ATTACHMENT X: L200E 100PCT CONSTRUCTION NOISE, VIBRATION AND GROUNDBORNE NOISE REPORT

Lynnwood Link Extension | Northgate Station to Lynnwood Transit Center

Contract No. RTA/AE 0010-15

Contract L200E
Construction Noise, Vibration, and Groundborne Noise Report
100% Submittal

August 14, 2018

Prepared for:

SOUNDTRANSIT

Prepared by:

HNTB Jacobs trusted design partners

TABLE OF CONTENTS

APPENDICES

TABLES

FIGURES

1.0 INTRODUCTION

This report outlines the existing construction noise criteria for the various jurisdictions along the Lynnwood Link Extension corridor, briefly describes the existing sound environment along the alignment, and summarizes potential construction noise sources and mitigation options. Detailed information regarding the construction equipment mix is not available at this time. The sound levels for equipment typically used for the construction of heavy civil projects are provided in the interim.

Only publicly available information is described herein; the results of any discussions or agreements between Sound Transit and the jurisdictions are not yet available. Criteria or regulations that may apply to construction noise were taken from published information provided by Sound Transit, the FTA, the State of Washington, the City of Seattle, and the City of Shoreline. The Washington State code serves as the basis for the ordinances adopted by the local jurisdictions. Only the City of Seattle has detailed and specific limits on construction noise and a clearly-defined noise variance application process. The City of Shoreline generally applies the state noise code and has a specified variance process. Existing noise levels in the corridor are summarized, though it is noted that none of the state and local criteria are based ambient noise levels. FTA states that construction noise should not exceed the existing ambient by more than ten decibels.

In this discussion, the L_{eq} metric is the time-averaged A-weighted noise level computed over the specified time period, and L_{dn} is the day-night average noise level computed over a 24-hour period with a +10 decibel "penalty" added to noise levels produced between 10 pm and 7 am. A-weighting is a standard frequency filter applied to approximate the typical hearing sensitivity of the humans.

2.0 SOUND TRANSIT DESIGN CRITERIA

The Sound Transit Link Design Criteria Manual, March 2016, Revision 4 – Chapter 3 Noise and Vibration states the following regarding noise and vibration during construction:

"For noise and vibration generated during construction, local codes should be followed where applicable. The FTA 2006 Manual (VA-90-1003-06) Chapter 12 provides guidance for assessment, criteria and mitigation development where local codes do not exist or apply."

Section 12.1.3 of the referenced 2006 FTA Transit Noise and Vibration Impact Assessment manual addresses Construction Noise Criteria. No standardized criteria are put forth and the manual states that, when no local ordinances apply, criteria should be project-specific and "should take into account the existing noise environment, the absolute noise levels of the construction activities, the duration of the construction, and the adjacent land use." FTA proposes construction noise criteria for residential land use of 80 dBA 8-hour L_{eq} for daytime, 70 dBA 8-hour L_{eq} for nighttime hours, and a 30-day average of 75 dBA L_{dn}. Furthermore, for areas with high ambient noise levels (L_{dn} > 65 dBA), which is true of most of the residential areas adjacent to I-5, the L_{dn} from construction operations should not exceed the existing ambient

level by more than 10 dBA. Noise measurements in the corridor indicate that the first and second row of homes adjacent to I-5 currently experience an ambient noise environment in excess of 70 dBA L_{dn}.

2.1 Washington Administrative Code

The Washington Administrative Code (WAC) Chapter 173-60-40 provides maximum permissible environmental noise levels for different property usage, called Environmental Designation for Noise Abatement (EDNA). These limits are shown in Table 1.

Table 1: Washington State Noise Control Regulation

EDNA OF NOISE SOURCE	EDNA OF RECEIVING PROPERTY (Maximum allowable noise level)		
	Class A: Residential	Class B: Commercial	Class C: Industrial
Class A: Residential	55 dBA	57 dBA	60 dBA
Class B: Commercial	57 dBA	60 dBA	65 dBA
Class C: Industrial	60 dBA	65 dBA	70 dBA

Between 10 pm and 7 am, the levels given above are reduced by 10 dBA in Class A EDNAs.

The WAC contains short-term exemptions to the property line noise standards based on the minutes per hour that the noise limit is exceeded, as indicated in Table 2.

Table 2: WAC Short-Term Noise Exemptions for Property Line Noise Levels

Minutes per hour	Adjustment to Maximum Sound Level
15	+ 5 dBA
5	+10 dBA
1.5	+15 dBA

2.1.1 WAC Construction Noise Criteria

Sounds received in Class A EDNAs that originate from construction sites are exempt from the limits of the WAC regulations during normal daytime hours (7:00 am to 10:00 pm). If construction is performed during the nighttime, the contractor must still meet the WAC noise-level requirements for sounds received in Class A EDNAs, as presented in Tables 1 and 2, or obtain a noise variance from the governing jurisdiction. The WAC also contains a set of construction-specific allowable noise-level limits. These construction noise regulations are organized by type of noise and, among other things, include haul trucks and back-up safety alarm criteria.

A) Haul Truck Noise Criteria

Maximum permissible sound levels for haul trucks on public roadways are limited to 86 dBA for speeds of 35 miles per hour (mph) or less, and 90 dBA for speeds over 35 mph when measured at 50 feet (Chapter 173-62, WAC). For trucks operating within staging areas, the general construction equipment noise criteria would be used to determine compliance during nighttime hours in Class A EDNAs.

B) Noise Related to Back-up Alarms

Sounds created by back-up alarms are prohibited by the WAC during nighttime hours (10:00 pm and 7:00 am) in Class A EDNAs, when other forms of back-up safety measures would need to be used. These could include the use of broadband alarms (as opposed to tonal), or smart back-up alarms, which automatically adjust the alarm level based on the background level, or switching off back-up alarms and using human spotters.

2.2 City of Seattle

The City of Seattle has maximum permissible environmental noise level requirements that are similar to those contained in the WAC (Seattle Municipal Code [SMC] Chapter 25.08; SMC Section 25.08.410). However, while the WAC does not define a noise descriptor to be used for purposes of applying the limits shown in Table 1, the City of Seattle explicitly states that the L_{eq} descriptor be used. In addition, during a measurement interval, maximum noise levels (L_{max}) may exceed the L_{eq} exterior sound level limits shown in Table 1 above by no more than 15 dBA (SMC Section 25.08.410(B)).

The SMC also imposes the following three limitations on the maximum permissible sound level limits, which are more restrictive than the WAC:

- The City of Seattle ordinance extends the 10 dBA reduction in maximum nighttime noise levels to 9:00 am on weekends and legal holidays, while under the WAC the reduction stops at 7:00 am.
- For any source of sound (other than an electrical substation) that has a pure tone, the exterior sound level limits established under SMC Section 25.08.410 are reduced by 5 dBA.
- For any source of sound that is impulsive and not measured with the Impulse response on a sound level meter, the exterior sound level limits established under SMC Section 25.08.410 are reduced by 5 dBA.

2.2.1 Construction Noise Criteria

The WAC exempts construction noise from maximum permissible noise levels except during nighttime hours in residential zones, but the City of Seattle code provides upper limits on construction noise *at all times*. Under SMC Section 25.08.425, the sound level limits established by SMC Section 25.08.410 may be exceeded for non-impact construction equipment used on public projects, such as the Lynnwood Link Extension, between 7:00 am and 10:00 pm on weekdays, and between 9:00 am and 10:00 pm on weekends and legal holidays, by no more than the following:

- **25 dBA** for equipment on construction sites, including, but not limited to, crawlers, tractors, dozers, rotary drills and augers, loaders, power shovels, cranes, derricks, graders, off-highway trucks, ditchers, trenchers, compactors, compressors, and pneumatic-powered equipment.
- **20 dBA** for portable-powered equipment used in temporary locations in support of construction activities or used in the maintenance of public facilities, including, but not limited to, chainsaws, log chippers, lawn and garden maintenance equipment, and handpowered tools.
- **15 dBA** for powered equipment used in temporary or periodic maintenance or repair of the grounds and appurtenances of residential property, including, but not limited to, lawnmowers, powered hand tools, snow removal equipment, and composters.

For impact types of equipment, including, but not limited to, pavement breakers, pile-drivers, jackhammers, sandblasting tools, or other types of equipment that create impulse sound or impact sound, the sound level limits established by SMC Section 25.08.425 may be exceeded in any 1-hour period between 8:00 am and 5:00 pm on weekdays and 9:00 am and 5:00 pm on weekends and legal holidays, but in no event may the sound level for impact types of equipment exceed the following:

- L_{eq} 90 dBA continuously
- L_{eq} 93 dBA for 30 minutes
- L_{eq} 96 dBA for 15 minutes
- L_{eq} 99 dBA for 7.5 minutes

Sound levels in excess of L_{eq} 99 dBA are prohibited unless authorized by variance, and impact equipment that produces sound levels less than 90 dBA must comply with the non-impact equipment construction sound level requirements between 7:00 am and 10:00 pm on weekdays and between 9:00 am and 10:00 pm on weekends and legal holidays.

The sound levels for all types of construction equipment are measured *at a distance of 50 feet from the equipment making the sound. If the equipment is to be placed less than 50 feet from a property line, then the sound levels are measured at the actual distance between the equipment and the property line (i.e., less than 50 feet)*. Furthermore, any type of equipment that exceeds the sound level limits in SMC Section 25.08.410, when measured from the interior of buildings within a commercial district, is prohibited between 8:00 am and 5:00 pm.

2.2.2 Haul Truck Noise Criteria

Sounds created by motor vehicles on public roadways, including haul trucks, are exempt from Seattle's previously described maximum permissible environmental noise levels, and instead, maximum permissible sound levels for haul trucks on public roadways are simply limited to 95 dBA (SMC Section 25.08.430 et seq.). However, the previously described maximum permissible environmental noise level requirements do apply to vehicles operating off highways, such as trucks at staging areas, when the sounds are received within a residential district.

2.2.3 Noise Related to Back-Up Alarms

Sounds created by warning devices or alarms not operated continuously for more than 30 minutes per incident are exempt from the City of Seattle noise control requirements (SMC Section 25.08.530). For nighttime construction activity, the noise from the alarms would be addressed in permit conditions and could include the use of broadband or smart alarms.

2.3 City of Shoreline

The City of Shoreline recently passed Ordinance No. 818 which repeals the Municipal Code Chapter 9.05 Public Disturbance Noise in its entirety and replaces it with Chapter 9.05 Noise Control. The Ordinance was passed by the City Council on April 16, 2018 and goes into effect on August 1, 2018, and will therefore apply to the Lynnwood Link Extension Project.

The new ordinance establishes maximum permissible noise levels consistent with the WAC criteria (Table 1), and allows short term deviations of higher noise levels (Table 2). The ordinance indicates that "sounds created by construction and emanating from construction sites" are exempt from the provisions of the ordinance when generated between the hours of 7:00 am and 10 pm on Weekdays, and between 9:00 am and 10 pm on Weekends. However, construction noise produced outside of these hours are considered unlawful "public nuisance noise".

The ordinance also includes a provision for granting noise variances if compliance cannot be achieved due to economic or physical factors. The variance can be related to permitted activity such as the Special Use Permit. For the Lynnwood Link project, the variance application shall include descriptions of the construction activity to be performed and expected noise levels, the reason for the variance request, and proposed interim noise control measures.

3.0 EXISTING ENVIRONMENTAL NOISE LEVELS

During the environmental phase of this project, a total of 59 noise measurements were made throughout the corridor to characterize the existing noise environment. These included 45 long-term measurements (more than 24 hours) and 14 short-term measurements (15 minute samples). The existing environmental noise levels measured in the project corridor, as measured and reported in the Lynnwood Link Extension Final Environmental Impact Statement (FEIS) Noise and Vibration Technical Report dated April 2015, were in the range of 56 to 81 dBA L_{dn} with peak-hour levels of 51 to 78 dBA L_{eq}.

Additional noise measurements were conducted to supplement the data gathered during the environmental phase. A total of 6 long-term and 11 short-term measurements were made. Measured noise levels ranged from 63 to 80 dBA L_{dn} with peak-hour levels of 59 to 78 dBA L_{eq}. Hourly noise levels during nighttime hours were typically in the range of 55 to 65 L_{eq} depending on location. The minimum nighttime noise levels were generally greater than 50 dBA.

The noise levels at the first and second row of homes adjacent to I-5, where most of the construction activity will take place, are generally in excess of 70 dBA L_{dn}. As such, the ambient noise levels at the residences closest to the construction activity will be significantly greater than the baseline noise criteria put forth in the WAC in many cases. None of the noise ordinances described above take into account the existing noise environment and present only absolute noise level limits.

4.0 CONSTRUCTION NOISE LEVELS

Construction will occur on a 24-hour basis, with most work being performed during the daytime hours. Grading along the alignment and station construction will be performed during the day, along with the drilled shafts to prepare the foundations along elevated sections. The delivery and installation of the guideway girders will be performed at night, and the necessary equipment may be limited to cranes and generators to power lighting. In general, construction activities will be scheduled so that quieter activities will be reserved for nighttime hours.

Construction will require the temporary use of noise-generating equipment. The equipment to be utilized during construction is still under consideration, but is assumed to be similar to that typically used for heavy civil projects. The expected equipment noise levels listed in the FHWA *Roadway Construction Noise Model User's Guide* (FHWA 2006) are provided here for reference. Table 3 provides the reference maximum (L_{max}) noise level at a distance of 50 feet. The L_{max} is the highest noise level, averaged over 1 second, detected within some duration of measurement.

Table 3: Maximum Construction Noise Levels (FHWA)

Construction Equipment	Reference L_{max} at 50 feet (dBA)
All Other Equipment > 5 horsepower	85
Air Compressor	80
Backhoe	80
Compactor	80
Crane	85
Dozer	85
Drill Rig	84
Dump Truck	84
Excavator	85
Generator (>25 kVA)	82
Grader	85
Jackhammer	85
Paver	85
Pile Driver	101
Pneumatic Tools	85
Roller	85
Vacuum Excavator	85
Welder	73

The equipment presented in Table 3 will not be operated continuously, nor will the equipment always operate simultaneously. Usage factors account for the fact that equipment is not always operated at full throttle conditions, and are applied irrespective of workday duration. Typical usage factors for construction equipment were obtained from the FHWA User's Guide and applied to the equipment sound levels. This provides an average sound level that would occur during a typical workday. Table 4 provides the construction sound levels adjusted to reflect a typical workday calculated at various distances out to 1,000 feet, and expressed in terms in the equivalent noise level (L_{eq}) averaged over the course of a shift or duration of a specific activity.

Table 4: Typical Construction Noise Levels (L_{eq})

Construction Equipment	50 feet	100 feet	200 feet	500 feet	1000 feet
All Other Equipment > 5 horsepower	82	76	70	62	56
Air Compressor	76	70	64	56	50
Backhoe	76	70	64	56	50
Compactor	73	67	61	53	47
Crane	77	71	65	57	51
Dozer	81	75	69	61	55
Drill Rig	77	71	65	57	51
Dump Truck	80	74	68	60	54
Excavator	81	75	69	61	55
Generator (>25 kVA)	79	73	67	59	53
Grader	81	75	69	61	55
Jackhammer	78	72	66	58	52
Paver	82	76	70	62	56
Pile Driver	94	88	82	74	68
Pneumatic Tools	82	76	70	62	56
Roller	78	72	66	58	52
Vacuum Excavator	81	75	69	61	55
Welder	69	63	57	49	43

5.0 CONSTRUCTION NOISE WALLS

5.1 Noise Walls for Short Term Construction Activity

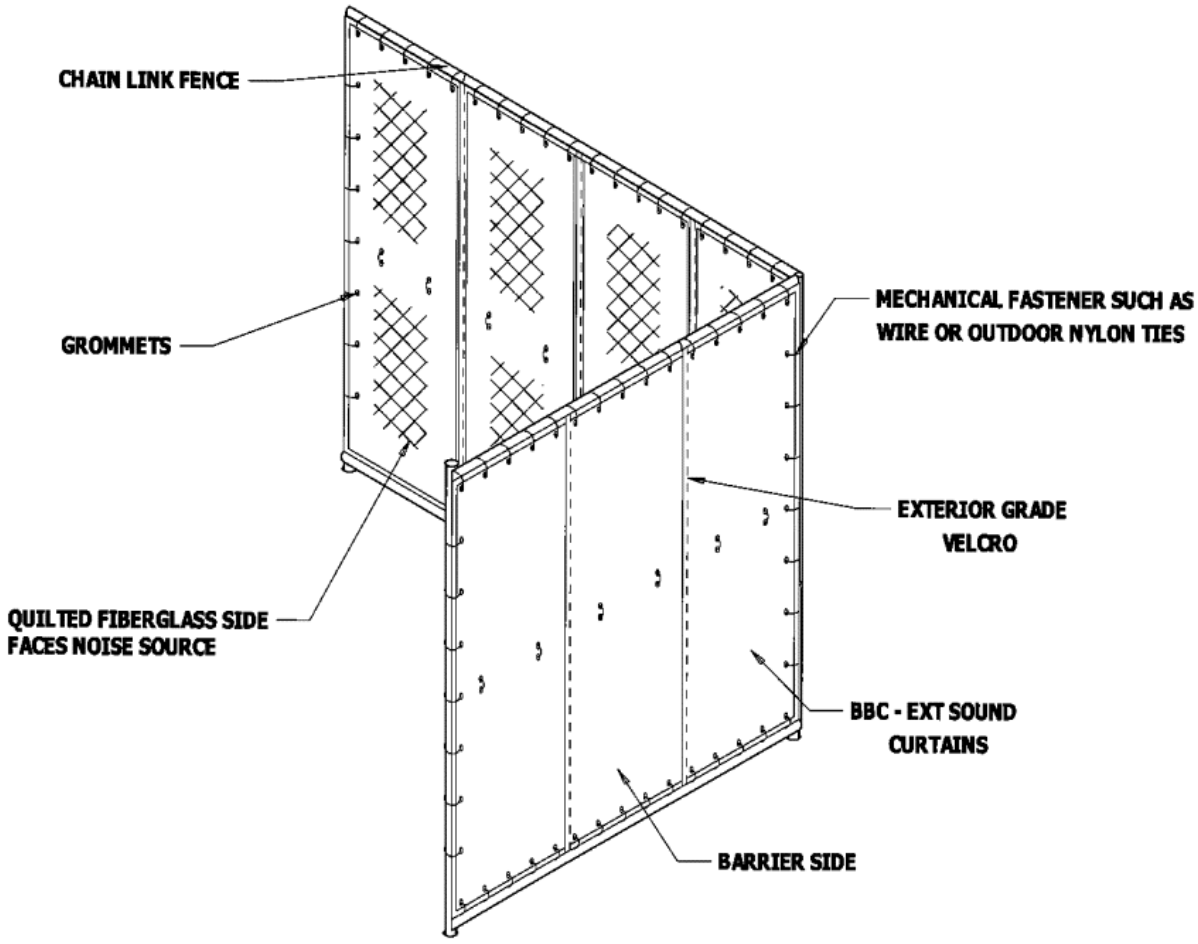
For construction activities expected to occur over the course of days or weeks, temporary portable noise walls should be used. One common method is to suspend acoustical curtains on portable sections of chain link fence or pipe frame. The blankets must have significant mass in order to block sound effectively. The curtains should include a layer of limp dense material, typically mass-loaded vinyl, and a layer of sound-absorbing material such as open-cell foam or fiberglass. The absorptive side of the curtains should face the noise source. The curtains should be sealed in a thin, weatherproof cover material and incorporate grommets for attachment to the fence. Below are links for acoustical curtains provided for example.

- http://www.acousticalsurfaces.com/curtan_stop/sound_blanket.htm
- https://acousticalsolutions.com/product/abbc-13-ext-audioseal-exterior-sound-blanket/
- http://www.construction-noise.com/BBC-ext-n.html

5.2 Noise Walls for Longer Term Construction Activity

For construction activity at a fixed location expected to progress for longer periods, or where existing highway noise walls will be temporarily removed for construction, a temporary but more substantial and more effective wall would be appropriate. The temporary noise walls could consist of a soldier pile wall with sheets of plywood in place of lagging, or acoustical curtains or plywood sheets mounted on mobile fencing. An example mobile fence/curtain assembly is shown in Figure 1. The walls should be assembled so that gaps are minimized. Sheets of plywood could be used in place of the acoustical curtains. If utilizing plywood, adjacent plywood sheets should include a method of closing the seam between sheets.

Figure 1: Example of Temporary Construction Noise Wall Assembly



5.3 Existing Highway Noise Wall Demolition

Seven sections of existing highway noise walls conflict with the future alignment or construction access requirements and will be removed during construction. Removing these walls would suddenly expose receptors to high sound levels from traffic on I-5. To alleviate impacts, long term temporary walls are proposed to protect those receptors. The proposed walls will mitigate both traffic noise and construction noise, and are proposed in addition to the aforementioned construction walls. Descriptions are provided below, and are shown graphically in Appendix A. Locations are approximate, and the configuration of the temporary walls may change based on field conditions and access requirements during construction.

- Latvian Church: The existing wall through this section is to be removed and replaced by the project. Residences south of the church will be protected with a temporary wall on the east side of the rail alignment. Along the church property, the existing wall will be removed and the future wall installed in a coordinated sequence.
- NE 125th Street and 5th Avenue NE: The existing wall through this section is to be removed for construction access and replaced in-kind. A temporary wall on the east side of the rail alignment may be utilized during construction.
- NE 145th Station: The existing wall through this section is to be removed for construction and replaced in-kind. A number of houses have been designated as full takes where the station will be, and the first row of houses is now over 400 feet away from I-5. Temporary walls for construction are not proposed through this short section. A temporary wall shielding the receptors closest to the station construction and on the east side of the rail alignment will be utilized during construction.
- NE 163rd Street to NE 164th Street and NE 167th Street to NE 170th Street: Portions of the existing wall are to be removed and replaced. Two options are being considered for these sections. The permanent replacement highway wall may be constructed prior to other construction, forming an effective wall for both highway traffic noise and construction noise, or a temporary wall on the east side of the rail alignment would be utilized.
- NE 170th Street to NE 174th Street: The existing wall through this section is to be removed and replaced by the project. A temporary wall on the east side of the rail alignment would be utilized during construction.
- NE 180th Street to NE 182nd Street: The existing wall through this section is to be removed and replaced by the project. A temporary wall on the east side of the alignment would be utilized during construction.

- NE 185th Station: The existing wall through this section is to be removed for construction and replaced in-kind. A number of houses have been designated as full takes where the station will be, and the first row of houses is now over 400 feet away from I-5. Temporary walls for construction are not proposed through this short section. A temporary wall shielding the receptors closest to the station construction and on the east side of the rail alignment will be utilized during construction.

6.0 CONSTRUCTION VIBRATION

6.1 Construction Vibration Criteria

Construction vibration from activities such as blasting and pile-driving, unlike vibration from train operations, has the potential to damage structures at very short distances. Because of this factor, the construction vibration discussion includes both damage criteria and annoyance impact criteria.

- Damage Criteria. Table 5 presents threshold cracking damage criteria for visible cracking in building surfaces for a range of building types. Threshold cracking is also known as cosmetic cracking to emphasize that it refers to non-structural damage. Cosmetic cracking commonly occurs in homes due to sources other than construction such as heating expansion and cooling contraction, minor foundation shifting, etc. Vibration measurements for damage assessment are cast in terms of the peak particle velocity (PPV) of the ground. The approximate corresponding root-mean-squared (rms) vibration level expressed in decibels is also included in Table 5. The majority of the residential receptors in the vicinity of the project guideway will fall into the Building Category III structure. Vibration that does not exceed the threshold cracking criteria for cosmetic damage can not possibly cause structural damage. Thus, threshold cracking criteria will be used as the main building damage criteria.

Table 5: Threshold Cracking Damage Criteria

Building Category	PPV (in/sec)	Approximate L_v[a]
I. Reinforced concrete, steel, or timber (no plaster)	0.50	102
II. Engineered concrete and masonry (no plaster)	0.30	98
III. Non-engineered timber and masonry buildings	0.20	94
IV. Buildings extremely susceptible to vibration damage	0.12	90

Root mean square velocity level in decibels (VdB) re 1 micro-inch/second

- Annoyance Criteria. Unlike the potential impact for damage, which will be considered for all construction activities, potential impact for annoyance will be considered only for long-term activities. When vibration is assessed for annoyance due to specific construction activities, the transit vibration impact criteria will be used to determine the potential for impact (per FTA). This impact criteria is defined in Table 6. For a high level vibration source like impact pile driving, each hammer blow would be considered an "event". However, for vibratory pile driving, each pile might be considered an "event". Similarly, for vibratory soil compaction, each time a vibratory roller passes by a receptor would count as an "event". Any activity localized near a receptor for the duration of a shift would certainly be considered "frequent".

Table 6: Ground-Borne Vibration Impact Criteria

Land Use Category	Ground-Borne Vibration Impact Levels (VdB re 1 micro-inch / sec)		
	Frequent Events[1]	Occasional Events[2]	Infrequent Events[3]
Category 1: Buildings where vibration would interfere with interior operations	65 VdB[4]	65 VdB[4]	65 VdB[4]
Category 2: Residences and buildings where people normally sleep	72 VdB	75 VdB	80 VdB
Category 3: Institutional land uses with primarily daytime use	75 VdB	78 VdB	83 VdB

[1]"Frequent Events" is defined as more than 70 vibration events of the same source per day.

[2]"Occasional Events" is defined as between 30 and 70 vibration events of the same source per day.

[3]"Infrequent Events" is defined as fewer than 30 vibration events of the same kind per day

[4]This criterion limit is based on levels that are acceptable for most moderately sensitive equipment such as optical microscopes. Vibration sensitive manufacturing or research will require detailed evaluation to define the acceptable vibration levels.

6.2 Construction Vibration Analysis

Construction vibration, similar to noise, is highly dependent on the specific equipment and methods employed. Construction vibration can cause a variety of potential effects, including interference with vibration-sensitive equipment, low rumbling or groundborne noise, vibrations perceptible to humans at moderate levels, and cosmetic damage to buildings at the highest levels potentially possible here. Because construction is a short-term, temporary impact, construction vibration will be assessed at locations where prolonged annoyance or building cosmetic damage might occur; namely, at the receptors within the vicinity of excavation, pile driving, and vibratory soil compaction activities.

Most construction processes do not generate high enough vibration levels to approach the threshold for cracking damage; therefore, structural damage, which requires much higher levels, is highly unlikely for construction vibration. Cosmetic damage from construction vibration is generally limited to pile-driving and vibratory rolling: these two activities cause PPV levels at 25 feet that are higher than the threshold for cracking damage. Because of this reason, care should be taken to avoid or limit these activities near structures as much as practicable.

The methodology for assessing construction vibration annoyance includes measuring maximum rms overall vibration levels with an integration time of 1 second for each source at a distance of 25 feet. A summary of expected upper-range vibration levels at a reference distance of 25 feet from various vibration sources are presented in Table 7 (from FTA).

Table 7: Summary of Construction Equipment Vibration

Equipment	PPV at 25 feet (inches/second)	Approximate L_v at 25-foot VdB	Minimum Distance between Equipment and Receptor to Avoid Annoyance Impact (feet)
Vibratory pile or casing	0.734	105	315
Impact pile driving	1.518	112	540
Shaft drilling	0.089	87	80
Vibratory soil compactor	0.210	94	120
Auger drilling	0.016	72	25
Hoe ram	0.089	87	80
Excavator/grader/bulldozer	0.089	87	80
Loaded trucks	0.076	86	75

Using the available reference vibration levels at 25 feet, the following general prediction model (from the FTA guidance manual) gives the vibration level as a function of distance:

Damage Assessment: $PPV_{equip} = PPV_{ref} \times (25/\text{distance})^{1.5}$

Annoyance Assessment: $L_v(\text{distance}) = L_v(25 \text{ feet}) - 30 \cdot \log(\text{distance}/25 \text{ feet})$

A vibration level of 72 VdB corresponds to the vibration annoyance criteria for frequent events at residential receptors (Table 6). The minimum distance from the vibration source necessary to achieve vibration levels of 72 VdB or below is given in the last column of Table 7. Any residence located further than the distances provided would not experience an impact.

7.0 CONSTRUCTION MONITORING

Monitoring of the construction noise and vibration levels is necessary to ensure that any unacceptable impacts are readily detected. The construction noise levels will be measured in terms of an A-weighted equivalent continuous sound pressure level (L_{eq}). Vibration levels will be measured in terms of peak particle velocity, PPV in inches/second. General guidelines for construction monitoring are outlined below with details to be developed in the Construction Noise and Vibration Mitigation and Monitoring Plan.

7.1 Construction Noise Monitoring

Preconstruction ambient sound levels shall be measured to accurately quantify existing conditions along the alignment. Ambient measurements shall be conducted in any area identified for construction noise monitoring.

Long-term noise monitoring shall be conducted near residences that will be exposed to construction noise over an extended period. This includes the stations sites, as well as several staging areas for equipment and supplies. Continuous long-term monitoring at the Seattle Latvian Church and Community Center is also recommended.

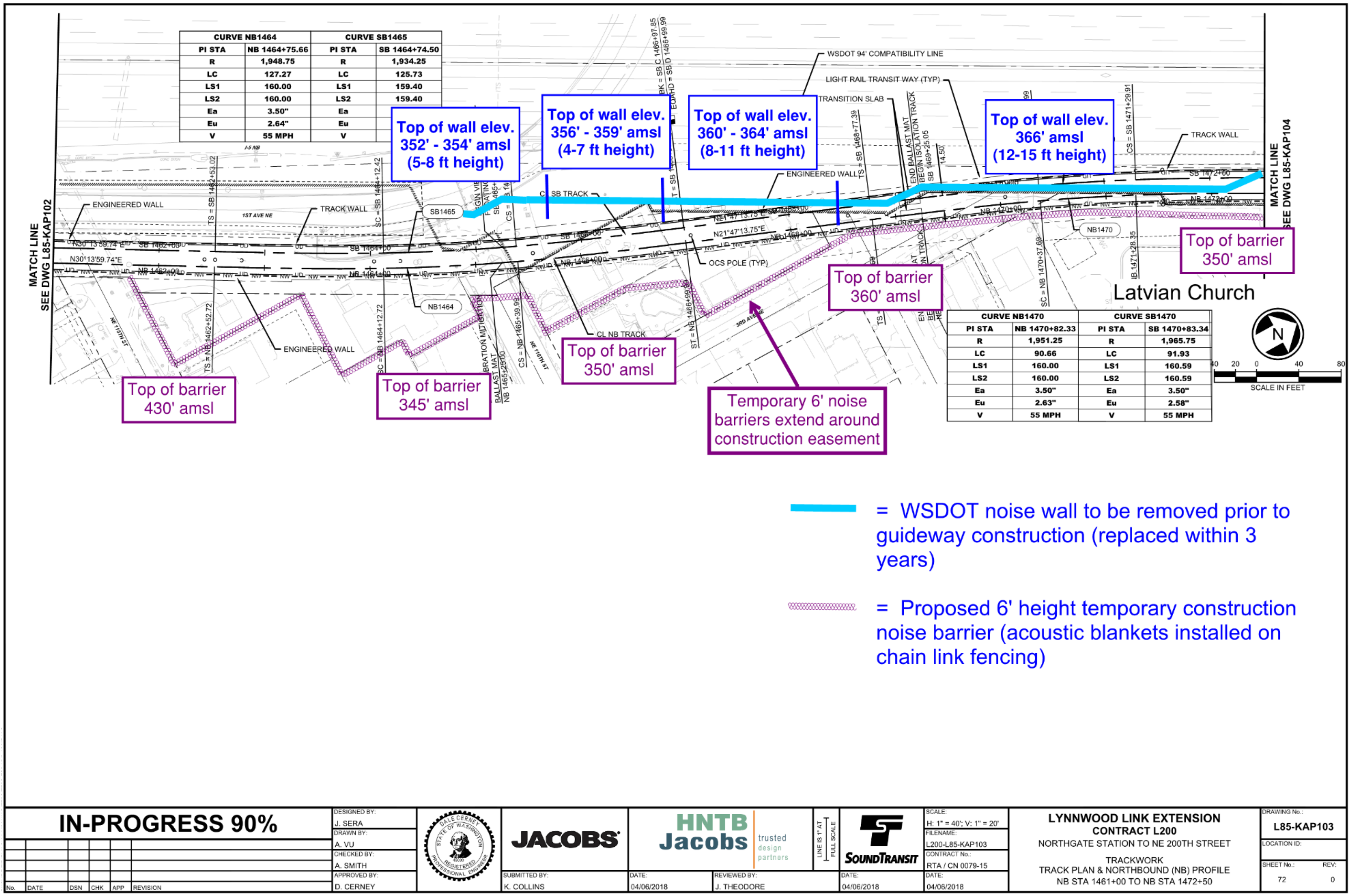
Some sections of highway noise wall will be removed during construction. In these sections, a temporary noise wall consisting of chain link fencing with acoustical blankets will be installed. Temporary noise walls will also be installed in locations where construction activities may occur in close proximity to receptors. Short-term monitoring should be completed at these locations to ensure that the temporary walls are sufficiently reducing noise from the I-5 roadway and the construction equipment.

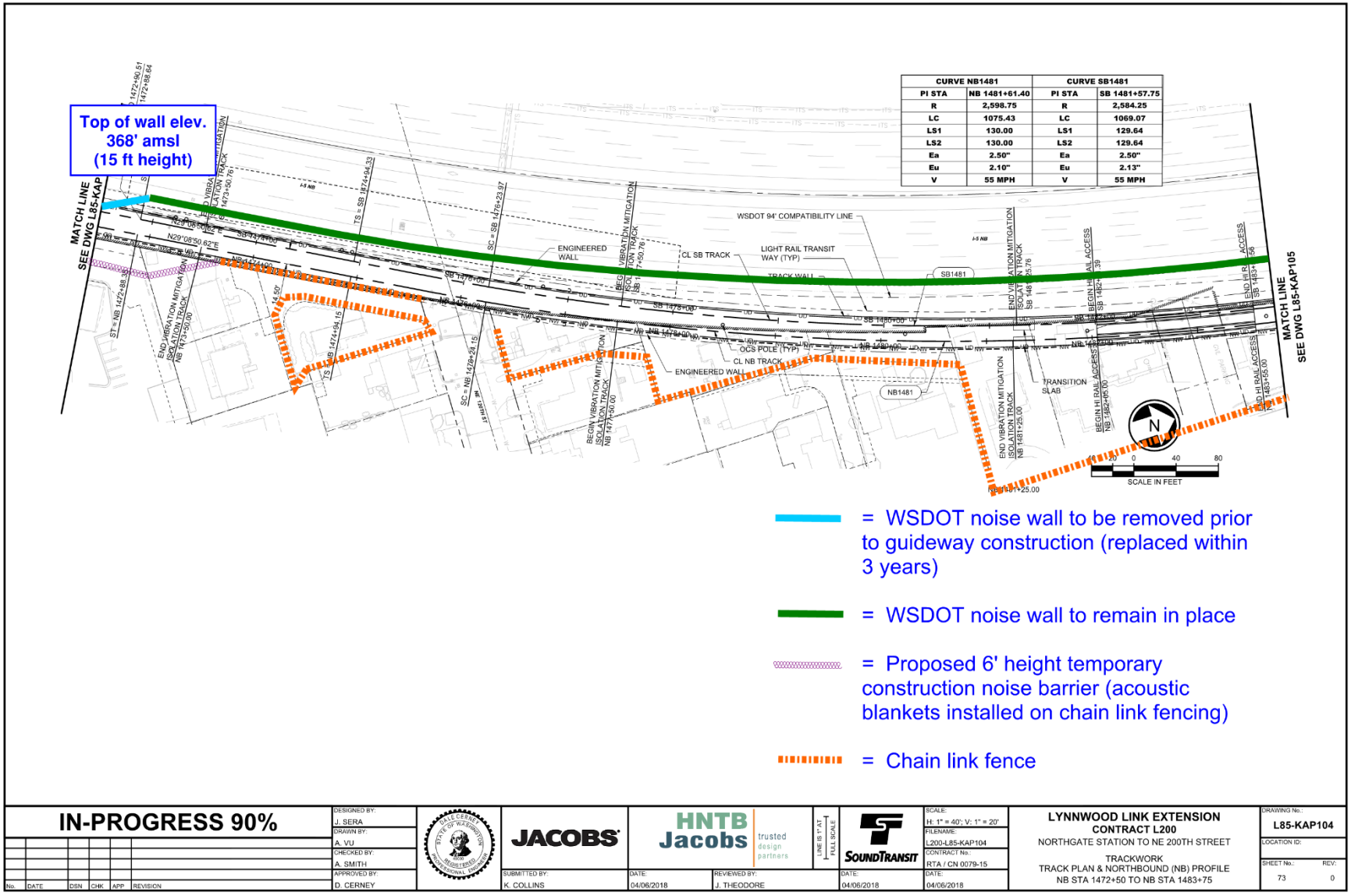
Noise monitoring should also be in place at the representative, nearby affected receptors during high level activity such as pile driving.

7.2 Construction Vibration Monitoring

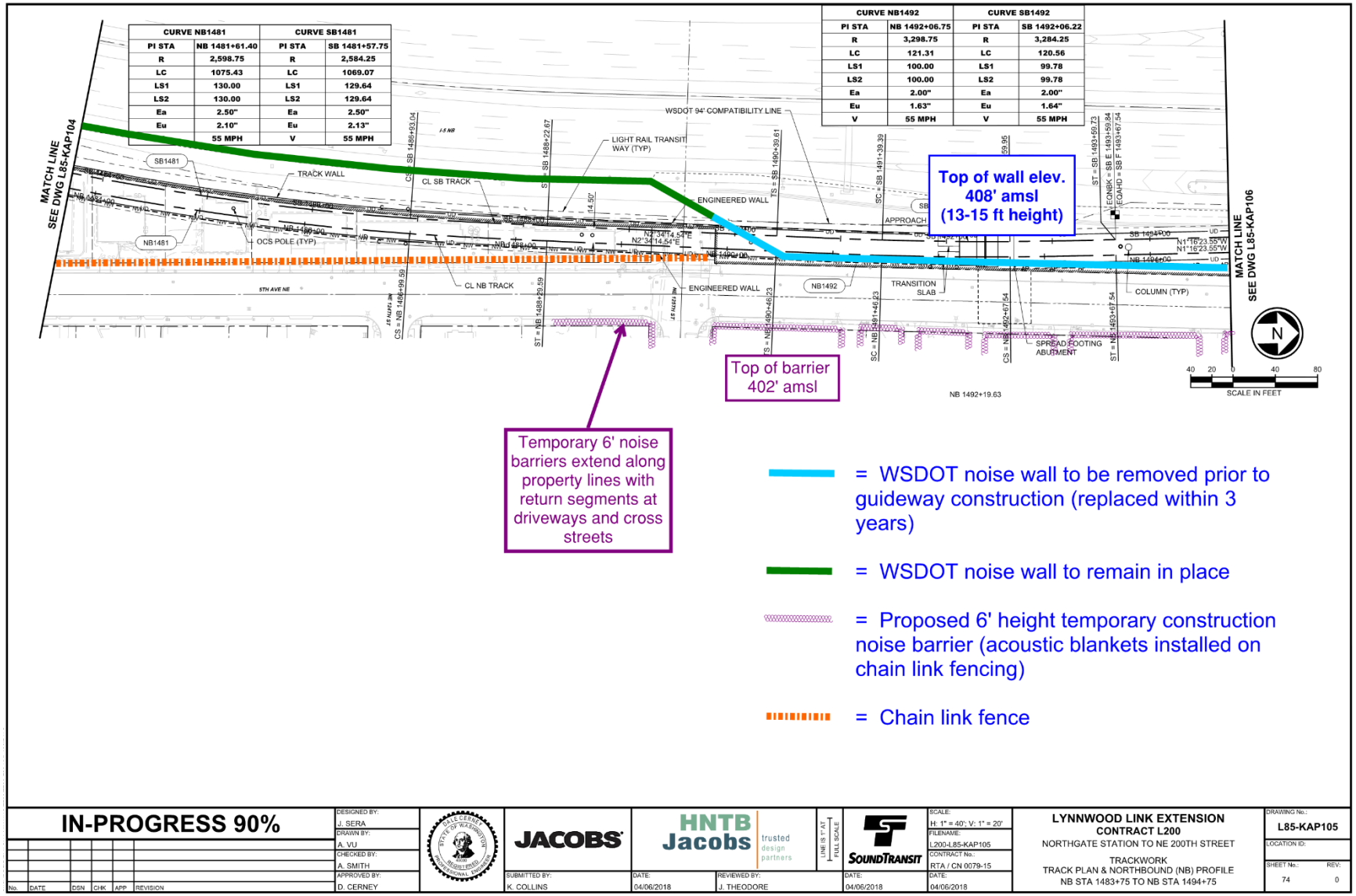
Construction activities will be performed by means and methods to avoid potential vibration damage to structures. It is expected that pile driving will be required at a few locations. Vibration monitoring will be conducted at any location where pile driving would occur within 100 feet of any structure and where vibratory soil compaction would occur within 50 feet of any structure. Vibration monitoring should also be in place at sensitive receptors during demolition, excavation, or when vibratory equipment is in use (such as vibratory pile driving or soil compaction) in close proximity to structures (appropriate distances TBD). Potential sensitive receptors include residential and business structures, as well as existing utilities (such as gas regulator vaults). Vibration should be monitored in real time and construction halted for assessment if the levels approach or exceed damage criteria. Levels that approach or exceed annoyance criteria may be dealt with without halting construction immediately. In either case, appropriate mitigation measures should be enacted if a criterion is exceeded.

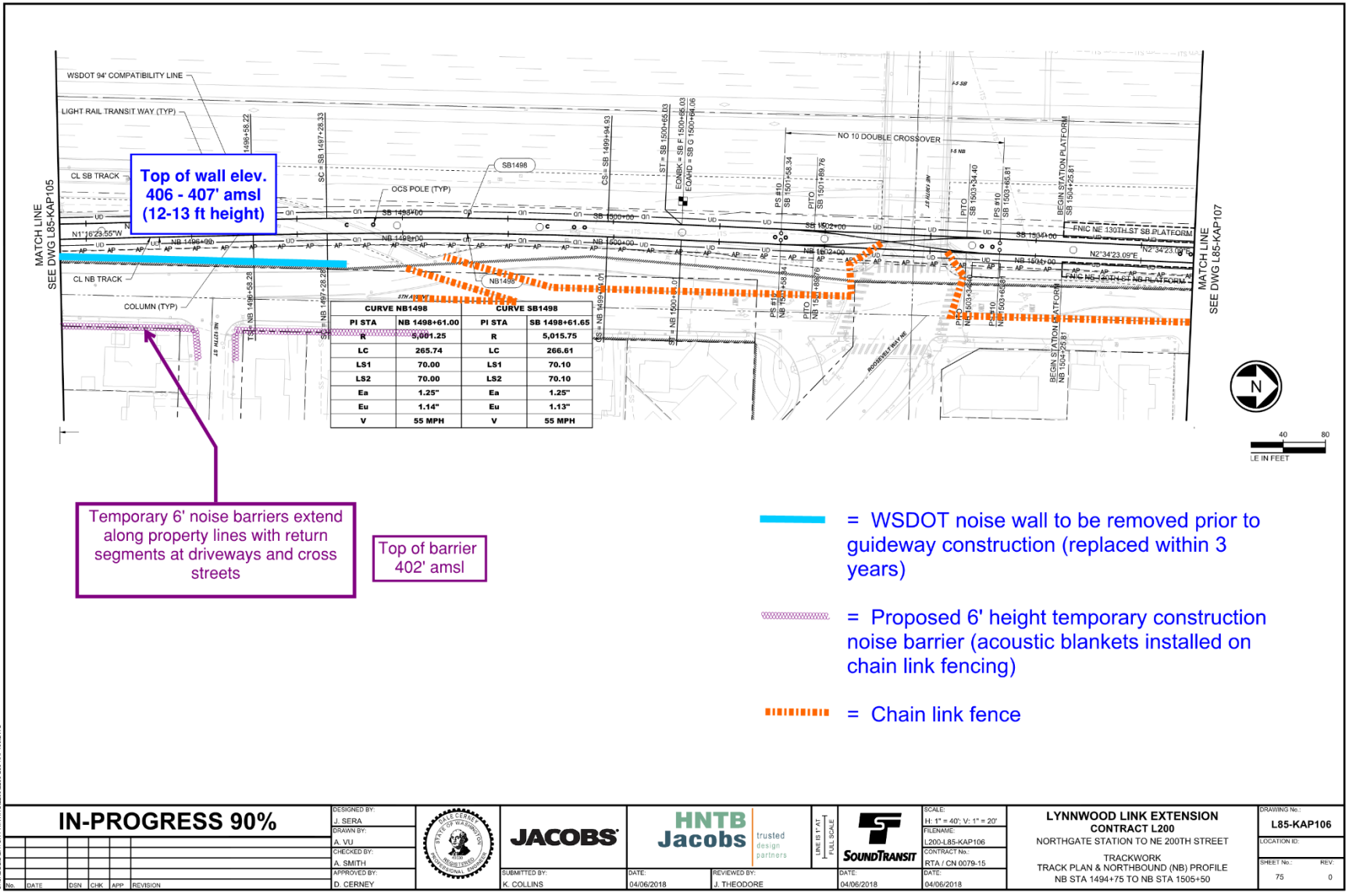
APPENDIX A: TEMPORARY CONSTRUCTION WALLS


CURVE NB1464
PI STA NB 1464+75.66
R 1,948.75
LC 127.27
LS1 160.00
LS2 160.00
Ea 3.50"
Eu 2.64"
V 55 MPH
CURVE SB1465
PI STA SB 1464+74.50
R 1,934.25
LC 125.73
LS1 159.40
LS2 159.40
Top of wall elev. 352' - 354' amsl (5-8 ft height)
Top of wall elev. 356' - 359' amsl (4-7 ft height)
Top of wall elev. 360' - 364' amsl (8-11 ft height)
Top of wall elev. 366' amsl (12-15 ft height)
WSDOT 94' COMPATIBILITY LINE
LIGHT RAIL TRANSIT WAY (TYP)
TRANSITION SLAB
TRACK WALL
ENGINEERED WALL
SB TRACK
OCS POLE (TYP)
CL NB TRACK
MATCH LINE SEE DWG L85-KAP102
MATCH LINE SEE DWG L85-KAP104
Top of barrier 350' amsl
Top of barrier 360' amsl
Latvian Church
Top of barrier 430' amsl
Top of barrier 345' amsl
Top of barrier 350' amsl
Temporary 6' noise barriers extend around construction easement
CURVE NB1470
PI STA NB 1470+82.33
R 1,951.25
LC 90.66
LS1 160.00
LS2 160.00
Ea 3.50"
Eu 2.63"
V 55 MPH
CURVE SB1470
PI STA SB 1470+83.34
R 1,965.75
LC 91.93
LS1 160.59
LS2 160.59
Ea 3.50"
Eu 2.58"
V 55 MPH
SCALE IN FEET
= WSDOT noise wall to be removed prior to guideway construction (replaced within 3 years)
= Proposed 6' height temporary construction noise barrier (acoustic blankets installed on chain link fencing)
IN-PROGRESS 90%
DESIGNED BY: J. SERA
DRAWN BY: A. VU
CHECKED BY: A. SMITH
APPROVED BY: D. CERNEY
SUBMITTED BY: K. COLLINS
DATE: 04/06/2018
REVIEWED BY: J. THEODORE
DATE: 04/06/2018
SCALE: H: 1" = 40'; V: 1" = 20'
FILENAME: L200-L85-KAP103
CONTRACT No.: RTA / CN 0079-15
DATE: 04/06/2018
LYNNWOOD LINK EXTENSION
CONTRACT L200
NORTHGATE STATION TO NE 200TH STREET
TRACKWORK
TRACK PLAN & NORTHBOUND (NB) PROFILE
NB STA 1461+00 TO NB STA 1472+50
DRAWING No.: L85-KAP103
SHEET No.: 72
REV: 0



IN-PROGRESS 90%	DESIGNED BY: J. SERA		JACOBS	HNTB Jacobs trusted design partners		SOUNDTRANSIT	SCALE: H: 1" = 40'; V: 1" = 20'	LYNNWOOD LINK EXTENSION CONTRACT L200 NORTHGATE STATION TO NE 200TH STREET	DRAWING No.: L85-KAP104
	DRAWN BY: A. VU						FILENAME: L200-L85-KAP104	TRACKWORK TRACK PLAN & NORTHBOUND (NB) PROFILE NB STA 1472+50 TO NB STA 1483+75	LOCATION ID:
	CHECKED BY: A. SMITH						CONTRACT No.: RTA / CN 0079-15		SHEET No.: 73 REV: 0
No. DATE DSN CHK APP REVISION	APPROVED BY: D. CERNEY		SUBMITTED BY: K. COLLINS	DATE: 04/06/2018	REVIEWED BY: J. THEODORE	DATE: 04/06/2018	DATE: 04/06/2018		


CURVE NB1481
PI STA NB 1481+61.40
R 2,598.75
LC 1075.43
LS1 130.00
LS2 130.00
Ea 2.50"
Eu 2.10"
V 55 MPH
CURVE SB1481
PI STA SB 1481+57.75
R 2,584.25
LC 1069.07
LS1 129.64
LS2 129.64
Ea 2.50"
Eu 2.13"
V 55 MPH
CURVE NB1492
PI STA NB 1492+06.75
R 3,298.75
LC 121.31
LS1 100.00
LS2 100.00
Ea 2.00"
Eu 1.63"
V 55 MPH
CURVE SB1492
PI STA SB 1492+06.22
R 3,284.25
LC 120.56
LS1 99.78
LS2 99.78
Ea 2.00"
Eu 1.64"
V 55 MPH
MATCH LINE SEE DWG L85-KAP104
MATCH LINE SEE DWG L85-KAP106
WSDOT 94' COMPATIBILITY LINE
LIGHT RAIL TRANSIT WAY (TYP)
TRACK WALL
CL SB TRACK
CL NB TRACK
ENGINEERED WALL
OCS POLE (TYP)
TRANSITION SLAB
COLUMN (TYP)
SPREAD FOOTING ABUTMENT
APPROACH
SB1481
NB1481
NB1492
SB 1492+06.22
NB 1492+06.75
NB 1492+19.63
Top of wall elev. 408' amsl (13-15 ft height)
Top of barrier 402' amsl
Temporary 6' noise barriers extend along property lines with return segments at driveways and cross streets
= WSDOT noise wall to be removed prior to guideway construction (replaced within 3 years)
= WSDOT noise wall to remain in place
= Proposed 6' height temporary construction noise barrier (acoustic blankets installed on chain link fencing)
= Chain link fence
SCALE IN FEET
IN-PROGRESS 90%
LYNNWOOD LINK EXTENSION
CONTRACT L200
NORTHGATE STATION TO NE 200TH STREET
TRACKWORK
TRACK PLAN & NORTHBOUND (NB) PROFILE
NB STA 1483+75 TO NB STA 1494+75
DRAWING No.: L85-KAP105
SHEET No.: 74
REV: 0



CURVE NB1498		CURVE SB1498	
PI STA	NB 1498+61.00	PI STA	SB 1498+61.65
R	5,001.25	R	5,015.75
LC	265.74	LC	266.61
LS1	70.00	LS1	70.10
LS2	70.00	LS2	70.10
Ea	1.25"	Ea	1.25"
Eu	1.14"	Eu	1.13"
V	55 MPH	V	55 MPH

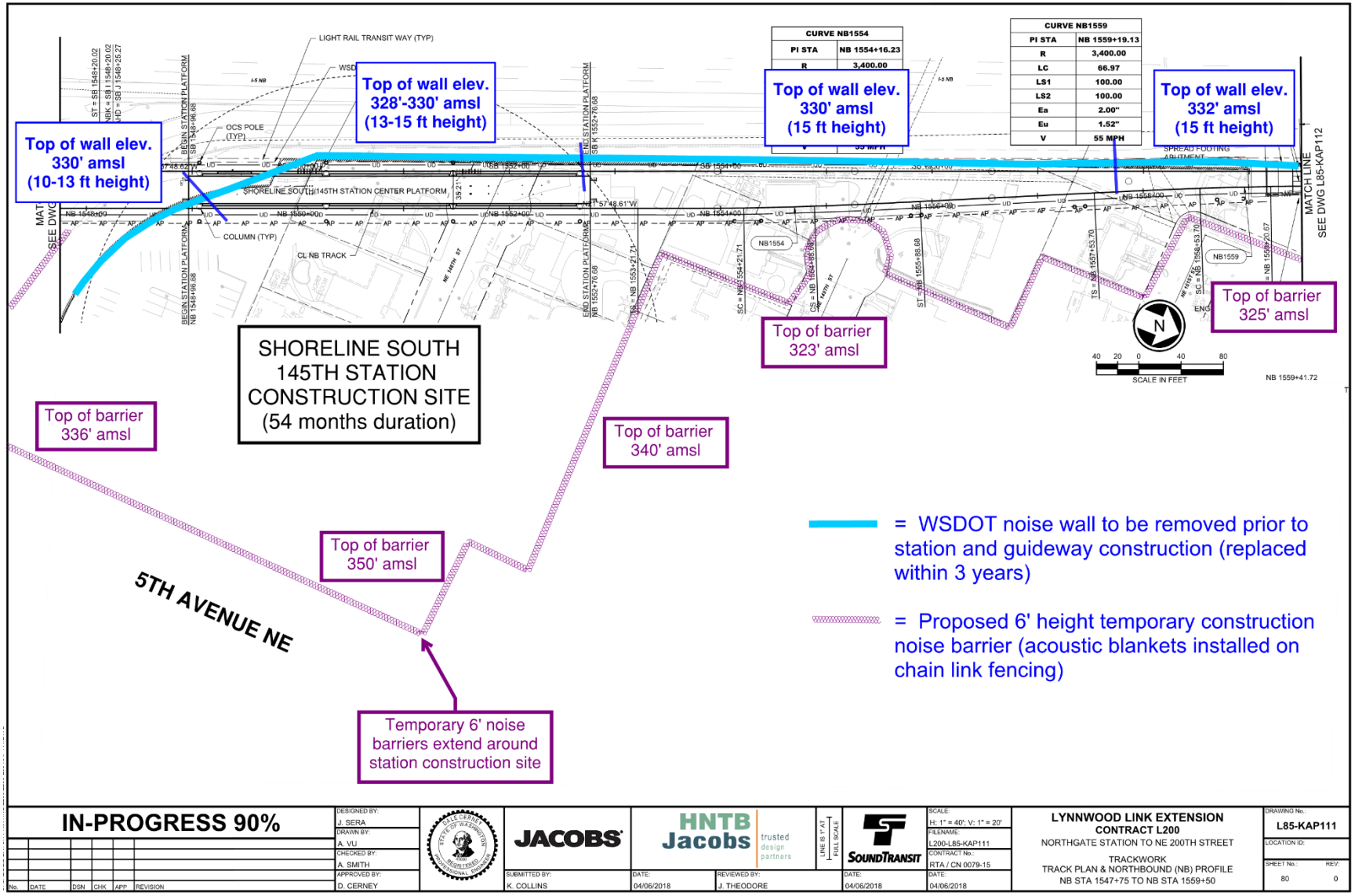
IN-PROGRESS 90%

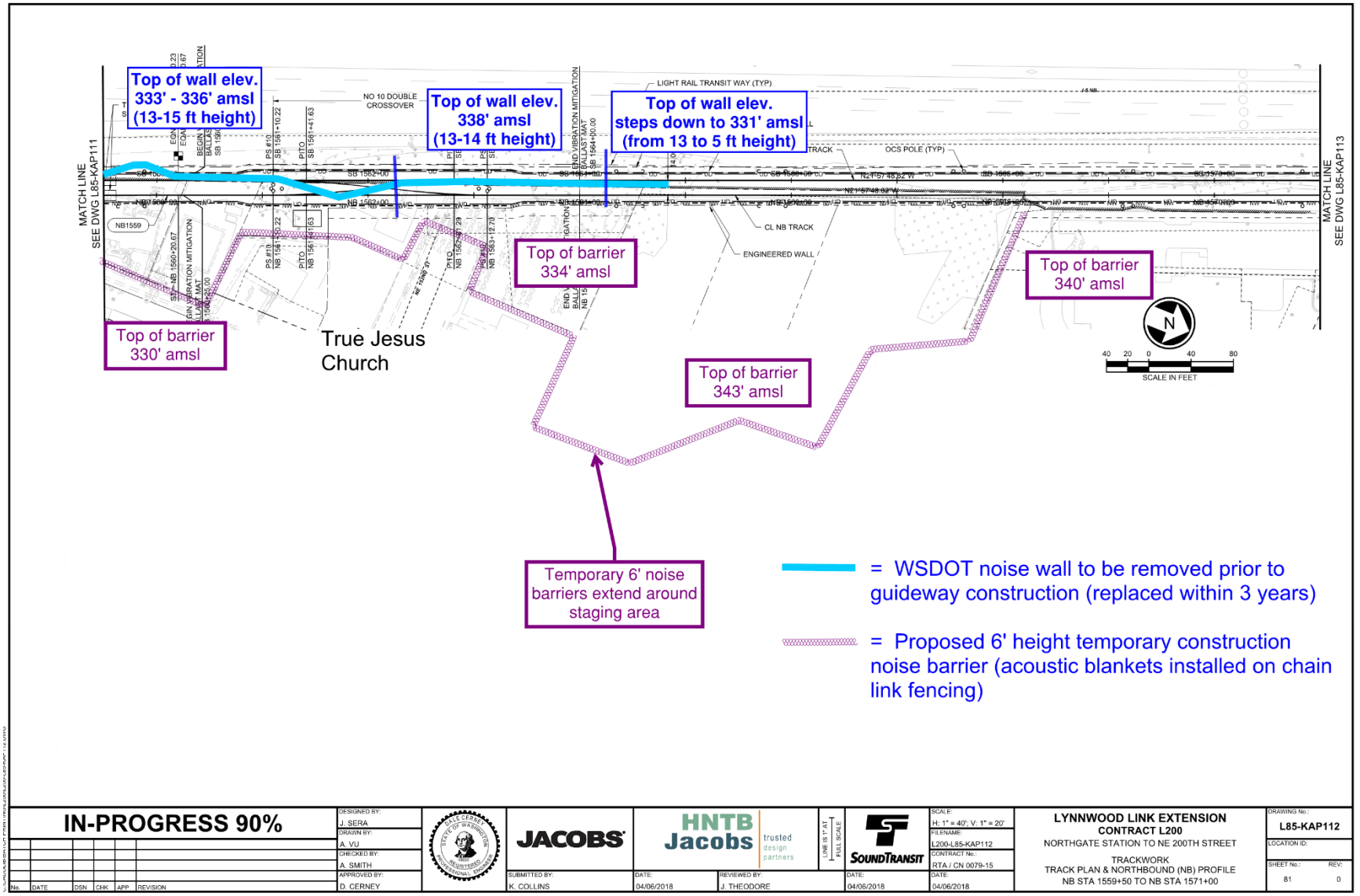
No.	DATE	DSN	CHK	APP	REVISION

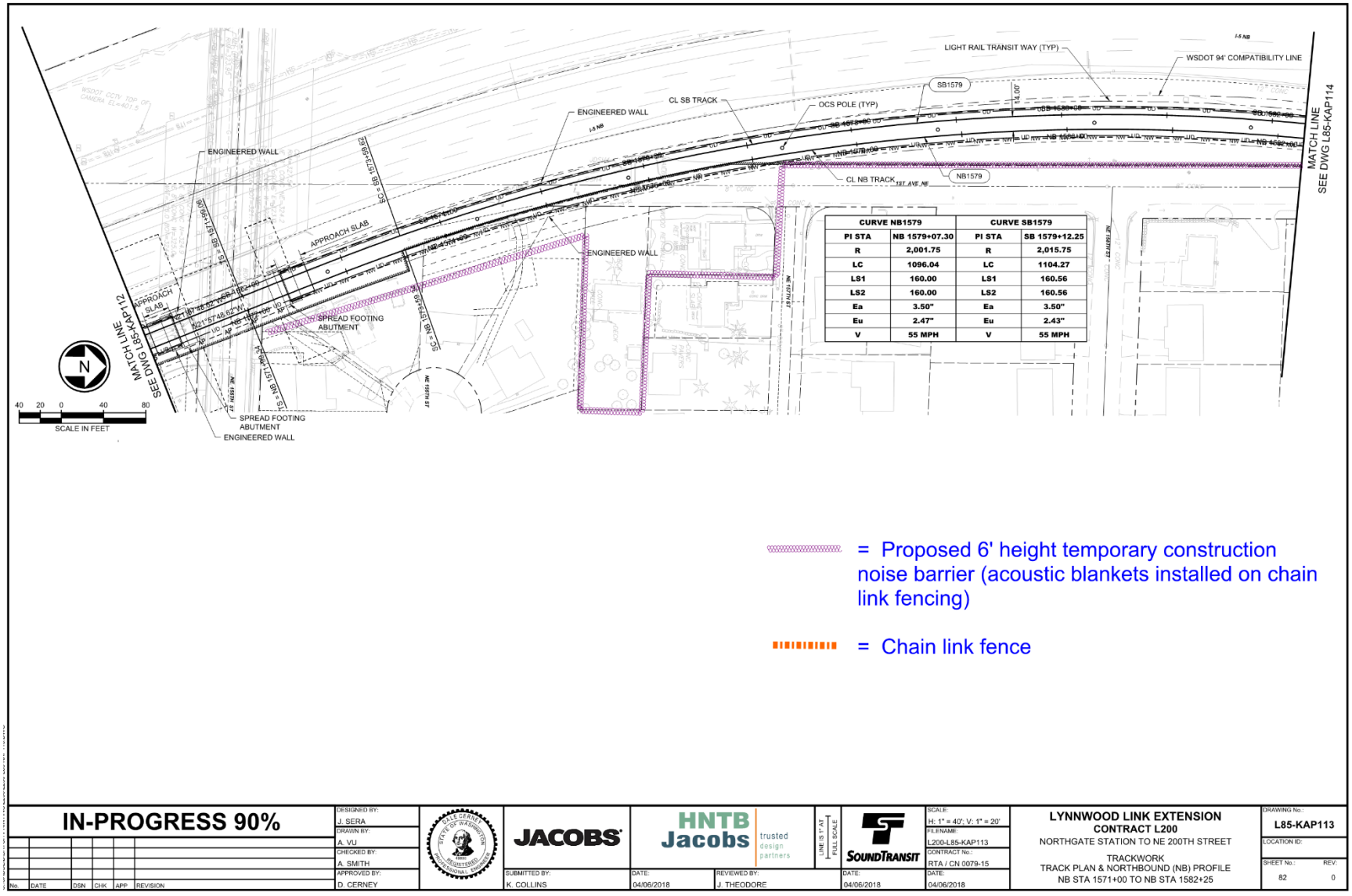
DESIGNED BY: J. SERA
DRAWN BY: A. VU
CHECKED BY: A. SMITH
APPROVED BY: D. CERNEY
SUBMITTED BY: K. COLLINS
DATE: 04/06/2018
REVIEWED BY: J. THEODORE
DATE: 04/06/2018
DATE: 04/06/2018
SCALE: H: 1" = 40'; V: 1" = 20'
FILENAME: L200-L85-KAP106
CONTRACT No.: RTA / CN 0079-15

LYNNWOOD LINK EXTENSION
CONTRACT L200
NORTHGATE STATION TO NE 200TH STREET
TRACKWORK
TRACK PLAN & NORTHBOUND (NB) PROFILE
NB STA 1494+75 TO NB STA 1505+50

DRAWING No.: L85-KAP106
LOCATION ID:
SHEET No.: 75
REV: 0


Top of wall elev. 330' amsl (10-13 ft height)
Top of wall elev. 328'-330' amsl (13-15 ft height)
Top of wall elev. 330' amsl (15 ft height)
Top of wall elev. 332' amsl (15 ft height)
SHORELINE SOUTH 145TH STATION CONSTRUCTION SITE (54 months duration)
Top of barrier 325' amsl
Top of barrier 323' amsl
Top of barrier 336' amsl
Top of barrier 340' amsl
Top of barrier 350' amsl
5TH AVENUE NE
Temporary 6' noise barriers extend around station construction site
= WSDOT noise wall to be removed prior to station and guideway construction (replaced within 3 years)
= Proposed 6' height temporary construction noise barrier (acoustic blankets installed on chain link fencing)
CURVE NB1554
CURVE NB1559
IN-PROGRESS 90%
LYNNWOOD LINK EXTENSION
CONTRACT L200
NORTHGATE STATION TO NE 200TH STREET
TRACKWORK
TRACK PLAN & NORTHBOUND (NB) PROFILE
NB STA 1547+75 TO NB STA 1559+50
L85-KAP111

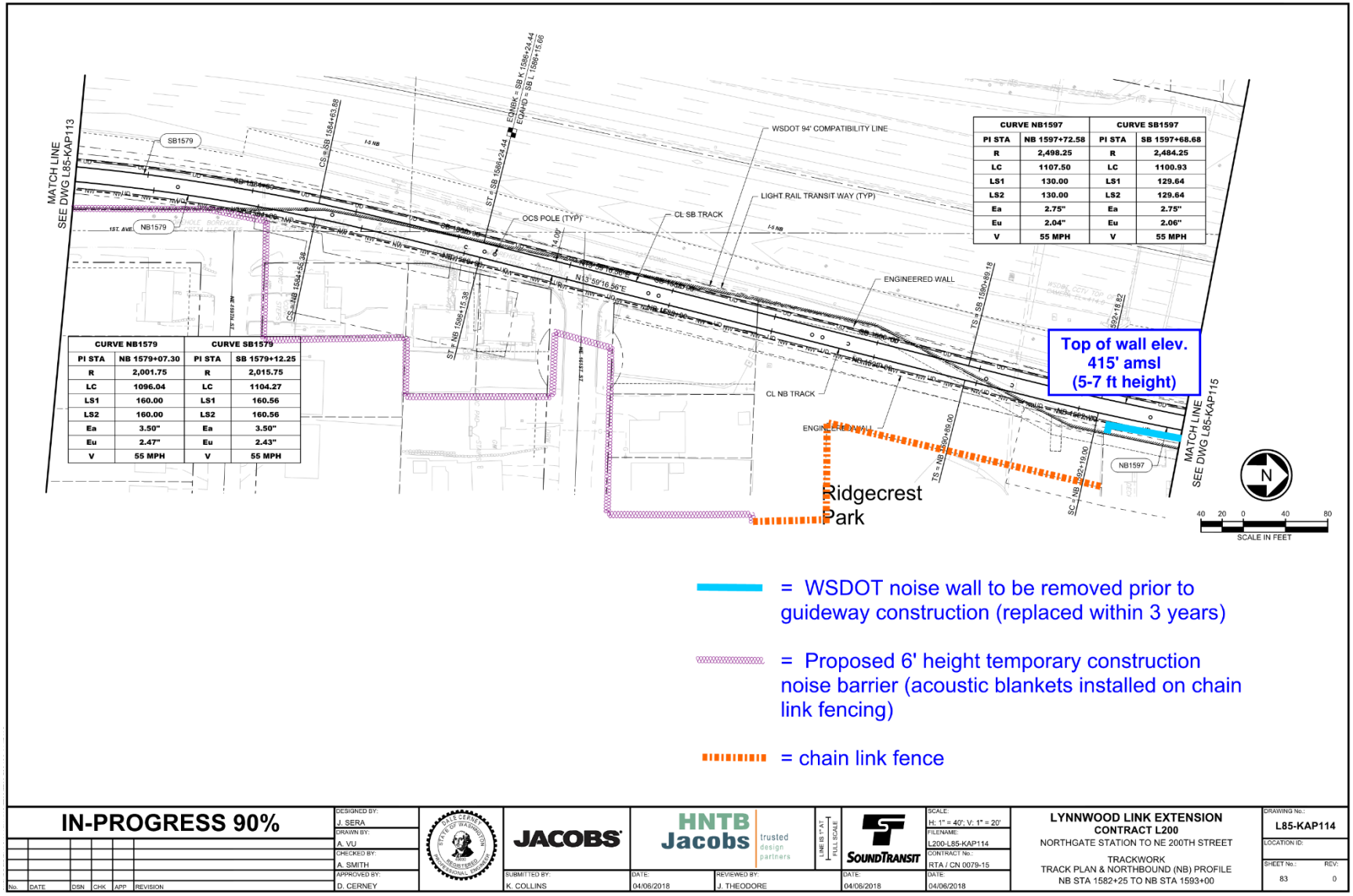

Top of wall elev. 333' - 336' amsl (13-15 ft height)
Top of wall elev. 338' amsl (13-14 ft height)
Top of wall elev. steps down to 331' amsl (from 13 to 5 ft height)
Top of barrier 330' amsl
Top of barrier 334' amsl
Top of barrier 340' amsl
Top of barrier 343' amsl
True Jesus Church
Temporary 6' noise barriers extend around staging area
= WSDOT noise wall to be removed prior to guideway construction (replaced within 3 years)
= Proposed 6' height temporary construction noise barrier (acoustic blankets installed on chain link fencing)
MATCH LINE SEE DWG L85-KAP111
MATCH LINE SEE DWG L85-KAP113
LIGHT RAIL TRANSIT WAY (TYP)
NO 10 DOUBLE CROSSOVER
OCS POLE (TYP)
CL NB TRACK
ENGINEERED WALL
NB1559
SCALE IN FEET
IN-PROGRESS 90%
LYNNWOOD LINK EXTENSION
CONTRACT L200
NORTHGATE STATION TO NE 200TH STREET
TRACKWORK
TRACK PLAN & NORTHBOUND (NB) PROFILE
NB STA 1559+50 TO NB STA 1571+00
L85-KAP112



= Proposed 6' height temporary construction noise barrier (acoustic blankets installed on chain link fencing)

= Chain link fence

IN-PROGRESS 90%	DESIGNED BY: J. SERA		JACOBS	HNTB Jacobs trusted design partners	LINE IS 1" AT FULL SCALE	SOUNDTRANSIT	SCALE: H: 1" = 40'; V: 1" = 20'	LYNNWOOD LINK EXTENSION CONTRACT L200 NORTHGATE STATION TO NE 200TH STREET TRACKWORK TRACK PLAN & NORTHBOUND (NB) PROFILE NB STA 1571+00 TO NB STA 1582+25	DRAWING No.: L85-KAP113	
	DRAWN BY: A. VU						FILENAME: L200-L85-KAP113		LOCATION ID:	
	CHECKED BY: A. SMITH						CONTRACT No.: RTA / CN 0079-15		SHEET No.: 82	REV: 0
No. DATE DSN CHK APP REVISION	APPROVED BY: D. CERNEY		SUBMITTED BY: K. COLLINS	DATE: 04/06/2018	REVIEWED BY: J. THEODORE	DATE: 04/06/2018	DATE: 04/06/2018			



CURVE NB1579		CURVE SB1579	
PI STA	NB 1579+07.30	PI STA	SB 1579+12.25
R	2,001.75	R	2,015.75
LC	1096.04	LC	1104.27
LS1	160.00	LS1	160.56
LS2	160.00	LS2	160.56
Ea	3.50"	Ea	3.50"
Eu	2.47"	Eu	2.43"
V	55 MPH	V	55 MPH

CURVE NB1597		CURVE SB1597	
PI STA	NB 1597+72.58	PI STA	SB 1597+68.68
R	2,498.25	R	2,484.25
LC	1107.50	LC	1100.93
LS1	130.00	LS1	129.64
LS2	130.00	LS2	129.64
Ea	2.75"	Ea	2.75"
Eu	2.04"	Eu	2.06"
V	55 MPH	V	55 MPH

= WSDOT noise wall to be removed prior to guideway construction (replaced within 3 years)

= Proposed 6' height temporary construction noise barrier (acoustic blankets installed on chain link fencing)

= chain link fence

IN-PROGRESS 90%

No.	DATE	DSN	CHK	APP	REVISION

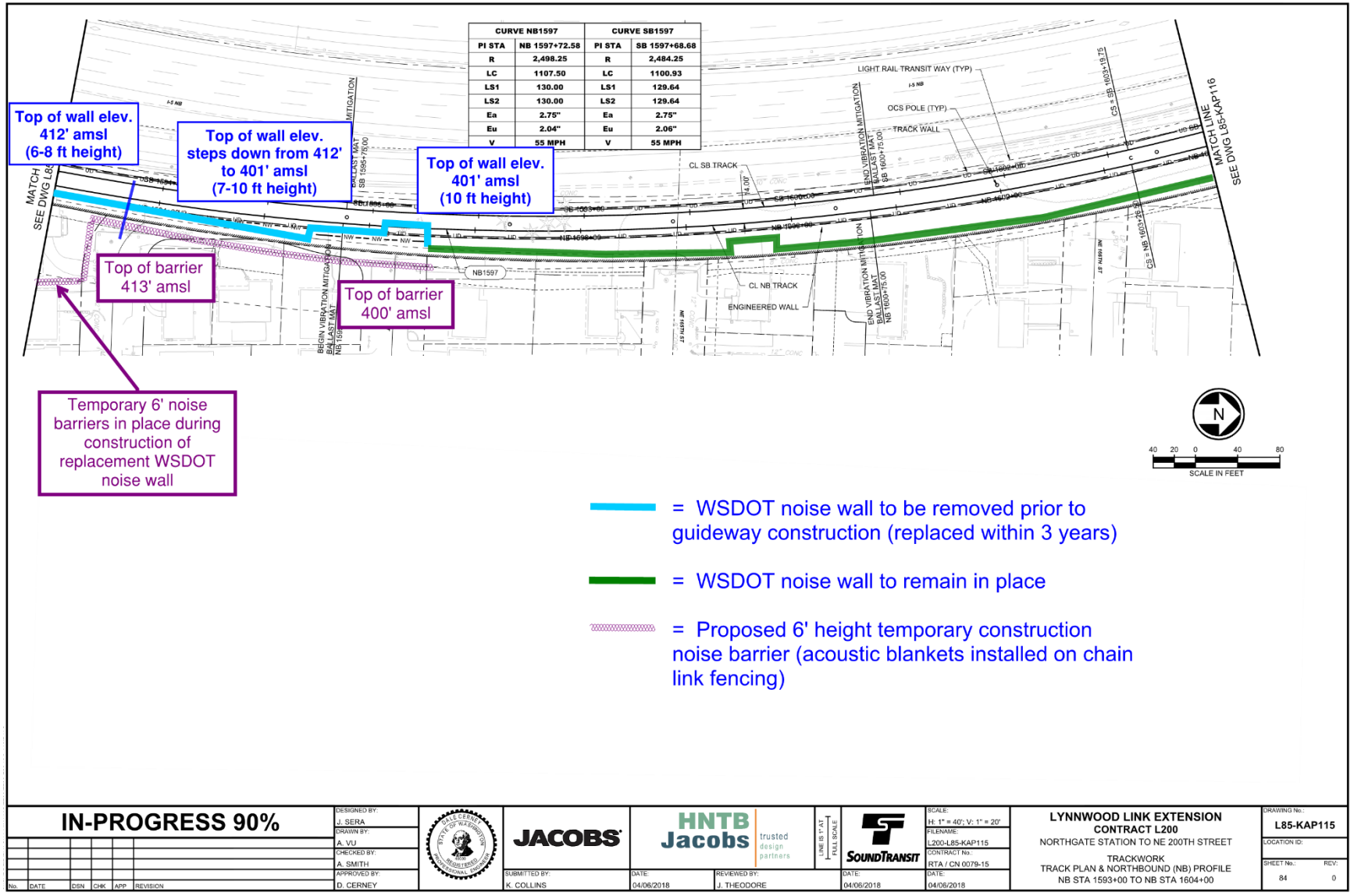
DESIGNED BY: J. SERA
DRAWN BY: A. VU
CHECKED BY: A. SMITH
APPROVED BY: D. CERNEY

JACOBS — SUBMITTED BY: K. COLLINS — DATE: 04/06/2018
HNTB Jacobs trusted design partners — REVIEWED BY: J. THEODORE — DATE: 04/06/2018
SOUNDTRANSIT — DATE: 04/06/2018

SCALE: H: 1" = 40'; V: 1" = 20'
FILENAME: L200-L85-KAP114
CONTRACT No.: RTA / CN 0079-15

LYNNWOOD LINK EXTENSION
CONTRACT L200
NORTHGATE STATION TO NE 200TH STREET
TRACKWORK
TRACK PLAN & NORTHBOUND (NB) PROFILE
NB STA 1582+25 TO NB STA 1593+00

DRAWING No.: L85-KAP114
LOCATION ID:
SHEET No.: 83
REV: 0

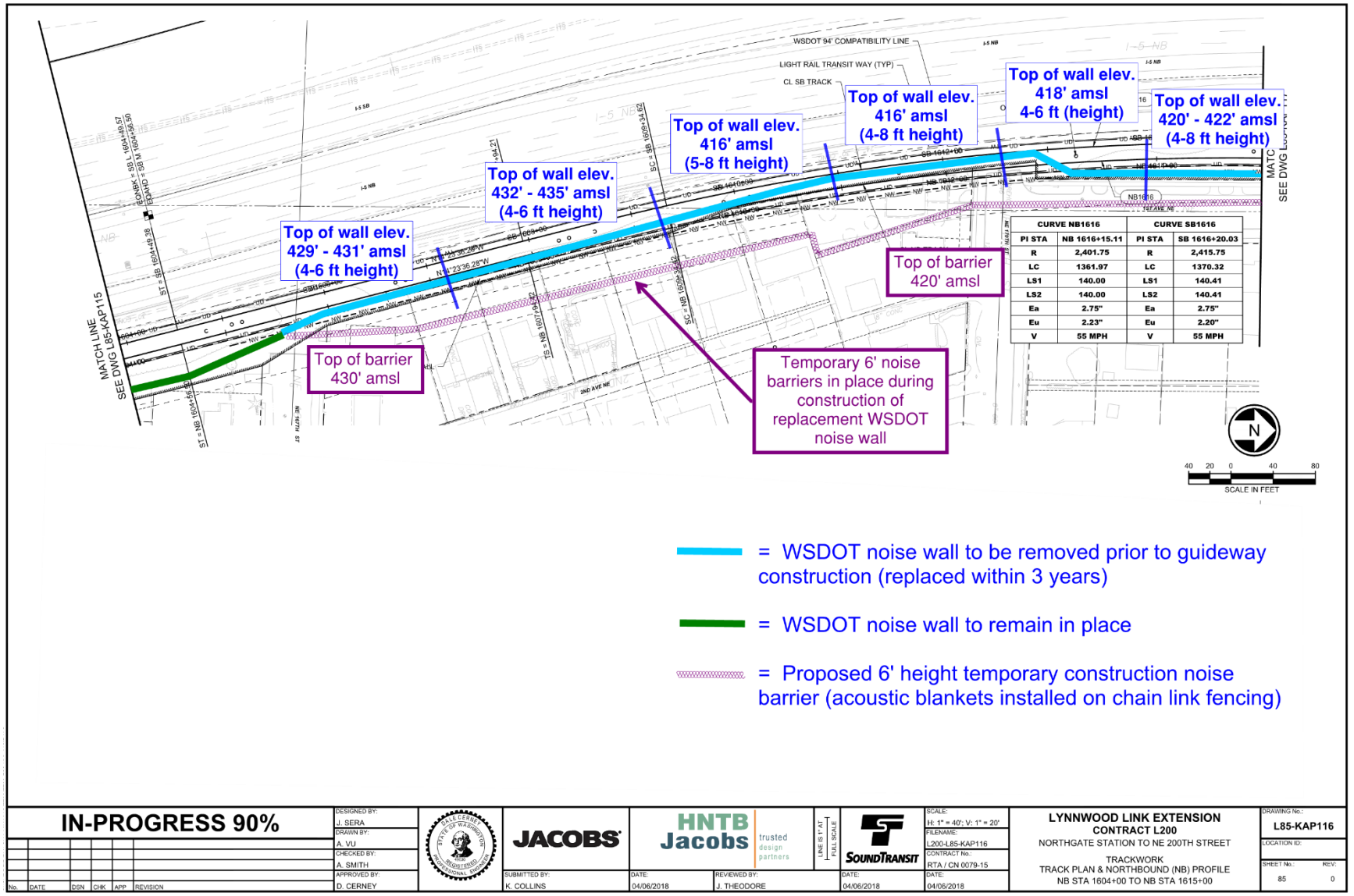


IN-PROGRESS 90%

DESIGNED BY: J. SERA
DRAWN BY: A. VU
CHECKED BY: A. SMITH
APPROVED BY: D. CERNEY
SUBMITTED BY: K. COLLINS
DATE: 04/06/2018
REVIEWED BY: J. THEODORE
DATE: 04/06/2018
DATE: 04/06/2018
SCALE: H: 1" = 40'; V: 1" = 20'
FILENAME: L200-L85-KAP115
CONTRACT No.: RTA / CN 0079-15

LYNNWOOD LINK EXTENSION
CONTRACT L200
NORTHGATE STATION TO NE 200TH STREET
TRACKWORK
TRACK PLAN & NORTHBOUND (NB) PROFILE
NB STA 1593+00 TO NB STA 1604+00

DRAWING No.: L85-KAP115
LOCATION ID:
SHEET No.: 84
REV: 0



CURVE NB1616		CURVE SB1616	
PI STA	NB 1616+15.11	PI STA	SB 1616+20.03
R	2,401.75	R	2,415.75
LC	1361.97	LC	1370.32
LS1	140.00	LS1	140.41
LS2	140.00	LS2	140.41
Ea	2.75"	Ea	2.75"
Eu	2.23"	Eu	2.20"
V	55 MPH	V	55 MPH

IN-PROGRESS 90%

No.	DATE	DSN	CHK	APP	REVISION

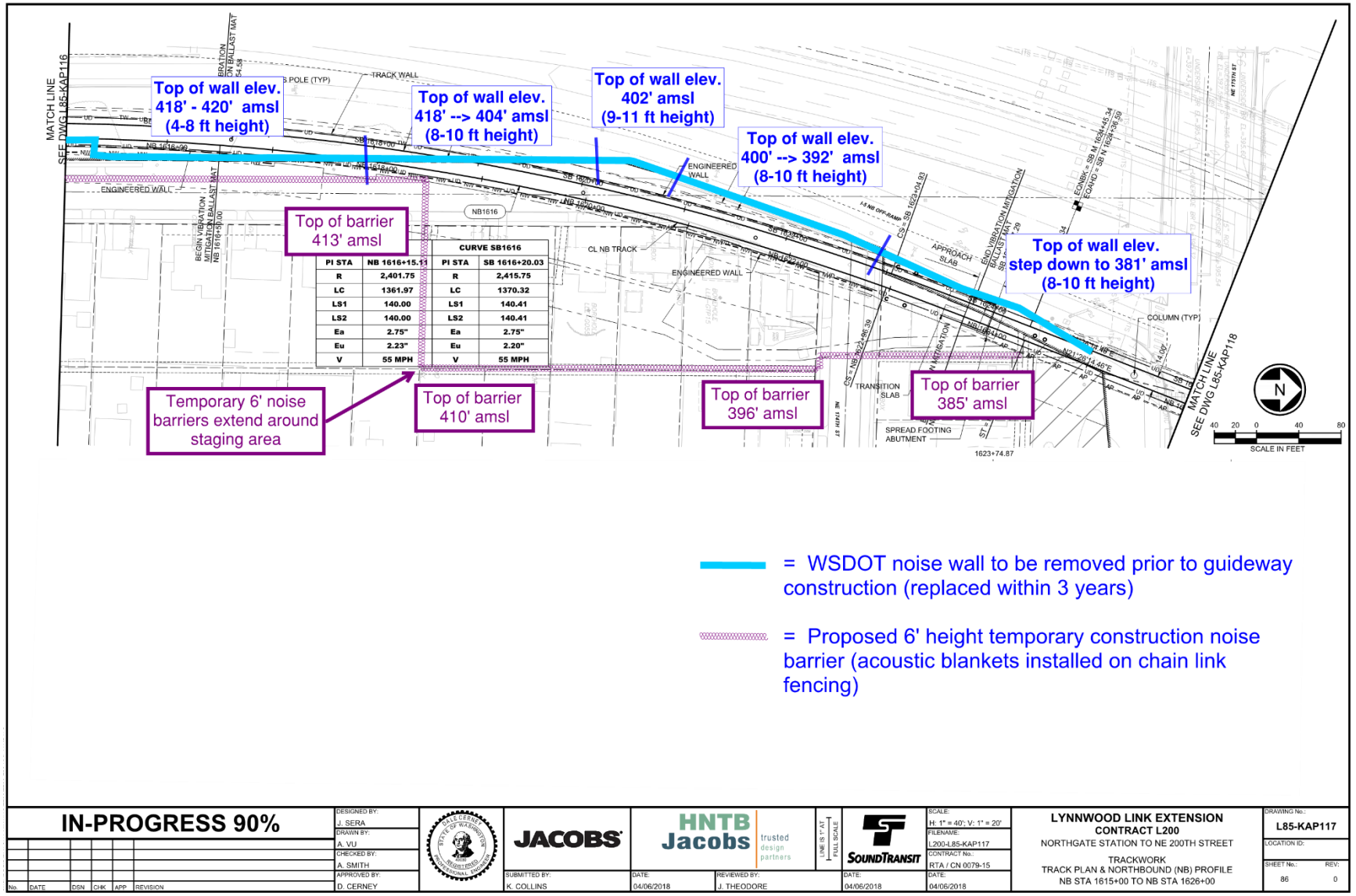
DESIGNED BY: J. SERA
DRAWN BY: A. VU
CHECKED BY: A. SMITH
APPROVED BY: D. CERNEY

SUBMITTED BY: K. COLLINS
DATE: 04/06/2018
REVIEWED BY: J. THEODORE
DATE: 04/06/2018
DATE: 04/06/2018

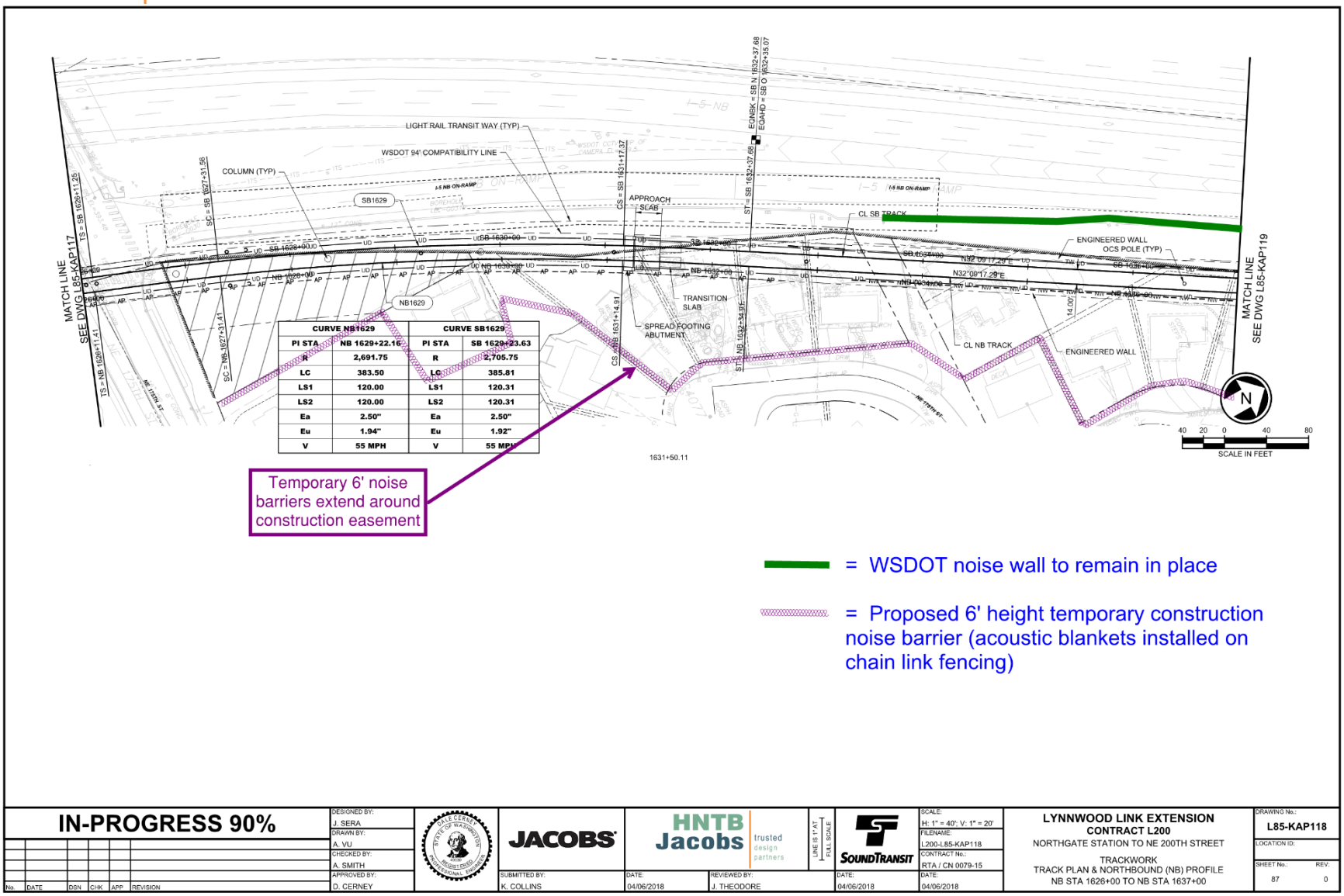
SCALE: H: 1" = 40'; V: 1" = 20'
FILENAME: L200-L85-KAP116
CONTRACT No.: RTA / CN 0079-15

LYNNWOOD LINK EXTENSION
CONTRACT L200
NORTHGATE STATION TO NE 200TH STREET
TRACKWORK
TRACK PLAN & NORTHBOUND (NB) PROFILE
NB STA 1604+00 TO NB STA 1615+00

DRAWING No.: L85-KAP116
LOCATION ID:
SHEET No.: 85
REV: 0



IN-PROGRESS 90%	DESIGNED BY: J. SERA		JACOBS	HNTB Jacobs trusted design partners		SOUNDTRANSIT	SCALE: H: 1" = 40'; V: 1" = 20'	LYNNWOOD LINK EXTENSION CONTRACT L200 NORTHGATE STATION TO NE 200TH STREET TRACKWORK TRACK PLAN & NORTHBOUND (NB) PROFILE NB STA 1615+00 TO NB STA 1626+00	DRAWING No.: L85-KAP117
	DRAWN BY: A. VU						FILENAME: L200-L85-KAP117		LOCATION ID:
	CHECKED BY: A. SMITH						CONTRACT No.: RTA / CN 0079-15		SHEET No.: 86 REV: 0
	APPROVED BY: D. CERNEY		SUBMITTED BY: K. COLLINS	DATE: 04/06/2018	REVIEWED BY: J. THEODORE	DATE: 04/06/2018	DATE: 04/06/2018		



CURVE NB1629		CURVE SB1629	
PI STA	NB 1629+22.16	PI STA	SB 1629+23.63
R	2,691.75	R	2,705.75
LC	383.50	LC	385.81
LS1	120.00	LS1	120.31
LS2	120.00	LS2	120.31
Ea	2.50"	Ea	2.50"
Eu	1.94"	Eu	1.92"
V	55 MPH	V	55 MPH

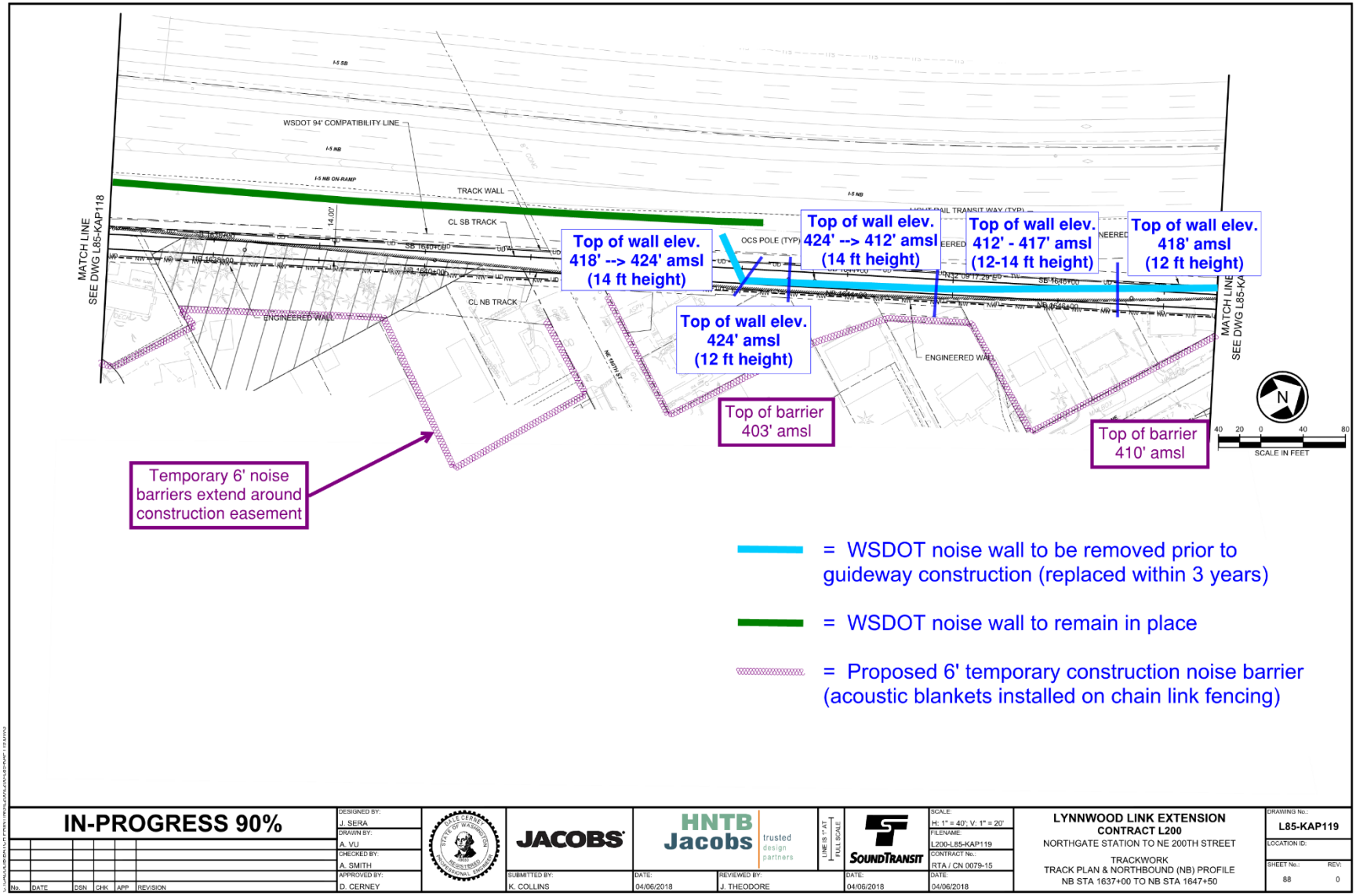
IN-PROGRESS 90%

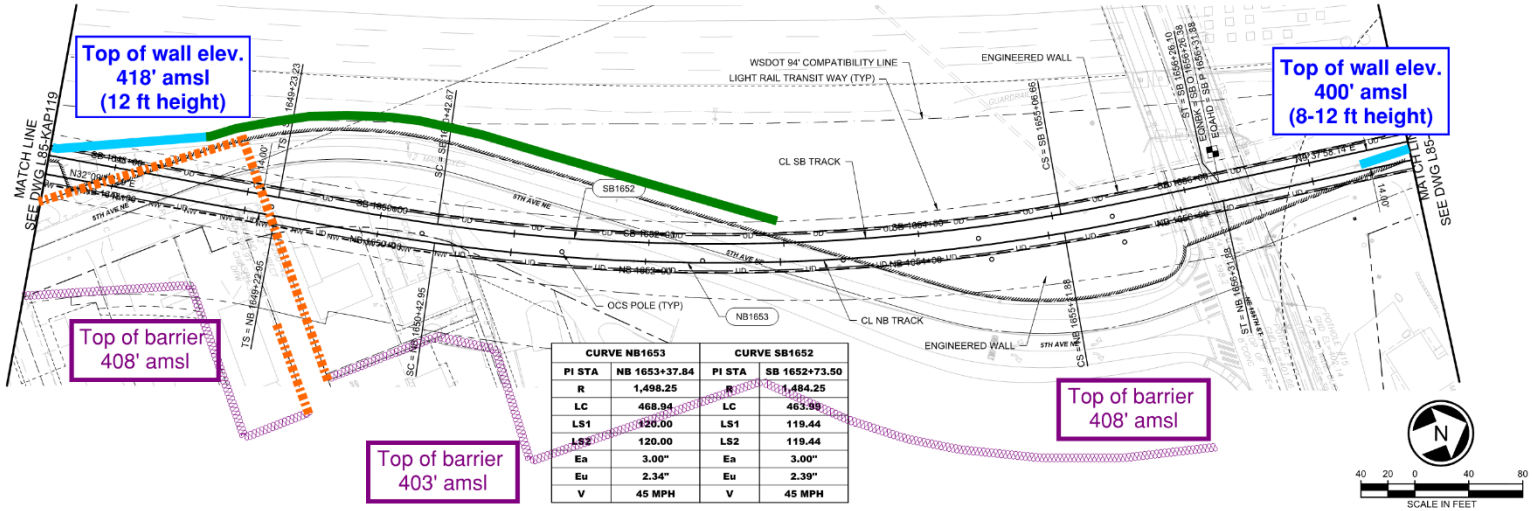
No.	DATE	DSN	CHK	APP	REVISION

DESIGNED BY: J. SERA
DRAWN BY: A. VU
CHECKED BY: A. SMITH
APPROVED BY: D. CERNEY
SUBMITTED BY: K. COLLINS
DATE: 04/06/2018
REVIEWED BY: J. THEODORE
DATE: 04/06/2018
DATE: 04/06/2018
SCALE: H: 1" = 40'; V: 1" = 20'
FILENAME: L200-L85-KAP118
CONTRACT No.: RTA / CN 0079-15

LYNNWOOD LINK EXTENSION
CONTRACT L200
NORTHGATE STATION TO NE 200TH STREET
TRACKWORK
TRACK PLAN & NORTHBOUND (NB) PROFILE
NB STA 1626+00 TO NB STA 1637+00

DRAWING No.: L85-KAP118
LOCATION ID:
SHEET No.: 87
REV: 0


WSDOT 94' COMPATIBILITY LINE
TRACK WALL
CL SB TRACK
CL NB TRACK
ENGINEERED WALL
OCS POLE (TYP)
MATCH LINE
SEE DWG L85-KAP118
Top of wall elev.
418' --> 424' amsl
(14 ft height)
Top of wall elev.
424' --> 412' amsl
(14 ft height)
Top of wall elev.
412' - 417' amsl
(12-14 ft height)
Top of wall elev.
418' amsl
(12 ft height)
Top of wall elev.
424' amsl
(12 ft height)
Top of barrier
403' amsl
Top of barrier
410' amsl
Temporary 6' noise barriers extend around construction easement
SCALE IN FEET
= WSDOT noise wall to be removed prior to guideway construction (replaced within 3 years)
= WSDOT noise wall to remain in place
= Proposed 6' temporary construction noise barrier (acoustic blankets installed on chain link fencing)
IN-PROGRESS 90%
LYNNWOOD LINK EXTENSION
CONTRACT L200
NORTHGATE STATION TO NE 200TH STREET
TRACKWORK
TRACK PLAN & NORTHBOUND (NB) PROFILE
NB STA 1637+00 TO NB STA 1647+50
L85-KAP119



CURVE NB1653		CURVE SB1652	
PI STA	NB 1653+37.84	PI STA	SB 1652+73.50
R	1,498.25	R	1,484.25
LC	468.94	LC	463.99
LS1	120.00	LS1	119.44
LS2	120.00	LS2	119.44
Ea	3.00"	Ea	3.00"
Eu	2.34"	Eu	2.39"
V	45 MPH	V	45 MPH

= WSDOT noise wall to be removed prior to guideway construction (replaced within 3 years)

= WSDOT noise wall to remain in place

= Proposed 6' height temporary construction noise barrier (acoustic blankets installed on chain link fencing)

= Chain link fence

IN-PROGRESS 90%

No.	DATE	DSN	CHK	APP	REVISION

DESIGNED BY: J. SERA
DRAWN BY: A. VU
CHECKED BY: A. SMITH
APPROVED BY: D. CERNEY

JACOBS
SUBMITTED BY: K. COLLINS
DATE: 04/06/2018

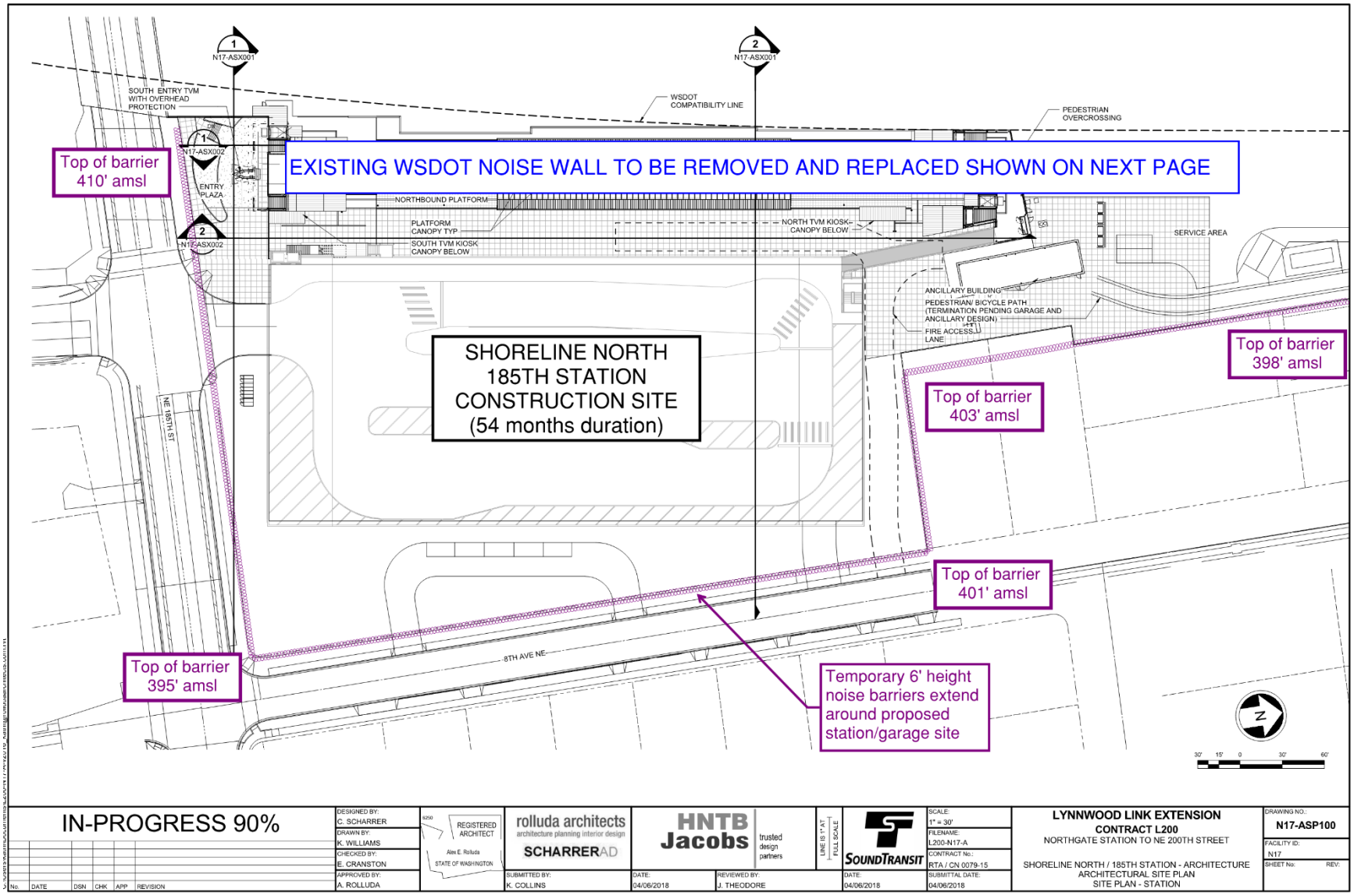
HNTB Jacobs trusted design partners
REVIEWED BY: J. THEODORE
DATE: 04/06/2018

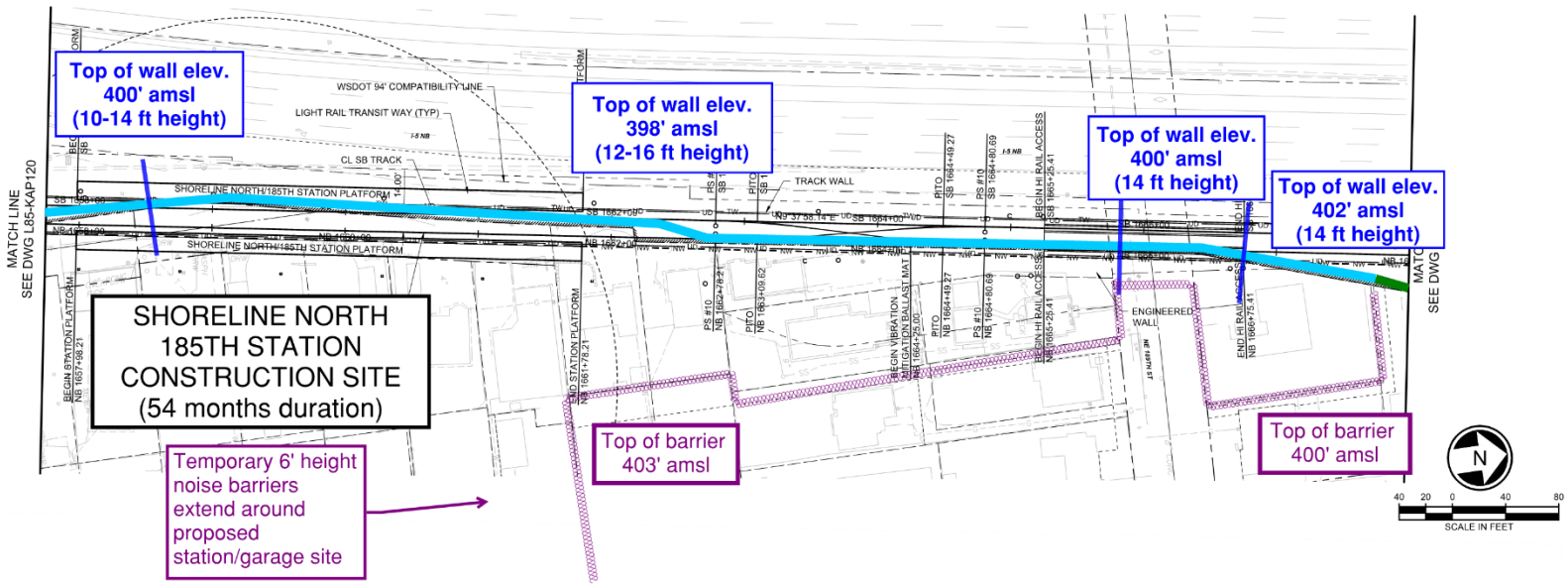
SOUNDTRANSIT
DATE: 04/06/2018

SCALE: H: 1" = 40'; V: 1" = 20'
FILENAME: L200-L85-KAP120
CONTRACT No.: RTA / CN 0079-15

LYNNWOOD LINK EXTENSION
CONTRACT L200
NORTHGATE STATION TO NE 200TH STREET
TRACKWORK
TRACK PLAN & NORTHBOUND (NB) PROFILE
NB STA 1647+50 TO NB STA 1657+75

DRAWING No.: L85-KAP120
LOCATION ID:
SHEET No.: 89
REV: 0


EXISTING WSDOT NOISE WALL TO BE REMOVED AND REPLACED SHOWN ON NEXT PAGE
SHORELINE NORTH
185TH STATION
CONSTRUCTION SITE
(54 months duration)
Top of barrier 410' amsl
Top of barrier 398' amsl
Top of barrier 403' amsl
Top of barrier 401' amsl
Top of barrier 395' amsl
Temporary 6' height noise barriers extend around proposed station/garage site
SOUTH ENTRY TVM WITH OVERHEAD PROTECTION
WSDOT COMPATIBILITY LINE
PEDESTRIAN OVERCROSSING
ENTRY PLAZA
NORTHBOUND PLATFORM
PLATFORM CANOPY TYP
SOUTH TVM KIOSK CANOPY BELOW
NORTH TVM KIOSK CANOPY BELOW
SERVICE AREA
ANCILLARY BUILDING
PEDESTRIAN/ BICYCLE PATH (TERMINATION PENDING GARAGE AND ANCILLARY DESIGN)
FIRE ACCESS LANE
NE 185TH ST
8TH AVE NE
IN-PROGRESS 90%
LYNNWOOD LINK EXTENSION
CONTRACT L200
NORTHGATE STATION TO NE 200TH STREET
SHORELINE NORTH / 185TH STATION - ARCHITECTURE
ARCHITECTURAL SITE PLAN
SITE PLAN - STATION
N17-ASP100

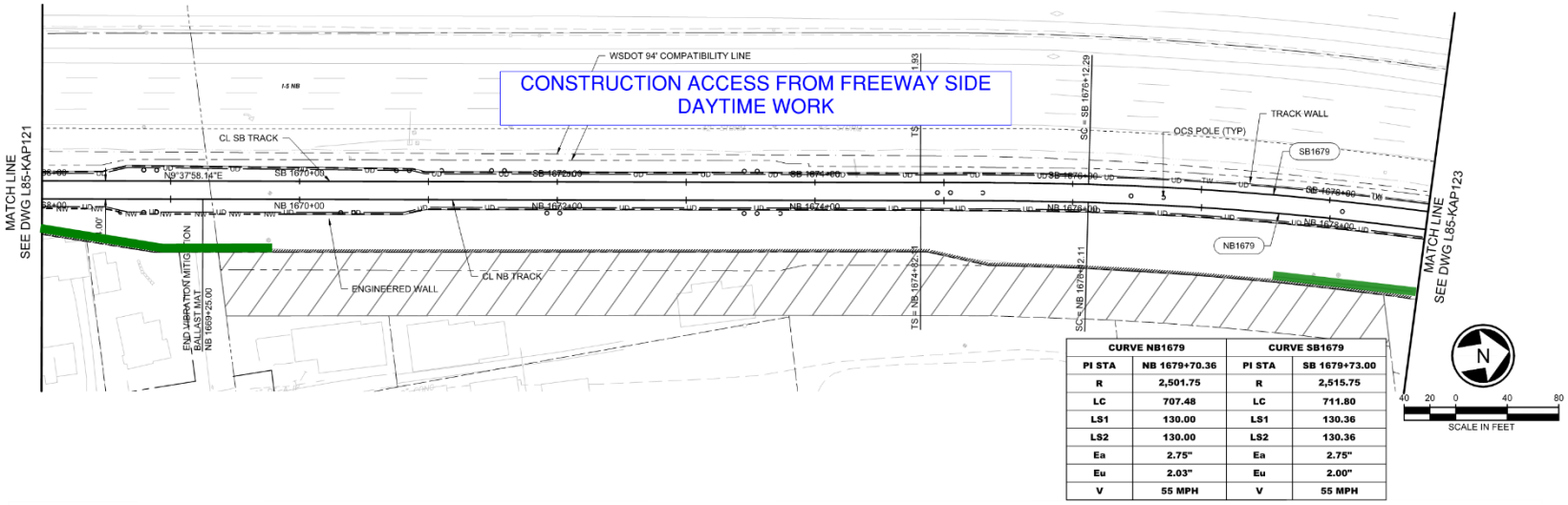


= WSDOT noise wall to be removed prior to guideway construction (replaced within 3 years)

= WSDOT noise wall to remain in place

= Proposed 6' height temporary construction noise barrier (acoustic blankets installed on chain link fencing)

IN-PROGRESS 90%	DESIGNED BY: J. SERA DRAWN BY: A. VU CHECKED BY: A. SMITH APPROVED BY: D. CERNEY	JACOBS	HNTB Jacobs trusted design partners	LINE IS 1" AT FULL SCALE	SOUNDTRANSIT	SCALE: H: 1" = 40'; V: 1" = 20' FILENAME: L200-L85-KAP121 CONTRACT No.: RTA / CN 0079-15	LYNNWOOD LINK EXTENSION CONTRACT L200 NORTHGATE STATION TO NE 200TH STREET TRACKWORK TRACK PLAN & NORTHBOUND (NB) PROFILE NB STA 1657+75 TO NB STA 1668+00	DRAWING No.: L85-KAP121 LOCATION ID: SHEET No.: 90 REV: 0
No. DATE DSN CHK APP REVISION		SUBMITTED BY: K. COLLINS	DATE: 04/06/2018	REVIEWED BY: J. THEODORE	DATE: 04/06/2018	DATE: 04/06/2018		



CURVE NB1679		CURVE SB1679	
PI STA	NB 1679+70.36	PI STA	SB 1679+73.00
R	2,501.75	R	2,515.75
LC	707.48	LC	711.80
LS1	130.00	LS1	130.36
LS2	130.00	LS2	130.36
Ea	2.75"	Ea	2.75"
Eu	2.03"	Eu	2.00"
V	55 MPH	V	55 MPH

= WSDOT noise wall to remain in place

IN-PROGRESS 90%

No.	DATE	DSN	CHK	APP	REVISION

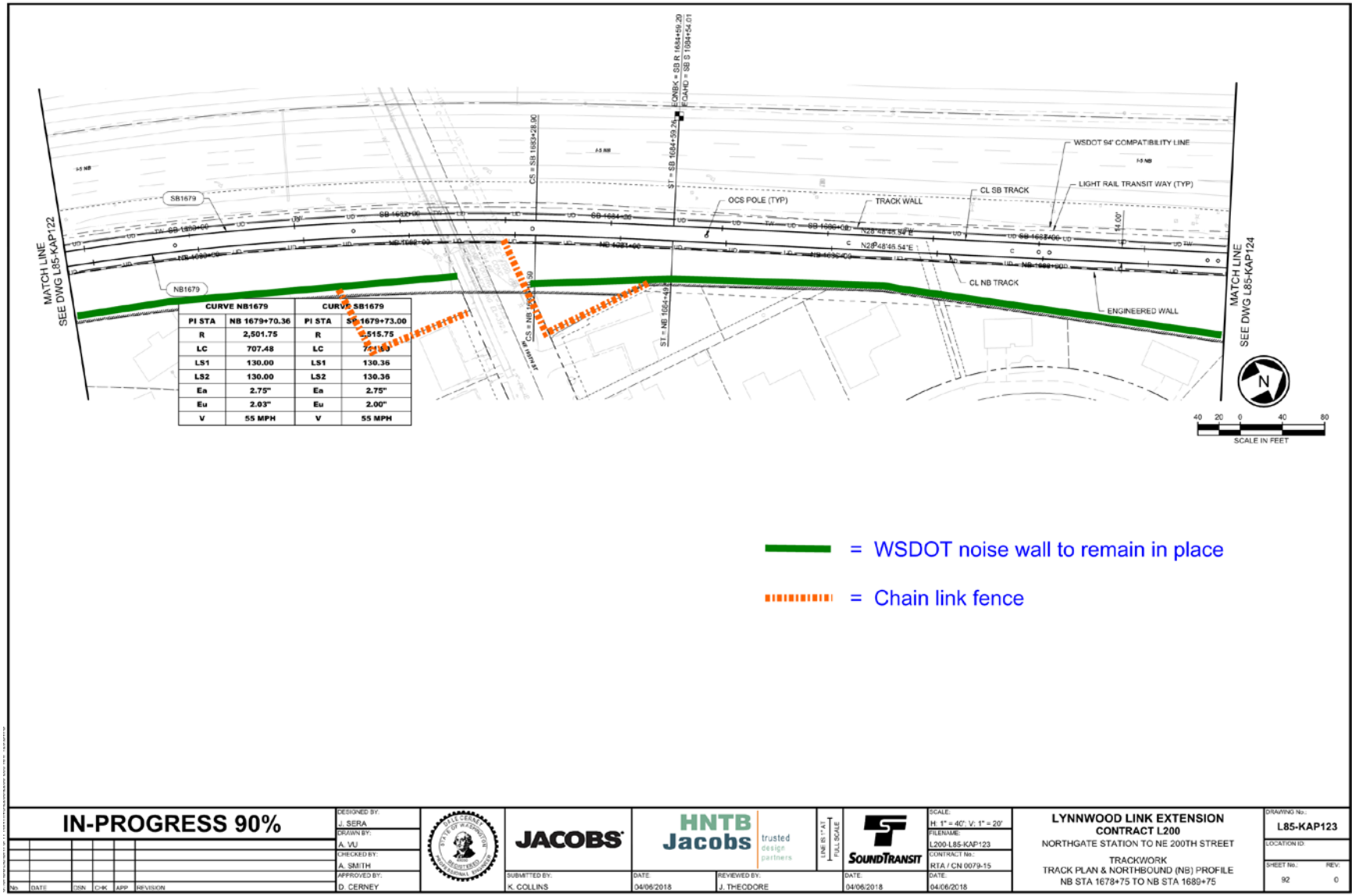
DESIGNED BY: J. SERA
DRAWN BY: A. VU
CHECKED BY: A. SMITH
APPROVED BY: D. CERNEY

SUBMITTED BY: K. COLLINS
DATE: 04/06/2018
REVIEWED BY: J. THEODORE
DATE: 04/06/2018
DATE: 04/06/2018

SCALE: H: 1" = 40'; V: 1" = 20'
FILENAME: L200-L85-KAP122
CONTRACT No.: RTA / CN 0079-15

LYNNWOOD LINK EXTENSION
CONTRACT L200
NORTHGATE STATION TO NE 200TH STREET
TRACKWORK
TRACK PLAN & NORTHBOUND (NB) PROFILE
NB STA 1668+00 TO NB STA 1678+75

DRAWING No.: L85-KAP122
LOCATION ID:
SHEET No.: 91
REV: 0



CURVE NB1679		CURVE SB1679	
PI STA	NB 1679+70.36	PI STA	SB 1679+73.00
R	2,501.75	R	2,515.75
LC	707.48	LC	707.63
LS1	130.00	LS1	130.36
LS2	130.00	LS2	130.36
Ea	2.75"	Ea	2.75"
Eu	2.03"	Eu	2.00"
V	55 MPH	V	55 MPH

IN-PROGRESS 90%

No.	DATE	DSN.	CHK.	APP.	REVISION

DESIGNED BY: J. SERA
DRAWN BY: A. VU
CHECKED BY: A. SMITH
APPROVED BY: D. CERNEY

JACOBS — SUBMITTED BY: K. COLLINS — DATE: 04/06/2018
HNTB Jacobs trusted design partners — REVIEWED BY: J. THEODORE — DATE: 04/06/2018
SOUNDTRANSIT — DATE: 04/06/2018

SCALE: H: 1" = 40', V: 1" = 20'
FILENAME: L200-L85-KAP123
CONTRACT No.: RTA / CN 0079-15

LYNNWOOD LINK EXTENSION
CONTRACT L200
NORTHGATE STATION TO NE 200TH STREET
TRACKWORK
TRACK PLAN & NORTHBOUND (NB) PROFILE
NB STA 1678+75 TO NB STA 1689+75

DRAWING No.: L85-KAP123
LOCATION ID:
SHEET No.: 92
REV: 0