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**WILLIAMS MIDSTREAM ABA /
LASER NORTHEAST GATHERING COMPANY
DUNBAR COMPRESSOR STATION**
(Broome County, NY)

NYPSC CASE 10-T-0350

ARTICLE VII SOUND SURVEY for UNITS 1-4

H&K Report No. 2872

H&K Job No. 4517

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REPORT SUMMARY

In this report, Hoover and Keith, Inc. (H&K) presents the results of May 23, 2013 and June 17, 2013 sound surveys during operation of Units 1-4 at the **Dunbar Compressor Station** (Station) which is owned and operated by **Williams Midstream ABA / Laser Northeast Gathering Company** (Williams).

The May 23, 2013 sound survey was performed upon completion of the following mitigation measures:

- Relocation of the low noise exhaust silencers for Units 1-3 to make room for the new low noise gas and engine JW/AW coolers.
- Installation of low noise horizontal gas and low noise engine JW/AW coolers (with Moore low noise MAG fans) on Units 1-3.
- Installation of acoustical pipe insulation and lagging on the aboveground gas piping for Units 1-3.
- Installation of high performance acoustical wall assemblies inside the previously framed cooler openings.

The June 17, 2013 sound survey was performed upon completion of the following mitigation measures:

- Installation of a low noise horizontal gas cooler (with Moore low noise MAG fans) on Unit 4.
- Retrofit the existing engine JW/AW cooler with low noise Moore MAG fans.
- Re-installation of acoustical pipe insulation and lagging on the aboveground gas piping for Unit 4.

The June 17, 2013 sound survey was performed in response to the conditions contained in NYPSC CASE 10-T-0350, which included installation of the final noise mitigation measures listed above.

The May 23, 2013 property line sound level data has been included to further illustrate the reduction in Station sound levels that has been obtained from implementation of the Station noise mitigation measures.

For comparison, **Tables 10 & 11** (pp. 15-16) depict the results of all previous and current sound level surveys, during Operation of Units 1-4.

NYPSC 40 dBA Criteria

The measured sound levels at the surrounding residences (i.e., NSAs) during operation of Units 1-4 on June 17, 2013 are summarized in **Table 1** (p. ii). Subsequent inclement weather during the May 23, 2013 site visit limited data acquisition to the Station property line locations.

Position	Residences (i.e. NSAs)	Distance to Comp. Bldg.	Units 1-4 (05/23/13) (dBA)	Meets 40 dBA NYPSC Criteria	Units 1-4 (06/17/13) (dBA)	Meets 40 dBA NYPSC Criteria
Pos. 1A	NSA #1A	1,175 ft. SW	Not Meas'd	--	36.1	Yes
Pos. 1B	NSA #1B	1,425 ft. W-NW	Not Meas'd	--	32.3	Yes
Pos. 2	NSA #2	1,900 ft. N	Not Meas'd	--	35.5	Yes
Pos. 3	NSA #3	1,800 ft. W	Not Meas'd	--	31.9	Yes
Pos. 4	NSA #4	2,100 ft. S	Not Meas'd	--	32.4	Yes

Table 1: Summary of Measured Sound Levels at Surrounding Residences

Our measurements, observations and analysis indicate that Station operation with Units 1-4 is in compliance with the NYPSC 40 dBA criteria all residences (i.e., NSAs). The measured sound levels on June 17, 2013 with Units 1-4 in operation ranged from 32 to 36 dBA.

Town of Windsor Noise Ordinance

The measured sound levels at the Station Property Line Boundary during operation of Units 1-4 on May 23, 2013 and June 17, 2013 are summarized in **Table 2**:

Position	Property Line	Distance to Comp. Bldg.	Units 1-4 (05/23/13) (dBA)	Meets 43.2 dBA Windsor N-Time Criteria	Units 1-4 (06/17/13) (dBA)	Meets 43.2 dBA Windsor N-Time Criteria
Pos. 2	Northwest	1,900 ft. N-NW	37.7	Yes	35.5	Yes
Pos. 5	Northeast	1,900 ft. NE	39.1	Yes	38.6	Yes
Pos. 6	East	900 ft. N-NE	41.2	Yes	40.4	Yes
Pos. 7	East	850 ft. NE	38.1	Yes	39.0	Yes
Pos. 8	East	550 ft. E	40.6	Yes	41.2	Yes
Pos. 9	Southeast	800 ft. SE	35.8	Yes	39.5	Yes
Pos. 10	South	650 ft. S	38.7	Yes	39.9	Yes
Pos. 11	Southwest	900 ft. SW	35.3	Yes	37.8	Yes
Pos. 12	West	650 ft. W	42.8	Yes	42.1	Yes
Pos. 13	West	950 ft. NW	39.7	Yes	38.8	Yes

Table 2: Summary of Measured Sound Levels at Station Property Line Boundary

It should be noted that even though the June 17, 2013 sound level survey was performed upon completion of the final noise mitigation measures, the measured / reported sound levels at some measurement positions increased slightly from the May 23, 2013 sound level survey. Please note that this is entirely due to the difference in ambient conditions (i.e., ambient sound levels) that existed for the May 23rd and June 17th sound level surveys. The final noise mitigation measures (i.e., low noise gas and engine JW/AW coolers for Unit 4) have further reduced the Station noise levels.

In lieu of a 35 dBA assumed ambient sound level as stipulated in the Town of Windsor noise ordinance, Williams has performed long term sound level monitoring to determine and document the existing ambient sound level ¹. **Table 3** depicts the results of the long-term ambient monitoring:

Measurement Period			L _d (L _{eq})	L _n (L _{eq})
Start		End	(7 AM to 10 PM)	(10 PM to 7 AM)
12/30/2010	to	06/25/2011	44.4 dBA	
12/30/2010	to	07/31/2011		40.2 dBA

Table 3: Measured Long Term L_d and L_n Ambient Sound Levels

Based upon the measured long term L_n level of 40.2 dBA, the Town of Windsor nighttime criteria is **43.2 dBA** ² (i.e., 40.2 dBA + 3 dBA).

Because the Town of Windsor daytime criteria is less stringent than the nighttime criteria, compliance with the nighttime criteria ensures that the Station is in compliance with the Town of Windsor daytime criteria.

Our measurements, observations and analysis indicate that Station operation with Units 1-4 is in compliance with the Town of Windsor nighttime criteria.

¹ Laser Northeast Gathering, LLC, Millennium Compressor Station, Sound Level Monitor Results, December 5, 2011.

² It is H&K's understanding that there are ongoing discussions taking place between Williams, the NYPSC and the Town of Windsor regarding the appropriate ambient sound level. Based upon those talks, certain parties are taking the position that the appropriate ambient nighttime sound level is 37.5 dBA, which under the Town of Windsor noise ordinance would limit the Station noise level contribution to 40.5 dBA (i.e., 37.5 dBA + 3 dB). Should it be ultimately determined that 37.5 dBA is the appropriate nighttime ambient sound level, the allowable nighttime Station sound level contribution could not exceed 40.5 dBA. In this event, H&K's measurements, observations and analysis indicate that that the sound level attributable to the Station does not exceed 40.5 dBA at all property boundary locations except Pos. 12, under no wind conditions, as stipulated in the Town of Windsor noise ordinance. Non-compliance would exist at Pos. 12, due solely to the proximity of the Station dehy systems to this boundary location.

Report Conclusions

1. The noise mitigation measures implemented by Williams in 2012 and 2013 have significantly reduced the overall A-Wt. sound levels at the Station property line boundary. The table below summarizes the highest initial sound levels, lowest final sound levels and resulting noise reduction at the Station property line boundary:

Position	Property Line	Distance to Comp. Bldg.	Units 1-4 Initial Level ⁽¹⁾ (dBA)	Units 1-4 Final Level ⁽²⁾ (dBA)	Noise Reduction (dBA)
Pos. 2	Northwest	1,900 ft. N-NW	41.9	35.5	6.5
Pos. 5	Northeast	1,900 ft. NE	43.4	38.6	4.8
Pos. 6	East	900 ft. N-NE	46.6	40.4	6.2
Pos. 7	East	850 ft. NE	45.9	38.1	7.7
Pos. 8	East	550 ft. E	48.7	40.6	8.2
Pos. 9	Southeast	800 ft. SE	41.0	35.8	5.2
Pos. 10	South	650 ft. S	42.7	38.7	4.1
Pos. 11	Southwest	900 ft. SW	40.0	35.3	4.7
Pos. 12	West	650 ft. W	45.1	42.1	2.9
Pos. 13	West	950 ft. NW	44.5	38.8	5.7
⁽¹⁾ Highest initial measured / reported sound level - April 20, 2012 or August 17, 2012 sound surveys.					
⁽²⁾ Lowest final measured / reported sound level - May 23, 2013 or June 17, 2013 sound surveys.					

**Highest Initial Sound Levels, Lowest Final Sound Levels
and Resulting Noise Reduction at the Station Property Line Boundary**

As depicted in the above table:

- Units 1-4 are in compliance with the Town of Windsor nighttime criteria at all Station property line boundary positions, based upon the measured long term L_n level of 40.2 dBA (i.e., Nighttime Criteria of 43.2 dBA).
 - The noise mitigation measures have reduced the property line boundary sound levels by 3 to 8 dB, noting that approximately 70% of the measurement locations were reduced by at least 5 dB, which is significant.
2. Should it be ultimately determined that 37.5 dBA is the appropriate nighttime ambient sound level, the allowable nighttime Station sound level contribution could not exceed 40.5 dBA. In this event, H&K's measurements, observations and analysis indicate that that the sound level attributable to the Station does not exceed 40.5 dBA at all property boundary locations except

Pos. 12, under no wind conditions, as stipulated in the Town of Windsor noise ordinance. Non-compliance would exist at Pos. 12, due solely to the proximity of the Station dehy systems to this boundary location. It is estimated that the sound of the Station dehy systems would naturally decrease (i.e., decrease with distance) to less than 40.5 dBA at approximately 150 ft. beyond Pos. 12, which is currently an undeveloped and heavily wooded area.

Because the majority of the property boundary is within a heavily wooded area of mature trees and because a significant portion of the property boundary is along an elevated ridge, the normal environmental sound level (i.e., sound of wind aloft along with the natural sound of birds, insects, etc.) will often exceed the Town of Windsor nighttime criteria. Because of this fact, a measured sound level slightly greater than the Town of Windsor nighttime criteria does not necessarily indicate non-compliance, as the ambient sound level conditions during the measurement can falsely indicate non-compliance.

- The noise mitigation measures implemented by Williams in 2012 and 2013 have also significantly reduced low frequency sound levels. The table below summarizes the measured 31 Hz. and 63 Hz. octave band sound levels before and after implementation of the noise mitigation measures at Pos. 6 and Pos. 8:

Position	Property Line	Distance to Comp. Bldg.	Date	SPL (dB)	
				31.5 Hz. O.B.	63 Hz. O.B.
Pos. 6	East	900 ft. N-NE	April 20, 2012	66	67
			August 17, 2012	67	70
			Average	67	69
			May 23, 2013	64	62
			June 17, 2013	61	62
			Average	62	62
			Decrease	4	7
Pos. 8	East	550 ft. E	April 20, 2012	63	71
			August 17, 2012	63	67
			Average	63	69
			May 23, 2013	59	59
			June 17, 2013	60	60
			Average	60	59
			Decrease	3	10

**31 Hz. & 63 Hz. Octave-Band Levels at Positions 6 & 8,
Before and After Implementation of Noise Mitigation Measures
and Resulting Noise Reduction**

As depicted in the above table, the noise mitigation measures implemented by Williams in 2012 and 2013 have reduced the 31 Hz. octave-and levels by 3 to 4 dB and the 63 Hz. octave-band

levels by 7 to 10 dB, at Positions 6 and 8. The reduction in low frequency sound levels near the Station translates into less low frequency sound levels in the surrounding community, and the reduction in the 63 Hz. octave-band sound level is very significant.

4. The very significant noise mitigation measures implemented by Williams are consistent with a state of the art compressor station, where modern noise control methodologies have been applied to the compressor station significant sound sources. Williams has employed all reasonable mitigation measures to reduce the sound of the Dunbar Compressor Station.
5. The measured / reported sound levels of 32 to 36 dBA during operation of the Dunbar Compressor Station at the surrounding residences are significantly below the NYPSC 40 dBA criteria. Because the NYPSC criteria has been established to protect the surrounding residents and, by extension, the general public, it is H&K's conclusion that no additional noise control measures are required.

1. INTRODUCTION

In this report, Hoover and Keith, Inc. (H&K) presents the results of May 23, 2013 and June 17, 2013 sound surveys during operation of Units 1-4 at the **Dunbar Compressor Station** (Station) which is owned and operated by **Williams Midstream ABA / Laser Northeast Gathering Company** (Williams).

2. SOUND CRITERIA

NYPSC

The Order Granting Certificate of Environmental Compatibility and Public Need for NYPSC CASE 10-T-0350 (Issued and Effective February 22, 2011) contained the following conditions:

1. (z) *prior to the commencement of construction, Applicants shall submit to the Secretary an acoustical study performed in accordance with the guidelines provided in the Town of Windsor Code to establish the ambient noise level at the edge of their property.*¹

1. (s2) *within 45 days of the commencement of operations of the compressor station, or such later date as may be specified by the Secretary, Applicants shall submit to the Secretary a report from an independent acoustical consultant, in sufficient detail for DPS Staff to determine whether Applicants comply with the Town of Windsor Noise Control Code and a maximum noise limit of 40 dBA under no wind conditions at any existing residences; if the study does not show compliance with the Town of Windsor Noise Code and the terms of this order, Applicants shall have 45 days in which to bring sound levels into compliance.*²

Town of Windsor – Chapter 68 Noise Control³

Chapter 68 of the Town of Windsor Code, adopted by the Windsor Town Board on June 2, 2010 and effective July 12, 2010, establishes noise control standards to protect public health, welfare, safety, peace and tranquility of the residents of the Town of Windsor by regulating noise levels. Section 68-7 prohibits unreasonable noise upon property within the geographical boundaries of the Town of Windsor; Section 68-8 describes the maximum permissible continuous sound level. Unreasonable noise is determined by reviewing the noise against the maximum permissible level. As stated, noise shall be measured as follows:

¹ NYPSC Order (Feb. 22, 2011) p. 76.

² NYPSC Order (Feb. 22, 2011) p. 87.

³ Synopsis of Town of Windsor Code, Chapter 68: from NYPSC Order (Feb. 22, 2011), pp. 27-28.

- A. *The measurement of sound or noise shall be made with a sound level meter meeting the standards prescribed by the American National Standards Institute;*
- B. *The slow meter response of the sound level meter shall be used in order to best determine that the average amplitude has not exceeded the limiting noise level;*
- C. *Measurement of noise levels shall be made at or beyond the property line of the property on which such noise is generated or perceived, as appropriate, and shall be taken at least four feet from ground level;*
- D. *Compliance with the noise limits shall be maintained at all elevations at the boundary of the property;*
- E. *Daytime hours shall be between 7:00 a.m. and 10:00 p.m. Nighttime hours shall be between 10:00 p.m. and 7:00 a.m.*
- F. *The maximum permitted noise or sound levels on property, within the geographic boundaries of the Town of Windsor are:*

During daytime hours: ambient noise levels plus five (5) dBA.

During nighttime hours: ambient noise levels plus three (3) dBA.

Additionally, until demonstrated by the applicant or by the Town, ambient noise or sound levels within the Town of Windsor shall be assumed to be 35 dBA.

However, in no event shall the allowed noise or sound levels on the property exceed 55 dBA, unless as allowed via a Special Permit.

Moreover, noise levels shall be measured as described in this section.

The Code outlines exceptions to the noise restrictions, none of which would be applicable to the Applicants' proposed project, discusses enforcement and administration, and describes the process for application for temporary or special permits.

3. DESCRIPTION OF SITE AND COMPRESSOR STATION

Figure 1 (p. 10) depicts the Station and surrounding area. The Station is located in the Town of Windsor, Broome County, New York approximately 8 miles West of Binghamton, NY. The surrounding area mainly consists of heavily forested areas with some agricultural land upon hilly terrain. The compressor building is located adjacent to a significant hill which provides significant shielding for the east and southeast directions.

Rural residences are located around the site along Dunbar, Patterson and Thompson Roads. The closest residences (i.e., noise sensitive areas – NSAs) are approximately 1,175 ft. SW to 1,425 ft. NW of the compressor building along Dunbar Road.

The Station includes (3) Cat 3606 and (1) Cat 3616 compressor units which are installed in a high performance acoustical compressor building. Compressor unit auxiliary equipment includes low noise engine & gas coolers, and high performance exhaust silencers. Station auxiliary equipment includes acoustically insulated gas piping, gas dehydration systems and metering equipment.

4. MEASURED SOUND LEVELS

Data Acquisition and Sound Measurement Equipment

Sound level measurements during Station operation were performed by Brian Hellebuyck, P.E., of H&K on May 23, 2013 and June 17, 2013. The testing was performed in accordance with requirements of Chapter 68 of the Town of Windsor Code as previously outlined. At the reported sound measurement locations, the A-wt. equivalent sound levels (L_{ea}) and unweight octave-band sound pressure levels (SPLs) were performed at approximately 5 ft. above ground. The sound measurements at the nearby NSAs attempted to exclude "extraneous sound" such as a car passing immediately by the measurement position and the sound measurements were typically performed during periods of minimum audible traffic noise.

The acoustical measurement system consisted of a Larson Davis 2900 Real Time Analyzer (a Type 1 SLM per ANSI S1.4 & S1.11) equipped with a 1/2-inch microphone with a windscreen, and the SLM was calibrated within 1 year of the sound test date.

Station Conditions

Table 4 depicts the Station conditions during the May 23, 2013 and June 17, 2013 sound level surveys:

Compressor Unit	(05/23/13)		(06/17/13)	
	RPM	Load (%)	RPM	Load (%)
Unit 1 (Cat 3606)	1,000	100%	1,000	97%
Unit 2 (Cat 3606)	1,000	100%	1,000	97%
Unit 3 (Cat 3606)	1,000	100%	1,000	97%
Unit 4 (Cat 3616)	1,000	100%	1,000	97%
Suction Pressure	450 psi		414 - 499 psi	
Discharge Pressure	1,134 psi		1,025 psi	

Table 4: Station Conditions during the May 20th and June 17th Sound Surveys

Sound Measurement Positions

The sound measurement positions are depicted on **Figure 1** (p. 10) and **Figures 2-15** (pp. 11-15) are photographs of the measurement positions. Where any significant drop in terrain occurred at

any property line location, the sound measurement position was performed closer to the Compressor Building, at a higher elevation, to accurately reflect the Station sound level contribution (i.e., at the vertical extension of the property line). The following is a description of the NSAs and the selected sound measurement positions:

- Pos. 1A: Adjacent to NSA #1A: Houses along Dunbar Road approximately 1,175 ft. SW of the center of the compressor building.
- Pos. 1B: Adjacent to NSA #1B: Houses along Dunbar Road approximately 1,425 ft. W to NW of the center of the compressor building.
- Pos. 2: At Northwest Property Line corner and Adjacent to NSA #2: Houses located along Patterson Road approximately 1,900 ft. N of the center of the compressor building.
- Pos. 3: Adjacent to NSA #3: Houses located on Thompson approximately 1,800 ft. W of the center of the compressor building.
- Pos. 4: Adjacent to NSA #4: Houses on Dunbar Road approximately 2,100 ft. S of the center of the compressor building.
- Pos. 5: At Northeast Property Line corner
- Pos. 6: At East Property Line
- Pos. 7: At East Property Line
- Pos. 8: At East Property Line
- Pos. 9: At Southeast Property Line corner
- Pos. 10: At South Property Line
- Pos. 11: At Southwest Property Line corner
- Pos. 12: At West Property Line
- Pos. 13: At West Property Line

Ambient Sound Level

In lieu of a 35 dBA assumed ambient sound level as stipulated in the Town of Windsor noise ordinance, Williams has performed long term sound level monitoring to determine and document the existing ambient sound level⁴. **Table 5** depicts the results of the long-term ambient monitoring:

Measurement Period			L _d (L _{eq})	L _n (L _{eq})
Start		End	(7 AM to 10 PM)	(10 PM to 7 AM)
12/30/2010	to	06/25/2011	44.4 dBA	
12/30/2010	to	07/31/2011		40.2 dBA

Table 5: Measured Long Term L_d and L_n Ambient Sound Levels

⁴ Laser Northeast Gathering, LLC, Millennium Compressor Station, Sound Level Monitor Results, December 5, 2011.

Measured Sound Level Data

NYPSC Criteria

Table 6 (p.6) summarizes the measured sound levels at the surrounding residences (i.e., NSAs) during operation of Units 1-4 on June 17, 2013, along with an assessment to the NYPSC criteria of 40 dBA at the surrounding residences (i.e., NSAs). Subsequent inclement weather during the May 23, 2013 site visit prevented data acquisition at the community locations.

Our measurements, observations and analysis indicate that Station operation with Units 1-4 is in compliance with the NYPSC 40 dBA criteria all residences (i.e., NSAs).

Town of Windsor Criteria

Tables 7 & 9 (pp. 7-8) summarize the measured sound levels at the Station property line perimeter during operation of Units 1-4 on May 23, 2013 and June 17, 2013, respectively, along with an assessment to the Town of Windsor criteria of Ambient Noise + 3 dBA. Based upon the measured long term L_n level of 40.2 dBA, the Town of Windsor nighttime criteria is **43.2 dBA** (i.e., 40.2 dBA + 3 dBA). Because the Town of Windsor daytime criteria is less stringent than the nighttime criteria, only the nighttime criteria is assessed, and compliance with the nighttime criteria ensures that the Station is in compliance with the Town of Windsor daytime criteria.

Our measurements, observations and analysis indicate that Station operation with Units 1-4 is in compliance with the Town of Windsor nighttime criteria, based upon an existing nighttime of 40.2 dBA.⁵

Previous and Current Sound Level Measurement Data

Table 9 (p. 15) depicts the station conditions during all previous and current sound level surveys. **Tables 10 & 11** (pp. 15-16) depict the results of all previous and current property line boundary and community sound level surveys, during Operation of Units 1-4.

⁵ Should it be ultimately determined that 37.5 dBA is the appropriate nighttime ambient sound level, the allowable nighttime Station sound level contribution could not exceed 40.5 dBA. In this event, H&K's measurements, observations and analysis indicate that that the sound level attributable to the Station does not exceed 40.5 dBA at all property boundary locations except Pos. 12, under no wind conditions, as stipulated in the Town of Windsor noise ordinance. Non-compliance would exist at Pos. 12, due solely to the proximity of the Station dehy systems to this boundary location.

Measurement Set		Sound Pressure Level (SPL) in dB per Octave-Band Freq. (in Hz)									A-Wt.	NYPSC	Meets
Position	Time	31.5	63	125	250	500	1000	2000	4000	8000	Level	Criteria	Criteria
Pos. 1A	9:00 PM	57.5	51.6	37.7	28.6	27.4	24.4	26.6	32.3	21.2	36.1	40	Yes
On Dunbar Rd. (NSA #1A)		Audible sounds included sound of Peepers, sound of birds and Station was faintly detectable.											
Pos. 1B	9:08 PM	48.6	44.8	39.5	30.2	29.5	26.5	21.7	19.6	19.3	32.3	40	Yes
On Dunbar Rd. (NSA #1B)		Audible sounds included distant traffic, nearby small pool filter and intermittent sound of birds. The Station was not audible.											
Pos. 2	4:25 PM	56.4	52.6	42.0	32.5	27.5	23.4	28.0	28.1	25.4	35.5	40	Yes
On Patterson Rd. (NSA #2)		Audible sounds included intermittent sound of distant birds and sound of Station. It was necessary to pause for louder bird noise.											
Pos. 3	9:18 PM	50.6	49.4	40.1	27.4	24.0	22.5	18.0	26.2	19.3	31.9	40	Yes
On Thompson Rd. (NSA #3)		Audible sounds included sound of insects, sound of distant traffic and was detectable.											
Pos. 4	9:27 PM	52.9	51.3	40.6	30.7	25.6	23.2	23.0	22.2	20.0	32.4	40	Yes
On Dunbar Rd. (NSA #4)		Audible sounds included a nearby air conditioner unit, distant aircraft noise and distant traffic. The Station may have been faintly detectable.											

Table 6: Dunbar Compressor Station: Community Sound Survey and Comparison to NYPSC 40 dBA Criteria during Operation of Units 1-4 on June 17, 2013

Measurement Set		Sound Pressure Level (SPL) in dB per Octave-Band Freq. (in Hz)									A-Wt.	Windsor	Meets
Position	Time	31.5	63	125	250	500	1000	2000	4000	8000	Level	Criteria	Criteria
Pos. 2	6:34 PM	57.3	52.0	42.3	39.2	35.2	26.3	26.2	29.3	24.2	37.7	43.2	Yes
		Audible sounds included the Station, which was dominant, sound of birds, slight sound of wind and slight sound of Peepers. It was necessary to pause during periods of louder bird noise.											
Pos. 5	2:34 PM	59.2	54.9	49.7	38.9	33.0	27.6	26.3	31.0	25.7	39.1	43.2	Yes
		Audible sounds included the Station, which was dominant, sound of wind and intermittent birds. The sound of wind and birds were contributing to the measured sound level.											
Pos. 6	2:59 PM	63.6	61.6	47.7	38.2	38.2	32.8	28.5	26.0	24.3	41.2	43.2	Yes
		Audible sounds included the Station, which was dominant, intermittent birds and very minor wind noise. It was necessary to pause and wait for periods of lower winds.											
Pos. 7	3:40 PM	62.7	59.0	42.4	36.6	35.0	30.2	25.2	21.3	18.9	38.1	43.2	Yes
		Audible sounds included the Station, which was dominant, sound of wind aloft and sound of intermittent birds.											
Pos. 8	4:01 PM	59.1	58.6	51.6	32.2	32.8	32.0	32.1	28.8	22.1	40.6	43.2	Yes
		Audible sounds included the Station, which was dominant, sound of intermittent birds and sound of wind aloft.											
Pos. 9	4:12 PM	55.1	52.7	45.5	32.2	30.7	28.4	25.7	24.6	21.5	35.8	43.2	Yes
		Audible sounds included the Station, sound of distant traffic and intermittent sound of birds. It was necessary to wait for a period of lower wind speeds and less bird noise.											
Pos. 10	4:28 PM	60.6	59.1	48.9	33.6	31.7	29.3	27.9	25.4	21.8	38.7	43.2	Yes
		Audible sounds included the Station, which was dominant, sound of wind aloft and distant traffic. It was necessary to wait for an extended period with lower wind noise.											
Pos. 11	4:45 PM	57.6	55.9	46.1	30.8	27.8	25.8	23.2	21.6	19.8	35.3	43.2	Yes
		Audible sounds included the Station, which was dominant, distant traffic, sound of wind aloft and intermittent sound of birds. It was necessary to wait for an extended period of less wind and bird noise.											
Pos. 12	5:13 PM	68.6	59.5	51.9	44.3	35.7	33.7	33.4	30.5	24.0	42.8	43.2	Yes
		Audible sounds included the Station, which was dominant, sound of wind and distant traffic.											
Pos. 13	5:30 PM	60.0	55.9	43.9	34.3	33.2	31.9	33.5	30.0	29.2	39.7	43.2	Yes
		Audible sounds included the Station, sounds of small birds which were contributing to the measured sound level, sound of wind which was also contributing, and distant traffic.											

Table 7: Dunbar Compressor Station: Property Line Sound Survey and Comparison to Town of Windsor Nighttime Criteria during Operation of Units 1-4 on May 23, 2013

Measurement Set		Sound Pressure Level (SPL) in dB per Octave-Band Freq. (in Hz)									A-Wt.	Windsor	Meets
Position	Time	31.5	63	125	250	500	1000	2000	4000	8000	Level	Criteria	Criteria
Pos. 2	4:25 PM	56.4	52.6	42.0	32.5	27.5	23.4	28.0	28.1	25.4	35.5	43.2	Yes
		Audible sounds included intermittent sound of distant birds and sound of Station. It was necessary to pause for periods of louder bird noise.											
Pos. 5	4:35 PM	56.1	51.3	46.5	39.2	31.1	28.4	27.8	32.5	27.2	38.6	43.2	Yes
		Audible sounds included intermittent sound of birds, sound of Station, distant traffic and intermittent sound of wind. The measurement was paused for distant truck traffic (jake break).											
Pos. 6	5:08 PM	61.3	62.4	47.2	35.6	34.9	30.9	28.3	28.5	22.6	40.4	43.2	Yes
		Audible sounds included the Station, which was dominant when wind speeds decreased, sound of birds and the sound of wind. The winds (i.e., wind noise aloft) starting picking up during this measurement.											
Pos. 7	4:51 PM	61.5	60.4	41.2	36.1	34.9	31.3	26.3	26.2	22.8	39.0	43.2	Yes
		Audible sounds included the Station, which was dominant, intermittent sound of birds and distant traffic noise was also contributing to the measured sound level.											
Pos. 8	8:30 PM	60.1	59.5	50.3	33.4	32.1	32.7	34.4	31.3	22.9	41.2	43.2	Yes
		Audible sounds included the Station, which was dominant, intermittent sound of birds and sound of wind aloft. It was necessary to pause the measurements during higher wind noise and louder bird noise.											
Pos. 9	8:38 PM	56.3	56.7	47.8	28.2	27.8	28.8	31.7	33.6	23.8	39.5	43.2	Yes
		Audible sounds included the Station, sound of louder nearby birds and sound of wind aloft. The measurement was paused during the loudest periods of bird noise.											
Pos. 10	7:57 PM	61.1	60.5	48.6	31.7	32.8	31.8	30.9	27.5	22.0	39.9	43.2	Yes
		Audible sounds included the Station, which was dominant, intermittent sound of wind, sound of wind aloft and distant traffic. It was necessary to pause during periods of higher wind speeds.											
Pos. 11	8:10 PM	56.2	55.5	42.9	30.4	31.0	30.2	29.5	30.4	26.1	37.8	43.2	Yes
		Audible sounds included distant traffic, the Station, sound of intermittent birds and sound of wind aloft. The measurements were paused for closer bird noise and higher wind noise.											
Pos. 12	7:28 PM	63.5	56.8	48.7	44.4	36.8	32.3	34.0	31.9	25.4	42.1	43.2	Yes
		Audible sounds included the Station (dehy area), which was dominant, a distant lawnmower, intermittent sound of birds. It was difficult to obtain a measurement not influenced by wind, birds and the lawnmower.											
Pos. 13	7:42 PM	57.1	55.2	46.1	38.5	32.1	29.8	29.8	31.2	24.5	38.8	43.2	Yes
		Audible sounds included the Station, which was dominant, intermittent sound of birds which contributed to the measured sound level and intermittent sound of wind.											

Table 8: Dunbar Compressor Station: Property Line Sound Survey and Comparison to Town of Windsor Nighttime Criteria during Operation of Units 1-4 on June 17, 2013

Meteorological Conditions during the Sound Surveys

May 23, 2013 Sound Survey during Operation of Units 1-4

- Start of Sound Survey: 73 degrees, 78% R.H., 2-4 mph winds from the Southwest, gusting to 6-8 mph, partly sunny skies.
- End of Sound Survey: 70 degrees, 76% R.H., 1-3 mph winds from the Southwest, gusting to 5-7 mph, partly sunny skies.

It is the opinion of H&K that the meteorological conditions during the May 23, 2013 sound survey primarily met the intent of the NYPSC and Town of Windsor requirements that the sound surveys be performed under calm wind conditions.

June 17, 2013 Sound Survey during Operation of Units 1-4

- Start of Sound Survey: 79 degrees, 58% R.H., mostly calm winds, skies with scattered clouds. Winds starting picking up to 6-8 mph from West.
- Middle of Sound Survey: Sound level measurements were not performed between 5:15 PM to 7:15 PM due to higher wind speeds.
- End of Sound Survey: 68 degrees, 63% R.H., 2-4 mph from West, gusting to 6-8 mph, with partly cloudy skies.

It is the opinion of H&K that the meteorological conditions during the June 17, 2013 sound survey were generally suitable to document compliance with the NYPSC and Town of Windsor requirements. However, it is the opinion of H&K that the June 17, 2013 measured sound levels included the sound level contribution of wind noise aloft due the natural hilly terrain that surrounds the Station. H&K and Williams went to great length to perform the sound level survey during calmer wind conditions; however the long term and short term weather forecasts consistently under predicted the actual wind speeds. It is our understanding that the area that surrounds the Station is frequently windy.

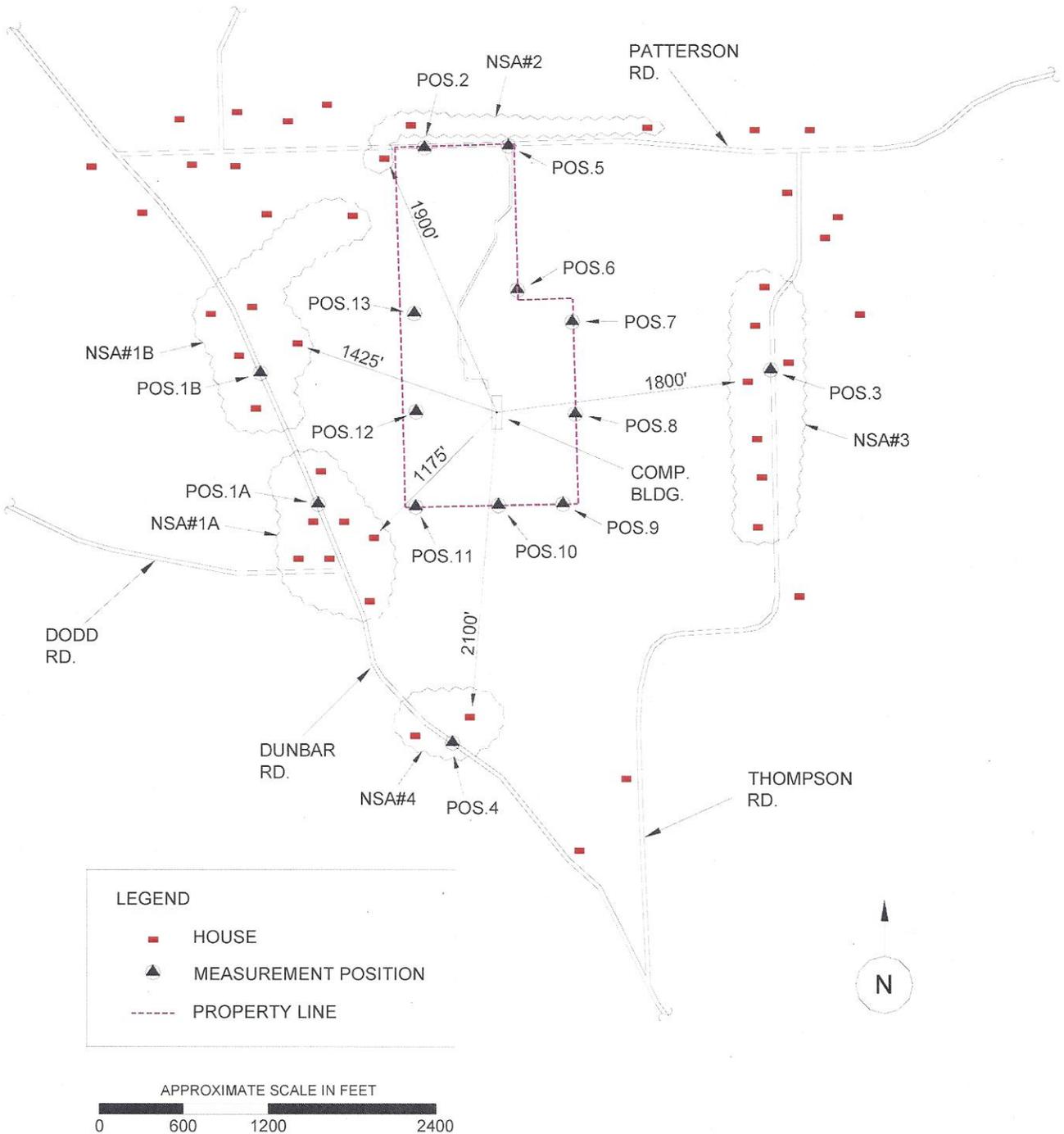


Figure 1: Dunbar Compressor Station and Surrounding Area showing Surrounding Residences (NSAs), Measurement Positions, Dunbar Compressor Building and Dunbar Compressor Station Property Line



Figure 2: Position 1A (taken 08/17/12)



Figure 4: Position 2 (taken 06/17/13)



Figure 3: Position 1B (taken 08/17/12)



Figure 5: Position 3 (taken 08/17/12)



Figure 6: Position 4 (taken 08/17/12)



Figure 8: Position 6 (taken 06/17/13)



Figure 7: Position 5 (taken 06/17/13)



Figure 9: Position 7 (taken 06/17/13)



Figure 10: Position 8 (taken 06/17/13)



Figure 12: Position 10 (taken 06/17/13)



Figure 11: Position 9 (taken 06/17/13)



Figure 13: Position 11 (taken 06/17/13)



Figure 14: Position 12 (taken 06/17/13)



Figure 15: Position 13 (taken 06/17/13)

Compressor Unit	(04/20/12) ⁽¹⁾		(08/17/12)		(11/27/12)		(05/23/13)		(06/17/13)	
	RPM	Load (%)	RPM	Load (%)	RPM	Load (%)	RPM	Load (%)	RPM	Load (%)
Unit 1 (Cat 3606)	1,000	60%	1,000	100%	1,000	105%	1,000	100%	1,000	97%
Unit 2 (Cat 3606)	1,000	60%	1,000	100%	1,000	105%	1,000	100%	1,000	97%
Unit 3 (Cat 3606)	1,000	60%	1,000	97%	1,000	105%	1,000	100%	1,000	97%
Unit 4 (Cat 3616)	980	70%	980	98%	1,000	105%	1,000	100%	1,000	97%
Suction Pressure	525 psi		400 psi		523 psi		450 psi		414 - 499 psi	
Discharge Pressure	1,040 psi		1,095 psi		1,103 psi		1,134 psi		1,025 psi	

⁽¹⁾ Units 1-3 in recycle due to pipeline system constraints during the testing timeframe.

Table 9: Dunbar Compressor Station: Station Conditions during the Previous and Current Sound Level Surveys

Position	Residences (i.e. NSAs)	Distance to Comp. Bldg.	Units 1-4 (04/20/12) (dBA)	Meets 40 dBA NYPSC Criteria	Units 1-4 (08/17/12) (dBA)	Meets 40 dBA NYPSC Criteria	Units 1-4 (11/27/12) (dBA)	Meets 40 dBA NYPSC Criteria	Units 1-4 (05/23/13) (dBA)	Meets 40 dBA NYPSC Criteria	Units 1-4 (06/17/13) (dBA)	Meets 40 dBA NYPSC Criteria
Pos. 1A	NSA #1A	1,175 ft. SW	38.9	Yes	38.1	Yes	35.7	Yes	Not Meas'd	--	36.1	Yes
Pos. 1B	NSA #1B	1,425 ft. W-NW	38.2	Yes	36.8	Yes	29.5	Yes	Not Meas'd	--	32.3	Yes
Pos. 2	NSA #2	1,900 ft. N	41.9	No	40.4	Yes ⁽¹⁾	32.1	Yes	Not Meas'd	--	35.5	Yes
Pos. 3	NSA #3	1,800 ft. W	40.9	Yes	37.5	Yes	33.6	Yes	Not Meas'd	--	31.9	Yes
Pos. 4	NSA #4	2,100 ft. S	38.0	Yes	36.3	Yes	32.7	Yes	Not Meas'd	--	32.4	Yes

⁽¹⁾ NSA #2 is in compliance with NYPSC criteria based upon the observations during the sound level measurement as normal environmental sound sources (birds, distant traffic, wind, etc.) were also contributing to the measured sound level.

Table 10: Dunbar Compressor Station: Previous and Current Community Sound Survey Measurement Data and Comparison to NYPSC 40 dBA Criteria during Operation of Units 1-4

Williams Midstream ABA
Dunbar Compressor Station – Sound Survey for Units 1-4
APPENDIX – Previous and Current Sound Level Survey Measurement Data

Hoover & Keith, Inc.
H&K JN 4517 / H&K RN 2872
(07/01/13)

Position	Property Line	Distance to Comp. Bldg.	Units 1-4 (04/20/12) (dBA)	Meets 43.2 dBA Windsor N-Time Criteria	Units 1-4 (08/17/12) (dBA)	Meets 43.2 dBA Windsor N-Time Criteria	Units 1-4 (11/27/12) (dBA)	Meets 43.2 dBA Windsor N-Time Criteria	Units 1-4 (05/23/13) (dBA)	Meets 43.2 dBA Windsor N-Time Criteria	Units 1-4 (06/17/13) (dBA)	Meets 43.2 dBA Windsor N-Time Criteria
Pos. 2	Northwest	1,900 ft. N-NW	41.9	Yes	40.4	Yes	32.1	Yes	37.7	Yes	35.5	Yes
Pos. 5	Northeast	1,900 ft. NE	43.3	Yes	43.4	Yes ⁽¹⁾	33.0	Yes	39.1	Yes	38.6	Yes
Pos. 6	East	900 ft. N-NE	45.2	No	46.6	No	41.6	Yes	41.2	Yes	40.4	Yes
Pos. 7	East	850 ft. NE	45.9	No	42.7	Yes	42.3	Yes	38.1	Yes	39.0	Yes
Pos. 8	East	550 ft. E	48.7	No	46.3	No	46.6	No	40.6	Yes	41.2	Yes
Pos. 9	Southeast	800 ft. SE	41.0	Yes	39.8	Yes	40.0	Yes	35.8	Yes	39.5	Yes
Pos. 10	South	650 ft. S	42.7	Yes	41.3	Yes	42.7	Yes	38.7	Yes	39.9	Yes
Pos. 11	Southwest	900 ft. SW	38.8	Yes	40.0	Yes	38.3	Yes	35.3	Yes	37.8	Yes
Pos. 12	West	650 ft. W	45.1	No	42.1	Yes	42.7	Yes	42.8	Yes	42.1	Yes
Pos. 13	West	950 ft. NW	44.5	No	39.6	Yes	35.4	Yes	39.7	Yes	38.8	Yes

⁽¹⁾ Position 5 is in compliance with Town of Windsor criteria based upon the observations during the sound level measurement as normal environmental sound sources (birds, distant traffic, wind, etc.) were also contributing to the measured sound level.

Table 11: Dunbar Compressor Station: Previous and Current Property Line Sound Survey Measurement Data and Comparison to Town of Windsor Nighttime Criteria during Operation of Units 1-4