central T subway

Connecting people. Connecting communities.

Transmittal

CS Transmittal No. 2224

To:	Hanson Tom	From:	Ross Edwards
		Project No./Contract No.:	M544.1, Contract CS149
	Department of Building Inspection (DBI)	Task No./Title:	1-6.02 Required Permits
	1660 Mission Street, 2 FL		
	San Francisco, CA 94103	Phase:	Final Design
Date:	May 3, 2013	Subject:	Contract 1278 Retrieval Shaft Application for Project Review – Plan Check

Sent via:							
	☒ mail	☐ overnight	☐ messenger	☒ hand-delivered			
	☐ fax – No:		☒ email – Address:	Hanson.Tom@sfgov.org			

The following:			For your:	Due date:
☐ copy of letter/memo	☐ estimate		☐ information/use	
☐ minutes/agenda	☐ schedule		☐ action	
☐ report	☐ deliverable		☒ review/comment	
☐ presentation	☐ review comment form		☐ response to comment	
☐ cd / dvd	☐ no review comment form		☐ concurrence	
☐ specifications	☐ review comments		☐ incorporation of comments	
☒ half-size drawings	☐ response to comments		☐ verification	
☐ full-size drawings	☐ concurrence with response		☐ signature	
☐ sketches/maps/layouts	☐ verification of incorporation		☐ acceptance/approval	
☐ reference material	☐ acceptance/approval		☐ other	
☐ other				

Item No.	Copies	Description	Rev. No.	Date
1	1	CN1278 Application for Project Review – plan check for comments	0	05/03/2012
2	1	CN1278 – Construction of Temporary TBM Retrieval Shaft Drawings (22)	0	05/02/2013
		(CV-2 drawings, ES-5 drawings, GT-3 drawings, ST-12 drawings)		

If enclosures are not as noted, kindly notify us at once.

Remarks:

Please find enclosed Central Subway's Application for Project Review to commence the plan check review for DBI comments as previously discussed with your office. The purpose of this half size set is to initiate the review process. DBI required submittals will be provided during this intake process.
If there are any questions or need for clarification, please feel free to contact me.

Ross Edwards
Project Development and Delivery Program Manager

821 Howard Street 415.701.5262 Phone
San Francisco, Ca 94103 415.701.5222 Fax

cc: Sylvia Thal, DBI (w/ attachments) – Sylvia.Thal@sfgov.org
Albert Hoe, SFMTA (w/o attachments) – via email
Jane Wang, SFMTA (w/o attachments) – via email

Rich Redmond, CSP (w/o attachments) – via email
Alex Clifford, CSP (w/o attachments) – via email
H. Quon Chin, CSP (w/o attachments) – via email
Aileen Read, CSDG (w/o attachments) – via email

CS File No. M544.1.2.

FOR DEPARTMENT USE ONLY

CITY AND COUNTY OF SAN FRANCISCO
DEPARTMENT OF BUILDING INSPECTION

APPLICATION FOR PROJECT REVIEW

APPLICATION IS HEREBY MADE TO THE DEPARTMENT OF BUILDING INSPECTION OF SAN FRANCISCO FOR PLAN REVIEW AND INSPECTION SERVICES FOR THE PROJECT DESCRIBED HEREIN.

DATE FILED:	FILING FEE RECEIPT NO.:	PROJECT CONTROL NO.:
5/3/2013		

BUILDING DESCRIPTION

STREET ADDRESS OF PROJECT:				ASSESSOR'S BLOCK & LOT NO.:
1731-1741 Powell Street				B: 0101 L: 004
TYPE OF CONSTR.:	USE OF BUILDING:			BUILDING CODE OCCUPANCY CLASS:
II B	former Theater			A-1
NO. OF DWELLING UNITS:	NO. OF STORIES:	NO. OF BASEMENTS:	ESTIMATED COST:	REVISED COST:
0	0	0	$3.3 million	
HEIGHT OF BUILDING:	GROUND FLOOR AREA:	WILL SUB-SIDEWALK SPACE BE USED?	DOES BUILDING EXTEND BEYOND PROPERTY LINE?	IS BUILDING DESIGNED FOR ADDITIONAL STORIES? HOW MANY?
N/A	N/A	no	no	no

WRITE IN DESCRIPTION OF ALL WORK TO BE PERFORMED UNDER THIS APPLICATION:

Construction of Temporary TBM Retrieval Shaft for Central Subway

Construction of Retrieval Shaft follows demolition of existing Pagoda Palace building - addressed by separate review and application by Demolition Contractor.

CONTACT INFORMATION

GENERAL CONTRACTOR:	CALIFORNIA LICENSE NUMBER:	EXPIRATION DATE:

ADDRESS:	TELEPHONE:	EMAIL ADDRESS:

ARCHITECT OF RECORD:	CALIFORNIA CERTIFICATE NUMBER:

ADDRESS:	TELEPHONE:	EMAIL ADDRESS:

ENGINEER OF RECORD:	CALIFORNIA CERTIFICATE NUMBER:
PB Americas	

ADDRESS:	TELEPHONE:	EMAIL ADDRESS:
303 Second Street Suite 700	415.243.4600	abrahamsd@pbworld.com

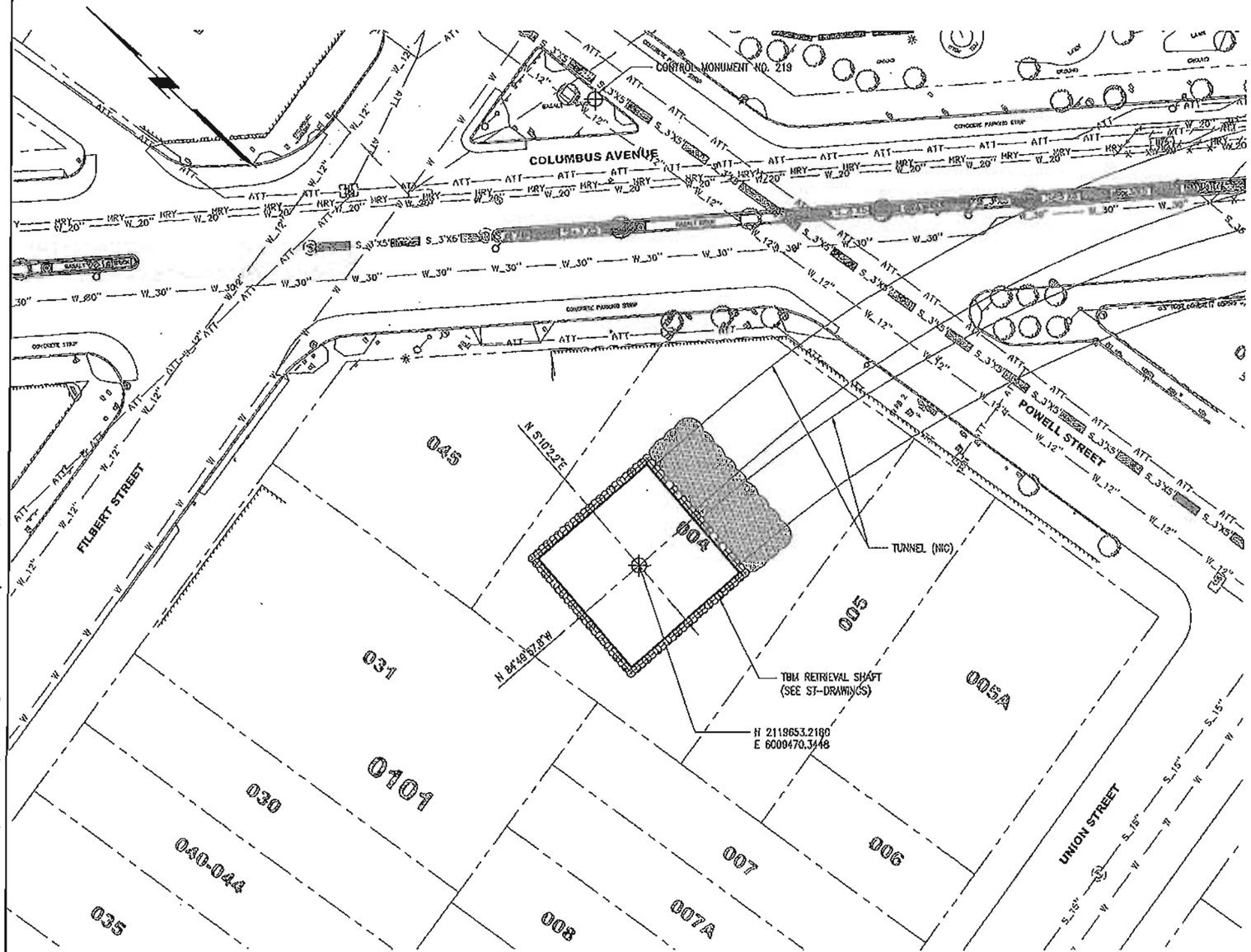
OWNER'S NAME:
Joel Campos

ADDRESS:	TELEPHONE:	EMAIL ADDRESS:
2731 Mission St, SF, 94110	415.669.2967	

APPLICANT'S NAME:	CHECK APPROPRIATE BOX:
SFMTA (Lessee) F Ross Edwards	☐ OWNER ☒ LESSEE ☐ CONTRACTOR ☐ ARCHITECT ☐ ENGINEER ☐ AGENT

ADDRESS:	TELEPHONE:	EMAIL ADDRESS:
821 Howard St, 2nd Floor, San Francisco	415.703.5296	ross.edwards@sfmta.com

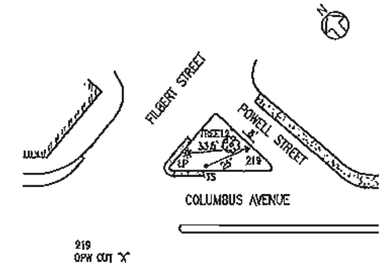
APPLICANT'S SIGNATURE:	DATE:
	5/3/2013



PLAN

LEGEND:

EXISTING PROPERTY LINE



219
OPW CUT 'X'

CONTROL MONUMENT No. 219
NTS

POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
219	2119774.69	6009574.08	59.24	DPW

SURVEY CONTROL NOTE:

THE BASIS OF BEARINGS FOR THIS SURVEY CONTROL NETWORK WAS ESTABLISHED USING THE "CALIFORNIA COORDINATE SYSTEM OF 1983, ZONE 3" (CCS83) (US SURVEY FOOT). SURVEY CONTROL COORDINATES ARE BASED ON A LOCAL SYSTEM USING GROUND DISTANCES AND ARE NOT INTENDED TO REFERENCE THE CALIFORNIA COORDINATE SYSTEM, WHICH WOULD REQUIRE USE OF A "GRID TO GROUND" COMBINED GRID FACTOR DISTANCE CONVERSION. ALL MEASUREMENTS AND CALCULATIONS ARE BASED ON GROUND DISTANCES.

ELEVATIONS SHOWN HEREON ARE BASED ON NAVD88 AND ARE SHOWN IN FEET, DERIVED FROM A NAVD88 ELEVATION OF 6.633 METERS ON BM-0015 AT THE NORTHERLY CORNER OF 2ND AND TOWNSEND. THE ELEVATION WAS THEN CONVERTED TO APPROXIMATE CCSF DATUM (NAVD88 - 11.353 FT)

20' 0 20' 40'
SCALE = 1"=20'

DATE	DESCRIPTION	REV. NO.	BY	CHECKED	APPROVED
		0			

BORDER REVISED 03/25/2011

PB TELAMON
PB AMERICAS, INC.

DESIGNED C. SUNTHORNARN
DRAWN O. KURKOVSKAYA
CHECKED D. ABRAHAMS
MANAGER A. READ
RECOMMENDED A. ROJO
APPROVED R. EDWARDS
DATE

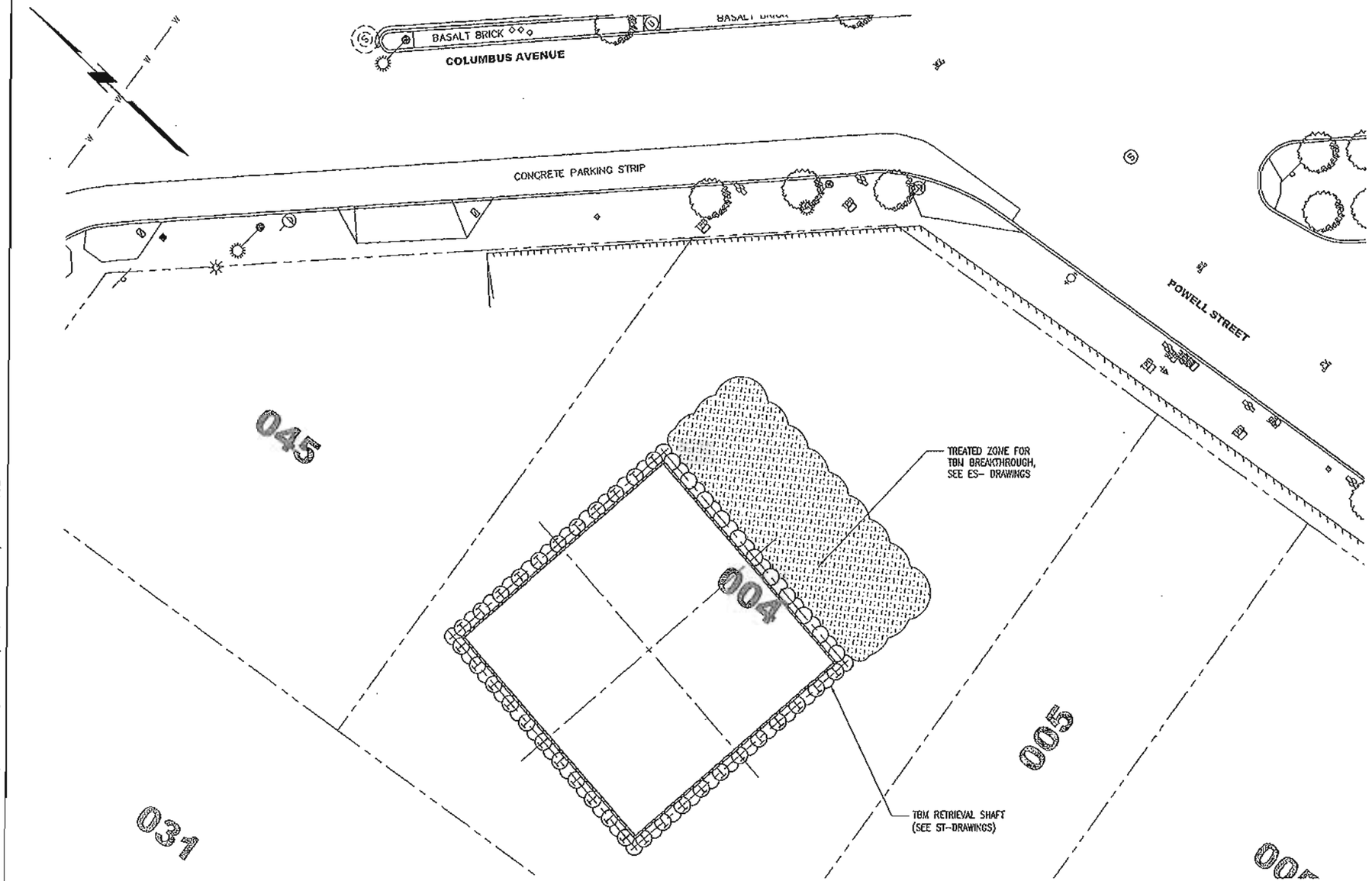
CITY AND COUNTY OF SAN FRANCISCO
MUNICIPAL TRANSPORTATION AGENCY
APPROVED
DIRECTOR OF TRANSPORTATION

THIRD STREET LIGHT RAIL PROGRAM
PHASE 2 – CENTRAL SUBWAY
TEMPORARY TBM RETRIEVAL SHAFT

CIVIL
SITE PLAN

CONTRACT NO. 1278
SFMTA CONTRACT NO.
DRAWING NO. CV–101
SHEET NO.
REVISION 0

T:\13285 CS DP1\GN 1278\Sheet Files\CV - Civil\ CV-101.dwg Kurkovskaya Thu May 02,2013 - 4:26 pm CV-101



PLAN

LEGEND:

- PROTECT IN PLACE EXISTING FIRE HYDRANT
- PROTECT IN PLACE EXISTING MUNI POLE
- PROTECT IN PLACE EXISTING PARKING METER
- PROTECT IN PLACE EXISTING SS VENT
- PROTECT IN PLACE EXISTING STREET SIGN
- PROTECT IN PLACE EXISTING STREET LIGHT
- PROTECT IN PLACE EXISTING TELEPHONE PULL BOX
- PROTECT IN PLACE EXISTING TRAFFIC SIGNAL
- PROTECT IN PLACE EXISTING TREES
- PROTECT IN PLACE EXISTING UTILITY BOX
- PROTECT IN PLACE EXISTING WATER METER

NOTE:

1. FOR UNDER GROUND UTILITY, SEE UT-DRAWINGS.
2. EXISTING FACILITIES ARE SHOWN SCREENED BACK, FOR REFERENCE ONLY.
3. EXISTING UTILITY INFORMATION IS BASED ON RECORDS RECEIVED FROM UTILITY AGENCIES. THE LOCATION OF EXISTING UNDERGROUND UTILITIES SHOWN ON THESE PLANS ARE APPROXIMATE LOCATIONS. ACTUAL CONDITIONS MAY VARY.

10' 0 10' 20'
SCALE = 1"=10'

DATE	DESCRIPTION	REV. NO.	BY	CHECKED	APPROVED
		0			

DRAWN C. SUTHIWONGSA
CHECKED O. ABRAHAMS
REVIEWED A. READ
RECOMMENDED A. READ
APPROVED R. EDWARDS
DATE

PB TELAMON
PB AMERICAS, INC.

CITY AND COUNTY OF SAN FRANCISCO
MUNICIPAL TRANSPORTATION AGENCY
APPROVED
DIRECTOR OF TRANSPORTATION

THIRD STREET LIGHT RAIL PROGRAM
PHASE 2 – CENTRAL SUBWAY
TEMPORARY TBM RETRIEVAL SHAFT

CIVIL
ABOVE GROUND UTILITY
SITE PLAN

CONTRACT NO. 1278
STATE CONTROL NO.
DRAWING NO. CV-102
SHEET NO.
REVISION 0

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DRAWING REVISED 03/25/2011

LOAD FOR TEMPORARY STRUCTURE

STRUCTURE		DEAD LOADS	LIVE LOADS AND OTHER LOADS		EARTHQUAKE LOADS [EQT]	LOADING COMBINATIONS (LRFD ONLY) [1]
			VERTICAL	HORIZONTAL		
EXCAVATION SUPPORT STRUCTURE	WALL SYSTEM (ELEMENTS IN CONTACT WITH RETAINED EARTH)	OWN WEIGHT AND REACTIONS FROM DEAD LOADS OF DECK STRUCTURE AND BRACING SYSTEM.	REACTIONS FROM LIVE LOADS EXCLUDING IMPACT ON DECK STRUCTURE [LLT] + [IT] WALKWAYS AND INCIDENTAL LOADS [LLW] CONSTRUCTION EQUIPMENT [LLH]	LATERAL EARTH PRESSURE [EHAR] DUE TO WEIGHT OF SOIL AND SURCHARGE HYDROSTATIC PRESSURE [WU] AXIAL LOADS FROM END WALLS WHERE APPLICABLE [EHAR] AND [WU]	LATERAL PRESSURE DUE TO EARTHQUAKE	LOAD SERVICE I (SEE GENERAL NOTES FOR LOADING COMBINATIONS) [DW] + [WU] + [DC] + [EV] + [EHS] + [EHAR] + [LLP] + 0.70[EQT] LOAD SERVICE II (SEE GENERAL NOTES FOR LOADING COMBINATIONS) LOAD SERVICE I + 0.5[TG] + 0.5[TU] + 0.5[SH] + 0.3[WS] WITHOUT [EQT] LOADING STRENGTH I (SEE TABLE FOR γ_p-VALUES & GENERAL NOTES FOR LOADING COMBINATIONS) γ_p[DW] + γ_p[WU] + γ_p[DC] + γ_p[EV] + γ_p[EHS] + γ_p[EHAR] + 1.75[LLP] + 1.75[LF] + 0.5/1.2[TU] + γ_{TG}[TG] + 0.5/1.2[SH] STRENGTH II (SEE TABLE FOR γ_p-VALUES & GENERAL NOTES FOR LOADING COMBINATIONS) γ_p[DW] + γ_p[WU] + γ_p[DC] + γ_p[EV] + γ_p[EHS] + γ_p[EHAR] + 0.6[LLT] + 0.5[LLW] + 0.5[LLP] + 0.5[LLHT] + 0.5[LF] + 0.5[IT] + 0.5[IH] + 0.5/1.2[TU] + γ_{TG}[TG] + 0.5/1.2[SH] + [EQT]
	BRACING SYSTEM: MAIN MEMBERS (MEMBERS CARRYING COMPUTED LOADS)			SIMPLE BEAM REACTIONS FROM WALL SYSTEM AXIAL LOADS FROM END WALLS WHERE APPLICABLE	REACTION FROM WALL SYSTEM	
	BRACING SYSTEM: SECONDARY BRACING	OWN WEIGHT	AXIAL LOAD EQUAL TO 3% OF THE DESIGN AXIAL LOAD IN THE MAIN BRACED MEMBER		NONE	

1. CONTRACTOR MAY USE ALLOWABLE STRESS DESIGN SUBJECT TO THE APPROVAL OF THE ENGINEER.

• REFERENCES ARE TO AASHTO BRIDGE DESIGN SPECIFICATIONS U.S. CUSTOMARY UNITS.

GENERAL NOTES FOR LOADING COMBINATIONS

1. THE LARGER OF THE TWO VALUES PROVIDED FOR LOAD FACTORS OF TU, AND SH SHALL BE USED FOR DEFORMATIONS AND THE SMALLER VALUES FOR ALL OTHER EFFECTS.
2. γ_{10} SHALL BE TAKEN AS:
   - 0.0 AT THE STRENGTH I & II LIMIT STATES.
   - 1.0 AT THE LOAD SERVICE LIMIT STATES I & II WHEN LIVE LOAD IS NOT CONSIDERED.
   - 0.50 AT THE LOAD SERVICE LIMIT STATES I & II WHEN LIVE LOAD IS CONSIDERED.
3. γ_p LOAD FACTORS SHALL BE APPLIED ACCORDING TO THE FOLLOWING REQUIREMENTS:
   - IN LOAD COMBINATIONS WHERE ONE FORCE EFFECT DECREASES ANOTHER EFFECT, THE MINIMUM VALUE SHALL BE APPLIED TO THE LOAD REDUCING THE FORCE EFFECT.
   - THE LOAD FACTOR THAT PRODUCES THE MORE CRITICAL COMBINATION SHALL BE SELECTED. WHERE THE LOAD INCREASES THE STABILITY OR LOAD-CARING CAPACITY OF A COMPONENT, THE MINIMUM VALUE OF THE LOAD FACTOR FOR THAT LOAD SHALL ALSO BE INVESTIGATED.
   - ALTHOUGH THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS INDICATES THAT γ_p ARE THE LOAD FACTORS FOR PERMANENT LOADS, THE SHORING DESIGN CRITERIA SHOWN IN THESE CONTRACT DRAWINGS HAVE ASSUMED THAT THE γ_p LOAD FACTORS SHALL SIMILARLY BE APPLIED TO THE TEMPORARY LOAD COMBINATIONS.
4. SEE AASHTO BRIDGE DESIGN SPECIFICATIONS FOR DEFINITIONS OF LOADS DW, DC, EV, TG, TU, SH, AND WS SHOWN IN THE LOAD COMBINATIONS.
5. LOADS NOT EXPLICITLY DEFINED IN AASHTO HAVE THE FOLLOWING DEFINITIONS:

   WU: GROUNDWATER LOAD (HYDROSTATIC)
   EHS: SURCHARGE LOADING FROM EARTH PRESSURE OR BUILDING SURCHARGE
   EHAR: AT REST HORIZONTAL EARTH PRESSURE AT FINAL CONSTRUCTION STAGE
   LLP: ROOF LIVE LOAD
   EQT: FORCES GENERATED BY EARTHQUAKE EFFECTS ON TEMPORARY STRUCTURES

T:\13285 CS DP1\CN 1278\Sheet Files\ES - Excavation and Ground Support\ ES-011.dwg Kurnovskaya Thu May 02,2013 - 4:40 pm ES-011

NO.	DATE	DESCRIPTION	BY	CHECKED	APPROVED
0					

BORDER REVISED 03/25/2011

PB TELAMON
PB AMERICAS, INC.

DESIGNED O. ABRAHAMS
DRAWN O. KURNOVSKAYA
CHECKED O. ABRAHAMS
REVIEWED A. READ
RECOMMENDED A. READ
APPROVED N. EDWARDS
DATE

CITY AND COUNTY OF SAN FRANCISCO
MUNICIPAL TRANSPORTATION AGENCY
APPROVED
DIRECTOR OF TRANSPORTATION

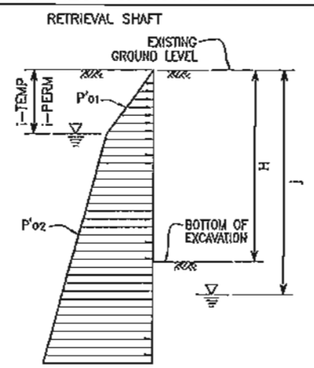
THIRD STREET LIGHT RAIL PROGRAM
PHASE 2 – CENTRAL SUBWAY
TEMPORARY TBM RETRIEVAL SHAFT

EXCAVATION AND GROUND SUPPORT
SHORING DESIGN CRITERIA
SHEET 1 OF 3

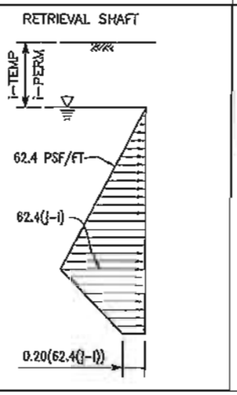
CONTRACT NO. 1278
SFCTA CONTRACT NO.
DRAWING NO. ES-011
SHEET NO.
REVISION 0

DESIGN LATERAL EARTH PRESSURE FOR SUPPORT OF EXCAVATIONS

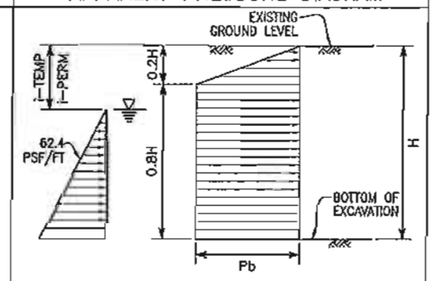
AVERAGE OF AT-REST & ACTIVE EARTH PRESSURES



NET GROUNDWATER PRESSURE



APPARENT PRESSURE DIAGRAM



AT-REST GRADIENTS & APPARENT PRESSURE MAGNITUDE

STRUCTURE	P'o1	P'o2	P'o3	I-TEMP	I-PERM	Pb	J
TBM RETRIEVAL SHAFT	48	24	N/A	8	5	20H	49

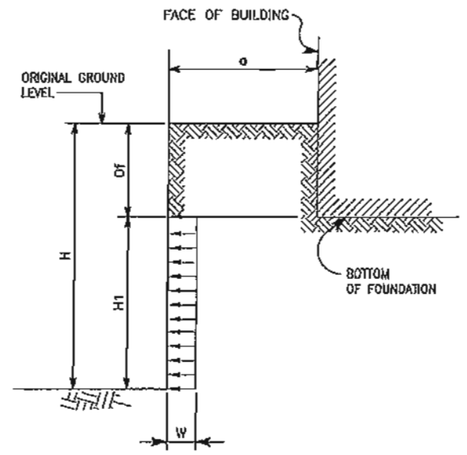
P'o1, P'o2, AND P'o3 ARE THE AVERAGE OF THE AT-REST AND ACTIVE PRESSURE GRADIENTS WITH UNITS OF PSF/FT PER FOOT OF HORIZONTAL WALL LENGTH.

Pb IS THE APPARENT PRESSURE IN UNITS OF PSF PER FOOT OF HORIZONTAL WALL LENGTH SHOWN IN THE APPARENT PRESSURE DIAGRAM ABOVE.

I IS THE VERTICAL DISTANCE FROM STREET GRADE TO WATER TABLE OUTSIDE SHORING WALLS IN UNITS OF FEET AND J IS THE VERTICAL DISTANCE FROM THE STREET GRADE TO THE WATER TABLE INSIDE THE SHORED EXCAVATION; CONTRACTOR SHALL VERIFY VALUES SHOWN AND NOTIFY THE ENGINEER OF ANY DISCREPANCIES DURING ALL STAGES OF CONSTRUCTION.

LATERAL PRESSURE DUE TO SURCHARGE LOADS

BUILDINGS



$W = 0.4N(1 - \frac{a}{1.5H1})$ FOR $0 \le \frac{a}{H1} \le 1.5$

$W = 0$ FOR $\frac{a}{H1} \ge 1.5$

WHERE:

N = NET BUILDING CONTACT PRESSURE (PSF)
$\approx q_f - 120D_f$

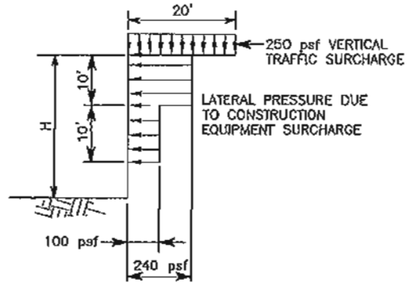
q_f = THE SUM OF ALL THE DEAD LOADS OF THE STRUCTURE AND LIVE LOADS ACTING THEREON (PSF).
(LIVE LOAD MAY BE REDUCED IN ACCORDANCE WITH UNIFORM BUILDING CODE, LATEST EDITION).

a, H1, D_f AS SHOWN (FT).

THIS LATERAL PRESSURE W APPLIES ONLY WHERE BUILDINGS ARE NOT UNDERPINNED.

TRAFFIC & CONSTRUCTION EQUIPMENT SURCHARGE SHOULD BE APPLIED TO HEIGHT D_f IN ALL CASES.

TRAFFIC & CONSTRUCTION SURCHARGE



GENERAL NOTES

1. REFER TO GEOTECHNICAL BASELINE REPORT DATED 01/21/11 BY PARSONS BRINCKERHOFF FOR INFORMATION NOT SHOWN.
2. THE LOADING SHOWN ON THIS DRAWING SHALL BE USED FOR TEMPORARY EARTH RETAINING STRUCTURES AT THE TBM LAUNCH BOX AND TBM RETRIEVAL SHAFT AND FOLLOW THE SEMTA STRUCTURAL DESIGN CRITERIA.
3. CONTRACTOR SHALL PROVIDE SUFFICIENT TOLERANCES FOR EXCAVATION SUPPORT SYSTEM SUCH THAT OUT-OF-PLUMBNESS OF THE EXCAVATION SUPPORT SYSTEM WILL NOT ENCROACH ON THE REQUIRED EXTERIOR STRUCTURAL WALL THICKNESS.
4. CHANGES IN SOIL DESIGN PASSIVE RESISTANCES SHOWN ARE AT CHANGES IN SOIL TYPES AND ARE SUBJECT TO VERIFICATION AND EFFECT ON DESIGN DURING CONSTRUCTION.
5. SHORING WALL AND BRACING SYSTEMS SHALL BE ANALYZED USING THE AT-REST SOIL AND HYDROSTATIC PRESSURE DIAGRAM WITH APPLICABLE SURCHARGES FOR ALL STAGES OF EXCAVATION, BRACING REMOVAL AND BRACING RELOCATION. THE SHORING WALL AND BRACING SYSTEM SHALL ALSO BE ANALYZED USING THE APPARENT PRESSURE DIAGRAM FOR ALL EXCAVATION STAGES WITH TWO OR MORE BRACING LEVELS IN-PLACE AS WELL AS ALL STAGES OF BRACING REMOVAL AND BRACING RELOCATION. NO REDUCTION IN SOIL PRESSURES COMPUTED FOR THE FULL DEPTH EXCAVATION CONDITION SHALL BE TAKEN DURING THE BRACING REMOVAL AND RELOCATION STAGES. THE DESIGN OF VARIOUS COMPONENTS OF THE SHORING SYSTEM SHALL BE BASED ON THE MOST-CRITICAL VALUES OBTAINED FROM THESE ANALYSES.
6. SOIL ARCHING SHALL NOT BE ASSUMED IN THE DESIGN OF SHORING MEMBERS.
7. SURCHARGE LOADS:

   LATERAL PRESSURE FROM SURCHARGE LOADS SHALL BE SUPERIMPOSED ON SOIL AND HYDROSTATIC LATERAL PRESSURES.

   ALL EXCAVATION SHORING SYSTEMS SHALL BE DESIGNED FOR NO LESS THAN THE TRAFFIC AND CONSTRUCTION SURCHARGE SHOWN ON THIS DRAWING.

   THIS LATERAL PRESSURE IS BASED ON AN ASSUMED CONSTRUCTION EQUIPMENT SURCHARGE OF 600 PSF. CONSTRUCTION EQUIPMENT SURCHARGE ON TEMPORARY DECKING SHALL NOT EXCEED 250 PSF. FOR MORE SEVERE CONSTRUCTION LOADING, SPECIAL ANALYSIS MUST BE MADE.

   SURCHARGE FROM OTHER SOURCES (E.G., EXISTING STRUCTURES) SHALL BE CONSIDERED IN THE DESIGN OF EXCAVATION SHORING SYSTEMS AS APPROPRIATE.

TOE EMBEDMENT NOTES

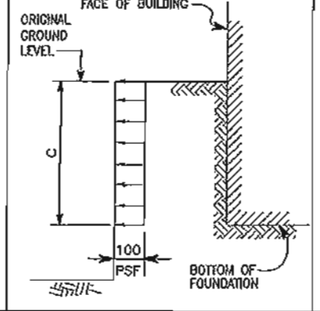
1. TOE EMBEDMENT SHALL BE ANALYZED USING THE AT-REST SOIL AND HYDROSTATIC PRESSURES WITH APPLICABLE SURCHARGES.
2. CANTILEVER SHORING WALLS SHALL BE ANALYZED IN ACCORDANCE WITH TENG'S SIMPLIFIED METHOD PER THE USS STEEL SHEET PILING DESIGN MANUAL.
3. FOR SHORING SYSTEMS WITH ONE LEVEL OF BRACING, PILE TOE EMBEDMENT SHALL BE COMPUTED BY BALANCING MOMENTS ABOUT THE BRACING ELEVATION.
4. FOR MULTI-LEVEL BRACED SHORING SYSTEMS, PILE TOE EMBEDMENT SHALL BE COMPUTED BY BALANCING MOMENTS RESULTING FROM LOADS ACTING BELOW THE LOWEST BRACING LEVEL.
5. IF SUFFICIENT PASSIVE RESISTANCE IS NOT AVAILABLE BELOW THE BOTTOM OF EXCAVATION TO BALANCE MOMENTS BELOW THE LOWEST BRACING LEVEL, THEN THE SHORING WALL MUST BE DESIGNED AS A CANTILEVER BELOW THE LOWEST BRACING LEVEL. CANTILEVER SHALL BE DESIGNED ASSUMING A MINIMUM WALL PENETRATION OF 5 FT. OR 0.2H, WHICHEVER IS GREATER, WHERE H IS THE DEPTH OF THE EXCAVATION.
6. FOR SINGLE AND MULTI-LEVEL BRACED SYSTEMS, THE MINIMUM PILE TOE PROVIDED SHALL BE 30% GREATER THAN THAT CALCULATED USING THE ABOVE METHODS.
7. FOR CANTILEVERED SYSTEMS, THE MINIMUM PILE TOE PROVIDED SHALL BE 40% GREATER THAN THAT CALCULATED USING THE ABOVE METHODS.
8. MINIMUM TOE EMBEDMENT SHALL BE THE GREATER OF THE PENETRATION FOUND BY THE ANALYSES OUTLINED ABOVE OR REQUIRED FOR GROUNDWATER CUT-OFF (SEE GEOTECHNICAL BASELINE REPORT).

BEARING CAPACITY AND MODULUS OF SUBGRADE REACTION

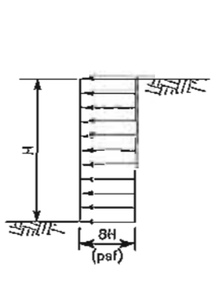
STRUCTURE	ALLOWABLE BEARING CAPACITY (PSF)	MODULUS OF SUBGRADE REACTION (PSI/INCH)
TBM RETRIEVAL SHAFT	6,000	200

LATERAL PRESSURE DUE TO EARTHQUAKE

BUILDING



SOIL OR ROCK



LEGEND

H	HEIGHT OF EXCAVATION (ft)
▽	GROUNDWATER TABLE
Pw	WATER PRESSURE (psf)
psf	POUND PER SQUARE FOOT
pcf	POUND PER CUBIC FOOT
I-TEMP	VERTICAL DISTANCE (ft) FROM STREET GRADE TO WATER TABLE OUTSIDE SHORING WALLS (TEMPORARY CONSTRUCTION CONDITION)
I-PERM	VERTICAL DISTANCE (ft) FROM STREET GRADE TO WATER TABLE OUTSIDE SHORING WALLS (PERMANENT LONG-TERM CONDITION).
J	VERTICAL DISTANCE (ft) FROM STREET GRADE TO WATER TABLE INSIDE SHORING WALLS (TEMPORARY CONSTRUCTION CONDITION)

DATE	DESCRIPTION	REV NO.	BY	CHECKED	APPROVED
		0			

BORDER REVISED 03/15/2011

PB TELAMON
PB AMERICAS, INC.

DESIGNED B. ABRAHAMS
DRAWN O. KURKOVSKAYA
CHECKED D. ABRAHAMS
QUALITY CHECKED J. READ
QUALITY CHECKED A. READ
APPROVED R. EDWARDS
DATE

CITY AND COUNTY OF SAN FRANCISCO
MUNICIPAL TRANSPORTATION AGENCY
APPROVED
DIRECTOR OF TRANSPORTATION

THIRD STREET LIGHT RAIL PROGRAM
PHASE 2 – CENTRAL SUBWAY
TEMPORARY TBM RETRIEVAL SHAFT

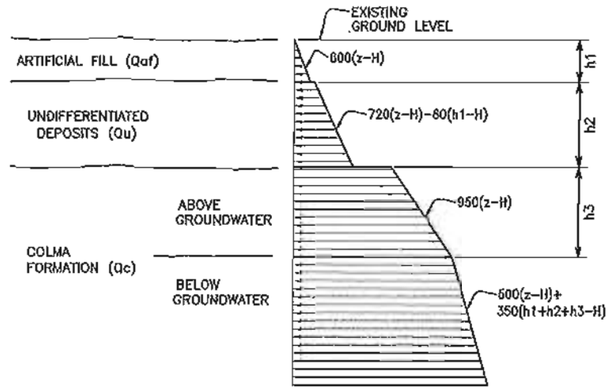
EXCAVATION AND GROUND SUPPORT
SHORING DESIGN CRITERIA
SHEET 2 OF 3

CONTRACT NO. 1278
DATA CONTROL NO.
DRAWING NO. ES-012
SHEET NO.
REVISION 0

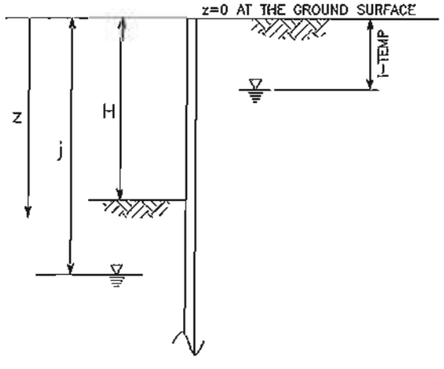
T:\13285 CS DP1\CN 1278\Sheet Files\ES - Excavation and Ground Support\ ES-012.dwg Kurkovskaya Thu May 02,2013 - 4:40 pm ES-012

DESIGN PASSIVE RESISTANCE FOR SUPPORT OF EXCAVATION SHORING

TBM RETRIEVAL SHAFT



TYPICAL SECTION



THICKNESSES OF SOIL LAYERS

STRUCTURE	h1	h2	h3
TBM RETRIEVAL SHAFT	10	20	19

NOTES:

VALUES OF h1, h2, AND h3 INDICATE THE INITIAL THICKNESS OF SOIL LAYERS PRIOR TO EXCAVATION. THESE VALUES MAY VARY DURING THE EXCAVATION, AND FOR FORMULAE THE SOIL PRESSURES SHOWN ARE ALSO VALID WHEN A LAYER IS FULLY EXCAVATED.

z, h1, h2, AND h3 IN UNITS OF FEET.

(h1-H) ≥ 0
(h1+h2-H) ≥ 0
(h1+h2+h3-H) >_0

} EXPRESSIONS USED IN THE EQUATIONS ABOVE MUST BE POSITIVE. SET TO ZERO IF EXPRESSION YIELDS A NEGATIVE RESULT.

GENERAL NOTES FOR ANALYSIS AND DESIGN OF TEMPORARY EXCAVATION SUPPORT STRUCTURES

1. DESIGN OF ALL TEMPORARY EXCAVATION SHORING SYSTEMS SHALL CONFORM TO THE "STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION TRENCHING AND SHORING MANAUL" (CTSM), LATEST EDITION, AND THE PROVISIONS OUTLINED BELOW. IN THE EVENT OF CONFLICT, THE PROVISIONS OUTLINED BELOW SHALL CONTROL.
2. DESIGN OF TEMPORARY EXCAVATION SUPPORT STRUCTURES SHALL BE TAKEN FROM THE FOLLOWING REFERENCES:

   STRUCTURAL STEEL – MANUAL OF STEEL CONSTRUCTION AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC), CURRENT EDITION EXCEPT THAT NO OVERSTRESS SHALL BE PERMITTED, U.O.N.

   REINFORCED CONCRETE – BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE, AMERICAN CONCRETE INSTITUTE, (ACI 318–CURRENT EDITION).

   TIMBER – CALIFORNIA BUILDING CODE (CBC), CURRENT EDITION
3. SUPPORT OF EXCAVATION STRUCTURES SHALL BE ANALYZED FOR ALL CONDITIONS THAT MIGHT OCCUR DURING THE VARIOUS STAGES OF CONSTRUCTION. AMONG OTHERS, THESE CONDITIONS INCLUDE: INSTALLATION, RELOCATION AND REMOVAL OF STRUTS; FLOODING AND DEWATERING OF EXCAVATION; CONCRETING OF EXCAVATION BOTTOM. THE LOADING CONDITIONS ON OPPOSITE SIDES OF THE EXCAVATION MAY NOT BE EQUAL DUE TO DIFFERENTIAL GROUND SURFACE AND/OR SUBGRADE ELEVATIONS, DIFFERENTIAL SURCHARGE LOADING, CURVED EXCAVATION ALIGNMENT, ETC. IN SUCH CASES, BOTH SIDES OF THE EXCAVATION MUST BE DESIGNED FOR AND BE COMPATIBLE WITH THE LARGER LOADING.
4. MEMBERS SUPPORTING VERTICAL LOADS AS WELL AS LATERAL PRESSURE SHALL BE DESIGNED FOR COMBINED AXIAL LOADS AND BENDING MOMENTS.
5. SOLDIER PILES, WHERE USED, MAY BE ASSUMED AS FULLY BRACED AGAINST BUCKLING IN THE PLANE OF LAGGING IF THE LAGGING IS PLACED AGAINST THE INSIDE FLANGES OF THE PILES (TOWARD THE EXCAVATION); OTHERWISE, BRACING MUST BE PROVIDED. IN THE PLANE PERPENDICULAR TO THE LAGGING, THE UNBRACED LENGTH SHALL BE TAKEN AS THE DISTANCE BETWEEN BRACED POINTS. SOLDIER PILES MAY BE ASSUMED TO BE FULLY BRACED IN BOTH PLANES AT OR BELOW THE BOTTOM OF THE EXCAVATION.
6. THE LOADS IN WALES AND STRUTS FOR MULTI-LEVEL BRACED SYSTEMS SHALL BE COMPUTED ASSUMING THE WALL IS CONTINUOUS. A FICTITIOUS SUPPORT AT OR BELOW SUBGRADE SHALL NOT BE ASSUMED FOR BRACING LOAD ANALYSIS USING THE AT-REST SOIL AND HYDROSTATIC PRESSURE DIAGRAM WITH APPLICABLE SURCHARGES.
7. STRUTS SHALL BE PRELOADED BY JACKING TO A MINIMUM OF 50% OF THEIR UNFACTORED DESIGN LOAD.
8. CONNECTIONS SHALL BE DESIGNED FOR GRADUAL UNLOADING OF STRUTS PRIOR TO THEIR REMOVAL. ALL COMPRESSION MEMBER CONNECTIONS, IN ADDITION TO BEING DESIGNED FOR THEIR COMPRESSIVE LOADS, SHALL BE DESIGNED FOR TENSION AND SHEAR EQUAL TO A MINIMUM OF 10% OF THE COMPRESSIVE LOAD, UNLESS THE ACTUAL TENSION AND SHEAR ARE GREATER.
9. PROVISIONS SHALL BE MADE TO PROTECT STRUTS AGAINST EXCESSIVE DEFORMATIONS AND STRESS VARIATIONS INDUCED BY TEMPERATURE FLUCTUATIONS.
10. AVAILABLE GEOTECHNICAL DATA SHALL BE USED IN CONJUNCTION WITH INDICATED CRITERIA IN THE SELECTION, ANALYSIS AND DESIGN OF EARTH SUPPORT SYSTEMS.
11. THE CONTRACTOR SHALL MAKE ITS OWN ASSESSMENT OF EXISTING CONDITIONS, INCLUDING ADJACENT PROPERTY, WHETHER PRIVATE OR PUBLIC, AND OF THE POSSIBLE EFFECTS OF ITS PROPOSED TEMPORARY WORK, CONSTRUCTION METHODS, AND SEQUENCING, AND SHALL SELECT AND DESIGN SUCH SUPPORT SYSTEMS, CONSTRUCTION METHODS AND DETAILS AS WILL ASSURE SAFETY TO THE PUBLIC, ADJACENT PROPERTY AND OF THE COMPLETED WORK.
12. EXCAVATION SUPPORT STRUCTURES FOR SUBWAY CONSTRUCTION SHALL BE INSTALLED WITH ADEQUATE CLEARANCE BETWEEN THE INSIDE FACE OF THE EXCAVATION SUPPORT AND THE THEORETICAL OUTSIDE FACE OF THE SUBWAY WALL OR BASE SLAB, TO ACCOMMODATE INSTALLATION TOLERANCE AND THE WATERPROOFING.

NO.	DATE	DESCRIPTION	BY	CHECKED	APPROVED
0					

BORDER REVISED 03/25/2013

PB TELAMON
PB AMERICAS, INC.

DESIGNED D. ABRAHAMS
DRAWN O. KURKOVSKAYA
CHECKED D. ABRAHAMS
RECEIVED A. READ
ACCOUNTED A. READ
APPROVED R. EDWARDS
DATE

CITY AND COUNTY OF SAN FRANCISCO
MUNICIPAL TRANSPORTATION AGENCY
APPROVED
DIRECTOR OF TRANSPORTATION

THIRD STREET LIGHT RAIL PROGRAM
PHASE 2 – CENTRAL SUBWAY
TEMPORARY TBM RETRIEVAL SHAFT

EXCAVATION AND GROUND SUPPORT
SHORING DESIGN CRITERIA
SHEET 3 OF 3

CONTRACT NO. 1278
SFMTA COUNCIL NO.
DRAWING NO. ES–013
SHEET NO.
REVISION 0

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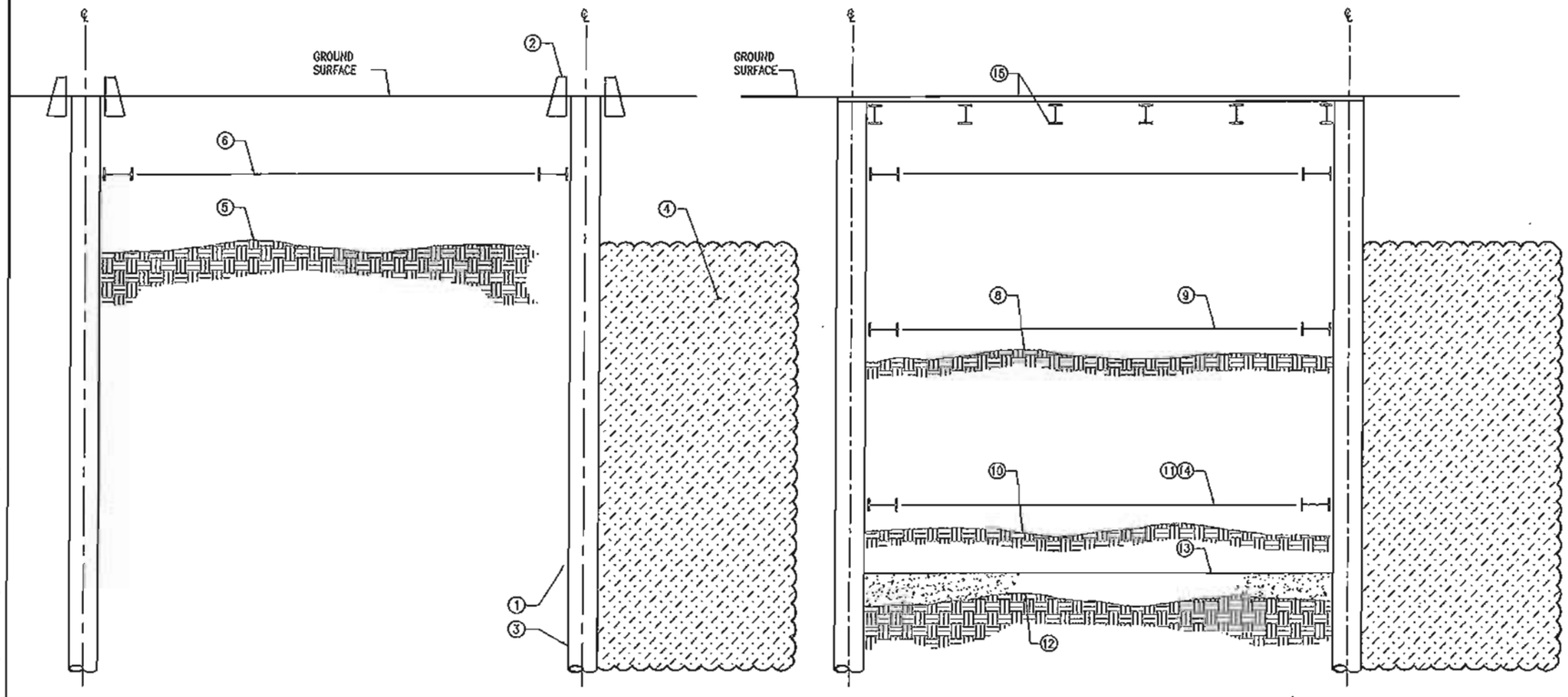


NOTES:

1. FOR GENERAL STRUCTURAL NOTES, SEE DRAWING ST-001.
2. MINIMUM STAR PACKING LENGTH SHALL BE BASED ON WORST CASE INWARD PILE INSTALLATION.
3. CONNECTION DETAILS SHOWN FOR SUGGESTED CONCEPTUAL DESIGN ONLY. CONNECTIONS SHALL BE DESIGNED BY FABRICATOR'S ENGINEER BASED ON LOADS PROVIDED.
4. STYROFOAM OR EQUIVALENT SHALL BE USED DURING PILE INSTALLATION TO FACILITATE BUND BOLTS INSTALLATION.

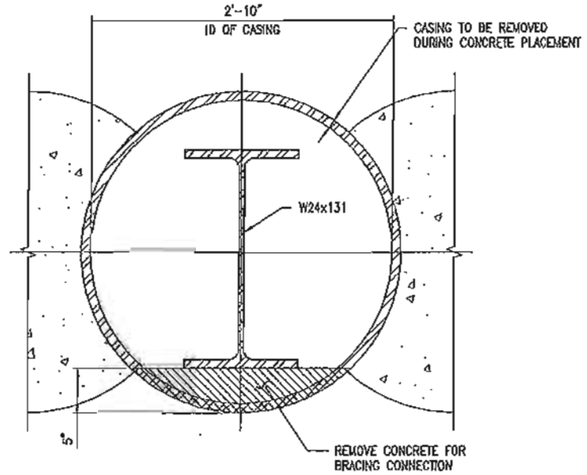
CONSTRUCTION SEQUENCE

STAGE 1

1. INSTALL COMPENSATION GROUTING PIPES, AND INSTRUMENTATION.
2. CONSTRUCT GUIDEWALLS.
3. INSTALL PILES, REPEAT (2) AND (3) UNTIL PILE CONSTRUCTION IS COMPLETE ON ALL SIDES.
4. INSTALL JET GROUT.
5. EXCAVATE TO BELOW BRACING LEVEL 1, EXPOSE PILE STEEL.
6. INSTALL BRACING LEVEL 1.
7. START DEWATERING.

STAGE 2

8. EXCAVATE TO BELOW BRACING LEVEL 2.
9. INSTALL BRACING LEVEL 2.
10. EXCAVATE TO BELOW BRACING LEVEL 2.
11. INSTALL BRACING LEVEL 3.
12. EXCAVATE TO BOTTOM.
13. POUR BASE SLAB.
14. REMOVE BRACING LEVEL 3.
15. INSTALL ROOF DECK AND RESTORE SITE.



PILE DETAIL
SCALE: 1 1/2"=1'-0"

6" 0 6" 12" 18"
SCALE: 1-1/2"= 1'-0"

80' 0 80' 160'
SCALE = 1"=80'

DATE	DESCRIPTION	NO.	BY	CHECKED	APPROVED
		0			

BORDER REVISED 03/25/2011

PB AMERICAS, INC.

DESIGNED B. ABRAHAMS
DRAWN E. LLORICO
CHECKED B. ABRAHAMS
QUALITY CONTROL A. REID
PROJECT MANAGER A. REID
APPROVED R. EDWARDS
DATE

CITY AND COUNTY OF SAN FRANCISCO
MUNICIPAL TRANSPORTATION AGENCY

APPROVED

DIRECTOR OF TRANSPORTATION

THIRD STREET LIGHT RAIL PROGRAM
PHASE 2 – CENTRAL SUBWAY
TEMPORARY TBM RETRIEVAL SHAFT

EXCAVATION AND GROUND SUPPORT
TBM RETRIEVAL
ASSUMED CONSTRUCTION SEQUENCE

CONTRACT NO. 1278
SFMTA CONTRACT NO.
DRAWING NO. ES-101
SHEET NO.
REVISION 0

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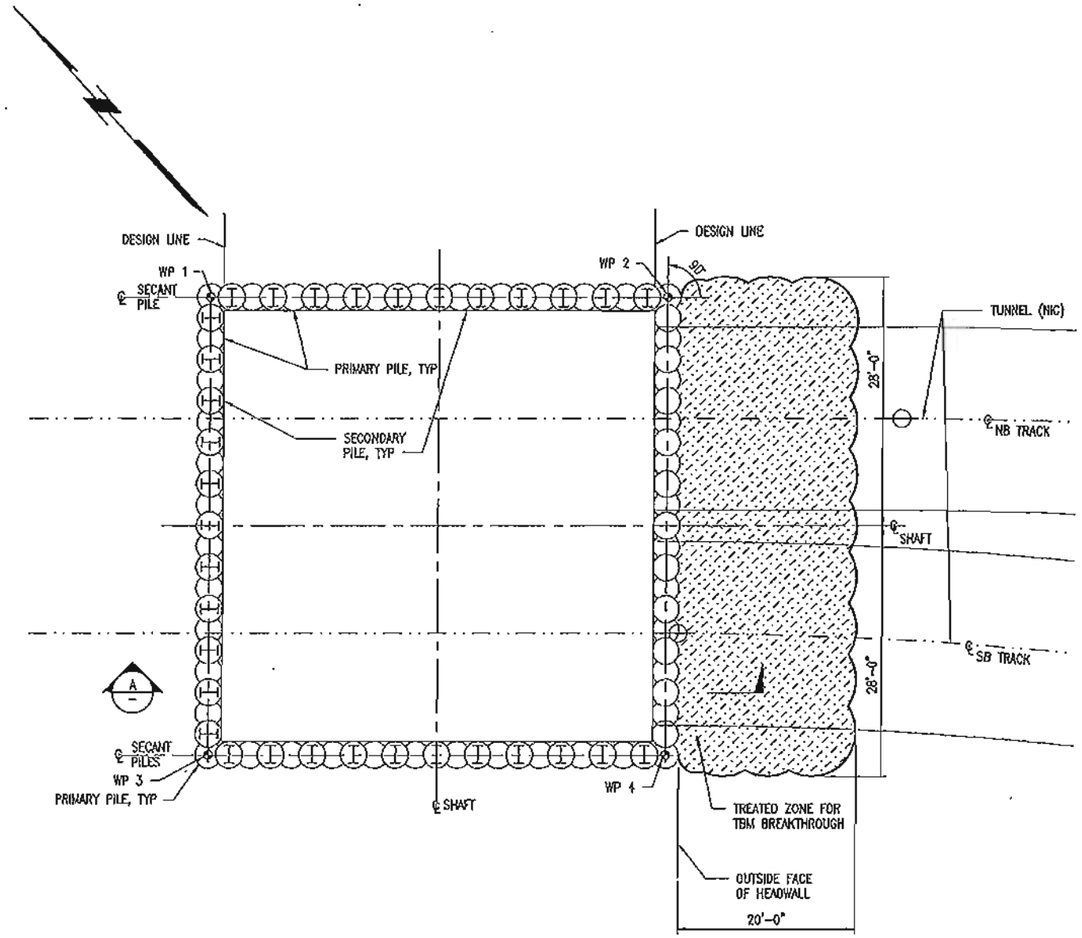
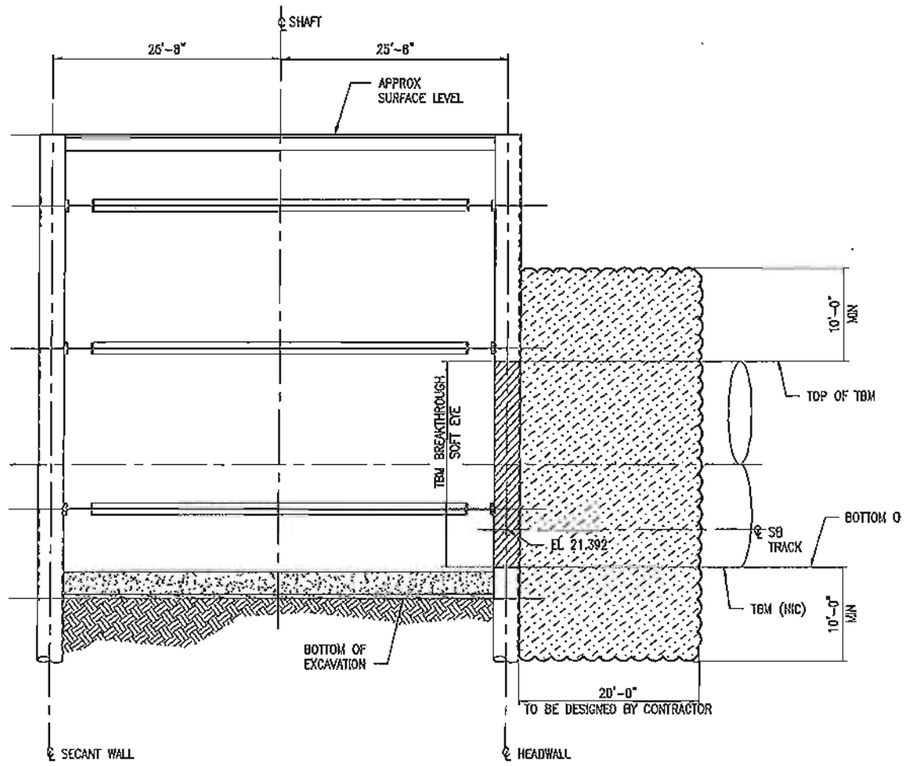
NOTES:

1. FOR GENERAL STRUCTURAL NOTES, SEE DRAWING ST-001.



PLAN



A ES-201 **SECTION**

4' 0 4' 8' 12' 16' 20'

SCALE: 1/8"=1'-0"

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NO.	DATE	DESCRIPTION	REV. NO.	BY	CHECKED	APPROVED
0						

ERROR REVISED 07/25/2011

PB TELAMON

PB AMERICAS, INC.

DESIGNED: M. ABRAHAMS
DRAWN: O. KURNOVSKAYA
CHECKED: S. XU
REVIEWED: A. READ
RECOMMENDED: M. FOWLER
APPROVED: R. EDWARDS
DATE:

CITY AND COUNTY OF SAN FRANCISCO
MUNICIPAL TRANSPORTATION AGENCY

APPROVED

DIRECTOR OF TRANSPORTATION

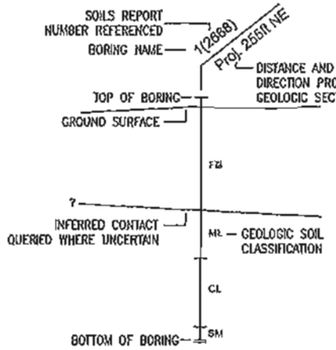
THIRD STREET LIGHT RAIL PROGRAM
PHASE 2 – CENTRAL SUBWAY
TEMPORARY TBM RETRIEVAL SHAFT

EXCAVATION AND GROUND SUPPORT
RETRIEVAL SHAFT LAYOUT
GROUND TREATMENT

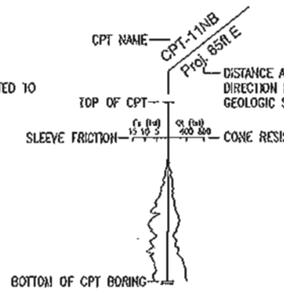
CONTRACT NO. 1278
SFRTA CONTRACT NO.
DRAWING NO. ES-201
SHEET NO.
REVISION 0

LEGEND

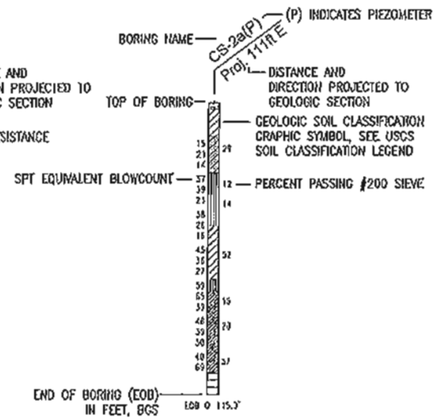
BORING LOG - OTHERS



CPT LOG



BORING LOG



SYMBOLS

TOP OF BEDROCK

3/20/08 — STABILIZED GROUNDWATER LEVEL OBSERVED AND DATE MEASURED

NOTES:

1. ELEVATION DATUM -- CCSF
2. CONTROL LINE STATIONING USED FOR GEOLOGICAL PROFILE
3. THE LOGS OF BORINGS AND RELATED INFORMATION SHOWN ON THE SECTIONS DEPICT SUBSURFACE CONDITIONS ONLY AT THOSE SPECIFIC LOCATIONS AND AT THE PARTICULAR TIME THE EXPLORATION WORK WAS PERFORMED. THE PASSAGE OF TIME MAY RESULT IN A CHANGE IN SOIL AND GROUNDWATER CONDITIONS AT THESE LOCATIONS. THE GEOLOGIC CONDITIONS AND CONTACTS SHOWN BETWEEN BORINGS ARE INTERPRETATIONS, BASED ON AVAILABLE INFORMATION AND MADE IN ACCORDANCE WITH ACCEPTED GEOLOGICAL PRACTICES AND PRINCIPLES. THE ACTUAL CONFIGURATION OF SUBSURFACE GEOLOGIC UNITS AND MATERIALS MAY DIFFER FROM THESE INTERPRETATIONS.
4. GEOLOGIC UNITS QUERIED WHERE EXISTENCE UNCERTAIN.
5. NO WARRANTY AS TO THE ACCURACY OF THE TOPOGRAPHIC SURVEY USED AS THE BASIS FOR THESE DRAWINGS IS GIVEN OR IMPLIED. TOPOGRAPHIC SURVEY FEATURES AND LOT BOUNDARIES ARE APPROXIMATE AND DO NOT REFLECT THE ACTUAL OR LEGAL POSITION OF ANY EXISTING STRUCTURE SHOWN. BUILDING LINES, WHERE SHOWN, DO NOT SHOW ALL BUILDING INFORMATION SUCH AS CANOPIES, OVERHANG PROJECTIONS OR ACCESS.

USCS SOIL CLASSIFICATION

CH: High Plasticity Clay	CL: Low Plasticity Clay	GP: Poorly Graded Gravel	MH: High Plasticity Silt	SP-SC: Poorly Graded Sand with Clay
CL-ML: Silty Clay	GC: Clayey Gravel	GM: Silty Gravel	GP-GC: Poorly Graded Gravel with Clay	GP-GM: Poorly Graded Gravel with Silt
GW: Well Graded Gravel	GW-GC: Well Graded Gravel with Clay	GW-GM: Well Graded Gravel with Silt	ML: Low Plasticity Silt	OH: High Plasticity Organic Silt or Clay
OL: Low Plasticity Organic Silt or Clay	SC: Clayey Sand	SM: Silty Sand	SP: Poorly Graded Sand	SP-SM: Poorly Graded Sand with Silt
SW: Well Graded Sand	SW-SC: Well Graded Sand with Clay	SW-SM: Well Graded Sand with Silt	SC-SM: Clayey Sand with Silty Sand	COBBLES
BEDROCK: SS = Sandstone; SH = Shale; SLT = Siltstone; M= Melange; MS = Meta-Sandstone			ASPHALT	CONCRETE

GEOLOGIC UNITS

SURFICIAL DEPOSITS

QUATERNARY

Qaf — Artificial Fill (Holocene): Generally consists of very loose to medium dense Sand (SP), Silty Sand (SM), and medium stiff Sandy Clay (CL); locally with miscellaneous debris (bricks, wood, metal, concrete, glass, etc.). Much of this deposit originates from the underlying Dune Sand (Qd).

Qd — Dune Sand: Generally consists of loose to medium dense poorly-graded fine to medium grained eolian Sand (SP).

Qm — Bay Mud/Marsh Deposit: Generally consists of very soft to soft, dark greenish gray to black organic-rich Clay and Sandy Clay (CL to CH).

Qu — Undifferentiated Deposits: Generally consists of medium stiff to stiff brown Sandy Clay (CL) and medium dense to dense brown Clayey Sand (SC). May comprise colluvium, alluvium, or Colma Formation.

Qc — Colma Formation – Generally consists of well-bedded dense to very dense Sand (SP to SM) with interbedded stiff to very stiff Clay and Sandy Clay (CL). Where observed in Project borings, beds range from 1 inch to greater than 2 feet thick. Color is typically brown to yellowish brown, with red, orange, and gray mottling.

Qo — Undifferentiated Old Bay Deposits: Generally consists of interbedded dense to very dense Sand (SP) and Silty Sand (SM) and stiff to very stiff Clay (CL); locally contains lenses of shell fragments. This unit also contains Older Bay Clay and Mud, which typically are stiff Clays and Silts that are gray to greenish gray in color.

Qcol — Colluvium: generally consists of very stiff brown to gray Sandy Clay (CL) to Clayey Gravel (GC). Appears to be decomposed bedrock/residual soil.

FRANCISCAN COMPLEX BEDROCK

Where observed in project borings, this unit is highly variable in composition, hardness, and strength, ranging from soft to hard and from friable to moderately strong. Observed fracture spacing varies from very close (< 0.1 ft) to close (0.1 to 0.3 ft) and, in general, the severity of weathering decreases slightly with depth.

CRETACEOUS AND JURASSIC

KJf — FRANCISCAN COMPLEX, UNDIFFERENTIATED; Includes sandstone, meta-sandstone, shale, siltstone, serpentine, and melange.

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BORDER REVISED 03/22/2011

DATE	DESCRIPTION	NO.	BY	CHECKED	APPROVED

PB TELAMON

PB AMERICAS, INC.

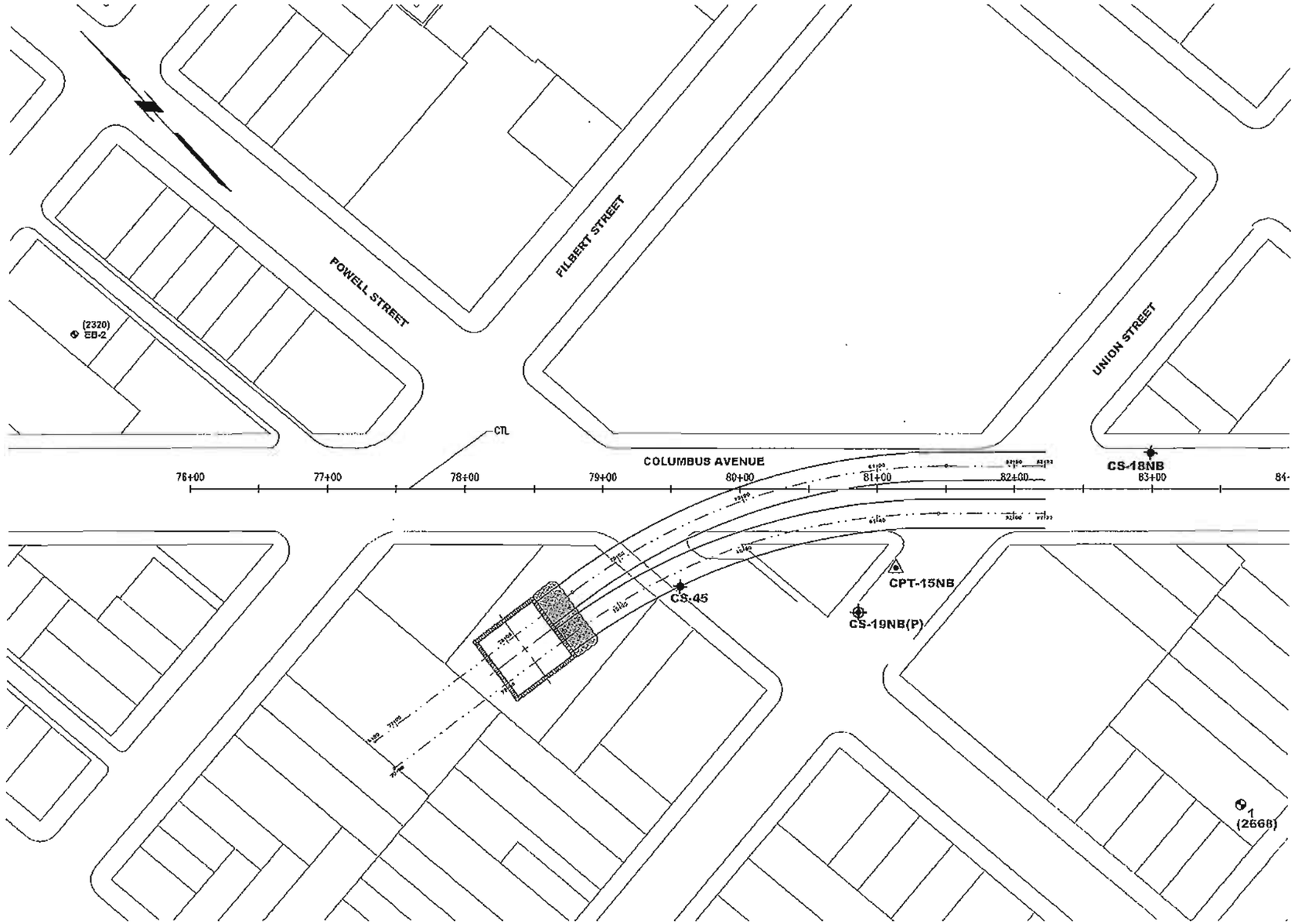
DESIGNED
DRAWN
CHECKED
REVIEWED
APPROVED
DATE

CITY AND COUNTY OF SAN FRANCISCO
MUNICIPAL TRANSPORTATION AGENCY
APPROVED
DIRECTOR OF TRANSPORTATION

THIRD STREET LIGHT RAIL PROGRAM
PHASE 2 – CENTRAL SUBWAY
TEMPORARY TBM RETRIEVAL SHAFT

GEOTECHNICAL
GENERAL NOTES
LEGEND AND ABBREVIATIONS

CONTRACT NO. 1278
SFDPW CONTRACT NO.
DRAWING NO. GT-001
SHEET NO.
REVISION 0



LEGEND

- BORING FOR CENTRAL SUBWAY
- CPT FOR CENTRAL SUBWAY
- PIEZOMETER FOR CENTRAL SUBWAY
- BORING OR TEST PIT
- BORING WITH TOP OF BEDROCK ELEVATION (USGS, 1861)

NOTES:

1. BASE MAP DATA AND TUNNEL ALIGNMENT PROVIDED BY SFMTA.
2. BORINGS/TEST PITS BY OTHERS INCLUDE UNIQUE I.D. (IN PARENTHESES). THESE LOGS ARE CONTAINED IN PROJECT FILES.
3. ALL BORINGS/PIEZOMETERS/TEST PIT LOCATIONS ARE APPROXIMATE.

40' 0 40' 80'
SCALE = 1"=40'

DATE	DESCRIPTION	BY	CHECKED	APPROVED

PB TELAMON
PB AMERICAS, INC.

DESIGNED K. TUNG
DRAWN O. KURKOVSKAYA
CHECKED S. KIM
REVIEWED D. ABRAHAMS
RECOMMENDED A. READ
APPROVED E. EDWARDS
DATE

CITY AND COUNTY OF SAN FRANCISCO
MUNICIPAL TRANSPORTATION AGENCY
APPROVED
DIRECTOR OF TRANSPORTATION

THIRD STREET LIGHT RAIL PROGRAM
PHASE 2 – CENTRAL SUBWAY
TEMPORARY TBM RETRIEVAL SHAFT

GEOTECHNICAL
EXPLORATION LOCATIONS
CTL 76+80 TO 82+22

CONTRACT NO. 1278
SFMTA CONTRACT NO.
DRAWING NO. GT-101
SHEET NO.
REVISION 0

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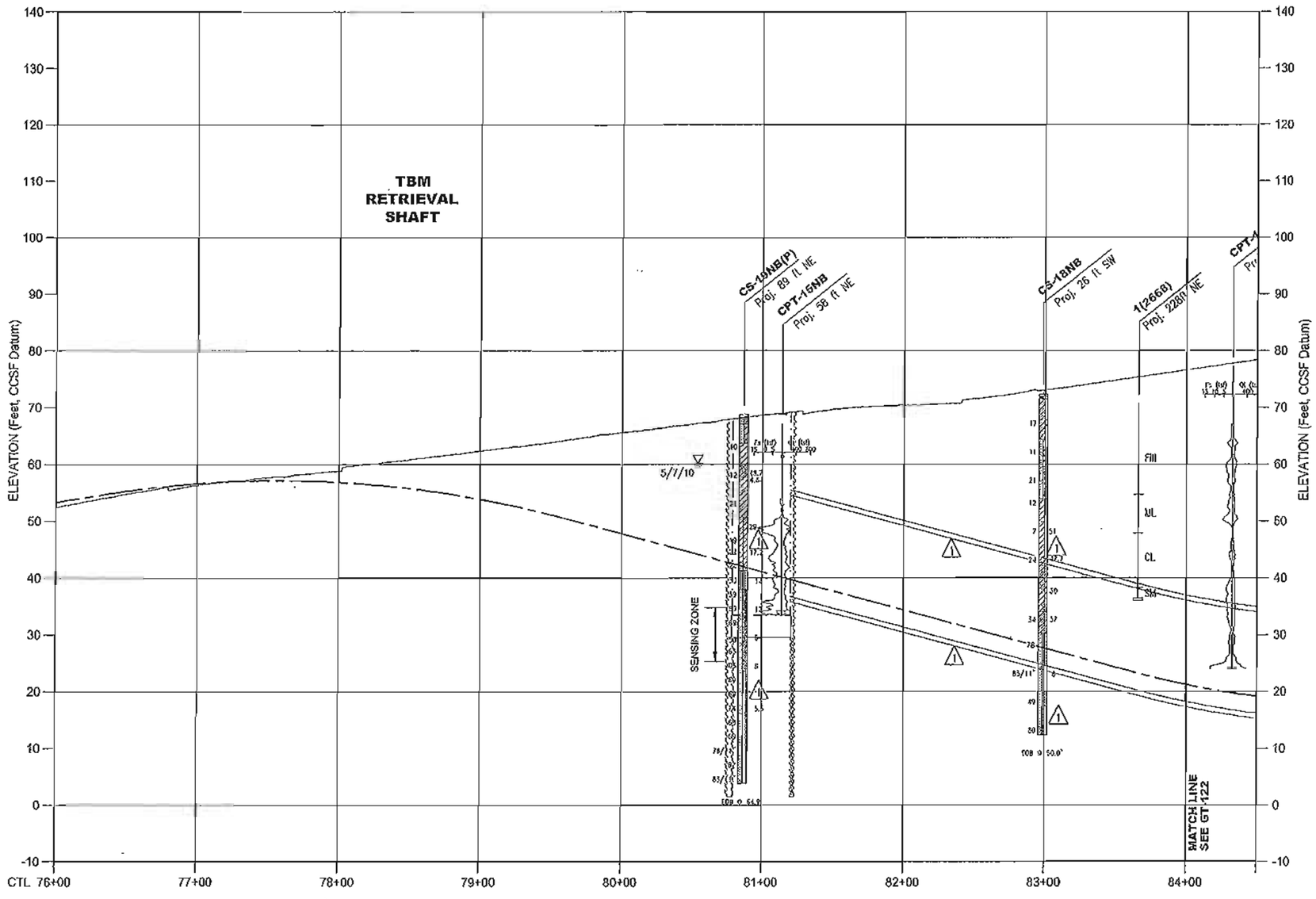

NOTE:

1. FOR BORING PLAN LOCATIONS REFER TO DRAWING EXGT-101.

10' 0 10' 20'
SCALE = 1"=10'
VERTICAL

40' 0 40' 80'
SCALE = 1"=40'
HORIZONTAL

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DATE	DESCRIPTION	FOR INT.	BY	CHECKED	APPROVED

LOWER REVISED 03/28/2011

PB TELAMON

PB AMERICAS, INC.

DESIGNED
DRAWN
CHECKED
REVIEWED
RECOMMENDED
APPROVED
DATE

CITY AND COUNTY OF SAN FRANCISCO
MUNICIPAL TRANSPORTATION AGENCY
APPROVED
DIRECTOR OF TRANSPORTATION

THIRD STREET LIGHT RAIL PROGRAM
PHASE 2 – CENTRAL SUBWAY
TEMPORARY TBM RETRIEVAL SHAFT

GEOTECHNICAL
GENERAL NOTES
LEGEND AND ABBREVIATIONS

CONTRACT NO. 1278
SFMTA CONTROL NO.
DRAWING NO. GT-121
SHEET NO.
REVISION 0

GENERAL NOTES

CODES AND STANDARDS
AMERICAN CONCRETE INSTITUTE, ACI 318 BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE

CALIFORNIA BUILDING CODE, CBC TITLE 24

AMERICAN INSTITUTE OF STEEL (AISC) SPECIFICATION FOR STRUCTURAL STEEL BUILDINGS

AMERICAN WELDING SOCIETY (AWS) D1.1 STRUCTURAL WELDING CODE – STEEL

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

AMERICAN SOCIETY OF CIVIL ENGINEERS, (ASCE) MINIMUM DESIGN LOADS FOR BUILDINGS AND OTHER STRUCTURES

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO) LRFD BRIDGE DESIGN SPECIFICATIONS

REINFORCED CONCRETE

PRIMARY PILE CAST-IN-PLACE CONCRETE:	f'c = 3,000 PSI
SECONDARY PILE CAST-IN-PLACE CONCRETE:	f'c = 5,000 PSI
MUD SLAB:	f'c = 2,000 PSI
BASE SLAB:	f'c = 3,000 PSI
REINFORCING STEEL (A706 AND GFRP):	fy = 60,000 PSI
NON-SHRINK GROUT ASTM 1107	f'c = 6,000 PSI

GENERAL
THE SECANT PILE SHAFT DESIGNED HEREIN WILL BE CONSTRUCTED FOR THE RETRIEVAL OF THE CENTRAL SUBWAY 1252 TUNNEL BORING MACHINE. THE SHAFT SHALL BE CONSTRUCTED AT 1731-1741 POWELL STREET PER THE SFMTA'S AGREEMENT WITH THE CURRENT PROPERTY OWNER.

STRUTS SHALL BE PRELOADED BY JACKING TO A MINIMUM OF 50% OF THEIR UNFACTORED DESIGN LOAD. HOWEVER CONSIDERATION MUST BE MADE AT SHALLOW DEPTHS ADJACENT TO EXISTING STRUCTURES SUCH THAT PRE LOADING WILL NOT DAMAGE OR ADVERSELY AFFECT SUCH STRUCTURES.

CONNECTIONS SHALL BE DESIGNED FOR GRADUAL UNLOADING OF STRUTS PRIOR TO THEIR REMOVAL. ALL COMPRESSION CONNECTIONS, IN ADDITIONS TO BEING DESIGN FOR THEIR COMPRESSIVE LOADS SHALL BE DESIGNED FOR TENSION AND SHEAR EQUAL TO A MINIMUM OF 10% OF THE COMPRESSIVE LOAD, UNLESS ACTUAL TENSION AND SHEAR ARE GREATER.

DESIGN BASIS

ROOF LIVE LOAD:	20 PSF OF 300 LB CONCENTRATED LOAD
HYDROSTATIC PRESSURE: (WATER TABLE AT SURFACE LEVEL)	SEE SHORING CRITERIA ES-DRAWINGS
SOIL:	

CONSTRUCTION AREA
WORK AREA SHALL BE FENCED AND BARRICADED FROM PUBLIC ACCESS. CONSTRUCTION AREA TRAFFIC RESTRICTION SHALL CONFORM TO SPECIFICATION.

LEGEND

&	AND
∠	ANGLE SECTION
@	AT
#	BAR SIZE
C OR MC	CHANNEL SECTION
℄	CONTROL POINT
ø	DIAMETER
=	EQUAL TO
>	GREATER THAN
≥	GREATER THAN OR EQUAL TO
<	LESS THAN
≤	LESS THAN OR EQUAL TO
%	PERCENTAGE
	WORK POINT
W	WIDE FLANGE SECTION
	GROUND WATER TABLE

	BACKFILL PERMANENT
	BACKFILL TEMPORARY
	CONCRETE IN SECTION
	DEMOLITION – STRUCTURAL
	GROUND LINE
	JET GROUT
	JET GROUT AT PILE CONTACTS
	STEEL IN SECTION

C. STRUCTURAL STEEL FRAMING

IN ADDITION TO THE CONTRACT DRAWINGS AND SPECIFICATIONS, THE FOLLOWING REQUIREMENTS RELATE TO THE DESIGN, FABRICATION AND ERECTION OF STRUCTURAL STEEL FOR THIS CONTRACT:

1. THE BASIC CODE FOR DESIGN AND FABRICATION OF STRUCTURAL STEEL IS THE "CODE OF STANDARD PRACTICE FOR STEEL BUILDINGS AND BRIDGES", AMERICAN INSTITUTE OF STEEL CONSTRUCTION, APRIL 14, 2010. UNDER SECTION 3. "DESIGN DRAWINGS AND SPECIFICATION, ARTICLE 3.1.2.", THE OPTION SPECIFIED FOR THIS CONTRACT IS: (OPTION 3) IN THE STRUCTURAL DESIGN DRAWINGS OR SPECIFICATIONS, THE CONNECTIONS SHALL BE DESIGNATED TO BE DESIGNED BY A LICENSED PROFESSIONAL ENGINEER WORKING FOR THE CONTRACTOR'S FABRICATOR. IN ADDITION, THE PROFESSIONAL ENGINEER SHALL BE LICENSED IN THE STATE OF CALIFORNIA.

   THE DESIGN CRITERIA FOR CONNECTION LOAD TABLES PROVIDED BY THE CONTRACT DRAWINGS IS LOAD AND RESISTANT FACTOR DESIGN (LRFD). LOAD TABLES ARE PROVIDED FOR SHEAR CONNECTIONS, MOMENT CONNECTIONS, AND BRACING CONNECTIONS. THE CONNECTIONS SHOWN ON THE DRAWINGS THAT HAVE BEEN PROVIDED WITH LOAD TABLES SHALL BE CONSIDERED SCHEMATIC FOR ONE OF THE ABOVE THREE TYPICAL CONNECTION TYPES. AT LEAST 90 DAYS PRIOR TO SUBMITTAL OF SHOP AND ERECTIONS DRAWINGS, THE CONTRACTOR SHALL PROVIDE DOCUMENTATION SUBSTANTIATING THE CONNECTION INFORMATION IN THE FORM OF SAMPLE CALCULATIONS FOR TYPICAL CONNECTIONS.

   SHOP AND ERECTION DRAWINGS SHALL BE ACCOMPANIED BY FINAL SUBSTANTIATING CONNECTION INFORMATION IN THE FORM OF CALCULATIONS FOR ALL OPTION 3 CONNECTIONS AND A LETTER STATING THAT THE SHOP AND ERECTION DRAWINGS INCORPORATE OPTION 3 DESIGN REQUIREMENTS. THE CONNECTION DESIGN INFORMATION ON THE SHOP AND ERECTIONS DRAWINGS SHALL BE SIGNED AND SEALED BY THE LICENSED PROFESSIONAL ENGINEER IN RESPONSIBLE CHARGE OF THE CONNECTION DESIGNS. PROVIDE CROSS REFERENCING INFORMATION ON THE DRAWINGS TO DESIGN INFORMATION FOR THE PURPOSE OF SFMTA REVIEW.

2. FIELD CONNECTIONS SHALL BE BOLTED OR WELDED USING FILLET ONLY WELDS UNLESS OTHERWISE ALLOWED BY THE SFMTA'S ENGINEER OF RECORD;
3. WHERE CONNECTIONS DEFINE THE SIZE AND NUMBER OF BOLTS OR SIZE AND LENGTH OF WELDS, NO SEALED DESIGN BY THE FABRICATOR IS REQUIRED;
4. MOMENT CONNECTIONS BETWEEN BEAMS AND COLUMNS WILL BE PREQUALIFIED CONNECTIONS FOR SEISMIC APPLICATION IN ACCORDANCE WITH ANSI/AISC 358-05, INCLUDING SUBSEQUENT SUPPLEMENTS IN FORCE AT THE TIME OF THE AWARD OF THE CONTRACT;
5. MOMENT CONNECTIONS BETWEEN TWO END TO END BEAMS OR COLUMNS WILL BE FULL STRENGTH MOMENT AND SHEAR CONNECTIONS DESIGNED FOR THE STRENGTH OF THE SMALLER SECTION;
6. WIDE FLANGE SHAPES — ASTM A992, GRADE 50, OR ASTM A913, GRADE 70 AS INDICATED;
   CHANNELS — ASTM A36, ASTM A572, GRADE 50, ASTM A514, GRADE B, OR A516, AS INDICATED;
   PLATE — ASTM A572, GRADE 50, WHERE INDICATED, OR ASTM A36, TYPICAL UNLESS NOTED OTHERWISE;
   PIPE STRUTS AND PILES — API 5L GRADES X50 AND X70, AAS INDICATED;
   HIGH STRENGTH BOLTS — ASTM A325 OR ASTM A490;
   ANCHOR BOLTS — ASTM F1554, GRADE 36 UNLESS NOTED OTHERWISE
   HEADED SHEAR STUD — ASTM A108, MIN. YIELD POINT=50 KSI;
   ANCHORS — MIN. TENSILE STRENGTH=60 KSI;
   STEEL DECKING — ASTM A653, SS GRADE 80, WITH G60 GALVANIZED COATING;
   THREADED RODS — ASTM A307, GRADE A;
   FORGED HARDWARE — AISI C-1035, CARBON STEEL

STEEL WORK SHALL CONFORM TO ALL REQUIREMENTS OF AISC, CODE OF STANDARD PRACTICE FOR STEEL BUILDINGS AND BRIDGES, LATEST EDITION.

ABBREVIATIONS

ADD'L	ADDITIONAL
BOT.	BOTTOM
C/L	CENTERLINE
C.I.P.	CAST IN PLACE
CLR.	CLEAR
CONC.	CONCRETE
CONN.	CONNECTION
CONT.	CONTINUOUS
CJ	CONSTRUCTION JOINT
DIAG.	DIAGONAL
Ø	DIAMETER
DIA.	DIAMETER
DN	DOWN
DWG	DRAWING
EA	EACH
EL.	ELEVATION
EQ	EQUAL
FIN	FINISH
FT	FEET
FTG	FOOTING
GFRP	GLASS FIBER REINFORCED POLYMER
HORIZ.	HORIZONTAL
IN.	INCH
LB.	POUND
LIN.	LINEAR
LF	LINEAR FEET
MAX.	MAXIMUM
MIN.	MINIMUM
NIC	NOT IN CONTRACT
PCF	POUNDS PER CUBIC FOOT
PL	PLATE
PROJ.	PROJECT
PSF	POUNDS PER SQUARE FOOT
PSI	POUNDS PER SQUARE INCH
REINF.	REINFORCING
SECT	SECTION
SPA.	SPACES
SPECS.	SPECIFICATIONS
SIM.	SIMILAR
STA.	STATION
STD	STANDARD
T&B	TOP AND BOTTOM
T.O.C.	TOP OF CONCRETE
TYP	TYPICAL
UOH	UNLESS OTHERWISE NOTED
VERT.	VERTICAL
VIF	VERIFY IN FIELD

T:\13285 CS DP\CN 1278\Sheet Files\ST - Structural\ ST-001.dwg Kurnovskaya Thu May 02,2013 - 4:47 pm ST-001

DATE	DESCRIPTION	MOD NO.	BY	CHECKED	APPROVED

BORDER REVISED 03/25/2011

PB TELAMON
PB AMERICAS, INC.

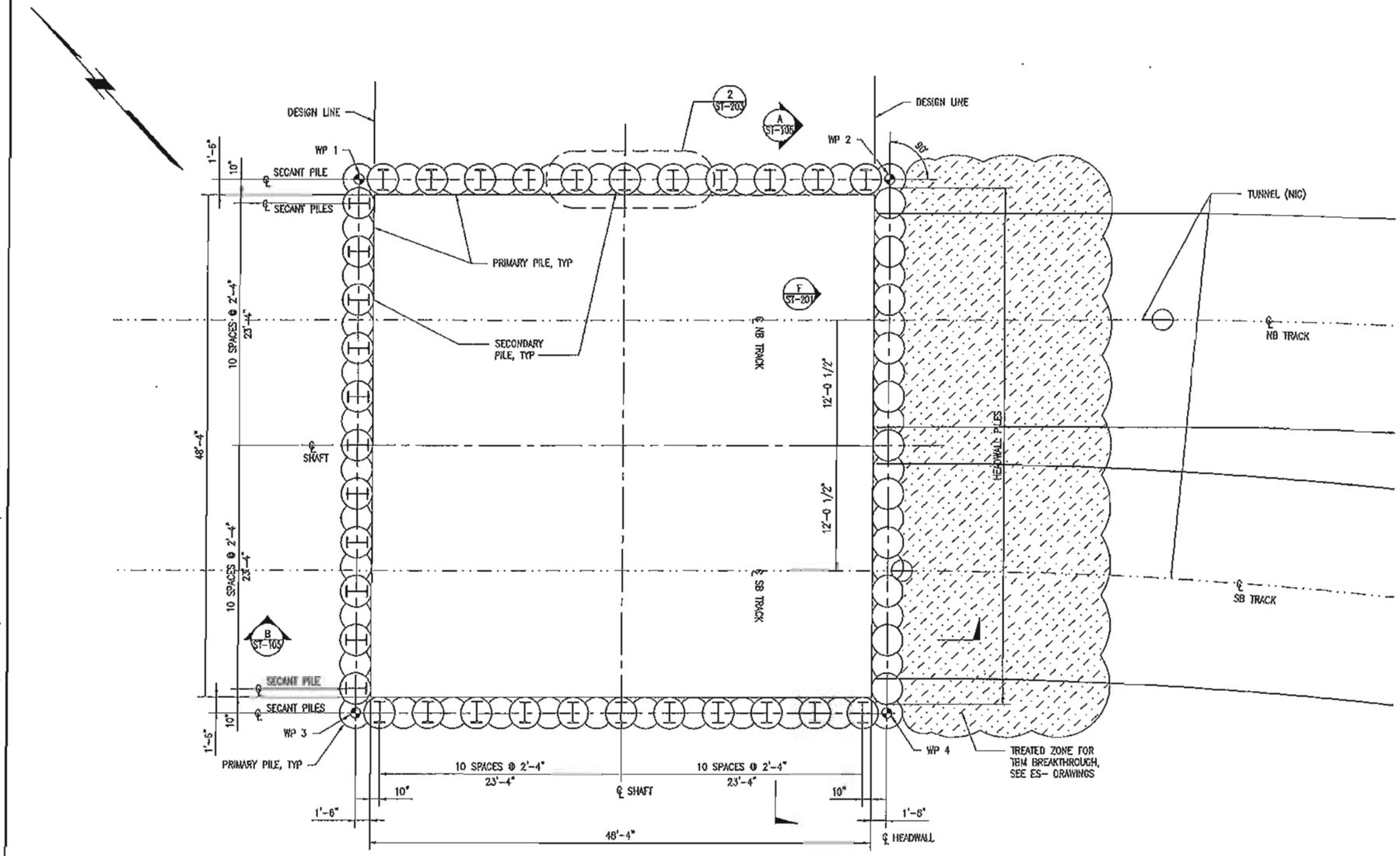
DESIGNED D. ABRAHAMS
DRAWN E. LIORDO
CHECKED B. YAVORSKY
QUANTITIES A. READ
RECOMMENDED M. FOWLER
APPROVED R. EDWARDS
DATE

CITY AND COUNTY OF SAN FRANCISCO
MUNICIPAL TRANSPORTATION AGENCY
APPROVED
DIRECTOR OF TRANSPORTATION

THIRD STREET LIGHT RAIL PROGRAM
PHASE 2 – CENTRAL SUBWAY
TEMPORARY TBM RETRIEVAL SHAFT

STRUCTURAL
GENERAL NOTES

CONTRACT NO. 1278
SFMTA CONTROL NO.
DRAWING NO. ST-001
SHEET NO.
REVISION 0



GENERAL ARRANGEMENT

SCALE: 3/16"=1'-0"

NOTES:

1. FOR GENERAL STRUCTURAL NOTES SEE DRAWING ST-001.
2. HEADWALL PILES ARE REINFORCED WITH A706 STEEL REINFORCEMENT, SEE ST-201 & ST-202. REMAINING PILES ARE REINFORCED WITH A992 GR 50 WIDE FLANGE STEEL OR PLAIN CONCRETE.

WORKING POINTS

NO.	NORTHING	EASTING
1		
2		
3		
4		

NO.	DESCRIPTION	BY	CHECKED	APPROVED	DATE
0					

PB TELAMON
PB AMERICAS, INC.

DESIGNED D. ABRAHAMS
DRAWN O. KURKOVSKAYA
CHECKED D. ABRAHAMS
RECOMMENDED M. FOWLER
RECOMMENDED A. READ
APPROVED R. EDWARDS
DATE

CITY AND COUNTY OF SAN FRANCISCO
MUNICIPAL TRANSPORTATION AGENCY
APPROVED
DIRECTOR OF TRANSPORTATION

THIRD STREET LIGHT RAIL PROGRAM
PHASE 2 – CENTRAL SUBWAY
TEMPORARY TBM RETRIEVAL SHAFT

STRUCTURAL
RETRIEVAL SHAFT LAYOUT
GENERAL PLAN

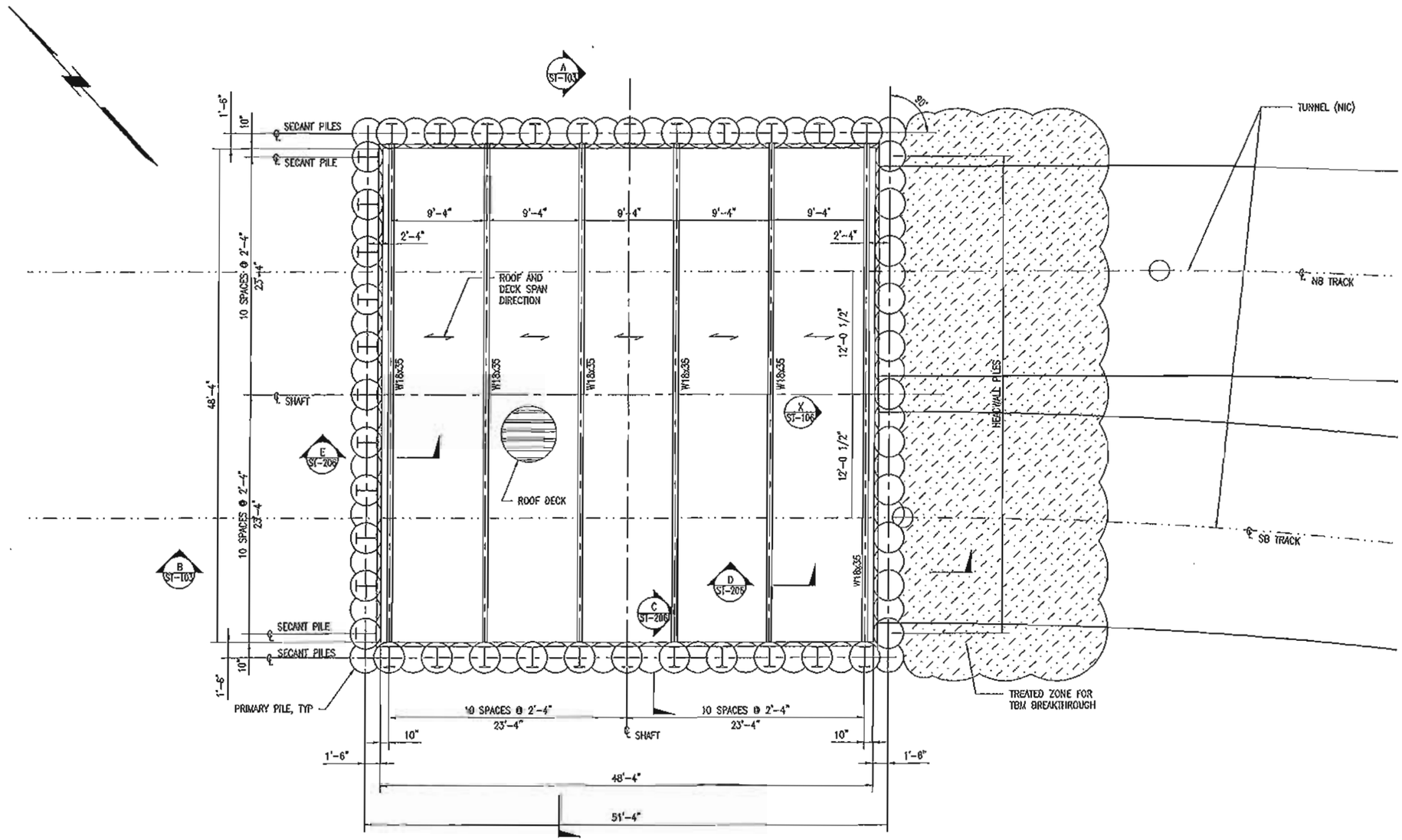
CONTRACT NO. 1278
DRAWING NO. ST-101
SHEET NO.
REVISION 0

T:\13285 CS DP1\CN 1278\Sheet Files\ST - Structural\ ST-101.dwg Kurkovskaya Thu May 02,2013 - 4:49 pm ST-101

Border Revised 03/29/2011

NOTES:

1. FOR GENERAL STRUCTURAL NOTES SEE DRAWING ST-001.



4' 2' 0 4' 8' 12'

SCALE: 3/16"=1'-0"

ROOF PLAN

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DATE	DESCRIPTION	REV NO.	BY	CHECKED	APPROVED
		0			

BORDER REVISED 03/25/2011

PB TELAMON

PB AMERICAS, INC.

DESIGNED D. ABRAHAMS
DRAWN O. KUMOVSKAYA
CHECKED D. ABRAHAMS
QUALITY REVIEW A. REVID
PROJECT MANAGER A. REVID
PRINCIPLE IN CHARGE R. EDWARDS
DWG #

CITY AND COUNTY OF SAN FRANCISCO
MUNICIPAL TRANSPORTATION AGENCY

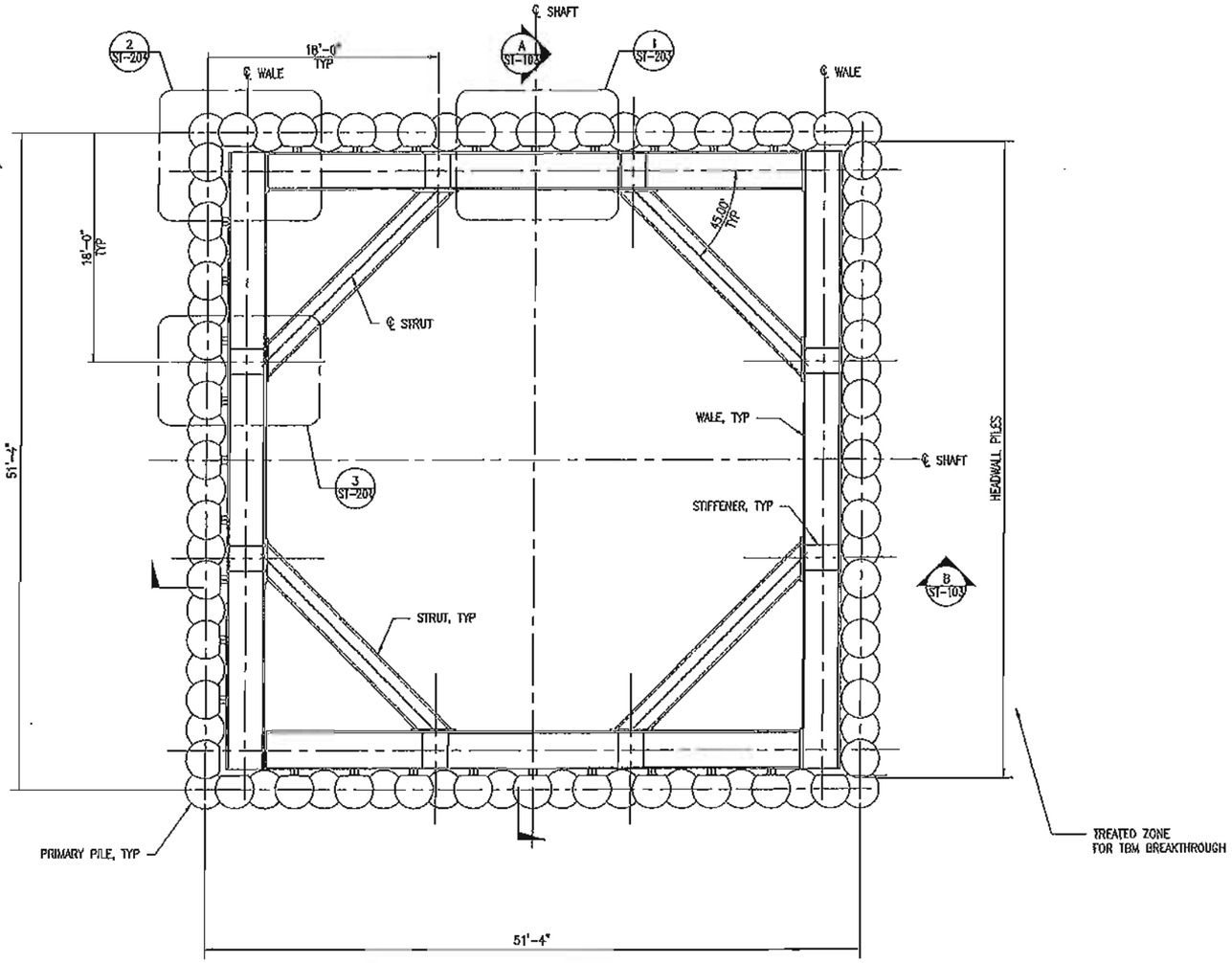
APPROVED

DIRECTOR OF TRANSPORTATION

THIRD STREET LIGHT RAIL PROGRAM
PHASE 2 – CENTRAL SUBWAY
TEMPORARY TBM RETRIEVAL SHAFT

STRUCTURAL
RETRIEVAL SHAFT LAYOUT
ROOF PLAN

CONTRACT NO. 1278
SFMTA CONTRACT NO.
DRAWING NO. ST-102
SHEET NO.
REVISION 0



BRACING LEVEL 1, 2 & 3

PLAN

4' 2' 0 4' 8' 12'

SCALE: 3/16"=1'-0"

NOTES:

1. FOR GENERAL STRUCTURAL NOTES SEE DRAWING ST-001.
2. FOR STRUT AND WALE PROPERTIES SEE DRAWING ST-203.
3. –

NO.	DATE	DESCRIPTION	BY	CHECKED	APPROVED
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BORDER REVISED 03/23/2011

PB TELAMON

PB AMERICAS, INC.

DESIGNED	B. ABRAHAMS
DRAWN	O. KUROVSKAYA
CHECKED	B. ABRAHAMS
QUANTITIES	M. FOWLER
RECOMMENDED	A. READ
APPROVED	R. EDWARDS
DATE	

CITY AND COUNTY OF SAN FRANCISCO
MUNICIPAL TRANSPORTATION AGENCY

APPROVED

DIRECTOR OF TRANSPORTATION

THIRD STREET LIGHT RAIL PROGRAM
PHASE 2 – CENTRAL SUBWAY
TEMPORARY TBM RETRIEVAL SHAFT

STRUCTURAL
TBM RETRIEVAL SHAFT
BRACING LEVEL 1, 2 & 3

CONTRACT NO. 1278
STATE CONTROL NO.
DRAWING NO. ST-103
SHEET NO.
REVISION 0

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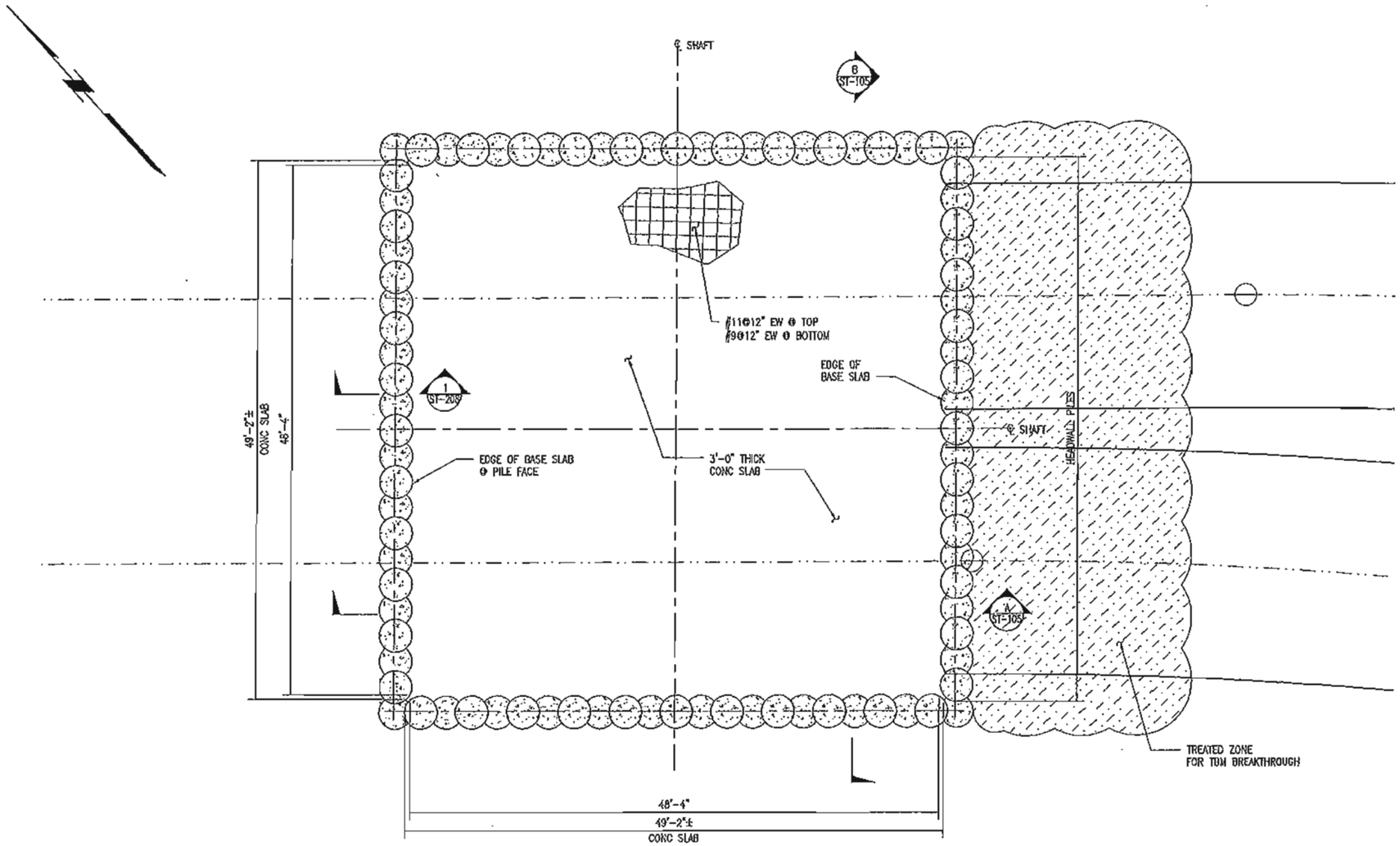
NOTES:

1. FOR GENERAL STRUCTURAL NOTES SEE DRAWING ST-001.



PLAN

4' 2' 0 4' 8' 12'
SCALE: 3/16"=1'-0"

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NO.	DESCRIPTION	BY	CHECKED	APPROVED	DATE
0					

BORDER REVISED 03/25/2011

PB TELAMON
PB AMERICAS, INC.

DESIGNED	D. ABRAHAMS
DRAWN	O. KUMOVSKAYA
CHECKED	D. ABRAHAMS
REVIEWED	M. FOWLER
RECOMMENDED	A. REA
APPROVED	R. EDWARDS
DATE	

CITY AND COUNTY OF SAN FRANCISCO
MUNICIPAL TRANSPORTATION AGENCY

APPROVED

DIRECTOR OF TRANSPORTATION

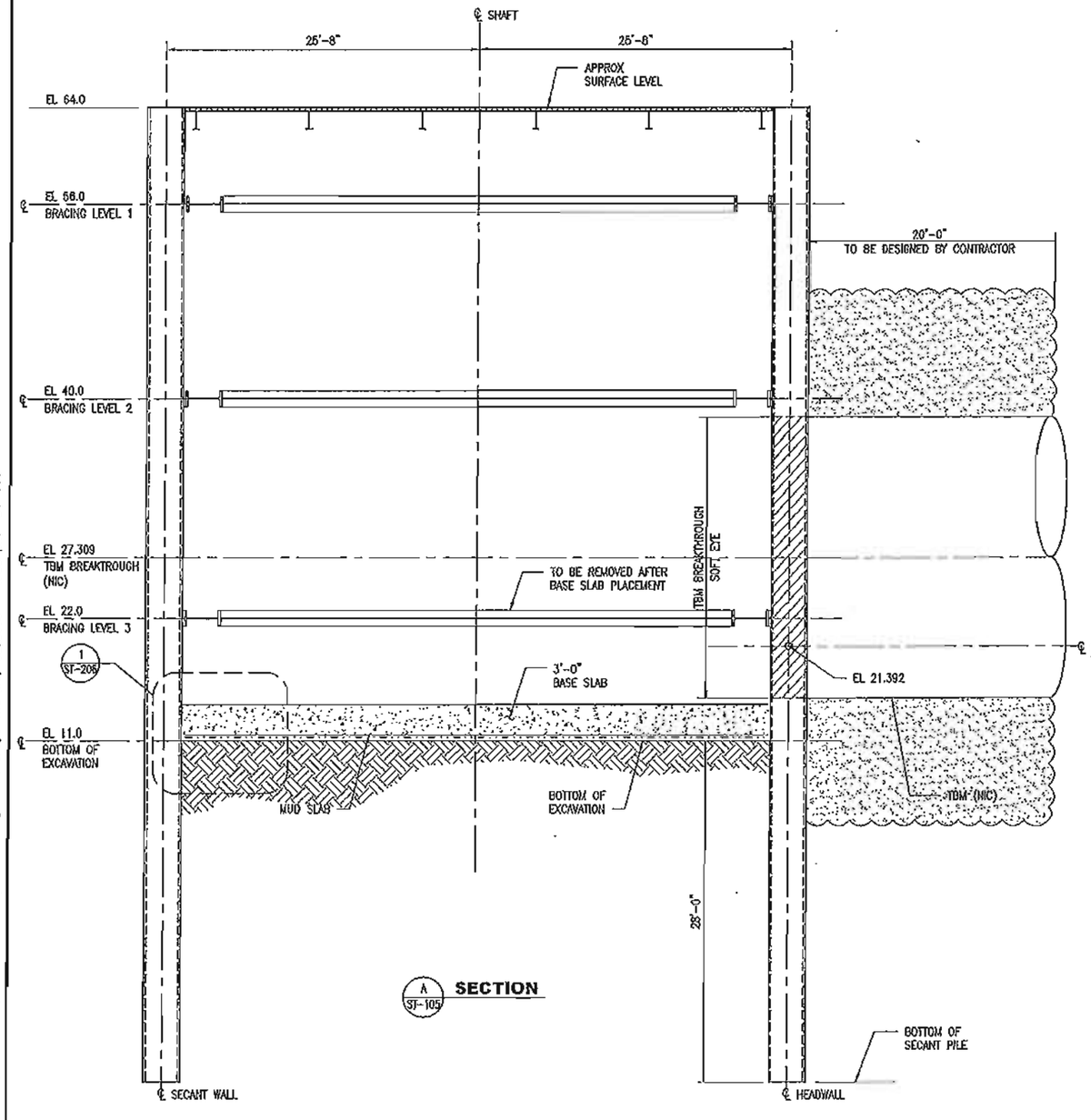
THIRD STREET LIGHT RAIL PROGRAM
PHASE 2 – CENTRAL SUBWAY
TEMPORARY TBM RETRIEVAL SHAFT

STRUCTURAL
RETRIEVAL SHAFT LAYOUT
BASE SLAB PLAN

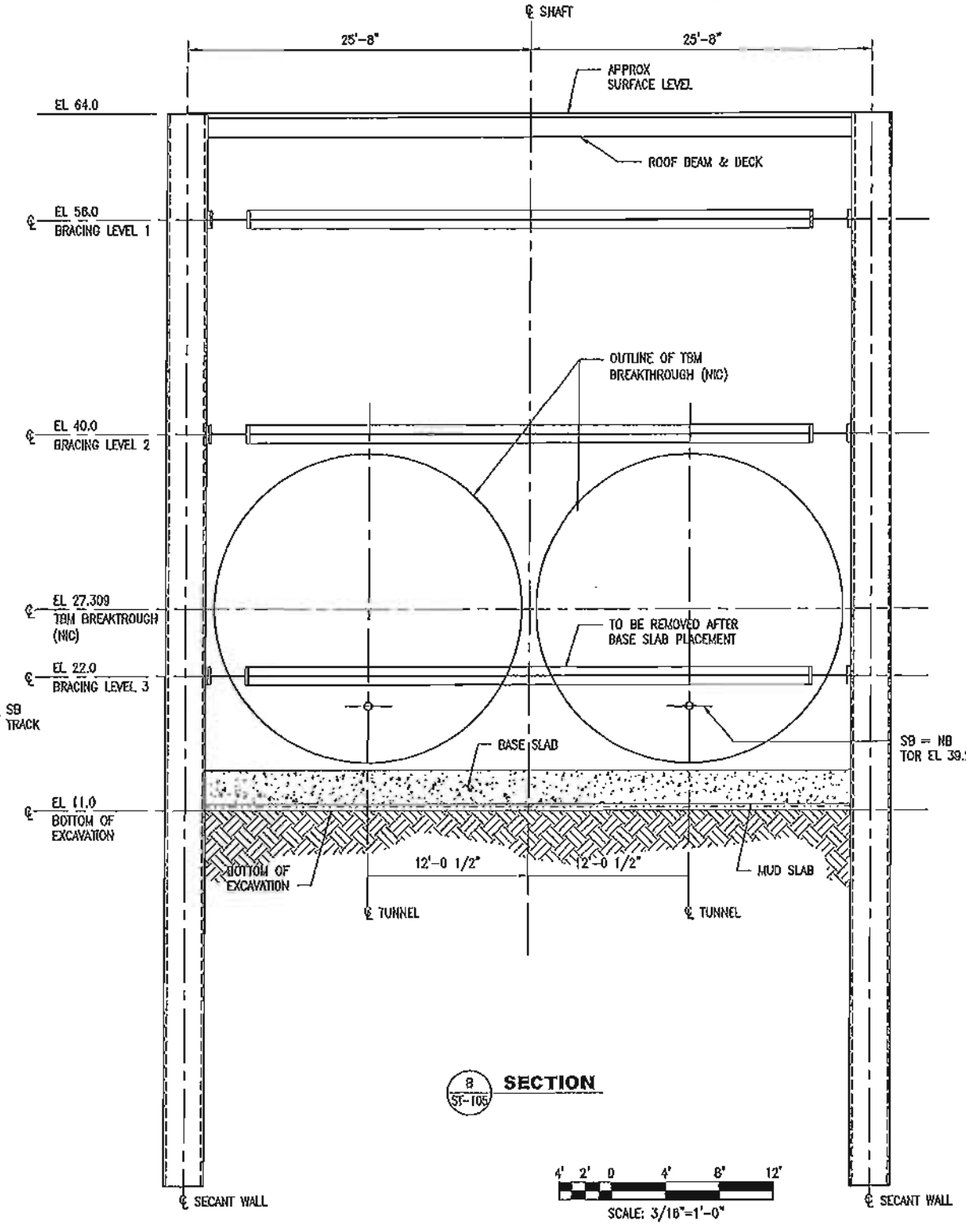
CONTRACT NO.	1278
SFMTA CONTROL NO.	
DRAWING NO.	ST-104
SHEET NO.	
REVISION	0

NOTES:

1. FOR GENERAL STRUCTURAL NOTES SEE DRAWING ST-001.



A ST-105 **SECTION**



B ST-105 **SECTION**

4' 2' 0 4' 8' 12'

SCALE: 3/16"=1'-0"

NO.	DATE	DESCRIPTION	FIX MK	BY	CHECKED	APPROVED
0						

BORDER REVISED 03/25/2011

PB TELAMON

PB AMERICAS, INC.

DESIGNED D. ABRAHAMS
DRAWN E. LLORCO
CHECKED D. ABRAHAMS
QA/C'D'ED W. FOWLER
RECOMMENDED A. READ
APPROVED R. EDWARDS
DATE

CITY AND COUNTY OF SAN FRANCISCO
MUNICIPAL TRANSPORTATION AGENCY
APPROVED
DIRECTOR OF TRANSPORTATION

THIRD STREET LIGHT RAIL PROGRAM
PHASE 2 – CENTRAL SUBWAY
TEMPORARY TBM RETRIEVAL SHAFT

STRUCTURAL SECTIONS

CONTRACT NO. 1278
STATE CONTROL NO.
DRAWING NO. ST-105
SHEET NO.
REVISION 0

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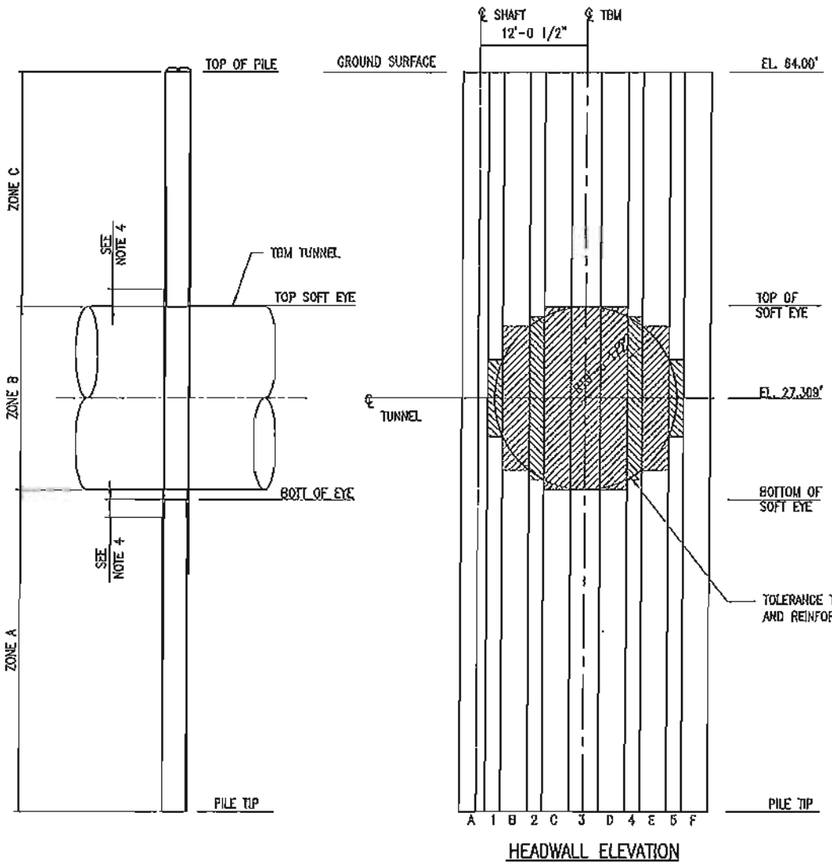


HEADWALL ELEVATION

HEADWALL LAYOUT

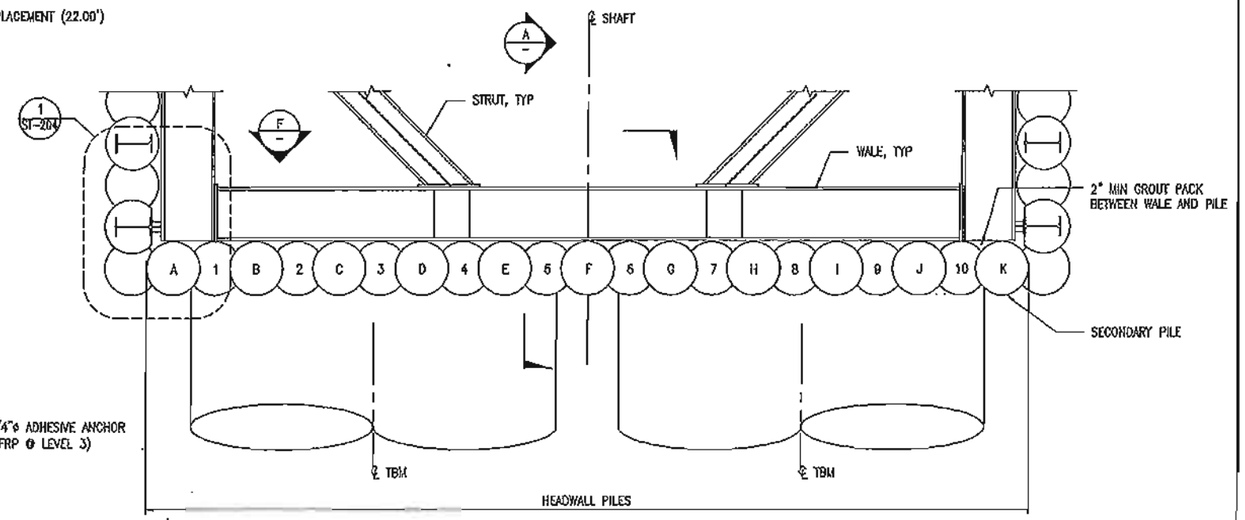
PILE ID	DIST. FROM SHAFT CENTER LINE (FT)	EL PILE TOP (FT)	EL SOFT EYE TOP (FT)	EL SOFT EYE BOTTOM (FT)	EL PILE BOTTOM	EL PILE BOTTOM	CONNECTION (NOTE 6)
A	-X	60.00			-6.00		YES
B	-X	60.00			-6.00		
C	-X	60.00			-6.00		YES
D	-X	60.00			-6.00		
E	-X	60.00			-6.00		YES
F	-X	60.00			-6.00	CSL	
G	X	60.00			-6.00		YES
H	X	60.00			-6.00		
I	X	60.00			-6.00		YES
J	X	60.00			-6.00		
K	X	60.00			-6.00		YES
1	-X	60.00			-6.00		
2	-X	60.00			-6.00		
3	-X	60.00			-6.00		
4	-X	60.00			-6.00		
5	-X	60.00			-6.00		
6	-X	60.00			-6.00	CSL	
7	X	60.00			-6.00		
8	X	60.00			-6.00		
9	X	60.00			-6.00		
10	X	60.00			-6.00		

NOTES:

1. FOR GENERAL STRUCTURAL NOTES, SEE DRAWING ST-001.
2. HOOKS TO BE DESIGNED BY CONTRACTOR.
3. DISTANCE SPACER, STIFFENING RING AND BOTTOM PLATE TO BE DESIGNED BY CONTRACTOR.
4. SPLICES SHALL CONFORM TO ACI-318. MINIMUM SPLICES POSITIONS SHOWN. CONTRACTOR TO USE ADDITIONAL SPLICES AS NEEDED PER HIS MEANS AND METHODS, SUBJECT TO COMPLY WITH ANY MANDATORY REQUIREMENTS.
5. AVOID SPLICES AT POINTS OF MAXIMUM STRESS WHENEVER POSSIBLE.
6. CONNECTION SHALL BE PROVIDED OR SHOWN ON DETAIL A OF THIS SHEET. ALL OTHER HEADWALL PILES SHALL ONLY REQUIRE GROUT PACK.

LEGEND:

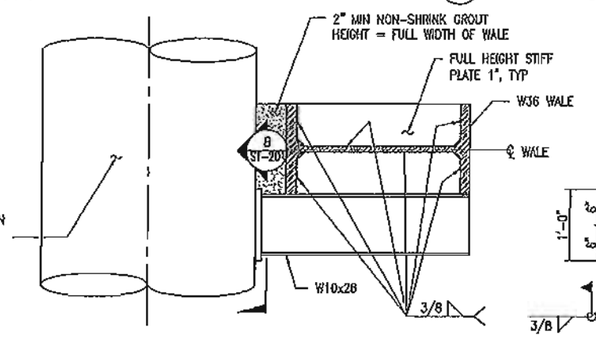
SOFT EYE AREA – ZONE B



X
S-XXX
PLAN
SCALE: 1/4" = 1'-0"

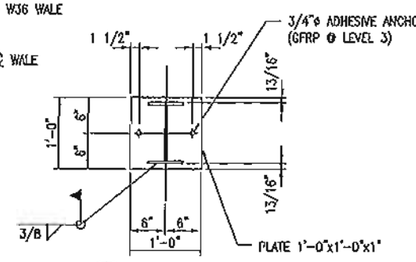
PILES CUT BY TBM

SCALE: NTS



A
–
SECTION
SCALE: 1" = 1'-0"

F
–
SECTION
NTS SIM ABOUT ℄



B
–
SECTION
SCALE: 1" = 1'-0"

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DATE	DESCRIPTION	BY	CHECKED	APPROVED
	0			

DGN:BOX REVISED 03/23/2011

PB TELAMON
PB AMERICAS, INC.

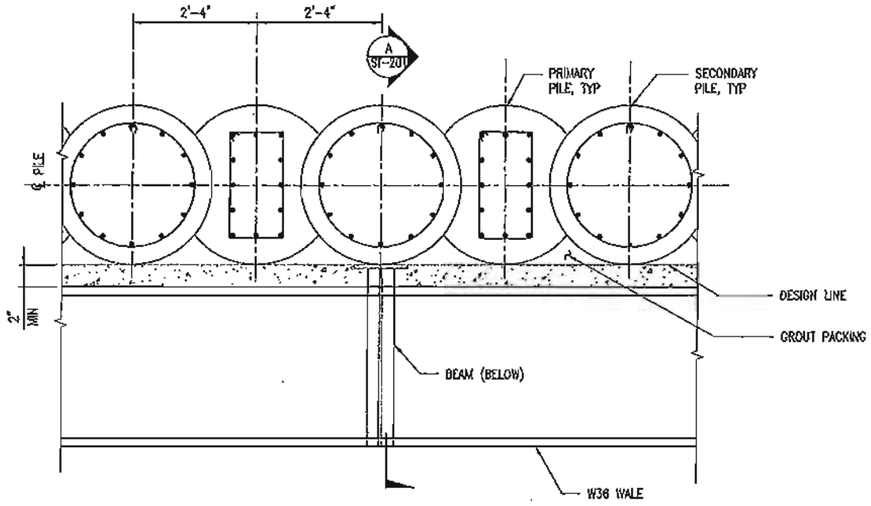
DESIGNED	D. ABRAHAMS
DRAWN	O. KURNOVSKAYA
CHECKED	D. ABRAHAMS
APPROVED	D. TOMLER
RECOMMENDED	A. READ
APPROVED	R. EDWARDS
DATE	

CITY AND COUNTY OF SAN FRANCISCO
MUNICIPAL TRANSPORTATION AGENCY
APPROVED
DIRECTOR OF TRANSPORTATION

THIRD STREET LIGHT RAIL PROGRAM
PHASE 2 – CENTRAL SUBWAY
TEMPORARY TBM RETRIEVAL SHAFT

STRUCTURAL
TBM RETRIEVAL SHAFT
HEADWALL LAYOUT

CONTRACT NO. 1278
STATE CONTROL NO.
DRAWING NO. ST-201
SHEET NO.
REVISION 0



GROUT PACK
SCALE: 3/4"=1'-0"

MINIMUM REQUIRED REINFORCEMENT - HEADWALL PRIMARY PILE

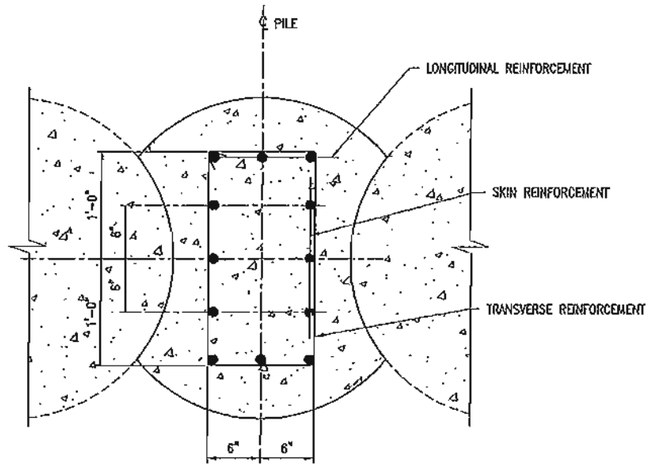
	PRIMARY LONGITUDINAL DIRECTION		TRANSVERSE REINFORCEMENT (GFRP-HOOPS)		SKIN REINFORCEMENT (EACH SIDE)	
REINFORCEMENT ZONE	NUMBER OF BARS	BAR SIZE	BAR SIZE	SPACING (IN.)	NUMBER OF BARS	BAR SIZE
ZONE A	6	#11	#5	4	3	#7
ZONE B	6 (GFRP)	#11	#5	4	3 (GFRP)	#7
ZONE C	6	#11	#5	4	3	#7

MINIMUM REQUIRED REINFORCEMENT - HEADWALL SECONDARY PILE

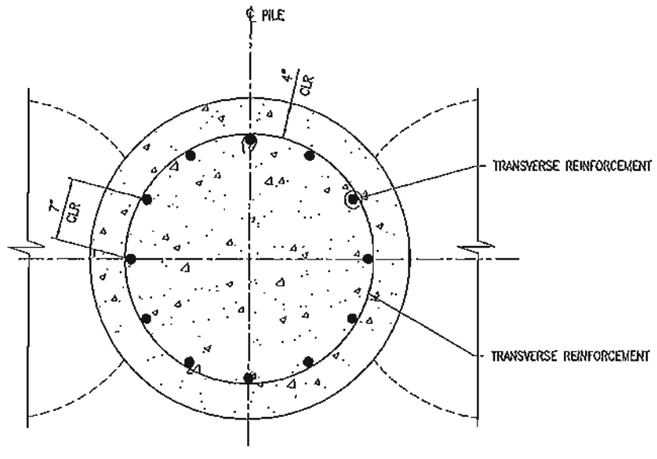
	PRIMARY LONGITUDINAL DIRECTION		TRANSVERSE REINFORCEMENT (GFRP-HOOPS)	
REINFORCEMENT ZONE	NUMBER OF BARS	BAR SIZE	BAR SIZE	SPACING (IN.)
ZONE A	12	#11	#5	4
ZONE B	12 (GFRP)	#11	#5	4
ZONE C	12	#11	#5	4

NOTES:

1. FOR GENERAL STRUCTURAL NOTES, SEE DRAWING ST-001.



PRIMARY PILE REINFORCEMENT
SCALE: 1 1/2"=1'-0"



SECONDARY PILE REINFORCEMENT
SCALE: 1 1/2"=1'-0"

NO.	DATE	DESCRIPTION	BY	CHECKED	APPROVED
0					

PB AMERICAS, INC.

DESIGNED D. ABRAHAMS
DRAWN O. KUKHOVSKAYA
CHECKED D. ABRAHAMS
RECOMMENDED M. FOWLER
RECOMMENDED A. READ
APPROVED R. EDWARDS
DATE

CITY AND COUNTY OF SAN FRANCISCO
MUNICIPAL TRANSPORTATION AGENCY
APPROVED
DIRECTOR OF TRANSPORTATION

THIRD STREET LIGHT RAIL PROGRAM
PHASE 2 – CENTRAL SUBWAY
TEMPORARY TBM RETRIEVAL SHAFT

STRUCTURAL
TBM RETRIEVAL SHAFT
REBAR SCHEDULE AND DETAILS

CONTRACT NO. 1278
SFMTA CONTROL NO.
DRAWING NO. ST-202
SHEET NO.
REVISION 0

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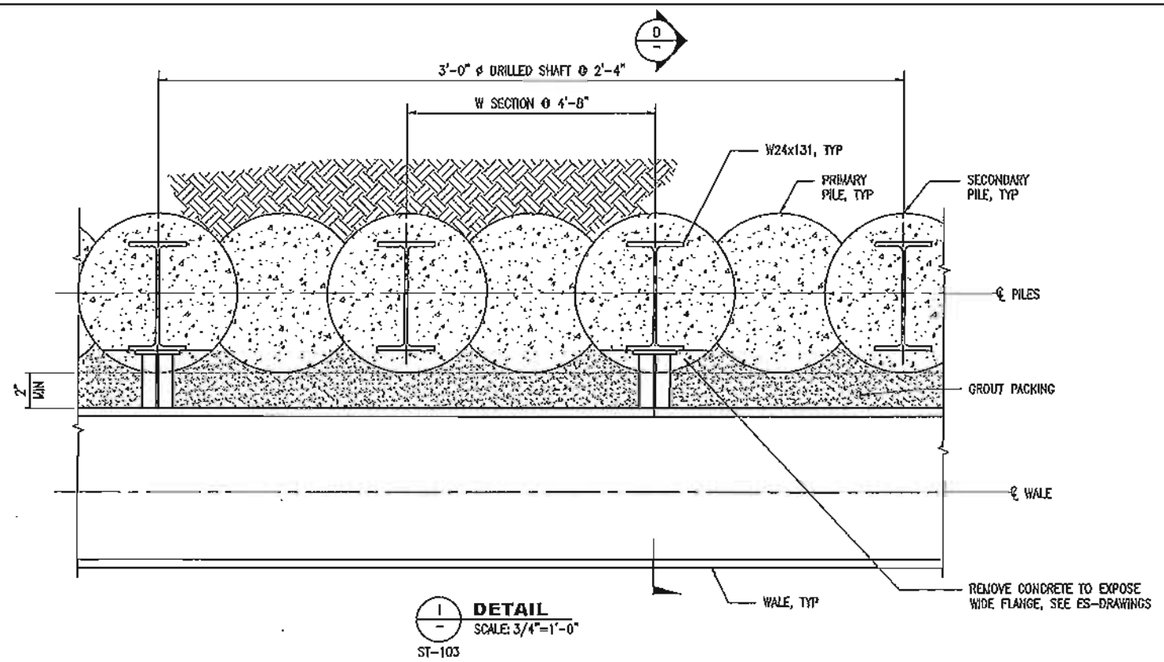
BORDER REVISED 03/29/2011



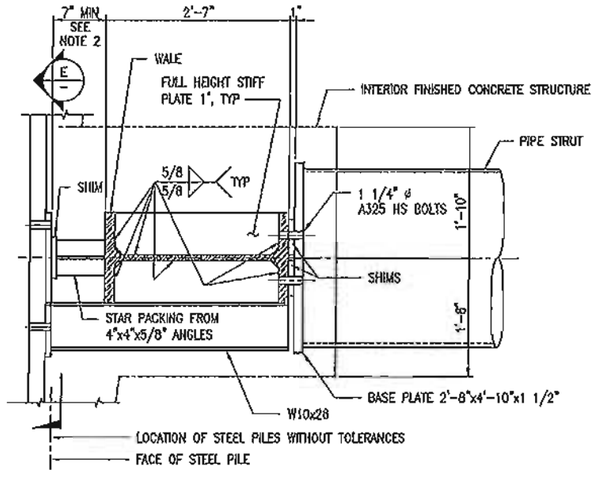
I — **DETAIL**
SCALE: 3/4"=1'-0"
ST-103

WALE SCHEDULE	
LEVEL	SIZE
LEVEL 1	W30x148
LEVEL 2	W33x169
LEVEL 3	W36x256

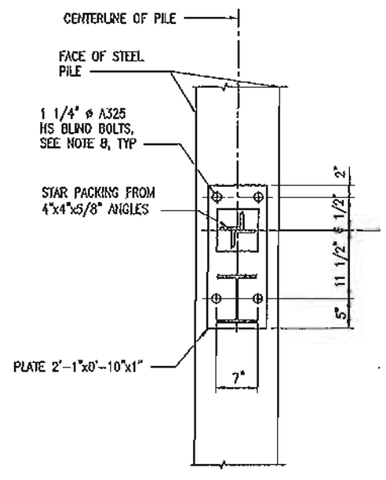
STRUT SCHEDULE	
LEVEL	SIZE
LEVEL 1	18"ø x 5/8"
LEVEL 2	30"ø x 3/4"
LEVEL 3	36"ø x 1 1/4"

NOTES:

1. FOR GENERAL STRUCTURAL NOTES, SEE DRAWING ST-001.
2. MINIMUM STAR PACKING LENGTH SHALL BE BASED ON WORST CASE INWARD PILE INSTALLATION.
3. CONNECTION DETAILS SHOWN FOR SUGGESTED CONCEPTUAL DESIGN ONLY. CONNECTIONS SHALL BE DESIGNED BY FABRICATOR'S ENGINEER BASED ON LOADS PROVIDED.
4. STYROFOAM OR EQUIVALENT SHALL BE USED DURING PILE INSTALLATION TO FACILITATE BLIND BOLTS INSTALLATION.



D — **SECTION**
NTS



E — **SECTION**
NTS

DATE	DESCRIPTION	REV. NO.	BY	CHECKED	APPROVED
		0			

PB TELAMON
PB AMERICAS, INC.

DESIGNED	D. ABRAHAMS
DRAWN	O. KURKOVSKAYA
CHECKED	D. ABRAHAMS
QA/QC'D	M. FOWLER
PROJECT MGR.	A. READ
APPROVED	R. EDWARDS
DATE	

CITY AND COUNTY OF SAN FRANCISCO
MUNICIPAL TRANSPORTATION AGENCY
APPROVED
DIRECTOR OF TRANSPORTATION

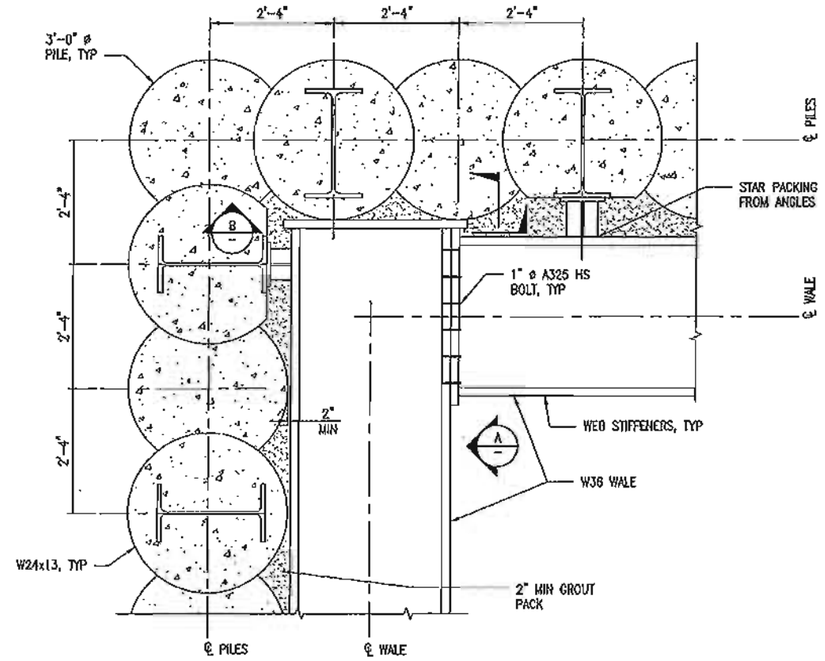
THIRD STREET LIGHT RAIL PROGRAM
PHASE 2 – CENTRAL SUBWAY
TEMPORARY TBM RETRIEVAL SHAFT

STRUCTURAL
TBM RETRIEVAL SHAFT
FRAMING SCHEDULE AND DETAILS

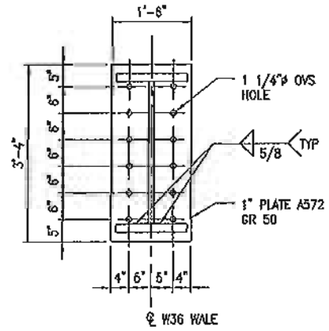
CONTRACT NO. 1278
SFMTA CONTRACT NO.
DRAWING NO. ST-203
SHEET NO.
REVISION 0

T:\13285 CS DP1\CN 1278\Sheet Files\ST - Structural\ ST-203.dwg Kurnovskaya Thu May 02,2013 - 4:57 pm ST-203

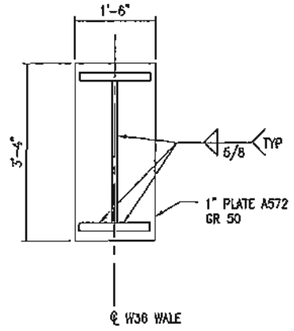
DRAWING REVISED 03/25/2011



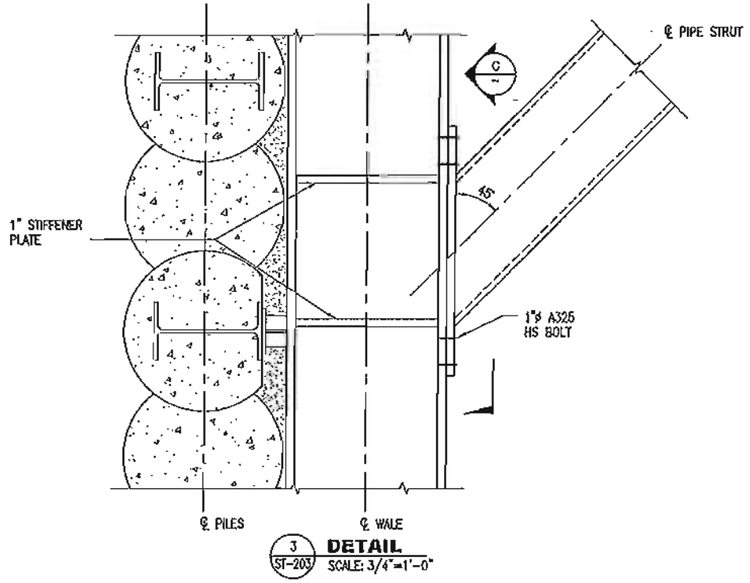
1 ST-203 **DETAIL** SCALE: 3/4"=1'-0"



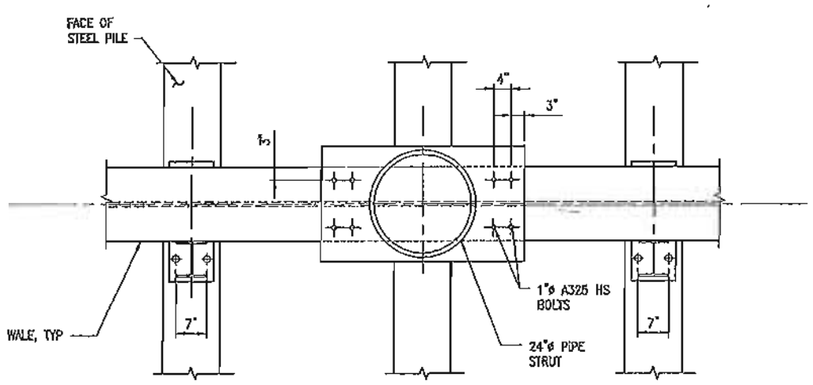
A ST-203 **SECTION** NTS



B ST-203 **SECTION** NTS



3 ST-203 **DETAIL** SCALE: 3/4"=1'-0"



C ST-203 **ELEVATION** SCALE: 3/4"=1'-0"

NOTES:

1. FOR GENERAL STRUCTURAL NOTES, SEE DRAWING ST-001.

REV NO.	BY	CHECKED	APPROVED	DATE	DESCRIPTION
0					BORROW REVISED 03/25/2011

PB TELAMON

PB AMERICAS, INC.

DESIGNED D. ABRAHAMS
DRAWN D. KURNOVSKAYA
CHECKED D. ABRAHAMS
TRACED M. FOWLER
RECOMMENDED A. READ
APPROVED R. RICHARDS
DATE

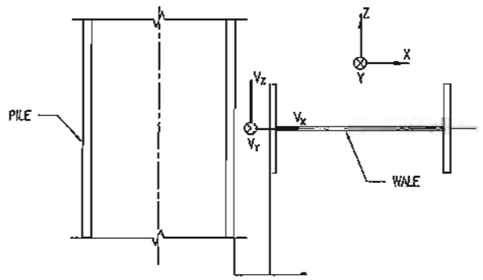
CITY AND COUNTY OF SAN FRANCISCO
MUNICIPAL TRANSPORTATION AGENCY
APPROVED
DIRECTOR OF TRANSPORTATION

THIRD STREET LIGHT RAIL PROGRAM
PHASE 2 – CENTRAL SUBWAY
TEMPORARY TBM RETRIEVAL SHAFT

STRUCTURAL
TBM RETRIEVAL SHAFT
FRAMING PLAN

CONTRACT NO. 1278
SFMTA CONTRACT NO.
DRAWING NO. ST-204
SHEET NO.
REVISION 0

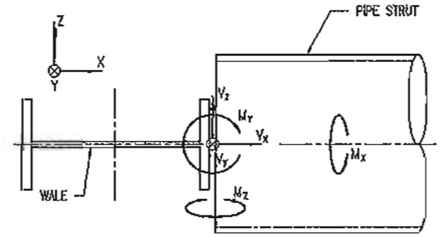
T:\13285 CS DP1\CN 1278\Sheet Files\ST – Structural\ ST-204.dwg Kurnovskaya Thu May 02,2013 – 4:58 pm ST-204



CONNECTION TYPE A

NTS

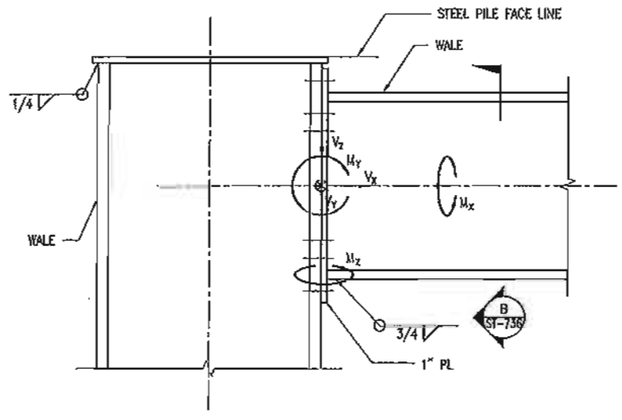
INCLUDES MIRRORED CONFIGURATION ALONG STATION ℄
PILE – TO – WALE



CONNECTION TYPE B

NTS

INCLUDES MIRRORED CONFIGURATION ALONG STATION ℄
WALE – TO – STRUT



CONNECTION TYPE C

NTS

WALE – TO – WALE

NOTES:

1. FOR GENERAL STRUCTURAL NOTES, SEE DRAWING ST-001.
2. GLOBAL +Y COORDINATE IS DEFINED ALONG STATION ℄ AND IN UPPER STATIONING DIRECTION; GLOBAL +Z COORDINATE IS DEFINED IN THE UPWARD VERTICAL DIRECTION; AND GLOBAL +X COORDINATE IS DEFINED IN STATION TRANSVERSE DIRECTION BY RIGHT-HAND RULE.
3. THE LETTER "M" IN THE TABLE ALSO DESIGNATES TORSION AND THE LETTER "V" ALSO DESIGNATES AXIAL LOAD.
4. POSITIVE VALUES INDICATE LOADS (FORCES/SHEARS/MOMENTS) IN POSITIVE GLOBAL COORDINATES DIRECTIONS; NEGATIVE VALUES INDICATE LOADS IN NEGATIVE GLOBAL COORDINATES DIRECTIONS.
5. CONNECTIONS SHALL BE DESIGNED BY FABRICATOR'S ENGINEER BASED ON PROVIDED CONNECTION LOAD TABLE. CONNECTIONS SHALL ALSO BE CHECKED WITH EXCAVATION AND GROUND SUPPORT SHORING LOADS PROVIDED IN DESIGN CRITERIA IN ES DRAWINGS.
6. THE BASIC CODE FOR DESIGN AND FABRICATION OF STRUCTURAL STEEL IS THE CODE OF STANDARD PRACTICE FOR STEEL BUILDINGS AND BRIDGES, AMERICAN INSTITUTE OF STEEL CONSTRUCTION, APRIL14, 2010, UNDER SECTION 3, DESIGN DRAWINGS AND SPECIFICATION, ARTICLE 3.1.2, THE OPTION SPECIFIED FOR THIS CONTRACT IS: (3) IN THE STRUCTURAL DESIGN DRAWINGS OR SPECIFICATIONS, THE CONNECTION SHALL BE DESIGNATED TO BE DESIGNED BY A LICENSED PROFESSIONAL ENGINEER WORKING FOR THE FABRICATOR.
7. FIELD CONNECTIONS SHALL BE BOLTED OR WELDED USING FILLET WELDS ONLY UNLESS OTHERWISE ALLOWED BY THE ENGINEER.
8. WHERE CONNECTIONS DEFINE THE SIZE AND NUMBER OF BOLTS OR SIZE AND LENGTH OF WELDS, NO SEALED DESIGN BY THE FABRICATOR IS REQUIRED.
9. MOMENT CONNECTIONS BETWEEN BEAMS AND COLUMNS WILL BE PRE-QUALIFIED CONNECTIONS FOR SEISMIC APPLICATION IN ACCORDANCE WITH ANSI/AISC 358-05, INCLUDING SUBSEQUENT SUPPLEMENTS IN FORCE AT THE TIME OF THE AWARD OF THE CONTRACT.
10. MOMENT CONNECTIONS BETWEEN TWO END TO END BEAMS OR COLUMNS WILL BE FULL STRENGTH MOMENT AND SHEAR CONNECTIONS DESIGNED FOR THE STRENGTH OF THE SMALLER SECTION.

CONNECTION LOAD TABLE

LEVEL	CONNECTION TYPE	LRFD LOADS					
		V_x* (K)	V_y (K)	V_z (K)	M_x (K-FT)	M_y (K-FT)	M_z (K-FT)
LEVEL 1	TYPE A	–	–	–	–	–	–
	TYPE B	–	–	–	–	–	–
	TYPE C	–	–	–	–	–	–
LEVEL 2	TYPE A	–	–	–	–	–	–
	TYPE B	–	–	–	–	–	–
	TYPE C	–	–	–	–	–	–
LEVEL 3	TYPE A	–	–	–	–	–	–
	TYPE B	–	–	–	–	–	–
	TYPE C	–	–	–	–	–	–

* LOADS IN COMPRESSION

NO.	DATE	DESCRIPTION	BY	CHECKED	APPROVED
0					

BORDER REVISED 03/25/2011

PB TELAMON

PB AMERICAS, INC.

DESIGNED D. ABRAHAMS
DRAWN O. KURIOVSKAYA
CHECKED C. LEE
REVIEWED M. FOWLER
RECOMMENDED A. READ
APPROVED R. SERRANO
DATE

CITY AND COUNTY OF SAN FRANCISCO
MUNICIPAL TRANSPORTATION AGENCY

APPROVED

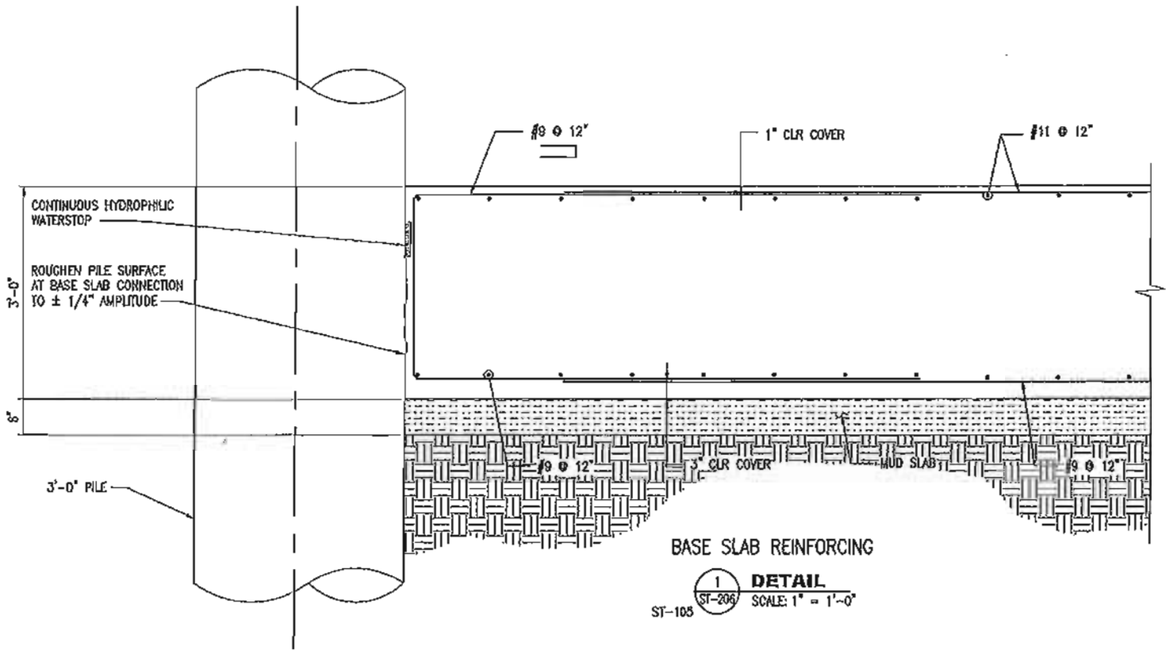
DIRECTOR OF TRANSPORTATION

THIRD STREET LIGHT RAIL PROGRAM
PHASE 2 – CENTRAL SUBWAY
TEMPORARY TBM RETRIEVAL SHAFT

STRUCTURAL
TBM RETRIEVAL SHAFT
SCHEDULE AND DETAILS CONNECTIONS

CONTRACT NO. 1278
SFMTA CONTRACT NO.
DRAWING NO. ST-205
REVISION 0
SHEET NO.

T:\13285 CS DP1\CN 1278\Sheet Files\ST – Structural\ ST-205.dwg Kuriovskaya Thu May 02,2013 – 4:59 pm ST-205



BASE SLAB REINFORCING DETAIL

1 / ST-206 — ST-105 — SCALE: 1" = 1'-0"

NOTES:

1. FOR GENERAL STRUCTURAL NOTES, SEE DRAWING ST-001.

1' 0 1' 2'

SCALE: 1"=1'-0"

T:\13285 CS DP1\CN 1278\Sheet Files\ST - Structural\ ST-206.dwg Kurnovskaya Thu May 02,2013 - 5:00 pm ST-206

DATE	DESCRIPTION	REV. NO.	BY	CHECKED	APPROVED
		0			

BORDER REVISED 03/25/2011

PB TELAMON

PB AMERICAS, INC.

DESIGNED	D. ABRAHAMS
DRAWN	E. LLORICO
CHECKED	D. ABRAHAMS
REVIEWED	W. FOWLER
RECOMMENDED	A. READ
APPROVED	R. EDWARDS
DATE	

CITY AND COUNTY OF SAN FRANCISCO
MUNICIPAL TRANSPORTATION AGENCY

APPROVED

DIRECTOR OF TRANSPORTATION

THIRD STREET LIGHT RAIL PROGRAM
PHASE 2 – CENTRAL SUBWAY
TEMPORARY TBM RETRIEVAL SHAFT

STRUCTURAL
ROOF AND BASE SLAB DETAILS

CONTRACT NO.	1278
DRAWING NO.	ST-206
SHEET NO.	
REVISION	0