SOUNDTRANSIT

July 26, 2012

Ms. Diane Sugimura, Director
Department of Planning and Development
700 – 5th Avenue, Suite 2000
Seattle, WA 98124

RE: Sound Transit Application for Major Public Project Construction Variance
Northgate Link Extension Project, U District Station Site: DPD Project 3013261

Dear Ms. Sugimura:

Sound Transit is pleased to submit this application for a Major Public Project Construction Variance ("MPPCV") to the Department of Planning and Development Noise Abatement Program in accordance with SMC 25.08. The enclosed MPPCV application is in support of the Northgate Link Extension Project (the "Project") for the U District Station site. Sound Transit's request for a MPPCV is for aboveground construction activities in support of the tunneling operations that must occur on a 24-hour, 7 day a week basis, including tunnel boring operations, and construction of cross-passages and the floating slab trackwork within the tunnel. These activities at the U District Station site are key components of the critical path for construction of the 4.3-mile light rail Northgate Link Project which was adopted by the Sound Transit Board on April 27, 2006.

In order to complete the tunnel construction as safely and efficiently as possible, work at the U District Station site will require around-the-clock operations, seven days a week. Although the tunneling work is underground, it will require various construction-related surface activities to support the below ground efforts. A noise variance from the City of Seattle will allow the necessary surface-level support work activities to continue for tunneling operations while ensuring that the public and those likely to be affected by the noise will be appropriately protected, and that noise impacts will be minimized.

Sound Transit's application includes a detailed technical noise analysis and recommendations for noise mitigation measures to effectively reduce construction sound levels. The application also includes a Noise Management and Mitigation Plan ("NMMP") as required by SMC 25.08. We recommend that DPD adopt the proposed mitigation measures stated in our application and NMMP as conditions of approval of the MPPCV. Prior to commencement of nighttime construction at the site, Sound Transit's Contractor would prepare a Noise Control and Monitoring Plan (the "Plan"), consistent with the NMMP which would include prescriptive specifications for noise control at the construction site. Sound Transit will require its Contractor to implement these measures to ensure compliance with the nighttime noise limits established in the approved noise variance and the Plan. The Plan would also be subject to review and approval by DPD prior to commencement of nighttime construction activities. The Plan could be updated on an as-needed basis during the duration of the construction period.

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Sound Transit has been working closely with city staff and community groups over the last several months to develop this variance application. These efforts have included public meetings, phone calls, letters, and discussion at public open houses. This has allowed Sound Transit to receive valuable public comments and suggestions to refine our Plan.

Granting this nighttime construction noise variance is critical to Sound Transit's ability to complete the tunneling work in support of the Project. We look forward to your decision on this very important variance request.

Sincerely,

Terry Beals

Terry Beals
Sound Transit Permits Administrator
Department of Design, Engineering, and Construction Management
401 S. Jackson Street
Seattle, WA 98104
206-398-5237

Enclosures

C:

Sound Transit w/o Enclosures	City of Seattle
Don Davis	David George
Ron Endlich	Dave Cordaro
Julian Franco	Victor Keys
Salah Al-Tamimi	
Wilbert Santos	

DOCC w/attachment (N125; U District Station Site)

SOUNDTRANSIT
Central Puget Sound
Regional Transit Authority

MAJOR PUBLIC PROJECT CONSTRUCTION NOISE VARIANCE APPLICATION FOR NIGHTTIME CONSTRUCTION NOISE

DPD PROJECT #3013261

Sound Transit Northgate Link Extension Light Rail

For Nighttime Construction at the U District Station Site

July 26, 2012

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Technical Noise Analysis and Recommended Mitigation Plan for the U District Station Site, **Prepared by Jacobs Associates and The Greenbusch Group, Inc., dated *July 25,2012.***

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1.0 INTRODUCTION

Sound Transit seeks a Major Public Project Construction Variance (MPPCV) from the City of Seattle's Noise Control Code. This request for a MPPCV is to allow above-ground construction activities required to support tunneling operations, including construction of tunnel cross-passages and the floating slab trackwork within the tunnel that need to take place during nighttime hours for the Northgate Link Extension Light Rail Project at the U District Station site (UDS).

Sound Transit completed a technical noise analysis as part of the April 2006 North Link Final Supplemental Environmental Impact Statement (FSEIS). An updated noise analysis was prepared for Sound Transit by The Greenbusch Group in a report titled *Technical Noise Analysis and Recommended Mitigation Plan* ("Greenbush Report") dated July 25, 2012 which is attached to this application in Appendix 1.

Sound Transit requests a MPPCV pursuant to Seattle Municipal Code (SMC) Sections 25.08.590 (Granting of variance) and 25.08.655 (Major Public Project Construction Variance) to allow construction noise generated on site to exceed the maximum permissible sound level during nighttime hours (between 10:00 p.m. and 7:00 a.m. on weekdays and between 10:00 p.m. and. 9:00 a.m. on weekends and legal holidays) as those sound levels are specified in SMC 25.08.410 - .425. These provisions of the Code limit nighttime project sound levels at UDS to 47 dBA in receiving areas classified as "Residential", and 60 dBA in receiving areas classified "Commercial". As explained in the Greenbusch Report, existing ambient sound levels at several nearby properties currently exceed these Code limits.

This application requests a variance that will limit nighttime sound levels from the project to 6 dBA (L_{eq}) above nighttime code limits or 6 dBA (L_{eq}) above existing ambient levels, whichever is greater. Also, in order to efficiently monitor compliance of the proposed nighttime sound level limits requested herein, this application proposes that L_{01} be the appropriate mathematical descriptor used by the Department of Planning and Development (DPD) for monitoring and compliance purposes.

2.0 THE NORTHGATE LINK EXTENSION PROJECT

The Northgate Link Extension Project ("the Project") is the northward extension of University Link with 4.3 miles of new light rail track extending from the University of Washington Station (UWS) to Northgate. The Project's alignment is routed underground, elevated, and with surface configuration, with three stations: one in the University District (U District Station), the second in the Roosevelt Commercial District (Roosevelt Station), and the third adjacent to the King County Northgate Transit Center and Northgate Shopping Mall (Northgate Station). The tunnel portion consists of 3.3 miles of twin-bored tunnels, which extend from the UWS, through the proposed U District and Roosevelt Stations, to the Maple Leaf Portal which is located on the east side of the Washington State Department of Transportation (WSDOT) Interstate 5 right-of-way. At

the Maple Leaf Portal, the light rail track alignment transitions from underground to a combination of approximately 1.0 mile of at-grade, retained cut and fill, and elevated structures within portions of the WSDOT and Seattle Department of Transportation (SDOT) rights-of-way, until it crosses over 1st Avenue NE near NE 100th Street. The alignment continues in an elevated guideway along the western boundary of the King County Transit Center. The elevated guideway then crosses over NE 103rd Street to its terminus at the above ground Northgate Station located to the southwest of the Northgate Shopping Mall.

The current Project schedule anticipates that a Notice to Proceed (NTP) will be issued to the demolition contractor for both the Roosevelt and U District Station sites in July 2012. Demolition and site preparation work is expected to begin first at the Roosevelt site in August 2012 and completed in the first quarter of 2013. Demolition and site preparation work is expected to begin at the UDS in March 2013 and completed by Fall 2013. Mass excavation for the station boxes and installation of supporting piles and perimeter walls for the box excavations is expected to begin in Fall 2013 at the Roosevelt site and early to mid-2014 at the UDS. The excavation phase will take approximately 12 months to complete at the Roosevelt site and approximately nine months at the UDS. Following completion of the excavation work at the Roosevelt site, tunneling operations at the Roosevelt site will commence by launching two tunnel boring machines (TBM) to the southeast towards the UDS, to eventually end at the UWS. These tunneling activities, are expected to commence in late 2014 and be completed by early to mid-2017. At the Maple Leaf Portal site, site preparation prior to tunneling is expected to commence in early 2014 and be completed in early 2015. This will be followed by tunneling operations at the Maple Leaf Portal, from which tunnels will be bored south to the Roosevelt Station. Tunneling from the Maple Leaf Portal site is expected to commence in mid- 2015 and be completed by Fall 2017. Construction of the elevated guideway, north of the Maple Leaf Portal, together with construction of the Northgate Station is expected to commence in late 2016 and be completed by Spring 2019. Construction of the U District and Roosevelt Stations will both commence in mid- 2017 and be completed by late- 2019. North Link Revenue Start Up is tentatively scheduled for early to mid-2021 following completion of trackwork and systems testing of light rail vehicles.

2.1 The U District Station Site (UDS) Description

The UDS project site is approximately 0.9 acres located on the east side of Brooklyn Avenue NE, south of the Neptune Theatre to NE 43rd Street. The UDS also includes three other parcels that will be leased by Sound Transit during the construction period: 1) at the northwest corner of Brooklyn and NE 43rd Street; 2) at the southwest corner of Brooklyn and NE 43rd Street; and 3) at the southeast corner of 12th Avenue NE and NE 43rd Street. The latter separate parcel will likely be used for construction offices and not as an active construction staging area. Brooklyn Avenue NE between NE 45th Street and NE 43rd Street will be closed to vehicular access during the construction period after the demolition phase. Portions of NE 43rd that intersect with Brooklyn Avenue NE will be closed temporarily during the construction period, with one-way traffic allowed during a majority of the time.

There are three zoning classifications within the project site area: Neighborhood Commercial 3 Pedestrian - 65 (NC3P-65), NC3-65 and NC3-85 which are all classified as "commercial" districts in SMC 25.08.100. A map showing the location of the project site area, zoning designations and the immediate surrounding land uses is shown on Figure 1.

There are several different zoning classifications immediately surrounding the project site area. Properties to the north and east which front along NE 45th Street and University Way NE are zoned NC3P-65. Properties to the west fronting on Brooklyn Avenue NE between NE 43rd and 45th Streets are zoned NC3-85. Properties to the south fronting on NE 43rd Street are zoned NC3-65. Properties further south of the NC3-65 zone are zoned Midrise (MR). Pursuant to the provisions in SMC 25.08.100, properties zoned NC3 are classified as "commercial" districts. Properties zoned MR are classified as "residential" districts. See Figure 1.

There is a mixture of commercial and residential development surrounding the UDS. Adjacent properties primarily to the east and west of the UDS are developed exclusively with commercial uses. The closest residential uses to the construction site include:

- Eight-story, 79-unit apartment building (University Manor Apartments), zoned NC3-65, located at the southeast corner of Brooklyn Avenue NE and NE 43rd Street immediately adjacent to the southeast portion of the UDS;
- Three-story, 20-unit condominium building (Varsity Arms), zoned MR, located on the west side of Brooklyn Avenue NE, south of NE 43rd Street, immediately adjacent to the southwest portion of the UDS;
- Three-story, rooming house, zoned MR, located on the east side of 12th Avenue NE, south of NE 43rd Street, immediately adjacent to the southwest portion of the UDS;
- Ten apartment units on the top (third) floor of the Neptune Theatre building, zoned NC3P-65, located at the southeast corner of Brooklyn Avenue NE and NE 45th Street, immediately adjacent to the north of the UDS.

2.2 Proposed Nighttime Operations

Sound Transit proposes that the construction activities listed below be allowed on weekdays between the hours of 10 p.m. and 7 a.m. and weekends and/or legal holidays between the hours of 10 p.m. and 9 a.m. for the durations indicated. This application for a MPPCV is made pursuant to the provisions for a noise variance specified in SMC Sections 25.08.560 through .655 (See Section 3.0 below for a discussion of the applicable Noise Control Code provisions regarding a noise variance). Construction sound levels during daytime construction activities at the UDS are expected to comply with Noise Control Code limits and are not subject to this variance application. Should any daytime exceedences be expected or encountered, the Contractor could seek authorization under a Temporary Noise Variance. There is a possibility that the Contractor may seek approval from DPD to perform nighttime work associated with a continuous mass concrete pour

required for the invert slab at the UDS site. This event is anticipated to be done over a one or two weekend period and would occur several months after tunneling operations are complete. However, due to the uncertainty that this concrete work would be conducted during nighttime hours and the exact timeframe during which this event may occur, Sound Transit is not including this event in the MPPCV. Sound Transit will defer to the Contractor to obtain the necessary DPD approvals for this concrete work.

Proposed nighttime work at the UDS includes:

Phase 4 Tunnel Operations: Support and staging areas for the construction of the running tunnels from the Roosevelt Station site to the UWS. Such support and staging includes, but may not be limited to, activities supporting TBM operations, staging of precast tunnel liner segments, excavation and support of cross-passages within the tunnel, and construction of tunnel invert and duct banks. Tunnel construction activities include related above-ground, noise-producing activities such as, but not limited to, material handling and hoisting, truck deliveries of material, and operation of equipment to provide ventilation in the tunnel. Tunneling operations, including cross-passage work, tunnel invert and duct banks, at the UDS would occur over an approximate 20 month period, from approximately September 2015 to April 2017.

Phase 5 Floating Slab: Support and staging areas for the construction of the floating slab trackwork within the tunnel between the UW Station and U District Station and between the U District Station and Roosevelt Station, which includes but may not be limited to material deliveries and material handling and hoisting operations. Floating slab construction staged at the UDS would occur over an approximate 7 to 9 month period depending on the total length of the floating slab which is yet to be determined. Construction of the floating slab is anticipated to start approximately in April 2017 and conclude between October 2017 and December 2017.

3.0 SOUND TRANSIT'S COMPLIANCE WITH THE CRITERIA FOR A MAJOR PUBLIC PROJECT CONSTRUCTION NOISE VARIANCE

3.1 SMC 25.08.168: The Definition of a Major Public Project

SMC 25.08.168 defines "major public project" as follows:

> *"Major public project" means a project for a public facility as defined in SMC Title 23, the construction of which the Administrator determines is likely to be of at least six months duration, and is likely to have a substantial impact on the public safety, health and welfare and the provision of public services, including transportation services. In making this determination the Administrator shall consider factors such as the*

expected size, complexity or cost of the proposed construction or reconstruction; the expected duration of the proposed construction or reconstruction; the magnitude of the expected impacts on traffic and transportation; and/or the degree of impact on the provision of public services during the proposed construction or reconstruction.

"Public facility" is defined in SMC 23.84.030 "P" as follows:

"Public facility" means a public project or city facility.

Sound Transit's proposed Northgate Link Extension Light Rail project is a "major public project" as defined in SMC 25.08.168 and is a "public facility" as defined in 23.84.030. This 4.3 mile extension of the Link light rail line system is a priority for the region's transit system and will provide a fast, reliable option for getting through one of the region's most congested traffic areas. Northgate Link Extension includes stations in the University District, the Roosevelt neighborhood and at Northgate. When Northgate Link Extension opens in 2021, it will be part of 36 miles of new light rail lines running north, east and south from Seattle. The project is budgeted at 1.39 billion dollars. The project has received the highest possible ranking for funding by the Federal Transit Administration.

3.2 The Criteria For Granting A Noise Variance

SMC 25.08.590.C states:

C. The Administrator may grant a variance if the Administrator finds that:
1. The noise occurring or proposed to occur does not endanger public health or safety; and
2. The applicant demonstrates that the criteria required for the variance are met.

As discussed in detail below, the Greenbusch Report predicts that nighttime project sound levels, during tunneling, will exceed the nighttime limits of 47 dBA (residential receiving districts) and 60 dBA (commercial receiving districts).

The proposed MPPCV will limit project sound levels to no more than 63 dBA in residential receiving districts, which is 6 dBA above existing late night ambient conditions (57 dBA). For commercial receiving districts, the proposed MPPCV will limit project sound levels to 66 dBA which is 6 dBA above the nighttime Code limit of 60 dBA. These requested variance limits are consistent with other Sound Transit noise variance applications. Sound Transit and their Contractors have had an excellent record of compliance with the terms and conditions of their respective approved noise variances. The mitigation measures and monitoring systems have been effective and DPD has

received very few complaints from surrounding neighbors. Every complaint was adequately addressed and resolved both to the complainant and to DPD's satisfaction.

The Federal Transit Authority's (FTA) guidelines recommend that a nighttime 8-hour Leq of 70 dBA not be exceeded. Because this federal guideline is stated in terms of 8-hour Leq, it would allow the sounds in any given hour to be much louder than 70 dBA so long as the sounds during other hours were quieter, to bring the 8-hour average down to 70 dBA. Sound Transit proposes a variance limit in residential districts that is substantially lower than 70 dBA, but also substantially stricter because it is stated in terms of hourly Leq, which does not allow for louder hours to be averaged down by quieter hours. Thus the requested variance goes much further than would be required by the federal guidelines that would apply if the City did not have its own ordinance.

The nighttime sound levels allowed by this variance also will be well below the Occupational Safety and Health Act (OSHA) limit of 90 dBA for hearing damage, and well under 85 dBA, the threshold of risk for potential hearing loss identified by the U.S. Environmental Protection Agency.

The requested variance will not endanger public health and safety, and in fact will promote health and safety by allowing truck traffic at times when neighboring streets are less congested, and by promoting worker safety within the tunnel as explained below. The proposed increase of 6 dBA above Code limits in commercial districts and 6 dBA increase above ambient conditions in residential districts will result in noise conditions that are reasonable both in terms of federal guidelines and impacts on the community.

3.3 The Criteria For A Major Public Project Construction Variance

The criteria for a MPPCV are stated in SMC 25.08.655.A:

> *A. The Administrator may grant a major public project construction variance to provide relief from the exterior sound level limits established by this chapter during the construction periods of major public projects. A major public project construction variance shall provide relief from the exterior sound level limits during the construction or reconstruction of a major public project only to the extent the applicant demonstrates that compliance with the levels would:*
> *1. Be unreasonable in light of public or worker safety or cause the applicant to violate other applicable regulations, including but not limited to regulations that reduce impacts on transportation infrastructure or natural resources; or*
> *2. Render the project economically or functionally unreasonable due to factors such as the financial cost of compliance or the impact of complying for the duration of the construction or reconstruction of the major public project.*

Limiting Tunneling Operations To Daytime Hours Would Be Unreasonable In Light Of Public Or Worker Safety, And Would Render The Project Economically Or Functionally Unreasonable

The prime benefit of constructing the tunnel on a continuous 24-hour basis is to allow support of the tunnel in the most efficient and safest way practical, especially for the workers below ground. Stoppage of a TBM increases the risk of ground movements around the TBM and concrete tunnel lining. This could lead to additional settlement and/or convergence of ground onto the TBM, putting worker safety in jeopardy, possibly causing damage to surface structures, and possibly causing the TBM to become stuck. These risks exist each hour that a TMB is stopped. If the TBM needs to be stopped for nine hours every night in order to comply with the City's Noise Control Code, these risks will correspondingly increase. Limiting TBM operations to daytime hours only would also significantly affect the project schedule because completion of the tunnels is part of the critical path for the Project.

Noise-producing above-ground construction activities and equipment are required to support around-the-clock operation of the TBM. Ventilation fans and power generators are needed at the surface to provide fresh air to the workers in the tunnel and a reliable power source for the underground equipment. Most of the work will occur at the bottom of the excavation and within the tunnel, reducing noise and activity at the ground surface. Spoils from the TBM operation will not be handled at the UDS. Tunnel spoils will be transported back to the Roosevelt Station site for disposal to an off-site location. The above-ground loading and unloading of required tunnel construction materials, such as tunnel liners are also required to efficiently maintain continuous tunneling operations.

There are unique physical constraints and size limitations on the site that make it impractical and inefficient for the Contractor to conduct all required construction activities during daytime hours. The site is relatively long and narrow at both the north and south ends with a deep excavation running lengthwise through it that limits areas for access, truck mobility, and storage of equipment and materials. Also, ingress and egress to the site is limited to one way in and one way out. Traffic congestion in and around the site during weekday morning and afternoon commute hours will generally constrain the efficient flow of truck traffic to and from the site. The City may likely require the Contractor to limit or avoid trucking activities during these peak traffic hours, or the contractor may determine it needs to do so in order to lessen conflicts between the trucks and the high volume of vehicles, pedestrians and bicyclists during the day.

An earlier completion of the Project is an additional, substantial benefit of continuous tunneling operations. Completing the Project earlier will result in bringing major public transportation sooner to the region as approved by the voters. These benefits are described in the Central Link Light Rail Project Final EIS, published November 1999 and the North Link Final SEIS, published in April 2006. If continuous tunneling is not granted, the total time to complete the tunnel would be significantly increased, even if there are no other delays. This could lead to at least a one year delay in the total construction period for the Northgate Link Extension light rail project.

Completion Of The Floating Slab Within The Tunnels Are On The Project's Critical Path

Floating slab trackwork construction requires the installation of a concrete slab which is supported by resilient natural rubber or other types of isolaters. The rail track will be directly fastened to the concrete slab. The slab will isolate the trackwork from the tunnel structure reducing the transmission of ground vibration impacts to sensitive buildings within the UW campus.

Installing the floating slab in a timely manner is an integral part of the critical path for completion of the Project. The Contractor needs the flexibility to perform this work at night for the following reasons:

- The floating slab system has a very low production rate and needs to be performed on a double shift in order to avoid delaying the start of construction for the U District station which in turn will delay the entire Northgate Link Extension construction schedule.
- The floating slab construction cannot be staged concurrently during the day with other construction activities at the UDS due to a severely constricted site.

Other public benefits related to allowing nighttime construction activities at UDS

Substantial cost savings for the public. A shorter construction period has clear effects on costs: reduced administrative expenses, reduced length of construction time needed for equipment and personnel, and savings on the inflation that would otherwise compound the cost of construction in later years. If tunneling were limited to normal daytime construction hours, the cost of tunneling would be significantly increased due to the daily start-up and shut down procedures of the TBMs.

Reduction of overall construction inconvenience. The variance will allow for a construction schedule that will lessen the duration of construction impacts (traffic, dust, noise) in and around the project site area.

In addition, the noise control mitigation measures established for nighttime construction activities will also provide a direct benefit to the local businesses and adjacent property owners by reducing the overall level of construction noise coming from the construction site during daytime hours. The mitigation measures proposed, such as the solid construction walls and quiet equipment, will be in place 24 hours per day, 7 days a week.

3.4 The Term Of The Proposed Variance

SMC 25.08.655.B states:

> *B. A major public project construction variance shall set forth the period or periods during which the variance is effective, which period or periods shall be the minimum reasonably necessary in light of the standard set forth in subsection A, and the exterior sound level limits that will be in effect during the period of the variance . . .*

The variance is requested for the length of time that is needed to complete the tunneling/cross-passage work for the construction of the twin tunnels, and for construction of the floating slab trackwork within the tunnels. According to the latest anticipated project construction schedules, these construction activities together will take approximately 28 months to complete, extending from approximately September 2015 to December 2017. This estimate of the duration of this construction phase assumes that there will not be any significant or unexpected delays beyond the control of Sound Transit and/or the Contractor during tunneling operations. Such delays could be caused by TBM or other equipment failures, unforeseen geological or other physical constraints during tunneling, or other technical problems that extend the timeline for project completion. Sound Transit requests a 30 month variance starting from the date that nighttime construction activities commence on the site to allow for any potential schedule delays that may affect the overall project.

3.5 The Noise Management And Mitigation Plan

SMC 25.08.590.D requires a proposed Noise Management and Mitigation Plan ("NMMP") to be included with the application for a noise variance. The required components of the plan are set forth in this section 3.5.

SMC 25.08.590.D.1 requires the NMMP to include:

> *1. A description of the exterior sound level limits of the chapter expected to be exceeded, estimates of the amount(s) by which these levels are expected to be exceeded and by what equipment, the exterior sound level limits that will be in effect during the variance, the time periods during which the pre-variance exterior sound level limits may be exceeded, and the expected sources of the sound during each of the time periods (e.g., types of equipment or activity causing the exterior sound level limits to be exceeded) . . .*

Description Of The Exterior Sound Level Limits Expected To Be Exceeded

The sound level limits that apply to construction at the UDS are stated in SMC 25.08.410, 420, and 425. The cumulative effect of these code sections is summarized on page 5 of the Greenbusch Report. For a "major public project" as defined in SMC 25.08.168, baseline levels, nighttime reductions, and increases allowed for construction equipment, yield the project Code limits outlined in Tables 1 and 2 below. Code limits for commercial properties are detailed in Table 1. Code limits for residential properties are detailed in Table 2. The tables also include the range of existing pre-construction ambient sound levels measured at the nearby commercial and residential district properties by The Greenbusch Group.

Table 1 Permissible Non-Impact Project Sound Levels in **Commercial** Districts, L_{eq} (L_{max})

Time Period	Baseline Code Limit	Nighttime Adjustment	Construction Adjustment	Existing Ambient Sound Level	Project Code Limit
Daytime hours	60 (75)	0	25	61-62 (76-77)[1]	85 (100)[2]
Nighttime hours	60 (75)	0	0	56-58 (71-73)[1]	60 (75)[3]

1. Ranges of period L_{eq} and period median L_{max} at 1303 NE 45th St and 1305 NE 43rd St.
2. As measured at the adjacent property line or 50' from the equipment, whichever is greater (daytime compliance point).
3. As measured at the adjacent property line or adjacent building façade, whichever level is greater (nighttime compliance point).

Source: SMC 25.08, The Greenbusch Group, Inc., Table 4.3 in the Greenbush Report

Table 2 Permissible Non-Impact Project Sound Levels at **Residential** Districts, L_{eq} (L_{max})

Time Period	Baseline Code Limit	Nighttime Adjustment	Construction Adjustment	Existing Ambient Sound Level	Project Code Limit
Daytime hours	57 (72)	0	25	64 (82)[1]	82 (97)[2]
Nighttime hours	57 (72)	-10	0	58 (78)[1]	47 (62)[3]

1. Overall period L_{eq} and period median L_{max} near 4235 Brooklyn Ave NE.
2. As measured at the adjacent property line or 50' from the equipment, whichever is greater (daytime compliance point).
3. As measured at the adjacent property line or adjacent building façade, whichever level is greater (nighttime compliance point).

Source: SMC 25.08, The Greenbusch Group, Inc., Table 4.4 in the Greenbush Report

As provided in SMC 25.08.480, vehicles operating on public roadways are exempt from the levels detailed in the tables above. However, once vehicles turn onto the subject property, the sound they make is included in the Project sound levels that must comply with the permissible sound level limits in Table 2 when received in a Residential District. Vehicles operating on public streets are regulated by SMC 25.08.430, and the vehicles associated with the Project are expected to comply this this code section.

Tables 1 and 2 indicate that the nighttime code limits on construction noise in commercial districts is an hourly Leq of 60 dBA; and in residential districts is an hourly Leq of 47 dBA.

The sound level data was collected by The Greenbusch Group to document existing sound levels at three properties identified below. Continuous twenty-four hour measurements were taken on consecutive days, during the time frames listed below:

- Location 1 – 1303 NE 45th St., apartments above the Neptune Theater (June 9 – June 16, 2011)
    - Southern edge of apartment building, approximately 6' above the rooftop.
    - Local noise sources included traffic on NE 45th St. and Brooklyn Ave. NE.

- Location 2 – 1305 NE 43rd St., University Manor Apartments (June 17-24, 2011)
  - Northern edge of building, approximately 5' above the rooftop.
  - Local noise sources included traffic on NE 43rd Street and Brooklyn Ave. NE.
- Location 3 – 4245 Brooklyn Ave. NE, Felch House (October 17-24, 2011)
  - Eastern edge of building, approximately 4' above a second floor balcony.
  - Local noise sources included traffic on NE 43rd Street and Brooklyn Ave. NE.
    - NOTE: This location was selected to represent ambient levels at the Varsity Arms building located immediately south, on Brooklyn Ave. NE.

The measured ambient sound levels reported in the Greenbusch Report are summarized in Table 3 below. This table includes measurements of average daytime and nighttime sound levels (as those hours are defined in the Noise Control Code) and the average sound levels between 12 a.m. and 5 a.m., a slightly quieter time period, identified as "late-nighttime". For purposes of analysis in this application, the quieter late-nighttime period between 12 a.m. and 5 a.m. is used to describe the existing ambient nighttime conditions. Full hourly measurement data is included in Appendix Tables A-1 through A-3 of the Greenbusch Report.

Table 3 Pre-Construction Ambient Sound Levels, Overall L_{eq} (median of hourly L_{max})

Location	Daytime Sound Levels	Nighttime Sound Levels	Late-Nighttime Sound Levels[1]
Commercial Districts	*Code = 85 (100)*	*Code = 60 (75)*	
Location 1 - apartments above the Neptune Theater	61 (76)	56 (73)	53 (72)
Location 2 - University Manor Apartments	62 (77)	58 (71)	56 (70)
Residential Districts	*Code = 82 (97)*	*Code = 47 (62)*	
Location 3 – Felch House/Varsity Arms Condos[2]	64 (82)	58 (78)	57 (77)

1. Between midnight and 5:00 a.m.

2. 3 dB was subtracted from raw measurement data to account for microphone in proximity to exterior façade of the building, according to standard industry practice.

Source: SMC 25.08, The Greenbusch Group, Inc., Table 5.1 in the Greenbush Report

Comparing Table 3 with Tables 1 and 2, existing average nighttime ambient sound levels are similar to or less than Code Limits for Commercial districts and greater than Code limits for Residential districts.

Estimates Of The Amount(s) By Which These Levels Are Expected To Be Exceeded And By What Equipment

The Greenbusch Report modeled sound levels that would be produced by the equipment that is anticipated for use during tunneling and cross-passage work (identified as "Phase 4" in Table 4) and during floating slab construction work (identified as "Phase 5" in

Table 6) This modeling took into account the solid construction walls proposed by Sound Transit as shown on Figure 2 and described on page 21 of this Application. Figures 3 and 4 indicate the type and location of the equipment that was used to model predicted nighttime sound levels at the UDS. The results of this modeling are set forth below in Table 5 for Phase 4 and Table 7 for Phase 5.

Table 4 Phase 4 Construction Equipment Assumptions for Noise Model

Equipment	Operating Period
Compressor	Daytime/nighttime
Crane	Daytime/nighttime
Delivery and haul trucks (4/hr)[1]	Daytime/nighttime
Generators (2)	Daytime/nighttime
Loader	Daytime/nighttime
Pumps (4)	Daytime/nighttime
Transformer	Daytime/nighttime
Tunnel fans (2)	Daytime/nighttime

1. On-site only

Source: Jacobs Associates, Table 6.6 from The Greenbusch Report

Table 5 Average Nighttime Phase 4 Sound Levels, Hourly L_{eq}

Receiving Property	Existing Ambient Level	Predicted Mitigated Project Level	Code Limit
Commercial Districts			
Location 1 - apartments above the Neptune Theater	53	49	60
Location 2 - University Manor Apartments	56	63	
Residential Districts			
Location 3 - Varsity Arms Condos	57	62	47

Source: The Greenbusch Group, Table 7.5 from the Greenbusch Report

As shown in Table 5 above, nighttime Code limits are predicted to be exceeded during Phase 4 at the University Manor Apartments and Varsity Arms Condos. Due to the proximity of nearby properties and the height of nearby buildings, nighttime Code compliance is not practical. Increased heights for the construction screening walls were considered by The Greenbusch Group, but reasonable increases in wall height would not provide significant improvements. Applying an absorptive surface to the barrier was also modeled, but sound level reductions were insignificant, due to the large size of the construction site.

Table 6 Phase 5 Construction Equipment Assumptions for Noise Model

Equipment	Operating Period
Compressor	Daytime/nighttime
Crane	Daytime/nighttime
Delivery and haul trucks (4/hr)	Daytime/nighttime
Generators (2)	Daytime/nighttime
Loader	Daytime/nighttime
Pumps (4)	Daytime/nighttime
Transformer	Daytime/nighttime
Tunnel fans (2)	Daytime/nighttime

Source: Jacobs Associates, Table 6.7 from the Greenbusch Report

Table 7 Average Nighttime Phase 5 Sound Levels, Hourly L_{eq}

Receiving Property	Existing Ambient Level	Predicted Mitigated Project Level	Code Limit
Commercial Districts			
Location 1 - apartments above the Neptune Theater	53	49	60
Location 2 - University Manor Apartments	56	63	
Residential Districts			
Location 3 - Varsity Arms Condos	57	62	47

Source: The Greenbusch Group, Table 7.7 from the Greenbusch Report

As shown in Table 7 above, similar to Phase 4, nighttime Code limits are predicted to be exceeded during Phase 5 at the University Manor Apartments and Varsity Arms Condos.

Exterior Sound Level Limits That Will Be In Effect During The Variance

Sound Transit proposes that the variance allow project sound levels to exceed no more than 6 dBA above Code limits in commercial districts, and to exceed the existing late-night ambient sound levels by no more than 6 dBA in residential receiving districts. Sound Transit thus proposes that nighttime limits imposed by the variance be 66 dBA (Leq) or less in commercially-zoned areas and 63 dBA (Leq) or less in residentially-zoned areas. These proposed limits are set forth in the next to last column of Table 8 below.

As described in Section 9 of the Greenbusch Report, this application also requests that the L_{01} metric be used for monitoring compliance of the variance limits. The proposed allowable L_{01} limit is 10 dBA above the allowable Leq variance limit. These proposed L_{01} limits are set forth in the last column of Table 8 below.

Table 8 Proposed Variance Sound Level Limits for Hourly Nighttime Sound Levels

Location	Nighttime Code L_{eq} (L_{max})	Ambient L_{eq}[1] (L_{01}[2])	L_{eq} + 6 dBA		Proposed Limits[3]	
			Code + 6 dBA	Ambient + 6 dBA	L_{eq}	L_{01}
All Commercial Properties	**60 (75)**	**51-60 (60-66)**	**66**	N/A	**66**	**76**
Apartments above the Neptune Theater		53 (60)				
University Manor Apartments		56 (61)				
All Residential Properties	**47 (62)**	**57 (65)**	N/A	**63**	**63**	**73**
Varsity Arms Condos						

1. Overall L_{eq} between 12:00 a.m. and 5:00 a.m.
2. Median hourly L_{01} between 12:00 a.m. and 5:00 a.m.
3. Due to anticipated monitoring challenges with L_{eq}, it is proposed that only the L_{01} sound level limit be monitored to determine Variance compliance .

Source: The Greenbusch Group, Inc., Table 9.1 from the Greenbusch Report

Predicted sound levels for nighttime construction activities, including noise reductions afforded by the mitigation outlined in Section 8 of the Greenbusch Report, are compared with recommended variance sound level limits in the Table 9 below.

Table 9 Predicted Construction Sound Levels and Variance Limit Compliance Analysis

Location	Predicted Nighttime Construction Sound Levels, Hourly L_{eq}	Variance Limit Compliance Analysis Result	
	Phases 4, 5, 6	Hourly L_{eq}	Predicted Level below Variance Limit
Apartments above the Neptune Theater	49	**66**	**Yes**
University Manor Apartments	63	**66**	**Yes**
Varsity Arms Condos	62	**63**	**Yes**

Source: The Greenbusch Group, Inc., Table 9.2 from the Greenbusch Report

The Time Periods During Which The Pre-Variance Sound Level Limits Will Be Exceeded

The duration of the proposed nighttime activities at the UDS is predicted to be approximately 28 months. This work could take longer if the project experiences unexpected delays. According to the most current schedule, this work is expected to begin in September 2015. This predicted start date may change once the Contractor prepares his/her schedule. As previously stated in Section 3.4, Sound Transit requests a

30 month variance that would be activated just prior to the commencement of nighttime work at the site.

The Expected Sources Of The Sound During Each Of These Time Periods

The equipment included and analyzed in the Greenbusch Report for nighttime work is outlined in Tables 4 and 6, above. The locations of the sound generating equipment and the work being done are shown in Figures 3 and 4. The equipment was generally placed at locations that tended to maximize predicted sound levels, given the likely site layout and staging. The estimated sound levels for the construction equipment are provided in Table 6.1 of the Greenbusch Report. (Note: Sound Transit provided The Greenbusch Group with information on the equipment listed in Tables 4 and 6 and with the location of the equipment on the site as shown in Figures 3 and 4.) This equipment is typical for a project of this scope and size. The actual equipment used by the Contractor and the location of the equipment used on site may vary, and any changes will be documented in in the Contractor's Noise Control and Monitoring Plan.

SMC 25.08.590.D.2 requires the NMMP to include:

> *2. Measures and provisions to be taken to avoid exceeding the exterior sound level limits of this chapter.*

The noise for which the variance is sought will be generated by the equipment and on-site trucks that are needed to support construction of the tunnels and cross-passages, and construction of the floating slab. No nighttime work is proposed that is not required to support these operations.

Sound Transit will require the Contractor to use its equipment and trucks in a manner that minimizes the sound that is being generated. Thus Sound Transit requires, and proposes that the variance also require, that:

Controls For Nighttime Haul Trucking

- No compression ("jake") brakes shall be used.
- All muck haul truck beds shall be lined with an appropriate dampening compound to reduce impact sound from debris as it is loaded into the beds, or maintain a minimum 1-foot thick layer of muck or dirt in the bottom of the beds.
- No tonal backup alarms shall be used; broadband backup alarms or strobe lights shall be installed on all muck haul trucks unless workplace safety dictates otherwise.
- Engines shall not idle for longer than 5 minutes while on site and not directly involved in work activities. This would include queuing of haul and delivery trucks.

Controls for Construction Site Equipment

- No tonal alarms shall be used; broadband alarms or strobe lights are required on all nighttime site construction vehicles and equipment unless workplace safety dictates otherwise. Any alternatives provided by the Contractor must avoid the use of tonal alarms while providing adequate safety performance. Flaggers could be used as an alternative to non-tonal alarms or strobes.
- No impact sound shall be generated after 5 p.m., including sound from jack hammers, hoe rams, hoe packs and non-impact equipment used in a fashion that generates impact-type sound.
- Radios shall be used for all long-range communication. Raised voices and public address systems are only allowed in the case of an emergency. Such systems shall be tested during daytime hours only.
- The Contractor shall use the quietest equipment available, based on industry standard practice.
- Upgraded mufflers, engine shrouds, or sound enclosures shall be used on equipment to meet nighttime sound level limits, as required.
- Equipment shall not idle un-used for longer than 5 minutes.
- Monitoring and maintenance of equipment to meet Variance sound level limits.

Optional Mitigation Measures

Additional mitigation measures could also be implemented by the Contractor on an as-needed basis to satisfy the proposed noise variance limits depending on the Contractor's final means and methods, including those identified as optional in the ROD. These measures could include, but are not limited to the following:

- Lined or covered storage bins, conveyors, tailgates, and chutes with sound deadening material.
- Acoustic shields or shrouds for equipment.
- Enclose electrical generators, ventilation fans, pumps, concrete batch plants, and air compressors.
- Minimize the use of generators to power equipment.
- Grade surface irregularities on construction sites.
- Use moveable noise barriers at the source of the construction activity.
- Limit or avoid certain noise-generating activities during nighttime hours.
- Where feasible, equipment operators could drive forward rather than backward to minimize use of back-up alarms.
- Place ventilation fans within shafts and use acoustically absorptive ducting and/or in-line silencers.
- Use electric and hydraulic equipment in lieu of diesel or pneumatic.

SMC 25.08.590.D.3 requires the NMMP to include:

> *3. Provisions to mitigate sounds that exceed the exterior sound level limits and that cannot otherwise be avoided.*

Section 8 of the Greenbusch Report recommends that solid construction walls be erected at the heights set forth below and as shown in Figure 2. The noise modeling performed by The Greenbusch Group determined that higher walls, and walls with sound-absorptive surfaces, would not produce significant additional mitigation of project sound levels below the levels produced by these proposed walls.

- A solid 16-foot high wall along southern boundary of the UDS along NE 43rd Street and extending northward from the southwest corner of the site to the north side of NE 43rd Street as shown on Figure 2.

- A solid 12-foot high wall encloses the remaining portions of the site along the western, eastern and northern boundaries as shown in Figure 2; except along the southern and eastern facades of the UW South Annex building located at the northwest corner of NE 43rd Street and Brooklyn Avenue NE. At this latter location, at the request of the University of Washington, a chain link fence atop a jersey barrier will be installed in lieu of a solid construction wall to allow light and air into the lower floor of the UW South Annex building along Brooklyn Avenue NE.

The construction screening walls described above will be constructed from 3/4" exterior grade plywood that will last for the duration of the construction project. The walls will be installed after the demolition phase, prior to station box excavation and prior to proposed nighttime construction activities.

Gates and/or doors in the walls, whether hinged or rolling, shall be constructed of the same or equally effective material as the construction screening wall. Edges of the gates and doors will overlap the wall to eliminate gaps.

SMC 25.08.590.D.4 requires the NMMP to include:

> *4. A process for informing the public in the affected areas about the provisions of the variance.*

Sound Transit will implement an extensive public process, not only to inform the public about the provisions of the variance, but also to inform the public about all construction on the site, and to respond to noise complaints as well as other concerns with construction activity. The Community Outreach programs listed below will be in place prior to commencement of work at the UDS. See Section 5.1 of this Application for a description of the process and procedures for handling complaints.

Public Notification and Communication

Building a mass transit system can temporarily impact neighborhood residents and businesses. Sound Transit's experience on past light rail projects has shown that advance notification of an activity can greatly reduce the perceived impact of construction. Sound Transit's Community Outreach and public involvement program described below will continue throughout the construction period at the UDS. Periodic public meetings, construction update flyers, and updates to the web page will be used to inform the public about the progress of construction and upcoming activities. Staff will also visit adjacent businesses and homes to discuss construction activity.

Sound Transit has developed and implemented a pro-active program of notification and communication, including the following:

1) Keep the public informed of construction activities through written materials, such as

   a) Fact sheets that contain basic information on the stations, art, etc. They are printed and handed out as needed.

   b) The Northgate Link Extension Project Update describes the major milestones and status updates for the project. It is e-mailed to people who request to receive project updates by e-mail. Sound Transit maintains an electronic mailing list at www.soundtransit.org/subscribe.

   c) Construction updates provide status update and information on current activities for the Northgate Link Extension project. They are e-mailed as needed.

   d) Construction alerts provide fast breaking information on specific activities, such as road closure, night work, and utility shut-offs, etc. They are e-mailed or printed and hand delivered as needed. See Section 3 below.

   e) The Sound Transit website (www.soundtransit.org) is kept up to date with the latest design and construction information.

   f) Custom communications are written materials that have the look and feel of existing stakeholder publications (newsletter inserts, ticket stuffers, etc.). They are produced as needed.

   g) Local media are used as needed to distribute information.

2) Host public meetings and provide opportunities for the public to meet with staff to discuss their concerns and to receive information about the proposed project, such as:

   a) Neighborhood construction update meetings are held regularly to provide a chance to speak directly with the project staff and the Contractor about current concerns, etc.

   b) Open houses are hosted several times a year to provide a broad overview to a wide audience.

   c) Community group briefings (as needed or by request).

   d) Participate in community events.

e) Host Sound Transit events at major milestones.

f) Provide viewing portals into the construction site and look for other opportunities for people to view the construction site.

g) Door to door outreach to properties directly impacted by construction activities.

3) Community Outreach protocols for advance notification of noise-producing activities:

a) The Contractor will notify Sound Transit Community Outreach staff in advance of initiating new phases of construction work that will generate noise at high levels and prior to work that will occur during nighttime hours when a noise variance is in effect.

b) Sound Transit Community Outreach staff will notify nearby residents and businesses with as much advance notice as possible prior to the noisemaking activities. Notification will normally include an email alert to the project email list and hand distribution of a Construction Alert flyer to affected parties. All flyers and other communications materials will contain the name and contact information for the Sound Transit Community Outreach staff personally assigned to the particular project area and the 24-hour Construction Hotline number. They also will contain the URL for the Sound Transit web page for the Northgate Link Extension project, where people can sign up for regular email newsletters and Construction Alert notifications.

c) Business and residential neighbors can contact the Sound Transit Community Outreach staff by telephone or email to inquire about construction issues or to register complaints about noise or other matters.

4) Community Outreach protocols during the construction period:

When construction activities reach the level where they start to create a perceived impact, Sound Transit's Community Outreach staff members will be available 24-hours a day to begin working on solutions. Regular visits with impacted residents and businesses are a key component in identifying problems before they become complaints. As an integral part of the construction management team, Outreach staff works in the field along with the inspectors and the Resident Engineer to help avoid construction impacts:

a) Monitor the Contractor's activities to minimize impacts
   i) Traffic flow
   ii) Pedestrian traffic
   iii) Access to business and residential properties
   iv) Housekeeping / worksite maintenance
   v) Parking
   vi) Directional signage

b) Work cooperatively to solve problems, minimize impacts and respond to concerns or complaints:
   i) Door to door outreach to impacted properties
   ii) Utilize the 24-hour hotline to receive concerns / complaints
   iii) Outreach staff has access to the resources needed to respond quickly such as janitorial services, plumbers, etc.

c) Respond to community inquiries and keep a log of all interactions (including noise complaints)

In addition to providing notification and responding to emerging issues, Sound Transit's outreach program includes other types of mitigation for the community, such as:

5) Signage and Art
   a) Provide custom business signage to mitigate construction impacts
   b) Soften the impact by installing art on construction fencing
   c) Install pedestrian kiosks to provide information
   d) Work with "STart" program to incorporate temporary art into Sound Transit facilities
   e) Provide pedestrian environment amenities where appropriate

6) Support business mitigation activities for the impacted businesses
   a) Provide signage for better visibility during construction
   b) Promotional activities

7) Provide information on safety around construction sites and rail facilities
   a) School presentation and safety information aimed at students.

4.0 CONTRACTOR REQUIREMENTS FOR NOISE MITIGATION

Sound Transit proposes that the following requirements be implemented by the Contractor to mitigate construction noise for all nighttime activities that are authorized under this MPPCV application. Sound Transit will incorporate the mitigation requirements stated below as mandatory contract specifications. Sound Transit requests that DPD adopt these mitigation requirements as a condition of MPPCV approval.

4.1 Contract Specifications

The contract specifications require that the Contractor perform construction operations in a manner to minimize noise at sensitive receptors. The Contractor shall comply with the requirements of the Seattle's Noise Control Code and any conditions of approval as specified by DPD in the MPPCV. Additionally, the Contractor shall be required to prepare, implement and maintain a Noise Control and Monitoring Plan (the "Plan")

consistent with DPD's requirements for a NMMP. The Plan will effectively incorporate and implement all required environmental protection precautions.

4.2 Acoustical Specialist

Within 45 days of Notice To Proceed (NTP) (which is currently anticipated in August 2013), the Contractor is required to submit to Sound Transit and the Noise Abatement Section of DPD, the name, address, and qualifications of the Acoustical Specialist responsible for preparing and overseeing the implementation of the Contractor's Noise Control and Monitoring Plan.

The Acoustical Specialist shall be recognized by membership in the National Council of Acoustical Consultants, Institute of Noise Control Engineering or Acoustical Consultants. In addition to this membership requirement, the Acoustical Specialist must demonstrate substantial and responsible experience in preparing and implementing construction noise management and mitigation plans on construction projects conducted in an urban setting, including qualifications to provide noise-monitoring as specified in Section 5.2 below.

4.3 Contractor's Noise Control and Monitoring Plan

The Contractor is required to submit its Plan to Sound Transit for review and approval within 45 days of the NTP. The Plan will include details of mitigation and monitoring of nighttime construction activities at the UDS. Once approved by Sound Transit, the Plan will be submitted to DPD for review and approval prior to commencement of any nighttime work on the site. The Plan would be updated on an as-needed basis by the Contractor, and resubmitted and approved for each new phase of work activity. A copy of the Plan will be maintained at all times in the Contractor's field office.

At a minimum, the Contractor's Plan shall:

- Specify the construction activities, monitoring locations, equipment, and procedures, and describe the characteristics of the noise produced with the equipment used, the schedule of measurements, and the reporting methods to be used.
- Identify measures to mitigate sound generated by the proposed construction.
- Update and modify the identified mitigation whenever major activity changes or different equipment is mobilized on the Site from the equipment previously submitted.
- Include a list of identified mitigation for the site and for each change in activities to be performed at the site.
    - At a minimum, such list shall include the following:
        - Identification of equipment.
        - Proposed sound mitigation (if any) for each piece of equipment.
        - Layout of equipment.

- Hours of work operation.
- Hours of operation of each piece of equipment.
- Any additional mitigation not related to a specific piece of equipment (e.g., barrier around entire site or around several pieces of equipment).

- Be consistent with the approved MPPCV and with SMC 25.08.590.D.1.

4.4 Additional Noise Control Measures

In the event that the measured sound levels exceed the nighttime noise limits specified in the approved MPPCV, the Contractor shall immediately stop the activity and notify Sound Transit. The Contractor will have the discretion to implement any additional noise control measures to reduce noise to acceptable levels or terminate the nighttime construction activity responsible for the noise limits exceedence until the daytime hours when higher sound levels are permitted under S.M.C 25.08.425.

Additional noise control measures may include, but are not limited to, raising the height and/or location or otherwise modifying the construction screening wall(s), providing additional noise control measures such as placing moveable temporary noise barriers or noise control curtains, and/or prohibiting the use of noisier activities during nighttime hours.

5.0 NOISE VARIANCE COMPLIANCE TRACKING

In addition to the noise mitigation measures stated in Section 4.0, another component of Sound Transit's MPPCV proposal for allowing nighttime construction noise is establishing procedures and programs for effectively tracking, evaluating and resolving public complaints by taking appropriate corrective measures.

It is the prime responsibility of the Contractor to monitor the construction activity and the equipment used on the project to ensure compliance with the nighttime sound level limits established under the approved MPPCV. Sound level monitoring requirements for the Contractor are specified in Section 5.2 below. In addition to the required monitoring by the Contractor, Sound Transit will provide independent third party monitoring as specified in Section 5.1 below to ensure the public's interest are represented and that the Contractor adheres to the City's Noise Control Code and permit conditions. Section 5.1 also contains provisions for a construction hotline and procedures for response to noise complaints.

5.1 Independent Third Party Monitoring

In order to comply with DR 3-2009, Sound Transit must provide an Independent Noise Monitor (INM), to perform the duties stated in Section C, Rule 2 of this Director's Rule. The INM will take direction from DPD's Noise Abatement Coordinator (NAC) at DPD.

Construction Hotline

Sound Transit will maintain a toll-free 24-hour Construction Hotline (888-298-2395) to provide a single point of contact for construction inquiries and complaints, including noise complaints. During normal business hours, 8 a.m. to 5 p.m. Monday through Friday, the line will be personally answered by Sound Transit Community Outreach staff. After hours and on weekends and holidays, calls will be answered by a professional answering service to ensure that callers are able to speak to a live person, not voice mail. Noise related calls will be immediately transferred to the INM. Non-noise related calls will be transferred to the Sound Transit Community Outreach team for resolution.

All complaints received by Community Outreach staff or over the Construction Hotline, whether during business hours or after hours, will be logged in a complaint database. The INM will be responsible for providing a written summary of noise related hotline calls to Sound Transit's Outreach staff to include in the database. Reports derived from that database will be presented regularly to the construction management team, to the Contractor, and to the City of Seattle DPD Noise Control Office. The database will indicate the date, time, and location of each incident, contact information for the complainant, and steps that were taken to resolve the complaint.

Noise Complaint Response

For each noise complaint received, the INM will contact Sound Transit's Resident Engineer or the lead nighttime inspector to initiate an investigation to determine the source of the noise and whether or not it exceeded applicable noise limits for that time and location. If the determination is made that the noise did exceed applicable limits, then the INM will work with the Sound Transit construction management team to direct the Contractor to take corrective actions and to operate within limits in the future. If the noise is within applicable limits but still objectionable to citizens, staff will determine if the Contractor should be requested to voluntarily reduce sound levels.

5.2 Sound Level Monitoring

Due to the sensitive nature of some nearby receivers, noise monitoring terminals (NMTs) with the capability to log continuous sound levels and record audio files of louder events will be provided. The Contractor will be responsible to provide, install, and maintain the NMTs (overseen by the INM), and provide unrestricted physical and unrestricted electronic access (viewing, editing, and controlling) to the INM.

Based on Sound Transit's experience at the Capitol Hill and University of Washington station sites, and input provided by DPD staff, short-term monitoring will be conducted by the INM at the start of the nighttime construction activities, with not less than 15 minutes of data collected at each monitoring location at each site inspection visit. The resulting short-term data could be considered representative of hourly emissions from the site and compared to the variance limits insofar as the limits are not exceeded during the 15 minute period. If the variance limits are exceeded within the 15 minute period, a full

hour of monitoring should be conducted at each location. If the short-term monitoring proves to not provide sufficient data to investigate complaints or potential non-compliance issues, continuous monitoring (whether or not night work is occurring) may be warranted.

It is proposed that the NMTs be equipped with the following:

- One sound level analyzer with the following capabilities and specifications:
  - Type 1 rating as delineated in American National Standards Institute (ANSI) S1.4 and S1.43, or Class 1 rating per IEC 61672.
  - Continuous broadband logging of one-second L_{eq} and L_{max}.
  - Continuous spectral logging of one-second L_{eq} and L_{max}.
  - Periodic reporting of L_{01} (at least 15 and 60 minutes)
  - Capability to record sound files based on a threshold trigger event, adjustable in 1 dB increments, and capable of triggering on the "fast" time-weighted sound pressure level.
  - Sufficient internal memory and power supply for one week of logging, with sound recordings.
  - Calibrated not less than weekly. If charge injection calibration is used, manual calibrations with an acoustic calibrator must occur not less than monthly.
  - Annual calibration at a National Voluntary Laboratory Accreditation Program (NVLAP)-accredited acoustical laboratory.
- One random-incidence microphone housed in an environmental shroud, providing protection from rain and wind conditions. The environmental shroud should be capable of outdoor measurements for at least one year without service or replacement. The sound level analyzer must be able to compensate for the presence of the shroud.
- One lockable and weather-resistant enclosure large enough to hold the battery, sound level meter, and accessories.

Unrestricted physical access and restricted electronic access (viewing only) shall be provided to Sound Transit, authorized DPD staff, and the Contractor. The INM would be responsible for maintaining the collected data on the NMTs, including downloading previous night monitoring data, and reviewing for compliance with Variance limits. The INM will also be responsible to log which nights work was occurring, based on construction schedules provided by the Resident Engineer and brief review of sound recordings from nights when work was not scheduled.

While precise installation locations will depend on acquired rights-of-entry or clearance to install devices in public rights-of-way, the following monitoring areas are proposed for the NMTs:

- Apartments above the Neptune Theater
- University Manor Apartments
- Varsity Arms Condominium

Microphones would ideally be located at, or within, the receiving property. If the solid perimeter construction wall (or other available mounting location such as a utility pole) is not near the property boundary, monitoring data collected at this location will likely not represent Project sound levels received by the property subject to Variance conditions.

5.3 Variance Non-Compliance Resolution

Complaints received by DPD, Sound Transit or Sound Transit's Community Outreach staff during the Project will be shared with the Contractor. The Contractor will work with Sound Transit and the INM, as required, to resolve these noise complaints.