PART 1 - GENERAL

1.1 RELATED SECTIONS

.1 Section 01 33 00 - Submittal Procedures

.2 Section 31 62 16.13 – Steel Sheet Piles

.3 Section 31 09 16.01 Pile Driving Template

1.2 REFERENCES

.1 Joose Environmental Geotechnical Report, Project Number JE0160-B dated March 29th, 2016: The entire report can be accessed through the Departmental Representative.

1.3 SUBMITTALS

.1 Provide submittals in accordance with Section 01 33 00.

.2 Sub-surface investigation reports: when site conditions differ from those indicated, submit written notification to a Departmental Representative and await further instructions.

.3 Submit schedule of planned sequence of driving to a Departmental Representative for review, as specified.

.4 Equipment:
.1 Submit prior to sheet pile installation for review by a Departmental Representative, list and details of equipment for use in installation of sheet piles.
.2 Impact hammers: submit manufacturer's written data as specified.
.3 Non-impact methods; submit characteristics to evaluate performance.

.6 Submit drivability analyses as specified, to a Departmental Representative for approval of hammers.

1.4 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with manufacturer’s instructions.

.2 Protect sheet piles from damage due to excessive bending stresses, impact, abrasion or other causes during delivery, storage and handling.

.3 Replace damaged sheet piles as directed by a Departmental Representative.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Material requirements for piles are specified in Section 31 62 16.13.

.2 Supply or fabricate full length sheet piles as indicated and provide equipment to handle full length sheet piles without cutting or splicing.

2.2 EQUIPMENT

.1 Impact hammers: provide manufacturer's name, type, rated energy per blow at normal working rate, mass of striking parts of hammer, mass of driving cap and type and elastic properties of hammer and pile cushions.

.2 Non-impact methods of installation such as auguring, jacking, vibratory hammers or other means: provide full details of characteristics necessary to evaluate performance.

.3 Hammer:
.1 Hammers to be selected on basis of drivability analysis using wave equation theory, performed to show that sheet piles can be driven to levels indicated.

.2 Drivability analysis to include, but not be limited to, following: hammer, cushion, and cap block details; static soil parameters; quake and damping factors, total soil resistance, blow count, sheet pile stresses and energy throughput at representative penetrations.
.3 When required criteria cannot be achieved with the proposed hammer, use larger hammer and take other measures as required.
.4 Recommended rated hammer energy equal to 450J/cm2 of steel cross-sectional area.

PART 3 - EXECUTION

3.1 PREPARATION

.1 Protection:
.1 Protect adjacent structures, services and work of other sections from hazards due to sheet pile driving operations.
.2 Arrange sequencing of sheet pile driving operations and methods to avoid damages to adjacent existing structures.
.3 When damages occur, remedy damaged items to restore to original or better condition at own expense.

.2 Ensure that conditions at sheet pile locations are adequate to support sheet pile driving operation and load testing operation. Make provision for access and support of sheet piling equipment during performance of Work.

3.2 INSTALLATION

.1 Leads: construct pile driver leads to provide free movement of hammer.
.1 Hold leads in position at top and bottom, with guides, stiff braces, or other means reviewed by Departmental Representative, to ensure support to shhet pile while being driven.
.2 Lengths: provide sufficient length of leads to ensure that use of follower is

unnecessary.
.3 Swing leads:
.1 Not permitted.

.2 Followers:
.1 Provide followers of such size, shape, length and mass to permit driving sheet pile in desired location to required depth and resistance.
.2 Provide followers with socket or hood carefully fitted to top of sheet pile to minimize loss of energy and prevent damage to sheet pile.

.3 Installation of each sheet pile will be subject to review of Departmental Representative.
.1 Departmental Representative will be the sole judge of acceptability of each sheet pile with respect to final driving resistance, depth of penetration or other criteria used to determine load capacity.
.2 A Departmental Representative to review final driving of all sheet piles prior to removal of pile driving rig from site.

.4 Drive each sheet pile to elevation indicated on the project drawings.
.1 Do not overdrive to cause damage to sheet piles in bedrock.

3.3 APPLICATION / DRIVING

.1 Use driving caps and cushions to protect sheet piles.
.1 Reinforce pile heads as required by Departmental Representative.
.2 Sheet piles with damaged heads as determined by Departmental Representative will be rejected.

.2 Hold sheet piles securely and accurately in position while driving.

.3 Deliver hammer blows along axis of sheet

pile.

.4 Ensure no contact between sheet pile and existing structure takes place.

.5 Re-strike already driven sheet piles lifted during driving of adjacent sheet piles to confirm set.

.6 Cut off sheet piles neatly and squarely at elevations as indicated to tolerance of plus or minus 5 mm.
.1 Provide sufficient length above cut-off elevation so that part damaged during driving is cut off.

.7 Remove cut-off lengths from site on completion of work.

3.4 OBSTRUCTIONS

.1 Where an obstruction is encountered that causes sudden unexpected change in penetration resistance or deviation from specified tolerances, notify the Departmental Representative.

3.5 FIELD QUALITY CONTROL

.1 Required Sheet Pile Testing
.1 Each sheet pile shall be driven to elevations outlined on the drawings.
.2 The depth to refusal of each sheet pile shall be monitored and recorded to ensure sheet piles are not obstructed during driving.

.2 Measurement:
.1 Maintain accurate records of driving for each sheet pile, including:
.1 Types and make of hammer, stroke or related energy.
.2 Other driving equipment including water jet, driving cap, cushion.
.3 Sheet pile size and length,

location of sheet pile.
.4 Numbers of blows per meter for entire length of sheet pile and number of blows per 25 mm for last 300 mm.
.5 Final tip and cut-off elevations.
.6 Record pertinent information such as interruption of continuous driving or sheet pile damage.
.7 Record elevations taken on adjacent sheet piles before and after driving of each sheet pile.

.2 Provide Departmental Representative with three copies of any records.

END OF SECTION