untested procedures?” (C. White, March 11\*)

“This many wells, with this many pathways for contamination for our water, is an unacceptable risk.” (M. Wiens, March 13\*)

“I don't need your sand, but I do need my water.” (L. Clubb, March 11\*)

**Sio Silica has failed to win the confidence of the community.**

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<sup>1</sup> CEC Hearing Transcript, March 9, 2023 at 60-61 (Poirier).

\* Presented based on attendee notes in the absence of transcripts.

## **COMMUNITY PRIORITIES: WATER IS OUR MOST ESSENTIAL RESOURCE (SRGMP)**

“In southeastern Manitoba, groundwater is the primary source of drinking water and is our most essential natural resource. . . . We are the stewards of this resource and we all have a role to play in protecting it and ensuring that it will be as fresh and abundant for our children, as it was for me and generations past.”

Cornie Goertzen, Planning Group Chairperson, Southeast Regional Groundwater Management Plan

“Development pressure on the regime, particularly the east side of the capital region, has grown to the point where a long-term groundwater management plan was desired to guide future resource management and development.”<sup>2</sup>

“Groundwater withdrawal from a number of aquifers has increased substantially over the past several decades and there is concern that we may gradually be approaching our sustainable development capacity for these aquifers. . . . Finally, many residents in the area are concerned about the quality of their water and that water quality may deteriorate over time if development is not undertaken in a sustainable fashion. This is particularly the case for those relying on groundwater near fresh water/saline water boundaries.”<sup>3</sup>

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<sup>2</sup> Southeast Regional Groundwater Management Plan at 1.

<sup>3</sup> *Ibid* at 2.

## **COMMUNITY PRIORITIES: WATER IS OUR MOST ESSENTIAL RESOURCE (SRGMP) (CONT'D)**

“The portion of the population living outside the city of Winnipeg is estimated to be 100,000 and is projected to continue growing rapidly. . . . The southeast region (excludes the city of Winnipeg and extends east beyond the study area to the Ontario border) had the largest population gain at 7.6 per cent. Projections for 2026 estimate Manitoba to grow by 23 per cent. The southeast region’s growth is projected to be the second greatest at 32 per cent. Given these population projections demand for additional water supply in this area will be high.”<sup>4</sup>

The approach to sustainable yield and water use licensing limits in the study area needs to be more continuous, integrated and comprehensive.<sup>5</sup>

“5.3 GOAL: Protect Groundwater Quality: The goal of protecting regional groundwater quality for safe, ongoing domestic, municipal, industrial and agricultural use within southeastern Manitoba is a key issue for the management plan to address. Threats to groundwater quality from various current and future land uses and developments throughout the region are perceived by many residents. There are concerns around connecting the Carbonate and Winnipeg Formation aquifers and around intrusion of saline water from the west into study area portions of the Carbonate and Winnipeg Formation aquifers.”<sup>6</sup>

### **Sio Silica’s assessment ignored the Southeast Regional Groundwater Management Plan.**

**You can’t win community confidence when you ignore community plans.**

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<sup>4</sup> Southeast Regional Groundwater Management Plan at 9. [emphasis added]

<sup>5</sup> *Ibid* at 33-35. [emphasis added]

<sup>6</sup> *Ibid* at 46 [emphasis added]

## MINING A SHARED RESOURCE

“MR. BOUTIN: ...So, the -- the nuance that I want to make is that in the case of Sio silica and the -- the part that is new here is that you're going to be mining something in the surrounding -- and you're going to be -- and that's the -- the difficulty of it is that you're sharing the resources. So, the sand that you're taking is the -- is the aquifer that does conduct a role of providing potable water to people. . .”<sup>7</sup>

“MR. BOUTIN: ...And in a context that there is an existing groundwater management plan that is in place where they spend two years plus defining what is the area of interest and building trust with population and stakeholders in the southeast homeowner and whatnot, you need to make at least an effort of considering what was done in the past in order to move forward in the future, and improve, build on on what's been done.”<sup>8</sup>

**Trust does not come from massive advertising campaigns. Trust is built through respectful listening and thoughtful analysis.**

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<sup>7</sup> Louis-Charles Boutin, March 8, 2023, Transcript p 151. [emphasis added]

<sup>8</sup> *Ibid* at 90-91.

## STATUTORY AND POLICY GUIDANCE: WATER

*“Water is central to the well-being of our natural environment, our families and our communities.”<sup>9</sup>*

“An abundant supply of high quality water is essential to sustain all ecological processes, life-support systems and food production, and is paramount to the environmental, economic and social well-being of Manitoba now and in the future”.

*The Water Protection Act, CCSM c W65 [emphasis added]*

“The conservation and protection of Manitoba's water resources, and of the ecosystems associated with and reliant upon those water resources, are essential to the long-term environmental, economic and social well-being of Manitoba.”

*The Water Resources Conservation Act, CCSM c W72*

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<sup>9</sup> Government of Manitoba, “Manitoba’s Water Management Strategy” (November 2022) at 2, online: <https://www.cttam.com/common/Uploaded%20files/General%20Uploads/Manitoba%20Water%20Management%20Strategy.pdf>.



# STATUTORY GUIDANCE: SUSTAINABILITY AND THE MINES AND MINERALS ACT

## Object and purpose of Act

### 2(1)

The object and purpose of this Act is to provide for, encourage, promote and facilitate exploration, development and production of minerals and mineral product in Manitoba, consistent with the principles of sustainable development.

## Sustainable development

### 2(2)

For purposes of subsection (1), the principles of sustainable development include the following:

- (a) that decisions respecting the economy and mining activities be integrated with decisions respecting protection and management of the environment so that mining activity is commenced with due regard for its impact on the environment and environmental programs or initiatives are instituted with proper regard for their economic impact;
- (b) that government and industry, in their respective policies and practices, acknowledge their stewardship of the mineral resources of the province, and work with local communities, so that the economy is developed and the environment is preserved, for the benefit of present and future generations of Manitobans;
- (c) that responsibility for sustaining a sound and healthy environment alongside development of a sound and healthy mining industry is a responsibility that is shared by government and industry, working with local communities;

## **STATUTORY GUIDANCE: SUSTAINABILITY AND THE MINES AND MINERALS ACT (CONT'D)**

*The Mines and Minerals Act, s 2(2) cont'd:*

- (d) that hazards to the environment and impediments to mineral development be prevented or, if not prevented, minimized by avoiding policies, programs and decisions that have significant adverse environmental or economic impact;
- (e) that conservation policies and practices be applied to enable the extraction and production of minerals in the province in a manner that is wise and efficient in both environmental and economic terms;
- (g) that mining activities and economic development, as well as government regulation, be conducted with a view to protecting and enhancing the ecosystems of the province;
- (h) that land that, in environmental terms, is damaged or diminished by mining activity be rehabilitated;
- (j) that the ecological interdependence of the provinces and territories of Canada and of the nations of the world increasingly requires integration of the decisions of government, industry and citizens, in respect of the environment and the economy.<sup>10</sup>

**Sustainable development is a shared responsibility of government,  
industry and communities.**

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<sup>10</sup> *The Mines and Minerals Act*, CCSM c M162, s 2.

# STATUTORY GUIDANCE: SUSTAINABILITY AND THE ENVIRONMENT ACT

## Intent and purposes

1(1) The intent of this Act is to develop and maintain an environmental protection and management system in Manitoba which will ensure that the environment is protected and maintained in such a manner as to sustain a high quality of life, including social and economic development, recreation and leisure for this and future generations, and in this regard, this Act

- (a) is complementary to, and support for, existing and future provincial planning and policy mechanisms;
- (b) provides for the environmental assessment of projects which are likely to have significant effects on the environment;
- (c) provides for the recognition and utilization of existing effective review processes that adequately address environmental issues;
- (d) provides for public consultation in environmental decision making while recognizing the responsibility of elected government including municipal governments as decision makers; and
- (e) prohibits the unauthorized release of pollutants having a significant adverse effect on the environment.

**The statutory mandate is to ensure the environment is protected and maintained.**

**It is incumbent on the CEC and the Department to utilize effective review processes that “adequately address environmental issues” in a manner that compliments and supports existing provincial planning mechanisms.**

**Guidelines are not law. The overarching responsibility is to the statutory mandate.**

## **POLICY GUIDANCE: SUSTAINABILITY, CUMULATIVE EFFECTS AND MANITOBA'S WATER MANAGEMENT STRATEGY**

**Sustainable development:** development that meets the needs of the present without compromising the ability of future generations to meet their own needs. It is not a fixed state of harmony, but rather a process of change and is often applied through consideration of the three sustainability pillars: environment, social and economic.<sup>11</sup>

**Cumulative Impacts** - changes to the environment (positive or negative, direct and indirect, long-term and short-term) that are caused by an action in combination with other past, present and reasonably foreseeable future human actions. Each individual impact may not be significant if taken in isolation, but can be significant when considered as a whole.”<sup>12</sup>

**A sustainable approach to development must consider cumulative effects.**

**The Proponent considers cumulative effects to be irrelevant.**

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<sup>11</sup> Manitoba, Water Management Strategy (2022) at 43, online: [https://manitoba.ca/sd/pubs/water/water\\_mgmt\\_strategy2022.pdf](https://manitoba.ca/sd/pubs/water/water_mgmt_strategy2022.pdf) [emphasis added]

<sup>12</sup> *Ibid* at 40. [emphasis added]

## CEC GUIDANCE: IMPACT ASSESSMENT

“Cumulative effects are important because significant environmental effects may result not from the direct effects of a particular project but from the combination of effects of multiple projects over an extended period of time.”<sup>13</sup>

“Environmental impact assessments consider the impacts of an individual project or activity but, in order to be done well, they must also include an assessment of cumulative effects.”<sup>14</sup>

“The cumulative effects analysis should be the most important section of an environmental assessment report. It is where the residual or lasting effects of the project are described.”<sup>15</sup>

“Some would make the persuasive argument that any project EIA should first try to determine whether the proposed project, with and without impact mitigation, might itself have any effects on [valued environmental components]. After all can assessors not conclude that a project cannot have any significant cumulative effects if it has no effects by itself? As attractive as this argument may be initially, it breaks down as soon as we consider the distinct possibility that two projects in the same vicinity, one ahead of the other in sequence, may each have undetectable impacts by themselves, but horrific impacts together.”<sup>16</sup>

<sup>13</sup> Manitoba Clean Environment Commission, “Report on Public Hearing: Red River Floodway Expansion Project” (June 2005) at 43. [emphasis added]

<sup>14</sup> Manitoba Clean Environment Commission, “Regional Cumulative Effects Assessment Review” (2018) at 7. [emphasis added]

<sup>15</sup> Manitoba Clean Environment Commission, “Report on Public Hearing: Bipole III Transmission Project” (June 2013) at 111. [emphasis added]

<sup>16</sup> *Ibid* at 112, citing Duinker, Peter N. and Lorne A. Greig. 2006. The Impotence of Cumulative Effects Assessment in Canada: Ailments and Ideas for Redevelopment. *Environmental Management*, 37(2): 157. [emphasis added]

## CEC GUIDANCE: IMPACT ASSESSMENT (CONT'D)

“The CEC holds a specific and important position in the environmental protection and management system created by *The Environment Act*, which is to conduct a review process that adequately assesses potential environmental effects associated with the proposed development.

Read in context and harmoniously with the statutory scheme and the object and the intention of the legislature in creating statutory protections for the environment and groundwater, the CEC must necessarily look beyond the four corners of the proponent’s Environment Act Proposal to consider the direct effects of proposed developments on the environment as well as potential effects, considered cumulatively, of the proposed development’s interactions with impacts from other sources past, present, and future.”<sup>17</sup>

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<sup>17</sup> MBEN & OLS Legal Brief, March 15, 2023 at paras 57-58.

## TERMS OF REFERENCE (TOR)

...conduct a technical review of the Environment Act proposal and the hydrogeology and geochemistry assessment report and provide advice and recommendations to the Minister regarding potential environmental and health effects of the proposed sequential installation, operation and decommissioning of silica sand extraction wells for the silica sand extraction project.<sup>18</sup>

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<sup>18</sup> CEC Terms of Reference (15 November 2021).

## **TOR: THE IMPORTANCE OF WATER TO THE AREA CANNOT BE OVERSTATED**

“In southeastern Manitoba, groundwater is the primary source of drinking water and is our most essential natural resource.”<sup>19</sup>

“The Carbonate Aquifer . . . is the largest freshwater aquifer in Manitoba and serves as the prime groundwater source for south-eastern Manitoba.”<sup>20</sup>

The Red River Carbonate formation is a key source of potable water within the Rural Municipality of Springfield. It serves as a significant source of groundwater for municipal, industrial, residential, and agricultural uses through a large portion of southeastern Manitoba.<sup>21</sup>

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<sup>19</sup> Cornie Goertzen, Planning Group Chairperson, Southeast Regional Groundwater Management Plan at pdf p 2.

<sup>20</sup> Manitoba Clean Environment Commission, “The Pembina Valley Water Cooperative Supplemental Groundwater Supply System” (2007) at 9-10. [emphasis added]

<sup>21</sup> CEC Hearing Transcript, March 2, 2023 at p 7 (Mills).



## TOR: PROHIBITIONS ON THE MIXING OF AQUIFERS IS ENSHRINED IN MANITOBA LAW

6(1) A licensee shall drill and abandon a borehole in such a manner as to prevent the vertical movement of fluids between permeable water bearing zones penetrated by the borehole.<sup>22</sup>

“...a person must not construct or seal a well or test hole in a manner that allows the interconnection or mixing of groundwater between the Winnipeg Formation and any overlying aquifer.”<sup>23</sup>

“The importance of preserving the hydraulic isolation between aquifers is paramount in a precautionary approach with regards to potential migration of contaminants in the groundwater.”<sup>24</sup>

<sup>22</sup> *Drilling Regulation, 1992*, Man Reg 63/92 under *The Mines and Minerals Act*. See also s 6(2), “For the purposes of this section, a “permeable water bearing zone” means a section of rock that produces water. . .”

<sup>23</sup> *Well Standards Regulation*, Man Reg 215/2015 at s 3(1). Section 3(2) of the same *Regulation* defines the “Winnipeg Formation” as “the shale, sandstone and sands of the Ordovician Winnipeg Formation.”

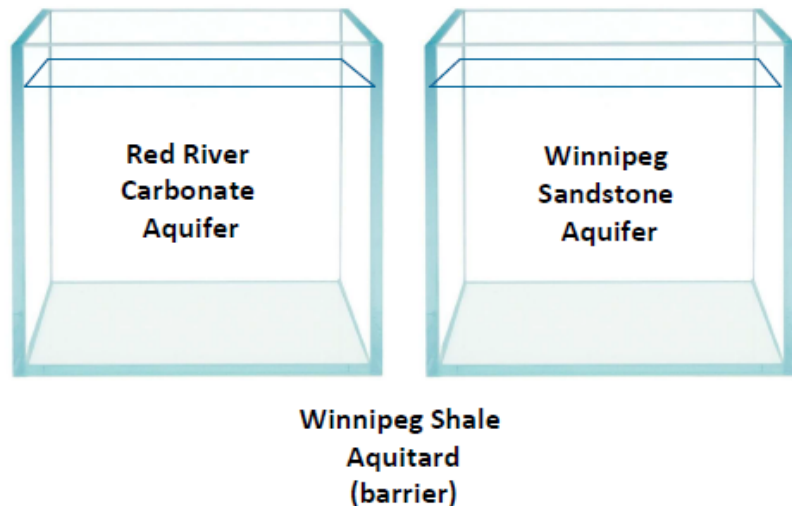
<sup>24</sup> Matrix Solutions Inc., “Hydrogeological Review of Sio Silica Corporation proposed Vivian Sand Project, Manitoba” (February 13, 2023) at 10.

# TOR: SHARED UNDERSTANDING OF THE IMPORTANCE OF THE AQUITARD

“It is Arcadis’ understanding that separation of the Red River Carbonate and Winnipeg Sandstone aquifers is necessary to protect the groundwater resource of the region. Sio Silica’s website notes that *‘The Red River Shale Aquitard (or the Winnipeg Shale) is a protective layer below the Red River Carbonate Formation and is a critical divide between the two freshwater aquifers: the Carbonate aquifer and the Sandstone aquifer’.*”<sup>25</sup>

## Why important?

- Winnipeg Shale Aquitard act as a **barrier** to groundwater flow
- Without the barrier, **creates a pathway**. It increases the vulnerability for both aquifers
- **Reduces ability to manage** aquifers individually (quantity and quality)

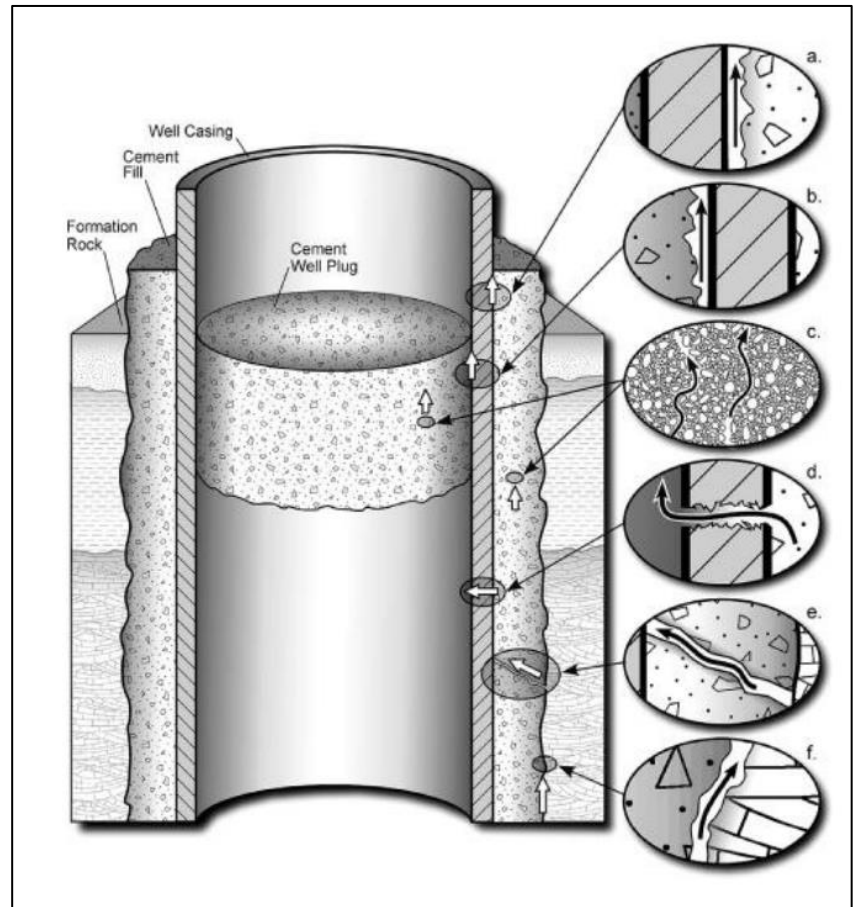


<sup>25</sup> Gerd Wiatzka (Arcadis Canada Inc.) Presentation (Exhibit H-020), March 6, 2023 at slide 7, See also Hearing Transcript, March 2, 2023 at 18 (Mills).

<sup>26</sup> Louis-Charles Boutin (Matrix Solutions Inc.) Presentation (Exhibit H-038), March 8, 2023 at slide 24.

## TOR: PRECAUTION – A TECHNOLOGY THAT HAS NEVER BEEN TESTED AT THE INDUSTRIAL SCALE

- Sio Silica is seeking a patent on technology which has never been applied at an industrial scale in mining<sup>27</sup>
- Each well will be punched through the Till, Red River Carbonate Aquifer, Winnipeg Shale and into the Sandstone Aquifer<sup>28</sup>
- “Each well raises the potential for multiple preferential pathways”<sup>29</sup>
- “Abandoned wells need to be perpetual (>> 100 years)”<sup>30</sup>



<sup>27</sup> CEC Hearing Transcript, February 28, 2023 at p 89 (Bullen).

<sup>28</sup> Louis-Charles Boutin (Matrix Solutions Inc.) Presentation (Exhibit H-038), March 8, 2023 at slide 11.

<sup>29</sup> *Ibid.*

<sup>30</sup> *Ibid.*

<sup>31</sup> *Ibid.*, citing Celia et al (2004).

## **TOR: PRECAUTION – A TECHNOLOGY THAT HAS NEVER BEEN TESTED AT THE INDUSTRIAL SCALE (CONT'D)**

- It is estimated there are more than 1,600 wells within the regional project area of which 1500 are domestic water wells<sup>32</sup>
- 1200 wells are expected to be added in years 1 to 5 of proposed Project<sup>33</sup>
- Many thousands more are anticipated over the 24-year lifespan of the project<sup>34</sup>
- “...ultimately could result in over 10,000 wells over 24 years.”<sup>35</sup>

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<sup>32</sup> CEC Hearing Transcript, March 2, 2023 at p 10-11 (Mills).

<sup>33</sup> Louis-Charles Boutin (Matrix Solutions Inc.) Presentation (Exhibit H-038), March 8, 2023 at slide 11.

<sup>34</sup> *Ibid.* See also CEC Hearing Transcript, March 2, 2023 at p 17 (Bullen).

<sup>35</sup> Dr. Hartmut Hollaender, Dr. Allan Woodbury, “Technical Review Sio Silica Corporation’s (formerly CanWhite Sands Corp.) Environment Act Project Proposal at 1, 7, 13.

## TOR: PRECAUTION IS NECESSARY GIVEN UNPROVEN MINING TECHNOLOGY

- “While pilot testing has occurred, the extraction method has not been proven in a full-scale mining operation. This introduces a degree of uncertainty that justifies adopting a precautionary approach when developing and implementing project designs. This is particularly important given the need to protect local and regional groundwater resources.”<sup>36</sup>
- “One of the aquifers (sandstone) is to be extensively mined with a new and unproven technology. Hence, it is important to be cautious.”<sup>37</sup>
- “MR. BOUTIN: ...I wanted to -- to bring some -- that there's that uncertainty and there is some risk for contaminant in the future and therefore, because these sources of water are used by thousands of Manitobans for water supply, there can be a precautionary approach being taken this case.”<sup>38</sup>

<sup>36</sup> Gerd Wiatzka (Arcadis Canada Inc.) Presentation (Exhibit H-020), March 6, 2023 at slide 3.

<sup>37</sup> Dr. Hartmut Hollaender, Dr. Allan Woodbury, “Technical Review Sio Silica Corporation’s (formerly CanWhite Sands Corp.) Environment Act Project Proposal at 3.

<sup>38</sup> CEC Hearing Transcript, March 8, 2023 at p 45 (Boutin).

**TOR: PROJECTS AFFECTING THE AQUIFERS MUST BE ASSESSED WITH A VIEW TO BROADER WATER PLANNING INITIATIVES AND THE CUMULATIVE PRESSURES ON THE REGION (CEC)**

- “To approve this Project prior to the development of an integrated understanding of how the aquifer fits with its surroundings is not in line with sustainable development guidelines.<sup>39</sup>
- “We concluded that, before individual groundwater projects are authorized, the larger planning initiatives envisioned by the government in recent legislation and policy, be completed.”<sup>40</sup>
- “In light of the possible influences of the Project on the surrounding water bodies and landscape described in the previous paragraph, cumulative effects should be considered in future assessments of this and any other development. The ecosystems in the area are currently affected by other developments and activities in the region and consideration of the additive effect of another impact needs to be addressed.”<sup>41</sup>

**Sio Silica’s assessment did not honour this guidance.**

**Sio Silica did not consider the SRGMP or cumulative effects.**

<sup>39</sup> CEC, “The Pembina Valley Water Cooperative Supplemental Groundwater Supply System” (2007) at 49. [emphasis added]

<sup>40</sup> *Ibid* at iii. See also pages 1, 40, 43 and 49.

<sup>41</sup> *Ibid* at 48.

## **TOR: CREDIBILITY – ENVIRONMENTAL ASSESSMENT IS NOT A CHECKLIST EXERCISE**

“MR. BOUTIN: ...So, you need that professional judgment. It's not a checklist exercise that you can say it takes a boundary condition here, check. Takes a numerical model, check. Doesn't matter if it's good or bad. That's not what it is. It's about the profession, and the -- the trust that you build by developing and making those assumptions, and being able to extract the information, and answer the question that is being asked. So, it comes down to the fact that what are we trying to achieve, and what is the objective of numerical model? And in a context that there is an existing groundwater management plan that is in place where they spend two years plus defining what is the area of interest and building trust with population and stakeholders in the southeast homeowner and whatnot, you need to make at least an effort of considering what was done in the past in order to move forward in the future, and improve, build on on what's been done.”<sup>42</sup>

**Impact Assessment is not a checklist exercise.**

**It is a substantive process of listening, working with stakeholders and asking the hard questions.**

<sup>42</sup> CEC Hearing Transcript, March 8, 2023 at 90-91 (Boutin).

## **TOR: CREDIBILITY – ENVIRONMENTAL ASSESSMENT IS NOT ABOUT THE MINIMUM**

“MR. DUNCANSON: Duncanson speaking. Absolutely. Really the question is, when Matrix is developing groundwater models for project proponents, does it develop its models based on industry standards, or does it develop its models to achieve state of the art?

MR. BOUTIN: Boutin speaking. This is where the professional judgment comes into play. . . . State of the art in my opinion are based on the definition that you just mentioned is seeking the aspect of pushing beyond and above the guidelines, and I think maybe it's not just me, but I hope not, that **a professional would do as they can to answer a question and go beyond the minimum requirement.** So, to answer your question, when Matrix builds a numerical model, **we use state of the art and in the industry standard that respect guidelines.** So, again, I think we're playing with words there, but thanks.”<sup>43</sup>

**Sio Silica’s defence of its EAP appears to be grounded in what it considers to be “the bare minimum” of the EAP guidelines.**

**Such an approach does not accord with the spirit and intent of *The Environment Act*.**

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<sup>43</sup> CEC Hearing Transcript, March 8, 2023 at p 107-108 (Duncanson, Boutin).



**TOR: CREDIBILITY – ENVIRONMENTAL ASSESSMENT IS NOT ABOUT IGNORING THE IMPORTANT VOICES OR CHALLENGING ISSUES**

- The SRGMP is not referenced in the EAP, the Appendix A Hydrogeological Assessment Final Report, nor any of the IR responses.
- The EAP does not reference CEC reports on Pembina Valley Water Co-op or Red River Floodway.<sup>44</sup>

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<sup>44</sup> CEC Hearing Transcript, March 2, 2023 at 152-153 (Samoiloff).

**TOR: CREDIBILITY – ENVIRONMENTAL ASSESSMENT IS NOT ABOUT IGNORING THE IMPORTANT VOICES OR CHALLENGING ISSUES (CONT'D)**

CLIFTON SAMOILOFF: Somoiloff. So, at the time of the EAP preparation, you know, cumulative effects was not a requirement as far as preparing the EAP and therefore, no, we don't believe that it's part of this I review. The debate whether we should consider cumulative effects is kind of -- not for us to respond to in this hearing.

BYRON WILLIAMS: Sir, just so I understand -- and you can answer my question if you'd like now. In terms of your EAP, you did not have reference to the comments of the of the Clean Environment Commission on cumulative effects assessment. Fair statement?

CLIFTON SAMOILOFF: Somoiloff. We're not - we did not consider them relevant to the scope of that particular assessment. [...] I understand that the references are there and I'm still of the opinion that cumulative effects is not relevant, even based upon those references.<sup>45</sup>

**While he is self-admittedly no expert on cumulative effects, Mr. Somoiloff's statement is a stunning repudiation of what has been good environmental assessment practice for decades.**

**That is why you have well established practitioners like Arcadis and Matrix asking fundamental questions about what the EAP does not do.**

<sup>45</sup> CEC Hearing Transcript, March 2, 2023 at 153-155 (Somoiloff, Williams). [emphasis added]

## TOR: CREDIBILITY – IMPACT ASSESSMENT IS NOT SAYING IT’S SOMEONE ELSE’S PROBLEM OR RESPONSIBILITY

“MR. BOUTIN: ...You cannot just isolate and provide the responsibility to one individual person. I do believe that there is the responsibility of the government for sure to initiate those -- those studies, and implement the framework, the regulation, and whatnot. So, there is that responsibility of the government. The project itself and the proponent has its own responsibility through that process, and anybody else that using water is responsible to some degree of best practice and sustainability. So, I think every stakeholder needs to communicate together, hence why I believe that integrated water management plan, that is on the water shed basis, is a great tool for that.”<sup>46</sup>

Sio Silica’s proposal to leave consideration of the SRGMP to Manitoba does not accord with the spirit and intent of *The Mines and Minerals Act*, s. 2(2):

- (c) that responsibility for sustaining a sound and healthy environment alongside development of a sound and healthy mining industry is **a responsibility that is shared by government and industry, working with local communities;**

<sup>46</sup> CEC Hearing Transcript, March 8, 2023 at 113 (Boutin).

## **TOR: RECOMMENDED APPROACH TO REVIEWING CREDIBILITY**

Consider:

- 1) Professional Qualifications and Relevant Experience
- 2) Approach to examining the questions – check list or substantive inquiry
- 3) Quality of Report
- 4) Performance under examination
- 5) Demonstrations of Independence

## **TOR: CREDIBILITY – HEAVY RELIANCE CAN BE PLACED ON THE EVIDENCE OF MATRIX**

Experience ranges from well drilling through groundwater impact assessments including cumulative impact assessments on behalf of individual proponents to ground-breaking regional cumulative impact assessments.<sup>47</sup>

- Evaluation of regional hydrogeological cumulative effects of baselines, application case, and planned development case scenarios in EIAs for the following projects:
  - Dover and Hangingstone Projects (Athabasca Oil Sands Corporation Mackay River)
  - Foster Creek Thermal Project Phase J Expansion Project (Cenovus Energy Inc.)
  - Dunkirk In Situ Demonstration Project (Koch Oil Sands Operating ULC)
  - Kirby Expansion and Grouse Projects (Canadian Natural Resources Limited)
  - MacKay SAGD Project (Suncor Energy Ltd.)
- Contribution to regional groundwater management issues for Innovation Alliance (COSIA), InnoTech Alberta, and Norfolk County.<sup>48</sup>

<sup>47</sup> See in particular Matrix presentation at slide 36, South Athabasca Regional Groundwater Solutions Project.

<sup>48</sup> Matrix Solutions Inc., “Hydrogeological Review of Sio Silica Corporation proposed Vivian Sand Project, Manitoba” (February 13, 2023) at Appendix A, Statement of Qualifications. See also CEC Hearing Transcript, March 8, 2023 at 6,

## **TOR: CREDIBILITY – HEAVY RELIANCE CAN BE PLACED ON THE EVIDENCE OF MATRIX**

The expertise of Matrix Solutions Inc. has been relied upon by a varied list of clients including municipalities, universities, governmental agencies, an industry association and various industrial partners.

- Matrix asked the hard questions.
- They reflected on the guidance from prior CEC decisions and the SRGWP.
- Their evidence and professionalism is a standard we should expect from all in impact assessment.
- A “bare minimum” approach does not suffice given the importance of the issues.

## **IRREVERSIBLE HARM AT AN INDUSTRIAL SCALE TO THE SHALE AQUITARD AND THE LIMESTONE CARBONATE**

“In Matrix’s opinion, there are the two critical irreversible effects the project has on the hydrogeological system that could lead to indirect effects in the long-term: 1) degradation of the Winnipeg Shale Aquitard, and 2) increase in fracture density of the Red River Carbonate Aquifer.”<sup>49</sup>

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<sup>49</sup> Matrix Solutions Inc., “Hydrogeological Review of Sio Silica Corporation proposed Vivian Sand Project, Manitoba” (February 13, 2023) at 7.

## PERMANENT CHANGES TO THE SANDSTONE

“Extraction of the silica sand resource will result in a permanent change to the underground geology in the form of horizontal arrays of rooms and pillars in the sandstone geological layer (between 52 m to 76 m), in the Winnipeg Formation aquifer.”<sup>50</sup>

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<sup>50</sup> Gerd Wiatzka (Arcadis Canada Inc.) Presentation (Exhibit H-020), March 6, 2023 at slide 4.



## THE COLLAPSE OF THE SHALE AQUITARD IS NOT IRRELEVANT FROM THE HYDROGEOLOGICAL PERSPECTIVE

“The other thing that's important is to recall the Winnipeg shale is -- is friable. That means it's -- it's susceptible to disturbance during the sand extraction process, it's susceptible to -- to falling apart.”<sup>51</sup>

“MR. BUNDROCK: Steve Bundrock with Stantec. We think that it's actually irrelevant whether or not the shale or the limestone, those lower units, fail, because we don't rely upon them for stability. In fact, we -- we assume that they're not providing us any strength. We're only relying upon the -- the upper section.”<sup>52</sup>

This is a myopic statement given that one of the objectives of Stantec is to “identify stable allowable extraction cavity sizes as well as distances between extraction boreholes and multi-borehole patterns that will not generate surface subsidence and to eliminate potential for connection to occur between the upper and lower aquifers as a result of caprock subsidence.”<sup>53</sup>

**It is an analytically perverse assessment that seeks to mitigate interconnection between the aquifers through avoiding subsidence and through well closure<sup>54</sup> but actively contemplates numerous collapses of the shale aquitard that will enable interconnection at a material scale.**

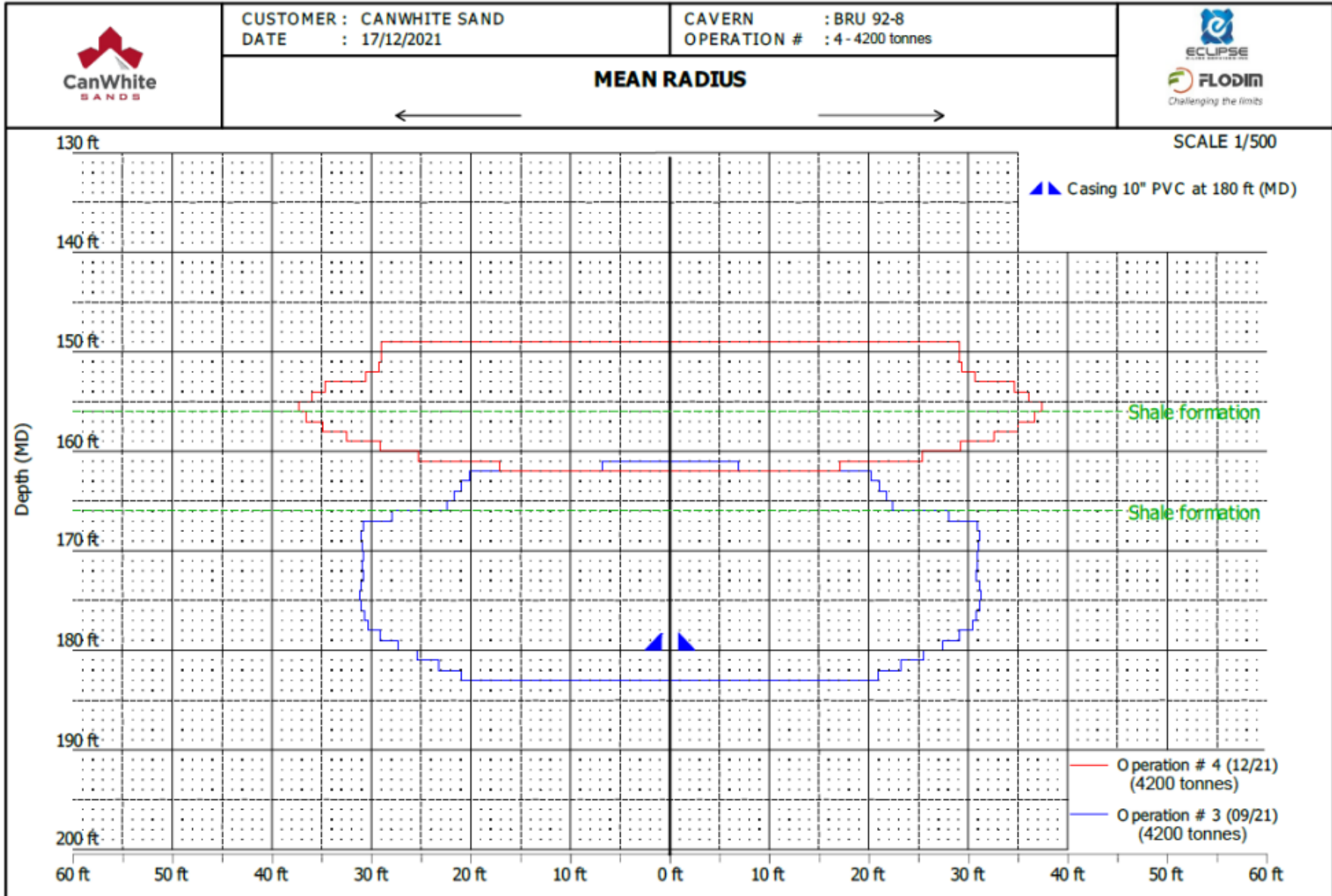
<sup>51</sup> CEC Hearing Transcript, February 28, 2023 at 5 (Bundrock).

<sup>52</sup> CEC Hearing Transcript, February 27, 2023 at 165-166 (Bundrock).

<sup>53</sup> Stantec, Geotechnical Analysis for Sio Silica Extraction Project – Public Version (2022) at 2.

<sup>54</sup> Gerd Wiatzka (Arcadis Canada Inc.) Presentation (Exhibit H-020), March 6, 2023 at slide 8.

# THE COLLAPSE OF THE SHALE AQUITARD



# COLLAPSE OF THE SHALE AQUITARD – THE RISK OF NUMEROUS LARGE BREACHES

## Indirect Effects of the Proposed Project



Geotechnical Analysis for Sio Silica Extraction Project

Project # 129500426

January 14, 2022

Prepared for:  
Sio Silica Corporation

Prepared by:  
Stantec Consulting Ltd.

Table 9: Allowable Extraction Disturbance Zone Dimensions

Competent Limestone Thickness (m)	Overburden Thickness (m)	Long-term Allowable Limestone Unsupported Span (Diameter) (m) <small>(Notes 1 and 2)</small>	Extraction Disturbance Zone Dimensions <small>(Notes 3 and 4)</small>	
			Top Diameter (m)	Bottom Diameter (m)
10	25	26	16	0 <small>(Note 5)</small>
	35	24	14	0 <small>(Note 5)</small>
15	25	35	25	6
	35	32	22	3
20	25	43	33	14
	35	40	30	11
25	25	50	40	21
	35	47	37	18

Notes:

- 1) Bending (Tensile) is the controlling failure mechanism to determine the long-term allowable span.
- 2) Single beam maximum long-term allowable span is 7 m. Average competent limestone bedding thickness is 0.7 m.
- 3) Extraction zone side wall slope of 65°.
- 4) Extraction depth is 20 m.
- 5) The long-term diameter of the extraction cavity is expected to be 10 m larger than the short-term diameter.
- 6) Due to possible long-term cavity expansion, limit the extraction zone to the long-term allowable unsupported span.
- 7) Extraction in areas with only 10 m of competent limestone is discouraged due to competency uncertainties.



~35 m Long-term allowable unsupported span



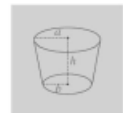
~21 m

~6 m

Volume disturbance zone per well: 6,735 m<sup>3</sup>

Frustum of right circular funnel of radii  $a$ ,  $b$  and depth  $h$

$$\text{Volume} = 1/3\pi h(a^2 + ab + b^2)$$



## COLLAPSE OF THE SHALE AQUITARD – THE RISK OF NUMEROUS LARGE BREACHES

Boutin:

“So, I think it's important for everyone to understand what those dimensions are. So I basically tried to illustrate that I using a -- a bus -- a city bus that is 12 metre long. So, 35 metres is basically three bus long. And because the aquifer thickness is roughly 21 metres -- 20 metres, that's about -- about short of being two bus high. **So, this is the kind of cavity that we're working with here, and that's for a single extraction well.**<sup>55</sup>

Arcadis Canada Inc.:

“The collapse of the shale has the potential to create numerous large diameter breaches in the shale aquitard in the project area.”<sup>56</sup>

<sup>55</sup> CEC Hearing Transcript, March 8, 2023 at 27-28 (Boutin). [emphasis added]

<sup>56</sup> Gerd Wiatzka (Arcadis Canada Inc.) Presentation (Exhibit H-020), March 6, 2023 at slide 7.

## THE COLLAPSE OF THE SHALE AQUITARD – THE ARCADIS SUMMARY

“shale and overlying cap rock have failed”<sup>57</sup>

- The materiality and significance of the shale collapse was well canvassed by Arcadis<sup>58</sup>
- Continued separation of the two aquifers is a fundamental design requirement of the proposed project.
- The shale serves as an important aquitard that limits the flow of waters between the Red River carbonate limestone aquifer and the underlying Winnipeg Sandstone aquifer.<sup>59</sup>
- The concern is that significant breaches in the shale aquitard might create a hydraulic connection between the Red River carbonate aquifer and the Winnipeg Sandstone Aquifer.
- At BRU 92-8, ten feet of shale immediately above the sandstone silica extraction has collapsed.
- At BRU 92-8, there's been a collapse of an additional seven feet of overlying limestone.

<sup>57</sup> Gerd Wiatzka (Arcadis Canada Inc.) Presentation (Exhibit H-020), March 6, 2023 at slide 7. See also CEC Hearing Transcript, February 28, 2023 at 103-105 (Bullen) and March 2, 2023 at 19 (Mills).

<sup>58</sup> CEC Hearing Transcript, March 6, 2023 at 58-65 (Arcadis)

<sup>59</sup> Hollaender and Woodbury (September 2022) at 4: “There is a shale layer that separates the two main aquifers and helps to preserve water quality and separate hydraulic pressures and chemistry. The proponent notes that degradation of this shale layer may occur because of project operations which would result in more direct communication between the two main aquifers: Winnipeg Sandstone and the Red River Carbonate. This is a crucial risk to the operation.”

## **THE COLLAPSE OF THE SHALE AQUITARD – THE ARCADIS SUMMARY (CONT'D)**

- From a geotechnical perspective, the collapse of the shale is irreversible.
- From a geotechnical perspective, the collapse of the seven feet of limestone also is irreversible.
- It is conceptually possible that the collapse of the shale aquitard could be a feature of all 1,200 extraction wells in years 1 to 5 of the Project.
- There will be thousands more extraction wells over the 24 year life of the Development.

**There will be a risk of shale collapse associated with each and every one of those thousands of - of silica extraction wells over the 24 year life of the Development.<sup>60</sup>**

**It is impossible to remediate the shale collapse.**

<sup>60</sup> CEC Hearing Transcript, March 6, 2023 at 65 (Williams, Wiatzka).

# THE COLLAPSE OF THE SHALE AQUITARD – FAR SURPASSES THE BREACH OF INDIVIDUAL WATER WELLS

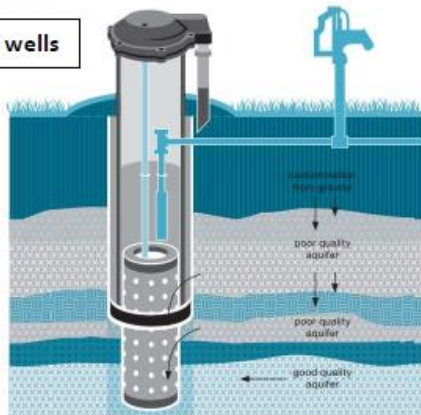
## Indirect Effects of the Proposed Project

### Why important?

- Winnipeg Shale and Fractured limestone collapse is irreversible
- Proponent response:  
... considered to not be a concern should this occur:  
“Interconnection between the two aquifers is a common occurrence because many drinking water wells have been screened across the Red River Carbonate and the Winnipeg Sandstone.”

FIGURE 2.0 EXAMPLE OF MULTIPLE AQUIFER COMPLETION

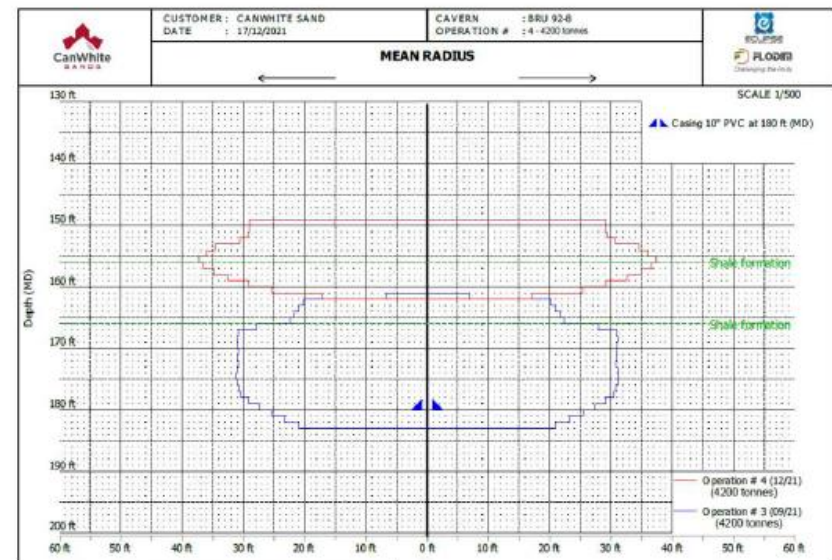
Hundreds of wells



**Assumption**  
Diameter Well\*:  
6" (152.4 mm)  
Area: 0.02 m<sup>2</sup>

\*Erratum

**Assumption**  
Top Diameter Well: 25 m  
Area: 491 m<sup>2</sup>



Hundreds to thousands of wells

## UNPARALLELED MAGNITUDE OF PLANNED RISK

“MR. BOUTIN: ...The surface area of a usual water well -- domestic water well is of -- of six inch, 0.02 square metre. This is an area, so if I'm going to make -- that's -- that's the area we're talking about. Now if we go back on the top right corner and look at the area of where the shale collapsed, that has a diameter of 25 metres and you look at the area. For a single extraction well, you're creating an area of 491 square metre. If we want to do the math -- if you take one well that is complete and across both aquifer that goes through the shale, you got 0.02 square metre. If you take ten of them, get 0.2 square metre. If you had 100 of them, you got two square metre. If you got 1000 of them, you got 20 square metre. If you got 26,000 wells, you get 491 in the order of square metre. How many wells there is in Manitoba? Roughly 20,000. So if you take all the wells that would go through those aquifer, this would be the -- the effect of a single well and the effect of a collapse of 25 metre radius of a single extraction well. We're talking about hundreds if not thousands of wells that's going to have a shale collapse like this. So, the surface area -- we're not even in the same ballpark here. We need to be aware of this.”<sup>61</sup>

“MR. BOUTIN: ...I'm just saying that there is a risk, and we shouldn't neglect and consider that risk with respect to where things going to go in the future, and I tied that back to the -- the component of irreversibility of the project effects, and the fact that you have and -- and the project is planning over a period of years of drilling in multiple thousands of wells, and I refer back to my presentation when I showed the image that when in each single bore hole, you're creating a pathway, you're creating some possibility of pathways, and therefore you're increasing the risk.”<sup>62</sup>

<sup>61</sup> CEC Hearing Transcript, March 8, 2023 at 38-39 (Boutin). [emphasis added]

<sup>62</sup> *Ibid* at 129-130 (Boutin). [emphasis added]



## WELLS CAN BE FIXED

“MR. BOUTIN: It is not irreversible if it's due to the effect of cross connecting bore holes. It can always go back to those bore hole and abandon them, and get rid of the inter aquifer mixing.”<sup>63</sup>

**Wells can be fixed but the collapse of the shale aquitard cannot be remediated.**

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<sup>63</sup> CEC Hearing Transcript, March 8, 2023 at 124-125 (Boutin).

## INTERCONNECTION OF THE AQUIFERS IS INEVITABLE

It is apparent that the shale aquitard separating the two aquifers will be unsupported and collapse into the top of the sand extraction zone void within each sandstone production well cluster, resulting in enhanced and multiple direct interconnections of the aquifers.<sup>64</sup>

However, collapse of the shale layer and fractured limestone is expected to occur, which will result in interconnection of the Red River Carbonate and Winnipeg Sandstone Aquifers.<sup>65</sup>

There will be loss of the shale aquitard that separates the carbonate and sandstone aquifers. The creation of these interconnections is irreversible. There will certainly be an exchange of groundwaters between the aquifers. There will be an irreversible change where mixing of these two aquifers will occur.<sup>66</sup>

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<sup>64</sup> KGS (2023) at 4. See also Arcadis Canada Inc report at ES-1. [emphasis added]

<sup>65</sup> Gerd Wiatzka (Arcadis Canada Inc.) Presentation (Exhibit H-020), March 6, 2023 at slide 6. See also CEC Hearing Transcript, March 2, 2023 at 20-21 (Mills).

<sup>66</sup> KGS Presentation (March 9, 2023) at slide 19.

## INTERCONNECTION OF AQUIFERS

"In the case of the Sio Silica Corporation proposed project, the enhancement of inter-aquifer connectivity is an **engineered consequence** of several hundreds of extraction wells in the project area."<sup>67</sup>

"DR. HOLLAENDER: Hollaender speaking. I If you look at the -- the shaded formation, this [depicts] two aquifers at this moment. The general understanding is that when we work on aquifers, manage aquifers, we don't -- we shouldn't mix waters."<sup>68</sup>

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<sup>67</sup> Matrix Solutions Inc., "Hydrogeological Review of Sio Silica Corporation proposed Vivian Sand Project, Manitoba" (February 13, 2023) at 11. [emphasis added]

<sup>68</sup> CEC Hearing Transcript, March 7, 2023 at 4 (Hollaender).

## **LARGE SCALE INTERCONNECTION, GATORADE AND THE LOSS OF ABILITY TO MANAGE EACH AQUIFER**

“MR. BOUTIN: ...The connection of two aquifer like this is that because you're putting a -- a pipe in between two glass of water, whatever is happening in one -- in one glass, going to happen [in] the other one. So, when I want to take a sip of water and I drink Gatorade, it's -- it's not good, right? It's not what I was expecting. **So, you're losing the ability to control the water quality individually in both glass of water**. I'm going to push the example a little bit further. I'm going to look about the ability to manage those aquifer. And we're going to look at the quantity and I'm going to take you the exact same example. My son plays soccer, when he runs, he's really thirsty. So, if those two bottles of bottled water are connected, if he start drinking all of the water of one bottle and I want to take a sip, there's no more water in my bottle. How can I manage that? So through this example, you understand that you lose the ability to manage individually those two bottles of water. If they were disconnected by the presence of a shale layer in between them, if he drinks all of his water in all of his bottle of water because he did not manage his water well throughout the game, there's still the second bottle where you can rely on. So, I want to make that clear that **there's some long-term issue of managing the aquifer** and potential issues of mixing the aquifer together, where you lose that ability -- that barrier of flow between the two aquifers. Now -- yeah, we -- there won't ever be Gatorade in that water, right?”<sup>69</sup>

**From a policy perspective and considering the priorities of the SRGMP, the loss of the ability to individually manage the quality and quantity of water in each individual aquifer is a significant consequence of the extraction project.**

**Sio Silica did not address the loss of ability to manage aquifers in Rebuttal Evidence.**

<sup>69</sup> CEC Hearing Transcript, March 8, 2023 at 30-32 (Boutin).

## **IRREVERSIBLE HARM THAT CANNOT BE REMEDIATED**

Sio Silica's closure approach is based on techniques that are applied to conventional groundwater wells (e.g., grouting, etc.). In the opinion of Arcadis, those approaches will be insufficient to prevent or mitigate hydraulic connectivity between the Red River Carbonate and Winnipeg Sandstone aquifers. Specifically, the closure approaches will not avoid or repair the large breaches in the shale aquitard that Stantec (2022) have predicted to form.<sup>70</sup>

It is Arcadis' understanding that Manitoba's regulatory requirements prohibit activities that may result in mixing between aquifers during well development, operation and closure.

Arcadis defers to the applicable Provincial authorities regarding whether the project complies with all relevant aquifer protection and well closure requirements.<sup>71</sup>

Given the importance of the topic to the current Environmental Assessment, it may be prudent that those authorities issue a preliminary opinion on the adequacy of Sio Silica's proposed closure approach prior to the project being authorized to proceed.<sup>72</sup>

**The proponent offered no solution to how to remediate the collapse of the existing aquitard.**

**The silence of Mines Branch on this issue is notable and stunning.**

<sup>70</sup> Gerd Wiatzka (Arcadis Canada Inc.) Presentation (Exhibit H-020), March 6, 2023 at slide 8.

<sup>71</sup> *Ibid.*

<sup>72</sup> *Ibid.*

## SHALE AQUITARD AS VEC

- “While it is important to ensure that all potentially affected environmental components are given consideration, attention should focus on the **valued environmental components (VECs)** most likely to be affected.”<sup>73</sup>
- VEC’s “are aspects of the environment, physical and human, that people value and are considered important from scientific or public perspectives, thus warranting detailed consideration in the impact assessment.”<sup>74</sup>
- Based on the evidence before the Commission it is strongly arguable that the Winnipeg Shale aquitard is both highly likely to be affected by the proposed project and considered important from scientific and public perspectives.<sup>75</sup>
- The impacts on the shale of project activities can be both quantitatively and qualitatively predicted.

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<sup>73</sup> Noble, B, *Introduction to Environmental Impact Assessment: A Guide to Principles and Practice* (Don Mills: Oxford University Press, 2015) at 103-105.

<sup>74</sup> *Ibid.* See also CEC Hearing Transcript, March 6, 2023 at 50-53 (Wiatzka).

<sup>75</sup> CEC Hearing Transcript, March 6, 2023 at 58-65 (Wiatzka).

## SHALE AQUITARD AS VEC

Characterization of the Winnipeg Shale aquitard as a VEC is consistent with many of the common rationales for VEC selection listed by Noble (2015), including:

- Ecological importance
  - The Winnipeg Shale has an important function in the operation of the groundwater system in southeastern Manitoba
- Societal value
  - As an aquitard separating two aquifers, the Winnipeg Shale provides protection to both aquifers by preventing the mixing of distinct groundwaters and enabling the management of both groundwater resources. The shale is important to ensuring the reliability and sustainability of both aquifers as sources of clean drinking water.
- Fragility
  - The collapse of the Winnipeg Shale into extraction voids created in the sandstone has occurred in test wells and is expected to recur during future extraction activities
- Importance to legal compliance
  - Manitoba's statutory framework governing the relationship between mining activities and groundwater resources requires that intermixing of aquifers be prevented.
- Economic importance
  - The economic consequences of compromised groundwater sources in southeastern Manitoba would be significant. (See the Water Protection Act and the Water Resources Conservation Act).

## SHALE AQUITARD AS VEC

- VECs are typically considered in terms of *benchmarks*, being baseline conditions, and *thresholds*, which are identified degrees of change from baseline conditions beyond which project impacts would not be acceptable.
- There is evidence before the CEC suggesting the risk of unprecedented human influenced impacts on the shale aquitard in terms of the magnitude and number of breaches.
- **There is presently no evidence before the Commission suggesting that a specific amount of collapsed shale is acceptable.**
- There is no support for any change to baseline shale conditions.
- As Noble explains, “when environmental effects or conditions change beyond acceptable levels, or when VEC objectives are not met, then project impacts are considered significant, and some form of impact management is necessary.”
- There are no remediation measures that can be applied to restore the aquitard or the isolation between aquifers.<sup>76</sup>

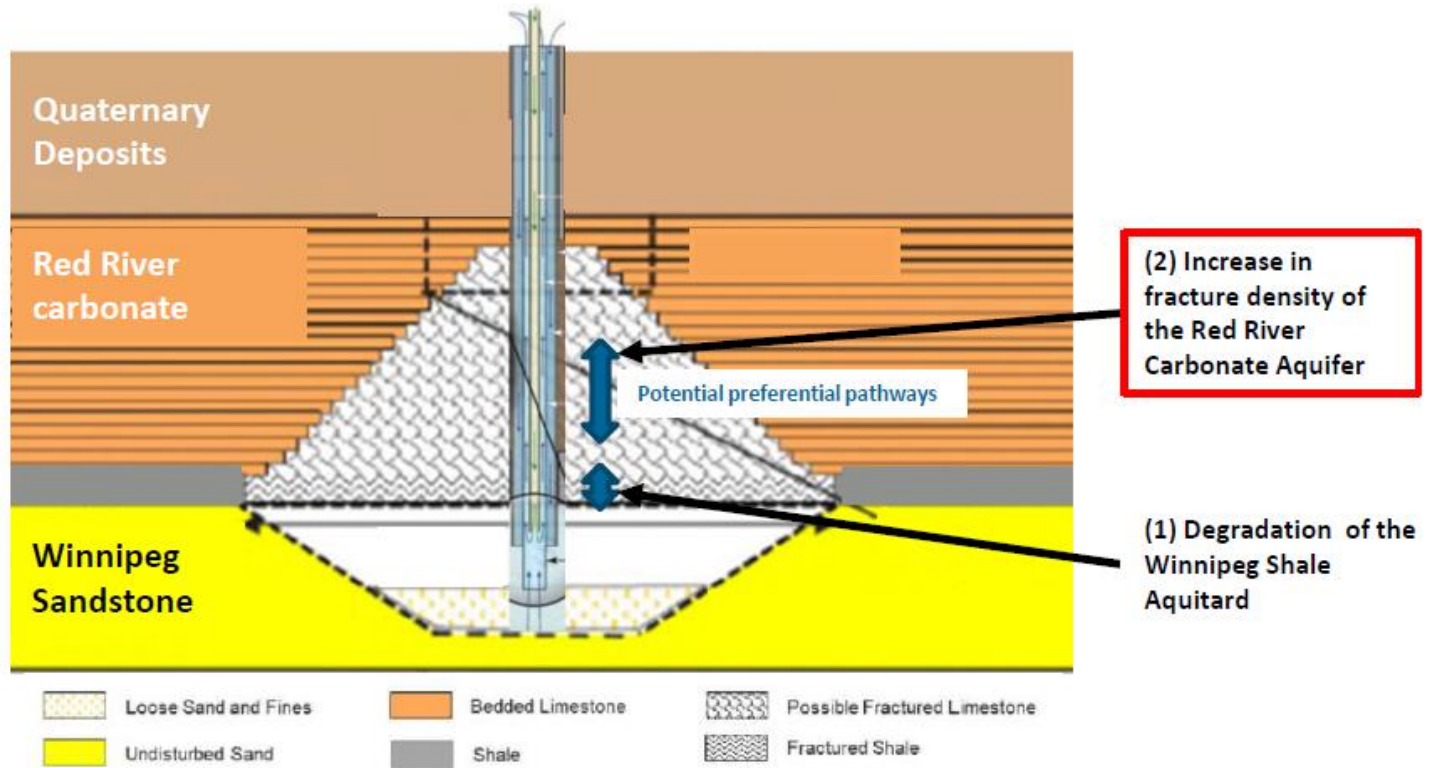
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<sup>76</sup> Gerd Wiatzka (Arcadis Canada Inc.) Presentation (Exhibit H-020), March 6, 2023 at slide 8. See also CEC Hearing Transcript, March 6, 2023 at 58-65 (Wiatzka).



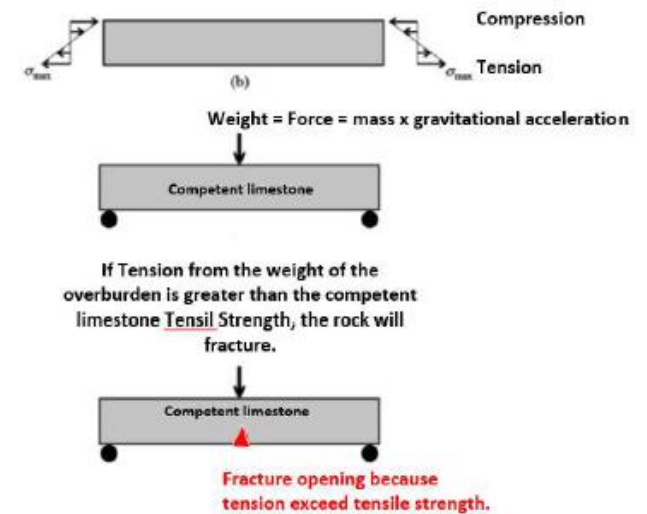
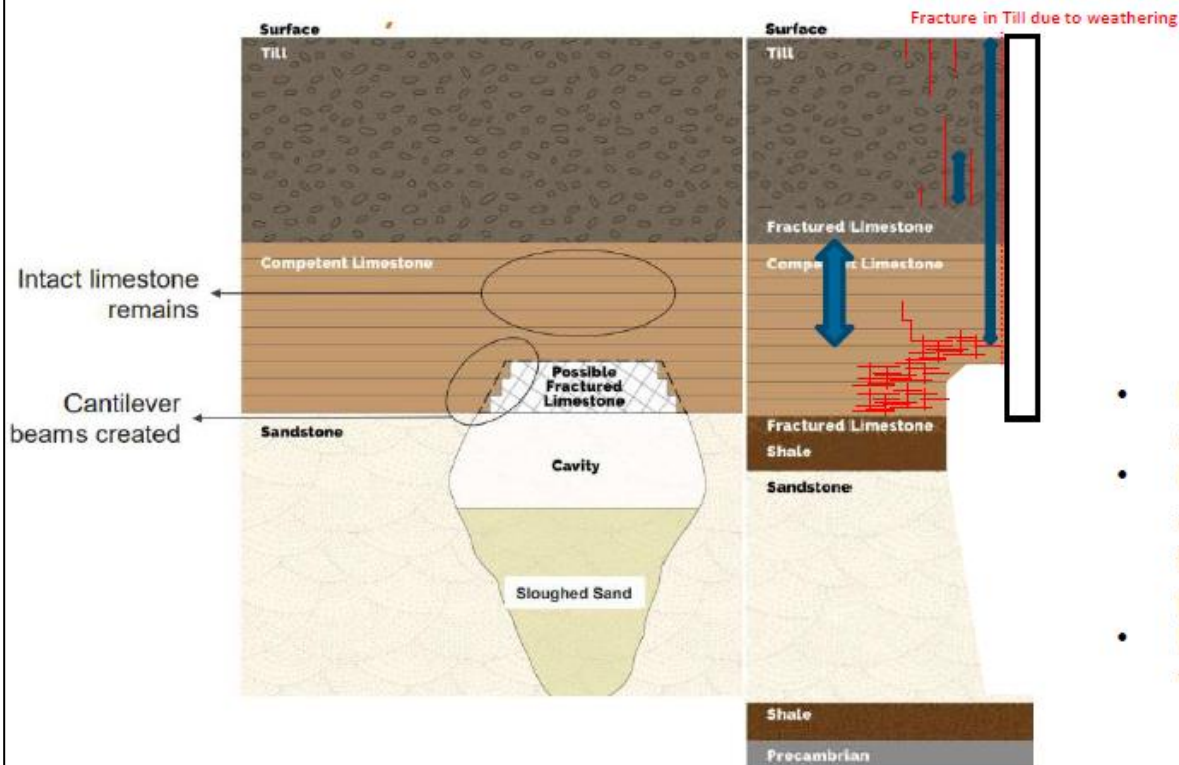
# PREFERENTIAL PATHWAYS IN THE LIMESTONE

## Indirect Effects of the Proposed Project



# PREFERENTIAL PATHWAYS IN THE LIMESTONE

## Indirect Effects of the Proposed Project



- Fractured porous network are highly **heterogeneous** and variability in fracture density should be expected.
- Increase in fracture density and/or increase in fracture apertures in the "Intact limestone" which could result in **increased vertical hydraulic permeability (e.g., pathways)**.
- Risk for preferential pathways increases with number of wells drilled (**hundreds/thousands**).

## EXACERBATED RISK OF CONTAMINATION

“The effect of the project is to increase vulnerability for contamination of both aquifers being actively and widely used for potable water supply.”<sup>77</sup>

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<sup>77</sup> Matrix Solutions Inc., “Hydrogeological Review of Sio Silica Corporation proposed Vivian Sand Project, Manitoba” (February 13, 2023) at 12.

## PRECAUTION IS IMPORTANT

Risk for contamination?

- It is unlikely that contaminants migrate from ground surface to the Red River Carbonate Aquifer under current confined conditions
- Proposed activities during project's lifespan are unlikely to contaminate, **if all mitigative measures** are implemented

BUT:

- It is **unlikely** that drilling and abandonment of thousands of wells be **100% compliant** with proposed well design due to unforeseen technical issues which would result in preferential pathways (e.g., cement quality, casing failure, ...)
- Sand extraction could result in potential enhanced vertical hydraulic connection between ground surface and the Red River Carbonate Aquifer, and between Red River Carbonate and Winnipeg Sandstone Aquifer
- Future **anthropogenic activities are unknowns** (e.g., Ontario legacy wells problem)
- Since groundwater is the main source of potable water for thousands of Manitobans, precautionary approach is important<sup>78</sup>

<sup>78</sup> Louis-Charles Boutin (Matrix Solutions Inc.) Presentation (Exhibit H-038), March 8, 2023 at slide 31.

## HARD-WON EXPERIENCE WITH MUNICIPAL WATER SUPPLIES

“MR. BOUTIN: .... What I -- what I want to point out though is that I'm going to talk about my experience in Ontario about water supply well for some municipalities and road salt. Road salt is becoming quite an important consideration for water supply. We've seen some water supply in populated areas having some issues with chloride and realizing that they have an issue with chlorides now when the practice been ongoing for 50 years. So, simply what I'm saying is that, yes, nitrate is a good example. When I looked at the water quality from those both aquifer, there's no nitrate in the groundwater. So, this alone suggest that currently it's not a problem. Does that mean that it won't be a problem in 50 years, and we just going to realize that all that nitrate is still in the till and making it's way very slowly towards those aquifer? Because the exact reason that it protects it, it may take a while before it gets there...”<sup>79</sup>

<sup>79</sup> CEC Hearing Transcript, March 8, 2023 at 136-137 (Boutin). [emphasis added]

## **RISK IS PROPORTIONATE TO THE INDUSTRIAL INTENSITY OF THE PROJECT**

“MR. BOUTIN: ...So, by creating pathways, you're effectively creating a risk and you're playing with the risk factor. . . Which is -- which is important because it's proportional - it's directly proportional to number of borehole that you're doing. So, more borehole you're doing, higher is the risk.”<sup>80</sup>

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<sup>80</sup> CEC Hearing Transcript, March 8, 2023 at 143-144 (Boutin). [emphasis added]

## **FUNDAMENTAL QUESTIONS RELATING TO THE RELIABILITY OF THE HYDROGEOLOGICAL ASSESSMENT FOR DECISION MAKING PURPOSES**

- Matrix and Hollaender/Woodbury are eminently qualified experts who raise profoundly different questions regarding whether the AECOM analysis can be relied upon for assessment decisions.
- MBEN/OLS will focus primarily on the independent evidence of Matrix.

## MATRIX KEY CONCERNS WITH THE HYDROGEOLOGICAL ASSESSMENT

Matrix raises concerns about reliance on the AECOM analysis because:

- i) Contrary to the direction of the SRGWP and the earlier guidance of the CEC, AECOM failed to undertake the cumulative impact assessment needed to understand whether the project was sustainable.
- ii) The model domain excluded important regional areas of overdevelopment and salt intrusion concerns identified within the SRGMP that are key to cumulative effects assessment. In addition, the domestic wells outside the regional project area were not considered and foreseeable population, industry, and agricultural growth was not considered.
- iii) There are unresolved concerns regarding the reliability of the recharge rate input to the AECOM model which were not resolved.
- iv) Concerns of using AECOM 2021 numerical model for the simulation of local scale effects.



## **MATRIX CONCERN I – A CUMULATIVE IMPACT ASSESSMENT WAS NOT UNDERTAKEN**

- Relying upon their review of the SRGMP, prior CEC decisions, their extensive professional expertise and the record of this proceeding, Matrix recommended that a Cumulative Impact Assessment be undertaken that considered:
  - Effects from existing and foreseeable future activities;
  - The impacts of the Full Development over its 24-year lifespan
  - Population growth
  - Agricultural and industry growth<sup>81</sup>

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<sup>81</sup> Louis-Charles Boutin (Matrix Solutions Inc.) Presentation (Exhibit H-038), March 8, 2023 at slides 39, 36.

## **MATRIX: THE SRGMP IS AN IMPORTANT STARTING POINT FOR CUMULATIVE IMPACTS ASSESSMENT**

- Matrix identifies the SRGMP as an essential starting point to guide an assessment of the project given its recognition that “The approach to sustainable yield and water use licensing limits in the study area needs to be more continuous, integrated and comprehensive.”<sup>82</sup>
- A central concern of the SRGMP is:
  - Groundwater withdrawal from a number of aquifers has increased substantially over the past several decades and there is concern that we may gradually be approaching our sustainable development capacity for these aquifers. . . . Many residents in the area are concerned about the quality of their water and that water quality may deteriorate over time if development is not undertaken in a sustainable fashion. This is particularly the case for those relying on groundwater near fresh water/saline water boundaries.”<sup>83</sup>

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<sup>82</sup> Louis-Charles Boutin (Matrix Solutions Inc.) Presentation (Exhibit H-038), March 8, 2023 at slides 35, 40.

<sup>83</sup> Southeast Regional Groundwater Management Plan at 2.

**MATRIX - IT DOES NOT MAKE SENSE TO EXCLUDE POPULATION GROWTH FROM AN ASSESSMENT OF THE SUSTAINABILITY OF THE AQUIFER**

“If you go back to the groundwater management plan, the Southeast Regional Groundwater Plan, they explicitly say about the future condition and that should be used to -- to predict and make those prediction. So, in an area where most of the groundwater usage are an important proportion, that I don't have the exact number for, that is **water supply for potable water, this is your main stressor of the system.** You need to do -- consider that and you need to do -- **you need to consider what's the growth, otherwise why are you planning sustainability if you're not taking into consideration the major usage of that aquifer. Doesn't make any sense.**”<sup>84</sup>

**The Proponent does not deny cumulative impact assessment is good practice. Instead, it baldly claims that CIA and the CEC prior findings on CIA are not relevant to this impact assessment.**

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<sup>84</sup> CEC Hearing Transcript, March 8, 2023 at 150 (Boutin). [emphasis added]

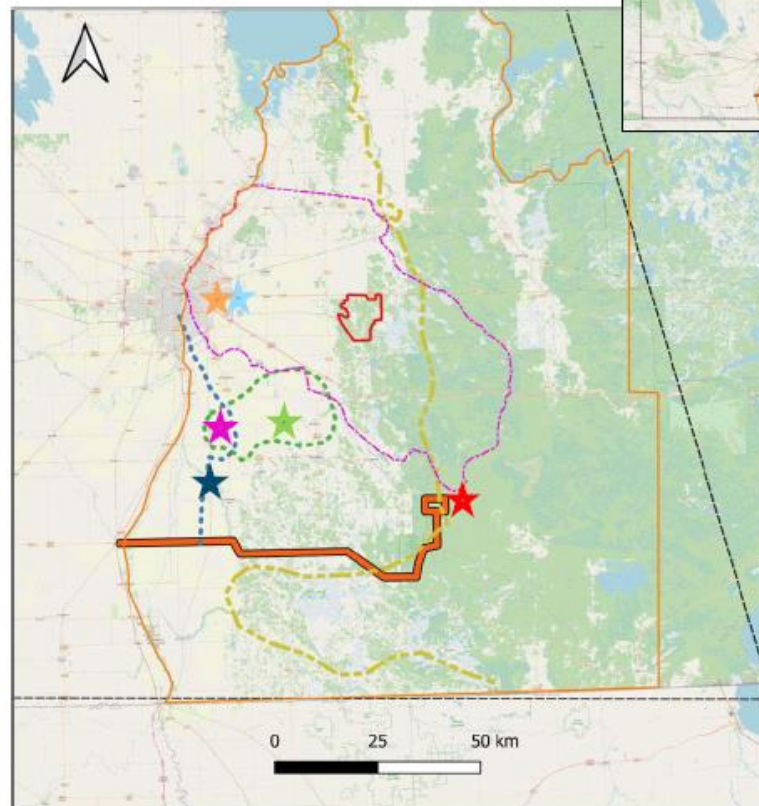
# STRAW THAT BROKE THE CAMEL'S BACK



# MATRIX - IMPORTANT GAPS IN THE AECOM ANALYSIS

## Historical Regional Hydrogeological Studies

- 1964 Red River Floodway Construction
  - **Groundwater levels decreased** from 234 to 227 m asl (Wang 2008)
- Large-scale dewatering below top of bedrock surface resulted in progression of the **freshwater/saltwater front**.
- 2005 Red River Floodway Expansion
  - Proposed to cut into the regional Red River Carbonate Aquifer; potential increased groundwater discharge and pathways for contaminants
- 2007 Pembina Valley Water Cooperative
  - Supplemental Groundwater Supply System: **7,000 m<sup>3</sup>/day**
- 2008 Wang
  - 1991-2005 2 m Drawdown from urban development near Steinbach
- 2010 Southeastern Regional Groundwater Management Plan
- 2019 Supplemental Municipal Groundwater Supply Rural Municipality of Springfield
  - Population growth 8.73% per year
  - Demand projected: **2,500 m<sup>3</sup>/day**
  - Speculated Steinbach drawdown caused by 1970's Manning Canal – New Equilibrium (Supply for Ste. Agathe/Ile des Chenes)



**Vivian Sands Proposed Project  
2023 Groundwater Model – 0%  
2,016 m<sup>3</sup>/day  
(650 USGPM 200 days operations)  
[Hydro. Feb. 28, 2023, Slide 24.]**

- Regional Hydrogeological Features
- Chloride >250ppm (Interp. from Phipps 2008 Fig.7)
  - Drawdown 2 m (Wang 2008 Fig. 15)
  - Winnipeg Sandstone Upper Contact
- Regional Model Domains
- AECOM 2021
  - Kennedy and Woodbury 2002
  - Wang 2008
  - Vivian Sands - Proposed Project Area
  - Pembina Valley Water Cooperative

# MATRIX CONCERN 2 - IMPORTANT GAPS IN THE AECOM ANALYSIS

## Cumulative Effects Assessment of the Full Project

- Concerns of using AECOM 2021 regional numerical model:
  - The model domain exclude regional areas of overdevelopment and salt intrusion concerns identified within the SRGMP that are key to cumulative effects assessment.
  - The domestic wells outside the regional project area were not considered.
  - Foreseeable population, industry, and agricultural growth was not considered.

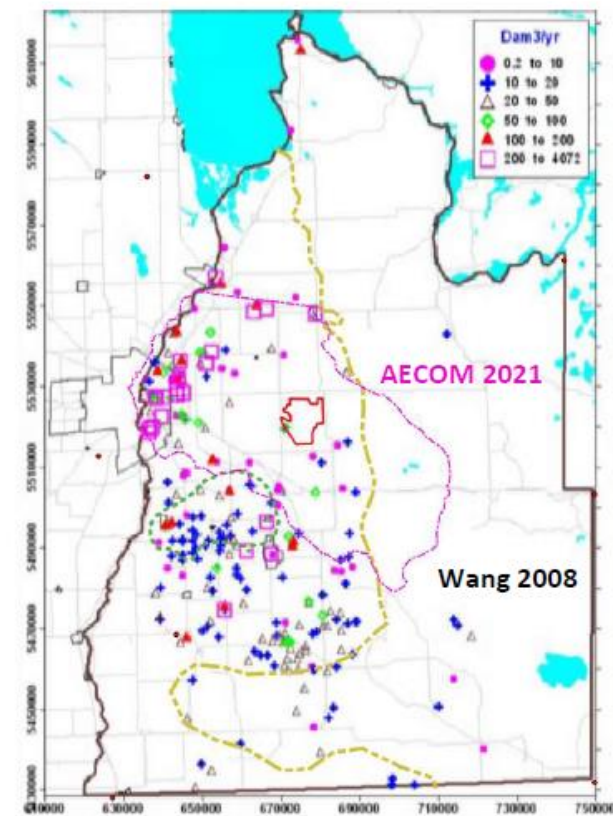


Figure 10 Groundwater License Location

From Wang 2008

## MATRIX - THE AECOM DOMAIN IS NOT RELIABLE FOR THE CENTRAL QUESTION OF SUSTAINABILITY

“So, if you choose your model domain size to answer specific question, what is the project effects, direct effects, and you're not choosing to answer the question is there enough water in the system, then maybe it is sufficient. And again, if you're looking at sustainability and integration of foreseen -- foreseen growth of the industry of the groundwater users, the domestics wells, the municipalities, and other project -- mining project, or industry project, that may go on that take the water in the same aquifer, then the model domain becomes too small.<sup>85</sup>

- The failure of the AECOM analysis to address foreseeable population, industrial and agricultural growth also is outlined in the testimony of Dr. Harvey<sup>86</sup> and Mr. Mills.<sup>87</sup>




<sup>85</sup> CEC Hearing Transcript, March 8, 2023 at 111-112 (Boutin). [emphasis added]

<sup>86</sup> CEC Hearing Transcript, March 2, 2023 at 24-25 (Harvey).

<sup>87</sup> CEC Hearing Transcript, March 2, 2023 at 26-27 (Mills).

## MATRIX CONCERN 3 – QUESTIONS EXIST RELATING TO THE RECHARGE INPUT ASSESSMENT

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Component of the Water Balance	AECOM 2021	Friesen 2019	SRGMP Wang 2008	Kennedy and Woodbury 2005
Model Domain Area (km <sup>2</sup> )	3,176	N/A	17,000	60,000
Recharge Applied (m <sup>3</sup> /day)	620,000	32,877	N/A	164,160
Groundwater Use (m <sup>3</sup> /day)	17,189	12,932	81,424	51,840
Groundwater Use (% of Recharge)	2.8 	39.0 	N/A	32.0 

<sup>88</sup> Louis-Charles Boutin (Matrix Solutions Inc.) Presentation (Exhibit H-038), March 8, 2023 at slide 43.



## MATRIX – CONCERNS REGARDING RECHARGE RATE INPUT ARE BARELY CONTESTED BY THE PROPONENT

- Matrix raised questions about whether the recharge rate used as an input in the model parameter was “too high” especially as compared to other reported values.<sup>89</sup>
- Cross examination **abandoned** after 3 questions:

“So, I can tell you that I have a recharge rate of 200 millimetres per year at the specific area like this, but if you do apply it on a large area like this, **suddenly your total recharge is just out of proportion**. So, by saying that you're using the same recharge rate doesn't mean that it's right. You need to think about how much area that you're imposing that rate, and if it makes sense based on a conceptual site model.”<sup>90</sup>
- AECOM does not seriously contest Matrix’s recharge analysis in its rebuttal evidence
- AECOM’s rebuttal admits that “recharge is one of the most difficult parameters to measure” and that “recharge values were higher than employed in some of the other ground water models.”<sup>91</sup>
- AECOM admits that recharge input value is relevant to the regional scale sustainability assessment.<sup>92</sup>

<sup>89</sup> Louis-Charles Boutin (Matrix Solutions Inc.) Presentation (Exhibit H-038), March 8, 2023 at slide 43. See also CEC Hearing Transcript, March 8, 2023 at 93-95 (Boutin).

<sup>90</sup> CEC Hearing Transcript, March 8, 2023 at 96 (Boutin).

<sup>91</sup> Sio Silica Rebuttal Evidence Presentation, March 14, 2023 at slide 23.

<sup>92</sup> *Ibid.*

## **MATRIX CONCERN 4 – USING AECOM NUMERICAL MODEL FOR THE SIMULATION OF LOCAL EFFECTS**

Concerns of using AECOM 2021 numerical model for the simulation of local scale effects:

- The use of seven layers does not represent the conceptual site model in vicinity of extraction wells.
- Higher hydraulic conductivity zones are found at the top and bottom of the Red River Carbonate Aquifer, but are not represented in AECOM model.
- Vertical refinement is needed to simulate the effect of sand extraction and collapse of Winnipeg Shale and fractured limestone.<sup>93</sup>

**The Proponent was unable to successfully challenge this assertion in cross examination or evidence.**

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<sup>93</sup> Louis-Charles Boutin (Matrix Solutions Inc.) Presentation (Exhibit H-038), March 8, 2023 at slide 44. See also CEC Hearing Transcript, March 2, 2023 at 37-39 (Harvey).

## KEY CONCERNS IDENTIFIED BY HOLLAENDER/WOODBURY

- Hollaender/Woodbury bring important practical and theoretical experience to hydrogeological issues generally and to this region specifically.
- Their intensive technical examination of the AECOM model is appreciated by our clients.
- Hollaender/Woodbury take a different analytic approach from Matrix. They concluded that the AECOM model:
  - Systematically overestimated heads below 275 m asl<sup>94</sup>
  - Does not represent behavior of the natural groundwater flow
  - **Cannot be used as a predictive tool at this point**<sup>95</sup>
- Hollaender/Woodbury also raise important questions about the implications of the failure of the shale and caprock limestone on hydraulic conductivities<sup>96</sup> and the risks of cumulative withdrawals from the aquifers causing intrusions of salinity.<sup>97</sup>

<sup>94</sup> Dr. Hollaender Presentation, March 7, 2023 at slide 24. See also CEC Hearing Transcripts, March 2, 2023 at 37-39 (Harvey) and March 7, 2023 at 64-65 (Hollaender).

<sup>95</sup> Dr. Hollaender Presentation, March 7, 2023 at slide 24.

<sup>96</sup> CEC Hearing Transcripts, March 7, 2023 at 53-56 (Hollaender).

<sup>97</sup> CEC Hearing Transcripts, March 7, 2023 at 82-83 (Hollaender).

## IMPORTANT INSIGHTS NOT AVAILABLE TO THE CEC

- Hollaender/Woodbury also identify gaps flowing from the fact that there has not been hydrogeological examination of testing from the mining of a cluster rather than a single extraction well.<sup>98</sup>

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<sup>98</sup> CEC Hearing Transcript, March 7, 2023 at 84-86 (Hollaender). See also KGS Presentation, March 9, 2023 at slide 13.

## **CONCERNS REGARDING THE RELIABILITY OF THE GEOTECHNICAL ANALYSIS**

- The CEC has benefitted from geotechnical and geological advice from KGS as well as geotechnical advice from Arcadis.
- The KGS team, in particular, brings critical regional insights based upon their experience with a number of relevant projects including but not limited to the floodway.
- MBEN/OLS understand KGS to be raising four critical questions:
  - The failure to undertake a full-scale test of an extraction cluster prior to the assessment and licensing which would assess whether the various geological, geotechnical, and groundwater interpretations made at this stage of the project, are valid;<sup>99</sup>
  - The failure to undertake necessary sensitivity analysis at the front end of the project on the stability of the caprock;<sup>100</sup>
  - The failure to more carefully investigate vertical features in the bedrock given Sio Silica's exclusive reliance on vertical boreholes;<sup>101</sup> and
  - The need for clarity on whether vertical joints, which will exist in the carbonate rock in the project area, are appropriately addressed or accounted for in the geotechnical model.<sup>102</sup>

<sup>99</sup> KGS Presentation, March 9, 2023 at slide 12. See also CEC Hearing Transcript, February 27, 2023 at 89 (Eshraghian).

<sup>100</sup> CEC Hearing Transcript, March 9, 2023 at 54-55 (Smith).

<sup>101</sup> KGS Presentation, March 9, 2023 at slide 10.

<sup>102</sup> *Ibid.*

## **A PROJECT LICENCE IS NOT AN APPROPRIATE VEHICLE TO OBTAIN CORE BASELINE DATA**

- Sio Silica/AECOM's rebuttal evidence undertakes to perform expanded pilot testing and inclined boreholes **but only after a permit is granted.**<sup>103</sup>
- While the concerns of KGS are clearly validated by Sio Silica's concession, **the failure to complete this important work prior to the assessment is fundamentally troubling.**
- It also underscores our clients' long standing concern that the Mines Branch remains silent during this assessment.
- We do not have a written explanation from Mines Branch on why an exploration license could not be granted to undertake this necessary baseline exploration of the record.<sup>104</sup>

**It is not acceptable to use an environmental license to obtain baseline data.**

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<sup>103</sup> Sio Silica Rebuttal Evidence, March 14, 2023 at slide 41.

<sup>104</sup> CEC Hearing Transcript, March 2, 2023 at 127-128 (Bullen).

## **GAPS IN THE GEOCHEMICAL RECORD AND DEEPER PUBLIC PROCESS CONCERNS**

- No participant funding was available for this process.
- While the CEC retained independent experts, the primary focus of their analysis was on geotechnical and hydrogeological issues. Their work in these areas is much appreciated.
- The limited geochemical analysis of CEC witnesses appears at slides 28 – 31 of the Hollaender presentation.

## **GAPS IN THE GEOCHEMICAL RECORD AND DEEPER PUBLIC PROCESS CONCERNS**

- In the absence of participant funding, MBEN/OLS focused their scarce resources on the outstanding hydrogeological support of Matrix Solutions Inc.
- KGS has not deeply explored geochemical issues.
- No independent expert was primarily responsible for testing the submissions of the Proponent on issues of geochemistry. There was no opportunity to hear from government witnesses on this point.
- The result is a record on geochemical issues that is sadly incomplete despite the enormous and valiant efforts of Mr. LeNevue.



## DR. PIP HAS BEEN IGNORED BY THE PROPONENT

- On the record of this proceeding is a voluminous and thoughtful submission by Dr. E. Pip, "Submission Re: Manitoba Environment Act Proposal Public Registry 6119.00 Silica Sand Extraction Project Sio Silica Corporation (formerly CanWhite Sands) to Clean Environment Commission" (13 February 2023), online: <http://www.cecmanitoba.ca/hearings/silica-sand-extraction-project/doc/ws21dr.evapip.pdf>.
- Dr. Pip describes her qualifications on page 6 of her report:
  - Professional opinions expressed herein derive from my qualifications as a career Research Scientist and Professor, and international publisher, in the fields of biology, toxicology, and water quality/public health. I have also published in the discipline of geology.
- While Dr. Pip is far too modest to cite any of her awards, we would encourage the panel to undertake a simple google search and explore her outstanding career.

## **TOUGH QUESTIONS SHOULD NOT BE IGNORED**

- It is unfortunate that the Proponent has chosen not to meaningfully address Dr. Pip's important contribution to the dialogue of this proceeding.
- If the Proponent seeks public confidence in its assessment proceedings, it is incumbent upon it to grapple with the tough questions, not ignore them.
- Given Manitoba's failure to provide participant funding and the palpable gap in the geochemical record of this proceeding, our clients cannot have confidence in the hearing record on this important issue.

## **PROJECT UNCERTAINTY CANNOT BE “MANAGED” AWAY**

In terms of issues related to follow-up, monitoring and what the Proponent alleges to be “adaptive management”, MBEN/OLS have the following concerns:

- 1) The thoughtful recommendations of KGS on follow-up and monitoring are likely to be inaccessible to the communities represented by MBEN/OLS.
- 2) Challenges within the technical team in understanding core concepts related to follow-up, monitoring and addressing uncertainty;
- 3) Follow-up, monitoring and managing uncertainty are no answer to circumstances where significant adverse effects cannot be mitigated and there is no plan.

## **IMMATURITY IN MONITORING, MITIGATION AND MANAGEMENT PLANS – THOUGHTFUL DISCUSSION OF KGS**

In its oral evidence, KGS noted the relative immaturity of certain Monitoring, Mitigation and Management Plans and made recommendations for an inclusive process to develop them prior to a license determination/issuance.

These plans included the:

- Groundwater Monitoring and Mitigation Plan<sup>105</sup>
- Progressive Well Abandonment Plan<sup>106</sup>
- Waste Characterization and Management Plan<sup>107</sup>

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<sup>105</sup> KGS Presentation, March 9, 2023 at slide 16.

<sup>106</sup> *Ibid* at slide 17.

<sup>107</sup> *Ibid* at slide 18.

## **SIGNIFICANT UNCERTAINTY CANNOT BE MANAGED AWAY BY FOLLOW-UP AND MONITORING**

While MBEN/OLS deeply appreciate the spirit in which the KGS recommendations were made, they note:

- They do not have the resources to meaningfully participate in the manner contemplated by KGS;
- They are troubled by what they perceive as challenges within the technical team in understanding core concepts related to follow-up, monitoring and addressing uncertainty;<sup>108</sup> and
- They are troubled by what appears to be an assumption by the Proponent that it can simply implement its plan and address any issues as they ‘pop up’ to work its way through uncertainty.

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<sup>108</sup> CEC Hearing Transcript, March 2, 2023 at 39-44 (Mills).

## **SIO-SILICA LACKS A PLAN TO DEAL WITH A CRITICAL UNCERTAINTY**

Most fundamentally and as noted by Arcadis:

- The Management Plans submitted to date lack detailed information necessary to confirm that operational practices will be capable of identifying and mitigating potential environmental impacts from the Project.<sup>109</sup> (Arcadis, March 6, Slide 10)
- Consequently, there continues to be uncertainty regarding how the project will be managed to avoid/mitigate potentially significant environmental impacts.
- The updated “Progressive Well Abandonment Plan” (February 3, 2023) presents insufficient information regarding how Sio Silica will mitigate large-scale hydraulic connectivity between the two freshwater aquifers.<sup>110</sup>

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<sup>109</sup> Gerd Wiatzka (Arcadis Canada Inc.) Presentation (Exhibit H-020), March 6, 2023 at slide 10.

<sup>110</sup> *Ibid.*

## **SIO-SILICA LACKS A PLAN TO DEAL WITH A CRITICAL UNCERTAINTY**

- Sio Silica has acknowledged that the Management Plans are preliminary and has indicated that comprehensive plans would be developed following project approval.<sup>111</sup>
- In the opinion of Arcadis, such an approach is acceptable when potential project-environment interactions are well understood (e.g., conventional mining projects).<sup>112</sup>
- However, in the case of the proposed sand extraction process, there continues to be uncertainties regarding the impacts of the proposed approach.
- As a consequence, detailed management plans would ideally be provided prior to project approval. This would help to demonstrate that all potential uncertainties and impacts can be effectively detected and mitigated.<sup>113</sup>

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<sup>111</sup> Gerd Wiatzka (Arcadis Canada Inc.) Presentation (Exhibit H-020), March 6, 2023 at slide 10.

<sup>112</sup> *Ibid* at slide 11.

<sup>113</sup> *Ibid*.

## **THE IMPOVERISHED ASSESSMENT IS NOT RELIABLE**

- Our clients are deeply appreciative of CEC leadership in retaining independent experts and running a fair, thoughtful hearing.
- But our clients are deeply concerned that the magnitude of the environmental impacts related to the Sio Silica development will be understated given fundamental flaws in the hearing process.
- Independent experts with extensive experience in extractive industries including mining and oil and gas have identified substantive flaws in the process related to:
  - Project splitting; and
  - The absence of a cumulative impact assessment.



## PROJECT SPLITTING

With regard to the EA process, Arcadis concluded that the abbreviated temporal scope, substantively smaller spatial scope and exclusion of critical project components constitutes “project splitting”. Arcadis considers this to be a material deficiency with the Project Proposal.<sup>114</sup>

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<sup>114</sup> Arcadis Canada Inc., “Technical Review of Sio Silica Corporation’s Environment Act Project Proposal” (2022) at ES-1, 8-10 and 23.

## **PROJECT SPLITTING MAY LEAD TO AN UNDERESTIMATE OF PROJECT IMPACTS**

“The mine has an expected life of 24 years but only 4 years of mining activity have been assessed in the Project Proposal. While breaking projects into phases is a common approach when issuing regulatory authorizations, it is **inappropriate in the context of Environmental Assessment because it has the potential to underestimate the spatial extent, duration and therefore significance of project impacts.**

Similarly, the exclusion of Sio Silica’s sand processing facility and other supporting infrastructure from the scope of the current Environmental Assessment is inappropriate. The potential impacts of the entire mining project throughout its life cycle including extraction, processing and transport should be evaluated by a single, comprehensive assessment that considers the Vivian Sand Project as one undertaking, not a series of independent and unrelated projects.”<sup>115</sup>

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<sup>115</sup> Arcadis Canada Inc., “Technical Review of Sio Silica Corporation’s Environment Act Project Proposal” (2022) at 8-10. See also CEC Hearing Transcript, February 27, 2023 at 54-56 (Somji).

## THE IMPOVERISHED ASSESSMENT IS NOT RELIABLE – NO CUMULATIVE IMPACTS ANALYSIS

- “Given this project would set a precedent in the province and could lead to other projects in the same region, the absence of an CIA is an important deficiency in Matrix’s opinion.”<sup>116</sup>
- “The Project Proposal and supporting documents do not include an assessment of cumulative effects. Given the wide range of land uses in the vicinity of the Project and the importance of the groundwater resource, this represents a substantive deficiency in the Project Proposal.”<sup>117</sup>

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<sup>116</sup> Matrix Solutions Inc., “Hydrogeological Review of Sio Silica Corporation proposed Vivian Sand Project, Manitoba” (2023) at 15.

<sup>117</sup> Arcadis Canada Inc., “Technical Review of Sio Silica Corporation’s Environment Act Project Proposal” (2022) at 25.

## **IMPORTANT INFORMATION IS NOT BEFORE THE CEC**

MR. WILLIAMS: And based upon your many years of experience with mining and in the industry, sir, you'll agree that cumulative impacts are important because significant adverse effects may result not only from the direct effects of a project, but from a combination of effects of multiple projects over an extended period of time, correct?

MR. WIATZKA: Wiatzka. Agreed.

MR. WILLIAMS: Williams speaking. And significant cumulative effects can occur when too much is happening within too small an area and over too brief a period of time. Agreed?

MR. WIATZKA: Wiatzka. Agreed.

MR. WILLIAMS: Williams speaking. And in those circumstances, sir, a threshold may be exceeded, and the environment may not be able to recover. Agreed?

MR. WIATZKA: Wiatzka. Agreed.<sup>118</sup>

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<sup>118</sup> CEC Hearing Transcript, March 6, 2023 at 53-55 (Wiatzka). See also page 49.

## **RECOMMENDED FINDINGS ON ENVIRONMENTAL AND HEALTH EFFECTS**

1. The proposed Development will cause irreparable harm to the Winnipeg Shale aquitard and the Red River Carbonate limestone and create material, irreversible interconnection between the carbonate and sandstone aquifers.
2. The Winnipeg Shale aquitard should be designated as a valued ecological component.
3. The proposed Development will have a significant direct effect on the Winnipeg Shale aquitard which cannot be mitigated.
4. There are substantial and unresolved concerns regarding the reliability of the hydrogeological numerical model for impact assessment.
5. The updated “Progressive Well Abandonment Plan” (February 3, 2023) does not explain how or if large-scale hydraulic connectivity between the two freshwater aquifers can be addressed.

## RECOMMENDATIONS

- I. The proposed Vivian Silica Sand Extraction Project should not be granted a license under *The Environment Act*.

## RECOMMENDATIONS

2. Particularly for projects where the direct, short-term effect is to increase the vulnerability of valuable ecosystem components such as aquifers and aquitards, a cumulative effects assessment is necessary to adequately assess potential environmental effects.

MBEN and OLS recommend that the CEC reiterate its past assertion that “in order to be done well, [environmental impact assessments] must also include an assessment of cumulative effects.”<sup>119</sup> The CEC should also reiterate its recommendation to government that guidance documents be amended to reflect the rigour of environmental assessment required by *The Environment Act*. This should include:

- a. Completion of cumulative effects assessment;
- b. Imposition of a minimum level of detail required for draft follow-up, monitoring and impact mitigation plans to enable adequate assessment of the proponent’s ability to successfully prevent, identify and mitigate potential adverse effects; and
- c. Reliable provision of funding for Participants in CEC processes to ensure the availability of technical support and independent expert evidence.

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<sup>119</sup> Manitoba Clean Environment Commission, “Regional Cumulative Effects Assessment Review” (2018) at 7.

## RECOMMENDATIONS

3. The CEC should recommend that Manitoba revitalize and complete earlier initiatives related to the development of integrated regional watershed and groundwater management plans to serve as tools for collaborative decision-making.

This should involve designation of watershed and groundwater management zones under the relevant statutes and the provision of support for stakeholder involvement in plan development.



*"...this project[,] with its risks to the only available fresh water source for the area, should **not** receive an Environment Act License. **The risk is too great.**"<sup>120</sup>*

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<sup>120</sup> Our Line in the Sand Manitoba, Public Comment Submission to Environmental Assessment and Licensing Public Registry 6119.00 (29 September 2021). [emphasis added]