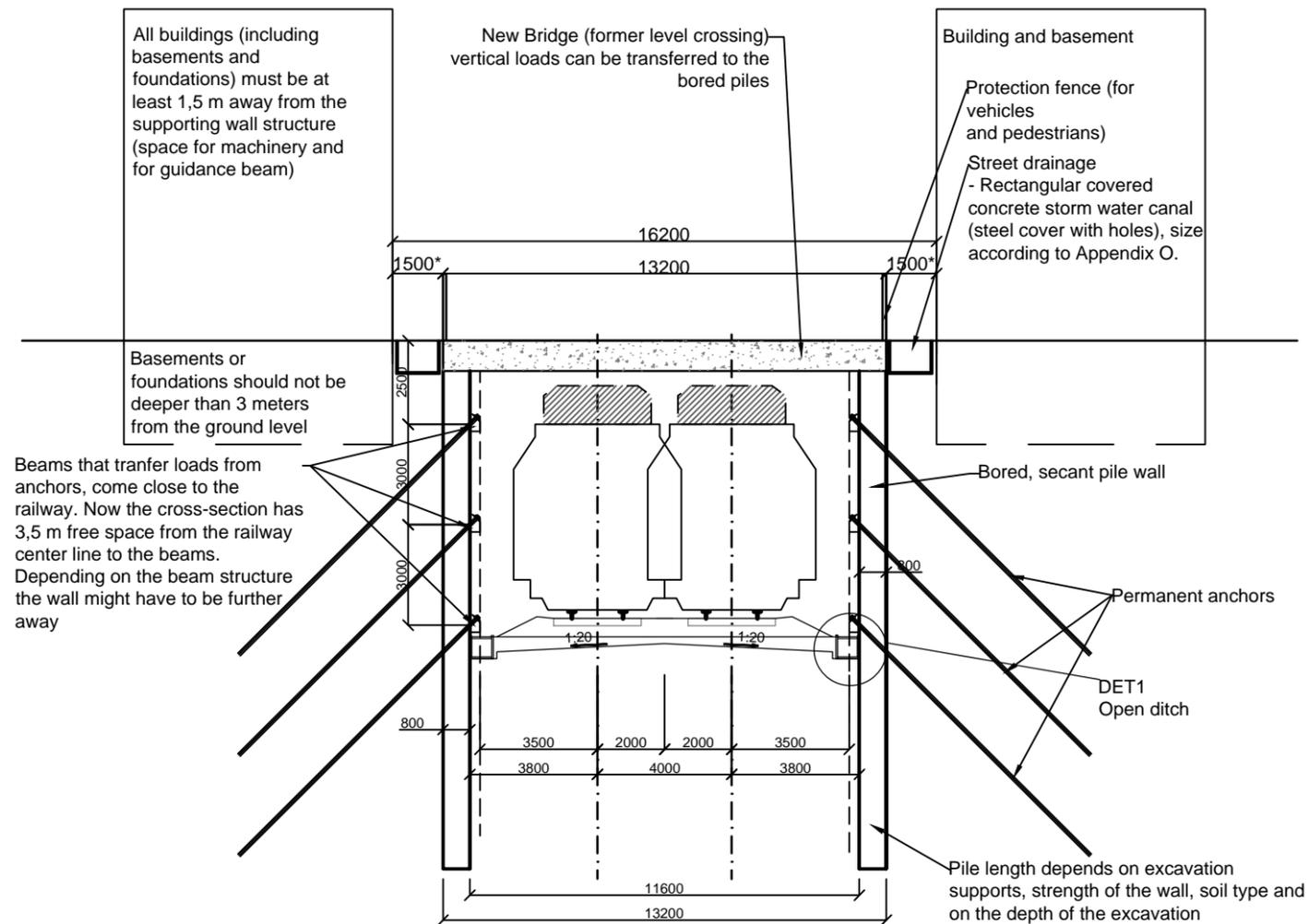


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Trench dimensions can be updated in the detailed design phase.



Dimensions and designs need to be assured in detailed design phase according to the soil investigations. For example these dimension parameters needs to be assured:

- the length and the type (soil or rock anchors) of the permanent anchor support levels and anchor distances
- the length of the piles below the excavation level
- support levels and anchor distances

The presented base structure for soil is category A, which includes 550 mm ballast and 200 mm intermediate layer. This is used, when the subsoil is hard soil or rock. If the sub soil is clay or other material which bearing capacity is 80 MPa or less, the soil category B needs to be used. In the category B, there is 550 mm thick ballast, 200 mm intermediate layer and 250 mm thick sub-base. The substructures are presented in designs H1-100. In case of the sub-soil category B, also a higher gutter must be used. The gutter should always reach to the base level.

Both trenches, Capurro/Uruguayana and Las Piedras need to have pumping stations at the lowest level of the trench drainage.

All arrangements that are needed in construction phase, needs to be designed.

*The size of rectangular storm water canal (based on trench drainage studies, Appendix O) on ground surface, outside of the trench is presented below:

Capurro/Uruguayana trench, Montevideo

South of 3+580:

- west: 1,3 m width x 0,8 m height
- east: 1,4 m width x 0,8 m height

North of 3+580:

- west: 1,3 m width x 0,9 m height
- east: 1,2 m width x 0,8 m height

Las Piedras trench, Canelones

South of 19+600:

- west: 2,0 m width x 1,4 m height
- east: 2,6 m width x 1,7 m height

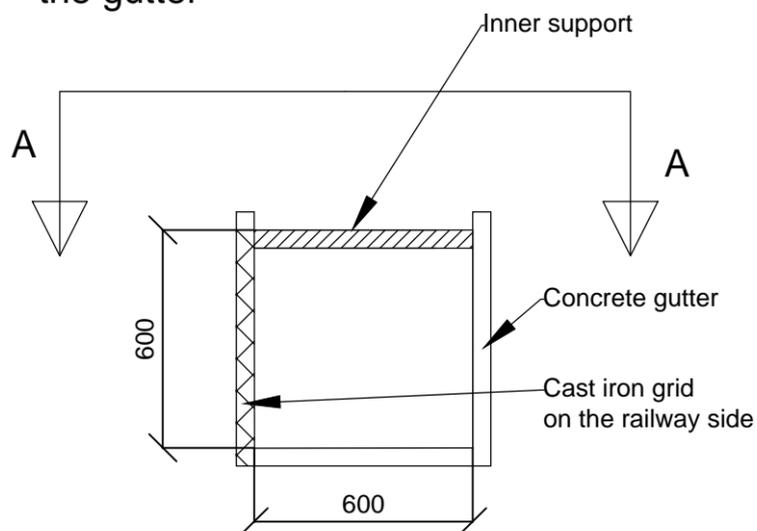
North of 19+600:

- west: 0,6 m width x 0,45 m height
- east: 1,8 m width x 1,2 m height

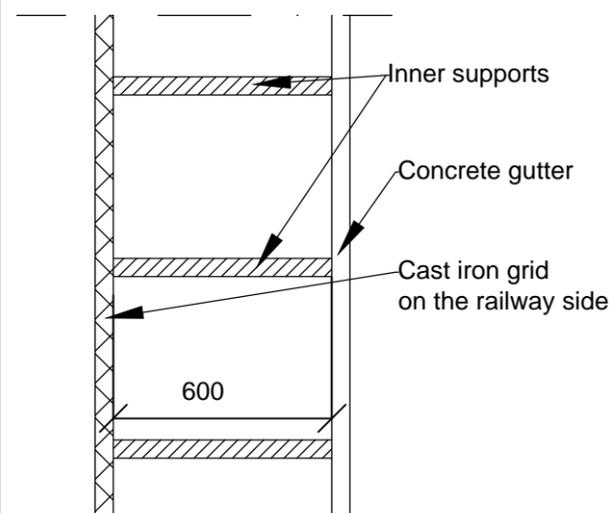
Sub structure categories

- A bearing capacity > 80 MPa
- B bearing capacity 40 ... 80 MPa

DET1 Open ditch cross-section of the gutter



A- A

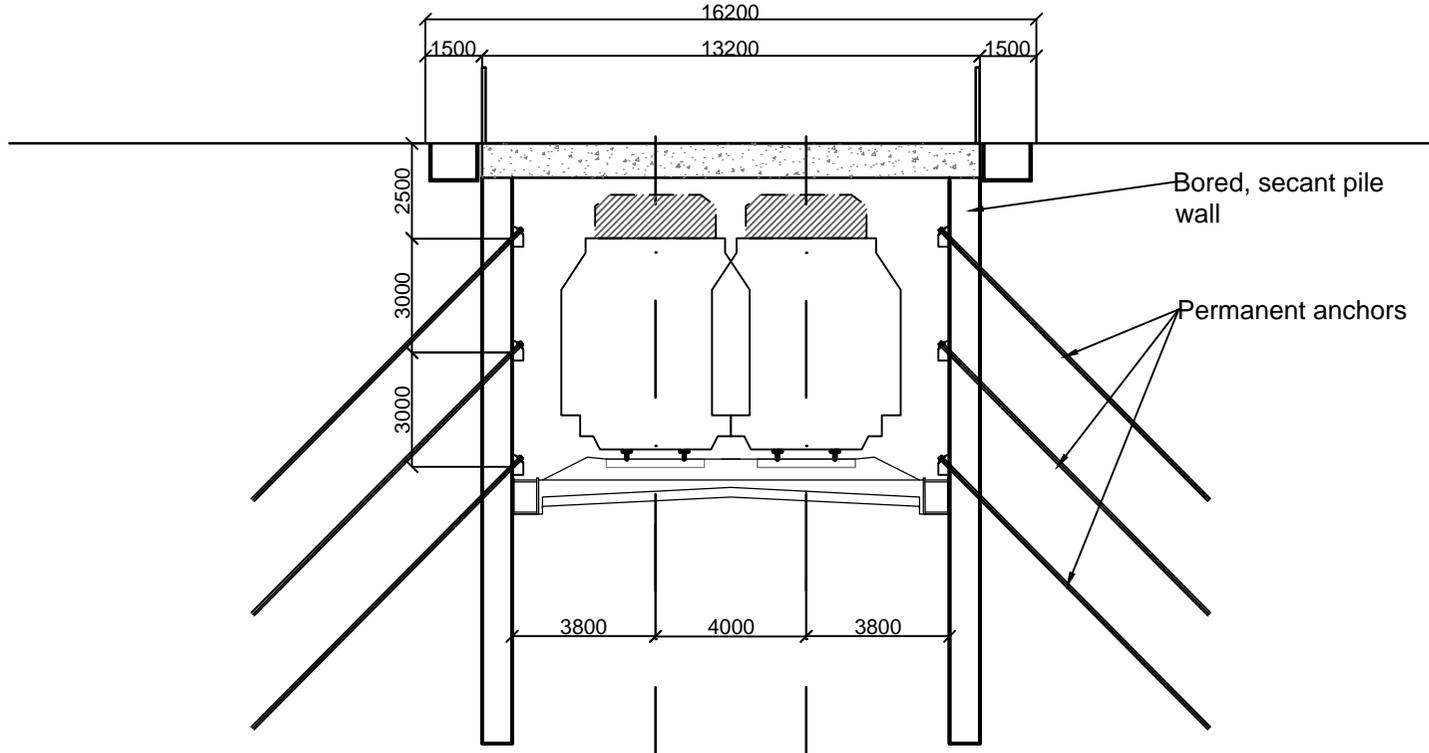


Version 15.12.2017

Revision	Explanation	DATE	DESIGNER	DATE	ACCEPTOR
 MINISTERIO DE TRANSPORTE Y OBRAS PÚBLICAS		SUPPLIER 		Railway Project, Pre-engineering, phase 2 Typical cross section of railway trench Basic solution and dimensions	
DESIGNER	RSi	DRAWER	RSi	DATE	23.10.2017
SUPERVISOR	HAK	ACCEPTOR		SCALE	1:200
				Elevation reference system	Coordinate system
				DRAWING NO.	001 / 005

Bored pile wall / secant pile wall
 When sub soil layers are clay or sand, bedrock is in deep
 Dimensions shall be updated in detailed design

The presented base structure for soil is category B which includes 550 mm thick ballast, 200 mm intermediate layer and 250 mm thick sub-base. The soil category B needs to be used, when the bearing capacity is <80 MPa.



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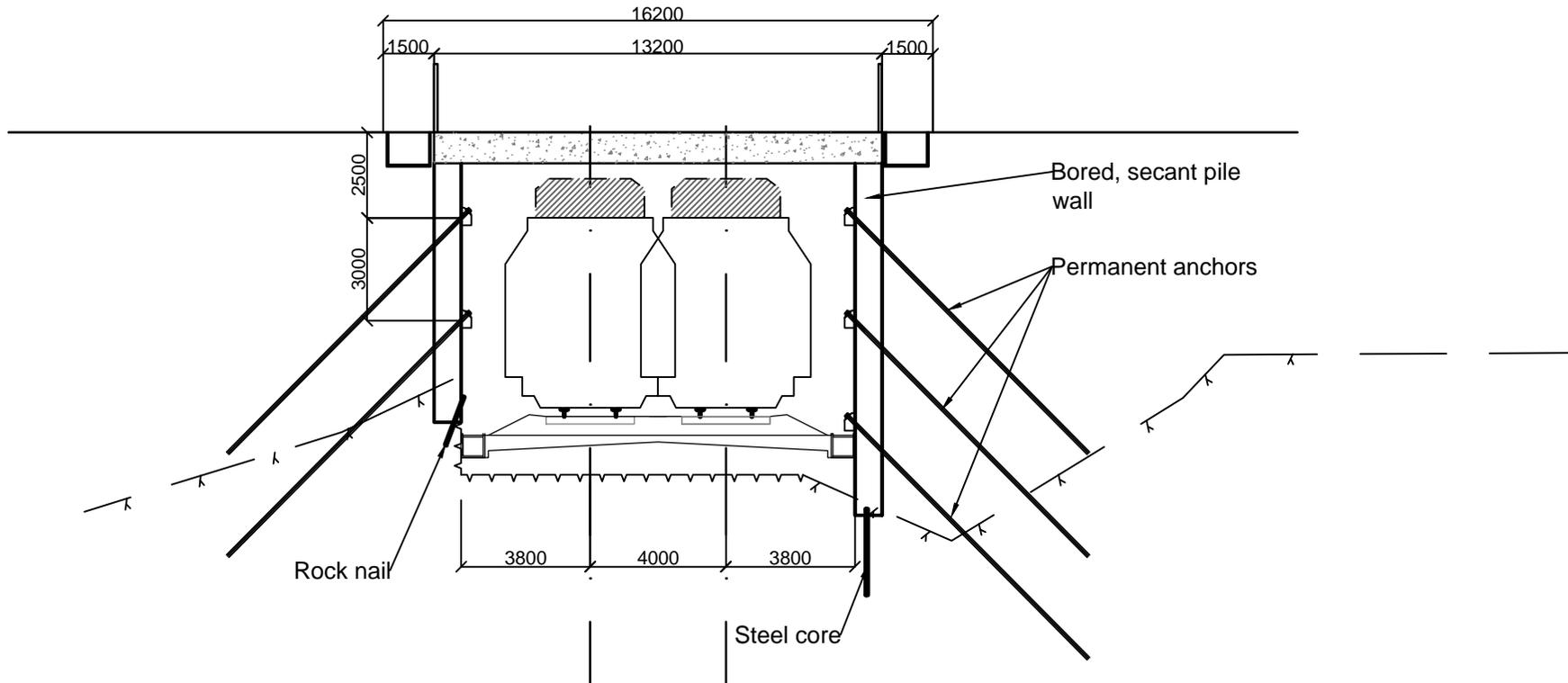
Revision	Explanation	DATE	DESIGNER	DATE	ACCEPTOR	
 MINISTERIO DE TRANSPORTE Y OBRAS PÚBLICAS		SUPPLIER 		Railway project, Pre-engineering, phase 2 Typical cross section of railway trench Bored pile wall / secant pile wall		
		DESIGNER RSi	DRAWER RSi	DATE 23.10.2017	Elevation reference system	Coordinate system
		SUPERVISOR HAK	ACCEPTOR	SCALE 1:200	DRAWING NO.	002 / 005

Bored pile wall / secant pile wall

When sub soil layers are clay or sand, bedrock is high, ground water level deep
 left side rock nail, right side core pile: the bedrock connection depends on
 the excavation depth

Dimensions shall be updated in detailed design

The presented base structure for soil is category A, which includes 550 mm ballast and 200 mm intermediate layer. This is used, when the subsoil is rock or subsoil >80 MPa.



Version 15.12.2017

Revision	Explanation	DATE	DESIGNER	DATE	ACCEPTOR	
 MINISTERIO DE TRANSPORTE Y OBRAS PÚBLICAS		SUPPLIER 		Railway project, Pre-engineering, phase 2 Typical cross section of railway trench Bored pile wall / secant pile wall Natural soil clay or sand, bedrock in high level		
		DESIGNER RSi	DRAWER RSi	DATE 23.10.2017	Elevation reference system -	Coordinate system -
		SUPERVISOR HAK	ACCEPTOR	SCALE 1:200	DRAWING NO. 003 / 005	

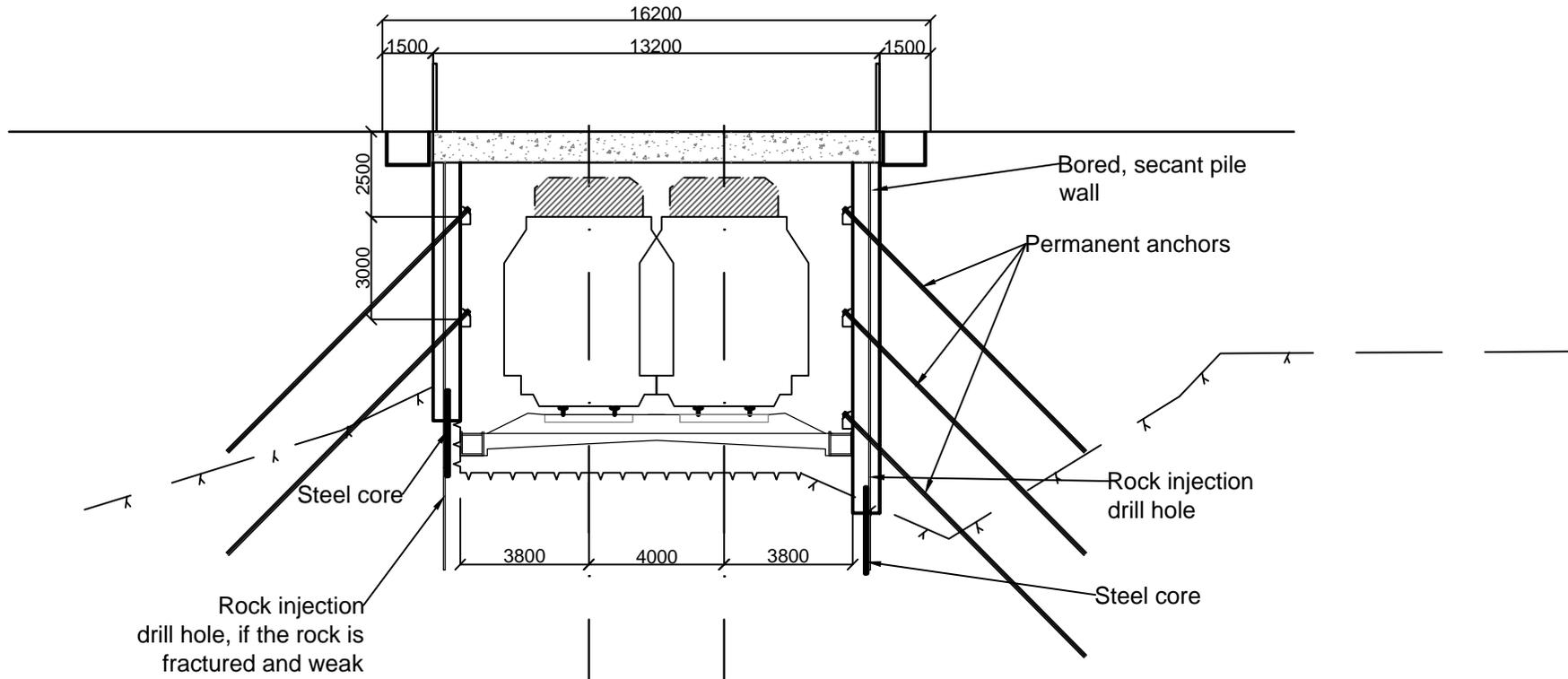
Bored pile wall / secant pile wall

When sub soil layers are clay or sand, bedrock is high, ground water level high
bedrock connection with steel core.

Rock injection through piles. Injection holes must reach at least 3 m below
the excavation level

Dimensions shall be updated in detailed design

The presented base structure for soil is category A,
which includes 550 mm ballast and 200 mm
intermediate layer. This is used, when the subsoil is
rock or subsoil >80 MPa.

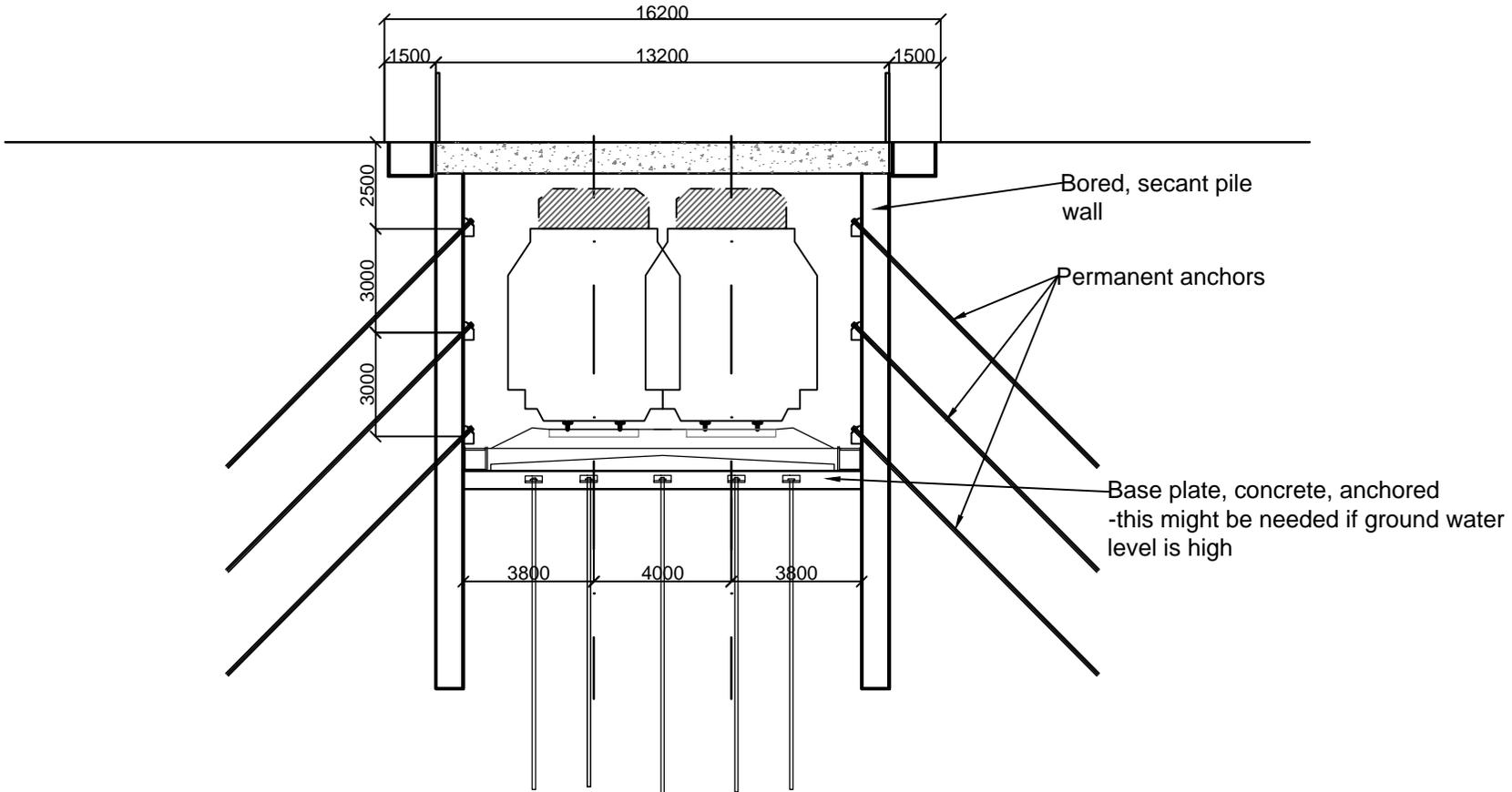


Version 15.12.2017

Revision	Explanation	DATE	DESIGNER	DATE	ACCEPTOR
 MINISTERIO DE TRANSPORTE Y OBRAS PÚBLICAS		SUPPLIER 		Railway project, Pre-engineering, phase 2 Typical cross section of railway trench Bored pile wall / secant pile wall (steel core connection) Natural soil clay or sand, bedrock in high level	
DESIGNER RSi	DRAWER RSi	DATE 23.10.2017	Elevation reference system	Coordinate system	
SUPERVISOR HAK	ACCEPTOR	SCALE 1:200	DRAWING NO.	004 / 005	

Bored pile wall / secant pile wall
 When sub soil layers are clay or sand, bedrock is in deep,
 ground water level is high
 Dimensions shall be updated in detailed design

The presented base structure for soil is category A,
 which includes 550 mm ballast and 200 mm
 intermediate layer. This is used, when the subsoil is
 rock or concrete base plate is below the stucture.



Version 15.12.2017

Revision	Explanation	DATE	DESIGNER	DATE	ACCEPTOR	
 MINISTERIO DE TRANSPORTE Y OBRAS PÚBLICAS		SUPPLIER 		Railway project, Pre-engineering, phase 2 Typical cross section of railway trench Bored pile wall / secant pile wall Natural soil clay or sand, bedrock in deep		
		DESIGNER RSi	DRAWER RSi	DATE 23.10.2017	Elevation reference system -	Coordinate system -
		SUPERVISOR HAk	ACCEPTOR	SCALE 1:200	DRAWING NO. 005 / 005	