MHBC
PLANNING
URBAN DESIGN
& LANDSCAPE
ARCHITECTURE

Authorized commenting Agency for
TransCanada
In business to deliver

KITCHENER
WOODBRIDGE
LONDON
KINGSTON
BARRIE
BURLINGTON

March 29, 2019

Armine Hassakourians
Senior Planner
The Corporation of the City of Vaughan
2141 Major Mackenzie Drive
Vaughan, ON
L6A 1T1

PUBLIC HEARING C4
COMMUNICATION
Date: Apr 2/19 ITEM NO. 3

Via email: armine.hassakourians@vaughan.ca
policyplanning@vaughan.ca

Dear Ms. Hassakourians:

RE: New Community Area Block 41 Secondary Plan Study, City of Vaughan
City File # 26.4.2
Our File # PAR 29981

The following letter is provided on behalf of TransCanada Pipelines Limited ("TransCanada") to provide City staff and members of Council with our comments on the New Community Area Block 41 Secondary Plan (the "Block 41 Plan") as requested with the release of the draft to the public on March 13th, 2019. Given the limited time within which to review and provide comments, we reserve our right to provide additional comments following the public meeting, if necessary.

Summary

TransCanada has operated its Station 130 compressor station at its current Weston Road location in the City of Vaughan since 1959. The Station is federally regulated and a vital part of the national network of natural gas transmission and critical to gas distribution in the local area. Any proposed development adjacent to the Station is subject to Provincial policies and must be compatible with the Station's current and future operations. In our view, the designation of lands for development within the "Noise Influence Area" as proposed by the Block 41 Plan, prior to confirmation that development is compatible with Station 130 and free from adverse effect, is premature. TransCanada recommends that further study be

undertaken prior to any designating of lands for residential or other sensitive land uses, as opposed to approving a designation now, and studying potential adverse effects later.

We also believe it is important to provide context to our comments in relation to TransCanada's role and interest in land use planning and the history of TransCanada's involvement and past correspondence through the Secondary Plan process as well as the applicable Provincial planning policy framework.

1. Background Context

TransCanada's Role and Interest in Land Use Planning

TransCanada owns and operates one of the largest networks of natural gas transmission pipelines in North America. Within the City of Vaughan, TransCanada has its Station 130 facility (also known as the Maple compressor station) which serves as a hub for natural gas transmission in southern Ontario. Station 130 is located on approximately 38.85 ha (96 acres) of land located at 11200 Weston Road within the Block 41 Plan study area. In addition, there are multiple pipelines which converge at Station 130 within TransCanada owned lands and within rights-of-way which traverse the Block 41 Plan area, three pipelines run east and two pipelines run west and north from the Station. Station 130 was constructed in 1959 and has expanded several times to meet the national energy supply needs of Canadians. This station is critical to the overall system design for the transmission of natural gas nationally and its delivery to the local distribution companies who convey the natural gas to the ultimate consumer.

TransCanada's interest and proactive role in land use planning and the requirements of the *National Energy Board Act* and regulations, were recently presented to Vaughan staff as part of an information exchange and presentation in November of 2018. At this session two areas of focus were noted: **public safety** related to the nature of the land uses abutting the pipeline rights-of-way and **compatibility** between TransCanada's facilities and sensitive land uses.

Provincial policy recognizes the importance of major facilities and infrastructure through policies 1.6.1 and 1.2.6.1 in the Provincial Policy Statement, 2014 ("PPS") and Vaughan's Official Plan, Section 8.4.3, specifically notes that *"any development within close proximity to TransCanada's facilities may affect the safety and integrity of the pipeline".*

TransCanada also notes a recent CSA Group (formerly the Canadian Standards Association) standard entitled "CSA Z663-18, Land use planning in the vicinity of pipeline systems" was released in September 2018. The standard was developed with input from both industry and municipalities and states:

> Effective land use planning in the vicinity of pipeline systems should include all relevant stakeholders. With an objective to realize an informed decision making process, effective land use planning in the vicinity of pipeline systems promotes

awareness through consistent and collaborative stakeholder communication early in the land use planning process.

This Standard intends to address the challenges facing land use planning in the vicinity of pipeline systems in Canada; outlining requirements and best practices that when consistently applied will enhance informed development. Land use planning that considers the existence of pipeline systems can support the planning for and provision of emergency services and pipeline integrity.

The relationship between TransCanada's compressor stations and other land uses is also of significance to TransCanada to ensure its infrastructure and ability to expand as required is protected. Land use planning must be coordinated to ensure compatible land uses are established in plans and policies. TransCanada is engaged in municipal plan formulation throughout Ontario and across Canada to ensure its interests and regulatory requirements, as well as public health and safety, is protected through appropriate land use locations, designations and policies.

TransCanada has executed agreements with customers seeking further expansion of its system which will require TransCanada to add compression facilities at a number of locations in Ontario, including the Maple compressor station.

Prior to determining the final facilities design, TransCanada must conduct additional external and internal processes which will occur over the next few months. Following the close of these processes, TransCanada will finalize its facilities design with a plan to file its facilities application with the National Energy Board prior to the end of this year.

TransCanada's Role and Past Involvement in the Secondary Plan Process

Prior to the Block 41 Plan process commencing, TransCanada was engaged with the Region of York and the City of Vaughan in relation to the issue of compatibility and land use around Station 130. Lehman and Associates prepared a report (July 2008) entitled "TransCanada Pipelines Compressor Station 130 and Land Use Compatibility". The purpose of this report was to inform the Region and the City about TransCanada's operations at Station 130 and to identify potential impacts the Station 130 facility would have on future proposed lands uses. In September of 2009, TransCanada also provided information to the Region of York in relation to its Official Plan to ensure appropriate policies were included that recognized TransCanada's facilities. These comments were prepared in the context of Station 130's operations at the time, and prior to the recent expansion of the C plant.

TransCanada was engaged in the Block 41 Plan process both as a member of the Technical Advisory Committee (TAC) and as a major landowner given the significant federal infrastructure that exists. Early in the process, TransCanada provided a number of comments on the draft land use concept for Block 41. Letters were provided to the City on behalf of TransCanada on September 14, 2015, December 10, 2015 and March 10, 2016 that identified

the importance of TransCanada's operations at Station 130 and the potential impacts the Station 130 facility would have on future proposed land uses. The submissions addressed the necessity for the protection of TransCanada's infrastructure as set out in the Provincial Policy Statement (Section 1.6) and identified the requirement for separation distances and buffering from the compressor station to sensitive lands uses. The submissions also noted concerns with the trail system proposed through TransCanada's lands as well as the major road proposed to cross TransCanada's existing privately- owned driveway into Station 130. In relation to the noise impact issues specifically, the submissions included draft policy wording relating to the NPC 300 Guidelines issued by the Ministry of the Environment and Climate Change (MOECC) and a map related to a Noise Influence Area surrounding the station based on initial work by Stantec dated March 2016 that reflected the configuration and operations at Station 130 at that time and conceptual modelling around a future C plant expansion

In 2017, TransCanada proceeded with its planned expansion to Station 130 with the "C4 Plant" and through that process under the National Energy Board, met with the City to review and discuss the project. During this time, TransCanada also met with the Block 41 Landowners Group (the "Block 41 Owners") and were provided with a conceptual neighbourhood design by the group as well as a noise study completed by Valcoustics. Upon seeing how close sensitive land uses were being proposed to Station 130, TransCanada had its noise consultant Stantec complete a further detailed noise impact assessment specifically in relation to the proposed residences taking into account all aspects of generated noise, including low frequency noise. A copy of Stantec's updated assessment dated January 2018 was provided both to the Block 41 Owners and the City of Vaughan on January 24, 2018.

On January 5, 2018, TransCanada received a letter from the City, wherein it was noted that the Block 41 Plan was close to final approval. In a response to the City dated January 24, 2018 (a copy of which is attached), TransCanada again reiterated the importance of ensuring that future development of sensitive land uses be compliant with the NPC 300 Guidelines issued by the MOECC and that potential environmental impacts and noise influence areas be taken into account.

2. Provincial Planning Policy Context

As has been conveyed through past correspondence, consideration of TransCanada's facilities is required through the development of planning policy in Ontario which must be consistent with and conform to Provincial policy. The Block 41 Plan must be consistent with the Provincial Policy Statement (2014) and must conform to and implement the Growth Plan for the Greater Golden Horseshoe (2017).

Provincial Legislation

Planning Act

Section 2 of the *Planning Act* sets out the "matters of provincial interest" which the Minister, the council of a municipality, a local board, a planning board and the Tribunal shall have regard to while carrying out their responsibilities under the Act. While all matters under

Section 2 are relevant to the Block 41 Plan, the following matters of provincial interest are specifically applicable to land use designations and land use compatibility near TransCanada's facilities:

(h) the orderly development of safe and healthy communities;
(l) the protection of the financial and economic well-being of the Province and its municipalities;
(n) the resolution of planning conflicts involving public and private interests;
(o) the protection of public health and safety;
(p) the appropriate location of growth and development.

These interests must be regarded in all decisions under the Planning Act and must be considered in the Block 41 Plan to ensure public health and safety above all other is protected.

Provincial Policy Statement (2014)

As has been reiterated through past correspondence, the Provincial Policy Statement (PPS) applies to the proposed Secondary Plan process and the resulting policies are required to be consistent with the PPS.

The PPS provides policy direction on matters of provincial interest related to land use planning and development in Ontario. As a key part of Ontario's policy-led planning system, the PPS sets the policy foundation for regulating the development and use of land.

Section 1.2.6.1 of the 2014 PPS states that *"major facilities and sensitive land uses should be planned to ensure they are appropriately designed, buffered and/or separated from each other to prevent or mitigate adverse effects from odour, noise and other contaminants, minimize risk to public health and safety, and to ensure the long-term viability of major facilities."*

Station 130 is a "major facility" as defined in the PPS. All proposed development within the Block 41 Plan needs to be located and designed to prevent or mitigate adverse effects and mitigation measures must be appropriately provided by the developers to address the adverse effects related to noise. This policy should be implemented with clear language in the Block 41 Plan.

Section 1.3.1 Planning authorities shall promote economic development and competitiveness by:

a. providing for an appropriate mix and range of employment and institutional uses to meet long-term needs;
b. providing opportunities for a diversified economic base, including maintaining a range and choice of suitable sites for employment uses which support a wide range of economic activities and ancillary uses, and take into account the needs of existing and future businesses;
c. encouraging compact, mixed-use development that incorporates compatible employment uses to support liveable and resilient communities; and,

d. ensuring the necessary infrastructure is provided to support current and projected needs.

Section 1.6 provides policies for *Infrastructure and Public Service Facilities*. Section 1.6.1 states:

> *"Infrastructure, electricity generation facilities and transmission and distribution systems, and public service facilities shall be provided in a coordinated, efficient and cost-effective manner that considers impacts from climate change while accommodating projected needs. Planning for infrastructure, electricity generation facilities and transmission and distribution systems, and public service facilities shall be coordinated and integrated with land use planning so that they are:*
>
> *a) Financially viable over their life cycle, which may be demonstrated through asset management planning; and,*
>
> *b) Available to meet current and projected needs."*

Again, these policies have been reiterated by TransCanada in past submissions and correspondence to ensure its facilities are maintained and protected. The Block 41 Plan policies need to emphasize and make clear the need to protect the current infrastructure and ability for station expansions on TransCanada-owned lands to meet current and projected needs.

A key issue related to consistency with these policies is to ensure protection through compatible land use as a first principle. This requires the study of proposed land uses in relation to potential adverse effects before land is designated for such uses. This is different than designating land uses subject to further study to determine mitigation. TransCanada's position is that the areas within Station 130's Noise Influence Area should not be designated through the Block 41 Plan process but rather be subject to further study to ensure potential adverse effects and impacts can be mitigated before the proposed residential land uses are approved. Any proposed underlying land use designation will only come into force once it has been demonstrated to the City and TransCanada's satisfaction that the land uses are compatible and there will be no adverse effects It is not appropriate or consistent with Provincial policy to designate uses prior to ensuring the proposed uses are compatible with existing infrastructure/major facilities.

Growth Plan for the Greater Golden Horseshoe, 2017

The **Growth Plan for the Greater Golden Horseshoe, 2017,** responds to the key challenges that the region continues to face over the coming decades with enhanced policy directions. The Growth Plan provides policies for where and how to grow, directing that population and employment growth should be located in urban areas and rural settlement areas. The policies of the Growth Plan focus on the key themes of developing cities and towns as 'complete communities' by meeting people's needs for daily living, which is to be achieved by directing growth to built up areas. The Growth Plan also promotes transit-supportive densities; a diverse mix of land uses; a range and mix of employment and housing types, including

affordable housing; high quality public open space and easy access to local stores and services.

In relation to infrastructure, the Growth Plan provides policies that protect and support infrastructure which includes pipelines and facilities. **Section 3.2** states as follows:

"3.2 Policies for Infrastructure to Support Growth

3.2.1 Integrated Planning

Infrastructure planning, land use planning, and infrastructure investment will be coordinated to implement this Plan.

Planning for new or expanded infrastructure will occur in an integrated manner, including evaluations of long-range scenario-based land use planning and financial planning, and will be supported by infrastructure master plans, asset management plans, community energy plans, watershed planning, environmental assessments, and other relevant studies where appropriate, and should involve:

a) leveraging infrastructure investment to direct growth and development in accordance with the policies and schedules of this Plan, including the achievement of the minimum intensification and density targets in this Plan;
b) providing sufficient infrastructure capacity in strategic growth areas;
c) identifying the full life cycle costs of infrastructure and developing options to pay for these costs over the long-term; and
d) considering the impacts of a changing climate."

The Growth Plan also contains specific definitions for energy transmission pipelines and infrastructure as follows*:*

"Energy Transmission Pipeline

A pipeline for transporting large quantities of oil or natural gas within a province or across provincial or international boundaries. Energy transmission pipelines do not include local distribution pipelines.

Infrastructure

Physical structures (facilities and corridors) that form the foundation for development. Infrastructure includes: sewage and water systems, septage treatment systems, stormwater management systems, waste management systems, electricity generation facilities, electricity transmission and distribution systems, communications/telecommunications, transit and transportation corridors and facilities, oil and gas pipelines and associated facilities. (PPS, 2014)."

Again, these Provincial policies specifically identify the importance of protecting and maintaining existing and planned infrastructure to support growth in Ontario.

The principle of the land use policies for Block 41 should first ensure that there are no adverse effects in relation to sensitive land uses in proximity to the Station 130 lands prior to the designation of such lands of potentially incompatible land uses that would not conform to Provincial policy. Conformity can be achieved by restricting land uses within the Noise Influence Area until the appropriate studies are undertaken to confirm if impacts and adverse effects can be mitigated. Securement for mitigation can then be provided through the further implementing approvals such as the detailed block plan and draft plans of subdivision.

We believe a revised policy framework should be provided within the Block 41 Plan to properly address the requirements for land use compatibility under the Provincial policies.

3. Comments on the Block 41 Plan

The following detailed comments represent those TransCanada were able to consolidate prior to the public meeting. As noted at the Technical Advisory Committee (TAC) meeting held on March 4th, 2019, TransCanada will require additional time to undertake a comprehensive review of the Block 41 Plan and to provide full comments. In addition to providing comments and questions, we have also where possible, provided recommended revisions to the policies which are highlighted in bold and providing on the chart circulated with the Block 41 Plan for staff's assistance a copy of which is attached.

General Comments

We are pleased to note that the Purpose of the proposed amendment includes the requirement for **land use that is compatible with surrounding land uses**. In the Basis section of the proposed amendment while there is reference to the PPS and the Growth Plan, there is not a reference to the policies related to the importance of the protection of infrastructure and the need for compatibility. We would recommend that additional reference be made in these sections to recognize the current physical context and TransCanada's infrastructure.

One additional general comment on the preparation of the Block 41 Plan is the lack of reference to the preparation of a noise study to address compatibility of proposed land uses within proximity to the Station 130 lands. Again, there is no analysis of whether the proposed land uses, based on a noise study, as a foundational study, can be provided without adverse effects as a first principle of compatibility to ensure the protection of the existing infrastructure. There is also no reference to the NPC 300 or D-6 guidelines as a requirement for policy determination.

Part A of the Plan contains a list of foundational studies. None address noise and noise impacts. In Section 5.0, there is a list of Provincial and Regional policies that define the policy context for the Secondary Plan to address. Absent from this list is the protection of

infrastructure under the PPS and the Growth Plan, compatibility of land uses, noise impacts and adverse impacts. There is also again no reference to the NPC 300 or D-6 Guidelines. These references should be added to the section.

Part B of the Plan provides Development Principles under Section 2.1 b. However, there are no development principles related to compatibility or the need to address adverse effects and impacts.

Section 3.0 reflects community structure. The reference to TransCanada's facilities in Section 3.1.9, should be expanded to incorporate the language from Section 8.4.3 of the Vaughan Official Plan. **Section 8.4.3** of the Vaughan Plan states:

> *"8.4.3 Natural Gas*
>
> *TransCanada PipeLines Limited operates high pressure natural gas pipelines within its right-of-way. Any development within close proximity of TransCanada's facilities may affect the safety and integrity of the pipeline. TransCanada is regulated by the National Energy Board. There exist a number of requirements regulating development in proximity to pipelines, including approvals for activities on or within 30 metres of the right-of-way such as excavation, blasting and any movement of heavy equipment.*
>
> *It is the policy of Council:*
>
> *8.4.3.1. That, for development proposals within 200 metres of the pipeline right-of-way or compressor station, the City shall require the applicant to pre-consult early in the process with TransCanada or its designated representative. The pipeline right-of-way is shown on Schedule 12.*
>
> *8.4.3.2. That no permanent building or structure may be located within 7 metres of the pipeline right-of-way. A reduction in the 7 metre setback will only be considered if it can be demonstrated, to TransCanada's satisfaction, that it will not compromise the safety and integrity of the pipeline and if all necessary municipal approvals are obtained.*
>
> *8.4.3.3. That no building or structure is permitted within 3 metres of the right-of-way. Accessory structures shall have a minimum setback of at least 3 metres from the limit of the right-of-way.*
>
> *8.4.3.4. That regard shall be given to noise levels where development is proposed in close proximity to the TransCanada compressor station. A noise and vibration study, to be carried out by the proponent, may be required for development proposals within 750 metres of the compressor station. The study will determine if provincial guidelines can be achieved, and if necessary recommend appropriate mitigation measures.*

8.4.3.5. That, where appropriate, the City will encourage the use of TransCanada's right-of-way for open space and trail purposes including an east-west open space link, subject to TransCanada's easement rights."

These policies are important to the future development of the lands and should be incorporated directly into the Block 41 Plan. It should also be noted that in addition to easement rights, TransCanada owns property and the rights of ways within Block 41.

SENSITIVE LAND USES AND NOISE

Section 3.1.10 refers to **"Sensitive Uses"**. This should be referenced as "Sensitive Land Uses" as italicized further in the section. These policies need to be revised to provide for clearer requirements that address TransCanada's infrastructure. Many of these policies assume the land use designation has been approved and the noise studies are for the purpose of addressing any adverse effects or impacts. As noted, the land use designations should not be considered until the noise impacts are confirmed and the location from the Station 130 lands is deemed appropriate and therefore consistent with Provincial policy.

More specific comments are as follows:

3.1.10 a) The referenced policy of the OP 5.2.1.2 states that mitigation is at the expense of the developer. That language should be repeated here so there is no ambiguity and clarify of who is responsible for mitigation.

3.1.10 b) Noise studies should be completed to the satisfaction of the City ***and Trans Canada***.

3.1.10 c) The referenced policies of the Vaughan OP incorporate the Land Use Compatibility Guidelines, but only in reference to lands that are designated General or Prestige Employment. There are no lands in the Secondary Plan with that designation. This policy should be amended to delete the policy references so it simply states "New development should be in accordance with [not 'refer to'] the Ministry of the Environment Land Use Compatibility Guidelines … ".

3.1.10 e) and f) These sections need to acknowledge that development shall not limit the ability of the Station 130 to expand its operations in the future. The reference to the fact that 45dbA "…shall represent the assumptions used to assess noise impacts" is unclear. In TransCanada's view, as a matter of good planning, potential adverse effects and impacts from low frequency noise should also be considered.

3.1.10 g) TransCanada should also be satisfied with the noise study and any proposed mitigation.

This paragraph also refers to both "adverse effects" and "adverse impacts". The latter term does not appear anywhere in NPC-300, while the former is a defined term in the Environmental Protection Act, as well as the Provincial Policy Statement. The term "adverse

effects" should be defined in the Secondary Plan and should be referred in this policy. The avoidance of adverse effects should be referenced as and the test that has to be met prior to the designation of new sensitive uses being approved.

3.1.10 h) We agree that sensitive land uses may need to be prohibited to achieve compatibility. In order to implement this policy we are recommending a policy approach, similar to that used for environmentally sensitive areas, such that the underlying residential land use designation within the Noise Influence Area may only take affect after a noise impact study has been completed and accepted by the City and TransCanada and it is demonstrated through the submission and approval of Noise Impact Studies that such uses can be approved without adverse effects.

Section 3.9, Infrastructure and Utilities again should incorporate Section 8.4.3 of the parent plan as well as Section 9.2.2.26 with amendments directly into the Block 41 Plan.

Schedule G:

Prior to approval of the Block 41 Plan, Schedule G must be finalized to the satisfaction of TransCanada.

ROADS

Section 4.0, Transportation and Mobility, contains policies related to the street network. As has been noted provided in several submissions to date, the Secondary Plan Schedule E provides for a road crossing of TransCanada's privately-owned driveway (east/west from the Station to Weston Road). This driveway and the TransCanada pipelines running parallel to the driveway are essential to the operation of TransCanada's compressor station. As set out in our comments dated March 28, 2019 on the North Vaughan and New Communities Transportation Master Plan ("NVNCTMP"), TransCanada has in the past worked with Vaughan and will continue to do so in the future to examine how a north-south connection might be achieved in a manner that does not affect TransCanada's operations.

Unimpeded access to the pipeline and compressor station on the existing TransCanada access road is key to TransCanada's operations, maintenance, emergency purposes, and for potential future expansion activities, all of which involve access that may include heavy equipment and large vehicles. The proposed road crossing over TransCanada's privately-owned lands (shown on Schedule E of the Block 41 Plan, and identified in the NVNCTMP, Appendix B: Block 41 Transportation Network, Exhibit 6-1 shown as Street 4) within Block 41 in its current location and configuration is not acceptable to TransCanada. As such, TransCanada requests that the Block 41 Plan and the NVNCTMP reflect this so there is no uncertainty as this matter proceeds.

TransCanada is regulated by the National Energy Board and as such there are a number of legislative requirements that apply to development in proximity to pipeline facilities and rights-of-way, including specifically roads and trails. As such, certain activities must comply with

the *National Energy Board Act* ("Act"), *National Energy Board Onshore Pipeline Regulations,* the *National Energy Board Damage Prevention Regulations – Authorizations, National Energy Board Act Damage Prevention Regulations – Obligations of Pipeline Companies* and CSA Z662 – Oil & gas pipeline systems.

Safety around pipelines is a shared responsibility and TransCanada notes that in addition to federal regulatory requirements, Provincial policy also recognizes the importance of major facilities and infrastructure as previously stated above.

STORMWATER MANAGEMENT

Section 8.2, Stormwater Management references the implementation of stormwater management ponds in accordance with the direction of the East Purplecreek Subwatershed Study and the Master Environment and Servicing Plan

TransCanada reviewed this study and had specific questions regarding calculated stormwater targets for existing conditions and whether or not TransCanada lands were sufficiently defined in the stormwater management model. Additionally, TransCanada expressed concerns about a proposed stormwater management pond located directly north of the TransCanada site. TransCanada requires additional information so that we can meaningfully analyze the findings in the report to determine if there would be any adverse impacts to TransCanada's existing storm water regime, adjacent-owned lands, compressor site, or operations. TransCanada posed its questions and requested additional information in its letters to the City dated June 19 and August 22, 2018. To date no formal response on the Study has been provided. Should this study serve as the completed study, TransCanada still has unanswered requests and unresolved comments as we have not received responses to these comments related to stormwater management and our concerns in relation to the proposed stormwater management pond located directly north of the Station 130 lands. To provide a pond at this location without the required information being completed is premature. TransCanada needs to see the responses to the comments and the additional information including the conceptual design of the ponds.

TRAILS

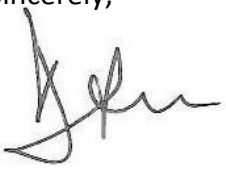
Section 9.0 references implementation and interpretation. This section highlights the implementation of the plan through the detailed Block Plan in accordance with the Multi-Use Recreational Trails Master Plan. As we have previously noted, TransCanada will not permit public trails on property owned in fee simple by TransCanada, for both operational and security reasons. TransCanada would not be opposed to the use of its rights-of-way as trails, provided that their use adheres to TransCanada's latest guidelines and safety requirements that were attached in TransCanada's letter dated May 14, 2018. It appears the trails have been removed from the Station 130 lands in the Block 41 Plan, however, in reviewing the NVNCTMP, the trails are still shown crossing through TransCanada's private lands. As set out in our March 28, 2019, comments on the NVNCTMP, consultation with TransCanada will be

required to ensure any potential trails meet current guidelines before we would be in a position to consider whether to agree to approve such trails. To be clear, the proposed trail over TransCanada's privately-owned lands (identified in the NVNCTMP) in that location and configuration is not acceptable to TransCanada, and the Block 41 Plan and the NVNCTMP should reflect this so that there is no uncertainty as this matter proceeds.

TransCanada looks forward to working with City staff and the Block 41 Owners to ensure that the future residents of Block 41 are able to live in a well planned community that is compatible with our current and future operations. We believe the policies of the Block 41 Plan can be revised to ensure public health and safety is protected through responsible planning policy that has regard for Provincial interests, is in conformity with the Growth Plan and consistent with the PPS.

We also welcome the upcoming meeting with City staff and the Block 41 Landowners to discuss our comments and revisions to the Block 41 Plan. We would ask that we be given notice of any decision with respect to the Block 41 Plan.

Sincerely,



Dana Anderson, MA, FCIP, RPP
Partner
On behalf of TransCanada PipeLines Limited

Cc: Mayor Bevilacqua, City of Vaughan
City Clerk, City of Vaughan

APPENDICES

Appendix A: Letter to the City of Vaughan Re: Parks and Trails, May 14, 2018

Appendix B: TransCanada Pipelines Compressor Station 130 and Land Use Compatibility Report, July, 2008

Appendix C: Letter to the Region of York, September 30, 2009

Appendix D: Letters to the City of Vaughan from Lehman & Associates Re: Block 41, September 14, 2015, December 10, 2015 & March 10, 2016

Appendix E: Letter to the City of Vaughan Re: C Plant and Block 41 Secondary Plan January 24, 2018

Appendix F: Letters to the City of Vaughan Re: East Purpleville Creek Subwatershed Study dated June 19, 2018 and August 22, 2018

Appendix G: Station 130 Compressor Station Assessment of Noise Impact on Noise Sensitive Land Use, Stantec Report, January, 2018

APPENDIX A

MHBC
PLANNING
URBAN DESIGN
& LANDSCAPE
ARCHITECTURE

Authorized commenting Agency for

TransCanada
In business to deliver

KITCHENER
WOODBRIDGE
LONDON
KINGSTON
BARRIE
BURLINGTON

May 14th, 2018

Ms. Armine Hassakourians,
Senior Planner
The Corporation of the City of Vaughan
2141 Major Mackenzie Drive
Vaughan, ON
L6A 1T1

Via email: Armine.Hassakourians@vaughan.ca

Dear Armine:

RE: Parks and Open Space Planning - Information Request

TransCanada was pleased to have the opportunity to meet with representatives from the Parks Department earlier this year and recognizes the City's desire to link existing and future planned pedestrian trails through the Pedestrian and Cycling master planning exercise currently underway. With sufficient collaborative pre-planning and engagement between parties, a community multi-use trail system and pipeline easements can co-exist in a safe manner and in compliance with regulatory requirements.

To facilitate this, in our meeting of January 30, 2018, TransCanada requested a plan or diagram illustrating the City's initial plans for trails in the vicinity of TransCanada's Maple Compressor Station within Block 41.

In response to the City's follow up request for AutoCAD format information on the pipelines coming into and out of the station, please be advised that due to internal safety and security protocols, we do not provide that detailed level of information. If the Parks Department requires survey information for exact locations and elevation of the pipelines, the City would need to contact Ontario One Call to have the pipelines located. If the City is not the owner of the lands, as in this case, permissions would have to be secured from the respective landowners to carry out those investigations.

As an interim alternative, we suggest using the GIS mapping that has already been provided to the Planning Department for the purposes of the City of Vaughan's Official Plan which would be of assistance for conceptual planning purposes. Our office is currently working with Ruth Rendon from the City to provide updated GIS data. TransCanada has also provided a pdf of mapping for Block 41 showing the general location of pipelines entering and leaving Station 130.

In addition, TransCanada would like to take this opportunity to provide some additional clarification to the Parks Department as it considers options in its trail planning exercise.

Developing Trails in Proximity to TransCanada's Pipeline Infrastructure

TransCanada's pipeline at this location is under the regulatory authority of the National Energy Board (NEB). Construction and excavation activities within 30m on either side of TransCanada's pipeline centerline must be conducted in compliance with Section 112 of the *National Energy Board Act* (NEB Act) and the associated *National Energy Board Pipeline Damage Prevention Regulations – Authorizations* (DPR-Authorizations) and Pipeline Damage Prevention Regulations – Obligations of Pipeline Companies (DPR-Obligations) collectively, the "Regulations" and defined as the "Prescribed Area" in the DPR-Authorizations.

Any person proposing or initiating the above activities in proximity to NEB-regulated facilities must ensure parties working on their behalf are aware of their legal obligations under the Regulations. TransCanada has provided some of the relevant details in Appendix A as well as a link to the Regulations.

As previously communicated in the January 30, 2018 meeting and in previous written correspondence, because recreational land uses are incompatible with an active industrial facility, no trails are permissible on the Station 130 site. However, to assist with the City's trails master planning, TransCanada is willing to consider trail options on or in proximity to other TransCanada lands in Block 41 which meet the general guidelines included in Appendix B ("Guidelines") and the Regulations.

Please note that the Guidelines are subject to change, in alignment with changes to standards, codes, regulatory and legal requirements, which is why ongoing collaboration is important through a master planning process. Additionally, the proponent of the non-pipeline related facilities or developments ("Proponent") is responsible for repair and replacement costs in the event the multi-use trail or associated structures must be removed or are damaged by TransCanada during pipeline maintenance activities. As such, the Guidelines are also aimed at reducing cost impacts to the third party.

Proponents are required to provide TransCanada with a development/design proposal for review and approval. Development and crossing applications shall be submitted to TransCanada through the application process described below. All trail proposals, as well as any other activities found in the Guidelines, are assessed on a site-specific basis to consider issues such as future maintenance access, risk analysis, stress analysis and pipeline attributes. If a proposal can meet all necessary requirements for approval, this assessment may result in specific conditions to that approval.

As part of the pre-planning and engagement process, the proponent must:

1. Provide early information to TransCanada.
    I. Design review requests shall be sent to integrity_crossings@transcanada.com.
    II. Approvals for work within the Prescribed Area can be requested at http://writtenconsent.transcanada.com.

2. Ensure that the multi-use trail design adheres to the general Guidelines attached in Appendix B. These guidelines were recently updated to reflect changes to standards, codes, regulatory and legal requirements, and are subject to site specific analysis and updates as necessary. The pertinent guidelines to consider includes, but is not limited to:
    I. Grantee's pathway shall maintain a minimum five (5) meter separation from the edge of TransCanada's pipeline(s).
    II. Where a pathway is crossing the pipeline or anywhere within the easement, the width of the pathway shall not exceed three (3) meters.

III. If the Grantee's pathway crosses over a TransCanada facility (i.e., pipeline), the crossing shall be installed as close as possible to a ninety (90) degree angle to the TransCanada facility.
IV. Where the installation of a pathway requires a ground disturbance, and the pathway crosses the pipeline, within five (5) meters of the pipeline, TransCanada's pipeline must be hand-exposed at certain intervals to be determined, as directed by TransCanada's regional field representative.

Please refer to the complete list of guidelines attached in Appendix B.

3. Additional considerations should be made to:
   I. Limit the locations where the community multi-use trail system is proposed to cross or parallel TransCanada's pipeline.
   II. Ensure installation of structures (benches, fences, signs, lighting) associated with the multi-use trail system are at sufficient distance from the pipeline in order to maintain safety and access as well as to avoid accidental damage to these structures. No structures are permitted within the easement. Notwithstanding this, structures may be removed or damaged at any time as may be necessary for TransCanada to maintain safe operation of the pipeline.

If you have any questions, please do not hesitate to contact me. Given the City's current master planning for multi-use trails, we would suggest a meeting with TransCanada to discuss this matter further at the appropriate time.

Regards,

Dana Anderson, MA, MCIP, RPP
Partner

cc. Martin Tavares, City of Vaughan
Janice Badgley, TransCanada

APPENDIX A – National Energy Board Damage Prevention Regulations - Excerpts

To provide for safety, the NEB prescribes that written consent is required from a pipeline company prior to undertaking certain activities, namely:

- Construction of a facility across, on, along or under a pipeline (including its Easement);
- Ground disturbance activities in the prescribed area, which extends 30 meters (100 feet) from each side of the centreline of a pipe; and
- Operation of a vehicle or mobile equipment across an Easement, outside the travelled portion of a highway or public road.

Some relevant excerpts and references are provided below.

The National Energy Board Pipeline Damage Prevention Regulations - Authorizations state, in part:

Authorization – ground disturbance activity

10 (1) For the purpose of subsection 112(1) of the Act, any activity — in an area other than an offshore area — that would cause a ground disturbance within the prescribed area, other than an activity referred to in section 11, is authorized if the person that intends to engage in the activity:

(a) obtains the pipeline company's written consent;

(b) makes a locate request in accordance with section 3; and

(c) obtains from the pipeline company the information that is referred to in paragraphs 6(1)(a) and

(c) of the *National Energy Board Pipeline Damage Prevention Regulations – Obligations of Pipeline Companies*.

Measures

(3) Any person that is engaged in an activity that causes a ground disturbance within the prescribed area must comply with the following measures:

(a) ensure that the activity is carried out in accordance with the technical details that are set out in the person's request for consent and that have been accepted by the pipeline company, as well as with the conditions set out in the pipeline company's consent, including the conditions respecting directional drilling or the use of explosives;

Please refer to NEB publication Pipeline Damage Prevention - Ground Disturbance, Construction and Vehicle Crossings for detailed guidance on activities conducted near NEB-regulated pipelines. Copies of the Regulations can be found here:

https://www.neb.gc.ca/bts/ctrg/gnnb/index-eng.html

APPENDIX B – TransCanada Landscaping Standards and General Conditions

TransCanada Landscaping Standards and General Conditions

(Note: This is a general list, any changes to standards, codes, regulatory and legal requirements or site-specific considerations may result in variance or additional conditions)

General	• Application for permission must be made to TransCanada for Facilities installations across, on, along or under a pipeline (including its Easement) or ground disturbance activities in the prescribed area, which extends 30 meters (100 feet) from each side of the centerline of a pipe. • Upon approval by TransCanada, Grantee's Facility shall be constructed in accordance with the attached / approved drawing(s). • Prior to any ground disturbance within five (5) meters of the edge of TransCanada's pipeline(s), the pipeline(s) must be 'daylighted' (i.e.,exposed) by hand or hydrovac and Grantor's (TransCanada) Field Representative shall be on site during this activity. • Storage of materials and/or equipment on TransCanada's Easement is not permitted. • In the event that TransCanada's pipelines experience contact damage or other damage as a result of Grantee's operation, Grantee s hall stop work immediately and notify TransCanada at once. • Mechanical excavation within 1.5 meters of the edge of TransCanada's pipeline is prohibited. Hand or hydrovac excavation must be utilized within this distance. • TransCanada will have regard for Municipal By-law Set-backs, where they exist, and evaluate implementation of such Set-backs on a site-specific basis. TransCanada also prefers a setback distance for third-party facilities and permanent/temporary and accessory structures of ten (10) meters from the edge of the Easement to allow for sufficient access to avoid or minimize disturbance when conducting future operations and maintenance activities on the Easement.
Costs	• In no event shall TransCanada be held liable to the Grantee respecting any loss of or damage to Grantee's Facility which the Grantee may suffer or incur as a result of the operations of TransCanada. The Grantee shall be responsible for all costs involved in replacing Grantee's Facility damaged or removed during TransCanada's operations and maintenance and shall indemnify and save harmless TransCanada from all actions, proceedings, claims, demands and costs brought against or incurred by TransCanada as a result of the presence of or damage to Grantee's Facility on the TransCanada Easement. • All associated work, signage or any other engineering protection measures must be completed by TransCanada or its qualified contractors at the sole expense of the Grantee. The complete scope of work that may be required is subject to other conditions that may be necessary related to a finalized landscaping design that is approved by TransCanada. Additionally, prior to TransCanada or its contractors conducting any associated work, TransCanada and the Grantee must execute a reimbursement agreement, including financial assurances, which provides that the entire cost of conducting this associated work is 100% reimbursable to TransCanada.

Permanent Structures	• Definition: An installation that cannot be moved without demolition; on piles, foundations, anchored and/or affixed to the ground. This includes, but is not limited to structures such as:
	  ○ houses (dwellings)
	  ○ barns
	  ○ roads (need to follow TransCanada's crossing application process)
	  ○ asphalt parking lots
	  ○ driveways
	  ○ retaining walls
	  ○ in-ground swimming pools
	  ○ detached garages
	  ○ playgrounds, benches, gazebos, bollards, etc.
	• Permanent Structures shall not be installed anywhere on the Easement
	• Roads cannot be installed running parallel to the pipeline within a seven (7) m setback from the edge of the pipeline.

Temporary or Accessory Structures	• Definition: Any installation that is not affixed to the ground.
	• This includes, but is not limited to structures such as:
	  ○ Above ground swimming pools
	  ○ greenhouses without foundations
	  ○ hot tubs
	  ○ sheds without foundations
	  ○ benches, decks and patios without foundations
	  ○ trailers
	  ○ porta-potties
	  ○ outdoor fireplaces
	• Temporary or Accessory Structures shall not be installed anywhere on the Easement.

Landscaping	• TransCanada's Easement is to be seeded with Canada #1 seed. • Grantee shall ensure a five (5) meter continuous access way is maintained over, through and within the Easement to facilitate access for future pipeline operation and maintenance activities. • No portion of trees or shrubs at the time of maturity shall be permitted to encroach within five (5) meters of the edge of the TransCanada pipeline within the Easement. • No trees or shrubs at the time of maturity that will reach a height greater than four (4) meters shall be planted within the Easement. • Tree roots must not interfere with the pipeline. • A minimum of five (5) meters between all groups of trees/shrubs will be established. A group is defined as 3-5 trees/shrubs. • Irrigation systems are not permitted within TransCanada's Easement.

Pathways	• Grantee's pathway shall maintain a minimum five (5) meter separation from the edge of TransCanada's pipeline(s). • Where a pathway is crossing the pipeline or anywhere within the easement, the width of the pathway shall not exceed three (3) meters. • If the Grantee's pathway crosses over a TransCanada facility, the crossing shall be installed as close as possible to a ninety (90) degree angle to the TransCanada facility (i.e., pipeline). • Where the installation of a pathway requires a ground disturbance, and the pathway crosses the pipeline, within five (5) meters of the pipeline, TransCanada's pipeline must be hand-exposed at certain intervals to be determined, as directed by TransCanada's regional field representative. • Grantee must ensure the presence of the pipeline is clearly visible through the installation of above ground pipeline signage in accordance with TransCanada specifications. Signage is to be installed at all road crossings, pathway, and other crossings, throughout the development area at intervals of 100 meters. Signage will be double sided.
Drainage	• Original depth of cover over the pipelines within TransCanada's Easement shall be maintained throughout and after construction of the Grantee's Facility. This depth of cover over the pipelines shall not be compromised over the life of the Grantee's Facility due to rutting, erosion or other means. TransCanada will evaluate and provide requirements for additional cover at approved road crossings. • Grantee's Facility shall be constructed to ensure drainage is directed away from the Easement so that erosion that would adversely affect the depth of cover over the pipelines does not occur. Catchment basins, drainage swales or berms are not permitted within TransCanada's Easement. • Should pooling of water or erosion occur on the Easement as a result of any Facility installation or landscaping, the Grantee will be responsible for the remediation of the pooling or erosion to TransCanada's satisfaction. • Any large-scale excavation adjacent to the ROW, which is deeper than the bottom of the pipe, must maintain a slope of 3:1 away from the edge of the ROW.
ATV / Snowmobile use	• A crossing and encroachment permit/agreement must be approved by TransCanada.
Mowing and Maintenance	• A crossing and encroachment permit/agreement must be approved by TransCanada for ongoing activities such as mowing or maintenance of the Easement on public lands.

APPENDIX B

TRANSCANADA PIPELINES COMPRESSOR STATION 130

&

LAND USE COMPATIBILITY

Submitted to
The Region of York & The City of Vaughan

TransCanada
In business to deliver

LEHMAN
& ASSOCIATES

July, 2008

Table of Contents

1.0 INTRODUCTION

TransCanada Pipelines is a Canadian company involved in the production and transmission of energy in Canada and the United States. The company's activities are focused on natural gas transmission and energy generation. The company's initial project – the TransCanada Pipeline, consists of a network of natural gas collection facilities in British Columbia and Alberta which funnel to a location in the south-east portion of Alberta. From this point a series of pipelines carry natural gas across the country through to Ontario, Quebec and the U.S.A. The company has over 50 years experience in building, operating and maintaining gas pipeline systems and currently operates more than 59,000 kilometres of pipeline ranging in size from four inches to four feet in diameter.

When the TransCanada natural gas pipeline was established in the late 1950s, the transmission routes were located primarily in farmers' fields and in corridors with other transmission facilities. As the country and its cities have grown, particularly in Southern Ontario, urban development has increasingly affected, and been affected by, the location of the pipeline corridor. For this reason, TransCanada Pipelines became involved in the land use planning process in order to ensure that safety and compatibility issues related to the pipeline and adjacent development were addressed in an appropriate manner. A portion of the TransCanda pipeline and a Compressor Station are located in the City of Vaughan.

Natural gas is pushed through the pipelines using a series of compressor stations (of which there are approximately 50) located on the pipeline route between Alberta and the border of the United States. Each of these compressor stations consists of gas turbine or jet engines which are used to compress and push the gas further along the system. Depending upon the number and size of the pipelines at that portion of the route the compressor stations vary in their size. TransCanada has established co-generation facilities at some of its compressor stations, as heat is a natural by-product of the compressing process and can be used in a relatively efficient manner to generate electricity.

1.1 Land Use Compatibility Issues

There are two primary areas of interest of TransCanada Pipelines in the land use approval process related to the compatibility of adjacent land uses with its facilities. First, there are safety concerns related to the nature of land uses abutting the pipelines themselves. The majority of natural gas pipelines are located in relatively shallow trenches below ground, generally 0.9-1.2 metres from the surface. The pipeline has a coating which is applied to ensure long-term integrity of the pipeline. National Energy Board regulations

mandate the nature of the pipewall thickness in relation to the nature of adjacent uses.

Where the pipeline runs through relatively uninhabited rural areas, a Class I pipewall thickness is required. Where the pipeline extends through a residential subdivision a Class II or Class III pipewall is required. As a consequence, the company is interested not only for reasons to ensure safety in the relationship between land uses and the pipeline, but also to ensure that as development occurs the pipeline can be replaced with an appropriate section of pipe to meet National Energy Board standards.

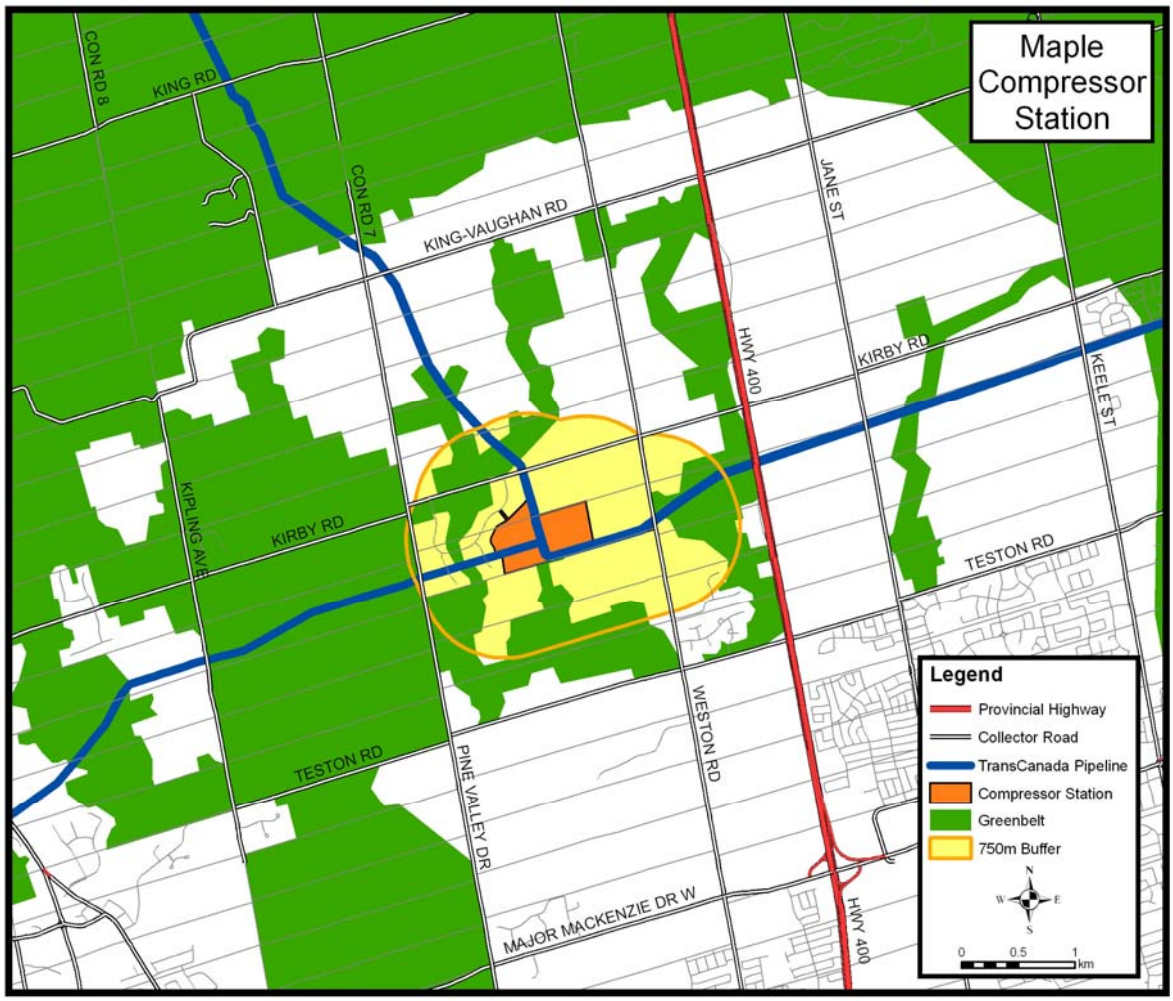
It should be noted that TransCanada monitors development approvals and applications adjacent to the pipeline rights-of-way for this reason and maintains a detailed and substantial database of the land uses lying within 200 metres of the entire pipeline system.

The second interest of TransCanada in land use matters is the relationship between adjacent land uses and its Compressor Stations. Compressor stations are considered a Class III Industrial Use in the context of the Ontario Ministry of the Environment's D-Series Guidelines.

2.0 COMPRESSOR STATION 130

As shown in Figure 1 below, our Compressor Station is located at 11200 Weston Road, Maple. There are up to three high-pressure natural gas pipelines ranging in diameter from 24" to 36" running to and from the Compressor Station lands.

Compressor stations are an industrial use in accordance with the Ministry of the Environment guidelines and their main purpose is to move natural gas at extremely high pressures using jet engines, which can result in both noise and vibration impacts.



In addition to its main purpose, TransCanada Compressor Stations act as District or Regional centres for all TransCanada's maintenance and operation activities including equipment and material storage (both indoors and outside) and general office functions. While not a regular activity, on occasion it is necessary for TransCanada Pipeline maintenance purposes to

conduct “blow downs” of sections of its pipelines. These activities, conducted in full compliance with NEB Standards, could generate impacts on adjacent sensitive land uses. It is recommended that the full range of TransCanada activities and uses be recognized and permitted in the relevant planning documents such as Official Plans and Secondary Plans.

In recognition of its Compressor Station being considered a Class III Industrial use, TransCanada wishes to review all development applications within 750 metres of the compressor stations in order to analyse any potential impacts on adjacent land uses. Where necessary, especially if there is a sensitive land use proposed (eg. residential uses), TransCanada will undertake a noise and vibration study. Based on the study’s results, and Federal and Provincial regulations, TransCanada will recommend the required buffers and/or other attenuation measures to protect both the land uses from industrial impacts and protect the operation of our Compressor Station.

3.0 PROVINCIAL POLICY

3.1 Provincial Policy Statement (PPS)

Under the 2005 PPS, Section 6.0, the definition of 'Infrastructure' includes oil and gas pipelines and associated facilities.

> "means physical structures (facilities and corridors) that form the foundation for development. Infrastructure includes: sewage and water systems, septage treatment systems, waste management systems, electric power generation and transmission, communications/telecommunications, transit and transportation corridors and facilities, oil and gas pipelines and associated facilities."

Section 1.6.6 of the PPS states:

> 1.6.6 Transportation and Infrastructure Corridors
>
> 1.6.6.1 Planning authorities shall plan for and protect corridors and rights-of-way for transportation, transit and *infrastructure* facilities to meet current and projected needs.

As the protection of TransCanada's facilities and corridors for both their current and future purposes is a Provincial interest, municipalities must ensure that their planning and approval process is consistent with this objective.

3.2 The Greenbelt Plan (GBP)

The GBP was developed to establish, sustain and protect countryside and open spaces, agriculture, ecological and hydrological functions as well as to control urbanization and direct infrastructure decisions within the lands covered by the Greenbelt Plan area. Lands outside the Greenbelt will therefore be subject to increased intensification as available developable land diminishes. The land surrounding TransCanada's Maple Compressor station, primarily to the north and southeast, therefore could be considered the location of a prime area for future development.

4.0 COMPATIBILITY GUIDELINES

4.1 MOE D Series Guidelines

A Class III industry is defined by the MOE guideline as follows:

"A place of business for large scale manufacturing or processing, characterized by: large physical size, outside storage or raw and finished products, large production volumes and continuous movement of products and employees during daily shift operations. It has frequent outputs of major annoyance and there is high probability of fugitive emissions."

Compressor stations are operated in a manner designed to minimize any impacts on adjacent uses. However, as with most forms of industrial operation, particularly those involving industrial gas turbines, there is a level of noise and vibration produced that in certain circumstances and locations would be beyond that recommended for a residential context by the Ontario Ministry of Environment. The D6 Guideline recommends a 1000 metre separation between a Class III Industrial use such as a Compressor Station and residential uses. With appropriate separation, together with the mitigating techniques recommended by TransCanada noise and vibration levels beyond the 1000 metres would be reduced to within acceptable standards for residential development.

4.2 NEB Guidelines

As a federally regulated industry, TransCanada is also subject to the rules and guidelines established by the National Energy Board (NEB). The National Energy Board sets out specific requirements for development adjacent to TransCanada Pipelines. Section 112 of the NEB Act, Construction of Facilities across Pipelines, states:

> 112 (1) Subject to subsection (5), no person shall, unless leave is first obtained from the Board, construct a facility across, on, along or under a pipeline or excavate using power-operated equipment or explosives within thirty metres of a pipeline.
>
> Use of vehicles and mobile equipment
>
> (2) Subject to subsection (5), no person shall operate a vehicle or mobile equipment across a pipeline unless leave is first obtained from the company or the vehicle or mobile equipment is operated within the travelled portion of a highway or public road.

As noted in Section 1.1 of this submission, TransCanada monitors all development within 200 metres of its pipelines right-of-way. TransCanada provides detailed development guidelines for all applications within 200 metres of its right-of-way. For all development within 30 metres of the right-of-way TransCanada requests, as a condition of approval, that the owner/developer enter into an agreement with TransCanada. This is one way of ensuring that the requirements of the NEB and TransCanada's development guidelines and conditions are registered on title.

5.0 RECOMMENDED ACTION

The most compatible land uses adjacent to the TransCanada Compressor Station 130 are other industrial or commercial uses. For sensitive land uses such as housing, parks and open spaces, an appropriate sound barrier and buffer from the Compressor Station may be required. By buffering or separating sensitive land uses from TransCanada's Compressor Station, there would be a significant reduction in the possibility of third party damage to the public and to TransCanada's facilities.

New development adjacent to the pipeline can result in increasing population density in the area and may result in TransCanada being required to replace its pipeline to comply with the Canadian Standards Association (CSA Code Z662). The National Energy Board Act and its regulations provide planning authorities with the opportunity to ensure its interests are represented when any new facilities are proposed.

TransCanada's main goal is for landowners and developers to be aware of their facilities and know when they are required to contact TransCanada. As such, we would request that the location of the right-of-way be identified on Schedules for relevant planning documents such as Official Plans and Secondary Plans.

It is important for developers to consult with TransCanada (or designated commenting agency) during the conceptual stage of development to ensure that any new development near the Compressor Station or Pipeline meets the National Energy Board's and TransCanada's requirements. We would appreciate a policy encouraging early consultation. In particular, notice of development for land uses within 750 metres of our Compressor Station should be noted.

We also request no 'sensitive land uses' be permitted within 750 metres of the Maple Compressor Station. Under the MOE Guidelines, sensitive land uses include "any building or associated amenity area which is not directly associated with the industrial use….for example, residences, senior citizen homes, schools, day care facilities, hospitals, churches and other similar institutional uses."

While the MOE D-Series Guidelines recommend a 1000 metre separation for sensitive land uses, TransCanada has concluded that a 750 metre 'buffer' around its Compressor Stations is acceptable. This is based upon their experience and technical studies related to the specific impacts of a compressor station.

The central objective of this submission to the Region is to ensure that no additional sensitive land uses are designated within this 750 metre buffer.

We have prepared this report to inform the Region of any potential impacts to our facilities and adjacent land uses, as well as to suggest appropriate buffers and the rationale for these buffers.

We look forward to working with the Region as it prepares for growth over the next 20 years while ensuring all of our interests are met. We would be pleased to meet and discuss the material in this report at your convenience.

APPENDIX C

September 30, 2009

Mr. John B. Waller, MCIP, RPP
Director Long Range and Strategic Planning Branch
Regional Municipality of York
17250 Yonge Street
Newmarket, ON
L3Y 6Z1

Dear Mr. Waller:

Re: Draft York Region Official Plan
Our File No. PAR 11917

We are responding to your request for comments on the draft Official Plan for York Region. Some relevant comments were provided in an earlier submission to your office dated July 2008, and that submission is attached for your information.

As you may be aware, TransCanada has three high pressure natural gas pipelines ranging in diameter from 24″ to 36″ in the Region. These pipelines convey natural gas from Alberta to all of southern, central and eastern Ontario, as well as much of Quebec. There are two main corridors for these pipelines, one on a north-south axis just west of Highway 400 and one in an east west direction north of Elgin Mills Road.

TransCanada is regulated by the National Energy Board and thus has specific requirements as well as safety guidelines that apply when development is proposed within 200 metres of the pipeline rights-of-way. In addition TransCanada has a major compressor station located in the City of Vaughan north of Teston Road and west of Weston Road.

The attached submission provides our concerns and interests with respect to the compressor station. You will note that the facility is considered a Class III industry under the various relevant MOE Guidelines and as such minimum distance separations should be considered if development is proposed within 1000m of the facility. The compressor station is in the area noted on Map 1 of the Draft Plan as a potential urban expansion. As such some recognition of the facility and the appropriate planning principles should be referenced in the Regional Plan.

We note that the PPS considers the pipelines and the compressor station as "Infrastructure", a defined term, and that in Section 1.6.6.1 it states that "Planning authorities shall plan for and protect corridors and rights of way for

transportation, transit and infrastructure facilities to meet current and projected needs."

We have reviewed the draft Official Plan and find no reference to, no mapping of, nor policies dealing with this Infrastructure. In Section 7.5 of the Draft Plan it is noted that the utility networks should have regard for potential impacts on the surrounding area, including existing communities and the natural environment.

However the subsequent Objectives and Polices provide no guidance, recognition nor direction in dealing with the compatibility of infrastructure and existing or proposed development. It would be our suggestion that the PPS requires the York Region Official Plan to deal with protection of the corridors which in operational terms means minimizing risk, maximizing safety measures and ensuring compatibility of new development adjacent to the pipelines.

In addition it is our recommendation that the alignment of the pipeline be shown on one of the Official Plan Maps with a cross reference in the appropriate text. The protection of the pipeline corridors is a significant health and safety issue that can be assisted by the appropriate planning policies.

We offer the following policies for inclusion in the York Region Official Plan for your consideration.

"TransCanada PipeLines Limited operates three high pressure natural gas pipelines within its right-of-way which crosses the Region and is identified on Schedule _ to this Plan.

TransCanada is regulated by the National Energy Board which, in addition to TransCanada, has a number of requirements regulating development in proximity to the pipelines. Therefore, the Region encourages local municipalities to consult with TransCanada or its designated representative for any development proposals in proximity of its facilities.

In areas of more urban development, the Region will encourage the development of TransCanada's right-of-way for passive parkland or open space purposes subject to TransCanada's easement rights".

We also note that TransCanada PipeLines Limited is not subject to municipal Zoning By-laws and Official Plans. We request a policy in the Plan reflecting this exemption.

To facilitate the inclusion of the TransCanada Pipeline on your OP Schedules we can provide a GIS shape file to the Region. Please let me know if you would be interested in this option. A confidentiality agreement will need to be entered into prior to releasing the file.

We would appreciate being advised in what manner our policies will be incorporated into the Plan. Please contact the undersigned if you have any questions or require additional information.

Sincerely,

Bob Lehman, FCIP, RPP
Partner

LEHMAN & ASSOCIATES

Authorized commenting Agency for

97 Collier St.,
Barrie, ON L4M 1H2
(705) 727-0663

TransCanada
In business to deliver

APPENDIX D

September 14, 2015

Ms. Armine Hassakourians, B.A.A., M.C.I.P., R.P.P.
Senior Planner
The City of Vaughan
2141 Major Mackenzie Drive
Vaughan, ON
L6A 1T1

Via email: Armine.Hassakourians@vaughan.ca

Dear Ms. Hassakourians:

Re: Draft Block 41 Emerging Land Use Concept Plan
Our File No. PAR 29981

We have reviewed the material provided on the Draft Land Use Concept for Block 41 and have the following comments:

1. TransCanada PipeLines Limited's Compressor Station 130 should be recognized as a key element of Infrastructure, consistent with Section 1.6 of the PPS which reads:

   1.6 Infrastructure and Public Service Facilities

   1. 1.6.1 *Infrastructure,* electricity generation facilities and transmission and distribution systems, and *public service facilities* shall be provided in a coordinated, efficient and cost-effective manner that considers impacts from climate change while accommodating projected needs.

      Planning for *infrastructure,* electricity generation facilities and transmission and distribution systems, and *public service facilities* shall be coordinated and integrated with land use planning so that they are:

      1. a) financially viable over their life cycle, which may be demonstrated through asset management planning; and
      2. b) available to meet current and projected needs.

2. In order to co-ordinate and integrate Station 130 with surrounding land use in a manner that will allow the facility to meet current and projected needs, the nature and extent of residential uses adjacent to Station 130 should be subject to the following policy and appropriate notation on the mapping. The extent of the area to which this policy would apply is currently the subject of ongoing acoustical analyses:

   Applications for development of sensitive land uses within the Noise Influence Area identified on Schedule "XX" shall include a noise feasibility

analysis that assesses the impacts of the TransCanada PipeLinesLimited Compressor Station operations, present and future, on any proposed sensitive uses. Such Study shall be prepared to the satisfaction of the City and the Ontario Ministry of the Environment and Climate Change (MOECC), in consultation with TransCanada PipeLines Limited, and shall recommend appropriate measures to mitigate any adverse effects from noise that are identified. Adverse impacts will be considered in the context of MOECC *Environmental Noise Guideline, Stationary and Transportation Sources – Approval and Planning (Publication NPC-300).*

3. While it is understood that the level of detail in the plans provided is relatively high, the access to Station 130 should be maintained in a manner that will allow the continued safe and unrestricted access to the site by authorized vehicles.

Thank you for the opportunity to comment. If you have any questions please don't hesitate to contact our office.

Sincerely,

Robert Lehman, FCIP, RPP
President

December 10th, 2015

Ms. Armine Hassakourians, B.A.A., M.C.I.P., R.P.P.
Senior Planner
The City of Vaughan
2141 Major Mackenzie Drive
Vaughan, ON
L6A 1T1

Via email: Armine.Hassakourians@vaughan.ca

Dear Ms. Hassakourians:

Re: Block 41 Land Use Concept Plan
Our File No. PAR 29981

Further to our letter dated September 14th, 2015, we have reviewed the revised Land Use Concept Plan. There are three aspects of the Concept Plan that are of significant concern to TransCanada. These three issues relate to operational elements of Station 130, long-term expansion potential of the facility and land use compatibility.

1. Trail system – The plan shows a trail system through the Station 130 lands. This will require consultation with TransCanada to determine whether this will be feasible. The type of industrial facilities and activities located within this parcel do not allow for public access.

2. Driveway – The Plan shows a major collector road (with a transit route) crossing the existing driveway into Station 130, which is owned by TransCanada. A road crossing will impede access to the Station lands. Other options need to be explored with the City and the landowner's group.

3. Noise – There is considerable work required to resolve the noise issue in a manner that will take into account the potential operating capacity of the Station. One mechanism to address this situation would be the inclusion of a noise impact zone as stated in previous correspondence.

We are currently working to assess the impacts of the Concept Plan on the facility but are not yet able to provide our comments as these concerns require input and review from several departments within TransCanada. We require additional time and consultation with the parties involved to review available options.

Thank you for the opportunity to comment. We will continue to work with City staff as well as the landowners group going forward. If you have any questions please don't hesitate to contact our office.

Sincerely,

Robert Lehman, FCIP, RPP
President

LEHMAN & ASSOCIATES

Authorized commenting Agency for

97 Collier St.,
Barrie, ON L4M 1H2
(705) 727-0663

TransCanada
In business to deliver

March 10th, 2016

Ms. Armine Hassakourians, B.A.A., M.C.I.P., R.P.P.
Senior Planner
The City of Vaughan
2141 Major Mackenzie Drive
Vaughan, ON
L6A 1T1

Via email: Armine.Hassakourians@vaughan.ca

Dear Ms. Hassakourians:

Re: Block 41 Land Use Plan
Our File No. PAR 29981

Further to our meeting January 27th, 2016, following are our comments on the draft Block 41 land use plan.

Trail System: TransCanada will not permit public trails on property owned in fee simple by TransCanada, for both operational and security reasons. TransCanada would not be opposed to the use of its rights-of-way as trails, provided that their use adheres to TransCanada's specifications and safety requirements; however, TransCanada would not want a trail directly adjacent to its property lines for both security and aesthetic reasons.

Driveway: TransCanada would prefer to transfer station access from the current driveway, to a new access point off of the proposed collector road to the north of site. TransCanada would request input on the placement of that proposed collector road. The existing pipelines are located within the ditch north of the current driveway into the Station .These lands would remain as a right-of-way for the pipelines and could be used as a public trail in adherence with TransCanada's specifications and safety requirements.

Secondary Plan Noise Impact Policies: The following policies addressing noise and process issues are recommended for inclusion in the Block 41 Secondary Plan.

The TransCanada Pipelines Limited (TransCanada) Compressor Station 130 is an important element of national infrastructure. This Plan recognizes that Station 130 is required for the transmission of natural gas supplies throughout Ontario and eastern Canada. Future developments should ensure there are no undue negative impacts on Station 130's ability to continue to facilitate the transmission of natural gas.

Applications for the development of sensitive land uses within the Noise Influence Area identified on Schedule "XX" shall include a noise feasibility analysis that assesses the impacts of noise from the TransCanada PipeLines Limited Compressor Station

operations, present and future, on any proposed sensitive uses. The Noise Influence Area represents the lands that may be subject to noise levels above 45dbA. This noise level and land area shall represent the assumptions used to assess noise impacts and potential mitigation.

Such study shall be prepared to the satisfaction of the City and the Ontario Ministry of the Environment and Climate Change (MOECC), in consultation with TransCanada PipeLines Limited, and shall recommend appropriate measures to mitigate any adverse effects from noise that are identified prior to approval of zoning. Adverse impacts will be considered in the context of MOECC Environmental Noise Guideline, Stationary and Transportation Sources – Approval and Planning (Publication NPC-300).

Such noise reports are to specify how compatibility will be achieved and maintained between Station 130 and the proposed development and may include measures aimed at minimizing impacts. Sensitive land uses may be prohibited in the implementing zoning or limited (through massing and siting, buffering and design mitigation measures) in proximity to Station 130 to ensure compatibility.

The City shall consult with TransCanada during the Subdivision, Zoning and Site Plan Approval process for all developments, as well as the design process for public spaces, within the Noise Influence Area, to ensure compatibility with its existing and potential operations.

Enclosed is a map detailing the limits of the Noise Influence Area surrounding Station 130. As a final comment we would also like to review and comment on the proposed landscaping Plan for Block 41 to co-ordinate with potential landscaping on the Station 130 site.

Thank you for the opportunity to comment. If you have any questions please contact our office.

Sincerely,

Robert Lehman, FCIP, RPP
President

Encl.

March 2016
123511682

Legend

- Point of Reception
- 45 dBA Noise Influence Area
- TransCanada Pipelines Property Boundary

Notes

1. Coordinate System: NAD 1983 UTM Zone 17N
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2015.
3. Orthoimagery © First Base Solutions, 2015

Client/Project

TransCanada PipeLines Ltd.
Station 130 B3 Unit Additions

Figure No.

1

Title

TransCanada Station 130 Noise Influence Area

APPENDIX E

MHBC
PLANNING
URBAN DESIGN
& LANDSCAPE
ARCHITECTURE

Authorized commenting Agency for
TransCanada
In business to deliver

KITCHENER
WOODBRIDGE
LONDON
KINGSTON
BARRIE
BURLINGTON

January 24, 2018

Mark Christie, MCIP, RPP
Director of Policy Planning and Environmental Sustainability
The City of Vaughan
2141 Major Mackenzie Drive
Vaughan, ON
L6A 1T1

Via email: Mark.Christie@vaughan.ca

Dear Mr. Christie:

RE: City of Vaughan Comments on the Proposed C Plant at Station 130 and Block 41 Secondary Plan Process

---

Thank you for your letter dated January 5, 2018 addressed to Brian MacDonnell at TransCanada PipeLines Limited ("TransCanada") regarding the matters noted above as a follow up to the December 11, 2017 meeting with staff. We recognize that your comments relate to both TransCanada's application to the National Energy Board ("NEB") for the C Plant at Station 130, as well as the ongoing Block 41 Secondary Plan process.

As you may know, MHBC are the planning consultants for TransCanada. Our role is to monitor and comment on development in proximity to the pipeline right-of-way and associated facilities. In addition, we also provide comments on municipal policies to ensure TransCanada's interests and regulatory requirements as well as public health and safety are protected. The following letter is intended to respond to your comments and information requests related to Station 130 and provide background and context to TransCanada's involvement to date in the Block 41 Secondary Plan process. We look forward to a meeting with you to discuss these comments which we understand is to be scheduled for late January 2018.

General Comments

- In relation to the Station 130 C Plant expansion, the City has requested a number of items to undertake a more detailed review of the proposal. While TransCanada can provide some of these items now, there are others that will not be available until later in the NEB process and still others that we are unable to provide. It is our intent to assist in providing as much information as possible and to respond to your comments as best we can in order to facilitate the City's review and understanding of the Project.

- TransCanada can and will forward to the City all plans that are available to the public or through the NEB regulatory process. The requirements for the NEB process, however, are much different than the City's site plan process. For example, detailed information such as detailed elevations, site and building cross sections and landscape plans, that may be provided through a site plan process may not be required to be provided in the NEB process or may only be provided during the later stages of such process. Further, many of the detailed drawings used to design and construct the facility are not publicly available due to proprietary and confidentiality requirements. TransCanada will provide as much information as possible to assist in the City's review.

- We understand TransCanada has already provided some additional information related to a similar C-plant design as noted in your letter to assist in your review as well as an aerial view of the existing Station 130 facility with the proposed facilities superimposed to provide a better understanding of the layout on site.

- Further to the December 11, 2017 meeting with the City, TransCanada is currently organizing a site visit.

- The City has requested "information on "the parts per million of natural gas in the gaseous material released at the station." It is not clear what information the City is requesting, but TransCanada can advise that gas releases at Station 130 are very infrequent, but can be expected through blowdowns or venting as part of the annual maintenance program or as a correction in the system. In either case, gas releases occur at high pressure and disperse rapidly into the atmosphere with little or no gas detectable at or near the site. The composition of natural gas through Station 130 is variable, but is regulated by TransCanada's Canadian Mainline Gas Transportation Tariff which requires gas entering the Station to meet certain minimum gas quality specifications.

- The City requests that TransCanada provide an updated noise report upon completion of the C-Plant Project. TransCanada agrees to conduct a follow up noise assessment after the Station C Plant expansion is complete and operational.

- Your comments also identified the need for TransCanada's Environmental Protection Plan (EPP) to address climate change objectives. The Project EPP, however, largely addresses the construction phase of the project and, as such does not address Ontario's Climate Change Action Plan. TransCanada is committed to developing effective solutions to manage greenhouse gas emissions. To this end, TransCanada does maintain a greenhouse gas emissions inventory and is compliant with Ontario Ministry of Environment and Climate Change (MOECC) and Environment and Climate Change Canada (ECCC) requirements by reporting those emissions annually. These reports are extensive and include combustion, fugitive, and venting emissions and are subject to third-party verification (as required). For more information, TransCanada's reported greenhouse gas emissions since 2004 are publicly available on ECCC's website at http://www.ec.gc.ca/ges-ghg/default.asp?lang=En&n=8044859A.

In summary, TransCanada will continue to work with the City to provide, wherever possible, additional information related to the C-Plant to assist in the City's review. We also look forward to accommodating a site visit in the near future.

Comments Related to the Block 41 Secondary Plan Study

Your letter also provided comments in relation to the Block 41 Secondary Plan process and we thought it would be useful to provide some further context and background on this process. As you may know, prior to 2016, Lehman & Associates, led by Bob Lehman, were the consultants for TransCanada and participated as a member of the Technical Advisory Committee. TransCanada has also engaged with the Landowners Group to discuss the impacts associated with the location of proposed sensitive land uses in proximity to the Station 130 facility and the need for appropriate separation distances as well as mitigation of impacts to its facility. TransCanada has provided written comments to the City over the course of the secondary plan's draft development based on the draft Land Use Concept Plan for Block 41. TransCanada's commenting letters outlining their concerns with respect to noise impact policies, trails and road access are attached hereto for your reference and TransCanada would be pleased to discuss further at the upcoming meeting with the City

Also, prior to the circulation of the draft Land Use Concept Plan for Block 41, a submission was made to the Region of York (with a copy provided to the City of Vaughan) which outlined the need to provide policies in the Regional Plan which recognize TransCanada's pipelines and facility, its jurisdiction under the NEB and the need to ensure appropriate separation distances in consideration of the development of sensitive land uses.

- You noted in your letter that the Draft Secondary Plan is "very close to final approval and should be the basis to decision making". We were advised in late November that the Draft Secondary Plan would be circulated to the TAC for comment by the end of the year, however, to our knowledge, no Draft Secondary Plan has been circulated nor have we been provided an opportunity to comment on the final Draft Secondary Plan. We understand that the City has been delayed in its finalization of the Draft Secondary Plan. At our upcoming meeting, it would be helpful to have a clear understanding of the remaining steps in the Block 41 process to ensure we can be fully engaged and provide ongoing input and comments.

- One item from your letter noted that the existing Maple Compressor Station and pipeline should be "integrated" into the Block 41 community and that "information pertaining to potential environmental impacts and the proposed means of mitigating those impacts on existing and future uses" should be developed as part of the Block 41 community plan to ensure the facility "integrates and is complimentary to the Block 41 community." While we recognize it is the goal of the plan to ensure land use compatibility and meet growth objectives, those objectives must be balanced with the need to protect the Maple Compressor Station and the existing pipeline as critical facilities and essential infrastructure that serve a broader public need and interest.

- The current City of Vaughan Official Plan policies establish the requirement for the proponent of any development within 750 metres of Station 130 to carry out a noise and vibration study to the satisfaction of the City and to address impacts through mitigation measures. It is not clear to TransCanada whether Block 41 or the Landowners Group has prepared these studies yet. However, TransCanada's noise consultant has been sharing information with the Landowners Group's noise consultant. TransCanada is currently finalizing noise influence area mapping based on a future build out of Station 130. The noise influence area mapping will assist in furthering discussions about future development limits and the mitigation of impacts where sensitive land uses may be proposed to ensure compliance with the NPC-300 Guidelines. While the onus in the legislation is to ensure existing and planned infrastructure and industry are protected through mitigation by the proponent of the sensitive land uses, we believe an initial discussion about

appropriate mitigation with the City would be helpful once a final noise influence area is confirmed. TransCanada is willing to work cooperatively with the City to avoid noise issues from future residents related to the TransCanada's existing and planned facilities while achieving the broader community development objectives.

- Your letter also refers to comments regarding the multi-use trail being developed on TransCanada's lands. In previous comments, including the attached December 2015 letter from Lehman & Associates, TransCanada had raised some concerns with active uses on its property and on the pipeline right-of-way and in fact requested the trail be removed from its owned lands. Any development or works on or near the pipeline right-of-way are subject to review by TransCanada and must conform to all NEB regulations related to development on or near the pipeline. As stated above, TransCanada would be pleased to further discuss these requirements at the upcoming meeting and provide additional information as required.

- Your comments also referred to the location of future parkland locations within Block 41 and a request for comments on any potential restrictions on any pubic parkland location which would be adjacent to or in close proximity to Station 130 or the pipeline right-of-way. We refer again to the previously forwarded comments attached which highlight the need for appropriate separation and mitigation of sensitive land uses to protect the existing and planned infrastructure. The noise report that TransCanada is also submitting will provide further insight into planning for future sensitive land uses which TransCanada would also like to discuss in the upcoming meeting.

Furthermore, we look forward to receiving the Draft Secondary Plan to review and provide more detailed comments as they relate to both parks and trails as well as the other potential sensitive land uses that may be adjacent to the TransCanada site.

As noted, we understand TransCanada is in the process of scheduling a meeting late in January to discuss in more detail the Draft Secondary Plan and the revised noise influence area. We trust you will be available at the meeting and we look forward to further discussion on the items noted herein.

Sincerely,

Dana Anderson, MCIP, RPP
Partner

Attach.

cc. Darren Hopkins, Janice Badgley, Brian MacDonnell, Erin Gagner, Shadi Shenouda – TransCanada Pipelines Limited
Armine Hassakourians – The City of Vaughan
Darlene Presley – MHBC

APPENDIX F

MHBC
PLANNING
URBAN DESIGN
& LANDSCAPE
ARCHITECTURE

Authorized commenting Agency for
TransCanada
In business to deliver

KITCHENER
WOODBRIDGE
LONDON
KINGSTON
BARRIE
BURLINGTON

June 19th, 2018

Ms. Armine Hassakourians,
Senior Planner
The Corporation of the City of Vaughan
2141 Major Mackenzie Drive
Vaughan, ON
L6A 1T1

Via email: armine.hassakourians@vaughan.ca.

Dear Armine:

RE: East Purpleville Creek Subwatershed Study

As the regional planning consultant for TransCanada PipeLines Limited (TransCanada), the following are TransCanada's preliminary comments on the Block 41 Participating Landowners Group - East Purpleville Creek Subwatershed Study.

TransCanada engaged Golder Associates Ltd. (Golder) to complete a desktop review of the Subwatershed Study (Savanta Inc. et al., 2018). Attached to this letter is a preliminary draft memorandum issued by Golder outlining their comments, questions, concerns and the need for additional information.

Upon receipt of this additional information Golder can complete a more in-depth review of the Subwatershed Study (SWS) in order to fully assess the impacts to TransCanada (both its compression station site - Station 130) and its adjacent buffer lands in relation to what is being proposed by Block 41 in terms of storm water management associated with the proposed development concept.

At this stage, TransCanada would highlight the following to the City of Vaughan:

- As set out in the Golder memo, it appears the underlying flow targets in the SWS may not be correct. TransCanada requires that the inputs be verified by Savanta and confirmed to TransCanada;

- It is not clear from the SWS whether the TransCanada lands (industrial site and adjacent undeveloped buffer lands were taken into account in the model for controlling storm water management associated with the Block 41's proposed development in the area. This needs to be fully understood before TransCanada can evaluate whether there is an impact to TransCanada lands;

- Currently the Block 41 Land Use Concept on Figure 1.5 of the SWS shows a proposed stormwater management pond directly north and upstream of TransCanada's industrial compression station site. There is nothing in the SWS that indicates how the storm water would be managed (outflows etc.) and without an in-depth understanding of this, the current proposal may present an adverse risk to TransCanada both in terms of potential negative impact to drainage patterns through TransCanada's site and across its adjacent buffer lands. TransCanada requires more detailed information from Savanta with respect to the proposed design and location of the adjacent storm water management pond so that TransCanada can assess the issue in greater detail.

In light of the above, TransCanada requires further information and further time to conduct a more in-depth analysis of the SWS and storm water management issues raised in the SWS. Please confirm that TransCanada reserves its right to provide additional comments once TransCanada has received the information noted above.

At that time TransCanada can provide the City of Vaughan with more detailed feedback on the storm water management issues in conjunction with the overall development being proposed by the Block 41 Participating Landowners Group as this matter proceeds through the planning process.

Yours truly,

Dana Anderson, MA, MCIP, RPP
Partner
On behalf of TransCanada PipeLines Limited

Attach.

GOLDER

June 18, 2018 Project No. 18101754

TransCanada PipeLines Limited
450 1st Street SW
Calgary, AB
T2P 5H1

Attention: Matt Chmilar and Sheena Johnson

DRAFT AND PRELIMINARY

REVIEW OF EAST PURPLEVILLE CREEK SUBWATERSHED STUDY

On behalf of TransCanada PipeLines Limited (TransCanada), Golder Associates Ltd. (Golder) completed a desktop review of the stormwater aspects of the East Purpleville Creek Subwatershed Study (Savanta Inc. et al., 2018). This high level assessment identified the following preliminary issues:

- 2-year to 100-Year Storm Events – Based on the equations presented in Table 13.1 of the East Purpleville Creek Subwatershed Study (SWS), the identified stormwater targets for the 2-year event up to and including the 100-year event appear unreasonably high. As an example, the peak flow target for a 10 ha site under the 1 in 100-year event would be 119 m^3/s. In Golder's professional opinion, this number appears to be approximately 2 orders of magnitude higher than expected. These equations should be reviewed, and, if incorrect, the SWS should be revised accordingly.
- Regional Storm Flow Management – Based on the results of the stormwater modelling analysis from the SWS, it is unclear if the "Existing Flow" value provided in Table 11.7 for subcatchment 19.07 accurately captures the existing flow contribution from Station 130 (and existing upstream lands). Further to this and specific to the Regional Storm flow and storage targets for subcatchments 19.06, 19.07, and 19.10, it is unclear if the calculated targets for these subcatchments accurately take into account TransCanada lands (industrial site and adjacent undeveloped buffer lands), given that (1) the results and discussion for Table 11.7 neglect to indicate that controls are not currently planned on these lands under the "Future Regional Controlled Flow Scenario" and (2) the future land use shown on Figure 5.3 includes the combined areas of Station 130 infrastructure and a portion of the adjacent undeveloped buffer lands as a single category (described as 'TCPL Lands / Utilities'). These observations suggest that TransCanada lands may not have been sufficiently defined in the SWS model, and, more specifically, that natural areas may not have been appropriately accounted for in the analysis. Further clarification is required to validate the pre-development characterization, understand how the numerical values for peak flow targets were developed, and assess the potential implications on stormwater management related to the TransCanada lands.

Golder Associates Ltd.
6925 Century Avenue, Suite #100, Mississauga, Ontario, L5N 7K2, Canada T: +1 905 567 4444 F: +1 905 567 6561

- Block 41 Land Use Concept Plan – The Block 41 Land Use Concept on Figure 1.5 of the SWS shows a proposed stormwater management pond directly north/upstream of and immediately adjacent to the TransCanada site. Stormwater flows from the stormwater management pond would be directed to the drainage feature that crosses the central portion of the TransCanada lands. In Golder's view, the proposed layout of the stormwater management pond may result in one or more added risks to the TransCanada site, including potential impacts related to flooding, erosion, and water quality. In addition, the drainage feature that crosses the central portion of the TransCanada site may require modifications and/or routine maintenance to accommodate discharge from the pond. Due to the potential for adverse effects and maintenance requirements on TransCanada lands, the proposed layout for the stormwater management pond would appear to be an issue and one that Golder recommends TransCanada obtain more information on with respect to location and design so that a thorough assessment of risks and impacts can be provided to TransCanada.

Golder Associates Ltd.

DRAFT

Christopher Davidson, P.Eng.
Surface Water Engineer

DRAFT

Andrew Forbes, M.Sc., P.Geo.
Associate, Senior Geoscientist

CD/AF/mp

https://golderassociates.sharepoint.com/sites/26868g/deliverables/draft/18101754-l-reva-draft comments for cov on sws-18jun2018.docx

MHBC
PLANNING
URBAN DESIGN
& LANDSCAPE
ARCHITECTURE

Authorized commenting Agency for
TransCanada
In business to deliver

KITCHENER
WOODBRIDGE
LONDON
KINGSTON
BARRIE
BURLINGTON

August 22nd, 2018

Ms. Armine Hassakourians,
Senior Planner
The Corporation of the City of Vaughan
2141 Major Mackenzie Drive
Vaughan, ON
L6A 1T1

Via email: armine.hassakourians@vaughan.ca.

Dear Ms. Hassakourians:

RE: East Purpleville Creek Subwatershed Study
Block 41, City of Vaughan

Further to our letter dated June 19th, 2018, TransCanada requires additional information and time to conduct a fulsome analysis of the Subwatershed Study (SWS) and storm water management issues raised in the SWS.

We understand from our follow-up inquiry of August 9, 2018 that our comments were forwarded to the Landowner's consultant; however we have not yet received a response or any information to date. As the SWS directly impacts TransCanada's industrial facility and the surrounding buffer lands also owned by TransCanada, it is imperative we are given an opportunity to comment with accurate information.

We note that your email dated August 16, 2018 requires final comments by August 24th, 2018 for the City to proceed.

To reiterate, we requested the following information:

- It appears the underlying flow targets in the SWS may not be correct. TransCanada requires that the inputs be verified by Savanta and confirmed to TransCanada;

- It is not clear from the SWS whether the TransCanada lands (industrial site and adjacent undeveloped buffer lands were taken into account in the model for controlling storm water management associated with the Block 41's proposed development in the area. This needs to be fully understood before TransCanada can evaluate whether there is an impact to TransCanada lands;

- Currently the Block 41 Land Use Concept on Figure 1.5 of the SWS shows a proposed stormwater management pond directly north and upstream of TransCanada's industrial compression station site. There is nothing in the SWS that indicates how the storm water would be managed (outflows etc.) and without an in-depth understanding of this, the current proposal may present an adverse risk to TransCanada both in terms of potential negative impact to drainage patterns through TransCanada's site and across its adjacent buffer lands. TransCanada requires more detailed information from Savanta with respect to the proposed design and location of the adjacent storm water management pond so that TransCanada can assess the issue in greater detail.

Again, as an impacted stakeholder, TransCanada needs an opportunity to conduct a fulsome review of the SWS which cannot be done without the requested information. Accordingly, please confirm that TransCanada can provide additional comments once TransCanada has received the information as requested and will not be subject to the August 24, 2018 deadline.

Please also continue to ensure that TransCanada is provided with all the information in a timely manner with respect to the planning process concerning the Block 41Secondary Plan.

Yours truly,

Dana Anderson, MA, FCIP, RPP
Partner
On behalf of TransCanada PipeLines Limited

APPENIDIX G

Station 130 Compressor Station
Assessment of Noise Impact on Noise Sensitive Land Use

Prepared for:
TransCanada PipeLines Limited
Calgary, Alberta

Prepared by:
Stantec Consulting Limited
Calgary, Alberta

January 2018

Table of Contents

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

Executive Summary

TransCanada PipeLines Limited (TransCanada) is proposing to expand the existing Maple Compressor Station (Station 130). The existing Station 130 consists of B-Plant units B1, B2, and B3, as well as the Portable P1 Unit. The current planned expansion (Station 130 C4 Unit Addition Project) involves the addition of a C-Plant building, which includes one additional Solar Titan 250 unit (C4) and associated supporting equipment. It is reasonably foreseeable that TransCanada will further expand Station 130 with the addition of a second Solar Titan 250-driven compressor unit (C5) within the C-Plant building along with supporting equipment. This further expansion is representative of the "Full Buildout" of Station 130 and is dependent on the future demand for natural gas as well as other factors such as commercial or contractual obligations.

The New Community Area – Block 41 (New Community Area) is planned as a new community area that will be established by a Secondary Plan, as approved by the City of Vaughan. The New Community Area is planned on the land surrounding Station 130, which includes noise sensitive land uses such as residential dwellings. Valcoustics Canada Ltd. (Valcoustics) was retained by the Block 41 Landowners Group (Block 41) to complete a preliminary assessment (Valcoustics Memorandum) of the predictable worst case noise for Station 130 at Full Buildout.

Stantec Consulting Limited (Stantec) was retained by TransCanada to:

1. Review the Valcoustics Memorandum
2. Identify risks and provide recommendations regarding development of noise sensitive land use around Station 130

Based on Stantec's review of the Valcoustics Memorandum and further analysis, Stantec's findings and recommendations are summarized as:

- Stantec agrees that the sound levels resulting from additional noise control suggested by Valcoustics are achievable. However, Stantec recommends alternative mitigation measures which are acoustically equivalent to those proposed by Valcoustics and which are technically and operationally feasible for implementation at Station 130. Nevertheless, these mitigation measures alone or in combination with receptor based (i.e., off-site from TransCanada property) noise control measures (e.g., barriers, screens) proposed by Valcoustics are not sufficient to address low frequency noise (LFN) impacts within the New Community Area
- Low frequency noise impacts were not adequately addressed by Valcoustics and present considerable risk with regard to noise-related annoyance
- Stantec recommends a minimum separation distance between Station 130 and development of any noise sensitive land use (refer to Figure 4-1 and Figure 4-2)
- The recommended separation distance was determined without the consideration of the New Community Area or receptor based noise control measures (refer to Section 3.4)

- Stantec has reviewed and considered receptor based noise control measures but these will still not adequately address environmental noise impacts, particularly for LFN, and therefore these did not affect the determination of the recommended minimum separation distance
- The recommended minimum separation distance is irrespective of the classification of the area (e.g., Class 2 area, Class 4 area) around Station 130 as outlined in the Ontario Ministry of Environment and Climate Change Environmental Noise Guideline – Stationary and Transportation Sources – Approval and Planning, NPC-300.

Glossary

Terms	Definitions
A – Weighting Network	A frequency weighting scale, which corrects the sound pressure levels in individual frequency bands according to human ear sensitivities. The scale is based upon the fact that the region of highest sensitivity for the average ear is between 2,000 and 4,000 Hz. Sound levels are measured on a logarithmic scale in decibels, dB. The universal measure for environmental sound is the A–weighted sound level, dBA.
Background Sound Level (baseline)	The sound level that is present in the environment, produced by noise sources other than the source under impact assessment. The background sound level is typically caused by road traffic, except in areas well removed from the activities of people. Sound from existing adjacent stationary sources are also included.
C—Weighting Network	The C-weighted decibel scale (dBC) was originally developed to reflect the frequency sensitivity of the human ear to high sound levels (above 85 dB). However, currently, the C-weighting is almost exclusively used to assess the low frequency content of sound, often in combination with the A-weighted scale. C-weighting is much flatter than the A-weighting, and thus includes more of the low-frequency range of sound.
Continuous Equivalent Sound Level Leq	It is the continuous sound level that is equivalent, in terms of acoustic energy, to the actual fluctuating noise existing at the location over a given period of time, usually one hour. Leq is often measured in hourly intervals over long periods in order to develop long-term noise levels. Leq can be frequency weighted using the A-weighting or C-weighting scales to the original sound, or left unweighted. It is also called the energy equivalent sound level.
dB, Decibel	Unit of measurement of sound levels
dBA, decibel A-Weighted	A unit of measurement of sound level corrected using the A-weighting network (scale), as defined in ANSI S1.4–1971 (R1983), using a reference level of 20 micro pascals.

Terms	Definitions
dBC, decibel C-Weighted	A unit of measurement of sound level corrected using the C-weighting network (scale), as defined in ANSI S1.4–1971 (R1983), using a reference level of 20 micro pascals.
Frequency Hz, Hertz	The number of periodic oscillations per second that an acoustic wave or a vibrating object exhibits. Frequency is commonly expressed in Hertz (Hz). Hz is numerically equal to cycles per second.
Insertion Loss (IL)	A reduction in sound pressure level at a receptor resulting from the insertion of noise abating element (barrier, silencer, etc.)
Low Frequency Noise (LFN)	Noise in the low frequency range – generally between 12.5 Hz and 160 Hz (i.e., covering 16 Hz, 31.5 Hz, 63 Hz and 125 Hz octave bands). Although, individual jurisdiction may occasionally expand or contract this frequency range (e.g., AER Directive 038).
Margin of Compliance	Arithmetic difference between the prediction results and the compliance target (i.e. sound level limit)
Safety Factor	A factor incorporated in the engineering calculations such that the predicted quantities are higher than nominal quantities (e.g., sound power levels)
Sound Level (SL)	Same as sound pressure level.
Sound Level Limit	Sound limits for stationary sources affecting points of reception in noise sensitive land uses
Sound Power Level (PWL)	The magnitude of sound power (the rate with which the acoustic energy radiates from the source) expressed in decibels, using a reference level of 1 piko Watt. PWL can be weighted using a frequency weighting scale and can be specified as an overall level or over a frequency interval (frequency band).
Sound Pressure Level (SPL)	The magnitude of sound pressure expressed ion decibels, using a reference level of 20 micro pascals. SPL can be weighted using a frequency weighting scale and can be specified as an overall level or over a frequency interval (frequency band).

1.0 INTRODUCTION

TransCanada PipeLines Limited (TransCanada) is proposing to expand the existing Maple Compressor Station (Station 130). Station 130 is located in a Restricted Industrial Zone (Zone M1) (City of Vaughan 2012). Areas surrounding Station 130 are currently zoned as Agricultural Zone (Zone A), Rural Residential Zone (Zone RR), Open Space Conservation Zone (Zone OS1), and Open Space Park Zone (Zone OS2) (The Corporation of the City of Vaughan 2015). The nearest residences are located to the east along Weston Road (205 m from the Station 130 property boundary) and to the northwest along Stephanie Drive (210 m from Station 130 property boundary).

The existing Station 130 consists of B-Plant units B1, B2, B3, as well as the Portable P1 Unit. The current planned expansion (Station 130 C4 Unit Addition Project) involves the addition of a C-Plant building, which includes one additional Solar Titan 250 unit (C4) and associated supporting equipment (refer to Appendix A: Plot Plan). The supporting equipment for the Station 130 C4 Unit Addition Project includes a new four bay aerial cooler, lube oil cooler, gas turbine combustion air inlet and exhaust systems, instrument air building and compressor building. With the addition of the C4 unit, the existing P1 unit will be reallocated as backup capacity in the event of outages to any of the B-Plant or C-Plant units or in scenarios where the power output from the B-Plant or C-Plant would exceed compression requirements.

In the future, it is reasonably foreseeable that TransCanada will further expand Station 130 with the addition of a second Solar Titan 250-driven compressor unit (C5) within the C-Plant building along with supporting equipment such as a second lube oil cooler and combustion air inlet and exhaust systems. This further expansion is representative of the "Full Buildout" of Station 130 (i.e., Units B1, B2, B3, C4, C5, P1[backup]), and is dependent on the future demand for natural gas as well as other factors such as commercial or contractual obligations.

At Full Buildout, the operating scenario adopted in this report is representative of the predictable worst case in accordance with Ontario Ministry of Environment and Climate Change (MOECC) Environmental Noise Guideline – Stationary and Transportation Sources – Approval and Planning, NPC-300 (NPC-300, MOECC 2013), which is based on the assumption that all units (i.e., B1, B2, B3, C4, and C5) and associated equipment operate concurrently at 100% throughput over a 1 hour period.

The New Community Area – Block 41 (New Community Area) is planned as a new community area that will be established by a Secondary Plan, as approved by the City of Vaughan. The New Community Area is planned on the land surrounding Station 130, which includes noise sensitive land uses such as residential dwellings (refer to Appendix B: New Community Area). Valcoustics Canada Ltd. (Valcoustics) was retained by the Block 41 Landowners Group (Block 41) to complete a preliminary assessment of the predictable worst case noise for

Station 130 at Full Buildout. Refer to Appendix C for the Valcoustics' memorandum "*Proposed C-Plant Project (The Project) at TransCanada's Maple Compressor Station Preliminary Acoustical Mitigation Measures*", dated October 25, 2017 (Valcoustics Memorandum).

1.1 PURPOSE OF THIS REPORT

Stantec Consulting Ltd. (Stantec) was retained by TransCanada to:

1. Review the Valcoustics Memorandum
2. Identify risks and provide recommendations regarding development of noise sensitive land use around Station 130

1.2 ENVIRONMENTAL NOISE DESCRIPTORS

Environmental noise is typically not steady. To account for the time-varying nature of environmental noise, a single number descriptor known as the continuous equivalent sound level (Leq) is used. It is defined as a steady continuous sound level over a specified time interval (commonly 1 hour) that has the same acoustic energy as the original time-varying sound. The recorded sound is typically "frequency-weighted" with A and C scales being the most common. The corresponding weighted Leq values, expressed in dBA or dBC (A-weighted and C-weighted decibels respectively), would then be used to describe the environmental noise present in the area.

The A-weighted scale is based on relative loudness of sound at different frequencies and is meant to reflect the human ear's response to noise. Nearly all noise regulations define limits on acceptable A-weighted L_{eq} sound levels. Different limits are typically assigned to time periods throughout a day (e.g., daytime, evening and nighttime).

In recent years, C-weighted sound levels have been recognized as an increasingly important descriptor for environmental sound, particularly in regard to low frequency noise (LFN) (WHO 1999; ANSI 2005). Some regulatory bodies have incorporated the C-weighted Leq into their regulations – most commonly, in combination with the A-weighted levels - to assess LFN (NSW Environment Protection Authority 2000; AER 2007; AUC 2013). Numerous researchers have linked excessive amounts of LFN to annoyance and complaints (Berglund et al. 1996; Broner 1982, 2011; Broner and Leventhall 1985; Hessler 2005).

1.3 STATION 130 EXISTING CONDITIONS

Station 130 is currently operating in compliance with the sound level limits (SLL) according to NPC-300. Sound levels were predicted at the existing nine points of reception (POR) around Station 130, which represent those that are most affected by Station 130 operation (Stantec 2016). Contours for both A-weighted and C-weighted sound levels associated with the predictable worst case under existing conditions are provided in Figure D-1 in Appendix D.

2.0 REVIEW OF VALCOUSTICS MEMORANDUM

Stantec reviewed the Valcoustics Memorandum and Valcoustics noise model. The details regarding the review are presented in Appendix E.

Stantec noted several deficiencies in the Valcoustics noise model and the assessment approach used by Valcoustics. Central among those were:

- The use of 45.5 dBA criteria for acceptable noise sensitive land use. The setback line provided in the Valcoustics Memorandum runs along their 45.5 dBA noise contour and criteria for acceptable building façade noise levels was set to 45.5 dBA. This exceeds the NPC-300 limit of 45 dBA for Class 2 area.
- Not including or considering the LFN impacts on the area of proposed development. The Full Buildout involves an operation of five gas turbines. Gas turbine exhaust and air inlet systems have considerable LFN emissions. For such installations, the effects of LFN have to be considered in noise impact assessments. Running the computer model used by Valcoustics in their assessment yielded noise levels in excess of 65 dBC over most of the New Community Area.
- The ground absorption constant G was not set to appropriate levels with the introduction of the New Community Area. The value of G = 0.75 used to represent the grassy areas and farmland around Station 130 was left unchanged with the addition of the New Community Area to the model. It is our view that much lower constant G should have been used within the New Community Area to properly represent reflective ground surfaces within the development, such as sidewalks and roadways, and it resulted in under-prediction of noise levels within the development by Valcoustics.
- Inadequate number of sound ray reflections were allowed in the model. The New Community Area shows a number of residential buildings in close proximity to one another. This provides conditions where multiple sound reflections from building facades result in an increase in sound levels (reverberant build-up). The model used by Valcoustics allowed for only a single reflection. It is our opinion this number is inadequate and resulted in under-prediction of noise levels within the development.
- Impractical noise control measures from a technical or operational perspective. Stantec recommended alternative measures that were equivalent to those proposed by Valcoustics and resulted in similar far-field A-weighted sound levels (refer to Appendix E).

In summary, Stantec concluded that the noise control measures and the corresponding "setbacks" (separation distances) proposed by Valcoustics are inadequate to address noise impacts within the New Community Area. The A-weighted levels would exceed Stantec-recommended criteria of 43 dBA (Section 3.4) and the C-weighted levels would exceed 65 dBC (Section 3.2) over large sections of the development. From a regulatory standpoint, noise impacts within the proposed development would not comply with NPC-300 as several building facades would exceed the 45 dBA SLL.

3.0 CRITERIA FOR ASSESSING NOISE/LAND USE COMPATIBILITY

NPC-300 provides criteria for assessing broadband noise (A-weighted sound levels) in Ontario, including defining class areas. There is no applicable regulatory guidance in Ontario that can be used to assess LFN effects and therefore assessing LFN depends on professional judgement. Criteria for assessing sound levels and for establishing separation distance, as well as a discussion on noise prediction accuracy, are provided below.

3.1 BROADBAND NOISE (A-WEIGHTED SOUND LEVELS)

In Ontario, the MOECC is responsible for the permitting and compliance monitoring of stationary noise sources. The MOECC regulates this through the Environmental Compliance Approval (ECA) process. The MOECC publication NPC-300 is the applicable regulatory guideline which provides quantitative SLLs and methods for assessing stationary noise sources. NPC-300 is a receptor based regulation that specifies the daytime (07:00 h to 19:00 h), evening (19:00 h to 23:00 PM) and nighttime (23:00 h to 07:00 h) SLL at PORs. The SLL is provided in terms of A-weighted 1 hour equivalent sound levels ($L_{eq,1HR}$ dBA) for which stationary sources under impact assessment may not exceed the SLL.

According to NPC-300, the SLL of each POR may be established by the greater of the following:

- the minimum background sound level that occurs or is likely to occur during the time period corresponding to the operation of the stationary source under impact assessment, or
- the Exclusion Limit defined in NPC-300 for class area identified for each POR in the area under assessment. Class areas are defined under NPC-300, and discussed further, below.

The background sound level incorporates noise sources representative of a class area (e.g., road traffic) but is exclusive of the stationary source(s) under impact assessment (e.g., Station 130). The Exclusion Limit may be defined synonymously with the background sound level according to NPC-300.

Observations made by Stantec during site surveys at Station 130 in 2016 and 2017 indicated that the acoustic environment without Station 130 (i.e., background sound level) is dominated by urban hum (described below) during the daytime period. Sounds of nature were noted to dominate during the evening and nighttime periods. Based on the site surveys at Station 130 in 2016 and 2017, the background sound level was identified to be consistent with a Class 2 Area as defined in NPC-300.

3.1.1 Class 2 Area

A Class 2 area is defined by NPC-300 as "an area with an acoustical environment that has qualities representative of both Class 1 and Class 3 areas". A Class 1 area is defined by NPC-300 as "an area with an acoustical environment typical of a major population centre, where the background sound level is dominated by the activities of people, usually road traffic, often referred to as urban hum." A Class 3 area is defined by NPC-300 as "a rural area with an acoustical environment that is dominated by natural sounds having little or no road traffic, such as a small community, agricultural area, a rural recreational area such as a cottage or a resort area, or a wilderness area.

A Class 2 area includes:

- sound levels characteristic of Class 1 during daytime (07:00 to 19:00 or to 23:00 hours)
- low evening and night background sound levels defined by natural environment and infrequent human activity starting as early as 19:00 hours (19:00 or 23:00 to 07:00 hours).

The MOECC SLLs for a Class 2 area are provided in Table 3-1.

Table 3-1 MOECC Sound Level Limits for a Class 2 Area

Time Period	Class 2 Area Sound Level Limit (Leq,1HR dBA)
Daytime (07:00 h – 19:00 h)	50
Evening (19:00 h – 23:00 h)	50
Nighttime (23:00 h – 07:00 h)	45

3.1.2 Class 4 Area

A Class 4 Area is defined by NPC-300 as an area or specific site that would otherwise be defined as Class 1 or 2 and which:

- is an area intended for development with new noise sensitive land use(s) that are not yet built
- is in proximity to existing, lawfully established stationary source(s)
- has formal confirmation from the land use planning authority with the Class 4 area classification which is determined during the land use planning process.

Additionally, areas with existing noise sensitive land use(s) cannot be classified as Class 4 areas (MOECC 2013).

The MOECC SLL for a Class 4 area are provided in Table 3-2.

Table 3-2 MOECC Sound Level Limits for a Class 4 Area

Time Period	Class 4 Area Sound Level Limit ($L_{eq,1HR}$ dBA)
Daytime (07:00 h – 19:00 h)	60
Evening (19:00 h – 23:00 h)	60
Nighttime (23:00 h – 07:00 h)	55

3.2 LOW-FREQUENCY NOISE (C-WEIGHTED SOUND LEVELS)

There is no applicable regulatory guidance in Ontario that can be used to assess LFN effects. In recent years, the area of LFN effects has seen much interest from regulators, researchers, and noise practitioners. It is generally recognized that C-weighted sound levels represent a good metric for assessing LFN impacts (Berglund et al. 1996; Broner 1982, 2011; Hessler 2005; WHO 1999). Excessive levels of LFN can lead to annoyance, which in recent years has been increasingly linked to health effects (Berglund et al. 1996; WHO 1999; WHO 2011; Health Canada 2016). Research in LFN-induced annoyance suggests that an increase of 4 to 5 dB in LFN doubles the perceived loudness of sound, while at middle frequency bands, a 10-dB increase in sound doubles the loudness (Berglund et al. 1996). This amplifies the potential LFN issues as sound levels increase. In dense urban or sub-urban developments, sound reverberation in spaces between buildings due to reflections (canyon effect) can increase sound levels at building facades. There is evidence that in sub-urban areas, sound levels in excess of 65 dBC trigger a significant increase in LFN-related complaints (Broner 1982; Broner and Leventhall 1985; Hessler 2005). In addition to annoyance, the World Health Organization (WHO) (WHO 1999) advises a number of other health effects associated with noise in general, such as sleep deprivation, and singles out increases in LFN in particular as being more impactful than similar increases in broadband A-weighted noise levels. Low frequency noise may also affect quality of life, including enjoyment of indoor and outdoor space.

The difference between the C-weighted and A-weighted sound levels is one of the metrics often cited by regulators for assessing LFN (NSW Environment Protection Authority 2000; AER 2007; AUC 2013). Ideally, that difference is below 15 dB. A difference of 20 dB is generally acceptable at lower overall A-weighted levels (Broner 2011). Noise with a difference between C-weighted and A-weighted Leq greater than 20 dB is generally considered as having an excessive amount of low frequency content (Broner 2011; Hessler 2005). However, as mitigation measures are applied to noise sources, A-weighted noise is generally reduced in proportion to C-weighted noise (i.e., the difference between C-weighted noise and A-weighted noise grows), making LFN more prominent. ANSI 12.9/Part 4 ANSI 2005, referenced by Health Canada, uses a difference of 10 dB as a cautionary limit. Exceedances of cautionary limits generally trigger closer scrutiny of LFN. This may include assessing the presence of low frequency tones and assessing individual octave bands for the potential of noise-induced vibration in buildings.

ANSI 12.9 considers the sound levels in the 16-Hz, 31.5-Hz, and 63-Hz octave bands and uses the logarithmic (energy) summation of sound pressure levels at these frequencies as single number descriptor for LFN content. Generally, LFN content of 70 dB (approximately equivalent to a maximum of 67 dBC) or less is considered acceptable. The standard also advises that, generally, annoyance is minimal when sound pressure levels at 16 Hz, 31.5 Hz and 63 Hz are below 65 dB and such LFN levels are generally acceptable.

Stantec recommends that criterion for assessing LFN from Station 130 on noise sensitive land use is set to 65 dBC during the nighttime periods. For daytime and evening hours a 5-dB increase to the limit can be permitted due to reduced sensitivity to noise during those hours. However, noise emissions from Station 130 (including LFN) do not substantially change between the daytime and nighttime hours and therefore, the nighttime criterion provides the overall limit.

Table 3-3 shows the Stantec-recommended LFN limits for noise sensitive land use around Station 130. These limits are in line with those proposed by other practitioners and researchers (Broner 2011; Hessler 2005).

Table 3-3 Recommended Low Frequency Sound Level Limits

Time Period	Low Frequency Sound Level Limit ($L_{eq,1HR}$ dBC)
Daytime (07:00 h – 19:00 h)	70
Evening (19:00 h – 23:00 h)	70
Nighttime (23:00 h – 07:00 h)	65

3.3 ENVIRONMENTAL NOISE PREDICTION ACCURACY

Overall prediction accuracy for environmental noise depends on two factors:

- the accuracy of the noise source data
- the accuracy of the noise model including:
  - accuracy of noise propagation calculation algorithms
  - accuracy of the representation of the actual physical setting

3.3.1 Noise Source Data

The sound power level is the rate with which acoustic energy radiates from the source of the noise (e.g., equipment). Generally, the source sound power level estimates are expected to be conservative. The degree of conservatism is related to the margins of safety and tolerances used by the equipment vendors – often between 2 and 5 dB depending on the particular piece of equipment and the octave bands in question. Field measurements aimed at quantifying sound power levels tend to over-estimate LFN emissions. Also, it is not always possible to perform field

measurements at full load operating conditions. Adjustments to sound power levels to approximate full load are subsequently made using commonly accepted engineering practices. Such adjustments, however, introduce uncertainty into noise modeling.

3.3.2 Noise Models

Noise modeling was performed using CadnaA64 computer program (DataKustik 2013) which implements ISO 9613 Part 1 and 2 standards (ISO 1993, 1996). The ISO 9613 sound propagation algorithms have a published accuracy of +/-3 dB over source receiver distances between 100 m and 1000 m. Propagation over shorter distances tends to be more accurate than that over longer distances. The ISO 9613 calculations also produce results representative of meteorological conditions enhancing sound propagation (e.g., downwind and/or mild ground-level temperature inversion conditions). These conditions do not occur all the time; therefore, the model predictions are expected to be conservative.

Noise models are also limited in their ability to represent the actual physical settings for the assessment. Parameters such as ground absorption, reflective/absorptive properties of building facades, scattering effects of various geometric features (curbs, fences, vegetation, building protrusions, pipe racks, etc.), or refractive effects of the actual atmosphere, among others, cannot be properly accounted for. The resulting uncertainties cannot be estimated. Correspondingly, the use of safety factors or assigning margins of compliance to account for such uncertainties is common. In its analysis of Station 130 for this report, Stantec did not apply any safety factors to the noise source data used in noise modeling as Stantec's confidence in these data is high.

3.3.3 Overall Prediction Accuracy

The overall accuracy of sound level prediction cannot be readily quantified. Our experience suggests that slight over-prediction typically results, assuming that all noise sources have been properly identified and quantified. However, over-prediction cannot be guaranteed in all cases.

Furthermore, the New Community Area represents a relatively dense development where multiple reflections from the facades of buildings in close proximity can lead to reverberant noise build-up. For more reflective facades, such build-up commonly results in the increases in noise levels of 2 to 3 dB as compared to cases where building facades are more absorptive (Kang 2006).

For the reasons discussed above, it is recommended that a suitable margin of compliance be assigned to noise predictions used for planning purposes around Station 130. The recommended margin of compliance for the overall A-weighted levels is 2 dB. This margin of compliance should be adequate to account for potential uncertainties related to the model representation of the physical setting and yet unforeseen noise effects that any future developments in the area surrounding Station 130 may create.

With regard to LFN, currently no margin of compliance pertaining to the C-weighted levels and the criteria of Table 3-3 is recommended as equipment LFN emission estimates are likely to be sufficiently conservative.

3.4 CRITERIA FOR ESTABLISHING SEPARATION DISTANCE

Separation distance between Station 130 and any future noise sensitive land use (e.g., residential dwellings) represents a critical mitigation measure to control noise impact on future residents. Upon careful assessment of noise impacts associated with both the overall A-weighted and C-weighted noise levels emitted by Station 130, Stantec advises that the separation distances proposed below are essential and noise sensitive land use should not be developed closer than this distance.

Stantec recommends that the separation distance for the development of noise sensitive land use be defined as the area which encompasses the combined predicted 43 dBA and the 65 dBC noise contours attributable to Station 130. The 43 dBA contour line incorporates a 2 dB margin of compliance for A-weighted noise as described in Section 3.3.3.

Stantec recommends that the separation distance be established without the consideration of the New Community Area and receptor based (i.e., off-site from TransCanada property) noise control measures because of uncertainties associated with the New Community Area; the effectiveness of receptor based noise control measures, particularly in regard to LFN; and uncertainly about facades of the proposed buildings and the future ground conditions within the New Community Area (refer to Section 4.0).

The MOECC D-Series Guidelines (specifically, D-6) (MOECC 1995) can be referenced for information regarding recommended minimum separation distances for land use planning.

4.0 RECOMMENDED SEPARATION DISTANCE FOR STATION 130

As described in Section 3.4, Stantec recommends that the separation distance for the development of noise sensitive land use be defined as the area which encompasses the combined predicted 43 dBA and the 65 dBC noise contours attributable to Station 130.

The recommended separation distance excludes consideration of the New Community Area and receptor based mitigation measures. The main reasons for excluding these are as follows:

- Uncertainty about the final New Community Area. Currently, only a conceptual design is available. Changes to building locations and orientations, geometry, or ground elevation in the subsequent development will alter the acoustic field within the development and may result in noise levels in areas that were previously acceptable.
- Uncertainty regarding the ground condition (absorption) in the area where the development will be. Currently, the Valcoustics noise model used 0.75 for ground absorption constant G which Stantec believes is too high. Ground absorption will affect the resultant sound levels within the development.
- Uncertainty about the facade acoustic characteristics of buildings and structures of the New Community Area. Reflections from building facades have a large effect on sound propagation in urban and dense sub-urban areas. The model currently uses 2-dB noise reduction for each reflection, making sound rays after the third reflection potentially not critical.
- Receptor based mitigation measures (barriers and screens) are considered inadequate to control LFN due to the uncertainties regarding barrier attenuation under conditions of strong temperature inversion and down-wind conditions.

Additionally, Stantec's analysis (Appendix E) demonstrates that receptor based noise control measures such as property line barriers are not effective means of mitigating LFN. Sound levels at residential building facades in excess of 65 dBC will be audible inside the residences of the New Community Area with the windows open. At these levels of C-weighted noise, some audibility may exist even with the windows closed. Receptor based noise control measures may to some extent address LFN concerns inside buildings. However, any receptor based noise control measures will not address LFN in outdoor spaces within the New Community Area.

Low frequency noise cannot be easily mitigated at the source, and therefore, an appropriate separation distance is the only option to address the potential for noise-related annoyances for noise sensitive land use around Station 130. Stantec recommends that receptor based noise control measures should not be used to reduce the recommended separation distance for noise sensitive land use. However, non-noise sensitive developments can be developed within the separation distance.

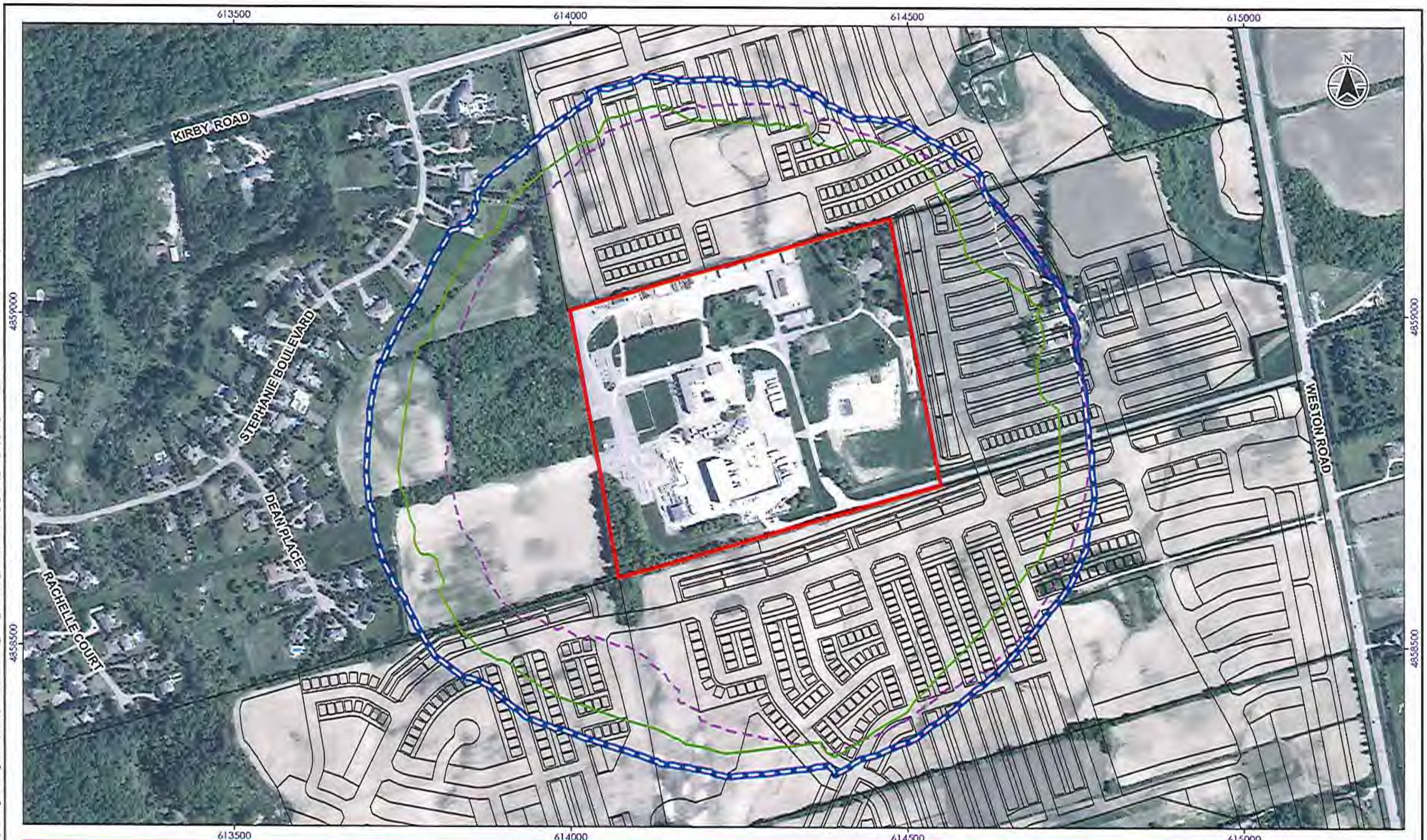
The area around Station 130 is currently considered a Class 2 area. The area around Station 130 may be reclassified at the discretion of the City of Vaughan to a Class 4 area. Reclassifying the area around Station 130 to a Class 4 area would increase the SLL from 45-50 dBA to 55-60 dBA. However, reclassifying the area around Station 130 to a Class 4 area would only address regulatory compliance with the corresponding SLL and would not address potential LFN issues as NPC-300 does not provide guidance on the assessment of or thresholds for C-weighted sound levels for LFN. Stantec has not seen any evidence suggesting that a particular area classification has an effect on residents' response to noise. Therefore, Stantec does not expect that the changes to the classification of development area will change the potential for levels of noise-related annoyance of future residents. Stantec maintains that an adequate separation distance as recommended hereinafter is required to adequately address the potential for adverse noise impacts.

4.1 SEPARATION DISTANCE WITHOUT GAS COOLER BARRIERS

The separation distance for noise sensitive land use around Station 130 without gas cooler barriers (which were proposed in the Valcoustics Memorandum) is shown in Figure 4-1. The separation distance (blue outlined) follows the combined 43 dBA isopleth (white contour line) and 65 dBC isopleth (purple contour line).

For reference, the 45.5 dBA isopleth of Station 130, as predicted by Valcoustics with Stantec-recommended minimum mitigation measures required for compliance at existing receptors is also shown on Figure 4-1 (green contour line).

The minimum separation distance is approximately 130 m from the Station 130 property boundary and the area encompassed by the separation distance is approximately 68 ha.



Legend

- Block 41 New Community Area
- Stantec Noise Model: 43 dBA Separation Distance, Full Buildout
- Stantec Noise Model: 65 dBC Separation Distance, Full Buildout
- Separation Distance without Gas Cooler Barriers, Full Buildout
- Valcoustics Noise Model with Stantec Minimum Mitigation Measures Required for Compliance at Existing Receptors: 45.5 dBA, Full Buildout
- TransCanada Station 130 property

0 160 320 metres

1:8,500 (At original document size of 8.5x11)

Notes

1. Coordinate System: NAD 1983 UTM Zone 17N
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2017.
3. Orthoimagery © First Base Solutions, 2017. Imagery Date, 2017.

Stantec

Project Location
City of Vaughan

123512478 REVA
Prepared by SPE on 2018-01-19
Technical Review by BCC on 2018-01-16

Client/Project
TRANSCANADA PIPELINES LTD.
STATION 130 POTENTIAL FULL BUILDOUT
ACOUSTIC ASSESSMENT

Figure No.
4-1

Title
Recommended Separation Distance for Station 130 without Gas Cooler Barriers

\\cd1215-f01\work_group\01609\Active\123511552\planning\drawing\MXD\Atmospheric\Noise\Mitigation_Measures_2018\123512478_Fig04-01_Rec_Sep_Dist_without_GCB.mxd Revised: 2018-01-19 By: searles

4.2 SEPARATION DISTANCE WITH GAS COOLER BARRIERS

The separation distance for noise sensitive land use around Station 130 with gas cooler barriers (as proposed in the Valcoustics Memorandum) is shown in Figure 4-2. The separation distance (blue outlined) follows the combined 43 dBA isopleth (white contour line) and 65 dBC isopleth (purple contour line).

For reference, the 45.5 dBA isopleth of Station 130, as predicted by Valcoustics with Stantec-recommended minimum mitigation measures required for compliance at existing receptors is also shown on Figure 4-2 (green contour line).

The minimum separation distance is approximately 90 m from the Station 130 property boundary and the area encompassed by the separation distance is approximately 55 ha.

Legend

- Block 41 New Community Area
- Gas Cooler Barriers within Station 130 property
- Stantec Noise Model: 43 dBA Separation Distance, Full Buildout
- Stantec Noise Model: 65 dBC Separation Distance, Full Buildout
- Separation Distance with Gas Cooler Barriers, Full Buildout
- Valcoustics Noise Model with Stantec Minimum Mitigation Measures Required for Compliance at Existing Receptors: 45.5 dBA, Full Buildout
- TransCanada Station 130 property

0 160 320 metres

1:8,500 (At original document size of 8.5x11)

Notes

1. Coordinate System: NAD 1983 UTM Zone 17N
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2017.
3. Orthoimagery © First Base Solutions, 2017. Imagery Date, 2017.

Stantec

Project Location: City of Vaughan

123512478 REVA
Prepared by SPE on 2018-01-19
Technical Review by BCC on 2018-01-16

Client/Project: TRANSCANADA PIPELINES LTD.
STATION 130 POTENTIAL FULL BUILDOUT
ACOUSTIC ASSESSMENT

Figure No. 4-2

Title: **Recommended Separation Distance for Station 130 with Gas Cooler Barriers**

Disclaimer: Stantec assumes no responsibility for data supplied in electronic format. The recipient accepts full responsibility for verifying the accuracy and completeness of the data. The recipient releases Stantec, its officers, employees, consultants and agents, from any and all claims arising in any way from the content or provision of the data.

STATION 130 COMPRESSOR STATION
ASSESSMENT OF NOISE IMPACT ON NOISE SENSITIVE LAND USE

Recommended Separation Distance for Station 130
January 2018

Stantec

5.0 CONCLUSIONS

Stantec has reviewed the Valcoustics Memorandum and the noise model used by Valcoustics. Stantec agrees that the sound levels resulting from additional noise control suggested by Valcoustics are achievable. However, Stantec has provided acoustically equivalent alternative mitigation measures where appropriate from a practical, technical, and operational feasibility standpoint. Nevertheless, these noise control measures, whether proposed by Stantec or Valcoustics, alone or in combination with the receptor based measures, are not sufficient to address LFN impacts within the New Community Area. Correspondingly, Stantec recommended a separation distance between Station 130 and any future noise sensitive land use.

The Stantec recommended separation distance was based on 43-dBA and 65-dBC noise isopleths without the consideration of any future development such as the New Community Area, as explained in Sections 3.4 and 4.0.

Stantec concluded that without the separation distance as recommended herein, LFN from Station 130 will exceed 65 dBC within the New Community Area. Low frequency noise is not regulated by MOECC, but is one of the influences on people's enjoyment of indoor and outdoor spaces, health, and noise-related annoyance. Low frequency noise levels in excess of 65 dBC at residential building facades have been known to trigger complaints to industry and municipal authorities, particularly in quiet suburban areas.

Receptor based noise control measures may to some extent address LFN concerns inside buildings. However, any receptor based noise control measures will not address LFN in outdoor spaces within the New Community Area. Furthermore, LFN is difficult to mitigate at the source. Therefore, an appropriate separation distance represents a crucial noise control measure to address the potential for LFN impact for noise sensitive land use in proximity to Station 130.

The New Community Area as currently proposed in the Valcoustics Memorandum represents a considerable risk in regard to noise-related impact for prospective residents. Due to the identified deficiencies in the Valcoustic model and assessment approach, the noise levels with the New Community Area have been understated. Additionally, Valcoustics has not considered and assessed the LFN impacts for this noise sensitive land use. The separation distances outlined in this report are crucial to mitigating that risk.

Conclusions
January 2018

Given the potential Full Buildout of Station 130 and without the recommended separation between Station 130 and noise sensitive land use, residents within the New Community Area may not perceive the area around Station 130 as a Class 2 area due to LFN, irrespective of the final overall A-weighted levels. This may lead to annoyances and future complaints directed towards the City and TransCanada.

Stantec Consulting Ltd.

Paul Wierzba
Senior Noise Engineer
Phone: 403-451-4437
paul.wierzba@stantec.com

Leaman Chow
Acoustical Engineer
Phone: 905-415-6396
leaman.chow@stantec.com

6.0 REFERENCES

AER (Alberta Energy Regulator). 2007. Directive 038: Noise Control, Calgary, Alberta, 16 Feb. 2007

ANSI (American National Standards Institute). 2005. ANSI S12.9-2005/Part 4 Quantities and procedures for description and measurement of environmental sound – *Part 4: Noise assessment and prediction of long-term community response*

AUC (Alberta Utilities Commission). 2013. Rule 012: Noise Control, Calgary, Alberta, 1 April 2013

Berglund, B., P. Hassmen and R.F.S. Job. 1996. "Sources and effects of low frequency noise", *J. Acoust. Soc. Am.* **99**, 2985-3002

Broner, N. 1982. "A criterion for predicting the annoyance due to higher level low frequency noise" *J. Sound Vib., 84, 443-448*

Broner, N. 2011. "A Simple Outdoor Criterion for Assessment of Low Frequency Noise Emissions", *Acoustics Australia (Journal) 39*(1), 7-14

Broner, N. and H.G. Leventhall. 1985. "Annoyance Loudness and Unacceptability of Higher Level Low Frequency Noise", *J. Low Freq. Noise Vib.* **4**, 1-11

DataKustik (DataKustik GmbH). 2013. Cadna/A64 Computer Aided Noise Abatement Model, Version 2017 MR1. Munich, Germany.

Health Canada. 2016. "Guidelines for Evaluating Human Health Impacts in Environmental Assessment: Noise", Ottawa, Ontario

Hessler Jr., G.F. 2005. "Proposed criteria for low frequency industrial noise in residential communities", *J. Low Freq. Noise, Vib. Active Control* **24**(2), 97-105

ISO (International Organization for Standardization). 1993. International Standard ISO 9613-1, Acoustics Attenuation of Sound during Propagation Outdoors. Part 1: Calculation of Absorption of Sound by the Atmosphere. Geneva, Switzerland.

ISO. 1996. International Standard ISO 9613-2, Acoustics Attenuation of Sound during Propagation Outdoors. Part 2: General Method of Calculation. Geneva, Switzerland.

Kang, J. 2006. "Urban Sound Environment", CRC Press, 1st Edition

MOECC (Ontario Ministry of Environment and Climate Change). 1995. Guideline D-6 - Compatibility Between Industrial Facilities and Sensitive Land Uses. July 1995. Ontario Ministry of the Environment. PIBS 3272e

MOECC. 2013. Environmental Noise Guideline: Stationary and Transportation Sources – Approval and Planning Publication NPC-300.

NSW Environment Protection Authority. 2000. *New South Wales Industrial Noise Policy,* Environmental Policy Branch, NSW Environment Protection Authority, January 2000

Stantec Consulting Ltd. 2016. Station 130 B3 Unit Addition Project Post-Construction Noise Monitoring Plan, January 2016.

The Corporation of the City of Vaughan. 2015. By-law Number 1-88 "The Comprehensive Zoning Bylaw"

WHO (World Health Organization). 1999. World Health Organization "Guidelines for Community Noise", 1999, edited by B. Berglund, T. Lindvall, D.H. Schwela.

WHO. 2011. *Burden of disease from environmental noise. Quantification of healthy life years lost in Europe.* Theakston, F. (Ed)

Appendix A STATION 130 C4 UNIT ADDITION PROJECT PLOT PLAN

STATION 130 COMPRESSOR STATION
ASSESSMENT OF NOISE IMPACT ON NOISE SENSITIVE LAND USE

Appendix A Station 130 C4 Unit Addition Project Plot Plan
January 2018

Stantec

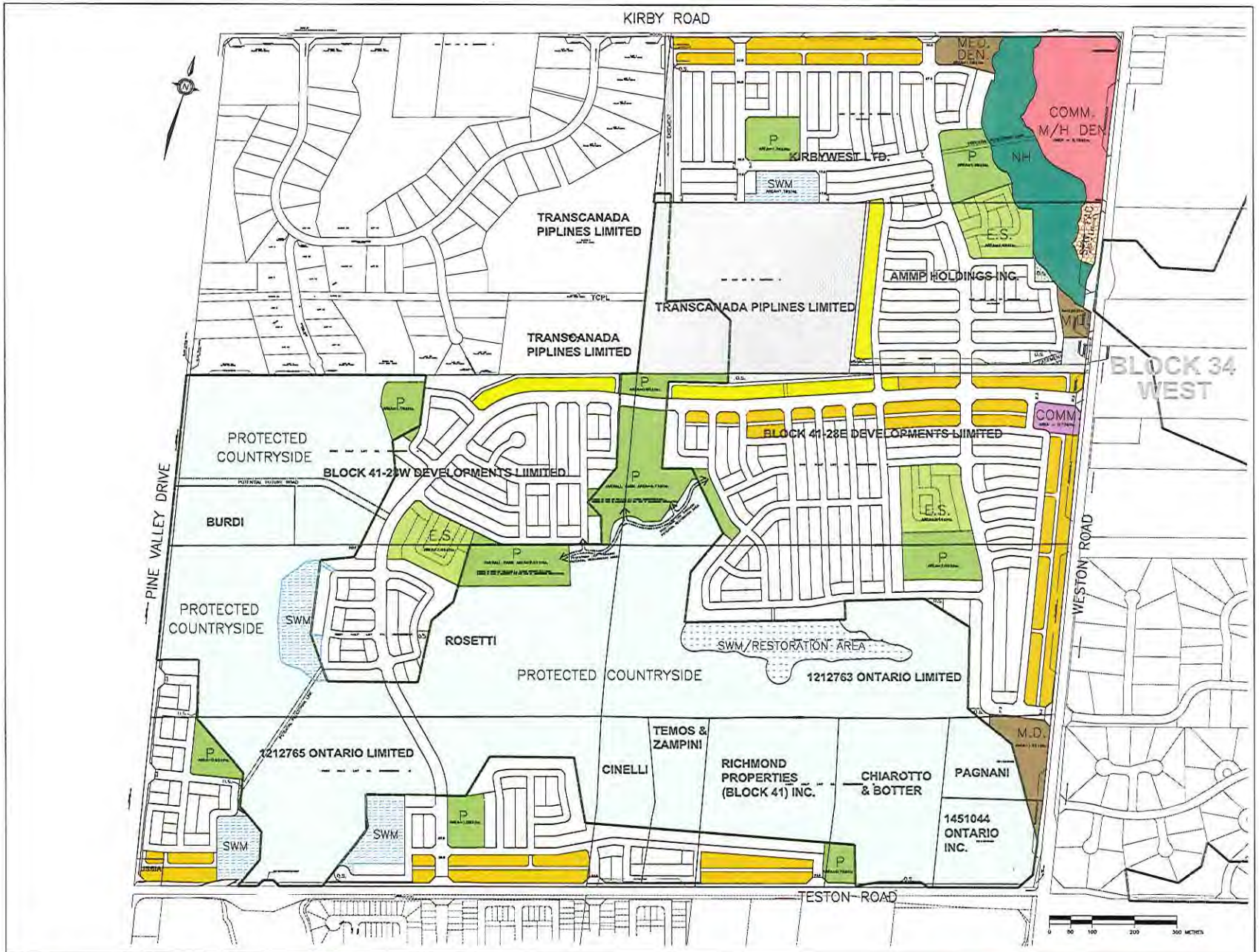
Appendix B BLOCK 41 NEW COMMUNITY AREA

Stantec

STATION 130 COMPRESSOR STATION
ASSESSMENT OF NOISE IMPACT ON NOISE SENSITIVE LAND USE

Appendix B Block 41 New Community Area
January 2018

Stantec



- SCHOOL
- EDGE OF PROTECTED COUNTRYSIDE
- PROTECTED COUNTRYSIDE
- MEDIUM/HIGH DENSITY & COMMERCIAL
- MEDIUM DENSITY
- COMMERCIAL
- SENIORS FACILITY
- FRONT ACCESSED LOTS
- PARK
- OPEN SPACE
- NATURAL HERITAGE OUTSIDE GREENBELT
- STORMWATER MANAGEMENT
- STORMWATER MANAGEMENT/RESTORATION AREA
- TRANS-CANADA PIPELINE FACILITY/EASEMENT
- LANEWAY ACCESSED LOTS (DECKED TOWNHOUSE)
- LANEWAY ACCESSED LOTS (DETACHED GARAGE TOWNHOUSE)

ALL STREET ACCESSED LOTS ARE NOMINALLY 27.6m DEPTH.
LANEWAY ACCESSED LOTS (DECKED TH) ARE NOMINALLY 27.6m DEPTH
LANEWAY ACCESSED LOTS (ATTACHED GARAGE TH) ARE NOMINALLY 33m DEPTH

For discussion purposes only

BLOCK 41 CONCEPT
PROJECT No. P-1434

SCALE 1:3000 OCT. 4, 2017

(1434-DES70)
X-REF: (1434MAS1)

Appendix C VALCOUSTICS MEMORANDUM

Stantec

STATION 130 COMPRESSOR STATION
ASSESSMENT OF NOISE IMPACT ON NOISE SENSITIVE LAND USE

Appendix C Valcoustics Memorandum
January 2018

Stantec

VALCOUSTICS
Canada Ltd.
Sound solutions to acoustical challenges
Celebrating over 60 years

MEMORANDUM

TO: Adam Sheldon **VIA E-MAIL**
adam_sheldon@transcanada.com

FROM: Anthony Amarra/Mark Levkoe

DATE: October 25, 2017

RE: Block 41 Landowners Group
Proposed C-Plant Project (The Project) at TransCanada's Maple Compressor Station
Preliminary Acoustical Mitigation Measures

FILE: 114-0304

1.0 INTRODUCTION

The TransCanada Pipeline (TCPL) Maple Compressor Station located at 11200 Weston Road is in an area of transition within the City of Vaughan, in the heart of Block 41, one of the City's two "New Community Areas". The Block 41 Landowners Group own approximately 232 gross hectares of land surrounding the Maple Compressor Station and represents 72% of the total block ownership. Block 41 also includes an existing residential subdivision known as "Purpleville Estates". In response to the proposed (future) C-Plant at the TCPL site, the Block 41 Landowners Group have engaged Valcoustics Canada Ltd. (VCL) to complete a preliminary assessment of the noise impact on the proposed Block 41 Conceptual Block Plan from the operations of the TCPL facility.

The assessment was done to determine potential mitigation measures that could be implemented at the TCPL facility that would result in compliance with the Ministry of the Environment and Climate Change (MOECC) noise guideline limits at the proposed dwellings to be constructed within the Block 41 secondary plan area. We understand that TransCanada will be filing the application to the National Energy Board (NEB) in early November 2017, and it is the hope of the Landowners Group that the mitigation proposed herein will be considered as part of the application going forward.

The assessment was based on the acoustical models "C1_2017-025.cna" and "C2_20170925.cna" prepared by Stantec Consulting Ltd., received on September 29, 2017.

2.0 BLOCK PLAN

The assessment is based on the Block 41 Conceptual Block Plan dated October 4, 2017 (included as Attachment A). Where necessary, the first row of dwellings to the east and south of the TCPL site could be designed to include noise mitigation measures as part of the building design. The proposed mitigation is in the form of rear yard garages acting as sound barriers. The intent is that the peak of the garage will be high enough to screen the line of sight from the 2nd storey windows of the dwellings to the majority of noise sources at TCPL.

The image below illustrates the concept. For this preliminary assessment, the garages were assumed to be 6.0 m high.

Garage as Sound Barrier Concept (Image taken from Google Earth)

3.0 C-PLANT MODEL AND MITIGATION

The acoustical model provided by Stantec indicates noise emissions from the TCPL facility comply with the MOE noise guideline limits at the closest *existing* noise-sensitive receptors (existing residential dwellings) in the area, provided specific mitigation measures are implemented. These measures include:

- Acoustic louvres on the east and west ventilation openings of the B-Plant (Source ID B-03A, B-03B, B-03C, B-04), providing an overall sound reduction of 9 dBA for noise emitted from the openings;

- Silencers for the C-Plant turbine exhaust stacks (Source ID TCP1_titan250stk and TCP2_titan250stk), providing an overall sound reduction of 8 to 10 dBA;

- A silencer for the C-Plant turbine inlet openings (Source ID TCP1_titan250_turin and TCP2_titan250_turin) capable of providing an overall sound reduction of 5 dBA; and

- Exterior wall and roof construction for the new C-Plant building (Source ID TCP2_titan250_bdg) and instrument air compressor building (Source ID C_IA) which meet a Sound Transmission Class (STC) rating of STC 30.

- Figure 1 shows the TCPL site and the IDs of all noise sources. Table 1 shows a description of the sources.

4.0 NOISE IMPACT AT BLOCK PLAN

The image to the right illustrates the noise impact from the TCPL facility (with the TCPL proposed mitigation, as noted in Section 3.0 above) onto the Conceptual Block Plan. The Green Line shows the noise influence area (45 dBA sound level contour) from the TCPL facility in absence of any buildings on the Conceptual Block Plan. The Red Line shows the same sound level contour but takes into account acoustical screening provided by the conceptual Block 41 building massing.

Predicted 45 dBA Contours with Block Concept Plan (Unmitigated)

The garages sound barrier concept at the dwellings to the east and south of TCPL, effectively mitigates the noise levels from TCPL to at or below the applicable sound level limits at most locations.

Where there are gaps between the garages and where the road network goes through, the sound contour penetrates through to the dwellings and sound level excesses are predicted. Sound level excesses are also predicted at the dwellings to the north of the TCPL facility, where the rear lane garage concept is not used.

5.0 ADDITIONAL MITIGATION

To comply with the applicable guideline limits at all dwellings in the Block Plan, additional mitigation measures can be implemented at the TCPL site, which have been identified and highlighted in Table 1. These include at-source noise controls (such as silencers) as well as sound barriers along the property line. In addition to this, there is one location on the Conceptual Block Plan (at the dwellings south of TCPL), where a sound barrier between the garages would be necessary.

Figure 2 shows the required mitigation measures.

Note, the acoustical model provided includes only the B-1 and B-2 compressors operating. The B-3 compressor is stand-by. However, mitigation is required for all three compressors. The locations for the sources associated with the B-3 unit were taken from the previous model provided by TCPL as part of the post-construction monitoring report (Scenario4_20170425.cna).

The image to the right illustrates the effect of the additional mitigation measures to the 45 dBA contour (Red Line). As shown in the image, the noise influence area moves further away from the proposed dwellings, especially to the south and east. At the dwellings to the north, the sound levels are predicted to meet the 45 dBA limit without the 6.0 m garage design. Therefore the recommended additional mitigation measures are sufficient to show compliance with the applicable guideline limits at all dwellings within the Block 41 area.

Predicted 45 dBA Contours with Block Concept Plan (Mitigated)

The details of the mitigation measures required to achieve the sound levels shown in the image are described below.

5.1 B-PLANT - SOURCE-SPECIFIC MEASURES

- The B-Plant north and south wall exhaust fan openings (Source ID: B-08, B-09, B-10 and B-11) require silencers which achieve an overall sound reduction of 15 dBA;
- The B-Plant GT Enclosure exhaust openings (Source ID: B-07A-1, B-07B-1 and B-07C-1) require silencers which achieve an overall sound reduction of 15 dBA;
- The B-Plant exhaust ducting (Source ID: B-06A, B-06B, B-06C) requires acoustical treatment in the form of acoustical duct lagging. The duct lagging should achieve an overall sound reduction of 14 dBA.

5.2 C-PLANT - SOURCE-SPECIFIC MEASURES

- The C-Plant compressor exhaust stacks (Source ID: TCP2_titan250stk1 and TCP2_titan250stk2) require silencers which provide an overall reduction of 25 dBA each. Note, that TCPL is proposing silencers that will achieve a reduction of 8 to 10 dBA for these stacks. These would need to be upgraded.
- The C-Plant lube oil coolers (Source ID: TCP1_titan250loc and TCP2_titan250loc) require reductions which provide an overall sound reduction of 18 dBA each;
- The C-Plant building exhaust fan openings (TCP2_titan250bdgfan1 to 5) require silencers or acoustical louvres which provide an overall reduction of 15 dBA each;

- The C-Plant building exterior wall construction should be upgraded to meet a minimum rating of STC-48. As an example, this could be achieved with 190 mm thick normal weight concrete block; and

- The C-Plant building roof construction should be upgraded to meet a minimum rating of STC-46. As an example, this could be achieved with 100 mm thick poured concrete atop a steel deck.

5.3 SOUND BARRIERS

- A 6.5 m high, approximately 82 m long, "L"-shaped sound barrier to screen the west and south sides of the B-Plant aerial coolers;

- A 7.5 m high, approximately 70 m long, "L"-shaped sound barrier to screen the north and east sides of the C-Plant aerial coolers;

- A 6.0 m high, approximately 75 m long, sound barrier along the south TCPL property boundary, screening the gap between townhouses at the laneway/walkway;

- A 4.5 m high, approximately 170 m long, sound barrier along the north TCPL property boundary, screening the single-family dwellings to the north.

- A sound barrier between two of the garages at a height of 6 m would be required. Alternatively, the garages could be continuous at this location, the intent being that the gap between be closed off.

5.4 NOTE ON MITIGATION MEASURES SHOWN

The mitigation measures that will be needed are a function of the final Block Plan design which cannot be determined definitively at this time. The design and configuration of the land uses surrounding the TCPL site may be subject to future changes, and these future changes in the block plan may result in variation of the mitigation requirements, such as the heights, extents and locations of the sound barriers (which are dependent on the locations of open spaces, gaps between buildings, etc.) Therefore the mitigation measures described herein cannot be considered final and may be subject to change as necessitated by any changes to the Conceptual Block Plan.

Should you have any questions or wish to discuss our comments in greater detail, please contact us.

AA\ML
J:\2014\114304\000\Memos\Block 41 M_4 - Mitigation Requirements - TCPL (Draft).docx

cc Malone Given Parsons Ltd.
Block 41 Landowners Group

TABLE 1

NOISE SOURCE SUMMARY AND AT SOURCE MITIGATION

Source ID[1]	Source Description	Unmitigated Sound Power Level (dBA re 10^{-12} W)	TCPL Proposed Mitigation		Block 41 – Proposed Mitigation	
			Proposed Attenuation to Meet at Existing Receptors	Mitigated Sound Power Level (dBA re 10^{-12} W)	Proposed Attenuation to Meet at Proposed Residential Development	Mitigated Sound Power Level (dBA re 10^{-12} W)
POINT SOURCES						
B-01A	B Plant Compressor Exhaust Stack 01	89	NONE	89	NONE	89
B-01B	B Plant Compressor Exhaust Stack 02	89	NONE	89	NONE	89
B-01C	B Plant Compressor Exhaust Stack 03	89	NONE	89	NONE	89
B-02A	B Plant Air Inlet 1	91	NONE	91	NONE	91
B-02B	B Plant Air Inlet 2	91	NONE	91	NONE	91
B-02C	B Plant Air Inlet 3	91	NONE	91	NONE	91
B-03A	B Plant East Vent	94	Acoustic louvre to achieve 9 dBA Overall Reduction	85	Acoustic louvre to achieve 9 dBA Overall Reduction[2]	85
B-03B	B Plant East Vent	94	Acoustic louvre to achieve 9 dBA Overall Reduction	85	Acoustic louvre to achieve 9 dBA Overall Reduction[2]	85
B-03C	B Plant East Vent	94	Acoustic louvre to achieve 9 dBA Overall Reduction	85	Acoustic louvre to achieve 9 dBA Overall Reduction[2]	85
B-04	B Plant West Vent	94	Acoustic louvre to achieve 9 dBA Overall Reduction	85	Acoustic louvre to achieve 9 dBA Overall Reduction[2]	85
B-06A	B Plant Lube Oil Cooler 01 Intake	90	Louvre to achieve 2 dBA Overall Reduction	88	Louvre to achieve 2 dBA Overall Reduction[2]	88
B-06B	B Plant Lube Oil Cooler 02 Intake	90	Louvre to achieve 2 dBA Overall Reduction	88	Louvre to achieve 2 dBA Overall Reduction[2]	88
B-06C	B Plant Lube Oil Cooler 03 Intake	90	Louvre to achieve 2 dBA Overall Reduction	88	Louvre to achieve 2 dBA Overall Reduction[2]	88
CRV	Cold Recycle Valve	100	NONE	100	NONE	100
B-06A-1	B Plant Lube Oil Cooler 01 Exhaust	87	Louvre to achieve 2 dBA Overall Reduction	85	Louvre to achieve 2 dBA Overall Reduction[2]	85
B-06B-1	B Plant Lube Oil Cooler 02 Exhaust	87	Louvre to achieve 2 dBA Overall Reduction	85	Louvre to achieve 2 dBA Overall Reduction[2]	85
B-06C-1	B Plant Lube Oil Cooler 03 Exhaust	87	Louvre to achieve 2 dBA Overall Reduction	85	Louvre to achieve 2 dBA Overall Reduction[2]	85
B-07A	B Plant GT Enclosure Inlet	77	NONE	77	NONE	77
B-07B	B Plant GT Enclosure Inlet	77	NONE	77	NONE	77
B-07C	B Plant GT Enclosure Inlet	77	NONE	77	NONE	77
B-07A-1	B Plant GT Enclosure Exhaust	99	NONE	99	Mitigation to achieve 15 dBA Overall Reduction	84
B-07B-1	B Plant GT Enclosure Exhaust	99	NONE	99	Mitigation to achieve 15 dBA Overall Reduction	84
B-07C-1	B Plant GT Enclosure Exhaust	99	NONE	99	Mitigation to achieve 15 dBA Overall Reduction	84
Cplant_IAfan	Instrument Air Comp (C Plant) fan	84	NONE	84	NONE	84
Cplant_IAfan	Instrument Air Comp (C Plant) fan	84	NONE	84	NONE	84
Cplant_IAlvr	Instrument Air Comp (C Plant) lvr	55	NONE	55	NONE	55
Cplant_IAlvr	Instrument Air Comp (C Plant) lvr	55	NONE	55	NONE	55
TCP2_titan250stk1	TCP1 titan 250 stack (C Plant)	110	Silencer to achieve 10 dBA Overall Reduction	100	Mitigation to achieve 25 dBA Overall Reduction	85
TCP1_titan250loc1	TCP1 titan 250 loc (C Plant)	100	NONE	100	Mitigation to achieve 18 dBA Overall Reduction	82
TCP2_titan250bdgfan1	TCP2 titan 250 (x2) bdg exhaust fan(C Plant)	95	NONE	95	Mitigation to achieve 15 dBA Overall Reduction	80
TCP2_titan250bdgfan2	TCP2 titan 250 (x2) bdg exhaust fan(C Plant)	95	NONE	95	Mitigation to achieve 15 dBA Overall Reduction	80
TCP2_titan250bdgfan3	TCP2 titan 250 (x2) bdg exhaust fan(C Plant)	95	NONE	95	Mitigation to achieve 15 dBA Overall Reduction	80
TCP2_titan250bdgfan4	TCP2 titan 250 (x2) bdg exhaust fan(C Plant)	95	NONE	95	Mitigation to achieve 15 dBA Overall Reduction	80
TCP2_titan250bdgfan5	TCP2 titan 250 (x2) bdg exhaust fan(C Plant)	95	NONE	95	Mitigation to achieve 15 dBA Overall Reduction	80

TABLE 1

NOISE SOURCE SUMMARY AND AT SOURCE MITIGATION

Source ID[1]	Source Description	Unmitigated Sound Power Level (dBA re 10^{-12} W)	TCPL Proposed Mitigation		Block 41 – Proposed Mitigation	
			Proposed Attenuation to Meet at Existing Receptors	Mitigated Sound Power Level (dBA re 10^{-12} W)	Proposed Attenuation to Meet at Proposed Residential Development	Mitigated Sound Power Level (dBA re 10^{-12} W)
TCP1_titan250ventin	TCP1 titan 250 Vent inlet silenced (C Plant)	85	NONE	85	NONE	85
TCP1_titan250ventout	TCP1 titan 250 Vent outletsilenced (C Plant)	83	NONE	83	NONE	83
TCP2_titan250stk2	TCP2 titan 250 stack (C Plant)	110	Silencer to achieve 10 dBA Overall Reduction	100	Mitigation to achieve 25 dBA Overall Reduction	85
TCP2_titan250loc2	TCP2 titan 250 loc (C Plant)	100	NONE	100	Mitigation to achieve 18 dBA Overall Reduction	82
TCP2_titan250ventin	TCP2 titan 250 Vent inlet silenced (C Plant)	85	NONE	85	NONE	85
TCP2_titan250ventout	TCP2 titan 250 Vent outletsilenced (C Plant)	83	NONE	83	NONE	83
LINE SOURCES						
B-05A	B Plant Breakout Duct Noise - Inlet 01	88	NONE	88	NONE	88
B-05B	B Plant Breakout Duct Noise - Inlet 02	88	NONE	88	NONE	88
B-05C	B Plant Breakout Duct Noise - Inlet 03	88	NONE	88	NONE	88
B-06A	B Plant Exhaust Ducting 01	92	NONE	92	Mitigation to achieve 13 dBA Overall Reduction	79
B-06B	B Plant Exhaust Ducting 02	92	NONE	92	Mitigation to achieve 13 dBA Overall Reduction	79
B-06C	B Plant Exhaust Ducting 03	92	NONE	92	Mitigation to achieve 13 dBA Overall Reduction	79
B-07A	B Plant Discharge Piping 01	106	Acoustic treatment to achieve 23 dBA Overall Reduction	83	Acoustic treatment to achieve 23 dBA Overall Reduction[2]	83
B-07B	B Plant Discharge Piping 02	106	Acoustic treatment to achieve 24 dBA Overall Reduction	82	Acoustic treatment to achieve 24 dBA Overall Reduction[2]	82
B-07C	B Plant Discharge Piping 03	106	Acoustic treatment to achieve 24 dBA Overall Reduction	82	Acoustic treatment to achieve 24 dBA Overall Reduction[2]	82
AREA SOURCES						
B-12_Discharge	Aerial Coolers 4 bays (B Plant)	103	NONE	103	Sound Barrier	103[3]
C_AC_Discharge	Aerial Coolers 4 bays (C Plant)	103	NONE	103	Sound Barrier	103[3]
C_IA	Instrument Air Comp (C Plant)	77	STC 30 Roof Construction	56	STC 30 Roof Construction[2]	56
TCP2_titan250_bdg	C-Plant Building Roof	114	STC 30 Roof Construction	99	STC 46 Roof Construction	89
TCP2_titan250_turin1	TCP2 titan 250 turbine inlet (C Plant)	104	Silencer to achieve 5 dBA Overall Reduction	99	Silencer to achieve 5 dBA Overall Reduction[2]	99
TCP2_titan250_turin2	TCP2 titan 250 turbine inlet (C Plant)	104	Silencer to achieve 5 dBA Overall Reduction	99	Silencer to achieve 5 dBA Overall Reduction[2]	99
VERTICAL AREA SOURCES						
B-08	B Plant Exhaust Fan 1 - South wall	94	NONE	94	Mitigation to achieve 15 dBA Overall Reduction	79
B-09	B Plant Exhaust Fan 2 - South wall	94	NONE	94	Mitigation to achieve 15 dBA Overall Reduction	79
B-10	B Plant Exhaust Fan 3 - North wall	94	NONE	94	Mitigation to achieve 15 dBA Overall Reduction	79
B-11	B Plant Exhaust Fan 4 - North wall	94	NONE	94	Mitigation to achieve 15 dBA Overall Reduction	79
B-12_Plenum	Aerial Coolers 4 bays (B Plant)	91	NONE	91	Sound Barrier	91[3]
B-12_Plenum	Aerial Coolers 4 bays (B Plant)	91	NONE	91	Sound Barrier	91[3]
B-12_Plenum	Aerial Coolers 4 bays (B Plant)	91	NONE	91	Sound Barrier	91[3]
B-12_Plenum	Aerial Coolers 4 bays (B Plant)	91	NONE	91	Sound Barrier	91[3]
B-12_Intake	Aerial Coolers 4 bays (B Plant)	102	NONE	102	Sound Barrier	102[3]
B-12_Intake	Aerial Coolers 4 bays (B Plant)	102	NONE	102	Sound Barrier	102[3]

TABLE 1
NOISE SOURCE SUMMARY AND AT SOURCE MITIGATION

Source ID[1]	Source Description	Unmitigated Sound Power Level (dBA re 10^{-12} W)	TCPL Proposed Mitigation		Block 41 – Proposed Mitigation	
			Proposed Attenuation to Meet at Existing Receptors	Mitigated Sound Power Level (dBA re 10^{-12} W)	Proposed Attenuation to Meet at Proposed Residential Development	Mitigated Sound Power Level (dBA re 10^{-12} W)
B-12_Intake	Aerial Coolers 4 bays (B Plant)	102	NONE	102	Sound Barrier	102[3]
B-12_Intake	Aerial Coolers 4 bays (B Plant)	102	NONE	102	Sound Barrier	102[3]
C_AC_Plenum	Aerial Coolers 4 bays (C Plant)	91	NONE	91	Sound Barrier	91[3]
C_AC_Plenum	Aerial Coolers 4 bays (C Plant)	91	NONE	91	Sound Barrier	91[3]
C_AC_Plenum	Aerial Coolers 4 bays (C Plant)	91	NONE	91	Sound Barrier	91[3]
C_AC_Plenum	Aerial Coolers 4 bays (C Plant)	91	NONE	91	Sound Barrier	91[3]
C_AC_Intake	Aerial Coolers 4 bays (C Plant)	102	NONE	102	Sound Barrier	102[3]
C_AC_Intake	Aerial Coolers 4 bays (C Plant)	102	NONE	102	Sound Barrier	102[3]
C_AC_Intake	Aerial Coolers 4 bays (C Plant)	102	NONE	102	Sound Barrier	102[3]
C_AC_Intake	Aerial Coolers 4 bays (C Plant)	102	NONE	102	Sound Barrier	102[3]
C_IA	Instrument Air Comp (C Plant)	81	STC 30 Wall Construction	60	STC 30 Wall Construction[2]	60
TCP2_titan250_bdg	TCP2 titan 250 (x2) compressor building (C Plant)	117	STC 30 Wall Construction	96	STC 48 Wall Construction	91
TCP2_titan250_bdglvr	TCP2 titan 250 (x2) compressor building (C Plant) louver	79	Louvre to achieve 2 dBA Overall Reduction	77	Louvre to achieve 2 dBA Overall Reduction[2]	77
TCP2_titan250_bdglvr	TCP2 titan 250 (x2) compressor building (C Plant) louver	79	Louvre to achieve 2 dBA Overall Reduction	77	Louvre to achieve 2 dBA Overall Reduction[2]	77
TCP2_titan250_bdglvr	TCP2 titan 250 (x2) compressor building (C Plant) louver	79	Louvre to achieve 2 dBA Overall Reduction	77	Louvre to achieve 2 dBA Overall Reduction[2]	77
TCP2_titan250_bdglvr	TCP2 titan 250 (x2) compressor building (C Plant) louver	79	Louvre to achieve 2 dBA Overall Reduction	77	Louvre to achieve 2 dBA Overall Reduction[2]	77
TCP2_titan250_bdglvr	TCP2 titan 250 (x2) compressor building (C Plant) louver	79	Louvre to achieve 2 dBA Overall Reduction	77	Louvre to achieve 2 dBA Overall Reduction[2]	77

Notes:
(1) See Figure 1.
(2) Mitigation to meet at proposed Block 41 site is the same as the mitigation to meet at existing receptors.
(3) The mitigated sound power level of the source with sound barrier is shown to be unchanged from the unmitigated sound power level.

VALCOUSTICS Canada Ltd. consulting acoustical engineers

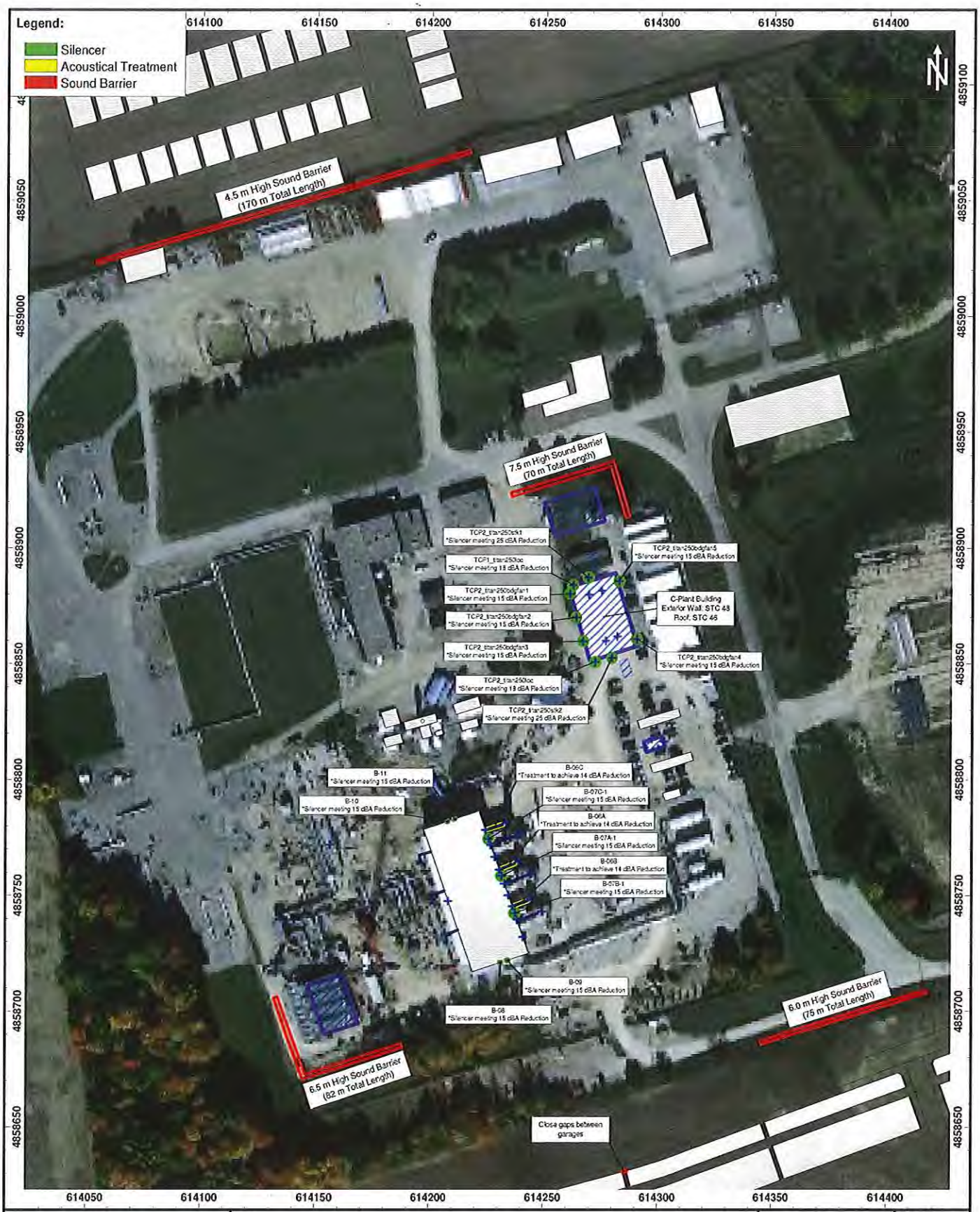
Title: Noise Source IDs and Locations

Project Name: Block 41

Date: 2017-10-16

Project No.: 114-304

Figure: 1



VALCOUSTICS
Canada Ltd.
consulting acoustical engineers

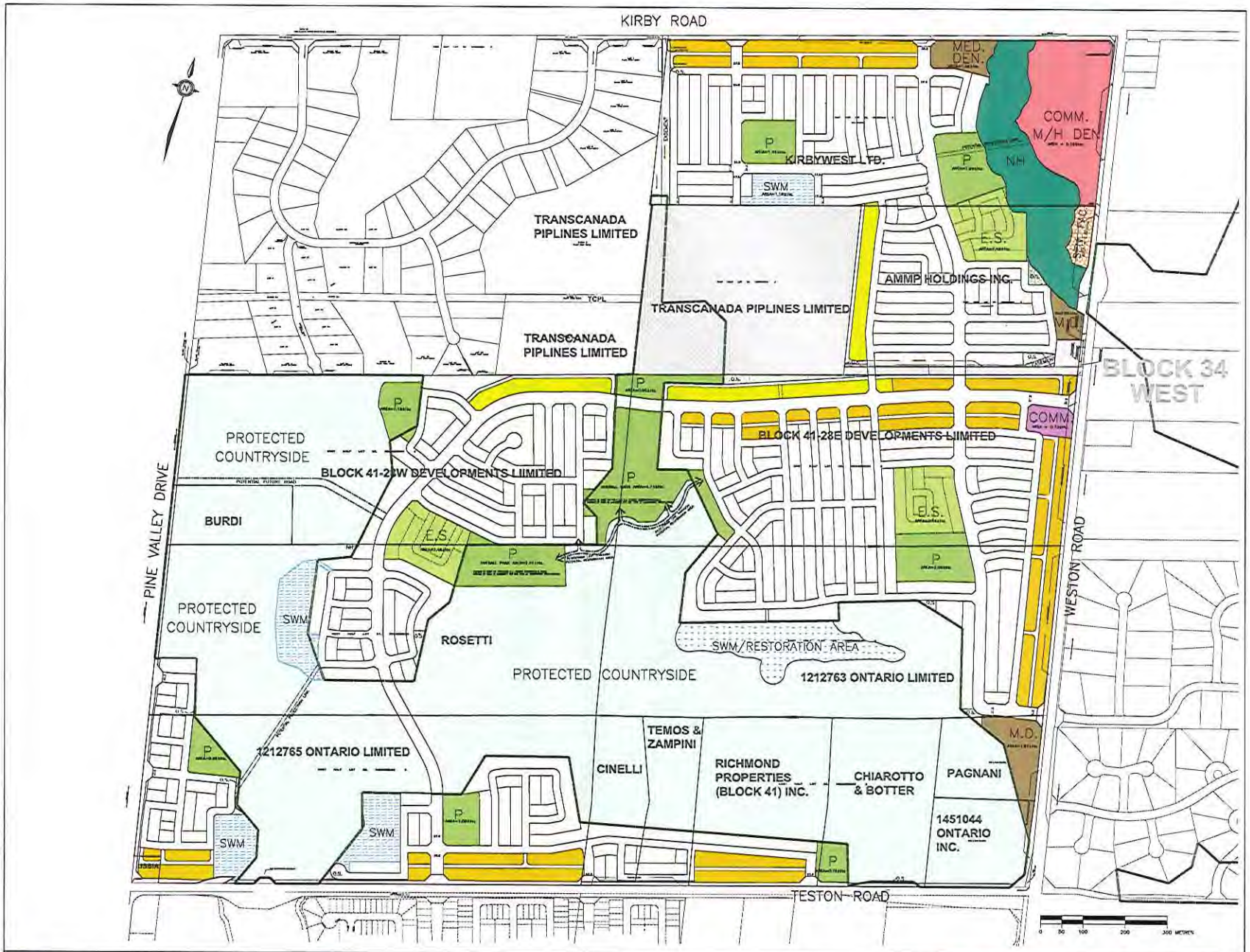
Title	Date	Figure
Summary of Noise Control Measures	**2017-10-16**	**2**
Project Name: **Block 41 - Vaughan**	Project No.: **114-304**	

VALCOUSTICS
Canada Ltd.
Sound solutions to acoustical challenges
Celebrating over 60 years

ATTACHMENT A

CONCEPTUAL BLOCK PLAN

(FOR DISCUSSION PURPOSES ONLY)



- SCHOOL
- EDGE OF PROTECTED COUNTRYSIDE
- PROTECTED COUNTRYSIDE
- MEDIUM/HIGH DENSITY & COMMERCIAL
- MEDIUM DENSITY
- COMMERCIAL
- SENIORS FACILITY
- FRONT ACCESSED LOTS
- PARK
- OPEN SPACE
- NATURAL HERITAGE OUTSIDE GREENBELT
- STORMWATER MANAGEMENT
- STORMWATER MANAGEMENT/RESTORATION AREA
- TRANS-CANADA PIPELINE FACILITY/EASEMENT
- LANEWAY ACCESSED LOTS (DECKED TOWNHOUSE)
- LANEWAY ACCESSED LOTS (DETACHED GARAGE TOWNHOUSE)

ALL STREET ACCESSED LOTS ARE NOMINALLY 27.5m DEPTH.
LANEWAY ACCESSED LOTS (DECKED TH) ARE NOMINALLY 27.5m DEPTH
LANEWAY ACCESSED LOTS (ATTACHED GARAGE TH) ARE NOMINALLY 33m DEPTH

For discussion purposes only

BLOCK 41 CONCEPT
PROJECT No. P-1434

SCALE 1:3000 OCT. 4, 2017

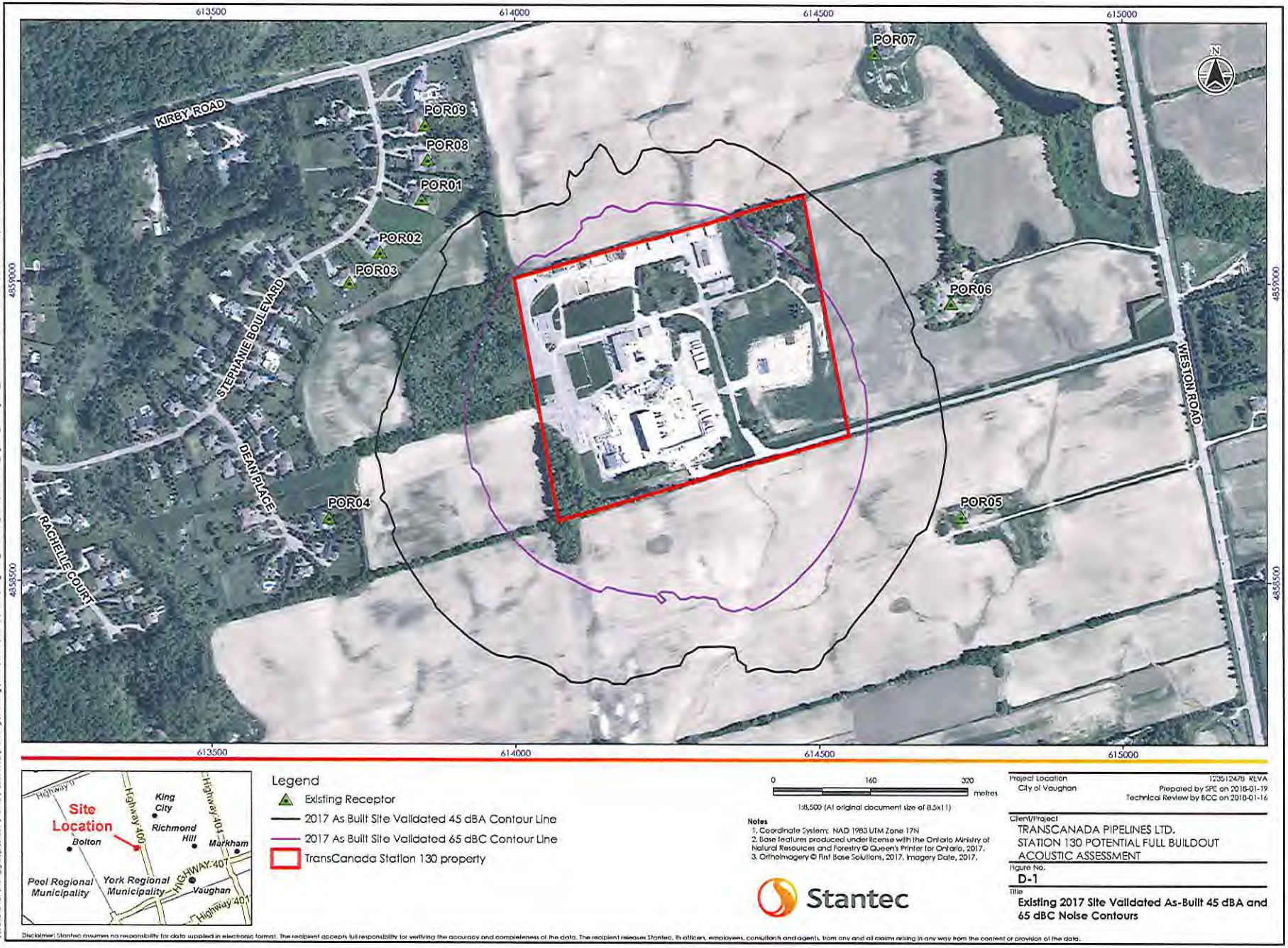
(1434-DES70)
X-REF: (1434MAS1)

Appendix D EXISTING CONDITIONS FOR NOISE AROUND STATION 130

Stantec

STATION 130 COMPRESSOR STATION
ASSESSMENT OF NOISE IMPACT ON NOISE SENSITIVE LAND USE

Appendix D Existing Conditions for Noise around Station 130
January 2018



Notes
1. Coordinate System: NAD 1983 UTM Zone 17N
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2017.
3. Orthoimagery © First Base Solutions, 2017. Imagery Date, 2017.

Stantec

Project Location
City of Vaughan

123512478 KLVA
Prepared by SPE on 2018-01-19
Technical Review by BCC on 2018-01-16

Client/Project
TRANSCANADA PIPELINES LTD.
STATION 130 POTENTIAL FULL BUILDOUT
ACOUSTIC ASSESSMENT

Figure No.
D-1

Title
Existing 2017 Site Validated As-Built 45 dBA and 65 dBC Noise Contours

Appendix E STANTEC REVIEW OF VALCOUSTICS MEMORANDUM

E.1 DISCUSSION OF STATION 130 NOISE CONTROL MEASURES

Stantec has reviewed and provided comments on Valcoustics mitigation measures. Stantec provided alternative mitigation measures, which are based on Stantec's experience in assisting our clients with selection and implementation of practical and technically feasible mitigation measures for similar facilities and equipment.

Valcoustics mitigation measures are provided in Section E.3 in bold. Stantec's comments and proposed alternatives follow each Valcoustics mitigation measure.

E.1.1 B-Plant Sources

1. ***The B-Plant north and south wall exhaust fan openings (Source ID: B-08, B-09, B-10 and B-11) require silencers which achieve an overall sound reduction of 15 dBA***

   Stantec Comments
   This noise reduction requirement of 15 dBA is acceptable and can be readily implemented. The noise radiated from these sources is centered in mid-band frequencies and it can be comfortably treated with parallel baffle silencers. Noise emissions for these sources used in the Stantec noise model are estimates. Based on our estimated interior building sound pressure levels and the corresponding noise break-out (assuming 42" diameter fan), the requested noise reduction can be achieved with a relatively short (3 to 4 feet) parallel baffle silencer with dynamic insertion losses (DIL) values as shown in Table E-1 below. Our expectation is that such silencers should not cost more than $3,000 each + installation.

Table E-1 Dynamic Insertion Losses by Frequency for Stantec Mitigation Measure #1

Frequency (Hz)	31.5	63	125	250	500	1000	2000	4000	8000
Silencer DIL (dB)	1	4	8	12	16	20	21	17	12

2. ***The B-Plant GT Enclosure exhaust openings (Source ID: B-07A-1, B-07B-1 and B-07C-1) require silencers which achieve an overall sound reduction of 15 dBA***

   Stantec Comments
   This noise reduction requirement of 15 dBA is acceptable and can be readily implemented by applying a parallel baffle silencer DIL as shown in Table E-2 below. The source data is based on on-site measurements at Station 130. These silencers could be sized and priced for budgeting purposes once the information on the air flow and the maximum allowed additional static pressure is made available from Solar. Our expectation is that such silencers should not cost more than $5,000 each + installation.

Table E-2 Dynamic Insertion Losses by Frequency for Stantec Mitigation Measure #2

Frequency (Hz)	31.5	63	125	250	500	1000	2000	4000	8000
Silencer DIL (dB)	2	6	9	15	22	26	27	20	13

3. ***The B-Plant exhaust ducting (Source ID: B-06A, B-06B, B-06C) requires acoustical treatment in the form of acoustical duct lagging. The duct lagging should achieve an overall sound reduction of 14 dBA.***

   Stantec Comments
   Stantec believes that the noise reduction requirement of 14 dB(A) for this source cannot be practically achieved with duct lagging. It has been Stantec's experience that the noise reduction data listed for Kinetics blanket is applicable to free-standing noise control elements such as partitions or enclosure walls. However, in the lagging application, we expect degradation of the performance. Correspondingly, we expect noise reduction to be below 10 dB(A) for the duct alone (from 91.7 dBA to 81.8 dBA). However, once the duct is treated, the untreated exhaust stack casing (estimated sound power of 85 dBA) would become a dominant source and effectively limit the overall noise reduction to about 5 dB(A). Therefore, the exhaust stack would also have to be lagged. This measure would be difficult and expensive to implement, particularly along the duct underside. The noise reduction benefit from this measure at the far-field receptor would be negligible. We therefore recommend that this measure not be implemented.

E.1.2 C-Plant Sources

4. ***The C-Plant compressor exhaust stacks (Source ID: TCP2_titan250stk1 and TCP2_titan250stk2) require silencers which provide an overall reduction of 25 dBA each.***

   Stantec Comments
   Stantec believes that the noise reduction requirement of an additional 25 dB(A) for this source cannot practically be achieved. At most, a 20 dB(A) reduction can be achieved (from 109 dBA to 89 dBA). However, this would require an extensive silencing system, increased size and length of exhaust ducting, and independent support for individual duct and silencer sections. The measure would be expensive and spacing constraints driven by TransCanada corporate safety standards may impact its feasibility.

   In the Station 130 C4 Unit Addition Project Environmental and Socio-economic Assessment and Acoustic Environment Technical Data Report, we recommended reducing the stack exit sound power level from 109 dBA to 102 dBA, as required for compliance at existing receptors. An additional 8-dB reduction (from 102 dBA to 94 dBA) may be possible with an additional one or two silencer stages meeting the following additional DIL values (Table E-3):

Table E-3 Dynamic Insertion Losses by Frequency for Stantec Mitigation Measure #4

Frequency (Hz)	31.5	63	125	250	500	1000	2000	4000	8000
Additional Silencer DIL (dB)	5	9	12	14	17	19	16	13	7

The DILs in the table above are in addition to the DILs for a standard exhaust silencer offered by Solar. It may be possible to implement a multi-stage silencer with the first stage being substantially inside the building and the subsequent stages being in the stack. This may alleviate some space constraints. However, including the silencer in the building may have operational and other impacts with may influence the feasibility of such a modification.

5. ***The C-Plant lube oil coolers (Source ID: TCP1_titan250loc and TCP2_titan250loc) require reductions which provide an overall sound reduction of 18 dBA each***

   Stantec Comments
   Stantec's noise model for the C-Plant addition to Station 130 assumed a standard lube oil cooler with a sound power rating of 100 dBA. The requested noise reduction of 18 dBA would result in a 82 dBA sound power level from the source. To the best of our knowledge, Solar offers a low-noise lube oil cooler rated at 90 dBA. For units mounted inside a building, there would be an additional 3 dB overall reduction associated with the ducting and operable dampers on inlet and discharge openings. Therefore, proceeding with a low-noise cooler option would effectively decrease the noise break-out from the lube oil cooler to approximately 87 dBA.

   Therefore, it is recommended that a low-noise lube oil cooler (90 dBA sound power) be procured. This would provide an adequate additional attenuation for this source in lieu of the requested 18 dB. This difference in attenuation can be partly offset (if required) by somewhat improved attenuation described below in Item 6 (TCP2_titan250bdgfan1 to 5). Valcoustic noise control set the two lube oil coolers are at 85 dBA sound power and the 5 fans described below in Item 6 at 87 dBA.

6. ***The C-Plant building exhaust fan openings (TCP2_titan250bdgfan1 to 5) require silencers or acoustical louvres which provide an overall reduction of 15 dBA each.***

   Stantec Comments
   This noise reduction requirement of 15 dBA is acceptable and can be implemented. The noise radiated from these sources is centered in mid-band frequencies and it can be treated with parallel baffle silencers. Based on our estimated interior building sound pressure levels and the corresponding noise break-out (assuming 52" diameter fan), the requested noise reduction can be achieved with relatively short (3 to 4 feet) parallel baffle silencers with DIL values as shown in Table E-4 below. Our expectation is that such silencers should not cost more than $3,000 each + installation.

Table E-4 Dynamic Insertion Losses by Frequency for Stantec Mitigation Measure #6

Frequency (Hz)	31.5	63	125	250	500	1000	2000	4000	8000
Silencer DIL (dB)	1	4	7	11	15	20	21	17	12

7. ***The C-Plant building exterior wall construction should be upgraded to meet a minimum rating of STC-48.***

   Stantec Comments
   In general, the requirement of wall construction with a minimum rating of Sound Transmission Class (STC)-48 can be effectively met. However, the system recommended by Valcoustics is not appropriate for this application. The Valcoustics Memorandum recommended 8-inch precast concrete panels. In their model, they have included the following transmission losses (TL) (Table E-5):

Table E-5 Valcoustics Wall Transmission Losses by Frequency for Valcoustics Mitigation Measure #7

Frequency (Hz)	31.5	63	125	250	500	1000	2000	4000	8000
Valcoustics Wall TL (dB)	0	34	33	38	44	48	55	61	68

The resulting sound power level from the building walls, as presented in the Valcoustics Memorandum, was 91 dBA and 127 dBC. However, the specified TL does not account for various penetrations and the associated reductions in acoustic performance of the wall. Furthermore, the specified TL disregards the 31.5 Hz component by making the wall transparent at this frequency. Finally, the recommended wall system eliminates the use of interior wall absorption, which would result in a 4 to 5 dB increase of interior sound levels due to reverberant build-up inside the building. This would, in turn, affect other building-related noise sources. Additionally, this may impact worker noise exposures and/or increase the occupational health and safety hazards.

Stantec recommends that this mitigation measure not be implemented. Instead, Stantec proposes an alternative of 9-inch layered wall with a STC rating of 46, having the following construction:

- 24 ga interior perforated steel liner,
- a vapor barrier,
- 2 layers of 4" mineral wool having density of 8 pcf,
- 24 ga profiled steel cladding.

The TL of the recommended wall system are shown in Table E-6 below.

Table E-6 Stantec Wall Transmission Losses by Frequency for Stantec Mitigation Measure #7

Frequency (Hz)	31.5	63	125	250	500	1000	2000	4000	8000
Stantec Recommended Wall TL (dB)	14	18	26	37	44	55	57	58	60

The resulting building wall sound power levels are: 86 dBA and 110 dBC. Stantec's recommendation represents an improvement in wall system performance and leaves enough "acoustic room" for the building ventilation inlet opening. The building ventilation inlet openings may be designed to a total sound power level of 90 dBA or less resulting in a combined performance of 91 dBA – i.e., matching the request in the Valcoustics Memorandum.

8. ***The C-Plant building roof construction should be upgraded to meet a minimum rating of STC-46.***

Stantec Comments
In general, the requirement of roof construction with a minimum rating of STC-46 can be met. However, the system recommended by Valcoustics is not practical and not cost-effective. The Valcoustics Memorandum recommended 4-inches of concrete poured over a steel deck. In their model, they have included the following TL (Table E-7):

Table E-7 Valcoustics Wall Transmission Losses by Frequency for Valcoustics Mitigation Measure #8

Frequency (Hz)	31.5	63	125	250	500	1000	2000	4000	8000
Valcoustics Wall TL (dB)	0	34	33	38	44	48	55	61	68

The resulting sound power level from the building walls, as presented in the Valcoustics Memorandum, was 89 dBA and 125 dBC. Similarly to Item 7, the specified TL disregards the 31.5 Hz component by making the wall transparent at this frequency. Stantec recommends that the roof panels have the same construction as the wall system recommended by Stantec. The corresponding TL are as shown in Table E-8 below.

Table E-8 Stantec Wall Transmission Losses by Frequency for Stantec Mitigation Measure #8

Frequency (Hz)	31.5	63	125	250	500	1000	2000	4000	8000
Stantec Recommended Wall TL (dB)	14	18	26	37	44	55	57	58	60

The resulting building wall sound power levels are 84 dBA and 108 dBC and represents a considerable improvement in roof system performance over that proposed by Valcoustics.

E.1.3 Additional Noise Control Measure Recommendations

9. *The C-Plant combustion air inlet for C4 and C5*

Stantec Comments
Stantec assumed that additional attenuation on C4 Unit and C5 Unit combustion air inlet of 6 dB will be required for compliance at the existing receptors with both C4 and C5 Units in operation. Such noise reduction can be achieved with the following additional DIL (Table E-9):

Table E-9 Additional Required Dynamic Insertion Losses by Frequency for Stantec Mitigation Measure #9

Frequency (Hz)	31.5	63	125	250	500	1000	2000	4000	8000
Additional Required DIL for Combustion Air Inlet (dB)	1	2	4	7	9	5	2	0	0

It is recommended that Solar be contacted to determine the feasibility of increasing the performance of their silencers. This additional attenuation should be possible with an additional silencer as evidenced by the inlet system designs for the B compressors.

10. *The C-Plant building ventilation inlets.*

Stantec Comments
As advised in Item 7, the noise break out from the C-building ventilation system should be limited to 90 dBA sound power to achieve the overall building envelope performance as requested by Block 41 development group. The exhaust fans (referred to in Item 6) were balanced to 87 dBA sound power (PWL) with the remaining 87 dBA "allocated" to the inlet openings. This noise reduction requirement can be implemented. Based on our estimated interior building sound pressure levels and the corresponding noise break-out (assuming 16 m² of inlet openings), the requested noise reduction can be achieved with relatively short (3 to 4 feet) parallel baffle silencers with DIL values as shown in Table E-10 below. Our expectation is that such silencers should not cost more than $3,000 each per 1.5 m² of opening area.

Table E-10 Dynamic Insertion Losses by Frequency for Stantec Mitigation Measure #10

Frequency (Hz)	31.5	63	125	250	500	1000	2000	4000	8000
Silencer DIL (dB)	1	4	8	12	16	21	23	22	16

E.1.4 Gas Cooler Barriers

11. **A 6.5 m high, approximately 82 m long, "L"-shaped sound barrier to screen the west and south sides of the B-Plant aerial coolers;**

12. **A 7.5 m high, approximately 70 m long, "L"-shaped sound barrier to screen the north and east sides of the C-Plant aerial coolers;**

E.1.5 Receptor Based Noise Control Measures

Stantec made adjustments to the receptor based mitigation measures proposed by Valcoustics to mathematically achieve similar noise levels as the Valcosutics noise model.

13. **A 6.0 m high, approximately 75 m long, sound barrier along the south TCPL property boundary, screening the gap between townhouses at the laneway/walkway**

    Stantec Comments
    Adjust the north property line barrier to a height of 6 meters and a length of 220 meters

14. **A 4.5 m high, approximately 170 m long, sound barrier along the north TCPL property boundary, screening the single-family dwellings to the north.**

    Stantec Comments
    Adjust the south property line barrier to a height of 7 meters and a length of 110 meters

15. **A sound barrier between two of the garages at a height of 6 m would be required.**

    Stantec Comments
    Increase the height of the garages along the south fence line to 7 meters from the current 6 meters

16. **Alternatively, the garages could be continuous at this location, the intent being that the gap between be closed off.**

    Stantec Comments
    Seal the passageways between the individual garage buildings with barriers to the full height of 7 meters. Ground level openings for pedestrian traffic access can be provided.

E.2 NOISE MODEL REFINEMENTS

The Valcoustics noise model used to assess impacts and separation distances (referred to in the Valcoustics Memorandum as "setbacks") had a few deficiencies. These were:

- The exclusion of the B3 Unit in propagation calculation results. The B3 Unit was present in the Valcoustics noise model but not set as a continually operating source.
- Specifying insufficient number of sound ray reflections in the Valcoustics noise model. The Valcoustics noise model set the number of allowed reflection for sound rays to 1. It is Stantec's opinion that this is inadequate for assessing effects in dense development such as the New Community Area.
- Not adjusting the ground attenuation within the New Community Area. The ground absorption constant used within the New Community Area was set at 0.75. While such absorption constant is appropriate for farm fields or grassy and treed areas, it is too high for a development such as the New Community Area.

The Valcoustics noise model used stack heights for C4 Unit and C5 Unit based on best available information provided by TransCanada. TransCanada since communicated to Stantec via email (November 23, 2017) that preliminary drawings from Solar Turbines indicate that the outlet of the Titan 250 exhaust stack will be 14.18 m from grade.

Stantec developed a noise model for this report (Stantec noise model) The Stantec noise model used the predictable worst-case to represent the anticipated operating emissions for Station 130 at Full Buildout. For the purposes of this analysis, Stantec refined the Valcoustics noise model as follows:

1. Stack height for C4 Unit and C5 Unit combustion exhausts were increased to 14.2 meters above ground. This change was performed to better reflect the final C-Plant design. The use of barriers and screens as noise control measures is sensitive to source heights. Accurate source height representation is critical in such instances.
2. The number of allowed sound ray reflections was increased from 1 to 2. In dense development, as is the case with the proposed New Community Area, a single reflection may not be adequate. Correspondingly, two reflections were used.
3. Sources corresponding to B3 Unit compressor were activated. The Valcoustics noise model did not account for contribution from B3 Unit-related sources
4. For the purpose of this memorandum, the adjustments to ground absorption constant was made to better facilitate the comparison of predictions from Stantec and Valcoustics noise models.

In order to accurately assess the performance of Stantec mitigation measures and help mitigate the Station 130 noise-related risks, the following further model refinements were made:

1. Stantec mitigation measures were implemented by replacing the Valcoustics mitigation measures for the corresponding sources.
2. The stack break-out noise for the combustion exhausts of the B-Plant units was added. Each stack break-out noise was estimated at 85 dBA PWL. The estimates were made on the basis of measured B2 Unit exhaust noise and applying field-observed stack insertion losses relative to gas path noise. In the C4 noise model and Stantec potential full buildout noise model, these sources were seen as negligible and were thus excluded. However, as additional noise reduction (as requested in the Valcoustics Memorandum) was applied to main noise sources, these previously negligible noise sources became more relevant and necessary for proper assessment of impacts.
3. Directivity adjustments were removed from B-Plant units combustion exhausts to better reflect the conditions of downward sound refraction during the nighttime periods and its effects on screening attenuation. This source was adjusted to measured 94 dBA PWL.
4. B-Plant compressor building walls (85 dBA, PWL) and roof (84 dBA, PWL) were added in the model. These sources were not included in the B3 noise model, C4 noise model or Stantec potential full buildout noise model. However, as additional noise reduction (as requested in the Valcoustics Memorandum) was applied to main noise sources, these previously negligible noise sources became more relevant and necessary for proper assessment of impacts.
5. Combustion air filter house shell-radiated noise for C4 Unit and C5 Unit were broken out from the respective inlets and added to the model. These noise sources were estimated at 91 dBA, PWL and was placed at a height of 8.5 meters above ground.
6. The stack break-out noise for the combustion exhausts of the C-Plant units was added. Each stack break-out noise was estimated at 85 dBA PWL with additional attenuation as described in Stantec mitigation measure #4. The estimates were made on the basis of calculated silenced exhaust noise and applying field-observed stack insertion losses relative to gas path noise. In the C4 noise model and Stantec potential full buildout noise model, these sources were seen as negligible and were thus excluded. However, as additional noise reduction (as requested in the Valcoustics Memorandum) was applied to main noise sources, these previously negligible noise sources became more relevant and necessary for proper assessment of impacts.
7. C-Plant building ventilation inlets were isolated from building walls and added as separate noise sources subject to Stantec mitigation measure #10. Previously, minimum composite TL were specified that included the effects of the ventilation openings.

E.3 COMPARISON OF SOUND POWER LEVELS

Overall, the noise emissions for Station 130 with Stantec mitigation measures are similar to those requested by Valcoustics in the Valcoustics Memorandum in regard to A-weighted as well as C-weighted levels. Tables E-11 and E-12 below show the comparisons of sound power levels using Valcoustic mitigation measures and Stantec mitigation measures, respectively. Stantec took data from the Valcoustics noise model and organized it into three elements for overall C-weighted noise.

With Stantec mitigation measures, the overall A-weighted noise emissions from Station 130 will be approximately 0.7 dB(A) higher than those used by Valcoustics, while the LFN content, as measured by the C-weighted levels, will be lower by 1.6 dB. Both discrepancies are within a margin of error. In this respect, the Stantec mitigation measures can be viewed as equivalent to the Valcoustics mitigation measures.

Some variabilities can be seen in individual octave bands. However, in terms of overall A-weighted and C-weighted levels, the noise emissions are similar and within a margin of error.

In summary, it can be stated that the Stantec mitigation measures result in similar far-field predictions and can be viewed as being equivalent to Valcoustics mitigation measures.

Table E-11 Sound Power Levels with Valcoustics Mitigation Measures

Element	Levels at Octave Band Centre Frequencies									Overall dBA	Overall dBC
	31.5	63	125	250	500	1000	2000	4000	8000		
B Plant Summary	121	114	108	105	99	96	96	102	92	**105.8**	**119.5**
C Plant Summary	129	109	106	104	100	87	85	98	86	**102.9**	**126.2**
New Gas Cooler (C Plant)	106	106	100	97	96	95	101	106	87	**108.8**	**110.8**
Total Facility	130	115	111	108	103	99	102	108	94	**111.3**	**127.1**

Table E-12 Sound Power Levels with Stantec Mitigation Measures

Element	Levels at Octave Band Centre Frequencies									Overall dBA	Overall dBC
	31.5	63	125	250	500	1000	2000	4000	8000		
B Plant Summary	121	116	110	106	101	98	97	102	92	**106.9**	**120.6**
C Plant Summary	122	121	116	111	97	89	85	93	83	**105.5**	**123.5**
New Gas Cooler (C Plant)	106	106	100	97	96	95	101	106	87	**108.8**	**110.8**
Total Facility	126	123	117	112	103	100	102	108	93	**112.0**	**125.5**

E.4 PREDICTION RESULTS

E.4.1 Broadband Noise (Station 130 A-weighted Sound Levels)

The Stantec noise model was run to predict A-weighted noise impacts of Station 130 with: Stantec mitigation measures, gas cooler barriers, and the New Community Area. The Stantec noise model predictions were compared with the Valcoustics noise model predictions, as shown in Figure E-1.

Figure E-1 shows the 45.5 dBA isopleth of Station 130, as predicted by the Valcoustics noise model (red contour line) and the 45.5 dBA isopleth of Station 130, as predicted by the Stantec noise model (blue contour line). For reference, the 45.5 dBA isopleth of Station 130, as predicted by the Valcoustics noise model with Stantec-recommended minimum mitigation measures required for compliance at existing receptors is also shown (green contour line).

The Stantec noise model predicts that, with the implementation of Stantec mitigation measures and gas cooler barriers, A-weighted noise levels from Station 130 will be similar to those predicted by Valcoustics noise model for the New Community Area. At some locations, noise levels predicted by Stantec noise model are 0.7 dB(A) higher than the corresponding sound levels predicted by the Valcoustics noise model. The difference is within the margin of error and, with respect to the overall A-weighted sound levels, the two models are equivalent. Noise levels at residential building facades were generally below 45 dBA. However, noise levels at residential building facades were as high as 47 dBA for certain areas in both models.

Legend

- Black 41 New Community Area
- Gas Cooler Barriers within Station 130 property
- Stantec Noise Model: 45.5 dBA, Full Buildout
- Valcoustics Noise Model with Stantec Minimum Mitigation Measures Required for Compliance at Existing Receptors: 45.5 dBA, Full Buildout
- Valcoustics Noise Model: 45.5 dBA, Full Buildout
- TransCanada Station 130 property

0 160 320 metres

1:8,500 (At original document size of 8.5x11)

Notes
1. Coordinate System: NAD 1983 UTM Zone 17N
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2017.
3. Orthoimagery © First Base Solutions, 2017. Imagery Date, 2017.

Stantec

Project Location
City of Vaughan

123512478 KLVA
Prepared by SPE on 2018-01-19
Technical Review by BCC on 2018-01-16

Client/Project
TRANSCANADA PIPELINES LTD.
STATION 130 POTENTIAL FULL BUILDOUT ACOUSTIC ASSESSMENT

Figure No.
E-1

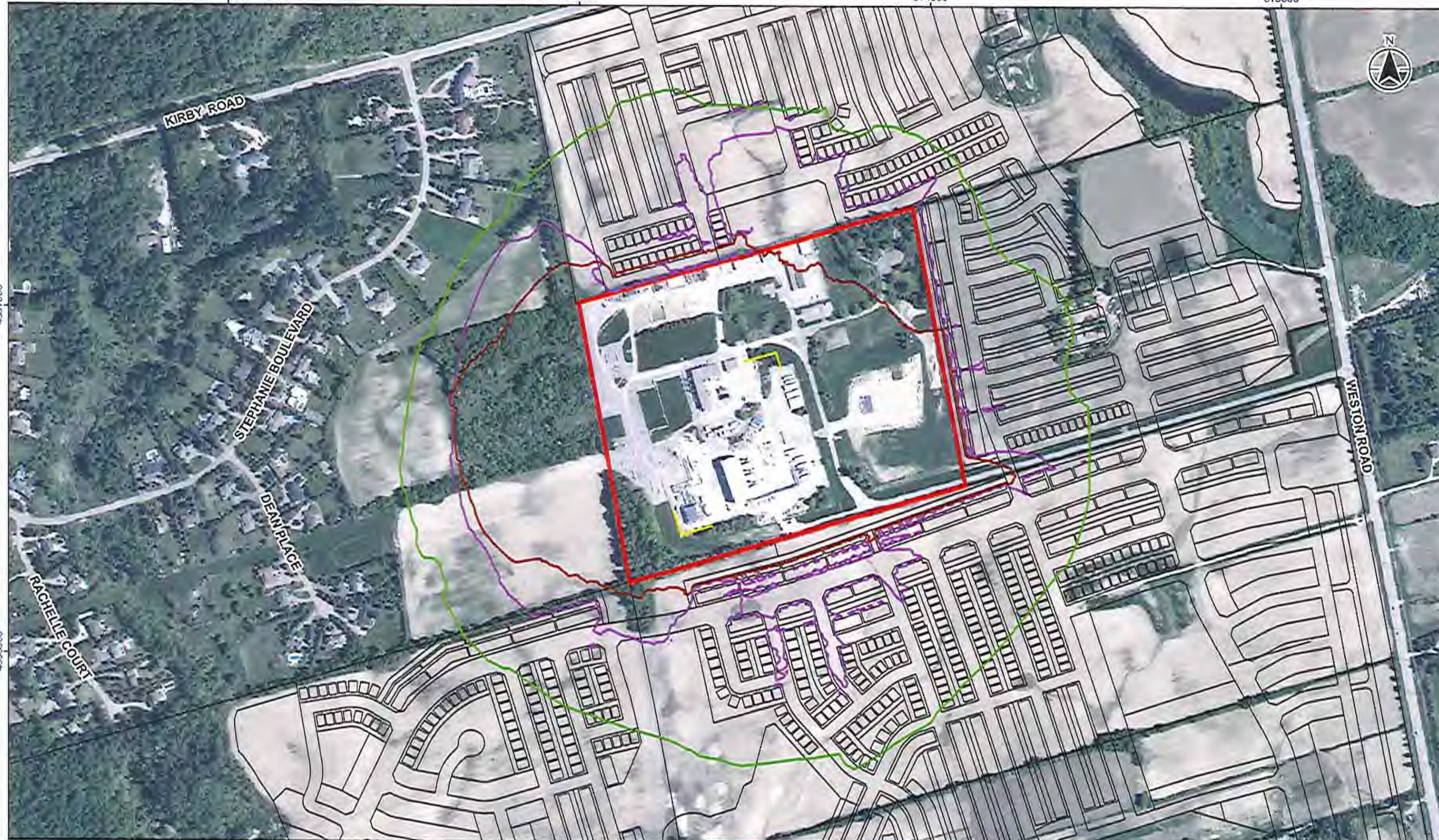
Title
Station 130 A-weighted Sound Levels

E.4.2 Low Frequency Noise (Station 130 C-weighted Sound Levels)

The Stantec noise model was run to predict C-weighted noise impacts of Station 130 with: Stantec mitigation measures, gas cooler barriers, and the New Community Area. The Stantec noise model predictions for C-weighted noise were compared with the Valcoustics noise model predictions for A-weighted noise as shown in Figure E-2.

Figure E-2 shows the 45.5 dBA isopleth of Station 130, as predicted by the Valcoustics noise model (red contour line) and the 65 dBC isopleth of Station 130, as predicted by Stantec noise model (purple contour line). For reference, the 45.5 dBA isopleth of Station 130 at Full Buildout, as predicted by the Valcoustics noise model with Stantec-recommended minimum mitigation measures required for compliance at existing receptors is also shown (green contour line).

As shown in Figure E-2, the Stantec noise model predicts that LFN impact will extend beyond the 45.5 dBA isopleth predicted by the Valcoustics noise model. Considerable LFN impact will be present in the New Community Area in some areas of the development near the north and south fence lines of Station 130. Large parts of the New Community Area will be exposed to levels in excess of 65 dBC, even with Stantec receptor based noise control measures.



Legend

- Block 41 New Community Area
- Gas Cooler Barriers within Station 130 property
- Stantec Noise Model: 65 dBC, Full Buildout
- Valcoustics Noise Model with Stantec Minimum Mitigation Measures Required for Compliance at Existing Receptors: 45.5 dBA, Full Buildout
- Valcoustics Noise Model: 45.5 dBA, Full Buildout
- TransCanada Station 130 property

0 160 320 metres

1:8,500 (At original document size of 8.5x11)

Notes
1. Coordinate System: NAD 1983 UTM Zone 17N
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2017.
3. Orthoimagery © First Base Solutions, 2017. Imagery Date, 2017.

Stantec

Project Location: City of Vaughan

123512478 REVA
Prepared by SPE on 2018-01-19
Technical Review by BCC on 2018-01-16

Client/Project
TRANSCANADA PIPELINES LTD.
STATION 130 POTENTIAL FULL BUILDOUT ACOUSTIC ASSESSMENT

Figure No.
E-2

Title
Station 130 C-weighted Sound Levels