

March 11, 2020

Version 1.0
Matrix 23876-527

Ms. Sonja Strynatka
GRAND RIVER CONSERVATION AUTHORITY
400 Clyde Rd.
Cambridge, ON N1R 5W6

Subject: Response to Nestlé Waters Canada Comments on the Centre Wellington Tier Three Water Budget Draft Final Risk Assessment Report

Dear Ms. Strynatka:

The purpose of this letter is to provide a response to Community Liaison Group (CLG) comments received from Nestlé Waters Canada (NWC) dated December 6, 2019 regarding the Centre Wellington Tier Three Water Budget Draft Final Risk Assessment Report (Tier Three Assessment; Matrix 2019).

1 RESPONSE TO SPECIFIC COMMENTS

1. Comment: *NWC concurs with the acknowledgement in Recommendation #1b that the simulation of drawdown at the Middlebrook Well due to pumping from that well is uncertain. The collection of additional data from focused additional field-based investigations is essential to reduce the uncertainty to a level such that any predictions of potential long-term effects of pumping from the Middlebrook well might be considered scientifically defensible.*

Response: Comment noted.

2. Comment: *NWC supports recommendation #1b to collect additional local high-quality data and to complete an aquifer pumping test in the area. In particular, it will be necessary to conduct investigations to assess the hydraulic properties of the bedrock aquifers between the Middlebrook well and the existing municipal supply wells, and to evaluate the potential for developing groundwater supplies at proposed locations for new municipal supply wells. The investigations must include long-term pumping tests.*

Response: Comment noted.

3. Comment: *NWC suggests that the statement on Page 23 of the draft final report be amended slightly. The statement currently reads, "As such, additional data collection, characterization, and calibration of the model may be required if predictions are required in areas that lie outside the focus area of this study, including in the vicinity of the Middlebrook well." The statement should read, "As such, additional data collection, characterization, and calibration of the model is required if predictions are required in areas that lie outside the focus area of this study, including in the vicinity of the Middlebrook well."*

Response: Agreed. The text has been revised as suggested.

4. Comment: *In a memorandum transmitted to the Grand River Conservation Authority on August 28, 2019, S.S. Papadopoulos & Associates, Inc. compiled several detailed lines of evidence leading to the conclusion that the groundwater model developed for the Centre Wellington Tier Three Water Budget Study was not fit for the purpose of making predictions of potential effects of pumping the Middlebrook well on hypothetical additional municipal supply wells. Despite the limitations of the groundwater model, it was applied for this purpose in the preparation of the Centre Wellington Water Supply Master Plan (page 81 of the draft dated July 2019). No discussion of the uncertainties in the predictions was presented in the Centre Wellington Water Supply Master Plan report, nor was there any assessment of the consistency of the model results with long-term testing and monitoring data from the Middlebrook site. No data are available to confirm the assumed subsurface properties at the locations of the hypothetical additional municipal wells, or between these wells and the Middlebrook well. The predictions of the potential effects of possible pumping from the Middlebrook on hypothetical additional municipal wells are highly speculative. Under no circumstances should the reported impacts of pumping from the Middlebrook wells on potential future municipal wells be regarded as factual.*

Response: This comment specifically relates to the Township of Centre Wellington Water Supply Master Plan (WSMP; AECOM 2019) and not the Centre Wellington Risk Assessment Report (Matrix 2019). Matrix has responded to comments from S.S. Papadopoulos & Associates, Inc. regarding the numerical modelling conducted in support of the WSMP as part of that separate project.

5. Comment: *It was indicated during the Community Liaison Group meeting #4 (November 19, 2019) that the peer review panel concluded that “the Risk Assessment is scientifically defensible and that the deliverables are consistent with the province’s source protection framework”. The peer review record was not included in the draft final Risk Assessment report (version 0.4, November 2019). Will the peer review comments and the responses to the comments be included as an appendix to the final version of the Risk Assessment Report? It is also our understanding that geology and groundwater experts with the Ontario Ministry of Natural Resources (Ontario Geological Survey) and the Ministry of the Environment, Conservation and Parks provided comments on the development of the Tier Three groundwater model. Will their comments and the responses to them be included in a publicly accessible peer review record?*

Response: Peer review comments from the provincial peer reviewers, as well as from other parties including municipal reviewers; the Ministry of the Environment, Conservation and Parks; Ontario Geological Survey; and CLG will be provided in appendices of the final Risk Assessment report, along with responses from the Tier Three Assessment project team.

6. Comment: *During the Community Liaison Group meeting #4, in response to the question on how much confidence can be assigned to the delineation of the “vulnerable area” (that is, the WHPA Q1), David Van Vliet of Matrix Solutions responded that the WHPA-Q1 is “not something that you can measure.” The methodology for the delineation of the WHPA Q1 is described on Page 24 of the Risk Assessment Report. However, there is no discussion of the uncertainty inherent in the delineation. For example, there is no discussion of the accuracy of the model calculations of groundwater levels relative to the 2.0 m drawdown contour adopted as the boundary of the WHPA Q1. Furthermore, there is no discussion regarding how the limits of the WHPA Q1 might change if different flow rates are assumed across the model boundaries (Figures 5, 19b and 19c of the Tier Three Model Development and Calibration Report, Version 1.0).*

Response: Indeed, the delineation of the WHPA-Q1 is something that cannot be measured in the field. The WHPA-Q1 is delineated based on the 2 m composite drawdown contour of a hypothetical situation where the Centre Wellington municipal wells pump at future (Allocated) rates and non-municipal wells pump at their current rates, versus a situation where there is no groundwater pumping in the study area (i.e., representing pre-groundwater pumping conditions).

An uncertainty analysis was completed as part of the model calibration exercise and used to inform the assessment of risk at the water supply wells. This included a series of scenarios designed to assess the range of uncertainty of the model parameters, boundary conditions, and conceptual model and an evaluation of the significance of that uncertainty on potential model results. However, there was not an assessment of the uncertainty analysis completed as to the location of the WHPA-Q1 boundary.

The WHPA-Q1 is intended as a conservative boundary to delineate areas where groundwater recharge could be reduced in the future and consumptive water takings that may have an effect on water levels at municipal wells. As described in the risk assessment report, the fact that a consumptive water taking is located within this boundary does not imply that that water taking has an effect on municipal water takings. The Tier Three Risk Assessment process recognizes this, and therefore has a follow-up task in the process to complete a water quantity threats ranking that prioritizes those consumptive water takings and areas where groundwater recharge may be reduced within the WHPA-Q1, which have the potential to effect water levels at municipal wells.

2 CLOSING

If you have any questions regarding this letter, please contact David Van Vliet by phone at 519.400.3186 or by email at dvanvliet@matrix-solutions.com.

Yours truly,

MATRIX SOLUTIONS INC.



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DISCLAIMER

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VERSION CONTROL

Version	Date	Issue Type	Filename	Description
V0.1	07-Feb-2020	Draft	23876-527 NWC L 2020-02-07 draft V0.1.docx	Issued to client for review
V1.0	11-Mar-2020	Final	23876-527 NWC L 2020-03-11 final V1.0.docx	Issued to client

REFERENCES

AECOM Canada Ltd. (AECOM). 2019. 'Township of Centre Wellington, Water Supply Master Plan'. Draft prepared for The Township of Centre Wellington. Kitchener, Ontario`. July 2019.

Matrix Solutions Inc. (Matrix). 2019. 'Centre Wellington Tier Three Water Budget Draft Final Risk Assessment Report'. Version 0.4. Draft prepared for Grand River Conservation Authority. Guelph, Ontario. November 2019.

March 11, 2020

Version 1.0
Matrix 23876-527

Ms. Sonja Strynatka
GRAND RIVER CONSERVATION AUTHORITY
400 Clyde Rd.
Cambridge, ON N1R 5W6

Subject: Response to Jim Wilton (Save Our Water) Comments on the Centre Wellington Tier Three Water Budget Draft Final Risk Assessment Report

Dear Ms. Strynatka:

The purpose of this letter is to provide a response to Community Liaison Group (CLG) comments received from Jim Wilton of Save Our Water received December 2, 2019 regarding the *Centre Wellington Tier Three Water Budget Draft Final Risk Assessment Report* (Tier Three Assessment; Matrix 2019).

1 RESPONSE TO SPECIFIC COMMENTS

1. Comment: *This report has considerable information and analysis and provides much useful material for planning for a secure water supply for the municipal water system in Fergus and Elora. The report clearly shows the justification for a Significant Risk rating.*

Response: Thank you. Comment noted.

2. Comment: *The report could, however, be improved by adding clarity to the recommendations and executive summary. One major clarification is that the risk assessment does not include analyses for the population increase to 2041 as given in the water supply master plan, but only to current and allocated uses. Known long-term risks due to population growth beyond current population levels are not included.*

Response: Additional text has been added to the Executive Summary and Conclusions sections of the Risk Assessment report clarifying that the Tier Three Assessment can only assess existing water supply wells or alternative wells that have already been tested and evaluated under a Master Plan or Class Environmental Assessment (EA) process. The existing municipal supply wells can only meet the municipality's average water demand until somewhere between 2031 and 2036. *The Township of Centre Wellington Water Supply Master Plan (WSMP)* evaluated alternatives to meet the 2041 population demand and outlined a process whereby the municipality will locate and test new water supply wells. However, the preliminary water supply alternatives considered in the WSMP cannot be assessed through the Tier Three Assessment until their respective sources are evaluated within a Master Plan or Class EA.

3. Comment: *Another clarification needed is that the risk included for drought is strictly based on historical data and no consideration of possible future changes is considered. It should at least be stated in the executive summary that any risks associated with future climate changes are not considered in this analysis.*

Response: The potential effects of climate change are not evaluated as part of this Tier Three Assessment. However, these effects will be evaluated and documented in a subsequent report similar to the climate change study completed in support of the Guelph-Guelph Eramosa Water Quantity Policy Study (Matrix 2018). This is stated in Section 4.2 of the Risk Assessment report (Matrix 2019). Additional text has been added to the Executive Summary to this effect (pg. vii)

4. Comment: *It would be most useful for further planning to note that the risk assessments associated with meeting municipal water needs do not consider agricultural needs. Even though the objective of the risk assessment relates to municipal water needs, there may well be interactions of water supplies for the municipal system with those for the agricultural community and the risks of those interactions should at least be recognized for township and county planning.*

Response: While the focus of the Tier Three Risk Assessment report is on the Centre Wellington municipal water supply system, groundwater takings associated with livestock watering have been represented in the groundwater flow model. The representation of the agricultural demands is summarized in Section 5.2.2.2 of the Risk Assessment Report:

The Tier Three model includes agricultural water uses associated with livestock water demands within a 3 km buffer surrounding the Fergus and Elora municipal wells. Water takings associated with a large poultry operation located near Ponsonby, outside of the 3 km buffer, are included. In total, livestock demands are represented in the model using 36 pumping wells, with a combined estimated consumptive demand of 596 m³/day.

As a result, the interactions between those takings and the municipal takings are represented in the model.

Furthermore, the relative impact of livestock groundwater demands on the municipal wells has been evaluated as part of a preliminary water quantity threats analysis for the Township of Centre Wellington (report in progress). This analysis suggests that current agricultural water use does not have an adverse effect on the municipal water supply. An evaluation of the potential relative impact of municipal pumping on livestock groundwater demands was outside of the scope of the Tier Three Risk Assessment report and analysis of water quantity threats, and therefore was not evaluated.

5. Comment: *For planning purposes, it would also be more appropriate to re-word the recommendations and executive summary (vii) to show the needs for additional information should begin with the municipality obtaining additional data in their establishment of additional wells to satisfy long-term needs, followed by a repeat of the risk analysis study. Subsequent to that, other potential permit applicants could provide additional data if seeking a permit.*

Response: Note that the numbering of the recommendations is not meant to infer a preferential order in which they should take place. There is currently no defined sequence for the order of future work.

6. Comment: *There should be a statement in recommendations that there is a risk that the model parameters may have to be revised as water taking proceeds for the larger population sizes expected, with that increased water taking being long-term over many years, especially if taken to 2041 or beyond.*

Response: The Risk Assessment report (Matrix 2019; Recommendation #7) recommends regular updates of water budgets by the Grand River Conservation Authority. The modelling tools should be updated periodically as new information is gathered and insights evolve within the watersheds. The province already requires a municipality to complete the Tier Three scenarios as new wells are permitted to meet future water supply requirements.

7. Comment: *As a small point, is the number in Table 14 of Industrial-Other a misprint? If not, a comment on this amount of use would be appropriate.*

Response: The number is not a misprint. A more fulsome summary of the permitted and non-permitted takings is provided in the Characterization Report (Matrix 2017; Appendix A). Details for this specific permitted taking are provided in Section 3.3.5 of that report. This “Industrial-Other” Permit To Take Water is for a hydroelectric power generator with a permit to temporarily divert Grand River surface water through a turbine and return that same volume of water back to the Grand River. Therefore, while the reported permitted rate appears to be large, no water is considered lost in the diversion process.

2 CLOSING

If you have any questions regarding this letter, please contact David Van Vliet by phone at 519.400.3186 or by email at dvanvliet@matrix-solutions.com.

Yours truly,

MATRIX SOLUTIONS INC.



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V0.1	07-Feb-2020	Draft	23876-527-SOW_JWilton L 2020-02-07 draft V0.1.docx	Issued to client for review
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V1.0	11-Mar-2020	Final	23876-527-SOW_JWilton L 2020-03-11 final V1.0.docx	Issued to client

REFERENCES

Matrix Solutions Inc. (Matrix). 2019. 'Centre Wellington Tier Three Water Budget Draft Final Risk Assessment Report'. Version 0.4. Draft prepared for Grand River Conservation Authority. Guelph, Ontario. November 2019.

Matrix Solutions Inc. (Matrix). 2018. *Assessment of Climate Change and Assessment of Water Quantity Threats in the IPZ-Q in Support of the Guelph-Guelph/Eramosa Water Quantity Policy Study*. Version 1.0. Prepared for Lake Erie Source Protection Region. Guelph, Ontario. November 2018.

Matrix Solutions Inc. (Matrix). 2017. *Centre Wellington Scoped Tier Three Water Budget Assessment, Physical Characterization Report*. Prepared for Grand River Conservation Authority. Guelph, Ontario. December 2017.

March 11, 2020

Version 1.0
Matrix 23876-527

Ms. Sonja Strynatka
GRAND RIVER CONSERVATION AUTHORITY
400 Clyde Rd.
Cambridge, ON N1R 5W6

Subject: Response to Jan Beveridge (Save Our Water) Comments on the Centre Wellington Tier Three Water Budget Draft Final Risk Assessment Report

Dear Ms. Strynatka:

The purpose of this letter is to provide a response to Community Liaison Group (CLG) comments received from Jan Beveridge of Save Our Water received November 29, 2019 regarding the *Centre Wellington Tier Three Water Budget Draft Final Risk Assessment Report* (Tier Three Assessment; Matrix 2019).

1 RESPONSE TO SPECIFIC COMMENTS

1. Comment: *This assessment does not consider projected population growth to 2041.*

The rationale for initiating the Tier 3 was to determine the impact of doubling Centre Wellington's urban population by 2041. This assessment ends at 2026 when the Township's current water infrastructure reaches capacity. The only future growth considered is growth that has been committed based on estimated available capacity.

Planned growth targets (i.e. projected growth to 2041) are not the basis of any conclusions of this study and this fact should be clearly stated in the Executive Summary and in the Introduction.

Recommended: It should be clearly stated in the introduction to the report and in the Executive Summary that this study does not consider the 2041 population growth targets for Centre Wellington.

Response: Additional text has been added to the Executive Summary and Conclusions sections of the Risk Assessment report (Matrix 2019) clarifying that the Tier Three Assessment can only assess existing water supply wells or alternative wells that have already been tested and evaluated under a Master Plan or Class Environmental Assessment (EA) process. The existing municipal supply wells can only meet the municipality's average water demand until somewhere between 2031 and 2036. The *Township of Centre Wellington Water Supply Master Plan* (WSMP; AECOM 2019) evaluated alternatives to meet the 2041 population demand and outlined a process whereby the municipality will locate and test new water supply wells. However, the preliminary water supply alternatives considered in the WSMP cannot be assessed through the Tier Three Assessment until their respective sources are evaluated within a Master Plan or Class EA.

2. Comment: *The 2026 cut off date is not what was expected with this project. This fact is puzzling in light of the report's Introductory statement: "The Tier Three Water Budget Assessment is required under the rules of the Clean Water Act (Bill 43, Government of Ontario 2017a) in the Province of Ontario to assess the sustainability of the municipality's water supply source in regards to meeting future population growth" (p. 1)*

It is contrary to information provided to CLG members and Council that Tier 3s look at growth scenarios and long-term planning.

It is contrary to the Tier 3 Terms of Reference, "The water budget study...uses water budget tools to evaluate how water levels will change within the municipal wells under various current and future scenarios." (p. 1)

It is contrary to the Physical Characterization Report, "The Scoped Tier Three Assessment will assess the current and future stresses on municipal drinking water sources under current and future conditions." (ES. p. iii).

And contrary to the Executive Summary of the Flow Model Report, "The model ...will be applied in later stages of the project to assess changes in water levels at municipal wells due to changes in municipal demand, land development and climate variability.

Recommend: The assessment define its use of the term "future" within the context of the expectations of the Province's 2017 Technical Rules under the Clean Water Act.

Response: The technical rules do not specify a year that each Tier Three Assessment must assess demands to. The term "future" is applied in the above examples to generally convey that the Tier Three Assessment assesses the impacts due to increased demand as the result of population growth. Indeed, the more specific terms which follow the expectation of the Technical Rules and relevant technical guidance are the concepts of "Committed", "Allocated", and "Planned" demand, which are defined in Section 5.2.1 of the Risk Assessment report (Matrix 2019).

3. Comment: *There are contradictions in what the assessment claims to do. Page 5 states, "Future municipal water projections were developed as part of the WSMP that are now available to assess within the Risk Assessment scenarios."*

Which contradicts page 32, "The infrastructure required to meet the water demands associated with the projected population growth to 2041 (Table 7) has not been identified within a completed Master Plan or Class EA, and therefore no planned demands were included in this assessment."

Recommend: In both the Executive Summary and the Introduction, clearly explain what specifically this assessment is doing.

Response: Additional text has been added to the Executive Summary and Conclusions sections of the Risk Assessment report (Matrix 2019) clarifying the scope of the Tier Three Assessment.

4. Comment: *Is an additional risk assessment for projected growth planned and who will pay? Originally, this Tier 3 was “Scoped” because the township did not have a Water Supply Master Plan. Given the fact a draft WSMP exists and Matrix has run scenarios through their model evaluating the future locations for four additional municipal wells, this assessment should not be scoped. The Tier 3 assessment of these potential well locations was released in a letter to AECOM dated April 2019.*

Recommend: Include the April 19, 2019 Matrix Tier 3 assessment letter in this report as an Appendix.

Page 32 states, “Risk Assessment scenarios capturing Planned demands may be evaluated using the Tier Three model when these locations are tested.” This means we will need another Risk Assessment for these wells. The question is, who will pay for this next required Risk Assessment? The initial model development costs were substantial. Going forward who will pay for the updates (Province, County, Township)?

Response: This Tier Three Assessment was initiated in 2016 as a “scoped” study, because at that time long-term municipal demand projections were not available. As a result, only Risk Assessment scenarios that evaluated the impact of existing municipal demands could be evaluated. In 2018, Centre Wellington initiated a WSMP that is now substantially complete (AECOM 2019). Future municipal water demand projections were developed as part of the WSMP that became available to assess within the Risk Assessment scenarios. As a result, this Tier Three Assessment is no longer considered a scoped study. This discussion is provided in Section 1.3 of the Risk Assessment report (Matrix 2019).

The April 19, 2019, Matrix letter was completed under the scope of work for the WSMP and not the Tier Three Assessment.

Defining funding sources for future Tier Three Assessments is not within the scope of this report. As was stated in the November 18 CLG meeting, the municipality will always continue its work to secure a long-term reliable water supply. Much of the township’s work is to service growth, and future water supply studies will be funded through development charges.

5. Comment: *A substantial increase in water supply is required to meet 2041 demands. “Centre Wellington’s service population will grow from 19,000 in 2016 to more than 40,000 people in 2041”. (p. 1) Furthermore, the serviced population will expand beyond 40,000 to account for some of the one in seven public well owners within the urban boundary who will switch to municipal service.*

Accordingly, the municipal water system must prepare to increase its average day water use from 5,103 m³/day in 2018 (p. 31) to over 11,709 m³/day by 2041 (p. 31-2). This is an increase of 130% in 23 years.

Why are we not considering the increased water service requirements in this risk assessment?

Response: The Tier Three Assessment is limited to the evaluation of existing water supply wells and wells that have been tested and considered within a Master Plan or Class EA. It is the WSMP that evaluates alternatives to meet the increased water service requirements given the 2041 demands. Updates to the Source Protection Plan (i.e., updates to existing and new wellhead protection areas) will be required as the Township completes additional technical work and obtains permits and approvals for new water supply wells.

6. Comment: *Maximum day demands will exceed peak water supply capacity in 2026. A statement below Table 7 states: “Based on the projected population growth and a max day ratio of 1.75, the current permitted capacity (15,031 m³/d) will be exceeded for max day demand by 2031.” This statement is misleading since the point of this report and the WSMP is that the current wells cannot reach the PTTW. The current well and pump infrastructure simply cannot do it.*

The Water supply Master Plan Draft Final makes it very clear that the township will be in a deficit situation in 2026. (WSMP Draft Final, Executive Summary p. ii, table 1). This is without considering Firm Capacity. The attached figure from the WSMP (Draft Final p. vi) shows that in fact Maximum Day Demands meet Current Firm Capacity in 2019.

Recommend: that this sentence on page 32 be changed to read “Based on the projected population growth and a max day ratio of 1.75, the current peak capacity (12,420 m³/d) will be exceeded for max day demand in 2026.”

Response: *The text has been updated as follows: “Based on the projected population growth and a max day ratio of 1.75, the current permitted capacity (15,031 m³/d) will be exceeded for max day demand by 2031. The WSMP presents Seven Day and 30-Day Peak Capacities of 13,510 m³/d and 12,410 m³/d, respectively. The WSMP uses the Seven Day Peak Capacity as a basis for the implementation of additional water supply capacity projects to service future growth to 2041.”*

In 2020, the Township is proceeding with Optimization at Wells F2 and F5 and a groundwater exploration program in Areas 3, 5, and 8 to secure additional capacity.

7. Comment: *This Risk Assessment is an evaluation of the sustainability of the current water system. This report, which assesses risk based on a timeframe until well supply capacity is reached, is an extremely short time period in water management planning. For all purposes, this is an assessment of the current water system and the status quo.*

This is not helpful, when Centre Wellington in 2018 had 42 residential developments in various stages of being plans, registered plans, approved developments and developments under construction.

Recommend: that the Executive Summary and Introduction state this assessment only evaluates until system capacity is reached in the next six years and not to 2041.

Response: *Additional text has been added to the Executive Summary and Conclusions sections of the Risk Assessment report (Matrix 2019) clarifying the scope of the Tier Three Assessment.*

8. Comment: *The terms “allocated and planned” in this report are misleading. The scenarios in sections 4 - 4.2.4 using the words “allocated + planned” are misleading. David van Vliet of Matrix explained at the end of the Nov. 18 CLG meeting that the term “allocated + planned” in Tables 3, 4 and 10 is there to satisfy 2017 Technical Rules under the Clean Water Act requirements. The Executive Summary defines “Allocated” as (Existing plus Committed demands up to the current permitted water takings”, or to 15,060 m³/day.*

Not until page 30 do we realize that “Allocated” for the purposes of this report only, refers to the timeframe of the existing total well system capacity, or 9,060 m³/day, and that a “Planned” demand does not exist for this study.

Recommend: that the report clearly defines the terms Existing, Committed, Allocated and Planned as they are used in this report in the introductory pages.

Under the Technical Rules, “Allocated demand” is defined as the ‘existing demand’ plus the “committed demand.” (p. 30). Unfortunately any information relevant to “committed demand” is missing in this report.

Response: The definitions for Existing, Committed, Planned, and Allocated demand according to the Technical Rules and relevant technical guidance are provided in Section 5.2.1 of the report (Matrix 2019). The text in Section 5.2.1.2 was refined to improve clarity.

As stated in Section 5.2.1.2, the infrastructure required to meet the water demands associated with the full projected population growth to 2041 has not been identified within a completed Master Plan or Class EA, and therefore no Planned demands were included in this assessment.

9. Comment: *The term “committed demand” in this document is also misleading. The Technical Rules definition of “committed demand” is “the amount greater than the existing demand that is necessary to meet the needs of the approved settlement area within an Official Plan.” However, this study defines “committed demand” as the amount left over when you subtract the existing average daily water use from the total well system capacity.*

Under the Technical Rules definition, what we are looking for with “committed demand” is the water needs of the approved but not yet constructed developments. It is important to know the future committed draws from our water system so we know the volume of water supply capacity remains.

This may not be the intended use of the term ‘committed demand’, but with the lack of numbers, it is hard to know. In any case, it is worth understanding the volume already ‘committed’ to developments.

Why was the actual “committed demand” as per the technical rules definition not used with this study?

Response: The definitions for Existing, Committed, Planned, and Allocated demand according to the Technical Rules and relevant technical guidance are provided in Section 5.2.1 of the report (Matrix 2019). The text in Section 5.2.1.2 was refined to improve clarity.

10. Comment: *What is the Township’s commitment for future water supply? The assessment does not reveal the number of committed future housing units used in the assessment related to “Allocated demand” (Existing plus Committed demands). How many units does it take to exceed the current well capacity?*

In November 2018 approved but not yet constructed development was estimated at 2,094 household units. (Hunter Report, Tables 6.4.1 and 6.4.2) This number of units requires a water supply of 1,446 m³/day. This does not include industrial or commercial development such as for the casino.

Response: As was stated in the November 18 CLG meeting, the municipality will always continue its work to secure a long-term reliable water supply. Much of the township’s work is to service growth, and future water supply studies will be funded through development charges. The WSMP describes methods used to estimate future water supply requirements referenced in the Tier Three report.

11. Comment: *The Township's current allocated demand is very close to exceeding supply on maximum days. Although Tier 3 Risk Assessments look at averages, the Water Supply Master Plan identified a greater concern when applying maximum day demand to peak water supply capacity rather than applying average day demand to average day supply.*

The WSMP concluded that capacity would be exceeded by demand in the year 2026, after which we would be in a deficit for peak day use (e.g. a serious water main break).

Table 7 of this Risk Assessment report provides the maximum day demand in 5-year increments from 2011 to 2041, but not the peak capacity numbers. These peak capacity numbers are noted in the Water Supply Master Plan draft final report, Table 1 'Future Water Supply Requirements'.

Recommend: Table 7 includes the infrastructure capacity necessary to meet the water demands associated with population growth to 2041.

In 2018 the township had a peak day capacity of 12,420 m³/day. For planning purposes this would be a firm wellfield capacity of 11,960 m³/day assuming the largest well out of service in the event of well maintenance or a contamination event. From this firm capacity, subtracting the 2018 maximum day demand (10,282 m³/day) as well as commitments for approved but not yet constructed residential developments (1,446 m³/day) the Township has only 232 m³/day of water supply capacity remaining.

Had the long-term watermain leaks in Elora not been repaired in March, 2018, the township would be in a deficit.

Have any developments been approved since November 2018? What are the new demand numbers for expanded commercial and industrial projects, such as for the casino?

It makes sense that this risk assessment assumes that Centre Wellington's water supply is already 100% allocated.

Recommend: clearly stating that the reason for re-defining "Allocated demand" as the same volume as System Capacity is because for planning purposes the water supply capacity is already 100% allocated.

Response: Table 7 in the Risk Assessment (Matrix 2019) report has been updated to reflect the data in Table 1 of the WSMP. A footnote in the table now includes the current average annual and peak system capacity numbers from the WSMP. The Tier Three report has been updated to clarify the scope and assumptions used in the assessment. The remaining questions and comments are outside the scope of the Tier Three.

12. Comment: *There is no Planned demand for Centre Wellington, since this would be above the system capacity.*

Recommend: On page vii, please remove the word 'likely' in this sentence: "the water supply infrastructure cannot likely meet the future needs of the municipality."

Response: The text has been updated as suggested.

13. Comment: *Centre Wellington’s water supply system is at significant risk. This report states the appropriate conclusion that “Centre Wellington’s current water supply system does not have the ability to meet future demands and this elevates the Water Quantity Risk Level to Significant for the Groundwater Vulnerable Area.”*

Given our “significant risk” status, the Township should reconsider approving any further developments before adopting a long-range implementation plan for its future water supply and before testing is carried out to ensure the plan is feasible.

Response: We cannot address this recommendation within the scope of the Tier Three Assessment report.

14. Comment: *Elora’s water supply is currently at more significant risk than Fergus’. Elora’s dependence on one well while its other two wells cannot simultaneously pump to their full capacity places it at great risk than Fergus. Equally concerning is the fact that the Aboyne Booster delivering water between the two communities is manually operated and was not designed for continuous use (staff information supplied in an FOI).*

This situation places Elora at a more significant risk level than the town of Fergus.

Response: Fergus and Elora have an integrated water distribution system, and as a result, water can be transferred between the two communities. As a result, the Significant risk classification applies to both communities.

15. Comment: *We don’t know the future extent and drawdown of the Vulnerable Area. It is surprising on the Vulnerable Area Map, Figure 7, that we are not shown a drawdown of more than 5 metres. It is worthwhile to show the further drawdown closer to the municipal wells as well as the zero reference for this drawdown. It is certainly not to the original levels of the wells. It is equally worthwhile to know the drawdown in the potential future water areas, not simply in the whole WHPA-Q1.*

The Vulnerable Area is associated with the existing water demand. We need to know the extent and drawdown with future population growth. We need a map corresponding to Figure 7 that shows drawdown with planned growth. The reader may wish to compare the Tier 3 Fig 7 map to Golder’s (2013) Well Field Capacity Assessment Figures from 1.14 to Fig 1.18 for the inclusive and underlying assumptions of how the wellfield is drawn down with future growth.

Until this future drawdown is determined, we cannot assess the following statements.

Response: It is recognized that predicted aquifer drawdown in the municipal wells is greater than 5 metres and this is reflected in the chart and table of simulated groundwater level decline for the Tier Three scenarios (i.e., Chart 1 and Table 10 of the Risk Assessment report [Matrix 2019]). Matrix has chosen to show the 5 metre drawdown area as it reflects the drawdown across much of the area of the pumping wells. An illustration of a zero reference for drawdown is not appropriate given the approach taken.

The WHPA-Q1 (Vulnerable Area) represents drawdown considering future population growth. More specifically, the WHPA-Q1 represents the 2 m composite drawdown contour of a scenario where the Centre Wellington municipal wells pump at their future (Allocated) rates and non-municipal wells pump at their current rates. Additional detail about the WHPA-Q1 is provided in sections 4.1.1 and 7.1.1 of the Tier Three Assessment report (Matrix 2019).

16. Comment: *The following sentences require additional information:*

“The presence of groundwater takings or recharge reduction activities within this area (WHPA-Q1) does not imply that they will threaten the reliability of the municipal water supply.” (section 7.1.1 p 39)

And this qualifier that appears on Figures 7 and 11: Note: the Risk level Assignment to the Groundwater Vulnerable Area does not imply that an individual groundwater taking or recharge reduction activity within that area will threaten the reliability of the municipal water supply.

These qualifiers are counter-intuitive, particularly given the conclusion that consumptive water takings are a Significant Threat. These statements are made without any consideration of the anticipated projected demand. Of course groundwater takings and recharge reduction will reduce the other takings, but we do not know by how much. This has to be calculated. As they stand, without future drawdown information, these are not reasonable statements.

Response: The identification of “Significant” Threats within a WHPA-Q1 that has been assigned a Significant Risk Level represents an initial screening-level exercise. When designing the Tier Three Assessment, the province made a decision to be conservative when initially identifying threats and has additional steps in the process to prioritize these threats based on potential effects to the municipal supply wells. After the Tier Three Assessment, additional work will be completed to rank these threats based on their effects on the municipal water supply. The relative impact of consumptive water takings and areas where future land development may reduce groundwater recharge will be assessed in greater detail as part of a preliminary water quantity threats analysis that is in progress for the Township of Centre Wellington.

17. Comment: *This assessment does not predict future Impacts of recharge change, drought and climate change for the future. The scenarios, using ‘Allocated’ as the timeframe, are only assessing impacts from recharge change and drought until 2026. This assessment did not look at climate factors, as stated on page 26, “The projected effects related to climate change are not evaluated as part of this Tier 3 assessment; however, these effects will be evaluated and documented in a subsequent report.”*

However, Table 15 (p. 50) estimates recharge reduction over 4.3 km² at a volume of about 1,300 m³/day or the loss of an approximate equivalent of an existing well (see Table 6).

Response: Table 4 in the Risk Assessment report (Matrix 2019) summarizes the various scenarios that were run using the groundwater flow model to predict potential impacts to water levels at the existing municipal wells. These scenarios included assessment of the relative impacts of:

- 1) Decreased recharge due to future land use change according to the Official Plan (i.e., due to an increase in impervious surfaces).

- 2) Increased municipal pumping due to population growth (i.e., future demands representing the estimated average annual capacity of the existing water supply system that is approximately equivalent to the projected future average demands between 2031 and 2036).
- 3) Two periods of drought within an existing 45-year climate record.

The magnitude of the simulated groundwater level decline resulting from these scenarios can be found on Table 10 and graphically on Chart 1. A climate change assessment is being completed and a report will be made available in 2020.

18. Comment: *Please clarify contradiction. Pages 10 and 11 contain contradictions as quoted below. Clarification is required:*

The results indicated that there is a lack of evidence to support a correlation between hydraulic conductivity and proximity to bedrock valleys. (section 2.4.3 p. 10)

Also higher conductivity was observed in areas where core samples showed a greater number of breaks that may be associated with stress relief zones associated with being closer to the Niagara Escarpment and bedrock valleys. (section 2.43 p. 11)

Response: Thank you for identifying this. The second paragraph of Section 2.4.3 has been revised to better reflect the main findings of the article:

The study results also indicated that there may be a combination of geological controls that together may be influencing the hydraulic conductivity trends of different areas. For example, relatively higher hydraulic conductivity values coincided with areas where the Gasport Formation was sub-cropping/outcropping; therefore, carbonate dissolution may have been enhanced in these areas due to a greater amount of vertical recharge. While a higher hydraulic conductivity was not found to be explicitly correlated with the proximity to buried valleys, deep bedrock valleys and frequent jointing and fracturing found in areas with relatively higher hydraulic conductivity were interpreted to provide conduits for enhanced dissolution.

19. Comment: *Water quality at F6 should be mentioned in this report. The report states on page 36: Unlike other municipal wells except for F5, some of the most productive fractures within Well F6 occur at an elevation of 370 m asl (pg 36) or at only 54 m depth. This shallow depth explains in part the adverse water quality of this well. Yet, the adverse quality of this water is not mentioned under water quality, on page 9. At F6, the TDS levels are always extremely high, around 1800 mg/L, but in April 2011 TDS were 2,020 mg/L, or 4 X the Drinking Water Objective of 500 mg/L, above which drinking water is considered unacceptable. This should be included under water quality data on page 9, and this well should be decommissioned, and if not it should be calculated that this well is utilized only on peak days.*

Response: Water quality concentration trends in the municipal wells were reviewed as part of the characterization phase of the Tier Three Assessment (i.e., Section 4.2 of Characterization Report [Matrix 2017]), primarily to help shed light on the source of the water (e.g., shallow vs. deep). However, detailed analyses of water quality were outside the scope of this study and were not completed or reported. In-depth analysis of water quality concerns is provided in water quality threats assessments under the Clean Water Act where potential drinking water quality Activities, Conditions and Issues are identified that could pose a threat to the quality of a municipal drinking water supply.

2 CLOSING

If you have any questions regarding this letter, please contact David Van Vliet by phone at 519.400.3186 or by email at dvanvliet@matrix-solutions.com.

Yours truly,

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VERSION CONTROL

Version	Date	Issue Type	Filename	Description
V0.1	07-Feb-2020	Draft	23876-527 SOW_JBeveridge L 2020-02-07 draft V0.1.docx	Issued to client for review
V0.2	27-Feb-2020	Draft	23876-527 SOW_JBeveridge L 2020-02-27 draft V0.2.docx	Issued to client for review
V0.3	11-Mar-2020	Final	23876-527 SOW_JBeveridge L 2020-03-11 final V1.0.docx	Issued to client

REFERENCES

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Matrix Solutions Inc. (Matrix). 2019. 'Centre Wellington Tier Three Water Budget Draft Final Risk Assessment Report'. Version 0.4. Draft prepared for Grand River Conservation Authority. Guelph, Ontario. November 2019.

Matrix Solutions Inc. (Matrix). 2017. *Centre Wellington Scoped Tier Three Water Budget Assessment, Physical Characterization Report*. Prepared for Grand River Conservation Authority. Guelph, Ontario. December 2017.

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