HAMBLY GROUP
DIVISION OF 8436550 CANADA CORPORATION 1104 CEDARWOODS DR., VERONA, ONTARIO
TEL 613 374 1746
Email evtrought@gmail.com CELL 613 536 9118

Tony Del Giudice
670 Charles St. North,
Gananoque, ON
K7G 2W5

21 August 2023

Reference: 670 Charles St. North, Gananoque, Ontario

Subject: Pre-Consultation Submission Requirements of 5 April 2023 - Land Use Report

1. Background of Land Use
The Pre-Consultation meeting and resulting document of submission requirements identified a 'Supporting Land Use Planning Report'.

Complying with the requirements of the Town of Gananoque, Tony Del Giudice of VX Resources, engaged HAMBLY GROUP to provide a "supporting Land Use Report" for the subject parcel of land.

This parcel of land is contained in Lot 13 and contained in the Official Plan designated as "Employment District".

Under this designation, the following activities and businesses may operate, yet not limited to the following:
Bulk Storage, Fuel Depot, Industrial and Business Centre, Commercial Storage, Sawmill or Planing Mill, Industrial Class I or II Uses and Class III (complying with conditions).
The Town has designated this proposed business as an "Industrial Use Class III Industrial, Heavy".

Because of this designation, supporting documentation has been provided to quantify the level of hazards with respect to Noise, Odour, Traffic and Other Emissions.

On this same lot, another commercial enterprise carries on minor activity as a inventory storage for a window supply and installation company. The company receives windows and doors, warehouses them in a separate unconditioned building to the rear of the main building, at the rear property line.

2. Introduction
The proposed development is located at 670 Charles St. North, Gananoque. Past operations included retail for rugs/flooring and for fuel sales [home heater oil and propane].

To the left [north west] of the subject property is the only residential neightbour at 680 Charles St. North, among industrial and commercial enterprises. Eastern Marine Services

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Tony Del Giudice
670 Charles St. North,
Gananoque, ON
K7G 2W5

14 August 2023

Reference: 670 Charles St. North, Gananoque, Ontario

Subject: Pre-Consultation Submission Requirements of 5 April 2023 - Noise

1. Background for Noise Protection
The Pre-Consultation meeting and resulting document of submission requirements identified a 'Noise and/or Vibration Study'.

Complying with the requirements of the Town of Gananoque, Tony Del Giudice of VX Resources, engaged HAMBLY GROUP to assess the sound generated by the proposed development and its impact on the nearest residential neighbour to the development.

The Ministry of the Environment and Climate Change (MOECC) ensures sources of emissions to the environment are adequately controlled to prevent potential negative effects.

The Guideline is published by the Ministry: August 2013; " Environmental Noise Guideline - Stationary and Transportation Sources - Approval and Planning (NPC-300)".

This guideline identifies a dwelling as a "Point of Reception", where noise from a stationary source is received. This analysis will determine if the noise is significant, requiring some mitigation measures, as per these Guidelines.

In this document, the Ministry has set acceptable limits of sound for the various areas with particular acoustical environment. These areas are identified by a "Class Number Area". The subject property can be described as a "Class 1 Area".

From the Guildeline:

"Class 1 area"
means 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."

This Class area has been assigned acceptable noise levels at a point outside and at a plane of a window. From "Environmental Noise Guideline - Stationary and Transportation Sources - Approval and Planning (NPC-300)", shown below:

Table B-1 Exclusion Limit Values of One-Hour Equivalent Sound Level (Leq, dB A) Outdo or Points of Reception

Time of Day	Class 1 Area	Class 2 Area	Class 3 Area	Class 4 Area
07:00 - 19:00	50	50	45	55
19:00 23:00	50	45	40	55

Table B-2 Exclusion Limit Values of One-Hour Equivalent Sound Level (Leq, dB A) Plane of Window of of Noise Sensitive Spaces

Time of Day	Class 1 Area	Class 2 Area	Class 3 Area	Class 4 Area
07:00 - 19:00	50	50	45	60
19:00 23:00	50	50	40	60

As per MOECC, ONTARIO REGULATION 381/15, Occupational Health and Safety Act, L_{eq}, the equivalent sound exposure level in 8 hours, is determined by equation:

$$L_{ex,8} = 10 \, Log_{10} \left(\frac{\left[\sum_{i=1}^{n} (t_i \times 10^{0.1 \, SPL_i}) \right]}{8} \right)$$

Σ is the sum of the values in the enclosed expression for all activities from i = 1 to i = n,
i is a discrete activity of a worker exposed to a sound level,
t_i is the duration in hours of i,
SPL_i is the sound level of i in dBA,
n is the total number of discrete activities in the worker's total workday.

The Province of Ontario regulates noise from industrial sources.
To cut down on noise pollution, Ontario regulates noise from industrial and renewable energy sources.
Industrial sources include:
heavy machinery or equipment
ventilation equipment
heating, ventilation and air condition systems (HVAC)
compressors
dust collectors
onsite truck traffic
refrigeration trucks

2. Introduction
The proposed development is located at 670 Charles St. North, Gananoque. Past operations included retail for rugs/flooring and for fuel sales [home heater oil and propane].

To the left [north west] of the subject property is the only residential neightbour at 680 Charles St. North, among industrial and commercial enterprises. Eastern Marine Services is directly to the rear of the subject property. A self storage company "Gan-U-Lock" is on the right side [south east]. Gananoque Public Works is across the road. Gananoque Public Works has a five bay truck garage and several small buildings.

3. Process and Operation
This process and sales enterprise will receive raw vermiculite [once a day by transport truck], and will process this material by heating it. The process transforms the material into the loose and light substance. The processed vermiculite is bagged then delivered to customers using cube van trucks.

The formula: $Mg0.7(Mg,Fe,Al)6(Si,Al)8O20(OH)4 \cdot 8H2O$
Raw vermiculite contains these elements:
Al, Fe, H, Mg, O and Si and
some impurities in small quantities:
Ca, Na and K

The heating drives out excess water and causes the material to expand, creating a very light material.

This business operates from 8:00 to 17:00, Monday to Friday [five days a week].

The burner is fueled with natural gas and has roof penetrations for air intake for combustion and an exhaust for the removal of combustion gases [mainly carbon dioxide and steam]. There is a filter in the exhaust that removes any dust resulting from the process. The dust would consist of various salts. The filter unit Model is the Brasco TR-BVF20/10 with less than $20mg/m^3$ emissions.

4. Noise Anaysis

The residence will have several "Points of Reception"; the front porch and each of the windows on neighbouring side of the residence. This analysis will review the noise impact at the nearest window and front porch.

The source of sounds from the proposed development include:
a) interior equipment; a burner used to dehydrate the raw vermiculite, 68dB, and a filtration fan with a sound level of less than 80dB
b) one transport per week day that delivers the raw material to the site, 88dB
c) the trucks that make five deliveries per day, making ten panel truck events per day, and 77dB
d) two split HVAC units - used Daikin 2-tn as a sound reference. 55dB
The burner is inside the building so the sound level is reduced by 20dB when transmitted through the wall/ceiling assembly with an STC of 45. This noise transmission loss is shown in the Appendix with chart "Comparing two walls STC".

The sound level decays with respect to distance as per equation:

$$Lp(R2) = Lp(R1) - 20*\log_{10}(R2/R1)$$

Lp(R1) = Known sound pressure level at the first location (typically measured data or equipment vendor data)
Lp(R2) = Unknown sound pressure level at the second location Location
R1 = Distance from the noise source to location of known sound pressure level
R2 = Distance from noise source to the second location

A drawing is provided in the appendix that indicates the locations of "Points of Reception" and the noise sources.

To add the effects of a number of noise sources on a single "Reception Point", the sound level is converted to sound intensity in Watts/m^2. These intensities are added together then converted back to a sound level in dB, using the following equation:

$$ILtotal=10*\log_{10}(\Sigma i/10^{-12})$$

The sound levels from the two pieces of interior equipment were added at the roof and treated as a single sound source from the roof. These interior sources of sound come from the burner and the filtration motor [the receiver].

To determine the equivalent sound exposure level in 8 hours, the day was divided into three minute time intervals, i.e. 160 three minute time intervals during one day. The noise events of a typical day were taken as:

two intervals of all equipment operating coincidently
eight intervals when a delivery truck, two a/c units and the burner are operating
fifty intervals when two a/c units and the burner/receiver are operating
fifty intervals when one a/c unit and the burner is operating, and
fifty intervals when only the burner/receiver is operating

The investigation of the two "Reception Points" indicated that less than 40 dB would be received in either point. The Ministry permits a reception of 50 dB at either.

All calculations are presented in the Appendix.

5. Conclusion

The proposed operation complies with the Environmental Noise Guideline - Stationary and Transportation Sources - Approval and Planning (NPC-300). At the two nearest types of 'Points of Reception' the equivalent sound exposure level in 8 hours is less than 40 dB. The permissible levels for both the outside 'Point of Reception' and at the window plane 'Point of Reception' are 50 dB in a residential area.

Regards,

Edward Trought, P. Eng.
For HAMBLY GROUP

attachment: Appendix

APPENDIX 1

CALCULATIONS

Determine sound from internal equipment at the roof

sound of receiver motor [on floor] at roof				
sound away from the equipment at	3 ft	0.91 m	level is	79 dB
	12 ft	3.66 m	level is	67 dB
	20*log10(R2/R1)	12		
sound of burner [4 ft off floor] at roof				
sound away from the equipment at	3 ft	0.91 m	level is	68 dB
	8 ft	2.44 m	level is	59.5 dB
	20*log10(R2/R1)	8.52		

adding both peices of equipment at the roof $L=10Log10(\Sigma 10^{(L/10)})=$ 68.6

Determine Sound Level at the Points of Reception at Nearest Neighbour - Nearest Window

			noise level at lower speed/idle	distance from neighbour R2	R1	R2/R1	20*log10(R2/	Lp(R2)-Lp(R1)
transport truck	1		88 dB	55.8 m	1	55.8	34.9	53.1 dB
panel truck	5		76 dB	52.4 m	1	52.4	34.4	41.6 dB
air conditioners	2		55 dB	40.1 m	2	20.05	26.0	29.0 dB
burner RS28 at maximum output inside & receiver fan	1	68.6 dB	48.6 dB	32.4 m	1	32.4	30.2	18.4 dB
Exterior wall noise rating	45 STC	-20 dB						

Equivalent sound exposure level at nearest neighbour from this proposed development

as per MOECC, ONTARIO REGULATION 381/15, Occupational Health and Safety Act

$L_{ex,8}$ is the equivalent sound exposure level in 8 hours,
Σ is the sum of the values in the enclosed expression for all activities from i = 1 to i = n,
i is a discrete activity of a worker exposed to a sound level,
t_i is the duration in hours of i,
SPL_i is the sound level of i in dBA,
n is is the total number of discrete activities in the worker's total workday.

$L_{ex,8} = 10*log10([\Sigma(t_i * 10^{0.1\ spl_i})]/8)=$

	NUMBER OF UNITS	SPL_i	UNIT INTERVAL	t_i	$t_i*10^{0.1 * SPL_i}$
for two three minute interval there could be all elements at once	2	53.4	0.05	0.1	21878.42
for eight three minute interval there could be 2-a/c, truck and burner	8	36.6	0.05	0.4	1839.81
for fifty three minute intervals there could be 2-a/c and burner	50	32.7	0.05	2.5	4634.413
1-a/c and burner	50	31.6	0.05	2.5	3629.406
for 50 three minute intervals there would be only burner and receiver	50	30.2	0.05	2.5	2624.4
$\Sigma=$	160			8	34606.45
$([\Sigma(t_i * 10^{0.1\ spl_i})]/8)=$				4325.807	
$L_{ex,8} = 10*log10([\Sigma(t_i * 10^{0.1\ spl_i})]/8)=$	**36.4 dB**				

Determine SPL_i	transport truck		panel truck		air conditioners two		receiver & process burner			
	53.06732		41.61337		28.95771		18.3891			
	202643		14498.98		786.6313		69.00967			
	1E-12		1E-12		1E-12		1E-12			
	2E-07		1.4E-08		7.9E-10		6.9E-11			
	10000		10000		10000		10000			
	0.002026	$x10^{-4}$ W/m^2	0.000145	$x10^{-4}$ W/m^2	7.9E-06	$x10^{-4}$ W/m^2	6.9E-07	$x10^{-4}$ W/m	$\Sigma i=$	0.00219 $x10^{-4}$ W/m^2
neighbour							dB $IL_{total}=10*\log_{10}(\Sigma i/10^{-12})=$			53.4002 dB
one panel truck, 2-a/c & one burner	0		34.38663		26.04229		30.2109			
	1		2745.76		402.0025		1049.76			
	1E-12		1E-12		1E-12		1E-12			
	1E-12		2.7E-09		4E-10		1E-09			
	10000		10000		10000		10000			
	0	$x10^{-4}$ W/m^2	2.7E-05	$x10^{-4}$ W/m^2	4E-06	$x10^{-4}$ W/m^2	1E-05	$x10^{-4}$ W/m	$\Sigma i=$	4.6E-05 $x10^{-4}$ W/m^2
							dB $IL_{total}=10*\log_{10}(\Sigma i/10^{-12})=$			36.6271 dB
2-a/c and the burner	0		0		26.04229		30.2109			
	1		1		402.0025		1049.76			
	1E-12		1E-12		1E-12		1E-12			
	1E-12		1E-12		4E-10		1E-09			
	10000		10000		10000		10000			
	0	$x10^{-4}$ W/m^2	0	$x10^{-4}$ W/m^2	4E-06	$x10^{-4}$ W/m^2	1E-05	$x10^{-4}$ W/m	$\Sigma i=$	1.9E-05 $x10^{-4}$ W/m^2
							dB $IL_{total}=10*\log_{10}(\Sigma i/10^{-12})=$			32.6805 dB
1-a/c and the burner	0		0		26.04229		30.2109			
	1		1		402.0025		1049.76			
	1E-12		1E-12		1E-12		1E-12			
	1E-12		1E-12		4E-10		1E-09			
	10000		10000		10000		10000			
	0	$x10^{-4}$ W/m^2	0	$x10^{-4}$ W/m^2	4E-06	$x10^{-4}$ W/m^2	1E-05	$x10^{-4}$ W/m	$\Sigma i=$	1.5E-05 $x10^{-4}$ W/m^2
							dB $IL_{total}=10*\log_{10}(\Sigma i/10^{-12})=$			31.619 dB

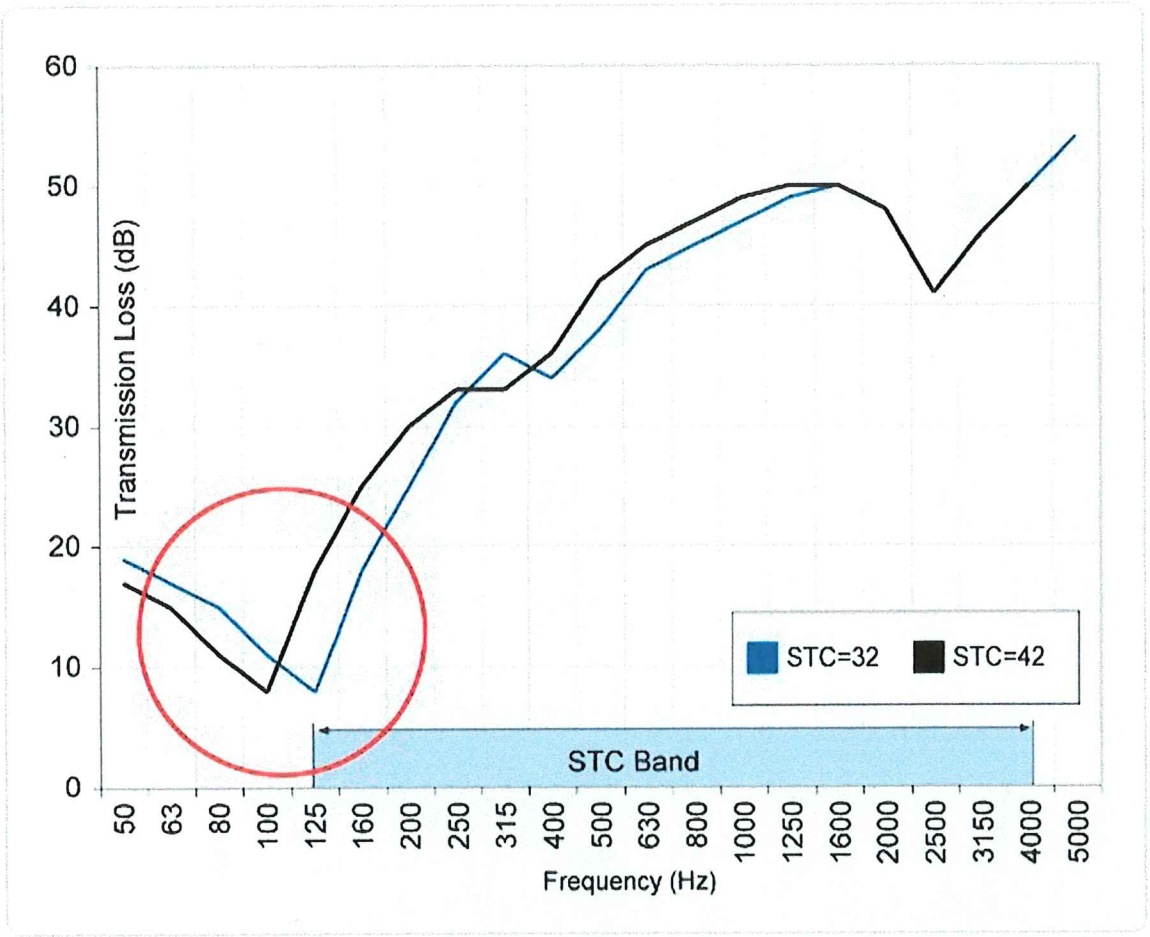
APPENDIX 2

STC CHART

Examples of noise sources below 125 Hz

Most of the sound energy generated by the average home theater
Traffic noise from airplanes, trucks, and heavy equipment operation
Guitar, bass, drums
Industrial equipment, especially pump system

Comparing two walls STC (in this graph, higher is better)



The example above demonstrates the problem with not considering data below 125 Hz. Frankly, neither of these walls stop much sound. Both are mediocre, with a low-frequency problem near 125 Hz. However one wall is STC 32, the other is STC 42!

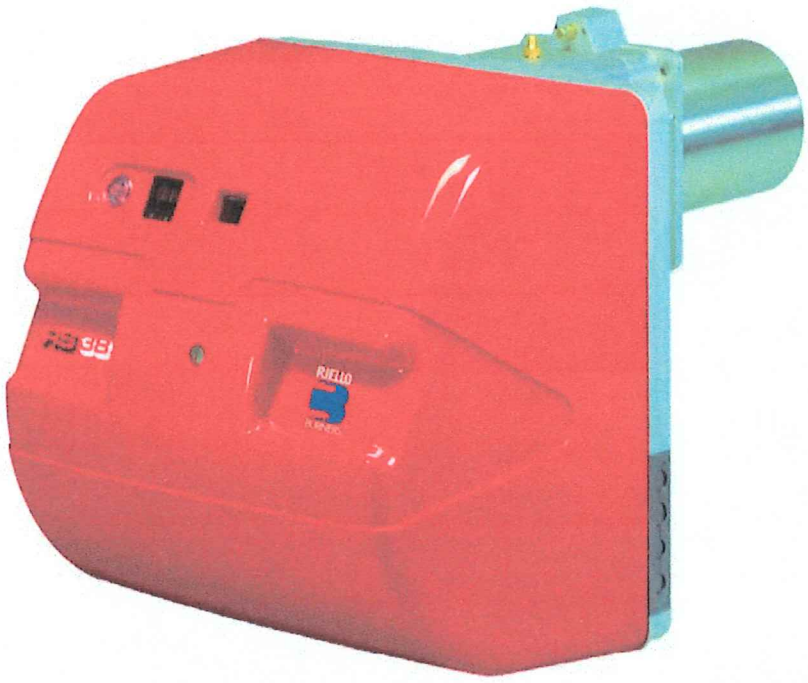
This is because, with the blue wall, the big problem occurs at 125 Hz, and is therefore measured by STC. The black wall has essentially the same problem; however, it occurs just below 125 Hz and is therefore not calculated.

APPENDIX 3

INTERIOR EQUIPMENT

RIELLO BURNERS

Gas Burners



c UL us LISTED

RS 28/M - 38/M - 50/M

Low-High-Low or Modulating Operation

C6505055 - 2915760 (5) - 10/2007

TECHNICAL DATA

Model			RS 28/M	RS 38/M	RS 38/M	RS 50/M	RS 50/M
Output (1)	High	MBtu/hr kW	617 - 1232 181 - 361	880 - 1665 258 - 488	880 - 1665 258 - 488	1099 - 2201 322 - 645	1099 - 2201 322 - 645
	Low	MBtu/hr kW	198 58	266 78	266 78	321 94	321 94
Fuel			Natural or propane gas				
- Max delivery		SCFH	1232	1665	1665	2201	2201
- Pressure at maximum delivery (2) natural gas		" WC	2.95	2.6	2.6	2.83	2.83
Operation			Low - high-low or modulating				
Standard application			Boilers: water, steam, thermal oil				
Ambient temperature		°F	32 - 104 (0 - 40 °C)				
Combustion air temperature		°F max	140 (60 °C)				
Main power supply (+/-10%)		V/Ph/Hz	120/1/60		208-230/460/575/3/60		120-230/1/60
Fan motor		rpm W - HP V A	3400 370 - 0.5 120 5.2		3400 550 - 0.75 208-230/460/575 3.2 - 1.6 - 1.3		3400 550 - 0.75 120 - 230 9.8 - 4.9
Motor capacitor		µV	45				40
Ignition transformer		V1 - V2 I1 - I2	120 V - 1 x 7 kV 1.6 A - 23 mA				
Electrical power consumption		W max	600		750		700
Electrical protection			NEMA 1				
Noise levels (3)		dBA	68	70	70	72	72

(1) Reference conditions: Ambient temperature 68 °F (20 °C) - Barometric pressure 394" WC - Altitude 329 ft.
(2) Pressure at test point 8)(A)p.4, with zero pressure in the combustion chamber, with open gas ring 2)(B)p.8 at maximum burner output
(3) Sound pressure measured in manufacturer's combustion laboratory, with burner operating on test boiler and at maximum rated output.

Burner models designation:

Model	Code	Voltage	Flame safeguard
RS 28/M	**C9521300** (3781070)	120/1/60	Burner mounted
RS 38/M	**C9522300** (3781270)	120/1/60	Burner mounted
	C9522350 (3781470)	208-230/460/3/60	Burner mounted
	C9522351 (3781475)	575/3/60	Burner mounted
RS 50/M	**C9523300** (3781670)	208-230/460/3/60	Burner mounted
	C9523301 (3781675)	575/3/60	Burner mounted
	(3781676)	120-230/1/60	Burner mounted

ACCESSORIES (optional):

- **Kit for LPG operation:** The kit allows the RS 28-38-50/M burners to operate on LPG.

Burner		RS 28/M		RS 38/M		RS 50/M	
Output	MBtu/hr	358 - 1232		437 - 1665		549 - 1986	
Blast tube length	inch	8 1/2"	13 13/16"	8 1/2"	13 13/16"	8 1/2"	13 13/16"
Code		3010270		3010271		3010272	

- **Modulating control kit:** Under modulating operation, the burner automatically adapts to one of an infinite number of firing rates between the low and high flame output position, thus ensuring stable operating conditions in terms of temperature or pressure. Two components should be ordered: • Modulating control to install to the burner; • probe to install to the boiler.

Parameter to be checked		Probe		Modulating control	
	Range	Type	Code	Type	Code
Temperature	- 212...+ 932 °F (- 100...+ 500 °C)	PT 100	3010110	RWF40	3010212
Pressure	0...36.3 PSI (0...2.5 bar)	Output probe	3010213		
	0...232 PSI (0...16 bar)	4...20 mA	3010214		

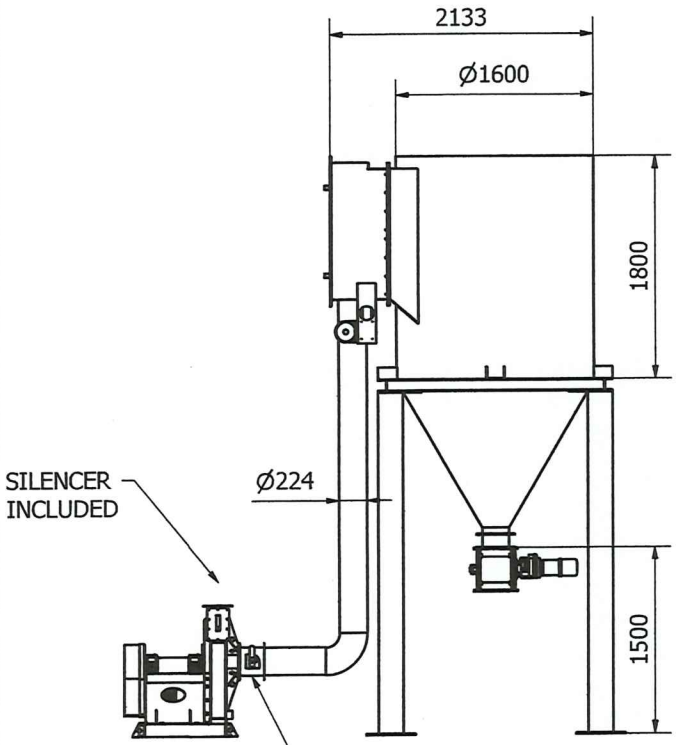
- **Gas train according to UL Standards:** see page 9.

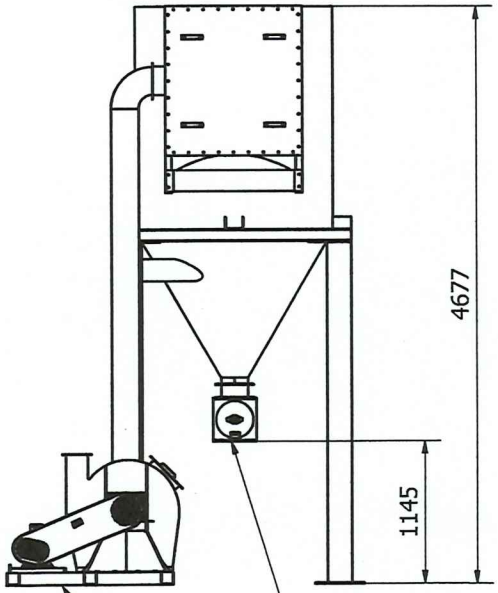
Important:
The installer is responsible for the supply and installation of any required safety device(s) not indicated in this manual.

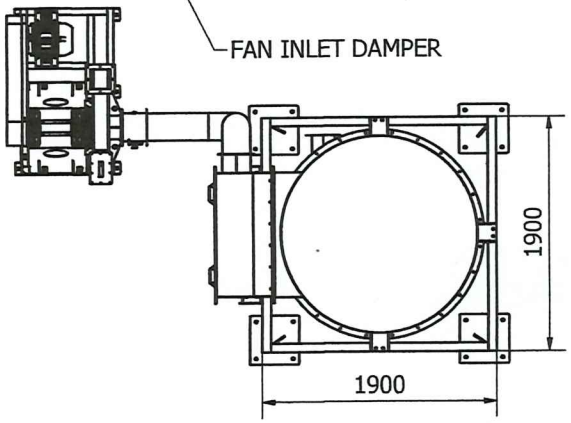
- **Kit for lengthening the combustion head**

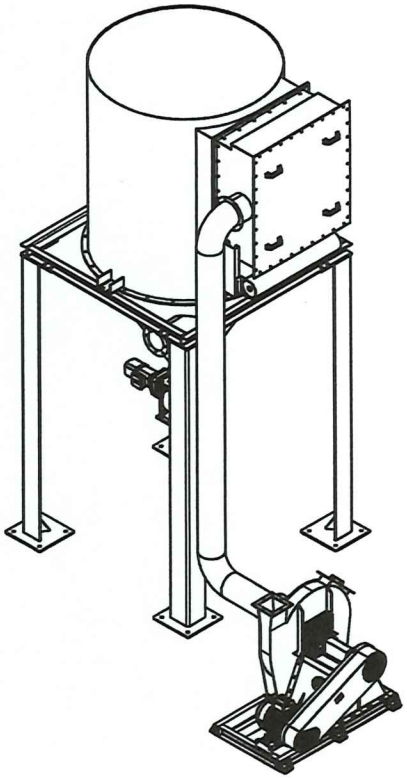
L = Standard length
L1 = Length obtainable with the kit

COD. 3010256	L = 8 1/2"	L1 = 13 13/16"	• RS 28/M
COD. 3010257	L = 8 1/2"	L1 = 13 13/16"	• RS 38/M
COD. 3010258	L = 8 1/2"	L1 = 13 13/16"	• RS 50/M







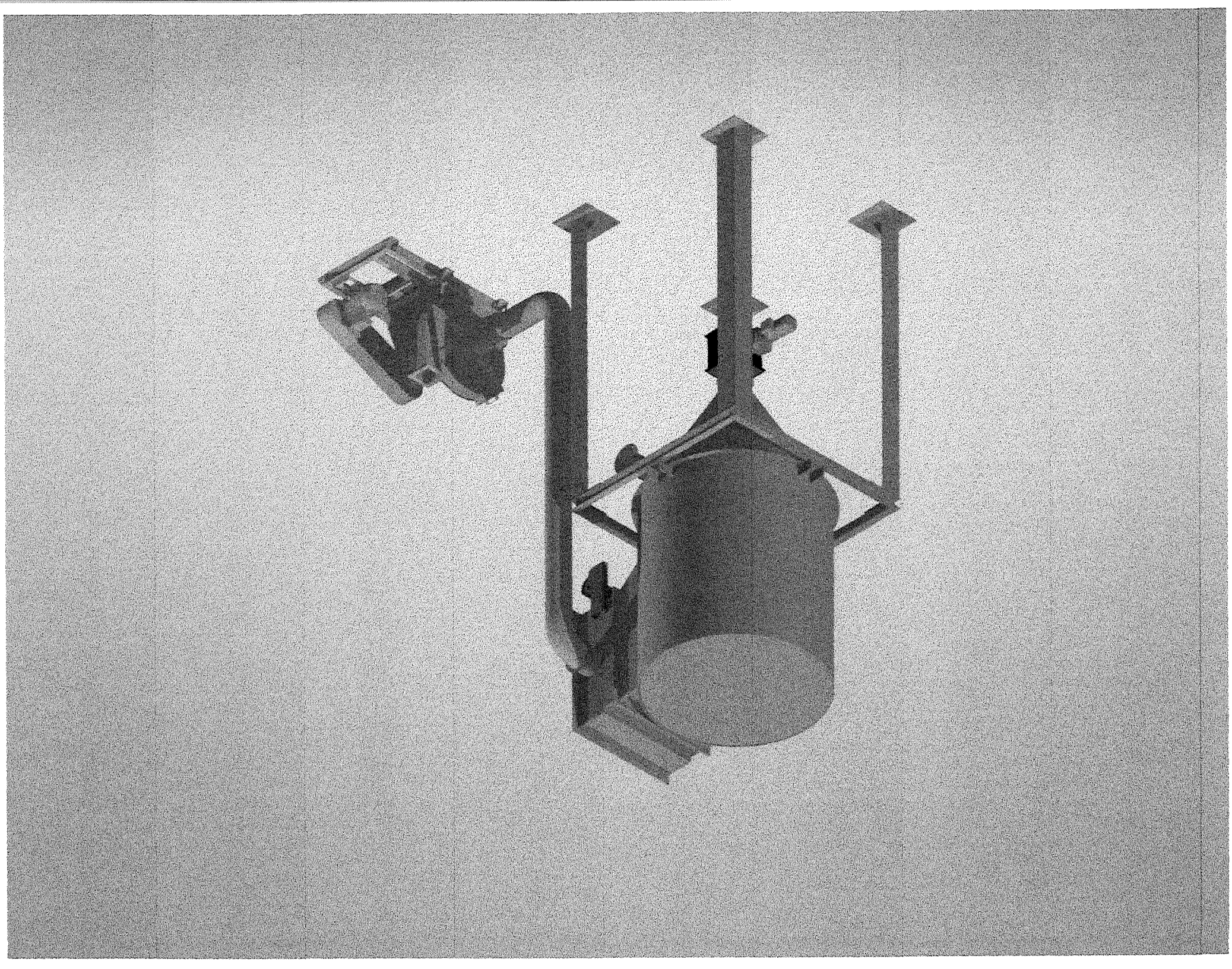


REVISIONS					
No.	DATE	DESCRIPTION	BY	CHECKED	

DRAWN: MB	DATE: 11/05/2023	QTY: 1	PROJECTION	
CHECKED	DATE			
MASS: APROX 1300kg	MATERIAL: AS PER BOM	TITLE: TOTAL RECEIVER WITH FAN SET (BVF20/10 TR)		
APPROVED BY:	PROJECT: HIGHVELD FILTERS	SCALE: 1:40	SHEET SIZE: A3	CONTRACT / DRAWING No.: BTR2010-000-00

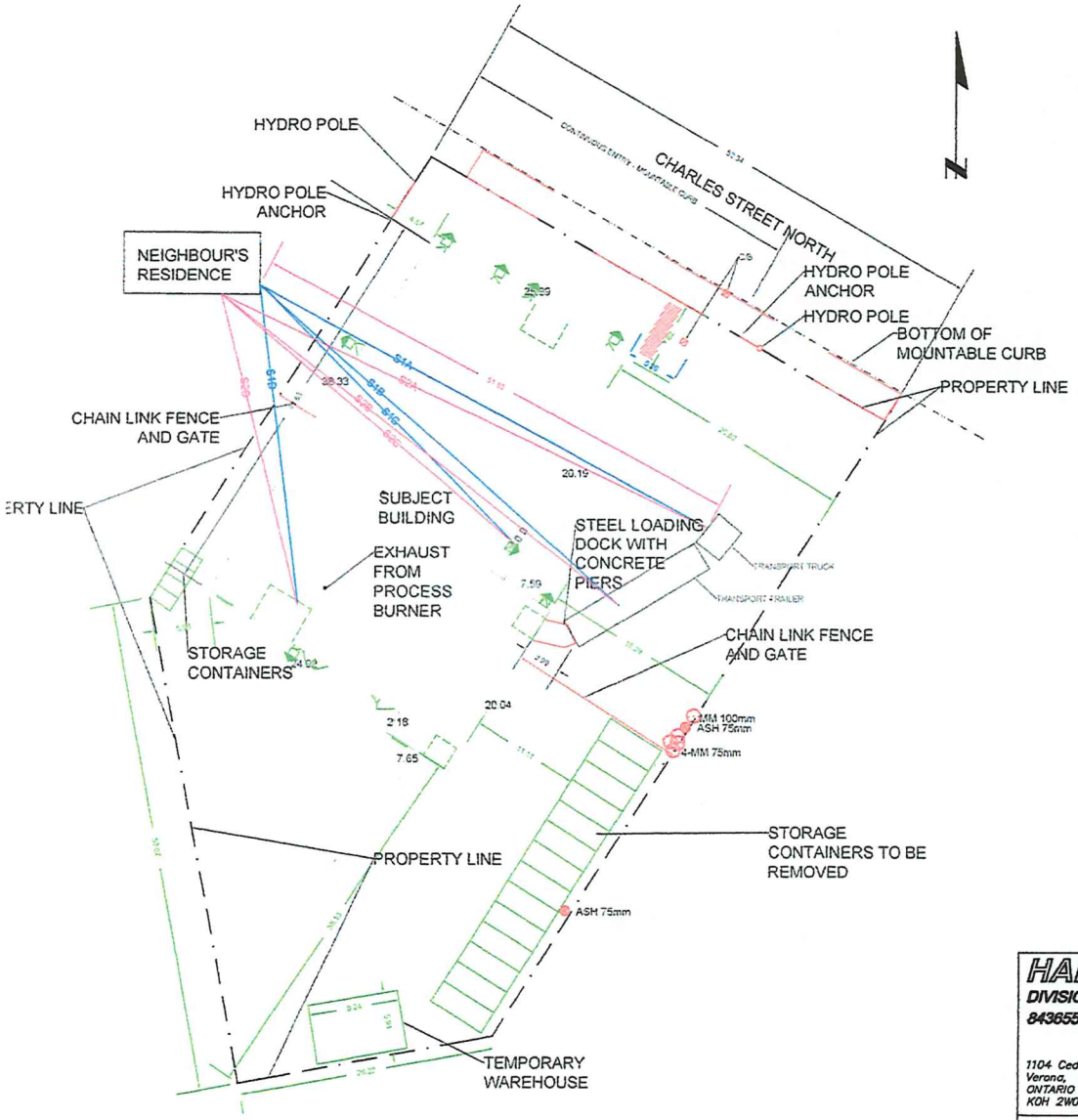
128 Turffontein Road
Eloff Extension
Johannesburg
2190

Tel: (011) 434 2801
drawings@brasco.co.za
www.brasco.co.za



APPENDIX 4

SITE PLAN - POINTS OF RECEPTION
LOCATIONS OF SOURCES



LEGEND

- EGRESS FROM MAN DOOR
- MAN DOOR
- CHAIN LINK FENCE

	DISTANCE FROM SOURCE	DISTANCE ADDED OVER ROOF	DISTANCE FROM SOURCE
S1A	51.8	1.0	52.8
S1B	49.0	1.0	50.0
S1C	36.4	1.0	37.4
S1D	32.6	0.0	32.6
S2A	54.8	1.0	55.8
S2B	51.4	1.0	52.4
S2C	39.1	1.0	40.1
S2D	32.4	0.0	32.4

S1 POINT OF RECEPTION AT FRONT PORCH
S2 POINT OF RECEPTION AT PLANE OF NEAREST WINDOW
A SOURCE IS TRANSPORT TRUCK
B SOURCE IS DELIVERY CUBE VAN
C SOURCE IS 2-A/C UNITS
D SOURCE IS PROCESS BURNER

LICENCED PROFESSIONAL ENGINEER
E. V. TROUGHT
PROVINCE OF ONTARIO

HAMBLY GROUP
DIVISION OF
8436550 CANADA CORPORATION

1104 Cedarwoods Dr.,
Verona,
ONTARIO
K0H 2W0

TEL 613 374 1746
CEL 613 536 8193
FAX 613 536 9118

SEAN BROPHY

SITE PLAN - SOUND

LOCATION: 670 CHARLES ST. NORTH,
GANANOQUE ONTARIO

SIZE	FSCM NO.	DWG NO.	REV
		SPS1	

SCALE 1 : 500 | 2023-05-31 | SHEET 1

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Raw vermiculite contains these elements:
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some impurities in small quantities:
Ca, Na and K

The heating drives out excess water and causes the material to expand, creating a very light material.

This business operates from 8:00 to 17:00, Monday to Friday [five days a week].

The burner is fueled with natural gas and has roof penetrations for air intake for combustion and an exhaust for the removal of combustion gases [mainly carbon dioxide and steam]. There is a filter in the exhaust that removes any dust resulting from the process. The dust would consist of various salts. The filter unit Model is the Brasco TR-BVF20/10 with less than $20mg/m^3$ emissions.

The equipment that has been purchased has a treatment capacity of 500kg/hr. This represents less than 20% of a transport trailer van. The noise analysis was considered for one transport per day. Deliveries will probably be made in a much quieter van.

4. Environment Consideration

Noise sources are from two pieces of interior equipment - the burner and the filter, one delivery truck per day, five deliveries peer day and air conditioning units.

The nearest point of reception is the residential neighbour on the immediate south, while the sources are all on the far south of the buildings - even the a/c units.

The noise levels were significantly less than that required in the "Environmental Noise Guideline - Stationary and Transportation Sources ".

Odour and particulate emissions consist of steam and filters salts. There are no odours from the process, while the particulates are captured in the filter - less than $20mg/m^3$.

Regarding vibration, the equipment of concern is electrical. These units are installed well within the perimeter of the building. The vibration will not be perceptible on the exterior. However the acceptable limit of workplace vibration is set at $0.43\ m/s^2$.

Concrete thickening and isolation may be required at time of installation. We are awaiting the vibration characteristics of the equipment from the supplier.

5. Conclusion

The proposed operation complies with the Environmental Noise Guideline - Stationary and Transportation Sources - Approval and Planning (NPC-300). At the two nearest types of 'Points of Reception' the equivalent sound exposure level in 8 hours is less than 40 dB. The permissible levels for both the outside 'Point of Reception' and at the window plane 'Point of Reception' are 50 dB in a residential area.

There are no odours from these industrial emissions and no perceptible dust discharges from the exhaust.

The propose Land Use poses not environmental risk to the neighbours nor wildlife.

Regards,

Edward Trought, P. Eng.
For HAMBLY GROUP

HAMBLY GROUP
DIVISION OF 8436550 CANADA CORPORATION
1104 CEDARWOODS DR., VERONA, ONTARIO
TEL 613 374 1746
Email evtrought@gmail.com
CELL 613 536 9118

Tony Del Giudice
670 Charles St. North,
Gananoque, ON
K7G 2W5

14 August 2023

Reference: 670 Charles St. North, Gananoque, Ontario

Subject: Pre-Consultation Submission Requirements of 5 April 2023 - Odour

1. Background for Odour Protection
The Pre-Consultation meeting and resulting document of submission requirements identified an 'Odour Impact Study'.

Complying with the requirements of the Town of Gananoque, Tony Del Giudice of VX Resources, engaged HAMBLY GROUP to assess the odour generated by the proposed development and its impact on the nearest residential neighbour to the development.

The Ministry of the Environment and Climate Change (MOECC) ensures sources of emissions to the environment are adequately controlled to prevent potential negative effects.

The Guideline is published by the Ministry: August 2013; " Best management practices for industrial sources of odour".

This guideline identifies a recommended method to deal with odours from industry.

From the Guidelines:

1.1 Development of a Best Management Practices Plan

To create an effective and efficient BMPP, the development and implementation process should include the following four stages:

Plan

Assess facility processes and site operations, identify potential sources of odour (continuous, intermittent, or occasional discharge of odour) and the manner of discharge (point source, building fugitive, outdoor).
Detail odour avoidance, control and mitigation strategies specific to the facility and site operations based on material and waste handling, production systems, ancillary services, preventative maintenance and general site operations.

Do

Identify BMPs to be implemented and how the BMPs will be integrated into site operations.
Establish odour complaint response protocols.
Implement administrative controls such as staff training, development of Standard Operating Procedures (SOPs), preventative maintenance schedules and recordkeeping.

Check

Odour monitoring and inspection protocols.
Recordkeeping.
Accountability and Management oversight of BMPP related activities.

Act

Periodic review of the effectiveness of the BMPs and update of the BMPP on a regularly scheduled basis, or when changes are made at the facility.
The guidance provided in this Technical Bulletin will support preparation of a BMPP and an odour management program that incorporates all four stages.

A sample Table of Contents for a BMPP for Odour is provided in Appendix A.

Requirements of a BMPP for Odour

Having an interactive BMPP for a facility or site operations is a key tool in any effective environmental management system and will minimize the potential impact a site can have on the community.

The elements of a BMPP for Odour assist in identifying potential odour sources and the best practices to prevent or minimize potential odour emissions. The following is a list of suggested content and requirements:

Identify each source of odour and the process associated with the odour, site/process location and the cause of odour. Identify potential causes for significant changes in odour emissions;
Ensure any BMPs developed are consistent with any established Environmental Compliance Approval (ECA) terms and conditions or specific regulatory or approval requirements;
Incorporate measures and procedures to prevent or minimize the discharge of odour;
Continually evaluate odour sources and effectiveness of existing BMPs to identify any additional measures and procedures that should be implemented at the facility to prevent or minimize the discharge of odour;Revise BMPP to include any new or additional sources with appropriate actions and BMPs,

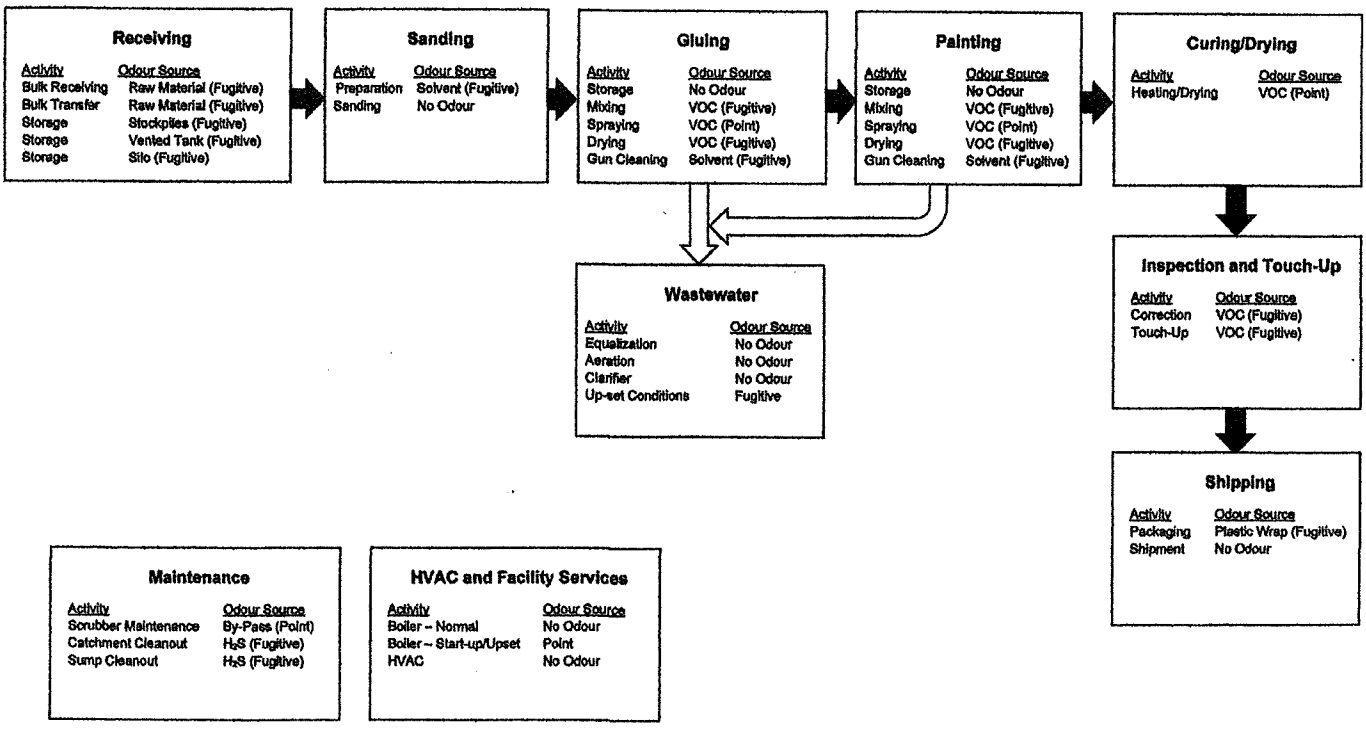
including schedule of implementation and any associated maintenance, frequency or inspection requirements and/or employee training; and,
Keep a copy at the facility for review or inspection by the Ontario Ministry of the Environment and Climate Change (MOECC).

Identification of Potential Sources of Odour

The identification of potential odour sources requires an understanding of all processes and activities that are considered normal or typical for the facility, as well as sources that may be or become odorous. Upset conditions, ineffective pollution control equipment, decomposition of organic matter, and spills are examples of potential causes of odours that are not a normal operation or activity, but may result in odours and should be identified and addressed as a potential odour source.

The steps involved in identifying potential sources of odour include process mapping, understanding where discharges to the air may occur, and identifying when these discharges are potentially odorous. Odours may be associated with gas phase emissions, liquids, aerosols, or particulate matter (fumes). The physical state of the odour carrier often dictates the controls and management practices that may be used to prevent or minimize the discharge of odour.

Sample process flow diagram



2. Introduction

The proposed development is located at 670 Charles St. North, Gananoque. Past operations included retail for rugs/flooring and for fuel sales [home heater oil and propane].

To the left [north west] of the subject property is the only residential neightbour at 680 Charles St. North, among industrial and commercial enterprises. Eastern Marine Services is directly to the rear of the subject property. A self storage company "Gan-U-Lock" is on the right side [south east]. Gananoque Public Works is across the road. This facility includes a five bay truck garage and several small buildings.

3. Process and Operation

This processing and sales enterprise will receive raw vermiculite [once a day by transport truck], process this material by heating it. The process transforms the material into the loose and light substance. The processed vermiculite is bagged then delivered to customers using cube van trucks.

The vermiculite formula: $Mg0.7(Mg,Fe,Al)6(Si,Al)8O20(OH)4 \cdot 8H2O$
Raw vermiculite contains these elements:
Al, Fe, H, Mg, O and Si and
some impurities in small quantities:
Ca, Na and K

The heating drives out excess water and causes the material to expand, creating a very light material. The light vermiculite is easily separated from the denser impurities. The impurities are salts. Salts are significantly more dense and heavier than vermiculite. The vermiculite is 'spun off' while the impurities fall to the lower portion of the hopper. The fine dust that is collected in the filter is also salt.

This business operates from 8:00 to 17:00, Monday to Friday [five days a week].

The burner is fueled with natural gas and has roof penetrations for air intake for combustion and an exhaust for the removal of combustion gases [mainly carbon dioxide and steam]. There is a filter in the exhaust that removes any dust resulting from the process. The dust would consist of various salts. The filter unit Model is the Brasco TR-BVF20/10 with less than $20mg/m^3$ emissions.

The receiver filter has a processing capacity of 500kg/hr. This capacity is much less than a transport per day.

4. Odour Anaysis

This raw vermiculite and its impurities consist of salts. Salts are odourless. The process uses natural gas to heat the product to 500 to 800 degrees Celsius. Should oil be used to treat the product, odours could be perceived. The combustion of natural gas is virtually odourless.

There are no byproducts of this process that generate odours. The byproducts from the processing of raw vermiculite are:
expanded vermiculite,
steam/water vapour,
salt and
salt dust.

Should there be any changes on the operation that introduces organic materials or other agents of odour, the procedures indicated in 'Section 1.' should be followed.

5. Conclusion

The proposed operation complies with the Environmental Odour Guideline. No neighbour to this operation will detect any odour generated from the processing of the proposed raw vermiculite..

Regards,

Edward Trought, P. Eng.
For HAMBLY GROUP

670 CHARLES STREET NORTH

in the Town of Gananoque, Ontario

Property Owner: VX Resources Canada Inc

TRAFFIC IMPACT ASSESSMENT REPORT

By

Dale W Ritchie

For

HAMBLY GROUP
1104 Cedarwood Drive
Verona, Ontario
K0H 2W0

613-374-1746

15 August, 2023

Table of Contents

1.0 Introduction

This report assesses the traffic impact of the present building/property at civic address #670 Charles Street North, in the Town of Gananoque, Ontario. The property is presently vacant. The proposed repurposing of the property is intended to be a manufacturing facility that will occupy a large portion of the building, or about 3013.8 square metres.

Specifically, the proposed operation will be the manufacturing/promotion of bulk materials required by greenhouse operations and gardening households. This manufacturing operation is intended to be a weekday operation, typically from 8:00 AM to 5:00 PM, Monday to Friday.

Besides the work-related vehicle trips by about ten employees, raw materials will be delivered by truck most weekdays and a finished product is expected to be transported off-site by trucks. Client vehicle trips are expected to be limited to about four to five per day for either selecting/ordering materials and/or discussing future needs/operations.

2.0 Roadways

Charles Street North is a main north-south two-lane roadway connecting trips from the downtown area of Gananoque to the northerly area of Gananoque/Highway 401/County Road 32. The proposed development at #670 Charles Street North is about 180 metres south-east of the intersection of Stone Street North/Charles Street North/Alberta Street. This intersection is controlled by traffic control signals, other intersections by stop signs.

Streetlights are mounted on utility poles along the south side of Charles Street North.

The posted maximum speed on this section of Charles Street North is 40 km/h. The posted maximum speed on the adjacent section of Stone Street North is 50 km/h.

3.0 Pedestrians, Cyclists, Transit

A concrete sidewalk is provided for pedestrian travel along the west side of Stone Street North. Pedestrians traveling along Charles Street North roadway have a combination of partial paved, gravel or grassed shoulder. Cyclists share the vehicle lanes along this section of Stone Street North and Charles Street North.

4.0 Sight Distance

The sight distance from the present building/property is clear to the north-west and to the south-east and unchanged from the previous business usage.

5.0 Trips to/from Site

The expected number of vehicle trips to be generated by the manufacturing activity is judged to be compatible with the daily traffic flows generated by the present driveway at #670 Charles Street North.

Town staff has advised that a traffic impact assessment is required to determine the impact, if any, of the generated vehicular trips on the adjacent roadways, notably, Charles Street N and Stone Street N. The usual method of determining the potential impact is to assess the two busiest hours during a typical weekday. If the roadway network can handle the busiest two hours of the day, it can handle the remaining hours.

These two 'busiest' hours are typically the AM and PM peak hours, the periods when most trips are made when motorists are either going to work or returning home. The number of expected trips to be generated by this proposed development are detailed below and are derived from the Institute of Transportation Engineers (ITE) software program Trip Generation, version 11. The ITE figures may in this case exceed the actual vehicle trips anticipated for this proposed facility.

ITE Land Use Manufacturing -
The 3013.8 square metre manufacturing facility is expected to generate about twenty-two (22) trips during the weekday AM peak hour, about seventeen (17) inbound to the property and about five (5) leaving the property.

About twenty-four (24) trips during the weekday PM peak hour are expected to be generated, about seven (7) inbound to the property and about seventeen (17) leaving the property. These generated trips are distributed in the table below.

Generated Trips Assigned to Adjacent Roadways – AM & PM Peak Hours

	SB left from Stone	NB right from Stone	SB right to #670 from Charles	NB left to #670 from Charles	Left to Charles from #670	Right to Charles from #670	WB right to Stone
AM Peak	7	2	9	8	1	4	1
PM Peak	2	0	2	5	9	8	9

The final step in this process is to apply an expected growth factor to the present traffic volumes to reflect the traffic volumes that would apply to a time five years in the future. In this case, year 2023 + 5 = year 2028. These future traffic volumes are assessed in the current Synchro software, version 11, to provide an expected level of service for the adjacent intersection that may be impacted by traffic related to the proposed development.

Town officials were unable to supply an expected vehicular traffic growth for this area. However, the Ministry of Transportation, Ontario (MTO) normally has historical traffic volume data for their roadways, one being Highway 2 from Gananoque east limit to Highway 401 interchange. Assessing this data from the year 1990 to present indicates that a realistic growth is about 1.5% per year, non-compounded. This growth rate was applied in this report to the Stone St N and Charles St N area.

6.0 Synchro Calculations

Synchro calculation sheets for the weekday AM & PM peak in the year 2028 are in the appendix.

The Stone-Charles-Alberta intersection and Charles Street N at #670 will operate at the most desirable level of service 'A' during the weekday AM peak hour in the year 2028 and during the weekday PM peak hour in the year 2028.

7.0 Conclusions/Recommendations

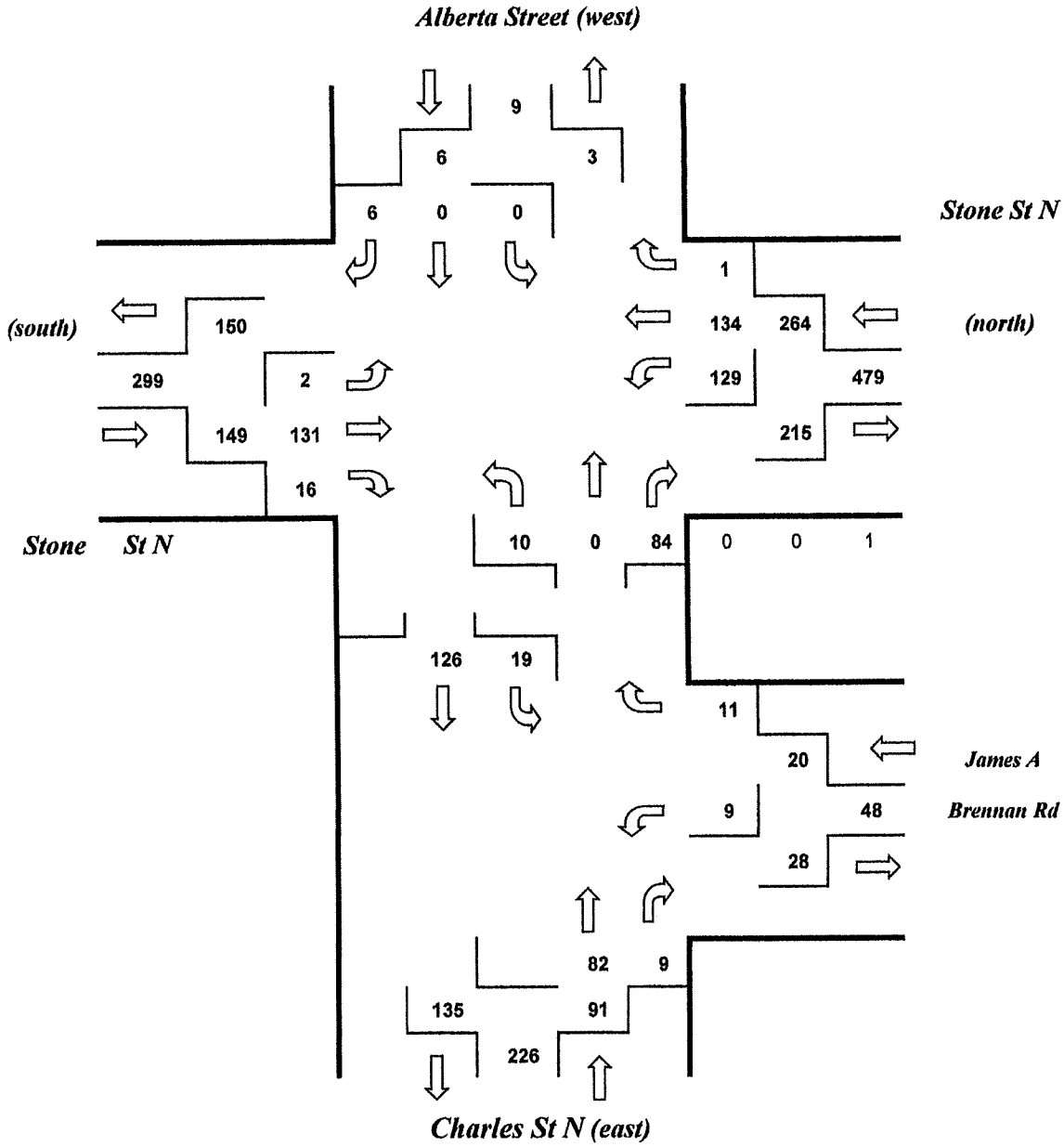
The manufacturing business traffic flows should not adversely affect the typical Charles Street North vehicle flows.

Pedestrians will continue to be served by municipal roadway shoulders along Charles Street North.

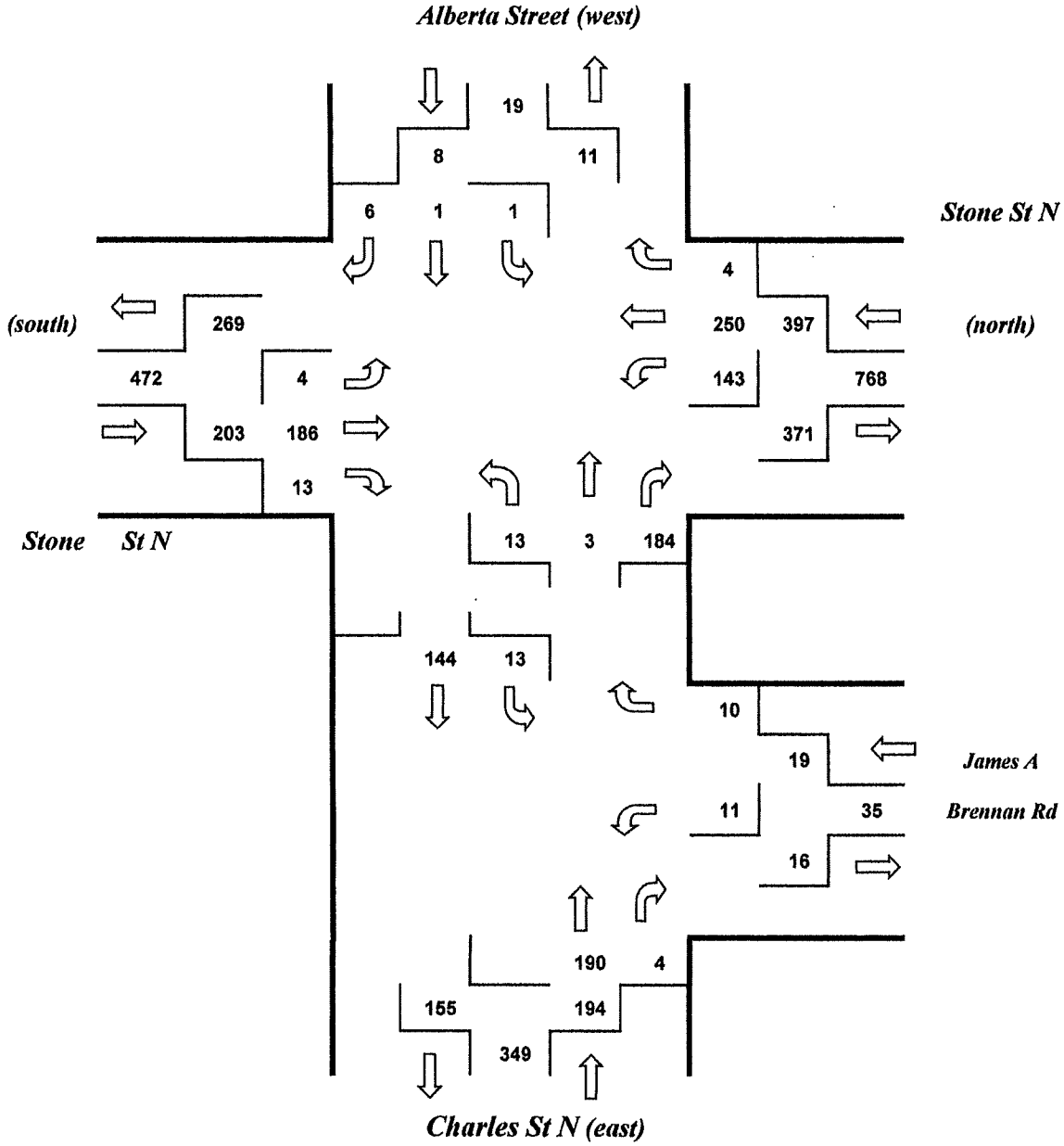
Cyclists will continue to be served by the municipal street system.

Appendix A

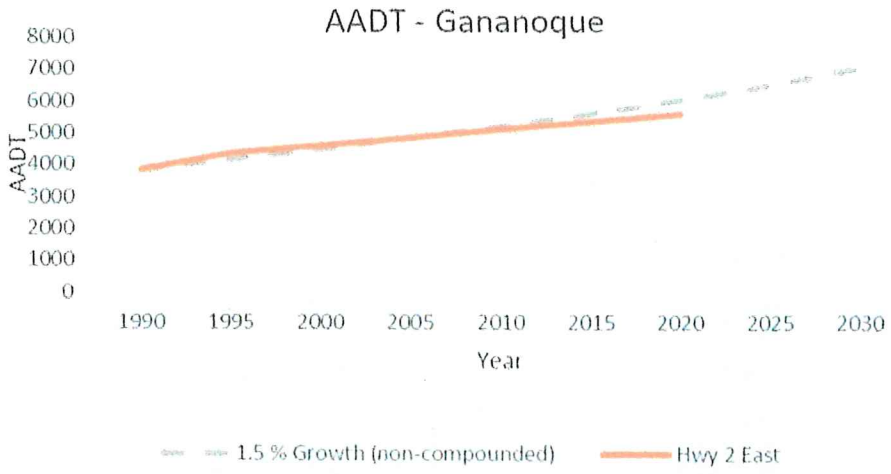
Stone Street N at Charles Street N intersection
AM Peak Hour Traffic Flows
Wednesday, June 14, 2023, 7:45 to 8:45 AM + Generated trips + 5 Years growth



Stone Street N at Charles Street N intersection
PM Peak Hour Traffic Flows
Tuesday, June 13, 2023, 4:15 to 5:15 PM + Generated trips + 5 Years growth



AADT vs Growth Rate



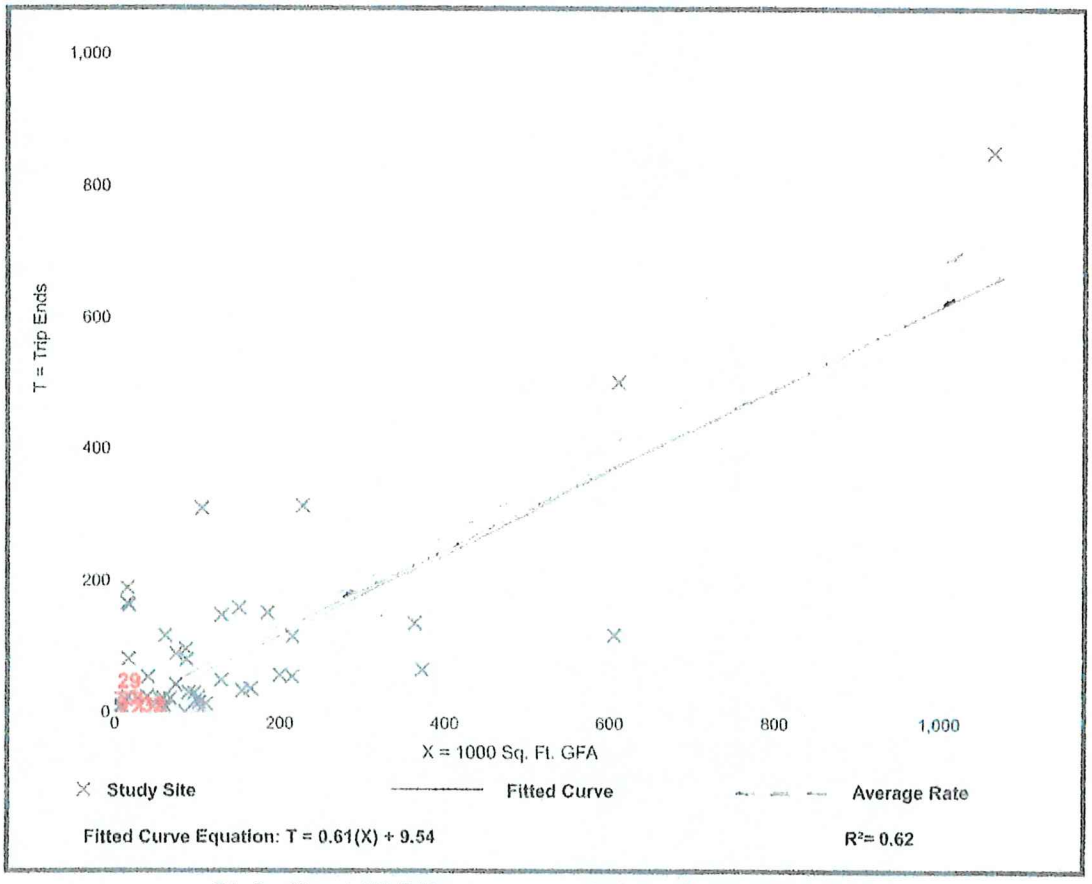
Manufacturing
(140)

Vehicle Trip Ends vs: 1000 Sq. Ft. GFA
On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.
Setting/Location: General Urban/Suburban
Number of Studies: 48
Avg. 1000 Sq. Ft. GFA: 138
Directional Distribution: 76% entering, 24% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.68	0.01 - 11.93	1.03

Data Plot and Equation



Trip Gen Manual, 11th Edition • Institute of Transportation Engineers

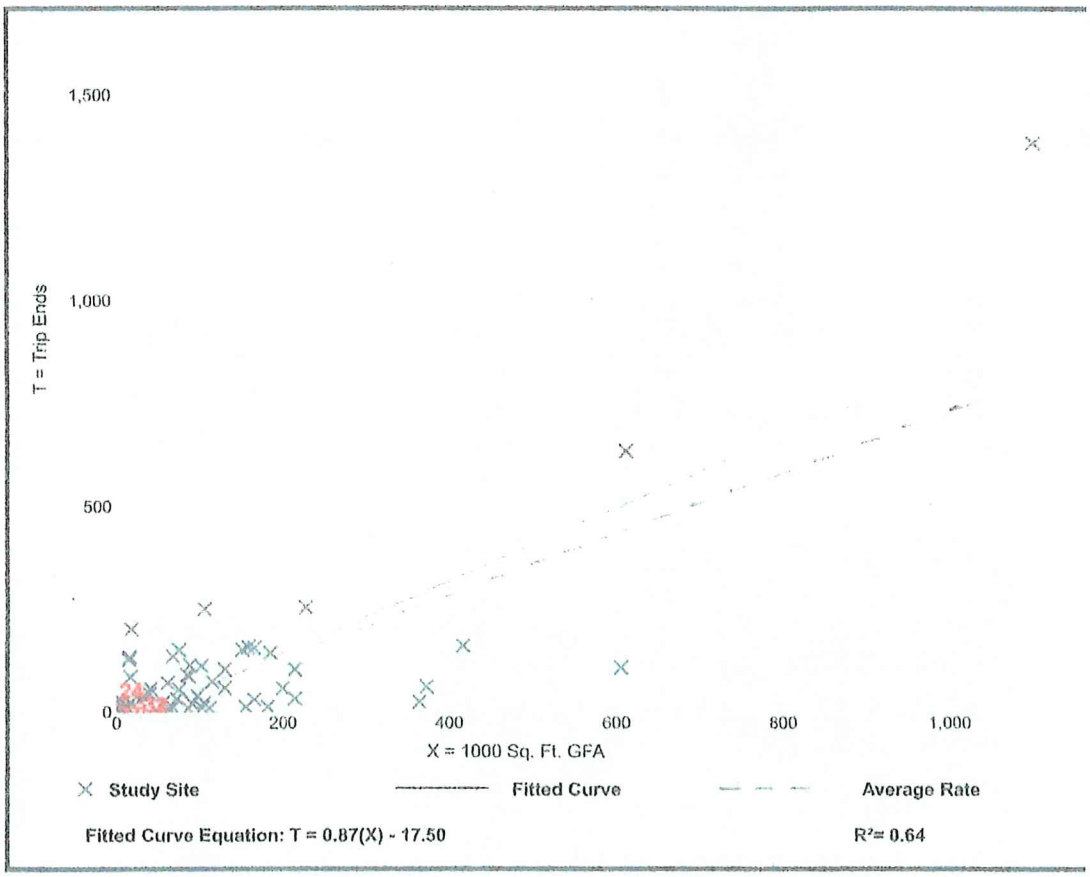
Manufacturing
(140)

Vehicle Trip Ends vs:	**1000 Sq. Ft. GFA**
On a:	**Weekday,**
	Peak Hour of Adjacent Street Traffic,
	One Hour Between 4 and 6 p.m.
Setting/Location:	**General Urban/Suburban**
Number of Studies:	55
Avg. 1000 Sq. Ft. GFA:	142
Directional Distribution:	31% entering, 69% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.74	0.07 - 11.37	0.93

Data Plot and Equation



Trip Gen Manual, 11th Edition ● Institute of Transportation Engineers

Synchro Level of Service Calculation
Weekday AM Peak – Stone Street N at Charles Street N Intersection

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	6	10	0	84	2	131	16	129	134	
Future Volume (vph)	0	0	6	10	0	84	2	131	16	129	134	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	190(
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.0(
Frt		0.865				0.850		0.984			0.999	
Flt Protected					0.950		0.950			0.950		
Satd. Flow (prot)	0	1611	0	0	1770	1583	1770	1833	0	1770	1861	(
Flt Permitted					0.753		0.663			0.656		
Satd. Flow (perm)	0	1611	0	0	1403	1583	1235	1833	0	1222	1861	(
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		685				91		16			1	
Link Speed (k/h)		50			40			50			50	
Link Distance (m)		70.3			38.4			203.2			147.0	
Travel Time (s)		5.1			3.5			14.6			10.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	7	11	0	91	2	142	17	140	146	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	7	0	0	11	91	2	159	0	140	147	(
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Righ
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.0(
Turning Speed (k/h)	25		15	25		15	25		15	25		1!
Turn Type		NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Minimum Split (s)	22.5	22.5		22.5	22.5	22.5	22.5	22.5		22.5	22.5	
Total Split (s)	22.5	22.5		22.5	22.5	22.5	22.5	22.5		22.5	22.5	
Total Split (%)	50.0%	50.0%		50.0%	50.0%	50.0%	50.0%	50.0%		50.0%	50.0%	
Maximum Green (s)	18.0	18.0		18.0	18.0	18.0	18.0	18.0		18.0	18.0	
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)		4.5			4.5	4.5	4.5	4.5		4.5	4.5	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0	11.0	11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0	0	0	0		0	0	
Act Effct Green (s)		18.0			18.0	18.0	18.0	18.0		18.0	18.0	
Actuated g/C Ratio		0.40			0.40	0.40	0.40	0.40		0.40	0.40	
v/c Ratio		0.01			0.02	0.13	0.00	0.21		0.29	0.20	
Control Delay		0.0			8.4	3.2	8.0	8.9		11.2	9.7	
Queue Delay		0.0			0.0	0.5	0.0	0.0		0.0	0.0	
Total Delay		0.0			8.4	3.7	8.0	8.9		11.2	9.7	

C:\Users\Dale\Documents\Trafficware\Synchro Studio 11\Gananoque AM Pk June 2028.syn Synchro 11 Light Repor

Continued below

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBF
LOS		A			A	A	A	A		B	A	
Approach Delay					4.2			8.9			10.4	
Approach LOS					A			A			B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 45			
Actuated Cycle Length: 45			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 45			
Control Type: Pretimed			
Maximum v/c Ratio: 0.29			
Intersection Signal Delay: 8.7		Intersection LOS: A	
Intersection Capacity Utilization 33.5%		ICU Level of Service A	
Analysis Period (min) 15			

Synchro Level of Service Calculation
Weekday PM Peak – Stone Street N at Charles Street N Intersection

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	1	6	13	3	184	4	186	13	143	250	4
Future Volume (vph)	1	1	6	13	3	184	4	186	13	143	250	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.895				0.850		0.990			0.998	
Flt Protected		0.994			0.960		0.950			0.950		
Satd. Flow (prot)	0	1657	0	0	1788	1583	1770	1844	0	1770	1859	0
Flt Permitted		0.987			0.879		0.577			0.623		
Satd. Flow (perm)	0	1645	0	0	1637	1583	1075	1844	0	1160	1859	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		7				200		9			2	
Link Speed (k/h)		50			40			50			50	
Link Distance (m)		70.3			38.4			203.2			147.0	
Travel Time (s)		5.1			3.5			14.6			10.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1	1	7	14	3	200	4	202	14	155	272	4
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	9	0	0	17	200	4	216	0	155	276	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Minimum Split (s)	22.5	22.5		22.5	22.5	22.5	22.5	22.5		22.5	22.5	
Total Split (s)	22.5	22.5		22.5	22.5	22.5	22.5	22.5		22.5	22.5	
Total Split (%)	50.0%	50.0%		50.0%	50.0%	50.0%	50.0%	50.0%		50.0%	50.0%	
Maximum Green (s)	18.0	18.0		18.0	18.0	18.0	18.0	18.0		18.0	18.0	
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)		4.5			4.5	4.5	4.5	4.5		4.5	4.5	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0	11.0	11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0	0	0	0		0	0	
Act Effct Green (s)		18.0			18.0	18.0	18.0	18.0		18.0	18.0	
Actuated g/C Ratio		0.40			0.40	0.40	0.40	0.40		0.40	0.40	
v/c Ratio		0.01			0.03	0.27	0.01	0.29		0.33	0.37	
Control Delay		6.0			8.4	2.9	8.2	10.1		11.9	11.3	
Queue Delay		0.0			0.0	0.9	0.0	0.0		0.0	0.0	
Total Delay		6.0			8.4	3.8	8.2	10.1		11.9	11.3	

Continued below

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS		A			A	A	A	B		B	B	
Approach Delay		6.0			4.1			10.1			11.5	
Approach LOS		A			A			B			B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 45			
Actuated Cycle Length: 45			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 45			
Control Type: Pretimed			
Maximum v/c Ratio: 0.37			
Intersection Signal Delay: 9.3		Intersection LOS: A	
Intersection Capacity Utilization 37.4%		ICU Level of Service A	
Analysis Period (min) 15			